

Healthcare Systems & Services Practice

How might the COVID-19 pandemic end?

Experts in healthcare, commerce, security, and more discuss new approaches to address the pandemic when vaccination alone may not be enough and the enduring costs of the crisis continue to rise.



The COVID-19 pandemic has changed most of our lives in a profound way. The size and complexity of the challenge is reflected in the numbers: millions of lives have been lost and trillions of dollars added to the mountain of global debt. Information quality varies greatly, and key issues about the pandemic can be easily misunderstood as the challenges transcend areas of expertise and make it hard to identify the most effective solutions. Ongoing vaccination programs and continued safety diligence provide snapshots of the end to the pandemic, but as vaccine hesitancy persists and variants manifest and spread across the world, the promise of herd immunity appears more challenging. In its place, the need for ongoing management and a plan to minimize the costs from this pandemic and any future crises becomes the priority.

So how do we effectively end the pandemic and prepare for the next one? It may require a more holistic approach that allows greater visibility and understanding of the challenges and reveals the interdependencies of the potential solutions. Cross-functional teams with complementary skills can pull together perspectives that allow for a broader, better view of crisis situations. That is what brought together a group of experts (see sidebar, “Biographies”) from various disciplines to write the forthcoming US-focused white paper “Reality injection: The true cost of COVID-19,”¹ which seeks to reduce ambiguity and empower citizens and leaders to make better decisions for managing an end to the pandemic and planning for the long term. McKinsey’s Gretchen Berlin recently sat down with this interdisciplinary group:

- Eric Achtmann, a venture capitalist, innovator, board member of several medical and technology companies, expert adviser to the European Commission, and founding member of the Pandemic Security Initiative
- Raquel Bono, a retired US Navy vice admiral, the former director of the Defense Health Agency, and the State of Washington’s COVID-19-response lead

- Anita Goel, MD, PhD, a world-renowned, award-winning physicist, physician, global-health security expert, and entrepreneur and the chair and CEO of Nanobiosym
- Margaret Hanson-Muse, a career diplomat and agency chair for the US Department of Commerce at the Eisenhower School for National Security and Resource Strategy with a focus on leadership, biotech, and contemporary topics in national security
- Steven M. Jones, a public-health scientist and an inventor of the world’s first Ebola vaccine

Although the discussion primarily focuses on US developments, the nature of the pandemic and the solutions offered quickly take on a global context. The discussion reveals some of the ongoing dynamics between local and global concerns about the recovery efforts under way and what needs to happen next to help end the pandemic and safeguard society from the next one. What follows are edited excerpts of the conversation.

How we got here: Understanding the nature of the COVID-19 pandemic

McKinsey: COVID-19 is not the first pandemic and, unfortunately, probably won’t be the last. How would you describe the COVID-19 pandemic relative to previous crises, and what key factors from the health, economic, and security perspectives define it?

Steven M. Jones: Pandemics appear relatively frequently. Influenza pandemics can occur every few decades on average.² And both the SARS outbreak in 2003 and the MERS outbreak in 2012 in the Middle East gave us a warning that coronaviruses could, and probably would, spread to pandemic levels. The biggest factor with this pandemic is the interconnectedness of the world now. Diseases move—from China or, indeed, the United States in the case of the 2009 influenza outbreak—across borders and into rural areas incredibly quickly now.

¹ Planned for publication in *Joint Force Quarterly*, Volume 103, October 2021.

² David M. Morens and Jeffery K. Taubenberger, “Influenza: The once and future pandemic,” *Public Health Reports*, April 2010, Volume 125, Number 3 (supplement), pp. 15–26, journals.sagepub.com.

Biographies

Several experts have formed an interdisciplinary group to discuss the ways that citizens and leaders can approach recovery from the COVID-19 pandemic and plan for future public-health crises.

Eric Achtmann is an executive, innovator, and venture capitalist. He is an expert adviser to the European Commission, senior adviser to McKinsey, founding member of the Pandemic Security Initiative, founding member of Meggitt's technical advisory board, and board member of Celdara Medical, Javelin Oncology, and Target Arm.

Raquel "Rocky" Bono is a retired vice admiral in the US Navy and the former director of the Defense Health Agency. Most recently, she served as the lead of Washington State's COVID-19 Health System Response Management program. She is a diplomate of the American Board of Surgery, fellow of the American College of Surgeons, senior fellow of the Johns

Hopkins University Applied Physics Laboratory, and member of the Eastern Association for the Surgery of Trauma.

