



Findings among Indigenous participants of the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019

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Abstract

Background: The Tracks survey of people who inject drugs (PWID) collected data in 14 sentinel sites across Canada (2017–2019). These findings describe the prevalence of human immunodeficiency virus (HIV), hepatitis C and associated risk behaviours among Indigenous participants.

Methods: Information regarding socio-demographics, social determinants of health, use of prevention services and testing, drug use, risk behaviours, and HIV and hepatitis C testing, care and treatment was collected through interviewer-administered questionnaires. Biological samples were tested for HIV, hepatitis C antibodies and hepatitis C ribonucleic acid (RNA). Descriptive statistics were calculated and reviewed by an Indigenous-led advisory group using the Two-Eyed Seeing approach.

Results: Of the 2,383 participants, 997 were Indigenous (82.9% First Nations, 14.9% Métis, 2.2% Inuit). Over half (54.5%) were cisgender male and the average age was 38.9 years. A large proportion (84.0%) reported their mental health as “fair to excellent”. High proportions experienced stigma and discrimination (90.2%) and physical, sexual and/or emotional abuse in childhood (87.5%) or with a sexual partner (78.6%). Use of a needle/syringe distribution program (90.5%) and testing for HIV (87.9%) and hepatitis C (87.8%) were high. Prevalence of HIV was 15.4% (78.2% were aware of infection status) and 36.4% were hepatitis C RNA-positive (49.4% were aware of infection status).

Conclusion: High rates of HIV and hepatitis C were identified. Challenges in access to and maintenance of HIV and hepatitis C care and treatment were noted. This information informs harm reduction strategies, including the need to scale-up awareness of prophylaxis in a culturally relevant manner.

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Introduction

In Canada, Indigenous peoples represent 4.9% of the total Canadian population (1); however, they are disproportionately affected by human immunodeficiency virus (HIV) and hepatitis C infections. In 2016, it was estimated that 11.3% of new HIV infections in Canada were among Indigenous peoples (2) and newly diagnosed hepatitis C infections among First Nations

people living on reserve were three-fold higher compared with new diagnoses in the overall Canadian population (3). National case-based HIV surveillance for 2017 found that 68.1% of cases attributed to people who inject drugs (PWID) reported Indigenous ethnicity, among the 49.3% of reported HIV cases with available ethnicity data (4).



The Public Health Agency of Canada (PHAC), in collaboration with provincial, territorial and local public health partners, monitors trends in the prevalence of HIV and hepatitis C and associated risk factors in key populations, such as PWID, through the Tracks Surveillance Systems. The Tracks survey of PWID (formerly I-Track) involves repeated cross-sectional surveys at selected sites across Canada. This national integrated bio-behavioural surveillance system was first implemented in 2003–2005 (Phase 1) in seven sentinel sites. This was followed by three subsequent data collection periods, including the most recent survey, Phase 4 (2017–2019), in 14 sentinel sites.

Information about risk practices and health-seeking behaviours among the populations most at risk for HIV, including Indigenous PWID, is necessary to better understand the factors driving transmission (5). The objective of this report is to present national surveillance findings among Indigenous participants from Phase 4 of the Tracks survey of PWID in Canada, conducted between January 1, 2017 and May 9, 2019, at participating sentinel sites in Canada. Findings include socio-demographic characteristics, social determinants of health, use of sexually transmitted and blood-borne infection (STBBI) prevention services and testing, drug use and experiences with overdoses, sexual risk behaviours, the HIV and hepatitis C care cascade, and prevalence and awareness of infection status.

Methods

Data source and sampling methods

The data presented in this report are from Phase 4 of the Tracks survey of PWID in Canada. The Tracks survey of PWID makes use of venue-based sampling, in which participants are recruited from settings in which they are likely to gather, most often, but not limited to, where STBBI-related prevention, testing and treatment services are provided including needle and syringe distribution programs. Individuals who had injected drugs six months prior to recruitment and who met the minimum age to provide consent, which was determined at each site according to local research ethics requirements, were eligible to participate in the survey. Eligible and consenting participants completed an interviewer-administered questionnaire and provided a biological sample in the form of a dried blood spot specimen (or oral fluid exudate in the Surveillance des maladies infectieuses chez les utilisateurs de drogues par injection (SurvUDI) network sites).

The surveillance protocol and questionnaire were approved by the Health Canada/PHAC Research Ethics Board, and by local research ethics boards at each sentinel site where required. The same sampling and recruitment strategies and core questionnaire, with minor revisions to question wording, were used across all four phases to ensure comparability over time. Survey methods, sentinel site selection, questionnaire details and laboratory testing algorithms are described elsewhere (6).

Interviewer-administered questionnaire and biological sample

The Tracks PWID questionnaire collects information about socio-demographic characteristics, social determinants of health, use of health and prevention services (including testing), drug use and injecting behaviours, sexual behaviours and care and treatment for HIV and hepatitis C. The questionnaire is interviewer-administered and takes approximately 30 minutes to complete.

Dried blood spot samples were tested for HIV (antibody and antigen) and hepatitis C (antibody and ribonucleic acid; RNA). Participants were not informed of their laboratory test results because no identifying information was collected to ensure participant anonymity. Sentinel sites were asked to provide on-site testing (e.g. point of care testing, full phlebotomy) during recruitment times so that participants who were not aware of their status could get tested, should they wish. Where on-site testing was not feasible, participants were referred to local testing sites and/or health care services.

