COVID-19 Omicron infection and severe outcomes in HIV and matched non-HIV cohorts in Ontario, Canada

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BACKGROUND

There is concern that people living with HIV may be at greater risk for COVID-19 infection or severe outcomes, and that vaccination may offer less protection, compared to those not living with HIV. Our aim was to quantify rates of SARS-CoV-2 testing, infection, and COVID-19-related hospitalization/death in the Omicron period and compare this by HIV and vaccination status.

METHODS

We identified community-dwelling adults living with HIV ≥19 years in health administrative databases using a validated algorithm and followed them from **2022/01/02**, to **2023/03/31**, along with an HIV-negative cohort matched on age, sex, census tract, and country of origin. Vaccination status was ascertained from the provincial COVID-19 vaccine registry. Most distributed vaccines during this period were monovalent mRNA vaccines. We report rates per 1000 person-years (PY) for first PCR testing for SARS-CoV-2, PCR-confirmed infection, and COVID-19-related hospitalization/death among HIV and non-HIV matched cohorts, with 95% confidence intervals (CI).

Table 1. Baseline characteristics, Ontario, Canada

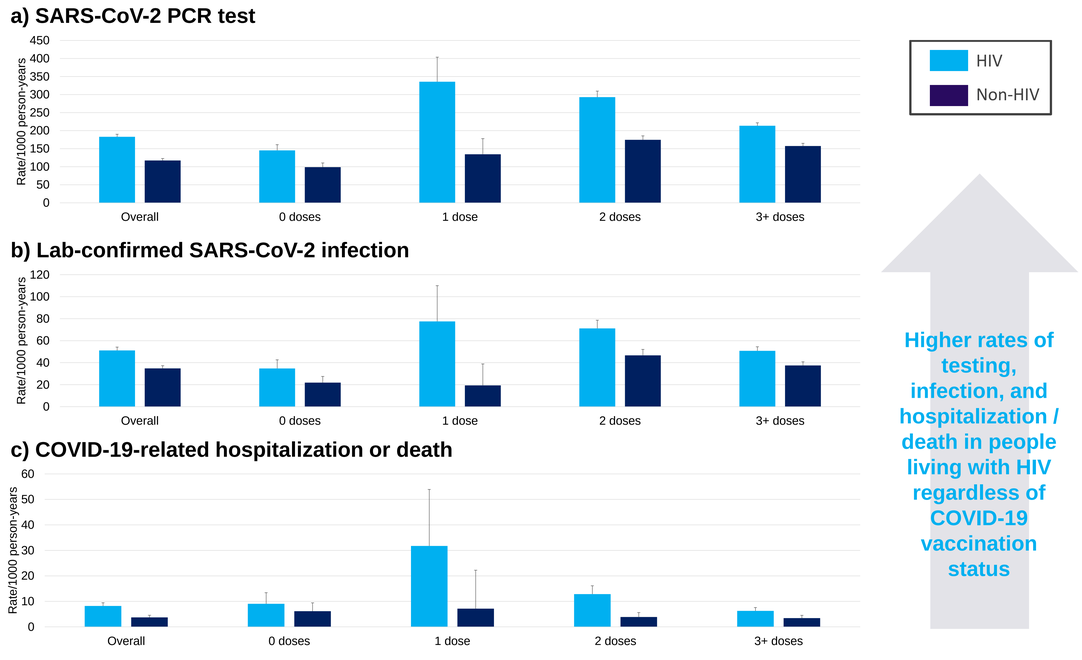
Characteristic	HIV cohort (20,978)	HIV-negative cohort (20,978)	SD
Female (%)	22	22	0.00
Age (Median, IQR)	52 (41-70)	52 (40-60)	0.00
Immigration status (%)			
Non-immigrant	72	72	0.00
HIV endemic country	14	14	0.00
Other country	12	12	0.00
COVID-19 vaccine (%)			
None	12	14	0.08
One dose	2	2	0.02
Two doses	54	60	0.11
Three or more doses	32	27	0.07
Influenza vaccine (2020/21 or 2021/22 seasons) (%)	43	29	0.29
Two or more comorbidities (%)	22	19	0.05

SD, standardized difference, defined as the absolute difference in means or proportions in units of the pooled standard deviation, with SDs ≤0.1 considered negligible. HIV-negative participants were matched 1:1 to people living with HIV on age (5-year interval), sex, residential census tract, and country of origin

In a population-based cohort of people living with HIV during the Omicron period, rates of **SARS-CoV-2 PCR testing** and **RT-PCR-confirmed infection** were approximately 50% higher than a matched HIV-negative cohort, while rates of **COVID-19-related hospitalization and/or death** were more than double, after controlling for age, sex, census tract, and country of origin

RESULTS

Figure 1. Incidence rates per 1000PY among HIV and non-HIV matched cohorts during the Omicron period (2022/01 to 2023/03), overall and by COVID-19 vaccine dose



CONCLUSIONS

The higher rates of testing, infection, and hospitalization/ death among people living with HIV are unlikely to be explained by differential vaccine uptake, since differences persisted across COVID-19 vaccination groups. These findings support prior research suggesting that HIV is an independent risk factor for severe COVID-19 outcomes, even among people who have well controlled HIV. Limitations include incomplete confounding control and imprecision for severe events which were rare. We recommend ongoing monitoring for more recent vaccine formulations, newer variants, and effectiveness of early treatment. To minimize severe outcomes in people living with HIV, timely boosters are important.

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Table 2. Characteristics of participants with a COVID-19-related hospitalization[a] among matched HIV and HIV-negative cohorts

Characteristic	HIV cohort (214)	HIV-negative cohort (99)	SD
Female (%)	33	22	0.25
Age (Median, IQR)	57 (43-68)	61 (51-73)	0.34
Immigration status (%)			
Non-immigrant	78	86	0.19
Immigrant	22	14	0.19
COVID-19 vaccine (%)			
None	12	19-23[b]	0.26
One dose	6	⩽5[b]	0.17
Two dose	36	27	0.18
Three or more doses	46	48	0.05
Time since last vaccine dose (%)			
Unvaccinated	12	21	0.26
7-90 days	21	14	0.18
91-179 days	28	20	0.19
180 days or more	39	44	0.12
Two or more comorbidities (%)	39	34	0.09
COVID-19-related death (%)	12	17	0.14

SD, standardized difference. [a] All-cause hospitalization with an RT-PCR-confirmed SARS-CoV-2 infection occurring within 14 days before or 3 days after admission or a hospitalization outcome recorded in the provincial COVID-19 surveillance database.
[b] Cells suppressed due to small sample sizes.