SARS-CoV-2 antibody seropositivity among gay, bisexual, and other men who have sex with men (GBM) in Montreal, Toronto, and Vancouver and the role of living with HIV

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Introduction

- Impact of COVID-19 has been heterogenous in Canada, with a greater occurrence of SARS-CoV-2 infections among vulnerable populations[1,2]
- Unknown whether sexual minority men such as gay, bisexual and other men who have sex with men (GBM) are differentially impacted
- Disparities in health among GBM, such as HIV[3], possibly increase COVID-19 acquisition risk but further evidence is needed[4]

Objective

We estimated seroincidence of SARS-CoV-2 antibodies due to infection among gay, bisexual, and other men who have sex with men (GBM) living in Montreal, Toronto, and Vancouver, and examined the effects of living with HIV on SARS-CoV-2 seropositivity

Methods

- Engage Cohort Study: GBM who were 16+ years old, identified as a man, and reported 1+ sexual encounter with another man in the past 6 months (P6M) were recruited (Feb 2017-Aug 2019) using respondent-driven-sampling (RDS)
- Engage-COVID (16-Sep-2020 to 07-Jun-2022) was nested in the Engage Cohort Study
- Cross-sectional seroincidence study: SARS-CoV-2 antibody testing using a bespoke enzyme-linked immunoassay coupled with self-administered questionnaire
- City-specific SARS-CoV-2 seroincidence rates are reported in cases per 100 person-years (pys)
- A causal framework was used; literature, expert knowledge, and DAGs identified confounders and factors known to be associated with SARS-CoV-2 seropositivity to consider for inclusion in analyses
- The effect of living with HIV on SARS-CoV-2 seropositivity was estimated using a quasi-Poisson regression model, incorporating inverse probability of treatment weights
- The model controlled for all identified confounders (age, city, ethnocultural identity, and educational level). Factors known to be associated with SARS-CoV-2 seropositivity (ex: self-perceived level of adherence to COVID-19 preventative measures [hand washing, physical distancing, and mask-wearing] in P6M) were retained in the model if they improved fit (Table 1)

Results

RDS-adjusted SARS-CoV-2 seroincidence by city

Montreal
(N=831)
5.5 cases per 100 pys
(95% CI: 3.6-8.4)

Toronto
(N=299)
7.2 cases per 100 pys
(95% CI: 3.0-17.4)

Vancouver
(N=432)
9.7 cases per 100 pys
(95% CI: 5.0-18.9)

Conclusions

Urban Canadian GBM living with HIV may be more susceptible to SARS-CoV-2 infection, independently of other known COVID-19 risk factors.

Next steps include:

- Examining the marginal effect of living with HIV on SARS-CoV-2 seropositivity
- City-stratified analyses and effect modification of associated factors of SARS-CoV-2 seropositivity
- Mediation analyses examining factors including COVID-19 vaccination

Table 1. RDS-adjusted rate ratio of SARS-CoV-2 seropositivity for living with HIV, and associated factors (n=1562)*

Predictor	aRR	95%CI
Living with HIV		
No	1	-
Yes	1.3	(1.0-1.8)
Age		
<30 years	1	-
30-45 years	2.5	(1.6-3.8)
>46 years	1.5	(0.9-2.6)
Ethnocultural group		
French/English Canadian	1	-
Other	2.1	(1.4-3.2)
Education level		
Post-secondary or more	1	-
Less than post-secondary	0.7	(0.4-1.2)
City		
Montreal	1	-
Toronto	1.0	(0.7-1.5)
Vancouver	1.1	(0.7-1.6)
Level of adherence to COVID-19 preventive measures (P6M)**		
Optimal	1	-
Suboptimal	2.1	(1.4-2.9)
Close contact with a COVID-19 case (P6M)***		
No	1	
Yes	4.0	(2.8-5.6)

*Factors known to be associated with SARS-CoV-2 seropositivity considered but not retained in the final model: living alone P6M (yes/no), essential worker status since Jan 2020 (yes/no), international travel P6M (yes/no), and number of male sexual partners P6M (#)
**Participants were defined as having optimal adherence to COVID-19 preventive measures if they indicated that they washed their hands/wore masks/practiced physical distancing "very well" or "somewhat well" in P6M. Participants indicating "neutral" "somewhat poorly" or "very poorly" were defined as having suboptimal adherence to COVID-19 preventive measures.
***Self-reported close contact with a confirmed or suspected COVID-19 case in P6M

References

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(4) Ssentongo P, Heilbrunn ES, Ssentongo AE, et al. Epidemiology and outcomes of COVID-19 in HIV-infected individuals: a systematic review and meta-analysis. *Sci Rep.* 2021;11(1):6283. Published 2021 Mar 18. doi:10.1038/s41598-021-85359-3