

Interview

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Jeremy Farrar, the director of Wellcome, discusses the state of the COVID-19 pandemic and what society must do to prepare for future global crises.

As an infectious diseases specialist and director of Wellcome, Jeremy Farrar was among the first people in the world to learn about the emergence of COVID-19. Before helming Wellcome, one of the world's largest philanthropic funders of science, he spent 18 years leading the clinical research unit at the Hospital for Tropical Diseases in Vietnam, where he contributed to pivotal advances in understanding tuberculosis, malaria, typhoid, dengue, and influenza. He is a member of the UK Vaccine Taskforce and the Principals Group of the World Health Organization's (WHO) Access to COVID-19 Tools (ACT) Accelerator and the WHO's R&D Blueprint Advisory Group, and until November 2021, he served on the UK government's Scientific Advisory Group for Emergencies. His new book, *Spike: The Virus vs. The People*, written with Anjana Ahuja, provides a gripping account of how the pandemic unfolded. *Issues in Science and Technology* editor Molly Galvin recently spoke with him to get his thoughts on the future of the pandemic, the status of science in society, and the uniquely globalized challenges of COVID-19 and climate.

We're now going on almost two years since the COVID-19 pandemic began. The vaccines have proven remarkably effective, and we have some promising antiviral treatments on the horizon. But of course, much of the world is still unvaccinated, and the new omicron variant is raising a great deal of concern—where are we in this process?

Two years can seem like a very long time, given what we've all been through. But perhaps in the bigger picture, it is a very short time. We're two years into the emergence of a brand new human pathogen. We know a lot more now than we did two years or 18 months ago, but there are still enormous unknowns. There is still uncertainty on the origins of the virus and its future evolution. We're still learning about omicron, and there will be other variants that emerge. We need to learn more about the underlying pathogenesis of COVID and what drives transmission, clinical severity, and immunity. All of this will inform our ability to make therapeutics and vaccines to provide long-term protection and reduce transmission. And we need to know more about the potential long-term consequences of infection and long-COVID.

What about the long-term outlook? When do you think COVID-19 will be viewed as an endemic disease, rather than as a global health emergency?

Any talk that the pandemic phase is coming to an end is premature. We're going through this highly variable period with waves that depend on the evolution of the virus, immunity, and access to vaccines. I think that this period will be quite protracted. Around the world, COVID's impact will depend on access to the essential tools needed to lessen the impact, such as vaccines, tests, personal protective equipment, oxygen, and therapeutics.

