



CURALINK

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thecurafoundation.org

Welcome to CuraLink—a newsletter for innovators building a healthier future for all.

Dear Cura Community,

Welcome back to CuraLink, a newsletter and interview series featuring the most pressing issues in human health, unmet medical needs and the emerging innovations and technologies directed to address them.

Last month, Dr. Eric Topol shared the latest progress in harnessing artificial intelligence to rescue medicine. The physician-scientist outlined the major risks of this rapidly advancing technology and emphasized how increasing transparency and improving regulatory frameworks are essential next steps. For anyone trying to make sense of the AI revolution, access the discussion at bit.ly/CuraLink-16.

In issue 17 of CuraLink, we are honored to share an inspiring conversation with [Dr. Kizzmekia Corbett](#). If you don't already know, Dr. Corbett is one of the brilliant scientists responsible for the development of the life-saving COVID-19 vaccines. Dr. Corbett tells us how the universe aligned for her to combine her background in academic research, public health and health equity during the pandemic.



Robin L. Smith, MD
*Founder, President and Chairman,
Cura Foundation*

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A conversation with Dr. Kizzmekia Corbett

As SARS-CoV-2 swept the globe, Dr. Corbett and her team at the Vaccine Research Center at the National Institutes of Health rushed to design an effective vaccine against it. Just 66 days after the viral sequence was released, her team rapidly deployed the concept to industry partner Moderna for a Phase 1 clinical trial. The vaccine was shown to be 94.1% effective in Phase 3 clinical trials and went on to prevent severe disease and death for hundreds of thousands of people worldwide.

Every step of the way, Dr. Corbett leveraged science for the public good—building trust in communities of color and combating misinformation on the national stage. She continually looks at the “bigger picture” beyond her lab and reminds each of us to use our talents to benefit all.

Now, at Harvard T.H. Chan School of Public Health, Dr. Corbett will continue to propel novel vaccine development for pandemic preparedness. The COVID-19 emergency may be over, but the legacy of Dr. Kizzmekia Corbett will live on.



Kizzmekia Corbett, PhD, Assistant Professor of Immunology and Infectious Diseases, Harvard T.H. Chan School of Public Health; Shutzer Assistant Professor, Harvard Radcliffe Institute for Advanced Study; Associate Member, Phillip T. and Susan M. Ragon Institute and Former Research Fellow, Vaccine Research Center, National Institutes of Health

What inspired you to pursue a career in science and public health? Was there an experience that cemented your choice in becoming a viral immunologist?

Initially, I was inspired by my mentor during my first internship when I was 16. At the time, I had no idea that he was a world-renowned scientist who was also incredibly humble. He operated like an academic on a day-to-day basis, speaking, teaching or doing research. Every day, he was doing something different. He was a very dynamic person, and I was inspired by that to pursue a career in science.

From a public health perspective, I realized in college that science can only do so much without public outreach, uptake and understanding. So I aspired to intertwine science and public health in my career.

As for where viral immunology came from, I was in college from 2004 through 2008 during the HIV epidemic. It was very interesting to live in Baltimore, which is almost always in the top three U.S. cities for HIV infections and death. I saw what HIV was doing in the same way that many burgeoning scientists are seeing what coronaviruses are doing, which is sparking their interest. So I interned at the Vaccine Research Center (VRC) at the National Institutes of Health, because I felt like it would be good to study viruses.

I ended up not studying HIV for multiple reasons and focused on other viruses like respiratory syncytial virus and later went to graduate school to work on dengue. My interest in coronaviruses was really piqued by the gap in the field. In 2014, the Middle East Respiratory Syndrome coronavirus was heavily circulating in the Middle East. It became very clear that it could cause a pandemic. But the VRC was about to shut down its vaccine program for coronaviruses since, without a global need, there was not a high demand for that type of product. I felt like I was in the right place to work on something that wasn't in high demand for which my interests really fit. It almost felt like the universe aligned.

I've never opted to work on the “sexiest virus” at any time. I work on the thing that needs to be worked on. Neglected viruses are generally what attract me.

How did each of these experiences inform the next?

