Combination HIV prevention among Montreal gay, bisexual, and other men who have sex with men in the PrEP era: a latent class analysis

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- *I would like to acknowledge that we are gathered on the traditional, ancestral, and unceded Indigenous territories of the Coast Salish Peoples, particularly the Musqueam, Squamish, and Tsleil-Waututh peoples.*

Conflict of Interest Disclosure

In the past 2 years I have been an employee of: **N/A**

In the past 2 years I have been a consultant for: **N/A**

In the past 2 years I have held investments in the following pharmaceutical organizations, medical devices companies or communications firms: **N/A**

In the past 2 years I have been a member of the Scientific advisory board for: **N/A**

In the past 2 years I have been a speaker for: **N/A**

In the past 2 years I have received research support (grants) from: **N/A**

In the past 2 years I have received honoraria from: **N/A**

I agree to disclose approved and non-approved indications for medications in this presentation: **YES**

I agree to use generic names of medications in this presentation: **YES**

There are relationships to disclose: **NO**

Background

- To date, no one HIV prevention method will eliminate HIV.

- Prevention methods differ by HIV serostatus.

- Previous studies have looked at the use of various prevention methods among gbMSM in Montreal (Otis, AIDS Behav, 2016) and Vancouver (Card, Arch Sex Behav, 2016).

- PrEP has been available in Montreal for close to 5 years and shifts in the HIV prevention landscape are expected.

- It is necessary to understand the current status of prevention use and their determinants to devise appropriate prevention strategies.

Study Objectives

1. To examine latent patterns of uptake of risk reduction strategies through combination HIV prevention among Montreal gbMSM.

2. To describe the potentially important sociodemographic and behavioural factors associated with each respective pattern.

Methods: Study Population

- <u>Study design</u>: Three-city, cross-sectional study

- <u>Data source:</u> Engage Montreal (preliminary data)

- <u>Study Period</u>: February 2017 – February 28, 2018

- <u>Recruitment type:</u> Respondent Driven Sampling (RDS)

- <u>Inclusion Criteria:</u>

  - Cisgender and transgender men
  - ≥16 years
  - reside in the greater Montreal area
  - had sex with another man in the past 6 months

- All study participants complete a computer-assisted questionnaire and undergo HIV/STI testing.

Methods: Statistical Analyses

- Latent class analyses (LCA) were used to empirically categorize participants into similar classes based on self-reported use of HIV risk reduction methods.

- Models were stratified by HIV serostatus.

- LCA model selection was based on model fit criterion and the interpretability of classes.

- Univariate and multivariate regression models were performed on selected factors

  - Significant factors in univariate models were included in the multivariate model

Methods: Variable Definitions

Strategy	Definition
HIV testing	HIV test in the past 6 months
PEP	Ever taken PEP
PrEP	Ever taken PrEP
Condom	Always used condoms for anal sex in the past 6 months
Strategic positioning	Positioning as the top (insertive partner) for anal sex as a strategy to prevent getting HIV in the past 6 months (HIV-negative men)/ Positioning as the bottom (receptive partner) for anal sex as a strategy to prevent transmitting HIV in the past 6 months (HIV-positive men)
Serosorting	Any condomless sex with known HIV-negative men as a strategy to prevent getting HIV in the past 6 months (HIV-negative men)/ Any condomless sex with known HIV-positive men as a strategy to prevent transmitting HIV in the past 6 months (HIV-positive men)
Viral suppression	Self-reported to currently have an undetectable viral load

Methods: Variable Definitions

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Viral suppression	Self-reported to currently have an undetectable viral load