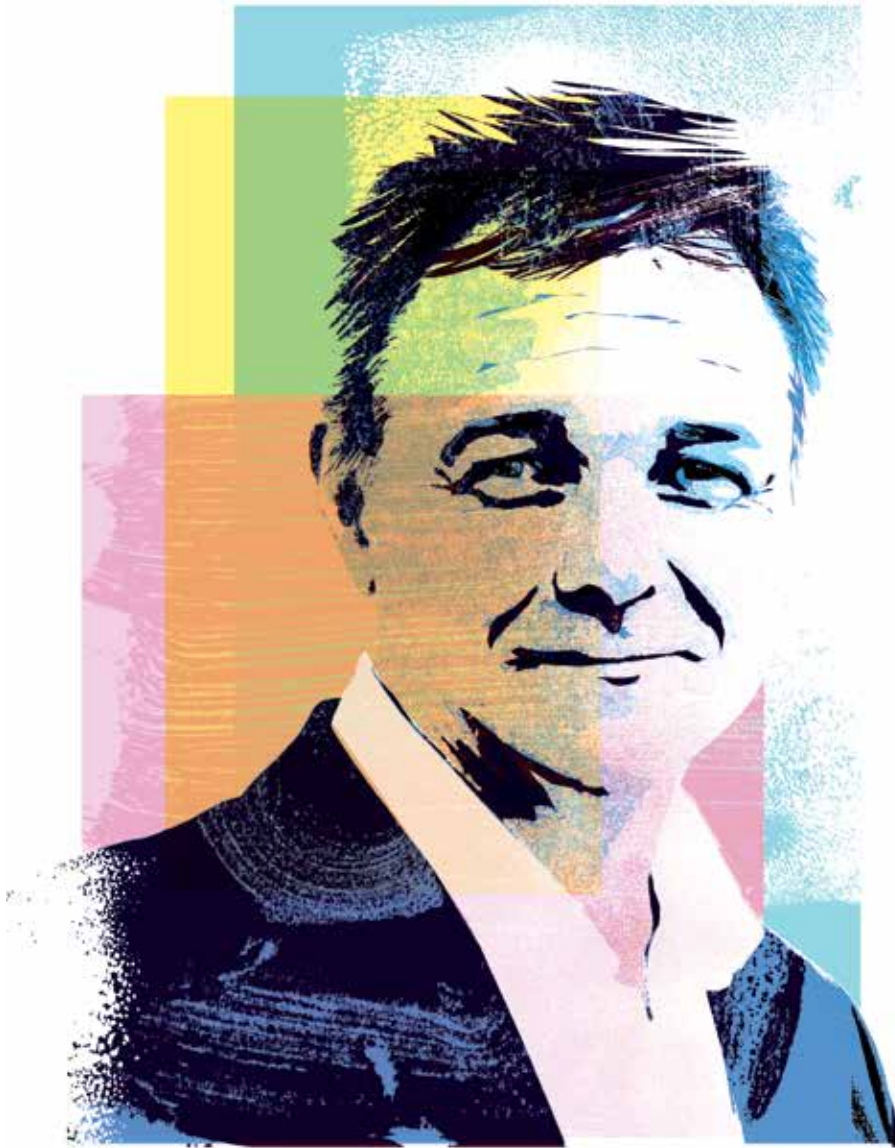


Illustration by Shonagh Rae

And then gradually over time—certainly through 2022 and into 2023 and possibly beyond in some parts of the world—we will have a period of continued oscillations in the frequency of waves of infection, hospitalizations, and deaths.

I don't think anybody thinks this infection is going away any time soon. It's part of humanity now. And even in the transition to the endemic era, we will still have transmission and we will still, sadly, have some hospitalizations and deaths. However, we are not passive observers of this or how it pans out. Science has provided the tools, and those tools will get better. But the science and the tools are only fully effective if we share them equitably—and only politicians can make that happen.

Your book is a reminder of just how much, and how quickly, scientists had to learn about this novel virus. What are the biggest lessons for science in how to improve that process, particularly in times of crisis?

One obvious lesson is the critical importance of science. And I don't just mean vaccine development. I mean social sciences, biomedical science, immunology, virology, mathematical modeling, economics. You can't just build that science when you think you need it: investment in people, teams, and infrastructure over years provides the bedrock that is so important in a crisis.

The vaccines were building off decades of investment in basic discovery science—such as in the RNA technology for

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cancer therapies, or the adenovirus vaccines for severe acute respiratory syndrome (SARS-1) and Middle East respiratory syndrome (MERS) that were repurposed for COVID-19. And I think this is a huge lesson for all of us: investment in discovery science is absolutely critical. You can’t invent it in a crisis.

Of course, we need to make sure that we’re prepared for the great threats that we might face. We need a trustworthy regulatory environment to consider novel interventions. We need vaccine manufacturing around the world—not just in some countries. So there are many lessons to be learned, but the fundamental one is, in a crisis, you build off what you’ve already got. And whether it’s fundamental science, or trust, or communication, or capacity in your public health or clinical systems, or the governance of your public health, or your political processes—the ability to respond to a crisis is determined by what people, infrastructure, and trust you have in place before it happens.

Although we’re still very much in the throes of this pandemic, many experts believe that other future pandemics are almost inevitable. Do you agree with that assessment?

It’s not a question of whether pandemics will happen, but when. Their impact will be determined by how well prepared we are when they occur, and how we respond. Diseases like SARS-1 or COVID-19 are the symptoms and outcomes of key drivers in the twenty-first century, which include land use change, ecological and environmental change, climate change, change of the relationship between animals and humans, and change in how we interact with nature.

And then of course, there’s urbanization. Big urban centers are where these epidemics get amplified because of the proximity of people, as we found in Ebola in West Africa in 2014 and in Wuhan in 2019. With trade and travel, these interconnected cities can pass pathogens around the world within hours. We need to see SARS-1, Ebola, Zika, influenza, MERS, or COVID not as drivers, but as symptoms—they are the outcomes. And we would be well advised to focus on the drivers as well as on the pandemics themselves.