Anita Goel is the chair and CEO of Nanobiosym and a world-renowned entrepreneur, inventor, physician, and physicist. She was named by *MIT Technology Review* to its World's Top Science & Tech Innovators list and by *Scientific American* to its World's Top Biotech Visionaries list. Nanobiosym was recognized by Barclays and *Scientific American* in their World's Top 10 Companies Solving the Global COVID Crisis list and at the 2019 Future Investment Initiative conference as one of the 12 most promising technology companies that will shape what's next for global business. Goel has served as an adviser to CIFAR, on the advisory boards of Lockheed Martin and PepsiCo, and on the President's Council of Advisors on Science and Technology.

Margaret Hanson-Muse is a career diplomat and agency chair for the US Department of Commerce at the Eisenhower School for National Security and Resource Strategy. She teaches biotech, contemporary topics in national security, and leadership and is a founding member of the Women in National Security chapter at the Eisenhower School for National Security and Resource Strategy and a member of its diversity, equity, and inclusion task force.

Steven M. Jones is public-health scientist and executive. An inventor of the world's first Ebola vaccine and member of the team that discovered SARS-CoV, he has served as an adviser to INTERPOL and WHO on bioterrorism and outbreak response. He has worked in Saudi Arabia leading the MERS laboratory-response team and in Sierra Leone leading the health-system recovery team. He is now COO at Bright App Enterprises.

Raquel Bono: National security is defined through the national elements of power, like military, economic, or financial elements. And any time you have an event like a pandemic that disrupts or destabilizes those elements, then I think you have to be looking at it through a national-security lens.

For this pandemic, the specific areas that we experienced revealed a lot of the fragility and brittleness of the interfaces among our public-health system and healthcare delivery, supply chains, and supply-chain logistics. And because this had such broad impact across not only the United States but also globally, then it had to have an impact on the economy, and these issues manifested themselves as the challenge areas.

McKinsey: How can we start to understand the enduring costs of the COVID-19 pandemic?

Eric Achtmann: It's worth taking a step back just to contextualize the short-term costs. We're talking about \$16 trillion to \$35 trillion by 2025³ as a potential direct cost of the pandemic. This equates to approximately wiping two years of gross income off the average American taxpayer, assuming a median gross income, or about 5 to 10 percent of a generation's productive life. And if we think that the long-term health implications may be about \$8.6 trillion of this, the cost is roughly \$26,000 per person. That bill's got to be borne by somebody, somehow.

³ David M. Cutler and Lawrence H. Summers, "The COVID-19 pandemic and the \$16 trillion virus," *JAMA*, October 20, 2020, Volume 324, Number 15, pp. 1,495–6, jamanetwork.com; Deepthi Nair, "COVID-19 may cost global economy \$35.3 trillion by 2025," *National*, August 27, 2020, thenationalnews.com.

If we break it down to long-term structural costs, that would include education, diversity, income disparity, and inflation of late- and long-term health issues.

On the education side, we've lost a year of math and reading, prospectively, in a nation whose education system has been ranked at 38 internationally.⁴

On diversity, 2.5 million women exited the workforce after decades of getting women into the workforce.⁵ It's going to take a concerted effort to recover that loss and to turn around that trend.

On income disparity, billionaire wealth increased 55 percent during the pandemic. That means \$1.6 trillion shifted to those who were already billionaires.⁶ That has long-term structural implications for our society.

On inflation, the May US numbers from the Council of Economic Advisers was 5 percent. For the average American, it means we've just cut roughly 5 percent off of savings.⁷

The main takeaway from all of this? The implications from the pandemic are significant and multifaceted, and they are not going to go away fast. The issue is how each individual—in this case, Americans—is going to pay the bill—the debt that's been racking up silently in the background.

McKinsey: What surprised you so far, both positive and negative, about the national and global responses to the COVID-19 pandemic?

Steven M. Jones: The response by healthcare workers was, and is, extremely strong, but public-health measures to shut borders don't work very effectively,⁸ and we saw that information sharing, which is an extremely important part of early control

measures, was limited in the early stage of this outbreak. As a consequence, we may have missed many potential early-control dates for this pandemic. We still need to be better at sharing information across borders in order to be able to control the spread of disease.

Raquel Bono: We had a very successful public-private partnership [PPP] with pharma and vaccine manufacturers and our regulatory agencies of the government. Its success was in part due to how the manufacturers, the scientists, and the research developers for the vaccines were willing to bring all their intellectual capability to making that happen. And on the government side, they were willing to put in a parallel, rather than an in-sequence, regulatory process that would allow them to approve the vaccines quickly. And by doing that together, they were able to arrive at a solution much faster than we would have otherwise. That kind of PPP is a great model for how we might want to continue to approach the solutions going forward.