Analysis

A partnership between the Canadian Aboriginal AIDS Network (CAAN), PHAC and an advisory group comprised of a representative from Pauktuutit Inuit Women of Canada, and people with lived and/or living experience of injection drug use, HIV and/or hepatitis C was formed. Using the Two-Eyed Seeing approach, where both Indigenous and Western worldviews were respected, the advisory group met regularly over a six-month period to review and interpret the survey findings. In addition to writing this article, the advisory group identified key findings and themes that resonated with community priorities for action and prepared complementary culturally relevant infographics targeted for community use. These infographics focused on indicators related to access to harm reduction and health care services including HIV and hepatitis C care and treatment and preexposure prophylaxis (PrEP) and will be released by CAAN at later date.

Descriptive statistics for selected indicators were computed with SAS Enterprise Guide 7.1. Small cell counts were assessed to determine the risk of identifying individual participants and were presented where there was no risk of reidentification, as per PHAC's *Directive for the collection, use and dissemination of information relating to public health (unpublished document, PHAC, 2013)*. Participants who responded as "not stated", "don't know" or "refused" were excluded from the denominator of each indicator analysis.

Results

A total of 2,383 individuals were eligible and consented to participate in the Phase 4 survey in 14 sentinel sites: Whitehorse Yukon, Central and Northern Vancouver Island British Columbia,

Prince Albert Saskatchewan (SK), Regina SK, Winnipeg Manitoba, Thunder Bay Ontario (ON), London ON, Hamilton ON, New Brunswick, Newfoundland and four geographical zones in the SurVUDI network (Ottawa, ON and the region of Outaouais, Québec [QC]; Montréal, QC; Québec, QC; and other urban sites in the province of Québec [Abitibi-Témiscamingue, Montérégie, Saguenay-Lac Saint-Jean, Eastern Townships, Mauricie and Central-Québec]).

Among the 2,360 participants who responded to the question “Are you an Indigenous person, that is First Nations, Métis or Inuk?”, 997 (42.2%) identified as Indigenous. The proportion of Indigenous participants within each sentinel site ranged from fewer than 10% in three SurVUDI sites (Montréal, QC, Québec, QC, other urban sites in Québec) to nearly 80% in Whitehorse, over 80% in Winnipeg and Regina and 95% in Prince Albert (Table 1). All 997 Indigenous participants completed a questionnaire and 884 (88.7%) provided a biological sample.

Table 1: Proportion of Indigenous participants and participants of other ethnicities by sentinel site in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=2,383)

Sentinel site	Indigenous participants		Participants of other ethnicities		Total
	n	%	n	%	
Whitehorse, YK	39	79.6	10	20.4	49
Central and Northern Vancouver Island, BC	67	37.6	111	62.4	178
Prince Albert, SK	170	95.0	9	5.0	179
Regina, SK	174	84.9	31	15.1	205
Winnipeg, MN	149	83.2	30	16.8	179
Thunder Bay, ON	137	68.8	62	31.2	199
London, ON	60	29.3	145	70.7	205
Hamilton, ON	38	25.2	113	74.8	151
Ottawa, ON and the region of Outaouais, QC	49	24.6	150	75.4	199
Montréal, QC	16	8.0	184	92.0	200
Québec, QC	11	8.9	113	91.1	124
Other urban sites in Québec ^a	14	8.4	152	91.6	166
New Brunswick	29	14.6	170	85.4	199
Newfoundland	44	34.6	83	65.4	127
Total	997	42.2	1,363	57.8	2,360

Abbreviations: BC, British Columbia; MN, Manitoba; ON, Ontario; QC, Québec; SK, Saskatchewan; YK, Yukon

^a Other urban sites in the province of Québec included Abitibi-Témiscamingue, Montérégie, Saguenay-Lac Saint-Jean, Eastern Townships and Mauricie-Central Québec

Socio-demographic characteristics

Among Phase 4 Indigenous participants, 82.9% identified as First Nations, 14.9% as Métis and 2.2% as Inuit. A small proportion (13.8%) reported living in a First Nations, Métis or Inuit community at the time of the interview (Table 2). Four sentinel sites—three in the prairies and one in western Ontario—

comprised over 60% of all Indigenous participants, while the proportion of Indigenous participants in the other sentinel sites was between 1% and 7%.

Table 2: Socio-demographic characteristics of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Socio-demographic characteristics ^a		n	%
Indigenous subgroup	First Nations	787	82.9
	Métis	141	14.9
	Inuit	21	2.2
Living in a First Nations, Métis or Inuit community ^b		128	13.8
Age group	Younger than 25 years	80	8.0
	25 to 39 years	463	46.5
	40 to 54 years	364	36.6
	55 years or older	89	8.9
Gender identity ^c	Cisgender male	542	54.5
	Cisgender female	426	42.9
	Transfeminine ^d	14	1.4
	Transmasculine ^e	12	1.2
Sexual orientation	Heterosexual or straight	850	85.7
	Bisexual	91	9.2
	Gay or lesbian	26	2.6
	Two-spirit	17	1.7
	Other ^f	8	0.8
Sentinel site	Regina, SK	174	17.5
	Prince Albert, SK	170	17.1
	Winnipeg, MN	149	14.9
	Thunder Bay, ON	137	13.7
	Central and Northern Vancouver Island, BC	67	6.7
	London, ON	60	6.0
	Ottawa, ON and the region of Outaouais, QC	49	4.9
	Newfoundland	44	4.4
	Whitehorse, YK	39	3.9
	Hamilton, ON	38	3.8
	New Brunswick	29	2.9
	Montréal, QC	16	1.6
	Other urban sites in the province of Québec ^g	14	1.4
	Québec, QC	11	1.1

