

HIV pre-exposure prophylaxis (PrEP) use among Urban Canadian Gay, Bisexual and Other Men Who Have Sex with Men for whom PrEP is clinically recommended: Baseline Results from the Engage Cohort Study

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ABSTRACT

Background: In Canada, gay, bisexual and other men who have sex with men (GBM) are disproportionately affected by HIV. HIV pre-exposure prophylaxis (PrEP) is proven to prevent HIV among HIV-negative GBM. We report on PrEP access among GBM for whom PrEP is clinically recommended and examine correlates of not using PrEP.

Methods: From 2017 to 2019, the Engage study recruited sexually-active GBM \geq 16 years in Montréal(M), Toronto(T), and Vancouver(V) via respondent-driven sampling (RDS). Participation included HIV/STI testing and a computer-assisted self-interview. We examined PrEP access using a health services model and fit RDS-adjusted logistic regressions to determine correlates of not using PrEP among those who were PrEP-aware and clinically recommended.

Results: We recruited 2008 self-reported HIV-negative/unknown GBM; 1159 (n=511(M), n=247(T), n=401(V)) met PrEP recommendations. Of these, 1100 were PrEP-aware (RDS-adjusted %: M=85%, T=94%, V=93%), 678 felt the need for PrEP (M=39%, T=56%, V=49%), 406 tried to access it (M=21%, T=33%, V=30%) and 319 used PrEP (M=15%, T=22%, V=22%) in the past 6 months. Not using PrEP was associated with several factors, including not feeling at high enough risk, viewing PrEP as not completely effective, not having a primary care provider, and lacking medication insurance.

Conclusion: While half of GBM from Canada's three largest cities met clinical recommendations for PrEP, less than a quarter reported use. Despite high levels of awareness, a programmatic response that addresses PrEP-related perceptions and health system barriers is needed to scale up PrEP access and ultimately end the HIV epidemic among GBM in Canada.

INTRODUCTION

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2 The HIV epidemic continues to disproportionately affect gay, bisexual and other men who have sex with men
3 (GBM) in Canada. While GBM make up only 2-3% of the Canadian population, they represent almost half of all
4 prevalent and newly reported HIV cases.(1–3) Disease burden is concentrated in Canada’s three largest cities - Montréal,
5 Toronto and Vancouver, where many GBM reside.(4,5) The 2018 Pan-Canadian framework on sexually transmitted and
6 blood-borne infections (STBBIs) aims to reduce the incidence of STBBIs, such as HIV. Actions(6) including the uptake
7 of existing and emerging HIV prevention interventions, such as HIV pre-exposure prophylaxis (PrEP) are recommended.
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9 HIV-PrEP, using antiretroviral medication – tenofovir disoproxil fumarate or tenofovir alafenamide combined
10 with emtricitabine, has been shown to be effective in preventing HIV infection among HIV-negative GBM.(7–9)
11 Canadian guidelines for PrEP (10) provide clinical criteria for the use of PrEP among individuals at high-risk of HIV
12 infection, including GBM.
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14 While approved since 2016,(11) the implementation of PrEP in Canada has varied. For example, in Quebec, PrEP
15 has been available since 2013,(12–15) followed by Ontario in 2017(16) and British Columbia in 2018.(17) Prior to
16 coverage of PrEP through a diversity of provincial drug benefit programs, availability was limited to private insurance and
17 the use of ‘buyers clubs’.(18)
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19 Although PrEP is increasingly available across Canada, documenting uptake and related barriers, especially for
20 GBM who may benefit most, is important as this intervention is scaled. Optimizing uptake of PrEP may be guided by
21 considering a prevention cascade(19) or conceptual frameworks for health services access.(20,21) One such model,
22 developed by Levesque et al.(22) identifies dimensions in relation to a person’s ability to 1) perceive a need, 2) look for,
23 3) obtain, 4) pay for, and 5) adhere to a health service.
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25 Examining PrEP access and related factors could identify specific barriers, and subsequent targets for
26 intervention.(23,24) A variety of patient-, provider- and system-related factors are known to be potential barriers to PrEP
27 use.(25–27) However, because many of these studies involved clinical cohorts or were conducted before changes in
28 provincial programs, (26,28,29) understanding the current status of PrEP use among HIV-negative GBM and the barriers
29 to uptake will be key to national and provincial strategies to end the HIV epidemic.(30) Our objectives were to 1) describe
30 HIV-PrEP access and 2) identify factors associated with not using PrEP, among HIV-negative or -unknown GBM meeting
31 clinical recommendations and living in Montréal, Toronto and Vancouver.
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METHODS

Study design

We used baseline data from the Engage Cohort study (Engage). Engage is a prospective biobehavioural study examining antiretroviral-based HIV prevention and the occurrence of STBBIs among GBM. It is being conducted in Montréal, Toronto and Vancouver. Respondent-driven sampling (RDS) was used to recruit participants. RDS is an adapted form of chain referral recommended for studies of hard-to-reach populations that aims to approximate probability sampling.(31–33).

Eligible participants were 16 years of age or older, gender-identified as a man (including transmen), reported sexual activity with a man in the past 6 months (P6M), and able to read English or French. Each initial participant (seed; purposively invited), and subsequent participants were given 6 recruitment coupons to invite peers; all participants provided written informed consent. Engage was reviewed and approved by the following ethics boards: Research Institute of the McGill University Health Centre, Ryerson University, St. Michael's Hospital, University of Toronto, University of Windsor, University of British Columbia, University of Victoria and the Simon Fraser University.

Participants were recruited from February 2017 to June 2018 in Montréal, May 2017 to August 2019 in Toronto, and February 2017 to August 2019 in Vancouver. The overall target sample size (n=2160) was based on an a priori consideration of precision in estimating HIV incidence. Participation involved a computer-assisted self-interview (CASI) with sections on sociodemographic characteristics, knowledge and attitudes regarding HIV and related prevention, access to health services, and sexual behaviours. Participation also included HIV/STBBI testing by a research nurse. Participants received \$50 CDN and \$15 CDN for each peer recruited. Details on the RDS method are described elsewhere(34) and the STROBE-RDS checklist guided reporting.(35)

Analytical sample

To describe PrEP access (objective 1), all participants who self-reported being HIV-negative/-unknown and met Canadian clinical recommendations for PrEP(10) were included. According to these guidelines, PrEP is recommended for GBM who report having condomless anal sex (P6M) and have at least one of the following: 1) diagnosis of syphilis or rectal sexually transmitted infection (STI) in the past year, 2) >1 previous use of HIV post-exposure prophylaxis, 3) an ongoing relationship with an HIV-positive partner at risk of transmitting HIV, and 4) an HIV incidence risk index for men

1 who have sex with men (HIRI-MSM) score ≥ 11 .(36) The HIRI-MSM is a validated 6-item screening tool developed by the
2 US Center for Disease Control and Prevention.(37).
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4 To identify factors associated with not using PrEP (objective 2), the analysis was limited to self-reported HIV-
5 negative/-unknown GBM who met clinical recommendations for PrEP, and were aware of PrEP, a necessary condition to
6 use PrEP.
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9 **Variables**

10 **Outcome variables**

11 For objective 1, the following measures were used: awareness of PrEP, perceiving the need for PrEP (P6M),
12 trying to access PrEP (P6M) and using PrEP (P6M). For objective 2, the main outcome of interest was no use of PrEP
13 (P6M). Corresponding questionnaire items are available in Appendix I.
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15 **Independent variables**

16 The main independent variables for objective 2 align with dimensions of access.(22) Details regarding the
17 development of questionnaire items are available in Appendix II. Variables were grouped in the following categories:
18 sociodemographic, sexual behaviour prevention strategies, and the dimensions of access (perceived risk of HIV infection,
19 knowledge about PrEP, impact of PrEP use on sexual behaviour, access to health services, and implications of ongoing
20 PrEP use). A complete list of potential correlates that were considered can be found in Appendix III (Table S2). While
21 response options to most questionnaire items had Likert-scale responses, variables were treated as categorical to facilitate
22 interpretation.
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24 **Statistical methods**

25 All analyses were adjusted using RDS-II weights,(33) which are inversely proportional to the size of participant's
26 social network; these weights account for individuals with larger social networks being more likely to be recruited into the
27 sample. The question to capture social network can be found in Appendix I. RDS-II weights were calculated separately
28 for each city.
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30 For objective 1, crude and RDS-adjusted estimates were calculated for each city. For objective 2, logistic
31 regression analyses stratified by city were first conducted to identify potential correlates of not using PrEP. Factors
32 exhibiting similar relationships (i.e. direction of association) in each city were selected for pooled (3-city) analyses in
33 order to identify salient factors common across cities. The total number of variables was further reduced using correlation
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matrices; for highly correlated items (Spearman's correlation coefficient $\geq |0.3|$), those amenable to intervention were prioritized. Univariable logistic regression analyses on pooled data were then conducted to identify significant correlates (p-value < 0.10 given the exploratory nature of the analysis). A complete case analysis using multivariable logistic regression on pooled data was then developed, adjusting for city and year of recruitment to reflect the progressive and varied implementation of PrEP across cities and recruitment periods. To account for the RDS-weights, quasi-binomial regressions were used. A sensitivity analysis was also done using all independent variables as continuous measures. All analyses were performed using RStudio (Version 1.1.419– © 2009-2018 RStudio, Inc.).

RESULTS

From February 2017 to August 2019, 1179 participants (seeds: 27) were recruited in Montréal, 517 (seeds: 96) in Toronto, and 754 (seeds: 117) in Vancouver. Among these 2449 participants, the RDS-adjusted proportions (95% CI) of self-reported HIV-negative/-unknown participants were 86.3% (82.8%-89.8%), 78.5% (74.0%-83.0%), and 79.7% (74.1%-85.2%) in Montréal, Toronto, and Vancouver, respectively. Of these participants (n=2008), the proportions who met clinical recommendations for PrEP were 49.9% (44.1%-55.6%) in Montréal, 44.9% (36.6%-53.1%) in Toronto and 58.1% (51.1%-65.2%) in Vancouver. A breakdown of participants by the guideline criteria can be found in Appendix III (Figure S1, Table S3). Determinations of clinical recommendation for PrEP were not possible for 3.5% (Montréal), 3.6% (Toronto) and 1.6% (Vancouver) HIV-negative/-unknown participants due to missing data (Figure 1).

A total of 1159 participants (median age:30, age-range:17-73) met clinical recommendations for PrEP. Most identified as cis-gender (88.5% to 96.5% across cities), gay (81.4% to 89.3%) and were born in Canada (60.3% to 63.6%). In addition, 30.5% to 46.0% reported not having a primary care provider and 32.0% to 44.6% reported not having medication insurance (Table 1).

Dimensions of PrEP access are presented in Figure 2. Awareness of PrEP ranged from 84.6% (Montréal) to 94.2% (Toronto), 39.2% (Montréal) to 56.1% (Toronto) felt the need for PrEP, 20.6% (Montréal) to 33.2% (Toronto) tried to obtain PrEP, and 14.5% (Montréal) to 21.8% (Vancouver) used PrEP (P6M).

In pooled multivariable models (Table 2), not using PrEP was significantly associated with: being in a relationship with a main partner (adjusted Odds Ratio=1.85; 95% Confidence Interval=1.21-2.86), not feeling at high enough risk to use PrEP (aOR 6.20; 95% CI 3.61-11.10), not knowing enough about PrEP to determine if it is right for them (aOR 2.33; 95% CI 1.37-4.05), and perceiving PrEP to not be very effective (aOR 3.97; 95% CI 2.23-7.38). Other

1 associated factors included not choosing sexual partners based on their PrEP-use (aOR 1.56; 95% CI 1.02-2.41) and
2 continuing condom-use if they were taking PrEP (aOR 1.99; 95% CI 1.27-3.14). Regarding access within the health
3 system, GBM had higher odds of not using PrEP if they thought they were unable to find a doctor accepting of their
4 sexual behaviours to prescribe PrEP (aOR 5.22; 95% CI 2.00-16.64). Compared with men who disclosed having male
5 sexual partners to a primary care provider, those who did not disclose (aOR 3.30; 95% CI 1.68-6.76) and those who did
6 not have a care provider (aOR 2.66; 95% CI 1.65-4.35) had higher odds of not using PrEP. Also, not having medication
7 insurance (aOR 3.10; 95% CI 1.91-5.12), being concerned about the cost of PrEP (aOR 1.55; 95% CI 1.00-2.41) and
8 worrying about PrEP side-effects (aOR 1.81; 95% CI 1.18-2.79) were associated with non-use. With respect to
9 recruitment, only year of study participation (2019 vs. 2017) had lower odds (aOR 0.51; 95% CI 0.26-0.99).