Results: HIV-/unknown LCA

HIV-Negative/Unknown Participants (n=719)
4 Class Model: Estimated Item Response Probabilities
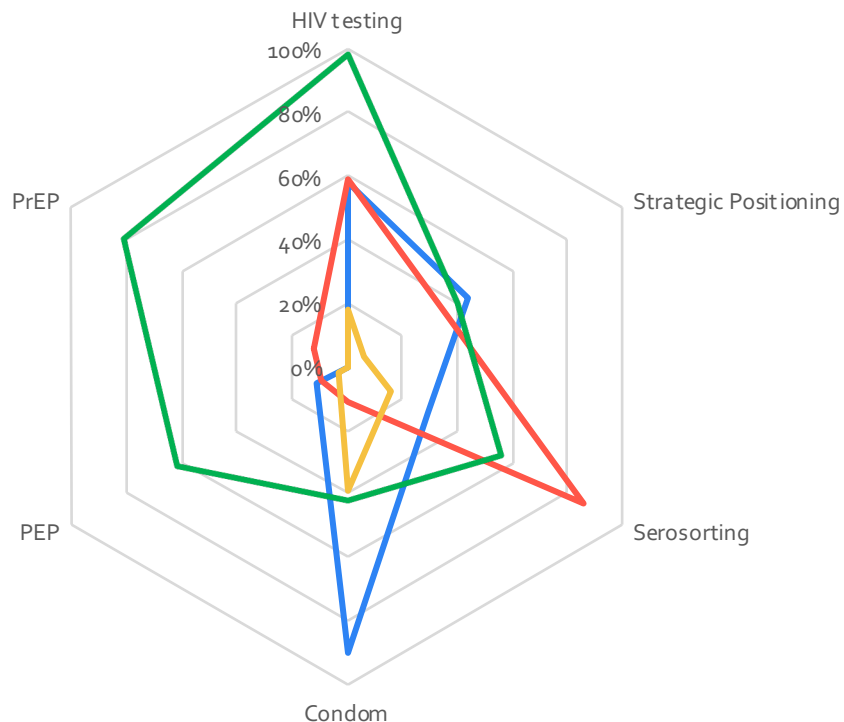
Class 1: Consistent condom users (31%)

Class 2: Serosorters (21%)

Class 3: PEP and/or PrEP users (15%)

Class 4: Low reported uptake of prevention (32%)

Results: HIV+ LCA

HIV-Positive Participants (n=187)
3 Class Model: Estimated Item Response Probabilities
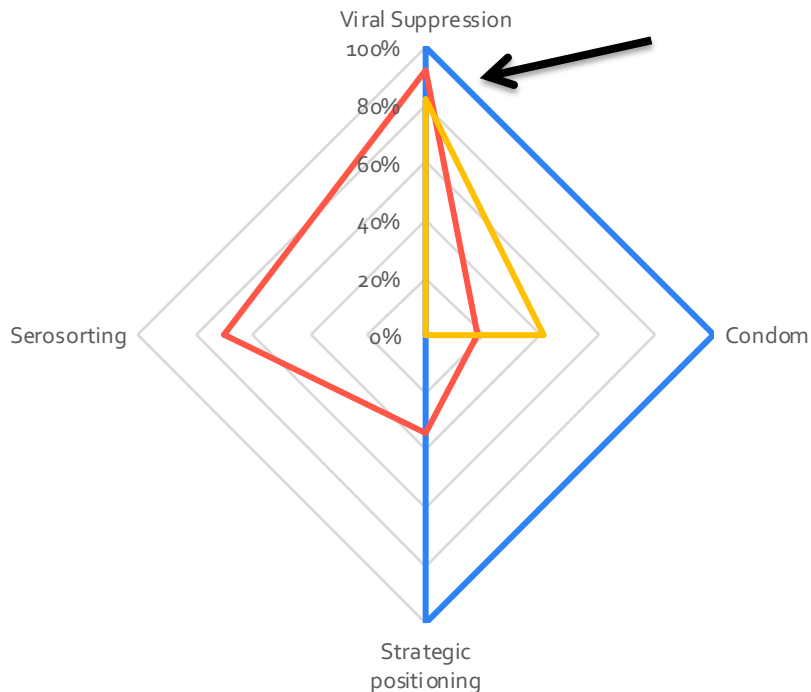
Class 1: Condom Use & Strategic Positioning (7%)

Class 2: Serosorters (54%)

