

# Tackle coronavirus in vulnerable communities

**The pandemic has hit care homes, prisons and low-income communities hardest. Researchers are ready to help, but need more data.**

**R**espiratory pathogens spread like wildfire when people are in close contact. So it's little wonder that almost all of the 150 biggest coronavirus outbreaks in the United States have been in prisons, nursing homes, veterans' homes, psychiatric hospitals, meat-packing plants and homeless shelters, where people live or work side by side.

The phenomenon can be seen worldwide. Singapore seemed to have almost contained its epidemic until it became clear that the virus had been spreading undetected among migrant workers living in dormitories. And across Europe, homes for elderly people are among the worst hit.

Health officials are still failing to contain COVID-19 in shared spaces such as these because of the difficulties in achieving physical distancing. Measures, such as working from home, that protect healthier, wealthier and freer individuals, are often impossible to achieve for those whose jobs or accommodation make it impossible to self-isolate. Worse, there is little evidence to back up current policies intended to keep residents of communal spaces safe – or to support new ones.

Evidence-based strategies are urgently needed to prevent the spread of infection in shared settings, and to detect cases early. Researchers are ready to answer this call. But policymakers and health officials must first prioritize this research, and report data on caseloads and deaths so that epidemiologists can work out, in detail, what is going wrong. Most urgently, they must make regular testing available for high-risk groups, so that responders can intervene when cases first arise.

In many countries, testing is limited to people with symptoms such as a fever or severe cough, even though it is now established that infected individuals without symptoms can spread the disease. Asymptomatic cases can be particularly dangerous in communal spaces, where infections spread fast. In early April, for example, researchers testing people in a homeless shelter in Boston, Massachusetts, found that almost 90% of 147 people infected with the coronavirus did not have identifiable symptoms (T. P. Baggett *et al.* *J. Am. Med. Assoc.* <http://doi.org/ggtsh3>; 2020).

Analyses of outbreaks in US nursing homes and in prisons have found that more than half of infected residents and staff didn't show obvious symptoms at the time of testing. Some epidemiologists, geneticists and social scientists are rightly urging policymakers to change the testing criteria



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so that people in communal settings are tested regularly, regardless of whether they have symptoms.

With more data, epidemiologists would be able to evaluate and compare interventions to see which work best. For example, are face masks preventing transmission? How effective is the practice of positioning beds in homeless shelters two metres apart? Would it be safer for homeless people to be accommodated outdoors, in tents, if single-occupancy accommodation isn't available?

In addition, by sequencing the viruses spreading in a facility, researchers can determine how often people are introducing viruses from outside, and to what extent infections are being amplified in communities. And full cost analyses will help policymakers to compare the total costs of different solutions. Something that seems expensive upfront might, over time, result in lower overall costs once other expenses, such as hospital stays, are factored in.

In the United States, which still has the world's highest number of confirmed deaths from COVID-19, scientists are ready to do more. Several academic labs say they can run thousands more tests than they are currently processing, and some have developed easier-to-deploy tests. For example, on 8 May, the US Food and Drug Administration permitted the emergency use of a test based on the gene-editing tool CRISPR that can be processed using less-sophisticated equipment than is required for many other tests.

But, for researchers to be more involved, they must be integrated into state-wide testing strategies that link them to health departments. And these agencies must, in turn, be prepared to respond to positive diagnoses.

At the moment, that is not a given. Alarming, some researchers have told *Nature* that officials are reluctant to survey people in communal spaces, because infected individuals will then need to be isolated, and their contacts potentially tested and quarantined, too. This could, in turn, mean providing housing, or paying wages to quarantined essential workers. These are difficult and expensive interventions, but ignoring the problem will not make it go away.

## **Wanted: accurate reporting**

A lack of transparency is another obstacle to epidemiological analyses. According to the US Centers for Disease Control and Prevention, 30% of jurisdictions aren't reporting COVID-19 cases in prisons as a separate, identifiable category. Some jails are reporting outbreaks as a single event, rather than listing the number of cases. And many state public-health departments aren't reporting infections and deaths among residents of homeless shelters and nursing homes. An outbreak at one nursing home in New Jersey was discovered only when police found 17 dead bodies piled up inside.

This cannot continue. Facilities should report what's happening within their walls, and states should make anonymized data available quickly.

Some cities provide a model for others to follow. In Seattle, Washington – where the first US COVID-19 outbreak was detected – the public-health department has an online dashboard devoted to reporting daily cases and deaths in care homes. The city's partnership between these

facilities, researchers and the public-health department helped to reduce new COVID-19 cases in care homes from 748 in March to 72 in the first 2 weeks of May.