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11 Using the independent variables as continuous measures showed similar results. However, worry about PrEP side-
12 effects was no longer statistically significant, and not liking the idea of regular PrEP follow-up visits was (data not
13 shown). Missingness ranged from 0 to 6.2% on reported independent variables.

14 **DISCUSSION**

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16 Using the Canadian HIV-PrEP clinical guidelines(10) and data from a well-characterized population-based
17 sample of HIV-negative/unknown GBM in Montréal, Toronto, and Vancouver, we estimated approximately half of GBM
18 could benefit from PrEP. We also documented different dimensions of PrEP access, finding that reported use of PrEP
19 ranged between 14.5% and 21.8%. Essentially, up to 4 out of 5 GBM who met clinical recommendations did not use
20 PrEP. Similarly low uptake has been documented elsewhere;(27,38) in a study of 20 urban areas in the US (2014-2017),
21 only one in three men thought to benefit from PrEP, reported using it.(27) While the majority of GBM in our study were
22 aware of PrEP, ranging from 84.6% (Montréal) to 84.7% (Toronto), far fewer perceived a need, or tried to obtain it,
23 indicating a substantial gap between PrEP awareness and use.

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25 Not feeling at sufficient risk and not knowing whether PrEP is appropriate and effective have all been identified
26 in previous studies as factors affecting PrEP use.(25,38–43)The discordance between these perceptions but having risk for
27 HIV as per clinical criteria, stands out as a target in optimizing access. Perceived risk is a known determinant of health
28 behaviours,(44) and can be harnessed in promoting behaviour change. These and other dimensions of access identified in
29 our analyses, align with literacy on the prevention and care aspects of PrEP. PrEP literacy, or health literacy more
30 generally, encompasses health-related knowledge, personal motivation to access health information, peer norms, and
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behavioural intentions. These are important determinants of an individual's ability to perceive a need and ultimately access a service.(22,45) As highlighted by Dubov, successful health system programming to improve access to PrEP should build upon different components of PrEP literacy and focus on the provision of related information to individuals and communities.(24) Perceived need, a function of both knowledge about PrEP and one's perceptions about personal HIV risk,(22) could be reinforced for GBM who are considered most at-risk for HIV, and therefore most likely to benefit from PrEP. Therefore, community information campaigns and peer-based programs, could be used to guide GBM regarding the scope of their HIV risk and the potential benefits of PrEP, ultimately affecting motivations to use PrEP.(19) In addition, by increasing overall community knowledge about PrEP, new norms regarding prevention strategies can take hold.(46)

We observed, like others,(38,47) several factors representing health system and structural barriers. For example, not having medical insurance or a primary care provider were independently associated with not accessing PrEP. GBM not able to find a doctor accepting of their sexual behaviours to prescribe PrEP also had higher odds of not using PrEP. This is consistent with qualitative work that showed a lack of PrEP use among GBM who expressed difficulty discussing risky sexual behaviours and PrEP-use with healthcare providers.(48,49) Finally, with respect to the ongoing use of PrEP, GBM who were concerned about related side effects were also less likely to use it. Interventions such as community outreach to improve linkage to PrEP care, and the removal of medication cost could help increase PrEP uptake.(50–52) Also, work is needed to improve PrEP awareness among primary care networks, including continuing professional development programs on PrEP and general sexual health for GBM. For example, a dissemination and implementation study underway in Toronto, Canada is examining patient-initiated continuing medical education and nurse-led PrEP delivery.(53)

This study has several limitations. Conducting an analysis on a multicity study using RDS presents some challenges, and there is currently no consensus on how to conduct RDS-adjusted regression analyses.(32) However, we adhered to RDS assumptions by providing city-specific descriptive results, recognizing three distinct networked populations, and we included the RDS-II weights in regression models to minimize selection bias. The proportion of GBM who met clinical recommendations may have been overestimated based on guideline criteria. For example, a man 18 to 28 years old, having had at least one episode of condomless receptive anal sex would meet clinical recommendations. Partner type (regular vs. casual) is not considered, highlighting the need for individualized and

1 differentiated PrEP care.(54) On the other hand, the application of current guidelines seems to be sufficiently specific in
2 excluding those unlikely to benefit from PrEP. Indeed, PrEP use ranged from 1.5% (Montréal) to 7.6% (Vancouver)
3 among men who did not meet clinical recommendations for PrEP (table S1). Also, while we cannot exclude social
4 desirability and recall biases in the self-reported measures, using a CASI questionnaire would largely mitigate these
5 biases.(56,57) Finally, because of the cross-sectional nature of the analysis, temporality cannot be established, and results
6 are generalizable only to GBM living in large urban centers.
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12 Despite these limitations, this is the first study to use RDS to recruit GBM in Canada's three largest cities. As a
13 recommended recruitment method that approximates probability sampling, it allows for inferences at the population level.
14 (31) By adhering closely to recommended RDS procedures and using statistical adjustments, possible related biases due to
15 this method were likely attenuated. Our use of a conceptual framework on access to healthcare assured a comprehensive
16 and nuanced consideration of psychosocial, behavioural, and sexual health determinants that could influence access to
17 PrEP.
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25 While the optimal target for PrEP coverage in the GBM population is unknown and work is underway,(55) our
26 findings nonetheless suggest sub-optimal coverage. By considering a variety of PrEP use-related barriers and facilitators,
27 we identified specific gaps and challenges shared by GBM in Canada's three largest cities. Finally, our findings represent
28 a snapshot of PrEP use among GBM as this prevention intervention begins to be used. Also, the higher odds of PrEP
29 access based on the year of recruitment, suggests evolving access and a need to follow uptake longitudinally.
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36 The epidemiology of HIV among GBM in Canada, along with the availability of PrEP, a proven prevention
37 strategy, highlights the urgency to act. If Canada aims to eliminate HIV as a public health threat by 2030, a scale-up in
38 PrEP access for GBM is needed.
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References

1. Public Health Agency of Canada. Summary: Estimates of HIV Incidence, Prevalence and Canada's Progress on Meeting the 90-90-90 HIV Targets, 2016 [Internet]. Ottawa: Public Health Agency of Canada; 2018 [cited 2020 Apr 11]. Available from: <https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/diseases-conditions/summary-estimates-hiv-incidence-prevalence-canadas-progress-90-90-90/pub-eng.pdf>
2. Haddad N. HIV Surveillance report, 2018, CCDR 45(12) [Internet]. aem. 2019 [cited 2020 Feb 28]. Available from: <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2019-45/issue-12-december-5-2019/article-1-2018-hiv-surveillance-report.html>
3. Lee H, Colyer S, Armstrong HL, Cox J. Trends in HIV Diagnoses by Age and Ethnicity Among Men Who Have Sex with Men (MSM) in British Columbia, Ontario, and Quebec: 2006-2015. In Vancouver, BC; [cited 2020 Jul 27]. Available from: <https://www.cahr-acrv.ca/wp-content/uploads/2018/04/CAHR2018-Abstract-Book-with-Errata.pdf>
4. Government of Canada SC. Census in Brief: Same-sex couples in Canada in 2016 [Internet]. 2017 [cited 2020 Feb 28]. Available from: <https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016007/98-200-x2016007-eng.cfm>
5. The epidemiology of HIV in gay, bisexual and other men who have sex with men [Internet]. [cited 2020 Feb 28]. Available from: <https://www.catie.ca/en/fact-sheets/epidemiology/epidemiology-hiv-gay-men-and-other-men-who-have-sex-men>
6. CCDR. A framework for action on STBBIs [Internet]. aem. 2018 [cited 2020 Feb 28]. Available from: <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2018-44/issue-7-8-july-5-2018/article-5-framework-action-sexually-transmitted-blood-borne-infections.html>
7. Sagaon-Teyssier L, Suzan-Monti M, Demoulin B, Capitant C, Lorente N, Préau M, et al. Uptake of PrEP and condom and sexual risk behavior among MSM during the ANRS IPERGAY trial. *AIDS Care*. 2016;28 Suppl 1:48–55.
8. McCormack S, Dunn DT, Desai M, Dolling DI, Gafos M, Gilson R, et al. Pre-exposure prophylaxis to prevent the acquisition of HIV-1 infection (PROUD): effectiveness results from the pilot phase of a pragmatic open-label randomised trial. *Lancet*. 2016 Jan 2;387(10013):53–60.
9. Hare CB, Coll J, Ruane P, Molina J-M, Mayer KH, Jessen H, et al. The Phase 3 DISCOVER Study: Daily F/TAF or F/TDF for HIV Preexposure prophylaxis. In Seattle, Washington; 2019 [cited 2020 Jul 29]. (104). Available from: <https://www.croiconference.org/abstract/phase-3-discover-study-daily-ftaf-or-ftdf-hiv-preexposure-prophylaxis/>
10. Tan DHS, Hull MW, Yoong D, Tremblay C, O'Byrne P, Thomas R, et al. Canadian guideline on HIV pre-exposure prophylaxis and nonoccupational postexposure prophylaxis. *CMAJ*. 2017 Nov 27;189(47):E1448–58.
11. PrEP in Canada: What do we know about awareness, acceptability and use? [Internet]. [cited 2020 Feb 28]. Available from: <https://www.catie.ca/en/pif/spring-2017/prep-canada-what-do-we-know-about-awareness-acceptability-and-use>
12. REZO. La PrEP [Internet]. [cited 2020 Feb 28]. Available from: <https://www.rezosante.org/ta-sexualite/prevention/prep>
13. Rates in effect | RAMQ [Internet]. [cited 2020 Feb 28]. Available from: https://www.ramq.gouv.qc.ca/en/citizens/prescription-drug-insurance/Pages/rates_effect.aspx

14. La Direction des communications du ministère de la Santé et des Services sociaux. La prophylaxie préexposition au virus de l'immunodéficience humaine: Guide pour les professionnels de la santé. 2019 Jan;59.
15. La Direction des communications du ministère de la Santé et des Services sociaux. Avis intérimaire sur la prophylaxie préexposition au virus de l'immunodéficience humaine. 2014.
16. AIDS Committee of Toronto (ACT). PrEP in Ontario – Update for Community [Internet]. [cited 2020 Apr 11]. Available from: <https://www.atoronto.org/health-information/sexual-health/prep-info/prepontario.pdf>
17. British Columbia Centre for Excellence in HIV/AIDS. Guidance for the use of Pre-Exposure Prophylaxis (PrEP) for the prevention of HIV acquisition in British Columbia [Internet]. BC Centre for Excellence in HIV/AIDS. 2019 [cited 2020 Feb 28]. Available from: <http://www.cfenet.ubc.ca/publications/centre-documents/guidance-for-the-use-pre-exposure-prophylaxis-prep-prevention-hiv-acquisition>
18. Davie Buyers Club. How to Access PrEP Without Insurance in Canada (for \$45 CAD Per Month) [Internet]. 2020 [cited 2020 Feb 28]. Available from: <https://daviebuyersclub.wordpress.com/>
19. Schaefer R, Gregson S, Fearon E, Hensen B, Hallett TB, Hargreaves JR. HIV prevention cascades: a unifying framework to replicate the successes of treatment cascades. *The Lancet HIV*. 2019 Jan 1;6(1):e60–6.
20. Kelley CF, Kahle E, Siegler A, Sanchez T, Del Rio C, Sullivan PS, et al. Applying a PrEP Continuum of Care for Men Who Have Sex With Men in Atlanta, Georgia. *Clin Infect Dis*. 2015 Nov 15;61(10):1590–7.
21. Newman PA, Guta A, Lacombe-Duncan A, Tepjan S. Clinical exigencies, psychosocial realities: negotiating HIV pre-exposure prophylaxis beyond the cascade among gay, bisexual and other men who have sex with men in Canada. *J Int AIDS Soc*. 2018;21(11):e25211.
22. Levesque J-F, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*. 2013 Mar 11;12(1):18.
23. Centre for Communicable Diseases and Infection Control. A summary of the Pan-Canadian framework on sexually-transmitted and blood-borne infections. *CCDR*. 2018 Jul 5;44(7/8):179–81.
24. Dubov A, Altice FL, Fraenkel L. An Information–Motivation–Behavioral Skills Model of PrEP Uptake. *AIDS Behav*. 2018 Nov;22(11):3603–16.
25. Lachowsky NJ, Lawson Tattersall T, Sereda P, Wang C, Edwards J, Hull M. Community awareness of, use of and attitudes towards HIV pre-exposure prophylaxis (PrEP) among men who have sex with men in Vancouver, Canada: preparing health promotion for a publicly funded PrEP program. *Sex Health*. 2019;16(2):180–6.
26. Wilton J, Kain T, Fowler S, Hart TA, Grennan T, Maxwell J, et al. Use of an HIV-risk screening tool to identify optimal candidates for PrEP scale-up among men who have sex with men in Toronto, Canada: disconnect between objective and subjective HIV risk. *J Int AIDS Soc* [Internet]. 2016 Jun 3 [cited 2020 Feb 28];19(1). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911732/>
27. Finlayson T, Cha S, Xia M, Trujillo L, Denson D, Prejean J, et al. Changes in HIV Preexposure Prophylaxis Awareness and Use Among Men Who Have Sex with Men — 20 Urban Areas, 2014 and 2017. *MMWR Morb Mortal Wkly Rep*. 2019 Jul 12;68(27):597–603.
28. Mosley T, Khaketla M, Armstrong HL, Cui Z, Sereda P, Lachowsky NJ, et al. Trends in Awareness and Use of HIV PrEP Among Gay, Bisexual, and Other Men who have Sex with Men in Vancouver, Canada 2012-2016. *AIDS Behav*. 2018 Nov;22(11):3550–65.
29. Greenwald ZR, Maheu-Giroux M, Szabo J, Robin JAB, Boissonnault M, Nguyen V-K, et al. Cohort profile: l'Actuel Pre-Exposure Prophylaxis (PrEP) Cohort study in Montreal, Canada. *BMJ Open*. 2019 Jun 1;9(6):e028768.

