

# Risk factors for COVID-19 death revealed in world's largest analysis of patient records

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3D print of a spike protein of SARS-CoV-2, the virus that causes COVID-19—in front of a 3D print of a SARS-CoV-2 virus particle. The spike protein (foreground) enables the virus to enter and infect human cells. On the virus model, the virus surface (blue) is covered with spike proteins (red) that enable the virus to enter and infect human cells. Credit: NIH

The largest study to date, analysing NHS health data from 17.4 million UK adults between 01 February 2020 and 25 April 2020, has given the strongest evidence on risk factors associated with COVID-19 death.

Academics at the University of Oxford and the London School of Hygiene & Tropical Medicine (LSHTM), working on behalf of NHS England and in partnership with NHSX, have analysed the pseudonymised health data of over 17.4 million UK adults to discover the key factors associated with death from COVID-19 .

This is the largest study on COVID-19 conducted by any country to date, and therefore gives the strongest evidence on risk factors associated with COVID-19 death.

Compared to [white people](#), people of Asian and Black ethnic origin were found to be at a higher risk of death. Previously, commentators and researchers have reasonably speculated that this might be due to higher prevalence of medical problems such as cardiovascular disease or diabetes among BME communities, or higher deprivation. The findings, based on detailed data, show that this only accounts for a small part of the excess risk. Consequently, further work must be done to fully understand why BME people are at such increased risk of death.

Additionally, people from deprived social backgrounds were also found to be at a higher risk of death, which also could not be explained by other [risk factors](#).

Results confirmed that men are at increased risk from COVID-19 death, as well as people of older ages and those with uncontrolled diabetes. People with more severe asthma were also found to be at increased risk of [death](#) from COVID-19.

The study linked data about patients that had been hospitalised with

COVID-19 with data held in primary care records processed by TPP. This was carried via the OpenSAFELY analytics platform, a new secure mechanism which allowed the GP records to be linked where they are stored for individual care. This minimises the security risks associated with transferring and storing data elsewhere, to deliver analyses quickly and safely while preserving patient privacy. All identifiable data remains in control of the NHS and data is pseudonymised before it can be accessed by researchers.

Professor Liam Smeeth, Professor of Clinical Epidemiology at LSHTM, NHS doctor and co-lead on the study, says, "We need highly accurate data on which patients are most at risk in order to manage the pandemic and improve patient care. The answers provided by this OpenSAFELY analysis are of crucial importance to countries around the world. For example, it is very concerning to see that the higher risks faced by people from BME backgrounds are not attributable to identifiable underlying health conditions."

Dr. Ben Goldacre, Director of the DataLab in the Nuffield Department of Primary Care Health Sciences at the University of Oxford, NHS doctor and co-lead on the study, says, "During a global health emergency we need answers quickly and accurately. That means we need very large, very current datasets. The UK has phenomenal coverage and quality of data. We owe it to patients to keep their data secure; and we owe it to the global community to make good use of this data. That's why we have developed a new highly secure model, taking the analytics to where the data already resides."

Further analyses using OpenSAFELY are already underway, including investigation into the effects of specific drugs routinely prescribed in primary care. The platform can also be used to evaluate COVID-19 spread with innovative approaches to modelling; predict local health service needs; assess the indirect health impacts of the pandemic; track

the impact of national interventions; and inform exit from lockdown.

**More information:** OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. doi:

[doi.org/10.1101/2020.05.06.20092999](https://doi.org/10.1101/2020.05.06.20092999)

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