



The Rhineland cohort study in Germany is collecting blood to test for coronavirus antibodies.

HUGE COHORT STUDIES PIVOT TO INVESTIGATE THE CORONAVIRUS

Projects that follow populations for years will trace pandemic's physical, mental and social consequences.

By Alison Abbott

Every 15 minutes, three masked individuals troop into each of two research centres in Bonn, Germany, to participate in a study that is checking whether people have antibodies against the coronavirus that causes COVID-19. With 28 millilitres less blood, the participants leave through a different door and will soon learn whether they have survived a coronavirus infection.

They are part of a population cohort called the Rhineland Study, and have been going to the centres six days a week since 24 April. Around 5,000 people from the region have donated blood plasma to the initiative so far.

The effort, led by epidemiologist Monique Breteler, is one of several long-term cohort studies that originally focused on other diseases but that have swiftly been repurposed to study the coronavirus. Population cohorts collect genetic, health and lifestyle information from thousands of people over years or even decades to find out which genetic and environmental factors collude to increase the risk of diseases. The Rhineland Study, for instance, was set up in 2016 to investigate neurodegenerative disorders, such as Alzheimer's disease.

But researchers hope that using cohorts

to study the coronavirus will create rich data sets that, in the short term, could help policymakers to decide how to best control the disease and relax the lockdowns implemented to stem the virus's spread. In the long term, they will be able to track physical, mental and socio-economic consequences of the pandemic, and allow scientists to address questions such as whether exposure to the virus increases health risks later in life.

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others become seriously ill," says Breteler. This knowledge could, for instance, inform decisions about who should be vaccinated first once limited batches of vaccine become available, she says.

Cohort studies differ from efforts that are using antibody measurements to calculate the proportion of a population that has been infected with SARS-CoV-2. Many repurposed

cohort studies will take blood samples from participants at multiple time intervals, to see how long antibody immunity might last. But their design also allows them to answer detailed questions about the biology of COVID-19 infections by combining this information with participants' genetic, health and lifestyle data.

This information will be made available to researchers from diverse fields who are seeking to find out which factors influence susceptibility or resistance to infection and the seriousness of disease. Genes, immunological and metabolic status and environmental factors could all be at play.

"We are all different and these larger pre-existing cohorts will be very valuable in helping us understand which of our biological or lifestyle factors put us at risk," says Ralf Reintjes, an epidemiologist at the Hamburg University of Applied Sciences in Germany. "They will give us a better understanding of the steps needed in the near future to come back to a safe but normal life – not based on gut feeling, but on evidence."

Cohort data will also be important for tracking how the COVID-19 crisis might exacerbate socio-economic inequalities, says Alissa Goodman, an economist who directs the Centre for Longitudinal Studies at University College London. The centre runs 4 UK birth cohorts and is gathering insights into how coronavirus is changing 50,000 participants' lives.

Intertwined factors

The Rhineland Study's scientists had recruited one-fifth of the participants for the original study when Germany's lockdown on 22 March closed its two centres. Breteler says it was a "no brainer" to turn over the study's rich resources to help to address the COVID-19 crisis.

Other cohorts followed, and began assessing whether participants had antibodies against the coronavirus. Norway's birth cohort – the Norwegian Mother and Child Cohort – began sampling its participants at the end of April. Iceland's government has enlisted the Reykjavik-based genomics company deCODE to monitor antibodies in about 50,000 people. And in May, the UK Biobank – which holds genomic and health information on its participants – began a programme to gather blood samples from 10,000 of its participants, along with 10,000 of their children and grandchildren, to test for antibodies.

An organization called the International HundredK+ Cohorts Consortium, which encourages data sharing between 66 cohorts worldwide, is also coordinating international efforts to test any biological samples that the cohorts might have collected in October or November last year. If it detects SARS-CoV-2, this could build a picture of when the virus began circulating, and of its path around the world.