30. CANFAR. Ending the HIV Epidemic in Canada in Five Years It's Time to Act - Google Search [Internet]. [cited 2020 Feb 28]. Available from:
https://www.google.com/search?q=Ending+the+HIV+Epidemic+in+Canada+in+Five+Years+It%E2%80%99s+Time+to+Act&rlz=1C1GCEU_frCA821CA821&oq=Ending+the+HIV+Epidemic+in+Canada+in+Five+Years+It%E2%80%99s+Time+to+Act&aqs=chrome..69i57.302j0j4&sourceid=chrome&ie=UTF-8
31. World Health Organization, Regional Office for the Eastern Mediterranean, Mediterranean RO for the E. Introduction to HIV/AIDS and sexually transmitted infection surveillance: module 4: introduction to respondent-driven sampling. 2013 [cited 2020 Feb 28]; Available from: <https://apps.who.int/iris/handle/10665/116864>
32. Gile KJ, Beaudry IS, Handcock MS, Ott MQ. Methods for Inference from Respondent-Driven Sampling Data. *Annual Review of Statistics and Its Application*. 2018;5(1):65–93.
33. Volz E, Heckathorn DD. Probability Based Estimation Theory for Respondent Driven Sampling. *Journal of Official Statistics* [Internet]. 2008 [cited 2020 Feb 28];24(1). Available from:
<http://search.proquest.com/docview/1266794018/abstract/D23C009DBF6C4930PQ/1>
34. Doyle CM, Maheu-Giroux M, Lambert G, Mishra S, Apelian H, Messier-Peet M, et al. Combination HIV Prevention Strategies Among Montreal Gay, Bisexual, and Other Men Who Have Sex with Men in the PrEP Era: A Latent Class Analysis. *AIDS Behav* [Internet]. 2020 Jul 9 [cited 2020 Jul 27]; Available from:
<http://link.springer.com/10.1007/s10461-020-02965-4>
35. White RG, Hakim AJ, Salganik MJ, Spiller MW, Johnston LG, Kerr L, et al. Strengthening the Reporting of Observational Studies in Epidemiology for respondent-driven sampling studies: “STROBE-RDS” statement. *Journal of Clinical Epidemiology*. 2015 Dec 1;68(12):1463–71.
36. Smith DK, Pals SL, Herbst JH, Shinde S, Carey JW. Development of a clinical screening index predictive of incident HIV infection among men who have sex with men in the United States. *J Acquir Immune Defic Syndr*. 2012 Aug 1;60(4):421–7.
37. Centers for Disease Control and Prevention. US Public Health Service. Preexposure prophylaxis for the prevention of HIV infection in the United States—2017 Update: a clinical practice guideline [Internet]. 2018 [cited 2020 Apr 3]. Available from: http://www.cfenet.ubc.ca/sites/default/files/uploads/publications/centredocs/prep_guidelines-14-aug-2019.pdf
38. Hannaford A, Lipshie-Williams M, Starrels JL, Arnsten JH, Rizzuto J, Cohen P, et al. The Use of Online Posts to Identify Barriers to and Facilitators of HIV Pre-exposure Prophylaxis (PrEP) Among Men Who Have Sex with Men: A Comparison to a Systematic Review of the Peer-Reviewed Literature. *AIDS Behav*. 2018 Apr;22(4):1080–95.
39. Parsons JT, Rendina HJ, Whitfield THF, Grov C. Familiarity with and Preferences for Oral and Long-Acting Injectable HIV Pre-exposure Prophylaxis (PrEP) in a National Sample of Gay and Bisexual Men in the U.S. *AIDS Behav*. 2016 Jul;20(7):1390–9.
40. Cohen SE, Vittinghoff E, Bacon O, Doblecki-Lewis S, Postle BS, Feaster DJ, et al. High Interest in Preexposure Prophylaxis Among Men Who Have Sex With Men at Risk for HIV Infection: Baseline Data From the US PrEP Demonstration Project. *JAIDS Journal of Acquired Immune Deficiency Syndromes*. 2015 Apr;68(4):439–48.
41. Krakower DS, Mimiaga MJ, Rosenberger JG, Novak DS, Mitty JA, White JM, et al. Limited Awareness and Low Immediate Uptake of Pre-Exposure Prophylaxis among Men Who Have Sex with Men Using an Internet Social Networking Site. Vermund SH, editor. *PLoS ONE*. 2012 Mar 28;7(3):e33119.
42. Uthappa C, Allam R, Pant R, Pal S, Dinaker M, Oruganti G, et al. Pre-exposure prophylaxis: awareness, acceptability and risk compensation behaviour among men who have sex with men and the transgender population. *HIV Med*. 2018 Apr;19(4):243–51.

- 1 43. Gallagher T, Link L, Ramos M, Bottger E, Aberg J, Daskalakis D. Self-Perception of HIV Risk and Candidacy for
2 Pre-Exposure Prophylaxis Among Men Who Have Sex with Men Testing for HIV at Commercial Sex Venues in
3 New York City. *LGBT Health*. 2014 Sep;1(3):218–24.
- 4 44. Janz NK, Becker MH. The Health Belief Model: A Decade Later. *Health Education Quarterly*. 1984 Mar;11(1):1–
5 47.
- 6 45. Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and
7 communication strategies into the 21st century. *Health Promotion International*. 2000 Sep 1;15(3):259–67.
- 8 46. Carson B. The Informal Norms of HIV Prevention: The Emergence and Erosion of the Condom Code. *The Journal*
9 *of Law Medicine & Ethics*. 2017 Jan 1;45:518–30.
- 10 47. Maxwell S, Gafos M, Shahmanesh M. Pre-exposure Prophylaxis Use and Medication Adherence Among Men Who
11 Have Sex With Men: A Systematic Review of the Literature | Ovid. *Journal of the Association of Nurses in AIDS*
12 *Care*. 2019 Aug;30(4):e38–e61.
- 13 48. Underhill K, Morrow KM, Colleran C, Holcomb R, Calabrese SK, Operario D, et al. A Qualitative Study of Medical
14 Mistrust, Perceived Discrimination, and Risk Behavior Disclosure to Clinicians by U.S. Male Sex Workers and
15 Other Men Who Have Sex with Men: Implications for Biomedical HIV Prevention. *J Urban Health*. 2015
16 Aug;92(4):667–86.
- 17 49. Taylor SW, Mayer KH, Elsesser SM, Mimiaga MJ, O’Cleirigh C, Safren SA. Optimizing Content for Pre-Exposure
18 Prophylaxis (PrEP) Counseling for Men who have Sex with Men: Perspectives of PrEP Users and High-risk PrEP
19 Naïve Men. *AIDS Behav*. 2014 May;18(5):871–9.
- 20 50. Krishnaratne S, Hensen B, Cordes J, Enstone J, Hargreaves JR. Interventions to strengthen the HIV prevention
21 cascade: a systematic review of reviews. *The Lancet HIV*. 2016 Jul 1;3(7):e307–17.
- 22 51. Hargreaves JR, Delany-Moretlwe S, Hallett TB, Johnson S, Kapiga S, Bhattacharjee P, et al. The HIV prevention
23 cascade: integrating theories of epidemiological, behavioural, and social science into programme design and
24 monitoring. *The Lancet HIV*. 2016 Jul 1;3(7):e318–22.
- 25 52. Pinto RM, Berringer KR, Melendez R, Mmeje O. Improving PrEP Implementation Through Multilevel
26 Interventions: A Synthesis of the Literature. *AIDS Behav*. 2018 Nov;22(11):3681–91.
- 27 53. Sharma M, Chris A, Chan A, Knox DC, Wilton J, McEwen O, et al. Decentralizing the delivery of HIV pre-
28 exposure prophylaxis (PrEP) through family physicians and sexual health clinic nurses: a dissemination and
29 implementation study protocol. *BMC Health Serv Res*. 2018 Jul 3;18(1):513.
- 30 54. Grimsrud Anna, Bygrave Helen, Doherty Meg, Ehrenkranz Peter, Ellman Tom, Ferris Robert, et al. Reimagining
31 HIV service delivery: the role of differentiated care from prevention to suppression. *Journal of the International*
32 *AIDS Society*. 2016 Dec 1;19(1):21484.
- 33 55. Milwid R, Yiqing X, Maheu-Giroux M. Informing the Path Towards HIV Elimination in Montreal Among Men
34 Who Have Sex with Men Through HIV Combination Prevention: a Mathematical Modelling Approach. In *Virtual*
35 *conference; 2020* [cited 2020 May 28]. Available from: [https://www.cahr-acrv.ca/wp-](https://www.cahr-acrv.ca/wp-content/uploads/2020/04/CAHR-2020-Abstract-book.pdf)
36 [content/uploads/2020/04/CAHR-2020-Abstract-book.pdf](https://www.cahr-acrv.ca/wp-content/uploads/2020/04/CAHR-2020-Abstract-book.pdf)
- 37 56. Reichmann WM, Losina E, Seage GR, Arbelaez C, Safren SA, Katz JN, et al. Does Modality of Survey
38 Administration Impact Data Quality: Audio Computer Assisted Self Interview (ACASI) Versus Self-Administered
39 Pen and Paper? *PLoS One* [Internet]. 2010 Jan 15 [cited 2020 Apr 28];5(1). Available from:
40 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2806918/>

- 1 57. Gribble JN, Miller HG, Rogers SM, Turner CF. Interview Mode and Measurement of Sexual Behaviors:
2 Methodological Issues. *J Sex Res.* 1999 Feb;36(1):16–24.
- 3 58. Ven PVD, Crawford J, Kippax S, Knox S, Prestage G. A scale of optimism-scepticism in the context of HIV
4 treatments. *AIDS Care.* 2000 Apr;12(2):171–6.
- 5
6 59. Herek GM, Glunt EK. Identity and Community Among Gay and Bisexual Men in the AIDS Era: Preliminary
7 Findings From The Sacramento Men’s Health Study. In: *AIDS, Identity, and Community.* SAGE; 1995.
- 8
9 60. Kalichman SC, Rompa D. The Sexual Compulsivity Scale: Further Development and Use With HIV-Positive
10 Persons. *Journal of Personality Assessment.* 2001 Jun;76(3):379–95.
- 11
12 61. Nimmons D, Folkman S. Other-Sensitive Motivation for Safer Sex Among Gay Men: Expanding Paradigms for HIV
13 Prevention. *AIDS Behav.* 1999 Dec 1;3(4):313–24.
- 14
15 62. O’Dell BL, Rosser BRS, Miner MH, Jacoby SM. HIV Prevention Altruism and Sexual Risk Behavior in HIV-
16 Positive Men Who Have Sex with Men. *AIDS Behav.* 2008 Sep;12(5):713–20.
- 17
18 63. Doyle SR, Calsyn DA, Ball SA. Factor Structure of the Condoms Barriers Scale With a Sample of Men at High Risk
19 for HIV. *Assessment.* 2009 Mar;16(1):3–15.
- 20
21
22
23
24
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Table 1: Descriptive characteristics of self-reported HIV-negative or unknown participants for whom PrEP is clinically recommended (n=1159)

