SCIENTISTS FEAR THAT 'COVIDIZATION' IS DISTORTING RESEARCH

Has a shift of priorities towards pandemic-focused science come at the expense of other disciplines?

By David Adam

Like millions of others, neuroscientist Lis Evered felt her career threatened by the COVID-19 pandemic. But her concern was not over security and funding. It went deeper — to her motivation and purpose as a scientist.

"I was carrying around this burden of thinking that I'm a complete failure because I'm not leading the charge on curing COVID. It felt like my work was not important any more," she says.

Evered, who is at Weill Cornell Medicine in New York City, studies perioperative cognitive disorders in older people — such as delirium after surgery — and she felt sidelined as colleagues and journals pivoted towards research with more obvious relevance to fighting COVID-19. But then she came across a word that changed her perspective: 'covidization'.

Coined in April by Madhukar Pai, a tuberculosis researcher at McGill University in Montreal, Canada, covidization describes the distorting impact of the pandemic on the way science is funded, produced, published and reported on. Pai was worried that the pandemic would force countries, funders, health agencies and researchers to focus too much on infectious threats of pandemic significance. Research into other factors vital for public health, from non-infectious diseases to climate change, could lose out.

For Evered, who came across the word in an article that Pai wrote in July, it gave her the confidence that non-COVID-19 science was still a worthy pursuit.

Covidization of research does have benefits: extra funds are one. By April, the European Commission alone had committed €137.5 million (US$165 million) to scientists working on the pandemic, which is more than it spent on research into HIV/AIDS, tuberculosis and malaria in 2018. The money is speeding vaccine development, and funding research into topics such as mental health and the effect of social inequality on the pandemic. But Pai argues that this sudden shift in priorities and surge of activity is also harming the research enterprise. "There is a fear of missing out," he says. "And it's turned into a feeding frenzy."

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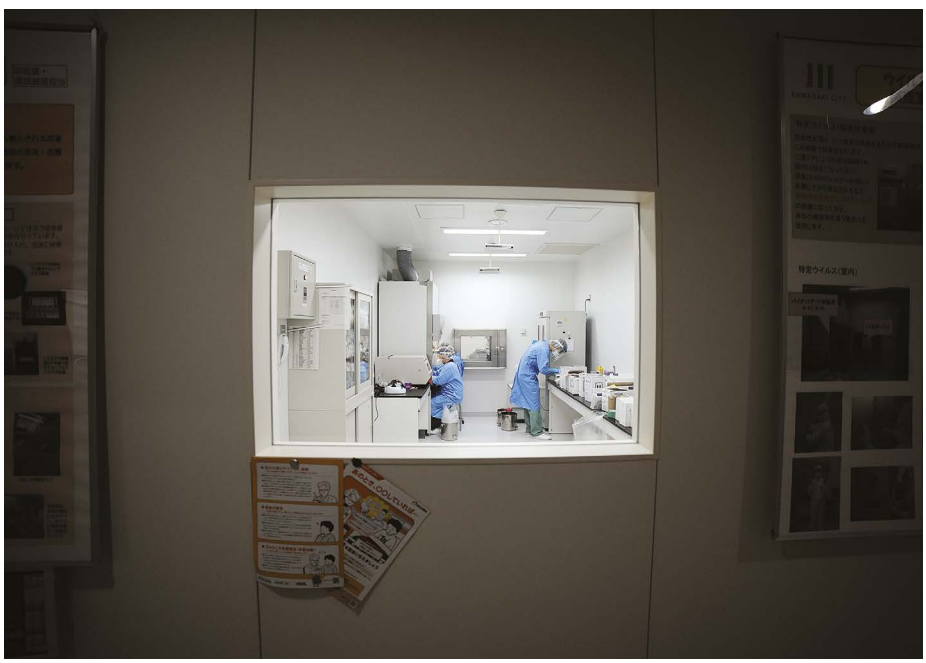

DAVID MAREUIL/ANADOLU AGENCY VIA GETTY

Some researchers worry that a focus on pandemic-related research will affect other work.

Pai identifies three problem areas within covidization. The first is funders diverting or delaying money from curiosity-driven research and handing it to pandemic-related proposals. The Canadian Institutes of Health Research cancelled its annual spring grant competition in April because of the pandemic, and soon afterwards announced a new Can$108-million (US$83-million) scheme to fund projects "responding to the current phase of the COVID-19 pandemic". (The agency did subsequently review and fund the original spring grants.)

Covidization of research is even distorting efforts to protect global health, says Colin Carlson, a biologist at Georgetown University in Washington DC. "I don't think a model in which folks who work in that field, like myself, try to ride the funding wave necessarily helps," Carlson says.

Conservation and wildlife organizations are using COVID to reframe basic research on deforestation, biodiversity loss and the wildlife trade as pandemic-preparedness, he adds. "Everyone is trying to sell what they're doing as COVID and that dilutes the work that people are doing," he says.

COVID trespassers

The second problem is scientists from different fields now researching and publishing on epidemiology, infectious diseases and immunology — areas in which they might be poorly qualified.

And the third is that, given the deluge of research done under the umbrella of COVID-19, often published as unreviewed preprints, it's increasingly hard for the public, media and policymakers to distinguish reliable evidence from the rest.

A study on the "carnage of substandard research" by Katrina Bramstedt, a bioethicist at the Luxembourg Agency for Research Integrity and Bond University in Gold Coast, Australia, found that 19 published articles and 14 preprints about COVID-19 had been retracted, withdrawn, or had an expression of concern issued by the end of July.