The lack of action elsewhere is an outrage. It isn't getting the attention it deserves because the people who are most affected are those least able to make their voices heard. Those who are poor, from minority communities, elderly, incarcerated, chronically ill or homeless are among the most marginalized in society. Their needs have been ignored in part because they have less access to policymakers. But they should not need to make their case – those in power should already be paying attention.

Researchers, however, can do their part. They understand the need to curb this pandemic among the most vulnerable people, and must make sure they work with these groups to study the pandemic and to analyse and highlight its devastating impacts. Policymakers must act on what they find. Until countries beat this disease in the places hit hardest, they won't be able to beat it at all.

## Everyone wins when patents are pooled

**The spirit of collaboration is being tested as vaccine development gets under way.**

Last week, the leaders of Ghana, Pakistan, Senegal and South Africa co-signed an open letter urging that research and intellectual property on coronavirus vaccines be shared freely – and that vaccines be distributed fairly – so that the poorest countries do not lose out. It is unfortunate that such a letter needed to be written in the middle of the worst pandemic in decades. But it was unavoidable, because some governments – including those funding the first wave of research and clinical trials – have not yet committed to the principles of fully open science and innovation.

This contrasts sharply with the rapid sharing of findings and expertise among researchers being reported daily. In a Feature on page 252, we cover one example of such collaboration. Since January, researchers have been working across the globe and around the clock to reveal the structures of key proteins that make up the new coronavirus. Their achievements are the result of free-flowing exchange between university laboratories and national synchrotron facilities in countries including China, Germany, the United Kingdom and the United States. Work that would normally have taken months – or even years – has been completed in weeks. But rather than building on this cooperation, some countries are retreating into a kind of techno-protectionism, which serves neither science nor society.

On 10 January, when researchers in China and Australia shared the genome sequence of SARS-CoV-2 (F. Wu *et al.* *Nature* 579, 265–269; 2020) online, a global network of

biologists interested in the structure of viral proteins set to work. The network included the Center for Structural Genomics of Infectious Diseases, a consortium of 40 scientists across 8 institutions in the United States and Canada, which played a central part in the project.

Top of the consortium's to-do list was to plan which proteins to tackle first, and which lab would take on which protein. The teams then set about getting high-resolution snapshots of these proteins, which enable the virus to enter cells and replicate. Thanks to this work and similar efforts elsewhere, there are now more than 170 structures of whole or partial proteins alone or bound to a drug or receptor. The visualizations generated by this work can be used to find ways to neutralize the virus with drugs or vaccines.

Simultaneously, structural biologists at ShanghaiTech University in China began the task of revealing the structure of a key enzyme, M<sup>pro</sup>, that the virus needs to replicate. Work that needed two months for SARS-CoV, the virus that caused the outbreak of severe acute respiratory syndrome (SARS) in 2003, this time took just one week. The team deposited its results in the Protein Data Bank – an open-access digital repository for 3D biological structures – ready for researchers around the world to access. As they worked, Shanghai team members collaborated with structural biologists at the University of Oxford, UK, to share knowledge and avoid overlap.

But when it comes to distributing some of the fruits of that knowledge, this spirit of cooperation looks to be at risk. It is crucial that any vaccine, once proved to work, can be made and distributed quickly in every country. For this to happen, the holders of intellectual property must pool their know-how so that companies large and small can participate in this emergency effort. Intellectual-property sharing initiatives are under way, but, as *Nature* went to press, neither the US nor UK governments seemed ready to support these efforts. This is unacceptable during a pandemic, when lives are at stake and the world's population needs to be immunized. The research that has got us to this point has been pooled, and governments are funding the vaccine effort. For these reasons, intellectual property has to be shared.

Patent pooling is not simple, but there's a wealth of literature from life-sciences patent law and case studies from the field of development studies that can help to make it work. And there is an important principle at stake. There is little justice, as economist Mariana Mazzucato at University College London often argues, if citizens have to bear many of the financial risks in such an endeavour, but most of the profits go to a small group of companies (and possibly a few universities) once a vaccine is ready to be rolled out.

Scientists are not exempt from competition: the race to publish a paper or patent a molecule is all too common. But in the race to solve the structure of SARS-CoV-2, the competitors have mostly worked together and shared credit – and that is how they, and the hundreds of researchers working in complementary fields, must continue as vaccines and drugs move into clinical trials. It is a tribute to the scientists involved that they immediately understood that a pandemic requires a different way of working. It is a tragedy that some governments do not.

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