There was a point during the pandemic where I noticed all of my interests culminating. Take vaccine enhancement. This occurs when a vaccine can actually make you more sick if you get infected, because it causes you to develop a bigger infection. So in dengue, for example, you make a certain type of antibody that's not protective. It still binds to the virus, but instead of binding, neutralizing and killing it, the antibody binds to it and brings it closer to the cell. Then the virus goes into a cell that it normally wouldn't go into, and you get a superinfection.

There was fear that the COVID-19 vaccine might cause you to make those types of antibodies because of some very old, antiquated and, frankly, untrue data. Vaccine enhancement doesn't happen with coronaviruses, but it can occur in dengue, which I spent 5 years of graduate school studying. So when we had to prove that it would not happen with coronaviruses, I realized my dengue background overlaps with this moment. Meanwhile, the social aspects of health were overlapping, too, because Black and Brown people were becoming sicker and dying more from COVID-19. There was also the outreach portion to my work, which I was doing all along, but particularly in college around HIV.

I think back to when I agreed to go on TV for the first time in mid-April 2020. The numbers around racial and ethnic disparities and the outcomes of COVID-19 were starting to come out and I realized: I need to talk. People need to see my face. They need to know that we're working on this vaccine. People need to feel a little bit of hope.

Some might say that when it comes to these viruses or diseases that science and public health are not that connected. But it all came together during the pandemic. I felt like I was supposed to be there.

Your work at the National Institute of Allergy and Infectious Diseases laid the groundwork for Moderna's COVID-19 vaccine, which saved millions from severe disease and death. Initially, how did it feel when you realized the vaccine was effective?

The moment was mid-February or so when we got the first animal data back. It's simple: you vaccinate mice and then you test their blood to see how many antibodies they have against the virus. And we saw a very whopping response. We realized that the vaccine was doing something.

When I rewatch that first TV appearance on CNN in April, I feel like I may have come off a little bit hopeful and confident in saying: "We'll have a vaccine. Don't worry."

But I had seen the data, which the world hadn't yet. That moment set the stage for the amount of hope I had going forward. It was hard to work in those conditions with isolation and the world shutting down ... at one point there were 3,000 people dying per day. But we knew we had something, so we kept pushing.

People and organizations often suffer from "pandemic amnesia" as outbreaks resolve. What lessons do you hope the scientific community and the general public will learn from the COVID-19 pandemic? How do we prevent another pandemic?

One of the most important lessons that I want the scientific community to understand is that our work is bigger than us. Oftentimes, as scientists, we are so focused on a single question. There are people who spend 30 years working on one protein or gene, for example.

"We always have to look at the bigger picture."

The pandemic helped a lot of virologists, immunologists, public health practitioners and doctors out of their immediate comfort zone and forced them to look at the big picture. Many people who were studying HIV, influenza or other viruses could easily transfer their work into coronaviruses. But they would have never thought about it previously.



Young Dr. Corbett in the lab



Dr. Kizzmekia Corbett with Barney Graham, MD, PhD, a physician-scientist, immunologist and former Deputy Director at the Vaccine Research Center. Drs. Corbett and Graham were recognized as Federal Employees of the Year in 2021, receiving the Samuel J. Heyman Service to America Medals for their work developing the COVID-19 vaccines while at the National Institutes of Health

The other lesson is how important our voices are. Hearing a scientist talk about their results directly on CNN was something I had never seen before. There is a different ring to that. I think that the public really appreciated that. We have a long way to go, but I do think that we made some progress on science communication.

For the general public, I want people to take heed of what it means to critically think through your health decisions. A pandemic is a very sensitive time. Every single day, you had a choice of whether to be isolated or not. You had a choice to go into crowds with or without a mask. You had a choice to heed guidelines or not or to take a vaccine or not. Every decision is an individual risk assessment. Oftentimes, the best way to determine the risk is to process what you know and attempt to work through what you don't know by asking questions or finding the answer through research. I don't think that we had ever experienced that critical thinking on this scale or frequency.

The pandemic presented a very immediate life or death scenario and made people more cognizant of their health. We should keep that critical attitude.

Do you think misinformation makes that difficult for people?

