

## Predictors of case fatality among individuals who have tested positive for COVID-19

### Summary

This paper identified risk factors associated with case fatality among individuals who have tested positive for COVID-19 in Ontario, Canada.

Predictors examined include age, sex, rural residence, comorbidities, prior healthcare use (number of hospital admissions in the past 3 years, number of outpatient physician office visits in the past year), and selected area-level social determinants of health (median household income, proportion of the population who self-report as a visible minority, proportion of the population who are essential workers). These findings, which can be used to inform COVID-19 vaccine prioritization, signal higher case fatality for certain populations.

### Implications

For community-dwelling individuals, increased age, male sex, history of prior hospital admissions in the past 3 years, certain chronic medical conditions, and residing in lower-income neighbourhoods were associated with increased risk of death following COVID-19 infection. Note that these estimates do not account for differences in the risk of COVID-19 acquisition or access to testing across these predictors.

**Reference:** Kwong, J., Calzavara, A., Sundaram, M., & Mishra, S. Predictors of case fatality among individuals who have tested positive for COVID-19. Online. 2021. <https://github.com/mishra-lab/cihr-multiprovince-covid-project/blob/main/reports/Ontario%20COVID-19%20Case-Fatality%20Report%20for%20the%20Ministry%20of%20Health.pdf>

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### What is the current situation?

- The spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing coronavirus disease 2019 (COVID-19), has resulted in a pandemic with increasing rates of case fatality, defined by death following COVID-19 diagnosis.
- Evidence has suggested that patients with severe and fatal COVID-19 are likely to be older adults with a high burden of comorbidities (asthma, chronic obstructive pulmonary disease [COPD], hypertension, diabetes, congestive heart failure [CHF], dementia and frailty, cancer, chronic kidney disease [CKD], immunosuppression, advanced liver disease, ischemic heart disease, history of stroke). However, risk factors remain unclear.

### How was the study conducted?

- We identified Ontario residents with a valid health card, aged 20 years or older, who tested positive for COVID-19 between March 1 and December 31, 2020 and stratified the study population into those residing in long-term care (LTC) and those residing in the community as of March 1, 2020.
- The outcome measure was 30-day all-cause mortality following a positive SARS-CoV-2 PCR test.
- A multivariable logistic regression was used to generate adjusted odds ratios for the associations between case fatality and individual-level and area-level characteristics.
- For the community-dwelling group, we examined the following predictors: age, sex, rural residence, comorbidities, prior healthcare use, and selected area-level social determinants of health.
- For the LTC group, we examined the following predictors: age, sex, rural, and comorbidities. All analyses were adjusted for month of test.

### What did the study find?

- Among 143,077 community-dwelling individuals who tested positive for COVID-19, there were 2,232 deaths.
- Increasing age, male sex, prior hospital admissions, COPD, hypertension, CHF, diabetes, dementia or high frailty score, cancer, CKD, and immunosuppression were associated with increased case fatality, with age effect estimates having the largest magnitude for increased risk.
- Residence in high-income neighbourhoods was associated with decreased case fatality.
- Among 10,763 LTC residents who tested positive for COVID-19, there were 2,893 deaths. Older age, male sex, COPD, diabetes, dementia and frailty, and CKD were associated with increased case fatality.