	Montréal (n=511)		Toronto (n=247)		Vancouver (n=401)	
	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)
Age: median (Q1, Q3)	30 (25, 36)		30 (26, 34)		30 (26, 35)	
Gender identity						
Cis	94.5	88.5 (82.3-94.7)	96.8	99.0 (97.8-100.0)	96.5	97.2 (93.8-100.0)
Trans	0.6	1.6 (0.0-4.5)	0.4	0.1 (0.0-0.2)	0.0	0
Genderqueer/gender non-conforming	3.3	3.3 (1.1-5.5)	2.4	0.9 (0.0-2.0)	2.5	1.4 (0.0-3.1)
Other	1.6	6.6 (1.2-12.0)	0.4	0.1 (0.0-0.1)	1.0	1.4 (0.0-4.4)
Sexual Orientation						
Gay	87.5	83.8 (78.1-89.4)	80.6	81.4 (71.6-91.2)	86.8	89.3 (85.1-93.4)
Queer	5.1	3.4 (1.1-5.8)	14.6	12.7 (4.2-21.1)	5.7	2.7 (0.3-5.2)
Bisexual	4.3	6.0 (2.1-10.0)	2.4	5.1 (0.0-11.4)	5.0	6.7 (3.5-9.8)
Other	3.1	6.8 (2.9-10.6)	2.4	0.8 (0.0-1.7)	2.5	1.3 (0.2-2.5)
Ethnicity						
Canadian	56.6	47.8 (40.2-55.3)	40.1	31.2 (21.4-41.0)	46.1	40.0 (32.1-48.0)
European	16.6	16.0 (11.0-21.1)	24.7	29.0 (19.3-38.8)	22.4	18.2 (10.6-25.7)
Asian	4.1	5.4 (1.3-9.6)	13.4	12.0 (6.9-17.0)	16.7	23.3 (16.8-29.9)
Latin American	9.8	13.5 (7.0-20.0)	7.7	8.7 (3.2-14.2)	6.7	11.2 (6.4-16.1)
African, Black, Caribbean	2.9	3.9 (0.7-7.0)	3.2	3.9 (0.0-8.5)	1.5	1.2 (0.0-2.8)
Arab or North African	3.9	7.4 (3.6-11.3)	1.2	1.6 (0.0-3.6)	0.7	0.6 (0.0-2.2)
Aboriginal or Indigenous	0.8	2.0 (0.0-4.8)	0.4	0.1 (0.0-0.1)	1.7	0.5 (0.0-1.3)
Other	5.3	3.9 (0.8-6.9)	9.3	13.5 (5.0-22.0)	4.0	5.0 (0.7-9.3)
Born in Canada						
Yes	63.6	54.5 (46.8-62.3)	60.3	49.0 (38.3-59.6)	62.8	55.6 (47.2-64.1)
No	36.4	45.5 (37.7-53.2)	39.7	51.0 (40.4-61.7)	37.2	44.4 (35.9-52.8)
Education						
No more than high school	14.9	15.4 (10.9-19.9)	9.3	12.9 (6.2-19.6)	10.7	10.6 (6.1-15.0)
Greater than high school	85.1	84.6 (80.1-89.1)	90.7	87.1 (80.4-93.8)	89.3	89.4 (85.0-93.9)
Annual income (CAD)						
<30K	52.4	65.1 (58.4-71.8)	44.1	52.3 (41.6-63.0)	40.9	54.7 (46.5-63.0)
30K-50K	26.6	18.6 (13.4-23.8)	23.5	22.0 (14.8-29.2)	23.7	21.5 (14.7-28.4)
50K+	20.9	16.3 (11.7-21.0)	32.4	25.7 (16.0-35.5)	35.4	23.7 (16.6-30.9)
Primary care provider aware about male sexual partners						
Yes	53.4	40.9 (33.4-48.4)	66.8	54.7 (43.6-65.8)	45.4	27.6 (20.5-34.6)
No	7.6	14.5 (9.0-20.0)	10.1	14.8 (6.1-23.5)	18.0	26.4 (19.5-33.4)
No primary care provider	38.9	44.6 (37.0-52.2)	23.1	30.5 (20.0-41.0)	36.7	46.0 (37.6-54.4)
Has medication Insurance						

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Yes	73.6	68.0 (60.9-75.0)	62.3	55.4 (45.2-65.7)	69.3	61.9 (53.8-70.1)
No	26.4	32.0 (25.0-39.1)	37.7	44.6 (34.3-54.8)	30.7	38.1 (29.9-46.2)

RDS respondent driven sampling, CI confidence interval

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Table 2: Factors associated with not using PrEP among self-reported HIV-negative or unknown participants for whom PrEP is clinically recommended and who are PrEP aware (n=1100)

		Univariable*	Multivariable*
		OR (95% CI)	aOR (95% CI)
Sociodemographic characteristics			
Age	30 years or older	Ref	Ref
	Less than 30 years	2.10 (1.56- 2.82)	1.13 (0.74- 1.74)
Education	Greater than high school	Ref	Ref
	No more than high school	1.83 (1.08- 3.34)	1.35 (0.64- 3.00)
Income	30 000 CAD or more	Ref	Ref
	<30 000 CAD	1.62 (1.21- 2.18)	1.02 (0.65- 1.58)
In a relationship with a main partner	No	Ref	Ref
	Yes	2.20 (1.63- 2.97)	1.85 (1.21- 2.86)
Sexual behaviour prevention strategies			
Viral load sorting as HIV prevention strategy	No	Ref	Ref
	Yes	0.32 (0.23- 0.45)	0.66 (0.41- 1.08)
Perceived risk of HIV infection			
"I don't feel that I am at high enough risk to use PrEP."	Strongly disagree/ disagree/neutral	Ref	Ref
	Agree/strongly agree	7.88 (5.13-12.69)	6.20 (3.61- 11.10)
"HIV/AIDS is a less serious threat than it used to be because of new treatments."	Strongly agree/agree	Ref	Ref
	Disagree/strongly disagree	1.91 (1.39- 2.63)	1.42 (0.89- 2.27)
Knowledge about PrEP			
"I know enough about PrEP to tell if it's right for me or not."	Strongly agree/agree/neutral	Ref	Ref
	Disagree/strongly disagree	2.70 (1.82- 4.12)	2.33 (1.37- 4.05)
"In your opinion, how effective is PrEP at preventing HIV infection?"	Completely/very	Ref	Ref
	Moderately/a little/not at all/no opinion	8.44 (5.34-14.12)	3.97 (2.23- 7.38)
"I believe that new drug therapies make people less infectious with HIV."	Strongly agree/agree	Ref	Ref
	Disagree/Strongly disagree	2.52 (1.70- 3.86)	1.34 (0.75- 2.42)
Impact of PrEP use on sexual behavioural			
"I will choose my sexual partners based on whether they are taking PrEP or not."	Strongly agree/agree/neutral	Ref	Ref
	Disagree/strongly disagree	1.48 (1.10- 1.98)	1.56 (1.02- 2.41)
"If I was taking PrEP, I would most likely stop using condoms."	Strongly agree/agree/neutral	Ref	Ref
	Disagree/strongly disagree	2.69 (1.94- 3.78)	1.99 (1.27- 3.14)
"I am afraid that guys being on PrEP will stop using other ways of protecting themselves."	Strongly disagree/disagree/neutral	Ref	Ref
	Agree/strongly agree	1.93 (1.40- 2.65)	1.00 (0.63- 1.59)
Access to health services			
Told primary healthcare provider about male partners	Yes	Ref	Ref
	No	5.68 (3.38, 10.14)	3.30 (1.68- 6.76)
	No primary care provider	3.65 (2.62, 5.13)	2.66 (1.65- 4.35)

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1	Has medication insurance	Yes	Ref	Ref
2		No	3.21 (2.26- 4.65)	3.10 (1.91 – 5.12)
3	“ I don’t think I can find a doctor that is sensitive and accepting enough of my sexual activities and choices to prescribe PrEP.”	Strongly disagree/ disagree/neutral	Ref	Ref
4		Agree/strongly agree	7.27 (3.27-20.57)	5.22 (2.00- 16.64)
5	“I know where to go to get a prescription for PrEP.”	Strongly agree/agree/neutral	Ref	Ref
6		Disagree/strongly disagree	4.13 (2.84- 6.19)	1.63 (0.97- 2.76)
7	“I have not sought a prescription for PrEP in the past because of the cost of the medication.”	Strongly disagree/disagree/neutral	Ref	Ref
8		Agree/strongly agree	1.43 (1.06- 1.94)	1.55 (1.00- 2.41)
9	Implications of ongoing PrEP use			
10	“ I am worried about the short- and long-term side effects of taking PrEP.”	Strongly disagree/disagree/neutral	Ref	Ref
11		Agree/strongly agree	2.19 (1.63- 2.94)	1.81 (1.18- 2.79)
12	“ I don’t like the idea of being required to go to the regular medical follow-up visits involved in taking PrEP”	Strongly disagree/disagree/neutral	Ref	Ref
13		Agree/Strongly agree	3.03 (1.94- 4.94)	1.23 (0.67- 2.31)
14	Year and city of recruitment			
15	City	Montreal	Ref	Ref
16		Toronto	0.69 (0.47, 1.03)	1.33 (0.70, 2.51)
17		Vancouver	0.67 (0.48, 0.93)	0.93 (0.54, 1.62)
18	Year	2017	Ref	Ref
19		2018	0.61 (0.43, 0.86)	0.99 (0.61, 1.60)
20		2019	0.44 (0.29, 0.67)	0.51 (0.26, 0.99)

21 *OR* odds ratio, *CI* confidence interval, *aOR* adjusted odds ratio

22 * All estimates are respondent driven sampling (RDS)-adjusted. For univariable models, the *n* ranged from 1032 to 1100, for the multivariable model *n*=987.

23 Other variables that were also explored:

24 **Sociodemographic characteristics:** Sexual orientation, ethnicity

25 **Sexual behaviour prevention strategies:** Sero-positioning as HIV prevention Strategy, sero-sorting as HIV prevention strategy, PrEP sorting as HIV prevention strategy, withdrawal as HIV prevention strategy,

26 **Sexual behavioural impact of PrEP use:** "PrEP would allow me to have the sex I want.", "If a guy is using PrEP it makes using condoms during anal sex less important."

27 **Community receptivity of PrEP:** "PrEP is well-perceived in the community.", " I am worried about being negatively judged for taking PrEP."

28 **Access to health services:** "Clinics where I could get PrEP are too far away.", "At this time, how easy overall would you say it is for you to access PrEP?", "Most doctors do not know enough about PrEP to be comfortable prescribing it."

29 **Implications of ongoing PrEP use:** "I would have difficulty taking PrEP medication every day."