Class 3: Low Reported Uptake of Non-ARV Prevention (39%)

Results: HIV-/unknown regression model

HIV-/unknown multivariate regression model results: OR (95% CI)				
Variable	Class 1: Consistent Condom Users (N=239)	Class 2: Serosorters (N=147)	Class 3: PEP and/or PrEP Users (N=104)	Class 4: Low Reported Uptake (N=229)
Age ≤ 30	1.5 (1.0 – 2.2)	1.5 (1.0 – 2.4)	0.7 (0.4 – 1.3)	REF
Sexual orientation: gay	1.2 (0.7 – 2.1)	1.8 (0.9 – 3.7)	1.3 (0.5 – 3.4)	REF
Ethnicity: French Canadian	-	-	-	-
English Canadian	1.3 (0.6 – 2.6)	1.1 (0.5 – 2.4)	0.9 (0.3 – 2.8)	REF
Other	1.3 (0.9 – 2.1)	0.6 (0.4 – 1.0)	0.9 (0.5 – 1.7)	REF
Education: college diploma or higher	**1.7 (1.1 – 2.6)**	**2.3 (1.4 – 3.8)**	**3.0 (1.6 – 5.8)**	REF
Health care provider	0.9 (0.6 – 1.4)	0.9 (0.6 – 1.5)	**2.6 (1.2 – 4.1)**	REF
STBBI (P12M)	**1.8 (1.0 – 3.0)**	**2.3 (1.3 – 4.1)**	**4.7 (2.5 – 8.8)**	REF
Number of anal sex partners (P12M)				
0-1	-	-	-	-
2-3	**3.1 (1.9 – 5.1)**	**2.6 (1.5 – 4.6)**	2.2 (0.8 – 6.3)	REF
4+	**4.0 (2.4 – 6.5)**	**3.5 (2.0 – 6.3)**	**18.0 (7.9 – 41.2)**	REF
Sex and recreational drug use (P6M)	1.0 (0.7 – 1.6)	**1.7 (1.1 – 2.8)**	**2.3 (1.3 – 4.0)**	REF

The following variables were assessed in univariate models: gender, current main partner, felt at risk of HIV acquisition, mental health disorder diagnosis, alcohol use (4+ drinks per week), crack or cocaine use (P6M), sex and reactional drug use (P6M)

Results: HIV-/unknown regression model

Variable	Class 1: Consistent Condom Users (N=239)	Class 2: Serosorters (N=147)	Class 3: PEP and/or PrEP Users (N=104)	Class 4: Low Reported Uptake (N=229)
HIV-/unknown multivariate regression model results: OR (95% CI)				
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Sexual orientation: gay	1.2 (0.7 – 2.1)	1.8 (0.9 – 3.7)	1.3 (0.5 – 3.4)	REF
Ethnicity: French Canadian	-	-	-	-
English Canadian	1.3 (0.6 – 2.6)	1.1 (0.5 – 2.4)	0.9 (0.3 – 2.8)	REF
Other	1.3 (0.9 – 2.1)	0.6 (0.4 – 1.0)	0.9 (0.5 – 1.7)	REF
Education: college diploma or higher	**1.7 (1.1 – 2.6)**	**2.3 (1.4 – 3.8)**	**3.0 (1.6 – 5.8)**	REF
Health care provider	0.9 (0.6 – 1.4)	0.9 (0.6 – 1.5)	**2.6 (1.2 – 4.1)**	REF
STBBI (P12M)	**1.8 (1.0 – 3.0)**	**2.3 (1.3 – 4.1)**	**4.7 (2.5 – 8.8)**	REF
Number of anal sex partners (P12M)				
0-1	-	-	-	-
2-3	**3.1 (1.9 – 5.1)**	**2.6 (1.5 – 4.6)**	2.2 (0.8 – 6.3)	REF
4+	**4.0 (2.4 – 6.5)**	**3.5 (2.0 – 6.3)**	**18.0 (7.9 –41.2)**	REF
Sex and recreational drug use (P6M)	1.0 (0.7 – 1.6)	**1.7 (1.1 – 2.8)**	**2.3 (1.3 – 4.0)**	REF

