

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^{pro}, 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.

“Scientists immediately understood that a pandemic requires a different way of working.”