Absolutely. It's critical for people to understand how to find and discern information, as well as distinguish between credible and non-credible sources. In the early days of the vaccine rollout, there was a supposed nurse who claimed that she had gotten Bell's palsy from her vaccination. She made a viral video. But it was fake, and people reposted it without thinking. One viewer searched the online nurse registry and discovered that this nurse didn't exist. It's those very simple fact-checking tactics that we have to make people aware of.

You would very seldom hear a scientist say this, but misinformation has a place. For everything that is true, there is something out there that is false. It would be unfair for scientists to think that we could be allowed on these huge platforms with our data and what we consider to be the truth without other people being allowed to share

what they consider to be true.

Sometimes there is malintent, but often people actually believe what they believe because of anecdotes they hear. So I am a fan of platforms being open. It is on each of us to make sure that we discern information appropriately. It is also on our educational systems and communities to make sure we teach discernment.

How do we most effectively fight misinformation?

During the pandemic, if I got on Twitter to correct something, for example, there were 20 people coming at me from all different angles. They didn't hold back. They attacked the science, and they also attacked the person.

Oftentimes, scientists, doctors, public health practitioners and the government thought we flew above that. But there comes a point where you can't. We don't have to be combative or talk down to people, but we do have to directly correct mistruths. We should say I'm from the President's office—and that is not the same as a quasi-expert. Sometimes we were too timid or too politically correct in our approach to misinformation. With the political climate and real-time access to information, that can be read as unknowing.

How can we prevent another pandemic?

There are multiple layers to how a pandemic starts. The truth is that this pandemic could have been prevented. Maybe the spillover or those initial infections could not have but the full spread could have been prevented had we locked down sooner or been quicker to identify the virus prior to it emerging in humans. That is the key: having some level of surveillance of zoonotic reservoirs, whether it be bats or farm animals or other animal populations.

Making sure that we're on top of emerging viruses is a hefty task. It isn't so fun, from a scientific perspective, because 99.9% of the time, you don't find anything. But some really good surveillance of zoonotic reservoirs will help us to identify risks and be more aware of the changes.

In health care, if the emergency room or intensive care units look different week to week, then something's happening in your immediate community. A healthcare provider should not necessarily be tasked with figuring that out. But there does need to be an alert system to tell experts who can take it seriously and address it swiftly.

Data shows minority populations were hit harder by COVID-19. What should people know about these health disparities, and what can public health experts and healthcare providers do to achieve health equity?

When various populations are affected unequally by an issue, we often talk about it in a way that is accusatory of the people who are different. We have to reframe that. I am trying very hard to make academia do this. People always ask: "How can we encourage more people of color to become scientists?" But why would you want to join the scientific community if you are a person of color when that environment is unwelcoming to you?

This is the same with healthcare disparities. The geography of health is different from one neighborhood to another. I've seen this in places I've lived like Boston and Baltimore. So we need to focus on how we can make people's environments better, so they can live longer and healthier lives.

When it comes to healthcare disparities, many people do have genetic components that influence their risk of conditions like high blood pressure or diabetes. But there are also social and economic components as well as lack of access to primary care, the infant mortality rate and differences in prenatal care that are at the population level.

"People should not feel ashamed of what ails their community."

That's often what happens. There are communities now who are hiding their opioid epidemic, because it's shameful to them. They don't know that the pharmaceutical industry is involved, the medical community is involved based on the way that medicines have been prescribed for decades and that access to these drugs often depends on where you live. It is harder to get heroin in some places as opposed to others. So you really have to release the self-blame and come out of that shame. It's the first step to freedom.

When you think that disease or poor health is predestined because of where you are coming from or your family history, it's harder to wrap your mind around the possibility of change. Releasing that shame also helps you to

speaking about it differently to your physician. It helps you to realize that you have the ability to change the outcome.

Often, when one pandemic comes it doesn't wipe out other ones, but it does push other pandemics to the backburner. COVID-19 pushed HIV to the backburner. I heard this story of a young man who came into the emergency department dying from AIDS. When asked why he hadn't come sooner, he said: "I figured it was AIDS." You would think that would prompt him to come to the doctor, but he felt so much shame. And he died. I just want people to release the shame that prevents them from seeking help.

You recently joined the Harvard T.H. Chan School of Public Health. Can you share your central objectives in leading the Corbett Lab? What do you hope to accomplish in the next stage of your career?

