Coronavirus ushers in new era of collaboration among scientists

by Laura Bliss in the June 3, 2020 issue

(Photo by Vincent Ghilione on Unsplash)

In a conference room in Washington, D.C., a dozen epidemiologists huddle over a computer monitor. On the screen, a map of self-reported data from test labs around the world shows a lethal strain of avian influenza originating in Asia.

They summon their colleagues—data scientists, economists, and sociologists. What could happen if the pathogen isn't contained? They build a series of simulations. The US poultry trade will be impacted, as will soybean farmers. Travelers from Asia will need to be monitored; a new vaccine might need to be produced. An alert goes out so that the Centers for Disease Control and Prevention and the US Department of Health and Human Services can prepare.

That's a hypothetical example of what an infectious disease forecasting center, housed inside the US government, might do. The center, however, doesn't exist.

Caitlin Rivers, an epidemiologist formerly with the US Army who is now a senior scholar at the Johns Hopkins Center for Health Security, was among the experts who first discussed the idea during the Obama administration, though it never came to pass. Rivers floated it again in a recent report for the conservative think tank American Enterprise Institute, where she has been working with economists, physicians, and regulatory experts on road maps for reopening parts of the economy now shuttered by the COVID-19 pandemic.

Collaboration between researchers across diverse fields is a critical part of the response to the coronavirus crisis, and collaboration would be key to preparing for them, too. "When there are infectious disease emergencies, there are so many kinds of questions for scientists to answer, and that interdisciplinary focus is so important," she said.

Although that forecasting center never came to pass, academics and government researchers say that interdisciplinary collaboration is now happening at a remarkable level in the face of the urgent coronavirus threat.

Across the board, the pandemic triggered an explosion in academic research. A Reuters analysis from early February estimated that at least 153 scientific studies probing the disease were posted or published within the first 50 days of the start of the outbreak in China. Health journals are now fielding three to five times the normal number of submissions. Presented with not only a mysterious disease but also a massive economic, environmental, social, and psychological disruption, many

scientists say that they are also reaching across traditional departmental boundaries more than before.

“When you have a global problem like this, you get more possibilities to see how our fields are connected to each other,” said Dario Caro, a microbiologist at Denmark’s Aarhus University. He recently coauthored a paper linking the high rate of coronavirus death in northern Italy to the thick smog and particulate matter in the region’s industrial cities—the first paper he’d ever published with medical specialists. The colleagues joked that they would coin a name for the new discipline they were pioneering: “immune-environment.”

Connecting environmental and social characteristics to medical conditions is nothing new, of course. Curious minds have been doing it since the day John Snow found the contaminated water pump at the heart of London’s 1852 cholera outbreak, and probably earlier than that. Plenty of researchers whose specialty lies at the intersection of science and society pair up with colleagues in other departments all the time.

“For me, it is already the norm,” said Eugenia South, a senior fellow at the University of Pennsylvania’s Perelman School of Medicine who studies the health effects of urban neighborhoods. Past research has found her in partnership with epidemiologists, criminologists, urban planners, health economists, ethnographers, and many other specialists far from the medical school.

Yet it’s common for modern-day academics to be siloed in their work, South said. That’s not necessarily for lack of curiosity: incentive structures built into academic research funding encourage people to stay in their lanes. A 2016 study published in *Nature* found that, of 18,476 research proposals submitted to a national academic grant program in Australia over five years, “the higher [the] degree of interdisciplinarity, the lower the probability of being funded.”

The more developmental psychologists teamed up with environmental biologists, or the more climatologists teamed up with geospatial scientists, in other words, the less likely they were to win financial support.

“We’re not really supposed to work freely on whatever we want, despite the perception,” said Mauricio Santillana, the director of Harvard University’s Machine Intelligence Lab and a professor at the medical school. “We have to get grants and create deliverables.”

As a mathematician specializing in big data and computer modeling, Santillana is now in high demand. He’s working with climate scientists to model how temperature changes and other atmospheric conditions work to transmit COVID-19. But he’s also collaborating with economists to look at job losses and other financial impacts across the United States, and with social scientists to examine how misinformation related to the disease spreads on social media.

“I had some contact with people in these areas, but now they’re active research areas for me, too, that were not before,” Santillana said. Grant proposals for several of these interdisciplinary projects are in the works.

Measuring any trend in interdisciplinary research won’t be possible until we know which proposals ultimately receive grants and funding, said David Lazer, a professor of political science and computer and information science at Northeastern University and one of Santillana’s new collaborators.

Like South, Lazer partners with colleagues across other fields as part of his normal work. While he believes the practice is surging, many projects are still being formed in home offices and basements where researchers are sheltering, so it’s hard to say for certain.

Dylan George, a former White House adviser and HHS research manager specializing in biological threats, believes the US ought to be fostering more scientific cross-pollination so that it’s better prepared for future pandemics, especially when it comes to the country’s technological abilities.

“If you had a hurricane that was barreling down on Florida, you wouldn’t run out and get a handful of academics to come tell you to set up a model and where to put resources and where to respond,” he said. “We have professionals whose day job it is to do that, and a whole system to enable [them] to do what they do, but we’re not doing that with a pandemic in the same way.”

The surge in academic research during the pandemic, interdisciplinary or not, has its drawbacks. For one, there seems to be a gender divide in who is able to perform academic labor right now: a number of journal editors have said that an outsize share of recent paper submissions are coming from men, since women scientists, like women in all fields, appear to be bearing a greater share of child care and household duties.

And though the frenzy in research is producing more papers than ever, observers have warned about the risk of more inaccuracies, whether in vaccine trials or hypotheses about the origins of the new virus.

Yet whether they are in government or academia, scientists ought to be breaking down disciplinary barriers, said Alfredo Morabia, professor of epidemiology at Queens College, City University of New York, and editor in chief of the *American Journal of Public Health*.

“There has long been a schism between the individual-focused approach of the clinician and the population-focused approach of epidemiologists,” he said. “This idea that populations have different qualities than the individuals that compose them, that populations are predictable and comparable—all of those concepts were rarely understood. Now they’re at the center of discussion.”

These convergences are happening not a moment too soon: from structural racism to economic inequality to climate change, the world’s thorniest problems can only be solved with intersectional thinking, Morabia, South, and others said. The stark racial disparity emerging in coronavirus death rates in the US is one example, especially since low-income people of color are also overexposed to the coming disasters of climate change, Morabia said.

Yet Morabia struck a hopeful note. After coronavirus, “I think it’s going to happen,” he said. “The public has changed, medicine and public health are more hand in hand than ever, and policy will follow. I’m confident about that.” —City Lab

This story is part of the SoJo Exchange of COVID-19 stories from the Solutions Journalism Network, a nonprofit organization dedicated to rigorous reporting about responses to social problems.