The following variables were assessed in univariate models: gender, current main partner, felt at risk of HIV acquisition, mental health disorder diagnosis, alcohol use (4+ drinks per week), crack or cocaine use (P6M), sex and reactional drug use (P6M)

Results: HIV+ regression model

HIV+univariate regression model results: OR (95% CI)	Class 1: Condoms and Strategic Positioning (N=13)	Class 2: Serosorters (N=75)	Class 3: Low Reported Uptake of Non-ARV Prevention (N=88)
Variable			
Age ≤ 50	1.7 (0.5 – 6.4)	1.1 (0.5 – 2.3)	REF
STBBI (P12M)	0.3 (0.1 – 1.4)	0.8 (0.4 – 1.7)	REF
Number of anal sex partners (P12M) 0-1	-	-	REF
2+	1.6 (0.4 – 6.5)	**3.3 (1.3 – 7.9)**	REF
Mental health disorder diagnosis	1.5 (0.5 – 5.3)	**3.8 (1.8 – 7.9)**	REF
Sex and recreational drug use (P6M)	0.4 (0.1 – 1.7)	**3.2 (1.4 – 7.0)**	REF

The following variables were assessed in univariate models but not included in multivariate models: gender, sexual orientation, ethnicity, education, current main partner, health care provider, felt at risk of transmitting HIV, mental health disorder diagnosis, alcohol use (4+ drinks per week), crack or cocaine use (P6M), sex and reactional drug use (P6M)

Limitations

- Not the full sample size (recruitment still ongoing)

- Estimates are not yet RDS weighted or adjusted for clustering

- Performed complete case analysis:

  - HIV-positive participants that self-reported as HIV-negative (n=11) removed due to missing information.

Conclusions

- Montreal gbMSM vary in their preferred combination HIV prevention strategies.

- ARV-based methods (PrEP, PEP, and TasP) are among their risk reduction strategies:
  - Among the HIV-/unknown participants, a class of PEP and/or PrEP users was identified.
  - Among the HIV+ participants, most men in all classes were virally suppressed (82-100%).

- The correlates of the PEP and/or PrEP class are the more at risk behaviours, but also a higher education.

- These results will be updated once recruitment is completed.

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- **Engage Participants**
- **Community and Public Health Partners**
  - AIDS Committee of Toronto
  - AIDS Community Care Montreal
  - Alliance for South Asian AIDS Prevention
  - Asian Community AIDS Service
  - Black Coalition for AIDS Prevention
  - British Columbia Centre for Disease Control
  - BC Centre for Excellence in HIV/AIDS
  - Centre hospitalier de l'Universite de Montreal
  - CIUSSS – Quebec
  - Community Based Research Centre for Gay Men's Health
  - Gay Men's Sexual Health Alliance

- Hassle Free Clinic - Toronto
- Health Initiative for Men
- HIV Prevention Lab - Toronto
- Maison Plein Coeur
- McGill University Health Centre
- Positive Living Society of British Columbia
- REZO – Montreal
- Vancouver Coastal Health
- YouthCO HIV and Hep C Society

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- Ryerson University
- McGill University
- University of Toronto
- Simon Fraser University
- University of Victoria

- University of British Columbia
- University of Windsor
- St. Michael's Hospital

- **Our Funders**
  - Canadian Institutes of Health Research
  - CIHR Canadian HIV Trials Network
  - Canadian Foundation for AIDS Research
  - Canadian Blood Services
  - Ontario HIV Treatment Network
  - Public Health Agency of Canada
  - National Institute of Health

Questions?