Science-wise, I have a high goal. By the end of my career, whether I do it or not, I would love for there to be, not necessarily a cure, but equity of health outcomes for

the common cold—the school of viruses that includes coronaviruses. This will most likely be achieved through vaccination. Coronaviruses are a problem that we live with because people think that there's nothing we can do differently. But 50,000 people a year die from the flu in this country. I want to improve that during my career. I used to always say that if I get a Nobel Prize, it's going to be for curing the common cold.

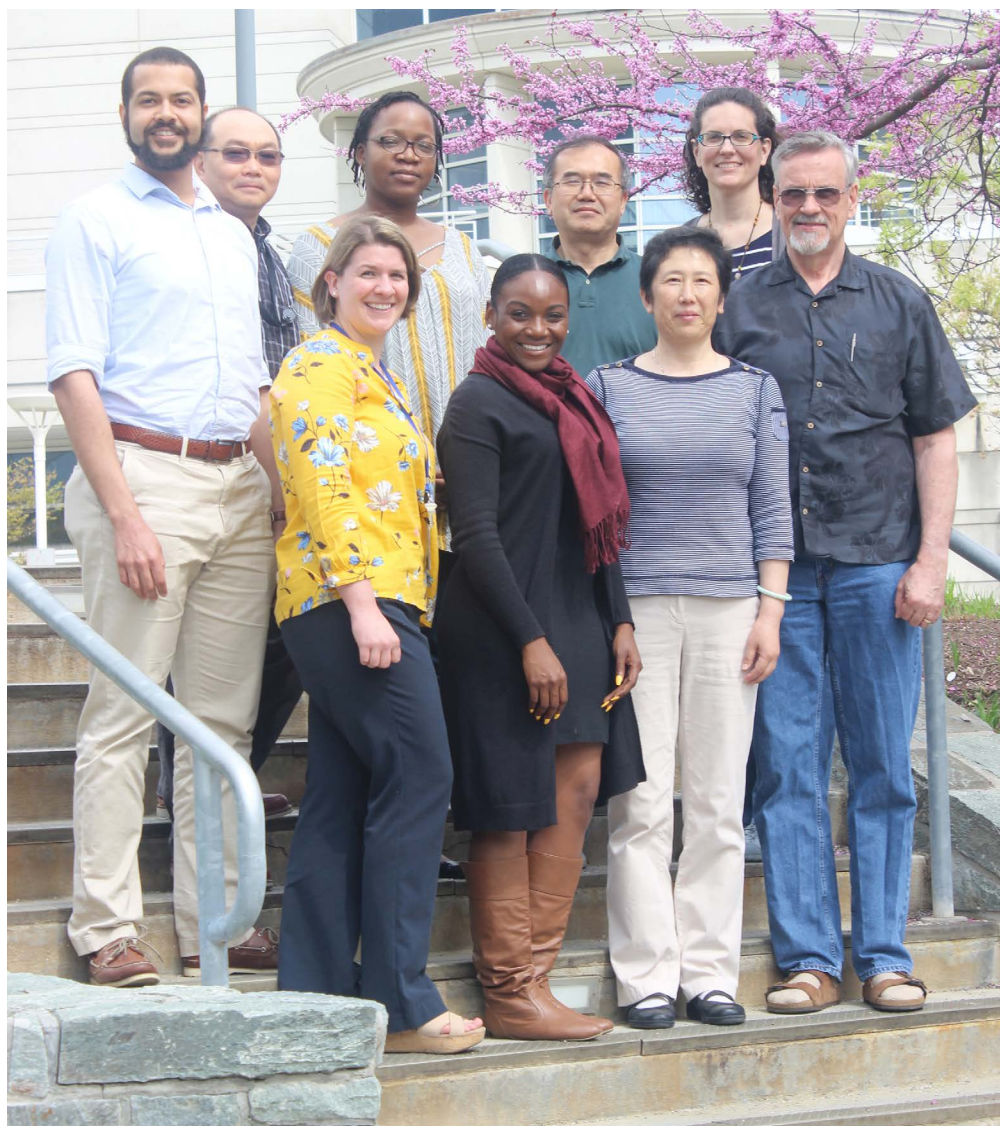
From a legacy standpoint, I would like for the doors that I've opened for women and young Black women in the sciences to remain open. I want people to have it easier than I did, to avoid the glass ceilings and not have to fight. I had to achieve a body of work that most people, in general, will not have accomplished in their lifetime just to get a job, which is not even a tenured position. This is a fight that I would not want anyone to have. It has informed who I am today. But resilience is exhausting, and it is actually not necessary.