Abbreviations: BC, British Columbia; MN, Manitoba; ON, Ontario; QC, Québec; SK, Saskatchewan; YK, Yukon

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 1% to 5% of the socio-demographic characteristics

^b This question was not asked at the London site

^c The Multidimensional Sex/Gender Measure was used to measure gender identity (7)

^d Transfeminine included both those assigned male at birth who identified with either female or a non-binary gender

^e Transmasculine included both those assigned female at birth who identified with male or a non-binary gender

^f Other included pansexual, exploring and other unclassifiable responses

^g Other urban sites in the province of Québec included: Abitibi-Témiscamingue, Montérégie, Saguenay-Lac Saint-Jean, Eastern Townships and Mauricie-Central Québec



The average age was 38.9 years. The largest proportion of participants were between the ages of 25 to 39 years (46.5%), with a lower proportion between the ages of 40 to 54 years (36.6%), and smaller proportions of participants younger than 25 years (8.0%) or 55 years or older (8.9%).

Just over half (54.5%) identified their gender as cisgender male, 42.9% identified as cisgender female, 1.4% as transfeminine (i.e. those assigned male at birth who identified with either female or a non-binary gender) and 1.2% as transmasculine (i.e. those assigned female at birth who identified with either male or a non-binary gender). A large proportion reported their sexual orientation as heterosexual or straight (85.7%) and smaller proportions identified as bisexual (9.2%), gay or lesbian (2.6%), Two-spirit (1.7%) or other (0.8%).

Social determinants of health

Among the Phase 4 Indigenous participants, over half (57.9%) completed some high school or less, 26.4% completed high school and 15.8% completed more than high school (Table 3). Within the six months prior to the interview, participants most commonly reported being unemployed (70.3%) and/or on social assistance (66.7%) and/or on disability assistance (33.6%). A large proportion (83.7%) experienced financial strain (i.e. difficulty making ends meet) in the 12 months prior to the interview.

Table 3: Social determinants of health of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Social determinants of health ^a		n	%
Education, highest level	Completed some high school or less	575	57.9
	Completed high school	262	26.4
	Completed more than high school	157	15.8
Experienced financial strain ^{b,c} , past 12 months		707	83.7
Housing status ^d , past six months	Unstable housing	659	66.2
	Stable housing	336	33.8
	Ever incarcerated ^e	691	75.2
	Incarcerated, past 12 months ^c	224	26.1
Mental health ^f	Fair to excellent	756	84.0
	Poor	144	16.0
Other social determinants of health	Experience of stigma and discrimination ^{c,g} , ever	753	90.2
	Experience of stigma and discrimination ^{c,g} , past 12 months	704	84.6
	Experience of childhood physical, sexual, and/or emotional abuse ^c	729	87.5
	Experience of sexual partner physical, sexual, and/or emotional abuse ^c	654	78.6

Table 3: Social determinants of health of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997) (continued)

Social determinants of health ^a		n	%
Other social determinants of health (continued)	Placed in a residential school ^c	197	23.7
	Family member placed in a residential school ^c	687	89.8

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 1% to 10% of the social determinants of health indicators

^b Defined as ever having difficulty making ends meet in the year prior to the interview

^c This question not asked at the SurvUDI network and London sites

^d Unstable housing included living in a hotel or motel room, rooming or boarding house, shelter or hostel, transition or halfway house, psychiatric institution or drug treatment facility, public place or correctional facility. Stable housing included living in an apartment or house or a relative's apartment or house

^e Only partial data available at the SurvUDI network sites

^f This question was not asked at the SurvUDI network sites

^g Defined as ever experienced any stigma or discrimination (e.g. avoidance, pity, blame, shame, rejection, verbal abuse, or bullying) based on racial or cultural background, hepatitis C status, HIV status, sexual orientation, use of drugs or alcohol or sex work

Two-thirds (66.2%) of participants reported living in unstable housing in the six months prior to the interview. This included living in a hotel or motel room, rooming or boarding house, shelter or hostel, transition or halfway house, psychiatric institution or drug treatment facility, public place or correctional facility. Overall, 75.2% had ever been incarcerated and 26.1% had been incarcerated in the 12 months prior to the interview.

Most participants (84.0%) reported their mental health as "fair to excellent" with a smaller proportion (16.0%) reporting poor mental health status. Among Indigenous participants, 23.7% had been placed in a residential school and 89.8% had a family member who had been placed in a residential school.

The majority of participants experienced stigma and discrimination (related to racial or cultural background, hepatitis C status, HIV status, sexual orientation, use of drugs or alcohol or sex work) in their lifetime (90.2%) and in the 12 months prior to the interview (84.6%). Large proportions of participants had also experienced physical, sexual and/or emotional abuse in childhood (87.5%) or with a sexual partner (78.6%).