One bright spot in this pandemic is the speed at which the vaccines were developed. In your book, you note that the work done in 2014 on the Ebola vaccine really helped pave the way. Can you elaborate on that?

We should remember that up until the Ebola crisis, almost no research had been done during epidemics. The 2014 outbreak was the first time in an epidemic crisis that really high-quality research was conducted in real time, leading to the development of a vaccine and therapeutics.

And there is no doubt that the lessons learned in that crisis helped the response to COVID. It is remarkable that, before 2014, essentially no clinical research was done during an epidemic. It was considered too difficult. Some people even questioned the ethics of doing research in an epidemic. Research was something that took you three years to set up, and then a few years to conduct the studies, and then it took two more years to report results. That changed with the Ebola vaccines. The experience led to the creation of the WHO R&D Blueprint, the Social Science in Humanitarian Action Platform, the International Severe Acute Respiratory and emerging Infection Consortium, and the global Coalition for Epidemic Preparedness Innovations to ensure that research was integral to all future epidemic prevention and responses.

And that became a huge component in the ability to conduct research in the COVID pandemic. You can, and in fact, *you must* conduct research in an epidemic.

Public-private partnerships have played a big role in helping to develop vaccines, diagnostics, and therapeutics. How important will such partnerships be in future global health preparedness efforts?

Industry is absolutely critical to research and development, the manufacturing and distribution of vaccines and therapeutics, and diagnostic testing. That capacity does not exist within the public sector, nor should it.

But when we’re talking about epidemics or drug-resistant infections, we need to recalibrate what the public sector asks or mandates from the private sector. I don’t like analogies with the military, but effectively, the public sector tells industry, “We need fighter jets.

We need aircraft carriers.” If the government doesn’t set priorities, why would industry make a remedy for something that may never happen?

We’re going to have to change the incentives to encourage industry to develop a vaccine for an epidemic disease that may not happen or for an antibiotic that may never be used, because at some point society will desperately need them.

Wellcome is one of the biggest nongovernmental funders of science and research in the world. What role do you see for Wellcome and other philanthropies in shaping science?

We shouldn’t overstate the scale of philanthropy. The numbers seem big, but compared to what governments and industry can bring to bear, philanthropy is not at the same scale. Philanthropy’s role is not to be the biggest player in the room, but to do things which the commercial sector and the government may not or cannot do.

There is an inherent conservatism in using taxpayers’ money to fund science, and that’s absolutely right. And in the commercial world, of course, there are very strong commercial drivers. Philanthropy doesn’t have those constraints. I think that is philanthropy’s key role: to be that catalytic disruptor in a positive, constructive way. Its role is to take greater risks than some others should or can and to push forward innovation, to ask questions, to do things differently, and to use their independence to challenge the status quo.

Last year you announced that Wellcome is going to focus not just on discovery research but also goal-oriented research to tackle infectious diseases, climate change and health, and mental health. What inspired that decision?

They are all key issues for the twenty-first century, and they will especially impact people in marginalized communities around the world as well as younger generations. There are also features that go across all of these challenges. We’ve talked about climate being a driver of epidemic diseases; it’s also a driver of where mosquitoes fly, where ticks locate, and where animal vectors might go. There is also a great deal of inequality in the way climate will affect lives around the world and, I am afraid, mental health—particularly young people’s mental health issues, which have been neglected and stigmatized for too long. I also believe that science can and will play a role in addressing these challenges. But it must be science that is committed to ensuring that everybody has equitable access to its benefits, and science that is part of the societies that sustain, support, and—I hope—trust it. So I think these are distinct challenges, but they overlap.

They also overlap with discovery science. Wellcome remains absolutely committed to the freedom of discovery science—the bedrock of innovative ideas which will change the world tomorrow, or in 50 years’ time.

There is a lot of discussion among the scientific community about why there’s so much misinformation about COVID. What observations do you have on that?

Over the last two years, we’ve been faced with an enormous global challenge. We need to acknowledge that the vast majority of people in the world have trusted science—perhaps more than they trust politicians—and have been willing to accept science, including accepting a vaccine that was developed in 10 months into their bodies.