When people divert from their primary field — say, nuclear physics — to work on COVID, they are prone to making mistakes because they lack the expert-level insight, Pai says. Blogs and preprint servers mean that half-baked ideas and poor-quality research do not have to pass peer review, he says. For instance, studies from non-experts have appeared on how eating cucumber and cabbage can protect against the coronavirus. "They get quoted, they get into the media and then it's mayhem," Pai says. "So an average policymaker or journalist is really struggling to know who to believe."

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Scientists straying from their field of expertise in this way are examples of what Nathan Ballantyne, a philosopher at Fordham University in New York City, calls "epistemic trespassing". Although scientists might romanticize the role and occasional genuine insight of an outsider — such as the writings of physicist Erwin Shrödinger on biology — in most cases, he says, such academic off-piste manoeuvrings dump non-experts head-first in deep snow.

Many trespassers have good intentions, Ballantyne says, and crossing disciplinary lines can be positive for research. But he says that outsiders should collaborate with a genuine expert — and that studies that do not list such an expert as a co-author should raise a red flag to other researchers and the media.

Some funders have recognized the threat of covidization. Matthias Egger, president of the National Research Council of the Swiss National Science Foundation, warned earlier this year of the "instant experts" thrown up by the pandemic. "Colleagues who had spent their academic careers far removed from viruses and lung inflammation have now miraculously revealed themselves as experts," he wrote in an opinion piece. Throwing money at COVID-19 at the expense of other science could be a mistake, he said, and researchers should concentrate on the questions they decided to pursue. "There will be no covidization of research here," he said. "Whether your chosen field is the coelacanth, exoplanets, social inequality or global warming, please keep doing what you do."

HOW KIDS' IMMUNE SYSTEMS CAN EVADE COVID

Children's untrained immune cells and other factors seem to be key to eliminating SARS-CoV-2.

By Bianca Nogrady

Young children account for only a small percentage of COVID-19 infections — a trend that has puzzled scientists. Now, a growing body of evidence suggests why: kids' immune systems seem better equipped to eliminate the virus SARS-CoV-2 than are adults'.

"Children are very much adapted to respond — and very well equipped to respond — to new viruses," says Donna Farber, an immunologist at Columbia University in New York City. Even when they are infected with SARS-CoV-2, children are most likely to experience mild or asymptomatic illness.

Another clue that children's response to the virus differs from that of adults is that some children develop COVID-19 symptoms and antibodies specific to SARS-CoV-2 but never test positive for the virus on a standard test using the technique RT-PCR. In one study, three children from the same family developed SARS-CoV-2 antibodies[1] — and two of them even experienced mild symptoms — but none tested positive on RT-PCR, despite being tested 11 times over 28 days while in close contact with their parents, who had tested positive.

Their immune system sees the virus "and it just mounts this really quick and effective immune response that shuts it down, before it has a chance to replicate to the point that it comes up positive on the swab diagnostic test", says Melanie Neeland, an immunologist at the Murdoch Children's Research Institute in Melbourne, Australia, who studied the family.

Even in children who experienced the severe but rare complication called multisystem inflammatory syndrome in response to SARS-CoV-2 infection, studies report that the rate of positive results on RT-PCR is 50% or below[2].

Farber says the types of antibody children develop offer clues about what is going on. In a study[3] of 32 adults and 47 children aged 18 or younger, she and colleagues found that children mostly produced antibodies aimed at the SARS-CoV-2 spike protein, which the virus uses to enter cells. Adults generated similar antibodies, but also developed antibodies against the nucleocapsid protein, which is essential for viral replication. Farber says the nucleocapsid protein is typically released in large quantities when a virus is widespread in the body.

That kids lacked nucleocapsid-specific antibodies suggests that they aren't experiencing a significant infection, says Farber. Children's immune responses seem to be able to eliminate the virus before it takes over, she says.

Children rarely show symptoms of COVID-19.

THOMAS LOHNES/GETTY

Adaptive versus innate

Farber suggests that the reason children can neutralize the virus is that their T cells are relatively naive. T cells are part of the body's adaptive immune system, which learns to recognize pathogens it encounters over a lifetime. Farber says that because children's T cells are mostly untrained, they might have a greater capacity to respond to new viruses.

But other evidence suggests the situation is not so straightforward: a study[4] of people with COVID-19 that included 65 children and young people under the age of 24, along with 60 adults, found that the adults had a stronger T-cell response to the virus's spike protein than did the children and young people. Farber says the study measured memory T-cell responses, which are much less developed in children, rather than naive T-cell activity.

Children's ability to neutralize the virus might also be linked to the fact that they have a strong innate immune response from birth, says Alasdair Munro, who studies paediatric infectious diseases at University Hospital Southampton, UK. But this effect is difficult to study, and raises the question of why it isn't seen with other viruses that can cause disease in children, he says.

Children are also the main reservoir for seasonal coronaviruses that cause the common cold. Some researchers have suggested that antibodies for these viruses might confer some protection against SARS-CoV-2, but the evidence is mixed, says Munro.

Meanwhile, there is evidence that when children are exposed to the virus, they receive a smaller dose than adults, because their noses contain fewer ACE2 receptors, which the virus uses to gain access to cells. This might also explain why COVID-19 is less prevalent in children than in adults, say researchers.

Munro says it is unlikely that there is a single explanation for why COVID-19 seems to affect children less than adults. "Biology is rarely so straightforward."

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