30 **Other variables:** HIV treatment optimism-skepticism scale,(58) Collective self-esteem scale,(59) Sexual compulsivity scale,(60) Sexual altruism scale,(61,62) Condom barriers scale(63)

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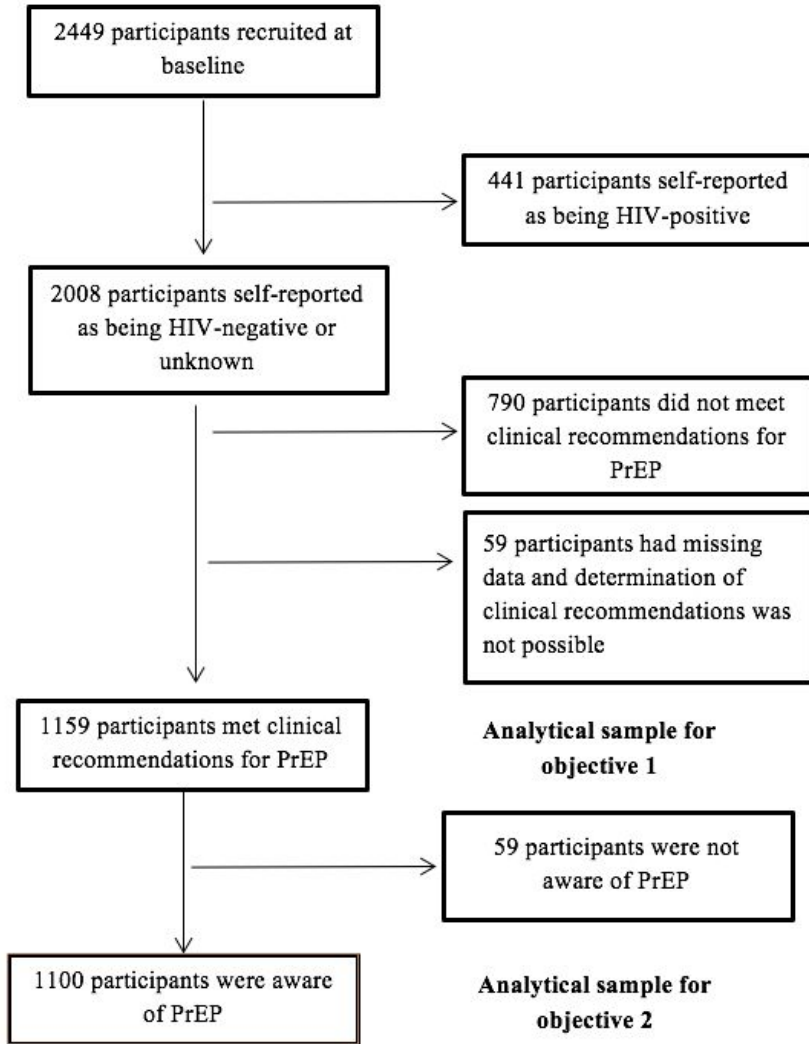
Figure 1: Flow chart of analytical samples 2

Figure 2: PrEP access among self-reported HIV-negative or unknown participants for whom PrEP is clinically recommended (n=1159) 3

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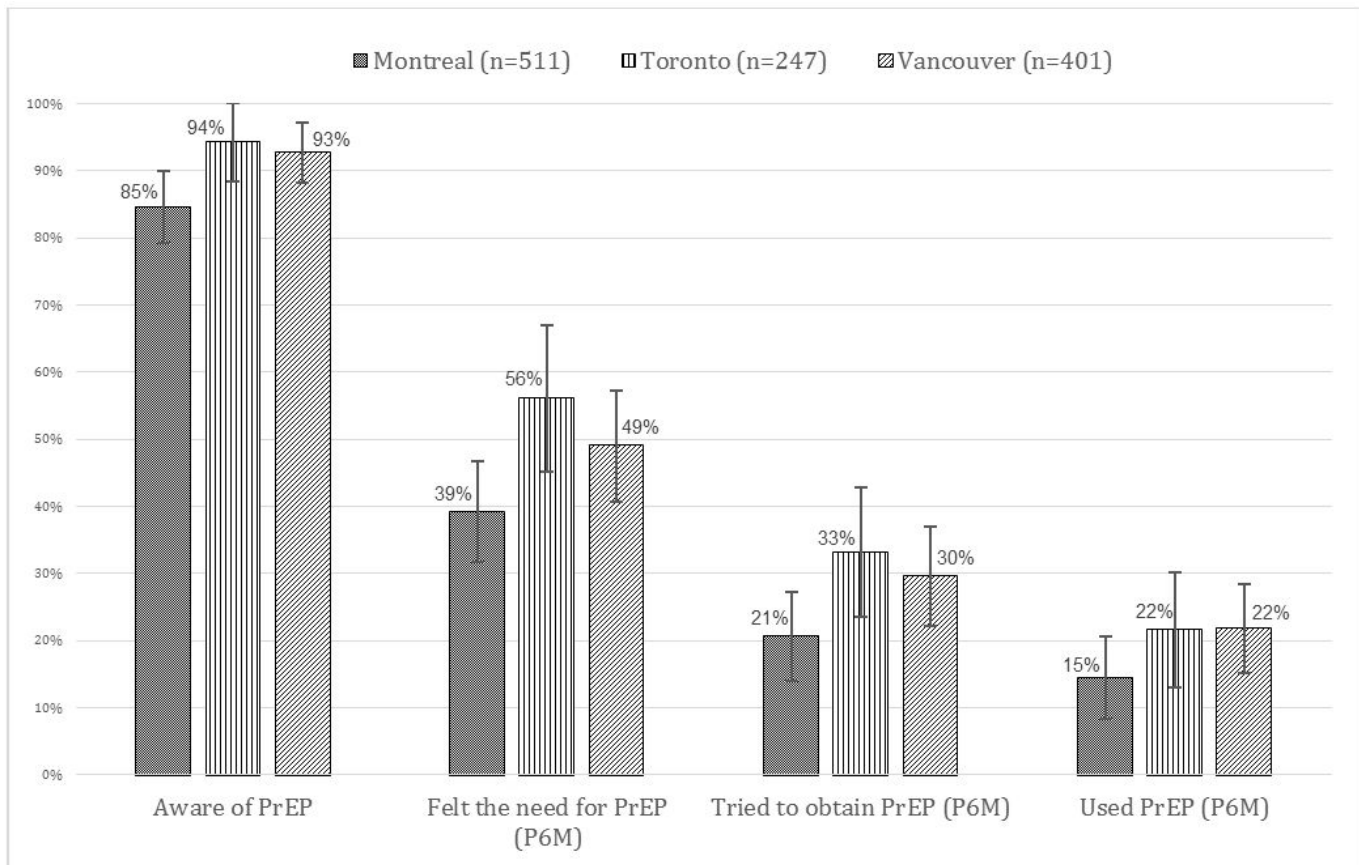
Figure 1: Flow chart of analytical samples



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Figure 2: PrEP access among self-reported HIV-negative or unknown participants for whom PrEP is clinically recommended (n=1159)



Note: Proportions are respondent driven sampling (RDS)-adjusted

Participants were provided a definition of HIV-PrEP and asked a series of questions (see Appendix I)

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Appendix I: Selected measures and corresponding Engage questionnaire items

Measure/variable	Engage questionnaire item
Awareness of PrEP	<p>Definition: “PrEP” stands for <i>Pre-Exposure Prophylaxis</i>. PrEP is a new highly effective HIV prevention method whereby a HIV-negative person takes a prescription HIV medication, Truvada, that was developed to <i>treat</i> HIV infection in HIV positive people, but can also be used by HIV negative people to <i>lower risk of HIV infection</i> if taken as prescribed.</p> <p>Before today, had you ever heard of PrEP (Pre-Exposure Prophylaxis)?</p>
Perceived need for PrEP	In the past 6 months, have you felt the need to go on PrEP?
Trying to access PrEP	In the past 6 months, have you tried to go on PrEP?
Use of PrEP (continuous or on-demand)	<p>Derived variable using the following questions:</p> <p>Have you ever taken PrEP yourself?</p> <p>(if yes) When did you last take PrEP?</p> <p>Are you currently on PrEP?</p>
Social network size	<p>How many men who have sex with men aged 16 years or older, including trans men, do you know who live or work in the (insert city) metropolitan area (whether they identify as gay or otherwise)?</p> <p><i>This includes gay/bi guys you see or speak to regularly; e.g., close friends, boyfriends, spouses, regular sex partners, roommates, relatives, people you regularly hang out with, etc.</i></p>

Appendix II: Developing questionnaire items related to PrEP access using a conceptual framework of access to care

During the development of the Engage questionnaire, the access to services module, including access to PrEP, was developed using the conceptual framework on access to care proposed by Levesque et al.¹ Levesque and colleagues conceptualize access as individual- and system-level dimensions. The steps taken by the Engage team were as follows:

1. A literature review was conducted to identify other studies focusing on GBM populations from developed countries that measure access to health services. Other similar questionnaires were reviewed (e.g., the UNAIDS Global AIDS Response Progress Reporting indicators², the M-TRACK surveillance report³).
2. The questionnaire items were constructed using the conceptual framework of access iteratively. Items were constructed to map along the individual-level dimensions of access to care: 1) ability to perceive a need, 2) ability to seek/look for, 3) ability to reach/obtain, 4) ability to pay and 5) ability to engage/adhere to a health service. Therefore, these items measure individual level barriers and facilitators to access that can be experienced when obtaining care and engagement with a service.
3. Questions were reviewed and discussed with members of the research team to determine pertinence and utility in addressing the module's objectives
4. The questionnaire items were presented using a 5-point Likert scale of agreement, participants were asked "at this time, thinking about PrEP as an HIV prevention method, how much do you agree with the following statements?"
5. Input from community engagement committee (CEC) meetings was elicited to assess the face validity of the module's questions, to identify any missed barriers that may be experienced by GBM and to identify any relevant issues the module may have overlooked. The CEC was composed of various members of the GBM community and the meetings consisted of informal round-table discussions. Feedback on the questionnaire's content, length and formatting were also elicited.
6. The module was reviewed and finalized after incorporating the feedback from CEC and other members of the research team.

¹ Levesque J-F, Harris MF, Russell G. Patient-centred access to health care: conceptualising access at the interface of health systems and populations. *International Journal for Equity in Health*. 2013 Mar 11;12(1):18.

² World Health Organization and UNAIDS 2015. Global AIDS response progress reporting 2015 [Internet]. 2015 [cited 2020 May 27]. Available from:

https://www.unaids.org/sites/default/files/media_asset/JC2702_GARPR2015guidelines_en.pdf

³ Centre for Communicable Diseases and Infection Control (Canada). M-Track, enhanced surveillance of HIV, sexually transmitted and blood-borne infections, and associated risk behaviours among men who have sex with men in Canada: phase 1 report. [Internet]. Ottawa, Ont.: Centre for Communicable Diseases and Infection Control; 2012 [cited 2020 May 27]. Available from: <https://www.deslibris.ca/ID/232461>

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Appendix III: Additional tables and figures of study results

Table S1: PrEP access among self-reported HIV-negative or unknown participant stratified by clinical recommendations for PrEP (n=1949)*

Clinically recommended PrEP?	Montreal (n=934)				Toronto (n= 403)				Vancouver (n=612)			
	No (n=423)		Yes (n=511)		No (n=156)		Yes (n=247)		No (n=211)		Yes (n=401)	
	Crude%	RDS adjusted % (95% CI)	Crude %	RDS adjusted% (95% CI)	Crude %	RDS adjusted % (95% CI)	Crude %	RDS adjusted % (95% CI)	Crude %	RDS adjusted% (95% CI)	Crude %	RDS adjusted % (95% CI)
Aware of PrEP	72.3	64.4 (56.0-72.8)	93.2	84.6 (79.3-90.0)	87.8	74.2 (62.5-86.0)	96.4	94.2 (87.7-100.0)	87.2	68.3 (57.4-79.2)	96.3	92.7 (88.2-97.3)
Felt the need for PrEP (P6M)	14.2	12.3 (7.2-17.4)	51.9	39.2 (31.7-46.7)	21.2	12.7 (5.7-19.6)	64.4	56.1 (45.2-67.0)	32.2	24.0 (13.4-34.6)	63.3	49.0 (40.7-57.3)
Tried to obtain PrEP (P6M)	4.5	4.4 (1.6-7.2)	27.0	20.6 (14.0-27.3)	7.1	3.7 (0.5-6.8)	40.1	33.2 (23.5-43.0)	13.3	11.5 (3.4-19.6)	42.1	29.6 (22.2-37.1)
Has used PrEP (P6M)	2.1	1.5 (0.6-2.5)	21.1	14.5 (8.4-20.5)	5.1	2.2 (0.5-3.8)	31.6	21.6 (13.1-30.1)	6.6	7.6 (0.2-14.9)	33.2	21.8 (15.1-28.5)

RDS respondent driven sampling, CI confidence interval

*Among 2008 HIV-negative or unknown participants, 59 had missing data and determination of clinical recommendations was not possible.