Access to primary health care and use of prevention services and testing

Participants were asked questions about access to primary health care and use of harm reduction and STBBI prevention services, as well as testing patterns for HIV and hepatitis C (Table 4). Overall, nearly three-quarters (72.2%) of participants had access to primary health care and a slightly smaller proportion (63.9%) had a regular primary healthcare provider. In the 12 months prior to the interview, one-quarter of participants (25.1%) used health services that included Indigenous health or healing practices such as a Traditional Healer, a Community Elder, the Hope for Wellness Help Line (8) or other Indigenous-specific health services. Mental health counselling services were used by 28.5% of participants in the 12 months prior to the interview.



Table 4: Access and use of health care, prevention services and testing for HIV and hepatitis C of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Access and use of health care services ^a	n	%
Access to primary health care ^b	594	72.2
Access to a primary healthcare provider ^b	528	63.9
Use of services that included Indigenous health or healing practices, past 12 months ^{b,c}	206	25.1
Use of mental health counselling services, past 12 months ^d	252	28.5
Use of prevention services and testing		
Use of a needle and syringe distribution program, past 12 months ^d	800	90.5
Tested for HIV, ever	841	87.9
Tested for HCV, ever	833	87.8
Received STBBI prevention counselling, past 12 months ^b	429	54.2
Use of a condom distribution program, past 12 months ^b	402	48.9
Use of methadone, suboxone or other opioid substitution therapy, past 12 months ^d	385	43.6
Use of treatment services for drug or alcohol use, past 12 months ^{b,e}	224	27.2
Use of a supervised injection or consumption site, past 12 months ^d	88	9.9
Awareness of PrEP and nPEP		
Awareness of oral HIV PrEP ^d	98	11.5
Awareness of nPEP for HIV ^d	88	10.8

Abbreviations: HCV, hepatitis C virus; HIV, human immunodeficiency virus; nPEP, non-occupational postexposure prophylaxis; PrEP, preexposure prophylaxis

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 2% to 10% of these indicators

^b This question was not asked at the SurvUDI network and London sites

^c Indigenous health or healing practices included a Traditional Healer, a Community Elder, the Hope for Wellness Help line or other Indigenous-specific services

^d This question was not asked at the SurvUDI network sites

^e Included services such as live-in treatment, group counselling or a Traditional Healer

Use of harm reduction and STBBI prevention services in the 12 months prior to interview varied depending on the service in question (Table 4). The majority of participants (90.5%) reported using a needle and syringe distribution program with a small proportion (9.9%) using a supervised injection or consumption site. Less than half of participants (43.6%) used methadone, suboxone or other opioid substitution therapy and just over one-quarter of participants (27.2%) used treatment services for drug or alcohol use in the 12 months prior to the interview. In the same period, 48.9% reported using a condom distribution program and 54.2% received STBBI prevention counselling. A large proportion of participants reported having ever tested for HIV (87.9%) and hepatitis C (87.8%) (Table 4).

Only a small proportion of participants were aware of oral HIV PrEP (11.5%) and non-occupational postexposure prophylaxis (nPEP) for HIV (10.8%) (Table 4). In the 12 months prior the interview, 45.7% of participants avoided healthcare services and among those who had never been tested for HIV and those who self-reported being HIV-negative, 23.1% avoided getting tested for HIV because of stigma and discrimination (defined as fear of or concern about or experienced stigma or discrimination by

staff or neighbours, fear of or concern someone may learn they inject drugs, fear of or concern about or experienced violence, fear of or concern about or experienced police harassment or arrest).

Injecting behaviours

The average age participants reported first injecting drugs was 24.5 years. Less than half of all participants (40.5%) reported injecting daily in the month prior to the interview and just over half (53.5%) reported injecting in a public space in the six months prior to the interview. Overall, 93.1% of participants used a sterile needle and syringe at last injection. In the six months prior to the interview, 10.0% of participants had injected with used needles and/or syringes, of whom the majority (85.0%) borrowed needles and/or syringes from people who they knew well (e.g. family, friends or sex partners). Just under one-half (45.7%) injected with used injection equipment other than needles and/or syringes, such as water, filters, cookers, tourniquets, swabs or acidifiers in the six months prior to the interview. Among those who borrowed used injection equipment (other than needles and/or syringes), the majority (85.9%) reported borrowing from people they knew well (family, friends or sex partners). More than half of participants (58.3%) borrowed used non-injection drug paraphernalia such as straws, dollar bills or pipes in the six months prior to the interview (Table 5).

Table 5: Injecting behaviours of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Injecting behaviours ^a	n	%
Injected daily in the past month ^b	375	40.5
Injected drugs in a public space, past six months	526	53.5
Borrowed used needles and/or syringes, past six months	97	10.0
Borrowed used needles and/or syringes from people known well ^c , past six months	79	85.0
Borrowed used other injecting equipment (i.e. water, filters, cookers, tourniquets, swabs, acidifiers), past six months	444	45.7
Borrowed used other injecting equipment from people known well ^c , past six months	370	85.9
Borrowed used non-injection drug paraphernalia (i.e. straws, dollar bills and pipes), past six months ^b	522	58.3

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 1% to 5% of the injecting behaviour indicators

^b This question was not asked at the London site

^c People known well was defined as family, friends or sex partners

Drug use and overdose experiences

Among Indigenous participants, cocaine was the most commonly injected drug in the six months prior to the interview (58.2%), followed by methamphetamine (55.5%), morphine (49.7%), hydromorphone (43.8%) and heroin (30.4%) (Table 6). Approximately 20% to 30% of participants injected Ritalin alone (29.3%), fentanyl (23.4%), crack (22.9%), amphetamines (20.7%) or oxycodone (18.7%).