You want to be successful, well-rounded and empathetic without having to be torn down in the process.

Many young people, especially young Black Americans, look up to you as an inspiration. What do you hope youth learn from your accomplishments and commitment to public service?

I hope they learn that you can be yourself. No dream is too big. But part of the reason why people don't have big dreams is because they feel like the type of person that they are would never be able to achieve them. Be yourself and do the best that you can, and it will all work out.

This interview has been edited for length and clarity.



Dr. Corbett and Dr. Graham, former Deputy Director at the Vaccine Research Center, with the scientists at the National Institutes of Health Vaccine Research Center responsible for the development of the life-saving COVID-19 vaccines



Noise Could Take Years Off Your Life

[The New York Times](#), June 2023

Chronic noise is a largely unrecognized health threat. Research shows that prior noise exposure primes the body to overreact, amplifying negative effects. The amygdala, the stress detection center in the brain, is activated by unpleasant sounds and triggers a cascade of reactions. Chronically overactivated amygdalas can produce harmful effects, such as cortisol, adrenaline and sympathetic nervous system hyperactivity. Over time, these changes can lead to inflammation, hypertension and plaque buildup in arteries, increasing the risk of heart disease, heart attacks and stroke.



AI Chatbots Could Help Provide Therapy, but Caution Is Needed

[Scientific American](#), June 2023

Therapy apps are incorporating AI programs like ChatGPT, but they could provide unvetted or harmful feedback if not well-regulated. Given the shortage of mental health professionals worldwide, advanced chatbots like ChatGPT and Google's Bard could help administer therapy, but they cannot completely replace therapists. Dr. Thomas Insel, former director of the National Institute of Mental Health and co-founder of Vanna Health, believes that "partnerships between professionals and carefully developed chatbots could ease the burden immensely" by summarizing patients' sessions, writing necessary reports and allowing providers to spend more time treating people.



How Real Is Smoke Brain?

[The Atlantic](#), June 2023

The science on how wildfire smoke affects cognitive function is in its early stages with only a handful of studies looking at its effects on brain processing. Carolyn Mimbs Nyce reports on "smoke brain: that foggy feeling that comes from breathing soot-clogged air." Breathing wildfire smoke can also irritate the body and cause inflammation. Carolyn Matz of Health Canada says smoke inhalation exacerbates asthma and chronic obstructive pulmonary disease and shortens life expectancy. Studies show that smoke exposure correlated with lower test scores and cognitive performance and increased neurodegenerative diseases, including Alzheimer's and dementia. We may not yet understand the consequences of what we're breathing, but we do know we want to keep it out of our bodies.



Global 'Pandemic Treaty': Nations Wrestle With How to Fairly Share Virus Data

[Nature](#), June 2023

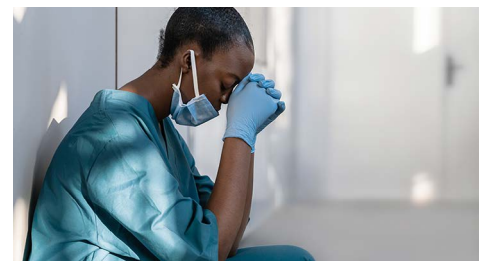
During the COVID-19 pandemic, researchers in Brazil, South Africa and India monitored SARS-CoV-2 virus evolution to determine genetic sequences. However, many countries with uploaded sequences were slow to receive vaccines, potentially leading to inequity. To prevent future pandemics, an equitable data sharing system is needed. The pandemic treaty aims to establish such a system, but negotiations have been difficult. Some public health specialists suggest the WHO should oversee viral-genome benefit sharing. Possible solutions include depositing 1% of retail sales from products with viral-genome sequences into a global fund or pharmaceutical companies committing to distribution to developing countries.