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Table S2: Potential correlates of not using PrEP among self-reported HIV-negative or unknown participants for whom PrEP is clinically recommended stratified by city of recruitment and PrEP use (n=1100)

Used PrEP in the P6M?		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)	Crude %	RDS adjusted % (95%CI)
Sociodemographic characteristics													
Age	30 years or older	50.0	43.4 (34.1-52.7)	67.6	55.2 (37.0-73.5)	40.6	38.6 (26.8-50.4)	70.5	53.5 (32.3-74.7)	43.5	34.0 (24.3-43.6)	64.7	60.8 (46.4-75.1)
	Less than 30 years	50.0	56.6 (47.3-65.9)	32.4	44.8 (26.5-63.0)	59.4	61.4 (49.6-73.2)	29.5	46.5 (25.3-67.7)	56.5	66.0 (56.4-75.7)	35.3	39.2 (24.9-53.6)
Sexual Orientation	Gay	89.4	84.8 (78.1-91.5)	87	82.9 (67.2-98.6)	76.2	81.3 (70.1-92.5)	93.6	96.6 (92.0-101.1)	86.6	90.2 (85.0-95.4)	88	88.1 (81.6-94.6)
	Other	10.6	15.2 (8.5-21.9)	13	17.1 (1.4-32.8)	23.8	18.7 (7.5-29.9)	6.4	3.4 (0.0-8.0)	13.4	9.8 (4.6-15.0)	12	11.9 (5.4-18.4)
Ethnicity	French Canadian or English Canadian	55.4	45.9 (36.9-54.8)	58.3	54.3 (35.8-72.9)	41.2	30.7 (19.8-41.7)	39.7	38.0 (15.1-60.8)	47.4	39.5 (29.2-49.8)	44.4	39.5 (24.6-54.3)
	Other	44.6	54.1 (45.2-63.1)	41.7	45.7 (27.1-64.2)	58.8	69.3 (58.3-80.2)	60.3	62.0 (39.2-84.9)	52.6	60.5 (50.2-70.8)	55.6	60.5 (45.7-75.4)
Born in Canada	No	38.6	46.4 (37.3-55.6)	35.2	42.2 (23.7-60.7)	38.1	48.8 (36.5-61.1)	39.7	52.4 (30.7-74.1)	35.6	44.5 (33.6-55.5)	39.8	44.3 (28.9-59.7)
	Yes	61.4	53.6 (44.4-62.7)	64.8	57.8 (39.3-76.3)	61.9	51.2 (38.9-63.5)	60.3	47.6 (25.9-69.3)	64.4	55.5 (44.5-66.4)	60.2	55.7 (40.3-71.1)
Education	Greater than highschool	87.8	87.1 (81.8-92.3)	86.1	90.5 (80.0-101.0)	89.4	85.2 (77.3-93.2)	96.2	99.0 (98.1-100.0)	89.3	91.8 (87.2-96.4)	92.5	92.8 (86.0-99.5)
	No more than high school	12.2	12.9 (7.7-18.2)	13.9	9.5 (0.0-20.0)	10.6	14.8 (6.8-22.7)	3.8	1.0 (0.0-1.9)	10.7	8.2 (3.6-12.8)	7.5	7.2 (0.5-14.0)
Income	30 000 CAD or more	45.4	33.4 (25.5-41.4)	58.3	42.7 (24.8-60.7)	53.1	49.3 (36.8-61.8)	67.9	55.2 (33.5-76.9)	58.1	42.9 (32.2-53.5)	63.9	57.6 (42.2-73.0)
	<30 000 CAD	54.6	66.6 (58.6-74.5)	41.7	57.3 (39.3-75.2)	46.9	50.7 (38.2-63.2)	32.1	44.8 (23.1-66.5)	41.9	57.1 (46.5-67.8)	36.1	42.4 (27.0-57.8)
In a relationship with a main partner	No	50.3	45.1 (36.0-54.1)	60.2	60.8 (41.7-79.9)	44.4	38.6 (27.0-50.2)	52.6	58.4 (39.2-77.6)	50.6	41.6 (31.5-51.7)	54.9	64.6 (51.2-78.1)
	Yes	49.7	54.9 (45.9-64.0)	39.8	39.2 (20.1-58.3)	55.6	61.4 (49.8-73.0)	47.4	41.6 (22.4-60.8)	49.4	58.4 (48.3-68.5)	45.1	35.4 (21.9-48.8)
Sexual behavioural characteristics													
Gave or received money for sex in last 6 months	Yes	9.0	6.9 (2.7-11.1)	9.3	18.5 (1.5-35.4)	13.3	7.6 (1.3-13.8)	18.2	19.5 (0.1-38.8)	6.4	10.0 (3.4-16.6)	10.5	8.2 (1.9-14.6)
	No	91.0	93.1 (88.9-97.3)	90.7	81.5 (64.6-98.5)	86.7	92.4 (86.2-98.7)	81.8	80.5 (61.2-99.9)	93.6	90.0 (83.4-96.6)	89.5	91.8 (85.4-98.1)

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		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
Used PrEP in the P6M?		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)
Participated in group sex (>=4 persons) in last 6 months	Yes	25.8	20.6 (13.7-27.5)	44.4	37.3 (16.3-58.3)	44.6	30.0 (19.0-41.0)	59.0	44.2 (24.8-63.7)	24.7	17.3 (9.0-25.6)	42.9	34.1 (18.9-49.3)
	No	74.2	79.4 (72.5-86.3)	55.6	62.7 (41.7-83.7)	55.4	70.0 (59.0-81.0)	41.0	55.8 (36.3-75.2)	75.3	82.7 (74.4-91.0)	57.1	65.9 (50.7-81.1)
Sero-positioning as HIV prevention strategy	No	70.9	78.7 (70.8-86.6)	63.9	63.2 (44.3-82.2)	62.5	67.1 (55.1-79.1)	60.3	64.5 (43.8-85.2)	62.8	64.0 (53.9-74.2)	63.2	76.7 (65.9-87.5)
	Yes	29.1	21.3 (13.4-29.2)	36.1	36.8 (17.8-55.7)	37.5	32.9 (20.9-44.9)	39.7	35.5 (14.8-56.2)	37.2	36.0 (25.8-46.1)	36.8	23.3 (12.5-34.1)
Sero-sorting as HIV prevention strategy	No	36.4	40.8 (32.2-49.4)	36.1	37.7 (18.6-56.9)	34.4	35.0 (23.1-46.8)	30.8	30.1 (12.0-48.2)	34.8	47.5 (37.0-57.9)	36.8	42.9 (28.4-57.4)
	Yes	63.6	59.2 (50.6-67.8)	63.9	62.3 (43.1-81.4)	65.6	65.0 (53.2-76.9)	69.2	69.9 (51.8-88.0)	65.2	52.5 (42.1-63.0)	63.2	57.1 (42.6-71.6)
Viral load sorting as HIV prevention strategy	No	83.2	81.9 (74.6-89.3)	62.0	67.0 (49.1-84.8)	81.2	86.4 (77.2-95.5)	57.7	63.3 (48.2-78.4)	81.4	92.5 (88.0-96.9)	55.6	70.2 (56.8-83.6)
	Yes	16.8	18.1 (10.7-25.4)	38.0	33.0 (15.2-50.9)	18.8	13.6 (4.5-22.8)	42.3	36.7 (21.6-51.8)	18.6	7.5 (3.1-12.0)	44.4	29.8 (16.4-43.2)
PrEP sorting as HIV prevention strategy	No	64.1	62.6 (53.7-71.4)	33.3	35.2 (17.6-52.8)	68.8	73.2 (63.1-83.4)	25.6	23.2 (5.5-40.9)	64.4	69.6 (59.6-79.5)	28.6	37.3 (22.9-51.8)
	Yes	35.9	37.4 (28.6-46.3)	66.7	64.8 (47.2-82.4)	31.2	26.8 (16.6-36.9)	74.4	76.8 (59.1-94.5)	35.6	30.4 (20.5-40.4)	71.4	62.7 (48.2-77.1)
Withdrawal as HIV prevention strategy	No	72.3	64.0 (55.2-72.8)	77.8	81.6 (70.1-93.1)	69.4	79.0 (68.8-89.1)	73.1	67.2 (48.9-85.4)	73.5	79.7 (71.1-88.3)	75.2	76.2 (63.4-89.0)
	Yes	27.7	36.0 (27.2-44.8)	22.2	18.4 (6.9-29.9)	30.6	21.0 (10.9-31.2)	26.9	32.8 (14.6-51.1)	26.5	20.3 (11.7-28.9)	24.8	23.8 (11.0-36.6)
Sexual compulsivity scale	<2.4	78.0	76.7 (70.0-83.3)	72.9	53.5 (34.6-72.3)	79.1	78.0 (68.3-87.8)	83.3	82.9 (67.2-98.7)	86.6	90.4 (86.7-94.1)	77.4	77.0 (65.1-88.9)
	>=2.4	22.0	23.3 (16.7-30.0)	27.1	46.5 (27.7-65.4)	20.9	22.0 (12.2-31.7)	16.7	17.1 (1.3-32.8)	13.4	9.6 (5.9-13.3)	22.6	23.0 (11.1-34.9)

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Used PrEP in the P6M?		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)
Perceived risk of HIV infection													
"I don't feel that I am at high enough risk to use PrEP."													
	Strongly disagree/disagree/neutral	54.4	56.0 (46.9-65.1)	88.0	80.9 (62.6-99.3)	54.1	50.2 (37.9-62.4)	98.7	99.6 (99.2-100.0)	56.9	50.7 (39.8-61.6)	90.8	92.1 (84.0-100.0)
	Agree/strongly agree	45.6	44.0 (34.9-53.1)	12.0	19.1 (0.7-37.4)	45.9	49.8 (37.6-62.1)	1.3	0.4 (0.0-0.8)	43.1	49.3 (38.4-60.2)	9.2	7.9 (0.0-16.0)
"HIV/AIDS is a less serious threat than it used to be because of new treatments."													
	Strongly agree/agree	50.1	49.6 (40.4-58.8)	60.2	62.6 (45.2-80.1)	67.5	70.4 (60.3-80.6)	80.8	82.4 (71.2-93.7)	72.7	59.2 (48.1-70.2)	82.7	73.6 (61.4-85.7)
	Disagree/strongly disagree	49.9	50.4 (41.2-59.6)	39.8	37.4 (19.9-54.8)	32.5	29.6 (19.4-39.7)	19.2	17.6 (6.3-28.8)	27.3	40.8 (29.8-51.9)	17.3	26.4 (14.3-38.6)
Knowledge about PrEP													
"I know enough about PrEP to tell if it's right for me or not."													
	Strongly agree/agree/neutral	69.6	63.2 (53.7-72.6)	79.6	89.3 (81.9-96.7)	72.2	75.9 (65.1-86.8)	85.9	81.8 (63.8-99.8)	71.7	75.5 (67.0-84.1)	84.0	86.4 (79.0-93.8)
	Disagree/strongly disagree	30.4	36.8 (27.4-46.3)	20.4	10.7 (3.3-18.1)	27.8	24.1 (13.2-34.9)	14.1	18.2 (0.2-36.2)	28.3	24.5 (15.9-33.0)	16.0	13.6 (6.2-21.0)
"In your opinion, how effective is PrEP at preventing HIV infection?"													
	Completely/very	65.8	44.4 (35.3-53.6)	91.7	82.3 (69.1-95.5)	77.5	69.8 (57.9-81.7)	98.7	98.8 (95.0-102.7)	73.9	62.3 (52.0-72.7)	95.5	95.0 (90.1-99.9)
	Moderately/a little/not at all/no opinion	34.2	55.6 (46.4-64.7)	8.3	17.7 (4.5-30.9)	22.5	30.2 (18.3-42.1)	1.3	1.2 (0.0-5.0)	26.1	37.7 (27.3-48.0)	4.5	5.0 (0.1-9.9)
"I believe that new drug therapies make people less infectious with HIV."													
	Strongly agree/agree	72.5	68.8 (60.2-77.5)	88.0	77.7 (60.7-94.6)	73.8	72.0 (61.3-82.7)	88.5	87.9 (72.4-103.3)	81.8	75.5 (66.6-84.4)	93.2	93.1 (86.4-99.7)

