

COVID-19 mortality highly influenced by age demographics

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A study released today from the University of Oxford is the first to highlight the importance of age and demographic science in explaining the difference in fatalities across countries affected by the virus.

The research, from Jennifer Beam Dowd, Melinda Mills and colleagues

at the Leverhulme Centre for Demographic Science, University of Oxford and Nuffield College, emphasises the potential for dramatically higher fatality rates in countries and localities with older populations.

Currently, COVID-19 mortality risk is highly concentrated at older ages, particularly those aged 80+. Understanding a country's age demographics can help predict the burden of critical cases and aid in more precise planning of availability of hospital beds, staff and other resources.

"Until more nuanced data on comorbidities becomes available, the concentration of mortality risk in the oldest ages is one of the best tools we have to understand and deal with COVID-19 at local and national levels," explains the lead author, Jennifer Dowd, Associate Professor of Demography and Population Health.

The study was motivated by the surprising early severity and number of deaths from COVID-19 in Italy. Compared to South Korea, which also had an early surge in cases, Italy has one of the oldest populations in the world with 23.3% over age 65, compared to 14% in South Korea.

Using the current age-specific case fatality rate in Italy, the researchers illustrate how population age structure interacts with high COVID-19 mortality rates at older ages to generate large differences in numbers of deaths. In Italy, the predicted number of fatalities was 1.7 times greater than for South Korea.

"In addition to age demographics, intergenerational interactions are also important to understand the spread of COVID-19," says Melinda Mills, Nuffield Professor and Director of the Leverhulme Centre for Demographic Science. "Italy is a country characterised by extensive intergenerational contacts and residential proximity between adult children and their parents. COVID-19 mitigation policies need to consider this interaction between household living situations and the

concentration of vulnerable populations."

Demographic projections can also be used to understand how population age structure could influence fatalities in different countries around the world. To demonstrate how population age structure might affect countries yet to experience a large surge in the virus, the authors simulated potential mortality rates in two countries with similar population sizes but very different age distributions: Brazil, where 2% of the population is 80+, and Nigeria, where only 0.2% of the population is over 80. This scenario saw in excess of three times more deaths in Brazil, based on age structure alone—but population density and health system capacity are also important.

"Our demographic science forecasting approach shows how COVID-19 could play out in different places, and could be an important tool for governments and policy makers," says Jennifer Dowd. "Holding other factors such as medical capacity constant, a younger age structure should provide protection to a [population](#). But countries and localities with older populations will need to take more aggressive protective measures to stay below the threshold of critical cases that outstrip health system capacity."

More information: Jennifer Beam Dowd et al. Demographic science aids in understanding the spread and fatality rates of COVID-19, (2020). [DOI: 10.1101/2020.03.15.20036293](https://doi.org/10.1101/2020.03.15.20036293)

Provided by University of Oxford

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