

Developing a predictive index for HIV pre-exposure prophylaxis (PrEP) use among gay, bisexual and other men who have sex with men

*Joseph Cox^{1,2,3}, Mehmet Inceer^{4,5}, Herak Apelian^{2,3}, Nancy E. Mayo^{4,5}, Darrel H. Tan⁶, Mark Hull⁷, Trevor A. Hart⁸, Syed Noor⁸, Bertrand Lebouché², Daniel Grace⁹, David M. Moore⁷, Nathan J. Lachowsky¹⁰, Shayna Skakoon-Sparling⁸, Marc Messier-Peet^{2,3}, Gilles Lambert^{3,11}

1. Department of Epidemiology & Biostatistics, McGill University, Montreal, QC, Canada, 2. Research Institute, McGill University Health Centre, Montreal, QC, Canada, 3. Direction régionale de santé publique - Montréal, Montréal, QC, Canada, 4. McGill University School of Physical and Occupational Therapy, Montreal, QC, Canada, 5. Centre for Outcomes Research & Evaluation, Research Institute-McGill University Health Centre, Montreal, QC, Canada, 6. Division of Infectious Diseases, St. Michael's Hospital, Toronto, ON, Canada, 7. BC Centre for Excellence in HIV/AIDS, Vancouver, BC, Canada, 8. Department of Psychology, Ryerson University, Toronto, ON, Canada, 9. Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada, 10. School of Public, Health & Social Policy, Faculty of Human & Social Development, University of Victoria, Victoria, BC, Canada, 11. Institut national de santé publique du Québec, Montréal, QC, Canada.

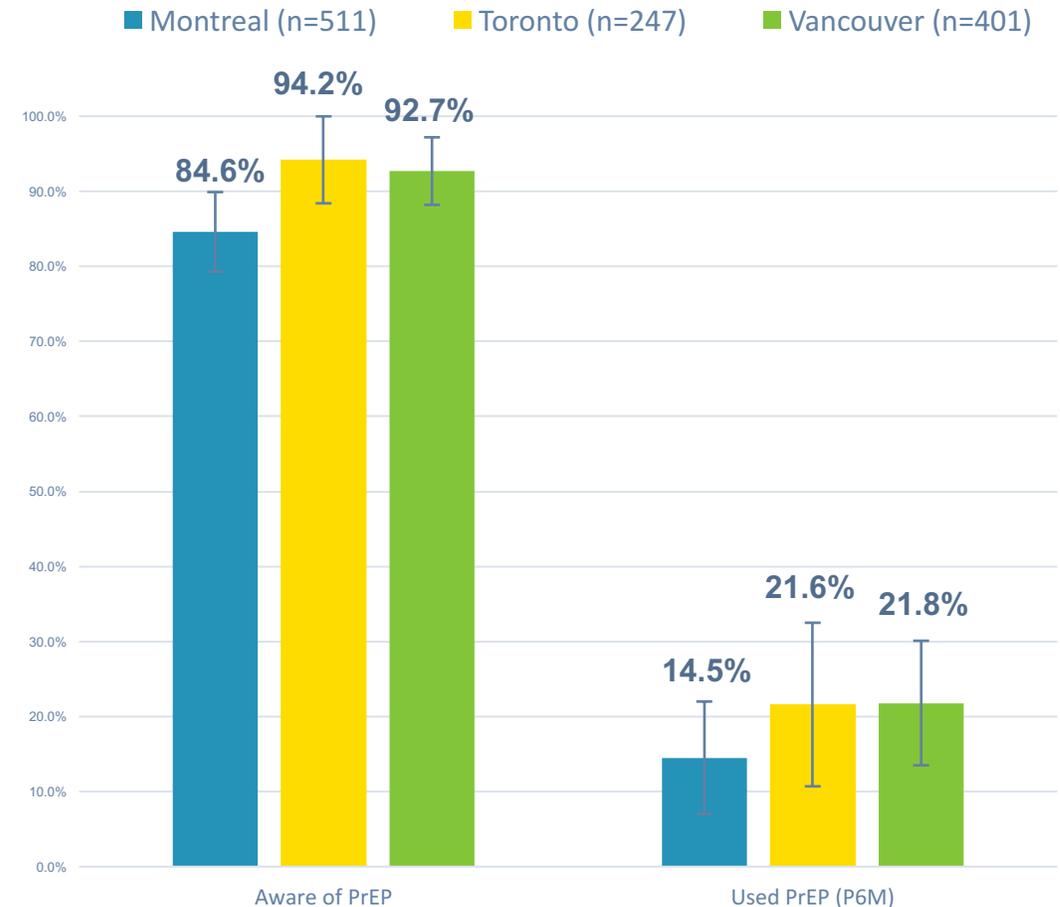
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For more information: joseph.cox@mcgill.ca

Why did we research this topic?

- ▶ While most HIV-negative gay, bisexual and other men who have sex with men (GBM) for whom PrEP is recommended¹ are PrEP-aware, many do not use it. In a previous analysis of Engage data, PrEP use among such men was low, ranging from 14.5-21.8% (Figure 1)².
- ▶ Certain perceptions regarding PrEP and its use may preclude men from seeking and continuing to use PrEP.
- ▶ We sought to develop a predictive index, based on PrEP perceptions, that could be used to identify GBM for whom efforts may be needed to improve access.