Table 6: Drug use and experiences with overdoses of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Drug use and experiences with overdoses ^a	n	%
Five most common injection drugs used, past six months ^b		
Cocaine	576	58.2
Methamphetamine	548	55.5
Morphine	491	49.7
Hydromorphone	433	43.8
Heroin	299	30.4
Five most common non-injection drugs used, past six months ^b		
Cannabis	708	71.9
Alcohol	652	66.2
Methamphetamine	503	51.3
Cocaine	490	49.9
Crack	479	48.8
Awareness, access and use of an overdose kit		
Heard of overdose kits ^c	693	83.3
Ever used an overdose kit ^{c,d}	178	25.7
Overdose kits are available in participants' community ^{d,e}		
No	28	4.0
Yes	631	91.1
Don't know	34	4.9
Overdose experiences		
Overdosed in the past six months ^{d,f}	185	20.9
Five most common drugs or substances used at last overdose ^{b,c,f}		
Fentanyl	67	42.7
Heroin	67	41.6
Methamphetamine	50	30.7
Alcohol	33	21.5
Cocaine	33	20.3

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 1% to 2% for these indicators except for drugs used at last overdose where information was missing or not collected for 10% to 15% of these indicators

^b Participants recorded all drugs (that they had injected, consumed or used at last overdose) for non-medical purposes in the six months prior to interview. The most commonly reported drugs among all participants are presented. Responses are non-mutually exclusive

^c This question was not asked at the SurvUDI network and London sites

^d Among participants who had heard of overdose kits

^e This question was not asked at the SurvUDI network sites

^f Among participants who overdosed in the past six months and who provided a response

A wide range of non-injection drugs were used in the six months prior to the interview, most frequently cannabis (71.9%), alcohol (66.2%), methamphetamine (51.3%), cocaine (49.9%) and crack (48.8%). Opioid analgesic consumption (non-injection routes) was also reported specifically for codeine (34.7%), methadone (31.0%), morphine (30.9%) and hydromorphone (27.3%) (Table 6).

Most participants (83.3%) had heard of overdose kits, of whom the majority (91.1%) reported that overdose kits were available in their community. Among participants who had heard of overdose kits, one-third (33.8%) of Indigenous participants carried an overdose kit and one-quarter (25.7%) had ever used one on someone else. In the six months prior to the interview, 20.9%

of participants had overdosed and the drugs most commonly reported at last overdose were fentanyl (42.7%), heroin (41.6%), and methamphetamine (30.7%) (Table 6).

Sexual risk behaviours

Among participants who had ever had sex, 35.4% had two or more sexual partners in the six months prior to the interview (Table 7). Among participants who had a regular sex partner, inconsistent condom use was reported by 85.6% during vaginal and/or anal sex. Among participants who had a casual sex partner, inconsistent condom use was reported by 57.6% during vaginal and/or anal sex. A small proportion (16.0%) had engaged in transactional sex at least once, among whom, 26.3% had condomless sex at last transactional sex (Table 7). Most participants (81.6%) reported substance use before or during sex (Table 7).

Table 7: Sexual behaviours of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

Sexual risk behaviours ^a	n	%
Two or more sex partners, past six months ^b	330	35.4
Inconsistent condom use during vaginal and/or anal sex with a regular sex partner, past six months ^c	540	85.6
Inconsistent condom use during vaginal and/or anal sex with a casual sex partner, past six months ^c	167	57.6
Engaged in transactional sex, past six months	127	16.0
Condomless sex at last transactional sex ^d	31	26.3
Substance use before or during sex, past six months ^d	586	81.6

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for 2% to 14% of the sexual risk behaviour indicators

^b Among participants who had ever had sex

^c Inconsistent condom use defined as not always using a condom (i.e. never, sometimes or frequently). This question was not asked at the London site

^d This question was not asked at the SurvUDI network sites

HIV and hepatitis C prevalence and awareness

Among Indigenous participants who provided a biological sample of sufficient quantity for testing (n=879), 15.4% tested positive for HIV, among whom 78.2% were aware of their HIV-positive status (Table 8). Lifetime exposure to hepatitis C infection (i.e. the proportion of hepatitis C seropositive respondents) was 65.8% (among n=863 samples of sufficient quantity for testing). Over one-third (36.4%) were hepatitis C RNA-positive (among n=696 samples of sufficient quantity for testing)—an indicator of current hepatitis C infection—of whom, 49.4% were aware of their hepatitis C RNA-positive status. Among participants who provided a biological sample of sufficient quantity for testing for both HIV antibodies and hepatitis C virus (HCV) RNA, 6.0% were HIV-positive and hepatitis C RNA positive.

