

First all-UK study of 67 million people reveals consequences of missed COVID-19 vaccines

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The first research study of the entire UK population highlights gaps in COVID-19 vaccine coverage. Between a third and a half of the

populations of the four UK nations had not had the recommended number of COVID vaccinations and boosters by summer 2022.

Findings suggest that more than 7,000 hospitalizations and deaths might have been averted in summer 2022 if the UK had had better [vaccine coverage](#), according to the paper, published in [The Lancet](#).

With COVID-19 cases on the rise and a new variant strain recently identified, this research provides a timely insight into vaccine uptake and hesitancy and could inform [policy-makers](#).

The findings—led by Health Data Research UK (HDR UK) and the University of Edinburgh—relied on secure access to anonymized health data for everyone in all four nations of the UK, an advance which has only become possible during the pandemic. The researchers say that this approach could be extended to many other areas of medicine with great potential for new discoveries in the understanding and treatment of disease.

Professor Sir Aziz Sheikh, Director of the Usher Institute at the University of Edinburgh, HDR UK Research Director and study co-lead, said, "Large-scale data studies have been critical to pandemic management, allowing scientists to make policy-relevant findings at speed. COVID-19 vaccines save lives. As new variants emerge, this study will help to pinpoint groups of our society and areas of the country where public health campaigns should be focused and tailored for those communities."

Early COVID-19 vaccine roll-out began strongly in the UK, with over 90% of the population over the age of 12 vaccinated with at least one dose by January 2022. However, rates of subsequent booster doses across the UK were not fully understood until now.

Scientists from England, Scotland, Northern Ireland and Wales studied securely held, routinely collected NHS data from everyone over five years of age from June 1 to September 30 2022. All data was de-identified and available only to approved researchers.

Data from across the four countries was then pooled and harmonized—or made more uniform—a feat that was not possible until now. People were grouped by vaccine status, with under-vaccination defined as not having had all doses of a vaccine for which a person was eligible.

The findings reveal that the proportion of people who were under-vaccinated on June 1, 2022, ranged between one-third and one-half of the population—45.7% for England, 49.8% for Northern Ireland, 34.2% for Scotland and 32.8% Wales.

Mathematical modeling indicated that 7,180 hospitalizations and deaths out of around 40,400 severe COVID-19 outcomes during four months in summer 2022 might have been averted, if the UK population was fully vaccinated.

Under-vaccination was related to significantly more hospitalizations and deaths across all age groups studied, with under-vaccinated people over 75 more than twice as likely to have a severe COVID-19 outcome than those who were fully protected.

The highest rates of under-vaccination were found in [younger people](#), men, people in areas of higher deprivation, and people of non-white ethnicity.

Researchers say the study—the largest ever study carried out in the UK—also ushers in a new era for UK science by overcoming challenges in uniting NHS data that is gathered and stored in different ways

between devolved nations.

Professor Cathie Sudlow, Chief Scientist at Health Data Research UK and Director of the British Heart Foundation (BHF) Data Science Center, said, "The infrastructure now exists to make full use of the potential of routinely collected data in the NHS across the four nations of the UK. We believe that we could and should extend these approaches to many other areas of medicine, such as cancer, heart disease and diabetes to search for better understanding, prevention and treatment of disease."

The study was set up to provide UK and devolved governments with data-driven insights into COVID-19 vaccination coverage and establish data pooling methods and infrastructure to pave the way for future UK-wide studies. It is led by HDR UK and the University of Edinburgh, in collaboration with research teams from across the four nations.

Alan Keys, a public contributor at the British Heart Foundation (BHF) Data Science Center at HDR UK who sat on the steering group of the study and is a co-author on the paper, said, "The research outcome is a powerful validation of the benefits of vaccination."

More information: Undervaccination and severe COVID-19 outcomes: meta-analysis of national cohort studies in England, Northern Ireland, Scotland, and Wales, *The Lancet* (2024). DOI: [10.1016/S0140-6736\(23\)02622-3](https://doi.org/10.1016/S0140-6736(23)02622-3). [www.thelancet.com/journals/lan ... \(23\)02467-4/fulltext](https://www.thelancet.com/journals/lan/article/S0140-6736(23)02467-4/fulltext)

Provided by Health Data Research UK

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