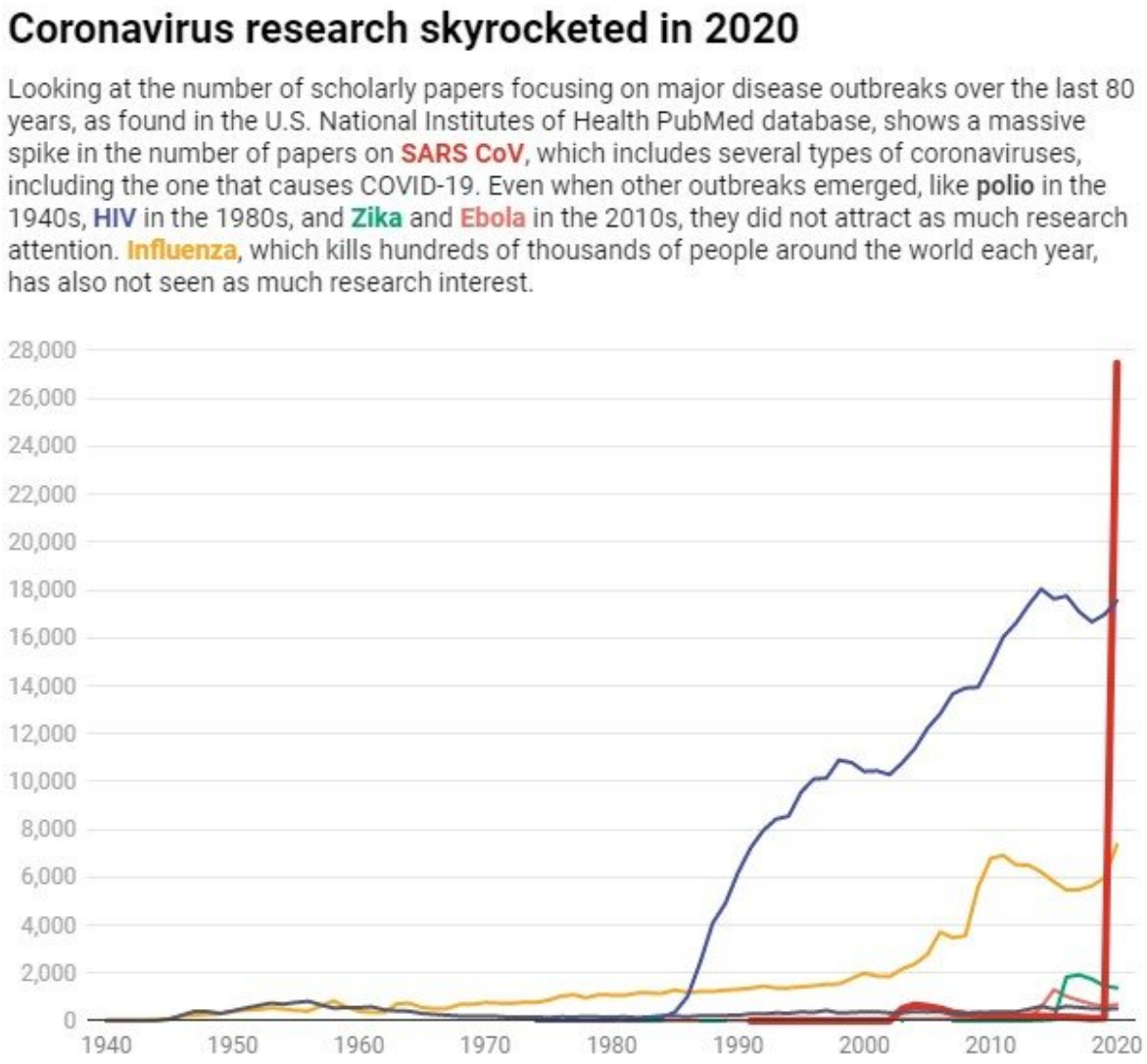
As scientists turn their attention to COVID-19, other research is not getting done

February 1 2021, by Julie K. Pfeiffer and Terence S. Dermody



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For many researchers, the choice to spend decades working in a lab or in the field comes from a desire to help—to expand understanding of how life works or to improve human health. So when COVID-19 emerged, many scientists dropped what they were doing and switched their focus to SARS-CoV-2, the virus responsible for the pandemic.

Suddenly, the ranks of scientists who had been studying coronaviruses were flooded with newcomers seeking to contribute in some way, many with little prior experience in infectious diseases. Some wanted to join in on the biggest problem facing the world. For others, it was the only way to open labs. Others saw funding opportunities.