Margaret Hanson-Muse: Taking a wider socioeconomic look at the response to the pandemic, we saw a high degree of mobilization and adaptability. For example, small businesses "double clicked" into action very quickly. Many were nimble and mobilized their cash and embraced e-commerce and digitalization. And some found ways to repurpose their staff in order to avoid layoffs, if they could.

We saw larger companies convert their production lines to produce hand sanitizers or to make ventilators. We saw the armed forces and the private sector cooperate to produce the vaccines and carry out state governments' public-health directives, such as delivering the PPE [personal protective equipment]. We saw both command-and-control and agile leadership styles successfully deliver

⁴ Drew DeSilver, "U.S. students' academic achievement still lags that of their peers in many other countries," Pew Research Center, February 15, 2017, [pewresearch.org](https://www.pewresearch.org).

⁵ Katie Rogers, "2.5 million women left the work force during the pandemic. Harris sees a 'national emergency,'" *New York Times*, March 30, 2021, [nytimes.com](https://www.nytimes.com).

⁶ *Billionaire pandemic wealth gains 55%, or \$1.6 trillion, come amid three decades of rapid wealth growth*, a joint report from Americans for Tax Fairness and Institute for Policy Studies, April 14, 2021, americansfortaxfairness.org.

⁷ "Current U.S. inflation rate: June 2021," Official Data Foundation, June 2021, in2013dollars.com.

⁸ Catarina Antão, Robert Hall, and Linda A. Selvey, "Evaluation of border entry screening for infectious diseases in humans," *Emerging Infectious Diseases*, February 2015, Volume 21, Number 2, pp. 197–201, [cdc.gov](https://www.cdc.gov); Smriti Mallapaty, "What the data say about border closures and COVID spread," *Nature*, January 2021, Volume 589, Number 7,841, p. 185, [nature.com](https://www.nature.com).

‘We jumped on physical distancing, masks, lockdowns, and vaccinations. But none of those solutions, in and of itself, is sufficient to solve the problem. We need a multifaceted approach.’

–Steven M. Jones

solutions. But what a way to have to respond: on the fly. What a way to have to be so reactive. We hope that next time we won't have to be so reactive.

What we do next: Managing the end of the COVID-19 pandemic

McKinsey: What innovations are you most excited about that may help deliver faster, more effective solutions to end the pandemic from both the health and economic perspectives?

Anita Goel: We live in a highly interconnected global economy where infections travel at lightning speed. To combat that, we need to embrace innovation and the best technologies and capabilities—technologies to detect, intervene, and create countermeasures on a massive scale early. We now have the technological capabilities, but it will require a paradigm shift to scale and deploy these nationally and globally—for example, moving from a more centralized to a decentralized paradigm about how we deliver healthcare.

We also need strong national mobilization to scale adoption quickly—for example, scaling nanobiophysics technology, which may solve the testing problem and create precision molecular testing in real time at a mass scale and enable real-time surveillance and early detection and countermeasures.⁹

Margaret Hanson-Muse: What excites me about the potential outcomes of the pandemic is that we're witnessing, once again, a change of eras. The pandemic is a huge opportunity to reset our business and personal lives. For instance, innovations in remote- and hybrid-working models, which helped us keep some of the economy going during lockdowns, have become more acceptable, even as restrictions lift and managers become more comfortable. Moving forward, to continue to battle the economic impact of COVID-19 and with the expectations that there will be more pandemics, managers may need to look at their workforces differently to accommodate for not only technological innovations but also changes to how people approach careers as new organizational practices, such as rising portfolio careers that allow workers to have multiple sources of income, emerge. This is a new reality for managers and a new opportunity for many.

McKinsey: Where do we go from here in terms of effectively ending the COVID-19 pandemic?

Steven M. Jones: We've behaved in this pandemic like a cat chasing a laser pointer. We jumped on physical distancing, masks, lockdowns, and vaccinations. But none of those solutions, in and of itself, is sufficient to solve the problem. We need a multifaceted approach.

⁹ Anita Goel, "Precision mobile testing is key to opening the economy safely," *Scientific American*, May 27, 2020, scientificamerican.com; John Nosta, "Fighting the next world war with a musket," *Forbes*, June 7, 2018, forbes.com.

Vaccination is one part of the solution and is a huge help, but we are unlikely to ever reach global herd immunity, which means there is always an opportunity for the virus to evolve.¹⁰ And we're seeing this now with virus mutants. Vaccination will help us prevent the health system from being overwhelmed, but it's not going to solve it completely.

