Research impact: Leveraging OHDP to understand COVID-19 mortality factors in long-term care residents

Managing COVID-19 in long-term care settings has been a high-profile concern during the pandemic, and for good reason. Long-term care residents are highly vulnerable to the disease's worst effects. An Ontario research team recently made a significant contribution to this area by using machine learning to study predictors of mortality in LTC residents with COVID-19.

The results, recently published in the **Journal of American Geriatrics*, concluded that functional status measures are key predictors of mortality, even after considering age, comorbidities and routine biochemical tests. "The results point to the need for sustained vigilance in long-term care settings," says Dr. Douglas Lee, co-author of the study, "especially regarding those with functional limitations, who are at exquisite risk." Precautions to minimize transmission of COVID-19 should continue to be employed, even when residents have been vaccinated.

The study was a collaboration between the clinical research team led by Lee, cardiologist and clinical epidemiologist at University Health Network's Peter Munk Cardiac Centre and the cardiovascular program leader at ICES, and the computational team led by Dr. Bo Wang, Lead Scientist of the Artificial Intelligence Team for Peter Munk Cardiac Centre. Wang's lab develops integrative and interpretable machine learning algorithms that can help clinicians with predictive models and decision support.

The two teams analyzed massive amounts of data housed on the Ontario Health Data Platform (OHDP), running on the high-performance computing cluster maintained by HPC4Health, a partnership between SickKids and the Princess Margaret Cancer Centre. The combination of a vast data set linked to powerful analytical resources enabled the teams to apply machine learning algorithms to investigate no less than 304 potential predictors of mortality, by analyzing more than 500,000 health records (approximately 65,000 patients). "This was unprecedented, not just in the scale of the data but also in the depth," says Wang, noting the team analyzed records going back nearly twenty years to include data from the first emergence of SARS in 2002.

He points out that deploying artificial intelligence in health care is complicated because of the critical need to keep data private. "OHDP offers the ability to bring a massive amount of data together and analyze it without risking privacy or security," he says. He also noted that OHDP provides researchers with expert data management support to prepare and harmonize data from a vast array of sources, enabling greater accuracy in results.

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***Predictors of mortality among long-term care residents with SARS-CoV-2 infection,** first published 19 August 2021. Authors: Douglas S. Lee ,MD, PhD; Shihao Ma, BASc; Anna Chu, MHSc; Chloe X. Wang, BSc; Xuesong Wang, MSc; Peter C. Austin, PhD; Finlay A. McAlister, MD, MSc; Sunil V. Kalmady, PhD; Moira K. Kapral, MD, MSc; Padma Kaul, PhD; Dennis T. Ko, MD, MSc; Paula A. Rochon, MD, MPH; Michael J. Schull MD, MSc; Barry B. Rubin, MD, PhD; Bo Wang, PhD; CORONA Collaboration.