Additional Results: HIV-/unknown

HIV-/unknown univariate regression model results: OR (95% CI)				
Variable	**Class 1: Consistent Condom Users (N=239)**	**Class 2: Serosorters (N=147)**	**Class 3: PEP and/or PrEP Users (N=104)**	**Class 4: Low Reported Uptake of Prevention (N=229)**
Age ≤ 30	1.9 (1.3 – 2.8)*	1.9 (1.2 – 2.9)*	1.1 (0.7 – 1.8)	REF
Sexual orientation: gay	1.6 (1.0 – 2.6)	2.7 (1.4 – 5.2)*	3.2 (1.4 – 7.0)*	REF
Ethnicity				
French Canadian	-	-	-	
English Canadian	1.3 (0.7 – 2.6)	1.3 (0.6 – 2.6)	0.8 (0.3 – 2.2)	REF
Other	2.0 (1.4 – 3.0)*	1.0 (0.6 – 1.6)	1.8 (1.1 – 2.9)*	REF
Education: college diploma or higher	2.2 (1.5 – 3.2)*	2.5 (1.6 – 4.0)*	3.5 (2.0 – 6.0)*	REF
Current main partner	1.2 (0.8 – 1.7)	1.4 (0.9 – 2.2)	0.9 (0.6 – 1.5)	REF
Health care provider	0.7 (0.5 – 1.1)	0.8 (0.5 – 1.2)	1.8 (1.1 – 3.1)*	REF
STBBI (P12M)	2.3 (1.4 – 3.7)*	3.1 (1.9 – 5.3)*	9.4 (5.4 – 16.3)*	REF
Number of anal sex partners (P12M)				
0-1	-	-	-	
2-3	3.6 (2.3 – 5.9)*	3.2 (1.9 – 5.6)*	2.4 (0.9 – 6.7)	REF
4+	5.4 (3.4 – 8.6)*	4.9 (2.9 – 8.3)*	28.2 (13.1 – 60.4)*	REF
Felt at risk of HIV acquisition	0.7 (0.4 – 1.1)	1.5 (0.9 – 2.4)	1.2 (0.7 – 2.1)	REF
Mental health disorder diagnosis	1.2 (0.8 – 1.7)	1.0 (0.6 – 1.5)	1.3 (0.8 – 2.0)	REF
Alcohol use: 4+ drinks per week	0.9 (0.6 – 1.5)	0.9 (0.5 – 1.5)	0.7 (0.4 – 1.4)	REF
Crack or cocaine use (P6M)	0.9 (0.6 – 1.4)	1.5 (0.9 – 2.3)	1.6 (0.9 – 2.6)	REF
Sex and recreational drug use (P6M)	1.2 (0.8 – 1.8)	2.0 (1.3 – 3.0)*	3.7 (2.3 – 6.1)*	REF

*Regression coefficient p-value <0.05

Additional Results: HIV+

HIV+ univariate regression model results: OR (95% CI)			
Variable	**Class 1:** **Condoms and Strategic Positioning (N=13)**	**Class 2:** **Serosorters** **(N=75)**	**Class 3:** **Low Reported Uptake of Prevention** **(N=88)**
Age ≤ 50	1.3 (0.4 – 4.2)	1.9 (1.0 – 3.6)*	REF
Education: college diploma or higher	0.9 (0.3 – 2.8)	1.9 (1.0 – 3.5)	REF
Current main partner	1.2 (0.4 – 4.0)	0.6 (0.3 – 1.1)	REF
STBBI (P12M)	0.4 (0.1 – 1.5)	1.9 (1.0 – 3.5)*	REF

Number of anal sex partners (P12M)
  0-1
  2+
	-
	1.0 (0.3 – 3.1)
		-
		4.4 (2.1 – 9.2)*
			REF

Mental health disorder diagnosis	1.5 (0.5 – 4.9)	2.8 (1.5 – 5.3)*	REF
Crack or cocaine use (P6M)	0.7 (0.1 – 3.2)	1.3 (0.6 – 2.7)	REF
Sex and recreational drug use (P6M)	0.4 (0.1 – 1.5)	3.6 (1.9 – 7.0)*	REF

*Regression coefficient p-value <0.05; unable to include the following variables in multinomial regression models due to small cell counts: sexual orientation, ethnicity, health care provider, felt risk of transmitting HIV, and alcohol use