We, a virologist and virologist-physician, saw this pivot in our own fields. Many of our colleagues began working on SARS-CoV-2. As an editor/adviser at the *Journal of Virology and Science*, one of us handled hundreds of papers in 2020, nearly half focused on COVID-19. Curious about the trend and implications, we analyzed published papers about SARS viruses found in PubMed and found the number had increased 20-fold relative to the early 2000s, when the first SARS coronavirus appeared. Our analysis has not yet been published.

Another recent analysis, which has not yet been peer-reviewed, found that the proportion of biomedical research papers focused on coronaviruses rose from 0.07% to 5.3% from 2019 to 2020. Many of these papers came from fields that hadn't considered coronaviruses before, such as psychiatry, cardiovascular research and oncology.

When a new virus is ravaging the planet, scientists should help. This is an all-hands-on-deck emergency, and researchers with different backgrounds can bring new perspectives that can lead to major breakthroughs. Yet there is some evidence that as labs have shifted

attention to SARS-CoV-2, efforts have been duplicated, and precious time and resources have been used ineffectively. This rapid scientific reorientation has implications far beyond SARS-COV-2 and potentially leaves the world vulnerable to other health crises.

Wasted time

Understandably, the rush to enter the field has led to many labs doing the same experiments at the same time. Some level of duplication is essential to ensure that findings are reproducible. But some of this duplication is unnecessary: A search for "SARS-CoV-2" and "ACE2" (the major receptor that SARS viruses use to enter cells) in an online archive of unpublished research yielded more than 1,400 papers, and we found evidence of overlap. For example, hundreds of these papers examine inhibition of viral entry into cells.

There is overlap even in unique subniches: Dozens of papers focus on nanobodies, a unique type of antibody often generated using alpacas, and the titles of many of the papers are very similar.

Fresh perspectives from newcomers don't always yield breakthroughs. Science and the media have been temporarily derailed by problematic research contributed by scientists switching to a new field—such as a paper by nonepidemiologists reporting that a vaccine against tuberculosis may protect against COVID-19 because countries with high rates of vaccination have lower mortality rates of the virus. Despite extensive media coverage – the study was picked up by 90 media outlets—a closer look revealed no evidence the vaccine had any protective effect.

In biomedicine, academic labs study a specific topic and are led by experienced scientists who direct trainees. Over several years of training, a select number of trainees have the desire and gain sufficient expertise to open their own labs and begin mentoring the next generation of

scientists in their field. This is how we keep science going.

Normally, trainees work in a lab investigating a particular field of biology or medicine, such as cancer or neurodegeneration. Each trainee studies a single, specific topic and publishes his or her research as scientific papers. The rapid pivot to COVID research means many labs—and trainees—that were once studying other topics are now focused on SARS-CoV-2, which means fewer young scientists are now being trained to tackle other health threats. This loss of knowledge and expertise could leave us less prepared for the next health crisis or outbreak.

At this point, our concerns are theoretical. We can't say something like this has happened in the past, because nothing like COVID-19 has occurred in the modern research era. When other viruses such as SARS (caused by the virus SARS-CoV-1), Ebola and Zika became news, some scientists switched gears to help, but at nowhere near the scale we see now.

Time to pivot back?

Now, one year into the pandemic, many lab teams may want to ask: Can we continue to make an important and distinct contribution to the field? For some—those with a unique angle or the appropriate experience and facilities to handle dangerous pathogens—the answer may be yes. However, for many others, it may be time to pivot back to pre-COVID-19 research topics in which the overall advances will be more significant.

Even within the field of infectious diseases, it doesn't make sense for the vast majority of virologists to focus on COVID-19. With hundreds of viruses colonizing bats and other animals around the world and the potential for spillover and future pandemics, it is imperative that we

study many different viruses.

Some researchers need to do "curiosity-based work," in which we follow investigations with no obvious link to human health. You never know where the path will lead. By studying yellow fever virus, Charles Rice laid the groundwork for his research on hepatitis C virus, which was acknowledged with last year's Nobel Prize in Physiology or Medicine.

Meanwhile, those who continue to study COVID-19 and other infectious diseases need dedicated, sustained funding, not isolated surges of cash that rely on the expedient wishes of Congress. Extending National Institutes of Health funding periods from five years to seven years would help immensely. The Howard Hughes Medical Institute recently adopted a similar approach. To prepare for the next outbreak, the field needs stable funding to study many different viruses, monitor reservoirs of viruses with pandemic potential and develop new antivirals we can rapidly deploy during the next pandemic.

In the war against the COVID-19 pandemic, facing SARS-CoV-2 will not be the only battle we fight. The attraction of working on the pandemic virus can divert scientists from other pressing health concerns that can be just as deadly.

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