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## Research Letter

# Variation in Care of Community and Nursing Home Residents Who Died of COVID-19 in Ontario, Canada



Worldwide, nursing home residents have experienced disproportionately high COVID-19 mortality because of the intersection of congregate living, multimorbidity, and advanced age. Among 12 OECD countries in July, Canada had the highest proportion of COVID-19 deaths in nursing home residents (78%), raising concerns about a skewed pandemic response that averted much transmission and mortality in community-dwelling residents, without adequately protecting those in nursing homes.<sup>1</sup> In Canada's most populous province of Ontario, there was no official policy denying hospitalizations for nursing home residents with COVID-19, yet media reports and a provincial commission suggest that resident transfers to hospital were strongly discouraged at the onset of the pandemic.<sup>2,3</sup> To investigate this, we measured temporal variations in hospitalizations among community and nursing home-dwelling decedents with COVID-19 during the first and second waves of the pandemic.

## Methods

We conducted a retrospective cohort study of Ontario residents with COVID-19 who died between March 11, 2020 (first COVID-19 death in Ontario), and December 31, 2020. COVID-19 is reportable under provincial public health legislation, and all laboratories relay positive nucleic acid amplification tests to local public health units, who subsequently investigate and enter case data, including demographics, address, and date of hospitalization and of death, into the provincial reportable diseases surveillance system. The surveillance data have been validated for hospitalization (sensitivity = 87%, specificity = 98%) and death (sensitivity = 97%, specificity = 99%).<sup>4</sup> We examined hospitalization prior to death as a function of 4 factors: nursing home residence vs community-dwelling (ie, non-nursing home), age in years (<70, 70–79, 80–89, ≥90), gender, and period of death (first wave: March–April, May, June–July 2020; second wave: August–October, November, December 2020). The study received a waiver of consent from the research ethics board of Public Health Ontario.

## Results

A total of 4770 people with confirmed COVID-19 died in Ontario from March to December, 2020 (Table 1), of whom 2155 (45.2%) were hospitalized prior to death (median: 9 days before death, interquartile range: 4–19). Among nursing home decedents (n = 2897), 24.1% were hospitalized prior to death, but this varied substantially from a low of 16.4% in March–April (peak of wave 1) to a high of 41.1% in June–July (nadir of wave 1). Among community-dwelling decedents (n = 1873), admission to acute care before death was higher (77.7%) and remained relatively stable throughout the first and second waves. Similar temporal trends for nursing home decedents were apparent in age-stratified analyses. Decedents who were older were less likely to be hospitalized than younger decedents in both community (79.2% <70 vs 69.4% ≥90) and nursing home (40.7% <70 vs 19.0% ≥90) settings. Decedents who were women were less likely to be hospitalized compared with men in both community (74.4% women vs 80.4% men) and nursing home (21.9% women vs 27.6% men) settings.

## Discussion

Only a minority of Ontario nursing home residents who died of COVID-19 at the onset of the pandemic in Canada were hospitalized before death. Although many nursing home residents have advance directives precluding hospitalization, the low admission rates observed in March–April 2020 were inconsistent with both higher admission rates in subsequent months and comparatively stable month-to-month rates among community-dwelling adults.

Our study suggests that variations in access to acute care services, whether due to informal policies or not, may partly explain high mortality among residents and variations in the proportion of COVID-19 deaths occurring in nursing homes, which, in the United States, ranged from 18% in Nevada to 79% in New Hampshire.<sup>5</sup> Our study lacked data on factors influencing hospitalization, including resident acuity at the time of infection identification, advance directives and engagement of family, and home outbreak severity and staffing shortages. Overall, we identified low levels of hospitalization for nursing home residents dying of COVID-19 at the onset of the pandemic, which may have contributed to the particularly high concentration of COVID-19 mortality in Ontario's nursing homes.

The authors declare no conflicts of interest.

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**Table 1**  
Admissions to Hospital Prior to Death Among Community-Dwelling Adults and Nursing Home Residents Who Died With COVID-19 in Ontario, Canada, March to December 2020 (N = 4770)

	n	Proportion of Total Ontario Deaths Among Nursing Home Residents (%)	Community Residents			Nursing Home Residents		
			n	Hospitalized Prior to Death, n (%)	P Value*	n	Hospitalized Prior to Death, n (%)	P Value*
Total	4770	60.7	1873	1456 (77.7)		2897	699 (24.1)	
Month (2020)					<.001			<.001
March-April	1570	66.1	533	426 (79.9)		1037	170 (16.4)	
May	1036	70.5	306	253 (82.7)		730	197 (27.0)	
June-July	310	54.2	142	127 (89.4)		168	69 (41.1)	
August-October	286	42.3	165	124 (75.2)		121	36 (29.8)	
November	543	56.9	234	163 (69.7)		309	108 (35.0)	
December	1025	51.9	493	363 (73.6)		532	119 (22.4)	
Age, y <sup>†</sup>					<.001			<.001
<70	610	28.2	438	347 (79.2)		172	70 (40.7)	
70-79	866	50.8	426	345 (81.0)		440	135 (30.7)	
80-89	1728	64.7	610	487 (79.8)		1118	272 (24.3)	
≥90	1566	74.5	399	277 (69.4)		1167	222 (19.0)	
Gender <sup>†</sup>					.002			<.001
Male	2264	52.8	1068	859 (80.4)		1196	330 (27.6)	
Female	2469	67.7	798	594 (74.4)		1671	366 (21.9)	

\*P values for differences in proportions were based on Pearson chi-square test.

<sup>†</sup>Deaths with unknown age (n = 1) or unknown, trans, or other gender (n = 37) are not presented above.

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Kevin A. Brown, PhD\*  
Public Health Ontario  
Toronto, Canada

Nick Daneman, MD, MSc  
Department of Medicine  
University of Toronto  
Canada

Sarah A. Buchan, PhD  
Public Health Ontario  
Toronto, Canada

Adrienne K. Chan, MD, MPH  
Nathan M. Stall, MD  
Department of Medicine  
University of Toronto  
Canada

\* Address correspondence to Kevin A. Brown, PhD, Public Health Ontario, 480 University Ave, Suite 300, Toronto, ON M5G1V2, Canada.

E-mail address: [kevin.brown@utoronto.ca](mailto:kevin.brown@utoronto.ca)