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		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
Used PrEP in the P6M?		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)
Disagree/Strongly disagree		27.5	31.2 (22.5-39.8)	12.0	22.3 (5.4-39.3)	26.2	28.0 (17.3-38.7)	11.5	12.1 (0.0-27.6)	18.2	24.5 (15.6-33.4)	6.8	6.9 (0.3-13.6)
Sexual behavioural impact of PrEP use													
"PrEP would allow me to have the sex I want."													
Strongly agree/agree/neutral	65.6	62.2 (53.4-70.9)	92.6	83.8 (71.6-96.1)	75.2	78.7 (68.0-89.3)	96.2	94.6 (84.6-104.6)	77.0	65.8 (55.2-76.4)	91.7	89.2 (80.1-98.2)	
Disagree/strongly disagree	34.4	37.8 (29.1-46.6)	7.4	16.2 (3.9-28.4)	24.8	21.3 (10.7-32.0)	3.8	5.4 (0.0-15.4)	23.0	34.2 (23.6-44.8)	8.3	10.8 (1.8-19.9)	
"I will choose my sexual partners based on whether they are taking PrEP or not.."													
Strongly agree/agree/neutral	36.4	38.2 (29.0-47.4)	45.3	52.7 (34.1-71.4)	30.1	35.9 (23.5-48.2)	39.7	42.3 (20.3-64.3)	36.3	42.6 (31.5-53.7)	51.1	49.4 (34.6-64.2)	
Disagree/strongly disagree	63.6	61.8 (52.6-71.0)	54.7	47.3 (28.6-65.9)	69.9	64.1 (51.8-76.5)	60.3	57.7 (35.7-79.7)	63.7	57.4 (46.3-68.5)	48.9	50.6 (35.8-65.4)	
"If I were taking PrEP. I'd talk about it with my sexual partners."													
Strongly agree/agree/neutral	94.2	93.7 (89.6-97.9)	96.3	97.0 (94.5-99.5)	98.1	99.1 (98.3-99.8)	94.9	86.4 (70.0-102.8)	96.8	92.8 (89.5-96.1)	99.2	98.0 (97.1-98.9)	
Disagree/strongly disagree	5.8	6.3 (2.1-10.4)	3.7	3.0 (0.5-5.5)	1.9	0.9 (0.2-1.7)	5.1	13.6 (0.0-30.0)	3.2	7.2 (3.9-10.5)	0.8	2.0 (1.1-2.9)	
"If I was taking PrEP. I would most likely stop using condoms."													
Strongly agree/agree/neutral	50.3	48.0 (38.7-57.3)	75.9	71.3 (55.8-86.7)	64.3	59.7 (47.7-71.7)	84.4	77.5 (61.8-93.1)	59.9	58.9 (47.9-69.9)	80.8	79.3 (68.2-90.3)	
Disagree/strongly disagree	49.7	52.0 (42.7-61.3)	24.1	28.7 (13.3-44.2)	35.7	40.3 (28.3-52.3)	15.6	22.5 (6.9-38.2)	40.1	41.1 (30.1-52.1)	19.2	20.7 (9.7-31.8)	
"If a guy is using PrEP it makes using condoms during anal sex less important."													
Strongly agree/agree	31.1	29.1 (20.5-37.8)	60.2	50.5 (31.3-69.6)	46.2	42.4 (30.5-54.3)	80.8	81.2 (70.3-92.1)	47.0	35.3 (25.7-44.9)	78.9	83.6 (73.9-93.3)	

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		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)				
Used PrEP in the P6M?		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)		
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	
	Disagree/strongly disagree	68.9	70.9 (62.2-79.5)	39.8	49.5 (30.4-68.7)	53.8	57.6 (45.7-69.5)	19.2	18.8 (7.9-29.7)	53.0	64.7 (55.1-74.3)	21.1	16.4 (6.7-26.1)	
	Agree/strongly agree	21.7	23.2 (14.7-31.7)	42.1	32.8 (15.4-50.2)	21.2	23.0 (13.2-32.8)	50.0	42.1 (21.7-62.5)	21.4	18.2 (11.0-25.4)	40.9	31.6 (17.7-45.6)	
"I am afraid that guys being on PrEP will stop using other ways of protecting themselves."														
	Strongly disagree/disagree/neutral	78.3	76.8 (68.3-85.3)	57.9	67.2 (49.8-84.6)	78.8	77.0 (67.2-86.8)	50.0	57.9 (37.5-78.3)	78.6	81.8 (74.6-89.0)	59.1	68.4 (54.4-82.3)	
	Agree/strongly agree	21.7	23.2 (14.7-31.7)	42.1	32.8 (15.4-50.2)	21.2	23.0 (13.2-32.8)	50.0	42.1 (21.7-62.5)	21.4	18.2 (11.0-25.4)	40.9	31.6 (17.7-45.6)	
Community receptivity of PrEP														
	"PrEP is well-perceived in the community."	81.9	83.0 (77.1-88.9)	76.9	77.0 (60.2-93.7)	94.3	97.3 (95.0-99.5)	88.5	90.5 (81.0-100.0)	91.5	96.4 (94.1-98.7)	94.7	92.9 (87.9-98.0)	
	Strongly agree/agree/neutral	18.1	17.0 (11.1-22.9)	23.1	23.0 (6.3-39.8)	5.7	2.7 (0.5-5.0)	11.5	9.5 (0.0-19.0)	8.5	3.6 (1.3-5.9)	5.3	7.1 (2.0-12.1)	
	Disagree/strongly disagree	74.4	71.0 (62.4-79.5)	78.7	76.7 (60.5-93.0)	83.9	81.2 (73.0-89.3)	74.0	76.8 (64.5-89.2)	79.8	73.5 (63.4-83.6)	85.0	81.3 (70.7-92.0)	
	Strongly disagree/disagree/neutral	25.6	29.0 (20.5-37.6)	21.3	23.3 (7.0-39.5)	16.1	18.8 (10.7-27.0)	26.0	23.2 (10.8-35.5)	20.2	26.5 (16.4-36.6)	15.0	18.7 (8.0-29.3)	
	Agree/strongly agree	Access to health services												
	Has a primary healthcare provider													
	Yes	58.4	49.4 (40.2-58.6)	75.9	69.6 (53.8-85.3)	70.6	67.3 (55.5-79.2)	93.6	85.4 (68.6-102.2)	56.5	48.7 (38.0-59.4)	78.2	70.7 (57.7-83.8)	
	No	41.6	50.6 (41.4-59.8)	24.1	30.4 (14.7-46.2)	29.4	32.7 (20.8-44.5)	6.4	14.6 (0.0-31.4)	43.5	51.3 (40.6-62.0)	21.8	29.3 (16.2-42.3)	
	Told primary healthcare provider about male partners													
	Yes	49.5	36.3 (27.5-45.1)	74.1	63.9 (45.8-82.0)	56.2	47.7 (35.2-60.2)	92.3	84.9 (68.1-101.8)	35.6	20.5 (12.8-28.1)	68.4	59.1 (44.6-73.5)	
	No	9.0	13.1 (6.4-19.8)	1.9	5.7 (0.0-20.0)	14.4	19.6 (8.4-30.9)	1.3	0.5 (0.0-0.9)	20.9	28.2 (18.9-37.5)	9.8	11.7 (2.1-21.3)	
	No primary care provider	41.6	50.6 (41.4-59.8)	24.1	30.4 (14.7-46.2)	29.4	32.7 (20.8-44.5)	6.4	14.6 (0.0-31.4)	43.5	51.3 (40.6-62.0)	21.8	29.3 (16.2-42.3)	

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		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
Used PrEP in the P6M?		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)
Has medication insurance	Yes	69.3	63.7 (54.7-72.8)	92.6	87.9 (74.8-101.1)	53.8	49.1 (36.9-61.3)	80.8	74.2 (55.5-92.8)	67.6	55.2 (44.6-65.9)	73.7	80.0 (65.6-94.4)
	No	30.7	36.3 (27.2-45.3)	7.4	12.1 (0.0-25.2)	46.2	50.9 (38.7-63.1)	19.2	25.8 (7.2-44.5)	32.4	44.8 (34.1-55.4)	26.3	20.0 (5.6-34.4)
"I don't think I can find a doctor that is sensitive and accepting enough of my sexual activities and choices to prescribe PrEP."	Strongly disagree/disagree/Neutral	89.8	87.8 (82.7-93.0)	97.2	96.8 (88.5-105.1)	85.7	84.9 (75.5-94.4)	94.8	97.7 (93.7-101.7)	82.9	83.5 (74.8-92.2)	97.7	98.5 (95.9-101.2)
	Agree/strongly agree	10.2	12.2 (7.0-17.3)	2.8	3.2 (0.0-11.5)	14.3	15.1 (5.6-24.5)	5.2	2.3 (0.0-6.3)	17.1	16.5 (7.8-25.2)	2.3	1.5 (0.0-4.1)
"I know where to go to get a prescription for PrEP."	Strongly agree/agree/neutral	67.5	60.8 (51.7-70.0)	88.9	83.3 (69.2-97.3)	65.6	54.9 (42.0-67.7)	92.3	94.0 (85.5-102.5)	57.8	56.4 (45.5-67.3)	92.4	82.1 (69.0-95.2)
	Disagree/strongly disagree	32.5	39.2 (30.0-48.3)	11.1	16.7 (2.7-30.8)	34.4	45.1 (32.3-58.0)	7.7	6.0 (0.0-14.5)	42.2	43.6 (32.7-54.5)	7.6	17.9 (4.8-31.0)
"Clinics where I could get PrEP are too far away."	Strongly disagree/disagree/neutral	93.2	94.5 (91.1-97.8)	87.0	82.3 (68.0-96.7)	92.1	93.5 (86.1-100.0)	97.3	94.9 (83.1-106.7)	92.7	87.0 (81.9-92.2)	93.1	93.8 (88.4-99.3)
	Agree/strongly agree	6.8	5.5 (2.2-8.9)	13.0	17.7 (3.3-32.0)	7.9	6.5 (0.0-13.9)	2.7	5.1 (0.0-16.9)	7.3	13.0 (7.8-18.1)	6.9	6.2 (0.7-11.6)
"I have not sought a prescription for PrEP in the past because of the cost of the medication."	Strongly disagree/disagree/neutral	51.3	56.0 (46.7-65.4)	64.2	56.6 (38.0-75.2)	37.8	41.8 (29.0-54.7)	60.8	65.0 (44.9-85.0)	51.1	55.9 (44.3-67.4)	63.8	65.0 (50.0-80.1)
	Agree/strongly agree	48.7	44.0 (34.6-53.3)	35.8	43.4 (24.8-62.0)	62.2	58.2 (45.3-71.0)	39.2	35.0 (15.0-55.1)	48.9	44.1 (32.6-55.7)	36.2	35.0 (19.9-50.0)

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Used PrEP in the P6M?		Montreal (n=476)				Toronto (n=238)				Vancouver (n=386)			
		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
		Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)	Crude %	RDS % (95%CI)
At this time, how easy overall would you say it is for you to access PrEP?													
	Very easy/easy	55.4	44.5 (35.1-53.9)	89.8	85.1 (72.6-97.6)	46.2	35.1 (23.7-46.4)	87.2	87.3 (76.4-98.1)	45.8	48.8 (37.9-59.6)	88.7	79.7 (70.0-89.4)
	Difficult/very difficult/don't know	44.6	55.5 (46.1-64.9)	10.2	14.9 (2.4-27.4)	53.8	64.9 (53.6-76.3)	12.8	12.7 (1.9-23.6)	54.2	51.2 (40.4-62.1)	11.3	20.3 (10.6-30.0)
"Most doctors do not know enough about PrEP to be comfortable prescribing it."													
	Strongly disagree/disagree/neutral	84.5	84.4 (78.0-90.9)	68.3	63.2 (44.2-82.3)	65.5	65.7 (53.2-78.2)	56.6	61.0 (38.4-83.5)	65.4	79.7 (72.3-87.0)	50.4	51.3 (36.7-65.8)
	Agree/strongly agree	15.5	15.6 (9.1-22.0)	31.7	36.8 (17.7-55.8)	34.5	34.3 (21.8-46.8)	43.4	39.0 (16.5-61.6)	34.6	20.3 (13.0-27.7)	49.6	48.7 (34.2-63.3)
Implications of ongoing PrEP use													
"I am worried about the short- and long-term side effects of taking PrEP."													
	Strongly disagree/disagree/neutral	38.8	35.7 (26.6-44.7)	50.9	52.0 (33.3-70.7)	44.9	38.8 (26.4-51.2)	69.2	63.8 (44.0-83.6)	38.5	33.5 (23.4-43.5)	61.4	51.9 (36.6-67.3)
	Agree/strongly agree	61.2	64.3 (55.3-73.4)	49.1	48.0 (29.3-66.7)	55.1	61.2 (48.8-73.6)	30.8	36.2 (16.4-56.0)	61.5	66.5 (56.5-76.6)	38.6	48.1 (32.7-63.4)
"I would have difficulty taking PrEP medication every day."													
	Strongly disagree/disagree/neutral	64.9	66.7 (58.1-75.3)	77.8	84.9 (73.9-96.0)	73.0	71.4 (58.4-84.3)	96.1	95.2 (80.3-110.1)	81.5	81.6 (73.4-89.9)	89.4	80.5 (72.9-88.1)
	Agree/strongly agree	35.1	33.3 (24.7-41.9)	22.2	15.1 (4.0-26.1)	27.0	28.6 (15.7-41.6)	3.9	4.8 (0.0-19.7)	18.5	18.4 (10.1-26.6)	10.6	19.5 (11.9-27.1)
"I don't like the idea of being required to go to the regular medical follow-up visits involved in taking "													
	Strongly disagree/disagree/neutral	72.7	70.2 (62.2-78.2)	85.2	80.8 (66.0-95.7)	74.0	72.9 (62.4-83.4)	88.5	92.6 (82.0-103.1)	79.4	83.0 (74.5-91.5)	93.2	96.7 (94.1-99.4)