Gut Microbiome Composition May Be an Indicator of Preclinical Alzheimer's Disease

[Science Translational Medicine](#), June 2023

Alzheimer's disease (AD) progresses from normal cognition to symptomatic AD with cognitive impairment. Ferreiro et al. compared gut microbiome composition and function in 164 cognitively normal individuals and found that 49 showed biomarker evidence of early preclinical AD. The gut microbiome's change correlated with β -amyloid and tau pathological biomarkers but not neurodegeneration biomarkers. The study identified specific gut bacterial taxa associated with preclinical AD, improving machine learning classifiers' accuracy, sensitivity and specificity. This finding may help to understand AD etiology and identify additional markers of AD risk.



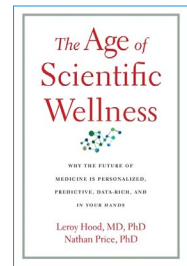
The Moral Crisis of America's Doctors

[The New York Times Magazine](#), June 2023

Eyal Press writes that many healthcare workers suffer from what Drs. Dean and Talbot call "moral injury." In 2018 (*Stat*), they explained: "Doctors are anguished and distraught, caught between the Hippocratic oath and the realities of making a profit from people at their sickest and most vulnerable." The pandemic led to a surge in distress among medical professionals, with nearly 1 in 5 quitting their jobs. The suicide rate among doctors also increased significantly in recent years. Emergency room doctors find it particularly difficult to maintain their values and patient safety because of the emphasis on speed, efficiency and relative value units. To fight back, medical professionals and patient advocates are forming unions to challenge inequities in the healthcare system.

Updates & Events

- Stat published [*The Health Data Revolution: Promise and Pitfalls*](#) e-book highlighting the promise and possibilities of health data, as well as the obstacles that still need to be overcome. Technology has significantly transformed the way health data is collected, managed and accessed in the healthcare industry. Electronic data systems enable healthcare professionals to access patient data and securely share medical records. This could lead to a patient-mediated data economy by allowing consumers to benefit from easily accessible data. However, the technology is far from perfect with websites leaking sensitive information and interoperability issues between systems. Read the e-book at bit.ly/StatHealthDataRevolution
- [*The Age of Scientific Wellness—Why the Future of Medicine Is Personalized, Predictive, Data-Rich, and in Your Hands*](#), a groundbreaking book by biotechnologist Leroy Hood, MD, PhD, and researcher Nathan Price, PhD, explores the potential of personalized health care. They argue that doctors should move beyond reactive, hit-or-miss approaches and adopt scientific wellness and use information gleaned from our blood and genes to tap into the data revolution driven by artificial intelligence to catch disease onset years before symptoms appear. This approach has shown promising results, such as reversing diabetes, eliminating cancers, avoiding Alzheimer's disease and preventing autoimmune conditions. Learn more and order the book at bit.ly/AgeofScientificWellness
- Nutrition 2023 will be held from July 22 to 25 in Boston, MA. This preeminent nutrition meeting will feature symposia and educational sessions covering themes such as Cellular and Physiological Nutrition and Metabolism, Climate and Food Systems, Clinical and Translational Nutrition, Global and Public Health Nutrition, Population Science and Career and Professional Development. The meeting is available for physicians and registered dietitians. Learn more and register at nutrition.org/N23
- The 23rd Population Health Colloquium hosted by the Jefferson College of Population Health will offer a hybrid conference and internet event from September 18 to 20 in Philadelphia, PA. This heritage value-based care conference series will gather the most influential people in healthcare transformation. Attendees will gain insights into critical business solutions and discover new approaches on the leading edge of innovation. Chair Billy Oglesby, PhD; Co-Chair David Nash, MD and renowned leaders in health care will be in attendance to share their wealth of knowledge. Learn more and register at populationhealthcolloquium.com



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If you have any questions or feedback, please contact: curalink@thecurafoundation.com

Newsletter created by health and science reporter and consulting producer for the Cura Foundation, [Ali Pattillo](#), consulting editor, [Catherine Tone](#) and associate director at the Cura Foundation, [Svetlana Izrailova](#).