HIV and hepatitis C care cascade

HIV care cascade indicators were measured among Indigenous participants aware of their HIV-positive status (Table 8). The majority (96.2%) were under the care of a doctor or healthcare



Table 8: HIV and hepatitis C prevalence, awareness of infection status, and care cascade of Indigenous participants in the Tracks survey of people who inject drugs in Canada, Phase 4, 2017–2019 (n=997)

HIV and hepatitis C prevalence ^a	n	%
HIV prevalence and awareness of infection status		
HIV prevalence ^{b,c}	135	15.4
Awareness of HIV-positive status ^d	104	78.2
HIV care cascade (among participants aware of their HIV-positive status, n=104)		
Linked to care for HIV-related services ^e	100	96.2
Currently taking ART treatment	87	83.7
Adherence to ART, no missed doses in last month ^f	30	43.5
Self-reported undetectable HIV viral load ^g	47	64.4
HIV care cascade (among participants aware of their HIV-positive status, n=104) (continued)		
Avoidance of HIV services because of stigma and discrimination, past 12 months ^f	21	25.3
Avoidance of HIV treatment because of stigma and discrimination, past 12 months ^f	18	21.7
Hepatitis C prevalence and awareness of infection status		
HCV antibody prevalence ^{c,h}	568	65.8
HCV RNA prevalence ^{c,i}	253	36.4
Awareness of hepatitis C RNA-positive status ^j	122	49.4
Hepatitis C care cascade (among participants aware of their hepatitis C RNA-positive status, n=122)		
Linked to care for hepatitis C ^k	66	54.1
Ever taken hepatitis C treatment ^l	17	14.1
Currently taking hepatitis C treatment ^l	7	5.8
HIV and hepatitis C co-infection ^m		
HIV-positive and hepatitis C RNA positive	42	6.0

Abbreviations: ART, anti-retroviral therapy; HCV, hepatitis C virus; HIV, human immunodeficiency virus; RNA, ribonucleic acid

^a Proportion of participants who responded to each individual question varied. Information was missing or not collected for less than 1% of these indicators except for adherence to ART (20%) and self-reported undetectable HIV viral load (26%)

^b Among participants who provided a biological sample of sufficient quantity for HIV testing (n=879)

^c HIV and hepatitis C testing algorithms are provided in **Appendix 1**

^d Among participants who tested positive for HIV antibodies and who reported their HIV diagnosis. Participants who reported that their last HIV test result was positive and who were found to be HIV positive based on testing of the biological specimen provided at the time of interview were classified as being aware of their HIV-positive status

^e Defined as under the care of a doctor or health care provider for HIV-related services at the time of the interview (in the six months prior to the interview in the SurvUDI network and London sites)

^f This question was not asked at the SurvUDI network and London sites. The denominator also excludes participants with missing data

^g Among participants currently on ART at the time of the interview. This question was not asked at the SurvUDI network sites. The denominator also excludes participants with missing data

^h Among participants who provided a biological sample of sufficient quantity for HCV antibody testing (n=863)

ⁱ Among participants who provided a biological sample of sufficient quantity for HCV antibody and RNA testing (n=696). HCV RNA testing was not conducted at the SurvUDI network sites

^j Among participants who tested HCV RNA positive and who reported their current hepatitis C status. Participants who reported being currently infected with hepatitis C and who were hepatitis C RNA positive based on testing of the biological specimen provided at the time of interview were classified as being aware of their hepatitis C RNA-positive status

^k Defined as under the care of a health care provider for hepatitis C-related services at the time of the interview. The denominator excludes participants with missing data

^l Denominator excludes participants with missing data

^m Among participants who provided a biological sample of sufficient quantity for testing for both HIV antibodies and HCV RNA testing. The HCV RNA testing was not conducted at the SurvUDI network sites

provider for HIV-related services at the time of the interview. A large proportion (83.7%) were currently taking antiretroviral therapy (ART) at the time of the interview. Adherence to ART, measured as no missed doses in the month prior to the interview, was 43.5%. Among participants currently taking ART at the time of the interview, 64.4% reported an undetectable HIV viral load. Approximately one-quarter of participants who were aware of their HIV-positive status reported avoiding HIV services (25.3%) or HIV treatment (21.7%) because of stigma and discrimination in the 12 months prior to the interview.

Hepatitis C care cascade indicators were measured among Indigenous participants who were aware of their current hepatitis C infection (Table 8). More than half (54.1%) reported being linked to care for hepatitis C; a smaller proportion (14.1%) had ever taken hepatitis C treatment; and an even smaller proportion (5.8%) were currently taking hepatitis C treatment. Common barriers for not taking hepatitis C treatment included because participants were drinking or using drugs (29.7%), they only recently started to get hepatitis C medical care (23.0%) or their doctor advised them to delay treatment (19.0%).

Discussion

The establishment of an Indigenous-led advisory group was fundamentally important and necessary in the analysis and interpretation of the surveillance findings focusing on Indigenous participants. The team composition and use of the Two-Eyed Seeing approach respected both Indigenous and Western world views while fostering meaningful engagement from diverse stakeholders, including Indigenous people with lived and/or living experience of injection drug use. The collaborative nature of the advisory group is a step towards reconciliation.

A large proportion of Indigenous participants (84.0%) reported fair to excellent mental health—a finding that stands out compared with proportions reported for other survey indicators associated with poor mental health: childhood and sexual partner abuse (87.5% and 78.6%, respectively); family member placed in a residential school (89.8%); incarceration (75.2%); unstable housing (66.2%); and ever experienced stigma and discrimination (90.2%). High levels of reported mental health wellness may be a reflection of the resiliency of Indigenous peoples within the individual and collective experience of trauma.