In many countries, majorities have accepted wearing a mask. They’ve accepted working from home. They’ve accepted that their schools will have to adjust, their workplaces will have to adjust. And the role of science in society is larger today than probably any point in my life, with the possible exception of the late 1960s and the era of the moonshot.

Science is on the front page of every newspaper. More people than not are able to understand the difference between a vaccine and a drug and can define what a virus is.

However, there will always be people who question science, doubt it, and challenge it. This has been true throughout history. We need to recognize that there will be some people who one may never persuade. And there is probably a much larger group of people who are just not sure—for perfectly understandable personal reasons. They are not convinced, but are not totally against it, and they will listen to evidence.

What we can’t expect is that everybody will trust us or see the world as we do. That level of trust is not built in a crisis. It’s built over years, before any crisis hits. Do people basically trust the scientific process, their political system, the public health system, and the doctor or the nurse in front of them? That’s built up over years or decades. And you then rely on it when there is a crisis.

And how do scientists or public health officials build that trust?

I think scientists have done a lot more in the last two years to build trust. And I think that is the sort of thing all of us are going to have to keep doing in the future. The things that help build trust are transparency, humility, and communication—honest communication, both of what you know and what you don’t know. And I think that trust is built up over years through personal communications, but also through our education system, from primary school

through university and technical college, through the workplace, and yes, through the media. Trust is something which builds over time in a society. And of course, you can lose it in an hour.

Throughout this pandemic, you and so many other scientists and public health experts have been the focus of some intense vitriol and anger over lockdowns and other public health measures. Did you envision this level of anger five years ago?

Five years ago, nobody could have predicted the level of vitriol, anger, and the personal threats. I've heard from friends in the Netherlands, Germany, Korea, China, the United States, and here in the UK who have had similar experiences with death threats aimed at us or our families—very personal abuse, as well as just general frustration and anger.

But none of us, including myself, could have predicted the scale of disruption to the whole of

leaders will take heed and really make the reforms that are necessary?

I'm not sure whether I'm optimistic or pessimistic. If you look back over the last 100 years or so, major reforms have been driven by crisis. After the Second World War, for instance, people said, "Never again. We're going to create the United Nations. We're going to create World Bank, the International Monetary Fund. We're going to create the World Health Organization—because we know that we can't go back to how it was before."

And I think we're at one of those moments in history. We have to ask ourselves, if we don't reform now, will we ever reform? Of course today, it's extraordinarily difficult to do that because of geopolitical tensions, but that was also the case in 1945. And if we don't, in a decade or two, we will be back where we are now. And that's unacceptable. If not now, when?

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society that COVID has caused over the last two years. It's not just a health issue. It's an economic, political, social, education, and commercial issue. There is no sector of society in any country that hasn't been affected. And I think, outside of war, when has that happened in the last hundred years?

We are living through history: 100 years from now, people will still be talking about COVID-19. When you read a history book about the 1918 flu pandemic, there's almost a romantic sense of people banding together despite the fact that tens of millions of people died.

But the truth is, when you live through history being made, it's awful. My father was a prisoner of war for five and a half years in the Second World War, and my mother was an army lorry driver. They lost friends, they lost family members. Their lives were disrupted. History, as it's being made, is very painful to live through.

For at least the last two decades, you and many others have advocated for major global public health reforms such as disease surveillance and public health financing. Are you hopeful that global

Countries need to decide how they're going to balance domestic pressures with international responsibilities. I think solving that problem is at the heart of whether we'll be able to address the great challenges of the twenty-first century. For instance, the domestic pressure in this pandemic is to only offer vaccines to your own citizens, but the enlightened, self-interested choice is to offer them globally, as we can see with the emergence of new variants.

After you come out of these crises, you are faced with a choice as a global community, and you either choose to reform, or you choose not to. It's for all of us to decide what sort of world we want to live in. The global financial crisis of 2008 and now COVID are the first two real crises of the twenty-first century. They are transnational and they demand transnational action. Climate change is the same type of globalized crisis. It can't be addressed by a single country. We're going to have to find ways to work together or we will fail together, whether for pandemics or climate change, drug resistance, inequality, or access to energy and water—these are the great transnational challenges of our time. In the twenty-first century, the cost of failure is surely too high.