Testing people is the only way to know whether individuals are presenting a hazard to other people and to understand how well the vaccines are suppressing infection. There are a variety of tests that can be deployed both nationally and internationally. Antigen-antibody tests provide reasonable data when you measure a population on a regular basis.¹¹ Other tests—nucleic-acid tests, like PCR [polymerase chain reaction], and quantitative tests—provide other elements of specificity but may not be easily accessible to all nations, particularly middle-income and developing countries.¹² To focus on global solutions, we may require a very complex network of different levels of tests designed to fill specific yet varying purposes.

The endpoint of this virus is that we will just start to live with it;¹³ it will become endemic in the population.¹⁴ And we can hope that it becomes less virulent over time, as diseases tend to. But there may be spikes, as there are with influenza, where occasionally a new variant comes about that is more deadly. We have to be prepared for the next thing to come along, potentially while we're still dealing with this one.

Anita Goel: To support recovery from this pandemic, and to prevent future pandemics, we need to have a *smarter quarantine* system—instead of entire lockdowns on our economy—enabled by decentralized nanoprecision and even quantitative, real-time testing of COVID-19 and other biomarkers. There's a Harvard University study that says it costs about \$12 billion a day for

America to have a lockdown.¹⁵ And it would cost Americans \$20 million a day to test 6 percent of the population—roughly 20 million Americans—to effectively and safely reopen the economy—and keep it open.¹⁶

A smart quarantine system means we create COVID-19-free safety zones where we can guarantee individuals, families, and communities—at least within a certain subset of the population—are indeed COVID-19 free. To do that, we need very high-precision, mobilized testing at a molecular level that can give you real-time data. That's how we are going to be able to separate who's infected, including the asymptomatic carriers—or "superspreaders"—who carry the virus and can transmit it yet show no symptoms. Today, less than 10 percent of the needed 20 million tests a day in the United States are being done. And the testing that's being done today provides only qualitative yes-or-no answers and has variable quality.

How we prepare for the future: Planning for the best outcome

McKinsey: How do we better prepare for any future potential pandemic or crisis?

Eric Achtmann: We invest, and we prepare. We must come to terms and act on the stark reality that any future pandemic will be faced with the \$35 trillion rock already on our shoulders from COVID-19. That has a profound impact on the future of the United States and its ability to combat emerging threats. This is a national-security issue that transcends diplomacy, information, the military, and economics. And it is a planetary challenge that manifests itself differently at local levels. There's no version of this where one side of the boat is leaking and those on the other side of the boat think they're going to be just fine.

¹⁰ Apoorva Mandavilli, "Reaching 'herd immunity' is unlikely in the U.S., experts now believe," *New York Times*, July 12, 2021, nytimes.com.

¹¹ Isaac I. Bogoch, Allison J. McGeer, and Kevin L. Schwartz, "Rapid antigen screening of asymptomatic people as a public health tool to combat COVID-19," *CMAJ*, March 29, 2021, Volume 193, Number 13, pp. E449–52, cmaj.ca.

¹² Lia M. Barros et al., "Pragmatic recommendations for identification and triage of patients with COVID-19 disease in low- and middle-income countries," *American Journal of Tropical Medicine and Hygiene*, January 6, 2021, Volume 104, Number 3 (supplement), pp. 3–11, ajtmh.org.

¹³ Adina Bresge, "WHO predicts COVID-19 will become endemic, but some experts are less certain," *Toronto Star*, December 31, 2020, thestar.com.

¹⁴ This endpoint is not a definitive endpoint but a continuation with potential complications requiring proactive planning, not just reactive response. Ingrid Torjesen, "Covid-19 will become endemic but with decreased potency over time, scientists believe," *BMJ*, February 2021, Volume 372, p. n494, bmj.com.

¹⁵ Danielle Allen et al., *Roadmap to pandemic resilience: Massive scale testing, tracing, and supported isolation (TTS) as the path to pandemic resilience for a free society*, a joint report from Edmond J. Safra Center for Ethics and Rockefeller Foundation, April 20, 2020, ethics.harvard.edu.

¹⁶ Ibid.

‘We need more conversation on our healthcare system and the historical leanness approach of the last 60 years that can be disrupted so readily.’

–Raquel Bono

Anita Goel: We need to unify our national and global thinking. This virus is definitely teaching us that it doesn't know the difference between borders. To combat that and future instances, we need democratized access to the best disruptive technologies and PPP approaches to rapidly scale them globally.

