

# Severity of SARS-CoV-2 omicron infection in vaccinated and unvaccinated residents of long-term care homes

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*To the Editor*—In Ontario, Canada, the initial impact of the coronavirus disease 2019 (COVID-19) pandemic on long-term care (LTC) homes was devastating.<sup>1</sup> LTC residents were thus prioritized for vaccination with mRNA vaccines (2 doses at 3–4-week intervals in January–February 2021), and they were offered a third dose in the fall of 2021 because of waning immunity and decreased protection against severe acute respiratory coronavirus virus 2 (SARS-CoV-2) variants.<sup>2,3</sup> The SARS-CoV-2 B.1.1.529 (omicron) was first detected in Ontario on November 28, 2021. By week 51 (beginning December 19), >90% of sequenced test samples were identified as the omicron variant.<sup>4</sup>

In Ontario, PCR testing for SARS-CoV-2 is recommended for all residents with any compatible symptom or exposure to any infected person. To assess the severity of COVID-19 due to the SARS-CoV-2 omicron variant in Ontario LTC residents, we undertook a chart review of the first 100 residents of Ontario LTC homes owned or managed by Extencare who were diagnosed with COVID-19 after December 15, 2021.

We collected data on resident demographics, body mass index, COVID-19 vaccination, underlying illness, treatment, symptoms, and outcomes (ie, oxygen requirement, hospitalization, and death within 31 days of diagnosis). Two reviewers (A.V. and A.M.) adjudicated whether hospitalizations and deaths were attributable to COVID-19, and a third reviewer (M.M.) was consulted if consensus was not achieved. This chart review was designated a quality improvement project and was exempt from research ethics review.

The 100 cases were diagnosed in 12 homes (median, 3.5 per home; range, 1–29) between December 17 and 30, 2021. The median age was 83.5 years (range, 48–99); 72 patients were female; 6 patients were immunocompromised; 23 patients had chronic renal disease; and 13 patients had previously had COVID-19. Overall, 5 residents had refused vaccination; 3 had received a single dose; 28 had received 2 doses; and 64 had received 3 doses. The median time from the second dose for residents with 2 doses was 178 days (interquartile range [IQR], 160–223); that from third dose was 90 days (IQR, 25–106). No residents received monoclonal antibodies or “remdesivir”, and oral antivirals had not been authorized in Canada. Infection outcomes by vaccination status are shown in Table 1. Overall, the 31-day case fatality rates were 25% (2 of 8) among residents who had not been vaccinated or had received a single vaccine dose, 7.1% (2 of 28) among residents

who had received 2 doses of vaccine, and 3.1% (2 of 64) among residents who had received 3 doses of vaccine ( $P = .01$ ).

The substantial reduction in severity of COVID-19 afforded by vaccination with mRNA vaccines has been noted by others: even 2 doses of COVID-19 vaccine >6 months prior maintains substantial protection against severe disease.<sup>5</sup> The case fatality rate in fully vaccinated residents is substantially and significantly lower than that in unvaccinated residents. However, these data also suggest that despite the SARS-CoV-2 omicron variant causing less severe disease than the delta variant, disease in unvaccinated residents remains severe. These data also suggest that after 3 doses of vaccine, the COVID-19 fatality rate is similar to that of influenza, and disease causing hypoxemia may be more common.<sup>6</sup> Thus, additional interventions (ie, fourth doses of vaccine, prophylaxis, and/or early therapy) may have a role in further reducing morbidity and mortality in this population.

This chart review was limited by sample size. In particular, we were not able to assess whether any differences in outcomes between residents with 2 versus 3 doses of vaccine. Outcomes in our residential LTC homes may differ from those in other types of long-term care with shorter lengths of stay and/or the availability of more acute care. Most residents were vaccinated at similar times, so we were unable to assess potential waning of vaccine protection over time. Nonetheless, these data illustrate both the substantial improvement in outcomes attributable to mRNA vaccines and the need to consider how to achieve further improvements.

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**Table 1.** Outcomes of COVID-19 During the Omicron Wave in Residents of Long-Term Care, Ontario, December 2021, by Vaccination Status

Vaccination Status <sup>a</sup>	Hypoxemia, Hospitalization or Death			Hospitalization or Death			Death		
	Any, No. (%)	Related to COVID-19, No. (%)	P Value	Any, No. (%)	Related to COVID-19, No. (%)	P Value	Any, No. (%)	Related to COVID-19, No. (%)	P Value
Unvaccinated or 1 dose (N=8)	3 (38)	3 (38)	.06 <sup>b</sup>	3 (38)	3 (38)	.01 <sup>b</sup>	2 (25)	2 (59)	.01 <sup>b</sup>
2 vaccine doses (N=28)	5 (18)	2 (7.1)	.12 <sup>c</sup>	4 (14)	1 (3.6)	.007 <sup>c</sup>	2 (7.1)	1 (3.6)	.02 <sup>c</sup>
3 vaccine doses (N=64)	8 (13)	7 (11)		5 (7.8)	3 (4.7)		2 (3.1)	2 (3.1)	

<sup>a</sup>All vaccines were mRNA vaccines (either Cominarty (40%) or Spikevax (60%)), with no significant differences in outcome between vaccines. <sup>b</sup> $\chi^2$  for trend, any case. <sup>c</sup> $\chi^2$  for trend, cases attributed to COVID-19.

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