Regarding prevention indicators, high rates of lifetime testing for HIV and hepatitis C were noted (87.9% and 87.8%, respectively) and the majority of participants (90.5%) had used the services of a needle and syringe distribution program and reported safe injecting practices (93.1% reported using a clean needle and syringe at last injection). Use of other harm reduction services was notably lower: opioid-substitution therapy (43.6%); drug treatment services (27.2%); condom distribution program (48.9%); or receipt of STBBI counselling (54.2%). While the use



of a supervised injection or consumption site in the 12 months prior to the interview was low (9.9%), it should be noted that this service is not available uniformly across Canada. Awareness of PrEP and nPEP was low (11.5% and 10.8%, respectively). Most participants had heard of naloxone kits (83.3%). The lower reported proportions that reported carrying an overdose kit (33.8%) speaks to the ongoing need for scaling up naloxone kit distribution.

Among Indigenous participants of the Tracks survey of PWID, HIV seroprevalence (15.4%), lifetime exposure to hepatitis C (65.8%) and current hepatitis C infection (36.4%) were high. These findings corroborate results from other regional studies that underscore how injection drug use and HIV and hepatitis C disproportionately impact Indigenous peoples and communities across Canada (9–12). The HIV 90-90-90 target indicators measured among Indigenous PWID in this survey (78.2% aware of their HIV-positive status, 83.7% currently taking ART, 64.4% reporting undetectable viral load) are encouraging however these findings signal that better access to HIV care and treatment need to be addressed. Further, hepatitis C care and treatment indicators (i.e. 54.1% linked to care, 5.8% currently on treatment) were substantially lower than those for HIV indicating important gaps in testing, care and treatment of hepatitis C in this key population.

Moving forward

Indigenous peoples and communities are resourceful and resilient. Connection to culture, land, and ceremony has helped Indigenous peoples to understand health and respond individually and collectively to historical and ongoing trauma such as colonialism and residential school experiences. As Indigenous peoples and communities face ongoing health issues such as HIV and hepatitis C infections, the burden of the opioid crisis and other drug-related overdose deaths further emphasize the ongoing need for access to culturally relevant prevention and treatment services including increased distribution of naloxone overdose kits. Prevention interventions are warranted such as comprehensive STBBI sexual health education including increasing awareness and access to PrEP and nPEP among HIV-negative individuals at high risk for infection to lower their risk of becoming infected (13). Ongoing engagement in the interpretation of surveillance findings among Indigenous participants through Indigenous-specific networks, traditional healers and community-based approaches can also contribute to the resilience of Indigenous peoples and communities.

Strengths and limitations

This national integrated bio-behavioural surveillance system provides information on HIV and hepatitis C among PWID from sites across the country for use at the local, provincial and federal levels to inform and guide public health interventions in this population. The Tracks survey of PWID uses non-probability-based sampling; therefore, findings are not representative of all Indigenous PWID at any given site or in Canada. Small numbers of participants who identified as Métis and Inuit, as well as those

whose gender identity was transmasculine or transfeminine, precluded specific sub-group analyses to examine associations with other socio-demographic characteristics and indicators. With the exception of the laboratory results, these findings were based on interviewer-administered questionnaires and self-reported data and it is possible that certain risk behaviours were over- or underrepresented.

Conclusion

The shared efforts of the Indigenous-led advisory group facilitated community leadership and collaborative analysis of the Tracks survey of PWID. This collaboration resulted in the development of knowledge products that will disseminate the Indigenous-specific results contextualized to be most relevant for uptake by stakeholders in diverse settings. These surveillance findings signal the challenges in access to and maintenance of effective HIV and hepatitis C care and treatment among Indigenous PWID in Canada. This information is especially important to inform harm reduction strategies and Indigenous-specific STBBI prevention and treatment services in Canada. Further examination of the barriers and facilitators to the access and use of STBBI and harm reduction prevention and treatment services is warranted.

Authors' statement

JT — Conceptualization, formal analysis, methodology, project administration, writing (original draft and review and editing)

MS — Conceptualization, writing (original draft and review and editing)

DB — Conceptualization, writing (original draft and review and editing)

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DP — Conceptualization, funding acquisition, methodology, writing (original draft and review and editing)

RM — Conceptualization, writing (original draft and review and editing)

Competing interests

None.

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Appendix 1: Human immunodeficiency virus and hepatitis C testing algorithms

HIV testing algorithms

For non-SurvUDI sites, HIV status was initially determined by screening dried blood spot specimens using the Bio-Rad GS HIV Combo Ag/Ab assay followed by confirmatory testing using the Roche COBAS AmpliPrep/COBAS Taqman HIV-1 Quant v2.0 assay (London) or the Roche COBAS AmpliPrep/COBAS Taqman HIV-1 Qualitative Test v2.0 (New Brunswick, Newfoundland and Regina). For the remaining non-SurvUDI sites (i.e. Vancouver Island, Thunder Bay, Whitehorse, Winnipeg, Prince Albert and Hamilton), due to recurrent low volume specimens, HIV status was determined by performing screening and confirmatory testing using two separate enzyme immunoassays (EIAs). As a result, specimen volume was sufficient for HIV and hepatitis C testing in most cases. The change in algorithms is not expected to have an impact on the results. Algorithms are described in more detail below.