We also need to embrace next-generation, decentralized ways of delivering healthcare, which, in some places, are already starting to happen and which have the potential to be more rapidly adopted among emerging economies that can bypass legacy infrastructures more readily and potentially scale solutions faster.¹⁷

Raquel Bono: We need more conversation on our healthcare system and the historical leanness approach of the last 60 years that can be disrupted so readily. For example, in order to have sufficient PPE readily available to the frontline healthcare workers at the start of the pandemic, many hospitals put a hold on all elective-surgery care to free up equipment. But even the most successful healthcare systems with healthy cash positions found a month of suspending elective-procedure care had an impact on their financial stability. It also had an impact on the individuals who didn't get the elective-procedure care and, in some cases, didn't receive the

preventive or primary care they required.¹⁸ What kind of enduring impact does that have on people with chronic conditions who might have had to delay their care?

We also need to look at the data side of the healthcare system, particularly the data interoperability and how we share that across healthcare systems and across health sectors. The data interoperability impacted a lot of our collective ability in the healthcare field to understand what was going on with testing, who was at most risk for having the virus, or where it was spreading next.¹⁹ Oftentimes we lag in our ability to get the data and to be able to have the decision support that the data represent.²⁰ Further discussion will be needed to improve that going forward to create resiliency in our system.

McKinsey: What advice would you give senior decision makers in the private sector to best prepare for the coming months and years?

Anita Goel: First, don't get complacent. Try to avoid relaxing restrictions—the masks and the physical-distancing measures—too early because we aren't out of the pandemic yet. And second, try to adopt the best solutions as quickly as possible to create a *smart quarantine* system for businesses and communities to proactively prevent another lockdown.

¹⁷ Ian Chiang, "Back to the future: Digital health-led decentralization of healthcare delivery," *MobiHealthNews*, July 24, 2020, mobihealthnews.com; John Henning Schumann, "How health care in the U.S. may change after COVID: An optimist's outlook," *NPR*, May 13, 2021, [npr.org](https://www.npr.org); Jayagandan Jayamani et al., "Decentralisation of healthcare system due to COVID-19 and its impact on hospital based laboratories—pandemic panic patients' reflection?," *Journal of Responsible Technology*, October 2020, Volume 1, p. 100,003, [sciencedirect.com](https://www.sciencedirect.com).

¹⁸ *Hospitals and health systems face unprecedented financial pressures due to COVID-19*, American Hospital Association, May 2020, [aha.org](https://www.aha.org).

¹⁹ Vikas N. O'Reilly-Shah et al., "The COVID-19 pandemic highlights shortcomings in US health care informatics infrastructure: A call to action," *Anesthesia & Analgesia*, August 2020, Volume 131, Number 2, pp. 340–4, [journals.lww.com](https://www.journals.lww.com).

²⁰ "COVID-19 accelerating interoperability, data exchange, analytics," *EHR Intelligence*, July 17, 2020, ehrintelligence.com.

Steven M. Jones: Prepare for the next pandemic. The last influenza pandemic was in 2009, and they happen every 20 to 35 years. The timeline is short. And there are other threats: global warming will likely increase the risk of the emergence of new diseases, as does the increasing density of humans on the planet.²¹ And antibiotic resistance was predicted to eventually cost \$125 trillion to the global economy, dwarfing the potential costs that we've talked about with COVID-19, as astronomical as they are.²²

Margaret Hanson-Muse: Leverage diversity as much as possible to access different pools of workers, as labor is likely to become more scarce, and allow for more flexibility that workers may need and want. And just as important, invest in digital technology. If you haven't, upgrade your infrastructure.

Eric Achtmann: Be empathetic; people are exhausted, and you're probably in the best shape of anybody. Be honest; people need to know what the best current knowledge is—and what it isn't. And, last, be realistic and measured. There are no silver bullets in such situations.

Raquel Bono: Look at things from a much broader aperture. Hear, see, and appreciate what other people have to say and realize that there isn't a single solution that is going to be available from a single sector or area of expertise. It is truly a multisector, whole-of-government, whole-of-society approach that we need to take. And leaders may need to be able to work across all of those elements.

²¹ Bettina Menne and Jan C. Semenza, "Climate change and infectious diseases in Europe," *Lancet Infectious Diseases*, June 2009, Volume 9, Number 6, pp. 365–75, thelancet.com.

²² Jirka Taylor et al., *Estimating the economic costs of antimicrobial resistance: Model and results*, RAND, 2014, rand.org

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