1. Tan et al. CMAJ 2017; 2. Apelian et al. CAHR 2019

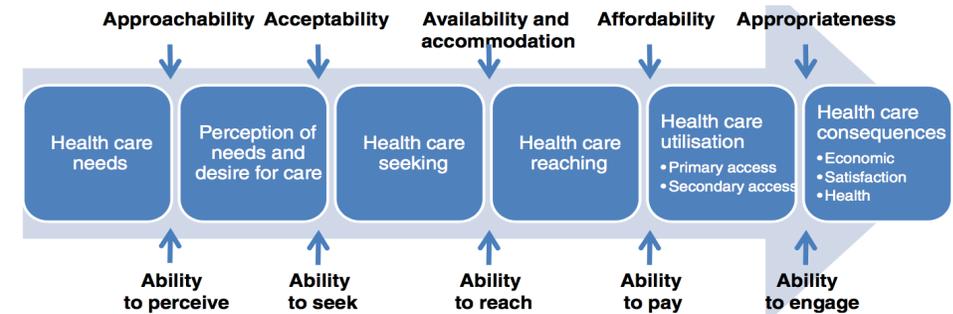
Figure 1. PrEP awareness and use among self-reported HIV negative Engage participants for whom PrEP is recommended. Montreal, Toronto, and Vancouver; 2017-2019 (n=1159)



How did we research this?

- ▶ Using Respondent-Driven Sampling (RDS), **Engage** recruited sexually active (sex with a man, past 6 months) cisgender and transgender **GBM** ≥ 16 years of age in **Montreal, Toronto, and Vancouver**. Participants completed a computer-assisted survey and biomedical testing (i.e., HIV/STI testing). **Baseline data (02-2017 to 06-2018)** from the **Montreal** site were used.

- ▶ 17 questions on PrEP-access, based on a **conceptual framework of health services access**¹, were used to derive the index².



- ▶ Among HIV-negative/unknown and PrEP-aware participants, we:
 - ▶ **Identified key items:** 17 questions were filtered using item-to-item (sampling weighted) correlations ($0.2 < r < 0.9$).
 - ▶ **Calculated item scores & total index score:** using univariate logistic regression (PrEP-use, past 6 months as the outcome), β -weights for each item were ascertained. A final set of β -weights were used to calculate participants' total index scores.
 - ▶ **Determined an index threshold:** based on best explanatory properties.
 - ▶ **Evaluated index performance:** using the index threshold and PrEP use as the reference, sensitivity and specificity were calculated.
 - ▶ **Determined whether the index provides information beyond clinical indication**³: a multivariate logistic regression model, controlling for whether PrEP is recommended, was evaluated. All analyses were RDS-adjusted.

What did we learn?

- ▶ Of 802 GBM, **10.3%** reported PrEP-use, past 6 months.
- ▶ The questionnaire was reduced to **9 items** (Table 1). The **total index score ranged from 0-14**. Mean=4.7; standard deviation=3.1
- ▶ An **index threshold of <6** was determined. 70% of participants had a score <6; for 53% of these men, PrEP was clinically indicated¹. Using this threshold, the index has:
 - ▶ a **sensitivity of 78%** and **specificity of 78%**
 - ▶ a negative predictive value of 95%; meaning among GBM with a score <6, 95% were not using PrEP.
- ▶ The **index was independently predictive** regardless of clinical indication¹:
 - ▶ Multivariate model: adjusted odds of using PrEP for those with a score <6, was 0.11(95%CI:0.05-0.23), after considering clinical indication (aOR:5.3;95%CI:1.7-16.5)
 - ▶ The interaction term (index*clinical recommendation) was not statistically significant, indicating the two are unique dimensions of PrEP use.

Table 1. Questions included in the PrEP-use index and their univariate β -weights contributing to a total score. Participants were asked “At this time, thinking about PrEP as an HIV prevention method, how much do you agree with the following statements?”

*Options: 0=strongly disagree; 4=strongly agree

Items	Responses*	Univariate B Weights
I don't feel that I am at high enough risk to use PrEP	0	2.38
	1	1.59
	2 - 4	Referent
PrEP would allow me to have the sex I want.	0 -1	Referent
	2-3	1.1
	4	2.37
If I was taking PrEP, I would most likely stop using condoms.	0	Referent
	1	1.24
	2 -4	1.84
I know where to go to get a prescription for PrEP.	0 -3	Referent
	4	2.05
Clinics where I could get PrEP are too far away.	0	1.31
	1 - 4	Referent
I am worried about the short- and long-term side effects of taking PrEP.	0	1.15
	1-2	0.23
	3 -4	Referent
I don't like the idea of being required to go to the regular medical follow-up visits involved in taking PrEP.	0	1.31
	1 -4	Referent
I have not sought a prescription for PrEP in the past because of the cost of the medication.	0	0.49
	1 -4	Referent
I would have difficulty taking PrEP medication every day.	0	1.08
	1-4	Referent
Total (Mean; SD)		14 (4.7±3.1)

What are the implications of these findings?

- ▶ We derived a predictive index consisting of 9 items on PrEP access perceptions; these items include both upstream (e.g., perceived need) and downstream (e.g., difficulty taking PrEP) dimensions of access.
- ▶ Participants having a score <6 (cut-off), were unlikely to report using PrEP. Regardless, many would have benefitted. For these men, specific index items could help orient interventions to increase the use of PrEP. For example:
 - ▶ A man who does not identify himself at “high enough risk to use PrEP” could benefit from one-on-one counselling to validate this perception.
 - ▶ A man worried about “short- and long-term side effects of PrEP” would benefit from related clinical counselling.
- ▶ The index predicts PrEP use independently of clinical indication. As such it may be complementary in the clinical assessment by considering individual-level perceptions that influence access and ongoing use.
- ▶ Limitations & future research: the index was developed using a single sample of GBM in Montreal; results must be validated. Future research will include validation of the index in a different sample of GBM, examination of its predictive validity over time, and deriving a similar index using a sample restricted to GBM for whom PrEP is clinically recommended.

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