London: HIV screening was performed using the Bio-Rad GS HIV Combo Ag/Ab assay. A non-reactive result indicated no HIV infection. Confirmatory testing was performed on screened reactive results using the Roche COBAS AmpliPrep/COBAS Taqman HIV-1 Quant v2.0 assay. A detected result indicated a HIV infection. In instances where the Bio-Rad GS HIV Combo Ag/Ab assay was positive, and the Roche COBAS AmpliPrep/COBAS Taqman HIV-1 v2.0 assay result was not detected, a second EIA (AVIOQ HIV-1 Microelisa System) was conducted. A reactive result on both the Bio-Rad GS HIV Combo Ag/Ab assay and the AVIOQ HIV-1 Microelisa System indicated an HIV infection.

New Brunswick, Newfoundland and Regina: HIV screening was performed using the Bio-Rad GS HIV Combo Ag/Ab assay (Bio-Rad). A non-reactive result indicated no HIV infection. Confirmatory testing was performed on screened reactive results using the Roche COBAS AmpliPrep/COBAS Taqman HIV-1 Qualitative Test v2.0 (Roche). A detected result indicated an HIV infection. In instances where the Bio-Rad was reactive, and the Roche result was not detected, a second EIA, the AVIOQ HIV-1 Microelisa System (Avioq), was conducted as a tie breaker. A reactive result on both the Bio-Rad and the Avioq indicated an HIV infection. A reactive result on the Bio-Rad, not detected result on the Roche, and a non-reactive or an indeterminate (i.e. absorbance results that were near, but did not overlap, the cut-off value for a reactive/non-reactive result) result on the Avioq, was interpreted as an overall indeterminate result.

Vancouver Island, Thunder Bay, Whitehorse, Winnipeg, Prince Albert, and Hamilton: HIV screening was performed using the Bio-Rad GS HIV Combo Ag/Ab assay (Bio-Rad). A non-reactive result indicated no HIV infection. Confirmatory testing was performed on screened reactive results using a second EIA, the AVIOQ HIV-1 Microelisa System (Avioq). A reactive result indicated an HIV infection. In instances where the Bio-Rad was reactive, and the Avioq was non-reactive or indeterminate (i.e. absorbance results that were near, but did not overlap, the cut-off value for a reactive/non-reactive result), the Roche COBAS AmpliPrep/COBAS Taqman HIV-1

Qualitative Test v2.0 (Roche) was used as a tie breaker. A reactive result on the Bio-Rad and a detected result on the Roche indicated an HIV infection. A reactive result on the Bio-Rad, non-reactive or indeterminate result on the Avioq, and a not detected result on the Roche, was interpreted as an overall indeterminate result.

For SurvUDI network sites, oral fluid specimens were screened for HIV at the Laboratoire de santé publique du Québec, Institut national de santé publique du Québec, using the Bio-Rad GS HIV1/HIV2 PLUS O EIA, a diagnostic assay approved by Health Canada and validated in the SurvUDI study for use with oral fluid. Confirmatory testing was not performed for samples that tested repeatedly reactive. A positive result indicated an HIV infection.

Hepatitis C testing algorithms

For all non-SurvUDI network sites: hepatitis C screening testing was performed using the Ortho® HCV version 3.0 EIA (Ortho). A non-reactive result indicated never having been infected with hepatitis C. A reactive result indicated lifetime exposure to hepatitis C. Confirmatory testing was performed on screened reactive and indeterminate results (i.e. absorbance results that were near, but did not overlap, the cut-off value for a reactive/non-reactive result) using the Roche COBAS AmpliPrep/COBAS Taqman HCV Quantitative test v2.0 (Roche). A detected result indicated a current hepatitis C infection and a not detected result indicated a lifetime exposure to hepatitis C. For those that screened indeterminate on the Ortho, a detected result on the Roche indicated a current hepatitis C infection and a not detected result on the Roche was interpreted as an indeterminate result.

SurvUDI network sites: hepatitis C antibody testing for oral fluid specimens was performed using the Ortho® hepatitis C version 3.0 EIA at the Institut national de santé publique du Québec laboratories. Confirmatory testing was not performed for samples that tested positive. A positive result indicated past or present hepatitis C infection and did not discriminate acute from chronic or resolved infections. Validation of this test for use with oral fluid was performed in the SurvUDI study.

Sensitivity and specificity of laboratory tests

The specificity of the Bio-Rad GS HIV Combo Ag/Ab EIA, Avioq HIV-1 Microelisa System, and Roche COBAS AmpliPrep/COBAS TaqMan HIV-1 Qualitative Test v2.0 is ≥99.9% on DBS according to kit inserts or internal validation data. Similarly, the sensitivity of each assay is 100% except for the Bio-Rad GS HIV Combo Ag/Ab EIA which is 96.6%. The limit of quantification for the Roche COBAS/AmpliPrep TaqMan HIV-1 Quantitative Test v2.0 on DBS is 616 copies/mL.

The specificity and sensitivity of the ORTHO HCV v3.0 ELISA Test System is 100% according to internal validation data. The limit of quantification for the Roche COBAS AmpliPrep/COBAS TaqMan HCV Test v2.0 is 355 IU/mL.