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Agree/Strongly agree		27.3	29.8 (21.8-37.8)	14.8	19.2 (4.3-34.0)	26.0	27.1 (16.6-37.6)	11.5	7.4 (0.0-18.0)	20.6	17.0 (8.5-25.5)	6.8	3.3 (0.6-5.9)
		Montreal (n=476)			Toronto (n=238)			Vancouver (n=386)					
Used PrEP in the P6M?		No (n=368)		Yes (n=108)		No (n=160)		Yes (n=78)		No (n=253)		Yes (n=133)	
Scales*													
Treatment optimism-skepticism scale (range: 2-36)													
median (IQR)		16 (6)		21 (7.3)		19 (6)		22.5 (5.0)		19 (6)		23 (6)	
Collective self-esteem scale (range: 3-12)													
median (IQR)		9 (3)		9 (3.5)		9 (4)		10 (3)		9 (3)		9 (4)	
Sexual Altruism scale (range: 6-30)													
median (IQR)		27 (6)		27 (7)		27 (5)		27.5 (6)		28 (6)		29 (5)	
Sexual compulsivity scale (range: 1-4)													
median (IQR)		1.7 (1)		1.9 (1)		1.7 (0.8)		1.7 (0.8)		1.6 (0.8)		1.7 (0.8)	
Condom Barriers scale (range: 7- 35)													
median (IQR)		19 (9)		17 (10)		19 (8)		17 (10)		19 (10)		17 (9)	

RDS respondent driven sampling, CI confidence interval.

*The HIV Treatment Optimism-Skepticism Scale⁴ includes 19 items related to the efficacy of antiretrovirals for both HIV treatment and reduced infectiousness.

The scale ranges from 0 to 36, where higher scores indicate higher optimism in antiretroviral treatment.

The collective self-esteem scale⁵ includes 3 items related to one's sense of belonging to the gay/bisexual/queer community. The scale ranges from 3 to 12, where higher score indicates higher collective self-esteem.

The sexual altruism scale^{6,7} includes 6 items related to "prevention altruism" or one's values, motivations, and practices in terms of sexual behavior to reduce HIV or STI transmission. The scale ranges from 6 to 30, where higher scores indicate higher sexual altruism.

⁴ Ven PVD, Crawford J, Kippax S, Knox S, Prestage G. A scale of optimism-scepticism in the context of HIV treatments. *AIDS Care*. 2000 Apr;12(2):171-6.

⁵ Herek GM, Glunt EK. Identity and Community Among Gay and Bisexual Men in the AIDS Era: Preliminary Findings From The Sacramento Men's Health Study. In: *AIDS, Identity, and Community*. SAGE; 1995.

⁶ Nimmons D, Folkman S. Other-Sensitive Motivation for Safer Sex Among Gay Men: Expanding Paradigms for HIV Prevention. *AIDS Behav*. 1999 Dec 1;3(4):313-24.

⁷ O'Dell BL, Rosser BRS, Miner MH, Jacoby SM. HIV Prevention Altruism and Sexual Risk Behavior in HIV-Positive Men Who Have Sex with Men. *AIDS Behav*. 2008 Sep;12(5):713-20.

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Confidential

The sexual compulsivity scale⁸ includes 10 items related to sexually compulsive behavior, sexual preoccupations, and sexually intrusive thoughts. The scale ranges from 1 to 4, where higher scores indicate higher sexually compulsive behavior.

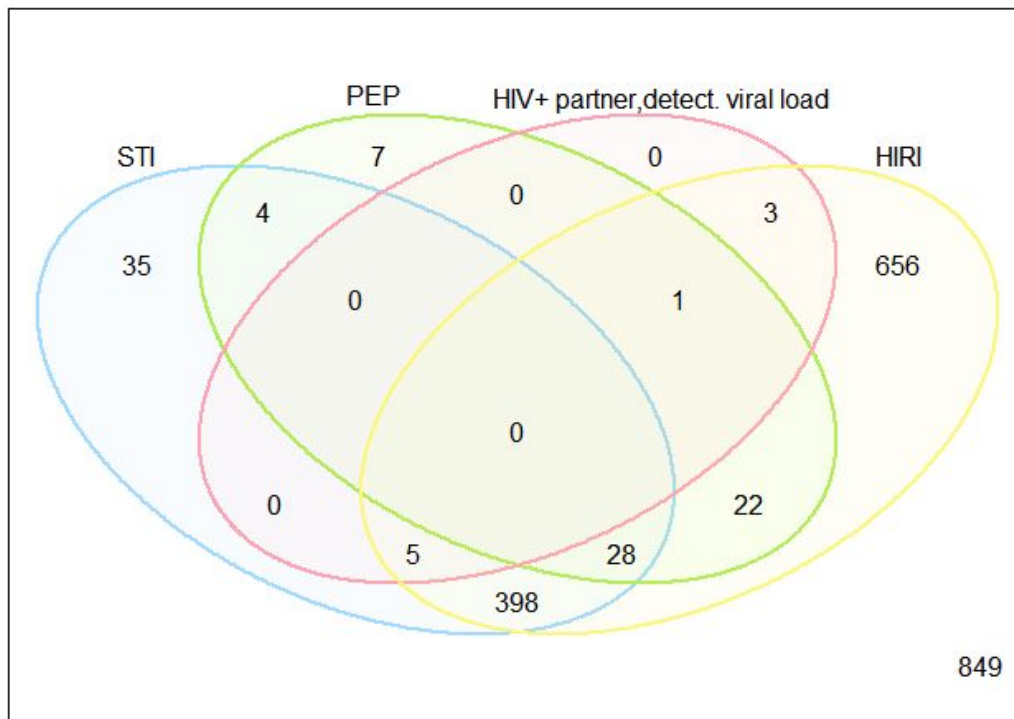
The condom barriers scale⁹ includes 7 items related to one's perception and attitudes regarding condom use. The scale ranges from 7 to 35, where higher scores indicate a more negative perception and attitude in using condoms(e.g., "condoms rub and cause irritation, "condoms do not feel good")

⁸ Kalichman SC, Rompa D. The Sexual Compulsivity Scale: Further Development and Use With HIV-Positive Persons. *Journal of Personality Assessment*. 2001 Jun;76(3):379–95.

⁹ Doyle SR, Calsyn DA, Ball SA. Factor Structure of the Condoms Barriers Scale With a Sample of Men at High Risk for HIV. *Assessment*. 2009 Mar;16(1):3–15.

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Figure S1: Distribution of self-reported HIV-negative participants by Canadian PrEP guideline criteria (n=2008)



STI: condomless anal sex in the past six months and a diagnosis of syphilis or rectal sexually transmitted infection (STI) in the past year

PEP: condomless anal sex in the past six months and more than one previous use of HIV post-exposure prophylaxis (PEP)

HIV+ partner, detect. viral load: condomless anal sex in the past six months and an ongoing relationship with an HIV-positive partner who is at risk of transmitting HIV

HIRI: condomless anal sex in the past six months and an HIV incidence risk index for men who have sex with men (HIRI-MSM) score ≥ 11

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Table S3: Distribution of self-reported HIV-negative participants by Canadian PrEP guideline criteria (n=2008)

	Self-reported HIV-negative or unknown participants			
	Montreal (n=968)	Toronto (n=418)	Vancouver (n=622)	Total (n=2008)
	n (crude %)	n (crude %)	n (crude %)	n (crude %)
PrEP recommendation criteria*				
CAS and bacterial STI	212 (21.9%)	96 (23.0%)	162 (26.0%)	470 (23.4%)
CAS and recurrent use of PEP	45 (4.6%)	6 (1.4%)	11 (1.8%)	62 (3.1%)
CAS and ongoing relationship with an HIV+ partner at risk of transmitting HIV	2 (0.2%)	3 (0.7%)	4 (0.6%)	9 (0.4%)
CAS and HIRI score ≥ 11	482 (49.8%)	243 (58.1%)	388 (62.4%)	1113 (55.4%)
Contribution of each criterion to PrEP recommendation				
Meets 1 criterion only: CAS and STI	20 (2.1%)	4 (1.0%)	11 (1.8%)	35 (1.7%)
Meets 1 criterion only: CAS and PEP	5 (0.5%)	0 (0%)	2 (0.3%)	7 (0.3%)
Meets 1 criterion only: CAS and HIV+ partner	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Meets 1 criterion only: CAS and HIRI+	277 (28.6%)	147 (35.2%)	232 (37.3%)	656 (32.7%)
Meets 2 criteria	188 (19.4%)	91 (21.8%)	148 (23.8%)	427 (21.3%)
Meets 3 criteria	21 (2.2%)	5 (1.2%)	8 (1.3%)	34 (1.7%)
Meets all 4 criteria	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Does not meet any of the criteria/not PrEP recommended	457 (47.2%)	171 (40.9%)	221 (35.5%)	849 (42.3%)

* Proportions are not mutually exclusive

CAS condomless anal sex STI sexually transmitted infection, PEP post exposure pr

HIV pre-exposure prophylaxis (PrEP) use among Urban Canadian Gay, Bisexual and Other Men Who Have Sex with Men for whom PrEP is clinically recommended: Baseline Results from the Engage Cohort Study

STROBE Statement—Checklist of items that should be included in reports of *cross-sectional studies*

The page and line numbers reported correspond to the numbers in the PDF generated by Scholar One which combines all files (39 pages)

	Item No	Recommendation	Page No	Line No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	2	1-2
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3	10-30
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4	1-52
Objectives	3	State specific objectives, including any prespecified hypotheses	4	52-57
Methods				
Study design	4	Present key elements of study design early in the paper	5	5-8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5	8-15, 29-40
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	5	16-23 45-55
			6	1-2
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6	12-38
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5	5-6, 33-34
Bias	9	Describe any efforts to address potential sources of bias	5	33-34
			6	41-48
Study size	10	Explain how the study size was arrived at	5	30-31
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6	33-38
				Table1
				Table2
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	6	41-57
			7	1-15
		(b) Describe any methods used to examine subgroups and interactions	n/a	n/a
		(c) Explain how missing data were addressed	7	6-10
		(d) If applicable, describe analytical methods taking account of sampling strategy	6	41-48
		(e) Describe any sensitivity analyses	7	12-13

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7	17-34
		(b) Give reasons for non-participation at each stage		Fig. 1
		(c) Consider use of a flow diagram		Fig. 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7	35-42
				Table1
		(b) Indicate number of participants with missing data for each variable of interest	7	31-33
			8	24-25
Outcome data	15*	Report numbers of outcome events or summary measures	7	43-49
				Fig. 2
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	7	49-57
			8	1-19
				Table2
		(b) Report category boundaries when continuous variables were categorized		Table2
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n/a	n/a
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	8	20-25
Discussion				
Key results	18	Summarise key results with reference to study objectives	8	29-57
			9	1-43
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	9	43-57
			10	1-12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10	14-42
Generalisability	21	Discuss the generalisability (external validity) of the study results	10	11-12
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	10	45-57