



A Vaccination Strategy to Save Lives and Livelihoods

MARCH 05, 2021

By [Tristan Hunt](#), [Johanna Benesty](#), [Amanda Brimmer](#), [Marin Gjaja](#), [Ben Horner](#), [Dan Kahn](#), [Josh Kellar](#), and [Emily Serazin](#)

With the approval of a third vaccine, the US is poised to win the fight to bring COVID-19 under control. Last March's faint dream of rapid, successful vaccine development has become real, despite hiccups along the way. Multiple vaccines are now available, and while their effectiveness against mild and moderate forms of the disease may vary, they are all remarkably successful by the most important clinical measure: preventing hospitalizations and death resulting from COVID-19. (See Exhibit 1.)

EXHIBIT 1 | First-Generation Vaccines Are Highly Effective at Preventing Hospitalization and Death

Vaccine	# of doses	Efficacy in registrational trials		
		Reported symptomatic reduction ¹	Hospitalizations ²	Deaths
mRNA				
BioNTech	2	95%	0	0
Moderna	2	94%	0	0
Adenovirus				
Oxford University, AstraZeneca	2	70% ³	0	0
Johnson & Johnson, Janssen	1	57-72% ⁴	0	0
Gamaleya “Sputnik V”	2	92%	0	0
Protein subunit				
Novavax	2	49-89% ⁴	0	0

Source: UNICEF COVID-19 Vaccine Market Dashboard; manufacturer press releases; BCG analysis.

¹Reported efficacy numbers are difficult to compare due to differences in clinical trial protocols; definition of symptoms may vary by clinical trial.

²Hospitalizations measured from primary endpoint of trial; some trials reported hospitalizations in vaccinated patients which occurred before primary endpoint.

³As reported in November 2020.

⁴Range reflects differences based on geography.

With hundreds of millions of doses already administered globally, early real-world evidence suggests similar levels of protection in the field. This is great news, though it is often obscured by bureaucratic snafus and the emerging threat of more contagious—and potentially more deadly—variants of the virus. Now, nearly three months into a global vaccination effort, it is time to ask some important questions: What has worked, and what has not? Where do we need to set our sights? What lessons can be passed along to nations whose vaccination efforts are just beginning?

THE ROAD AHEAD, FROM PANDEMIC TO ENDEMIC

All vaccine strategies are a delicate balance of thoughtful preparation and strong execution. Governments are acting with imperfect information as they prioritize scarce resources across a broad population and pick which groups to protect first. They must weigh the risks posed by the virus itself against the costs society can bear. And they must do this in real time, as scenarios develop and evolve. These strategies require clear guiding principles as well as flexibility.

A primary aim of a vaccination program should be to do what all of the available vaccines are doing: keeping people alive and out of the hospital. The best way to achieve that is to vaccinate the *health vulnerable*—those most at risk of developing serious disease or dying if infected—as swiftly as possible. COVID-19 is especially deadly to people over the age of 65 and those with underlying health conditions. Older people with underlying health conditions are at least 30 times as likely to land in the hospital than younger and healthier people.

Once the health vulnerable are vaccinated, governments can offer vaccines to the rest of the population while beginning the process of reopening their communities—and while retaining public-health measures, such as mask wearing, for the time being. Even if the virus causes new outbreaks, governments can be confident that it won't overwhelm their health care systems again.

“

Once the health vulnerable are vaccinated, governments can offer vaccines to the rest of the population while beginning the process of reopening their communities.

Beyond those immediate concerns, a COVID-19 vaccination strategy also needs to confront the dawning and daunting reality that COVID-19 is likely endemic. There are several reasons why we believe this will be the case. First, this initial generation of vaccines appears less likely to prevent mild to moderate disease from many of the variants that have emerged around the world. Second, the current vaccines

may still allow people to become infected by and transmit the virus even if they do not develop symptoms; in other words, the vaccines minimize the risk of disease but may be less effective at fully preventing infection and transmission of the virus. Third, a significant minority of the population remains reluctant to be vaccinated.

Finally, the duration and efficacy of immunization for those who have recovered from COVID-19 are not yet fully understood. The experience of the Brazilian city of Manaus is

cautionary. It experienced a resurgence of cases in January despite an estimated 70% of the population having been previously infected, which suggests that people who had recovered from COVID-19 may have become reinfected by variants because their immunity had faded, or because variants made their immunity less effective, or both. As the virus continues to evolve, it remains uncertain how selective pressures—including the vaccines themselves—will shape the virus’s path.

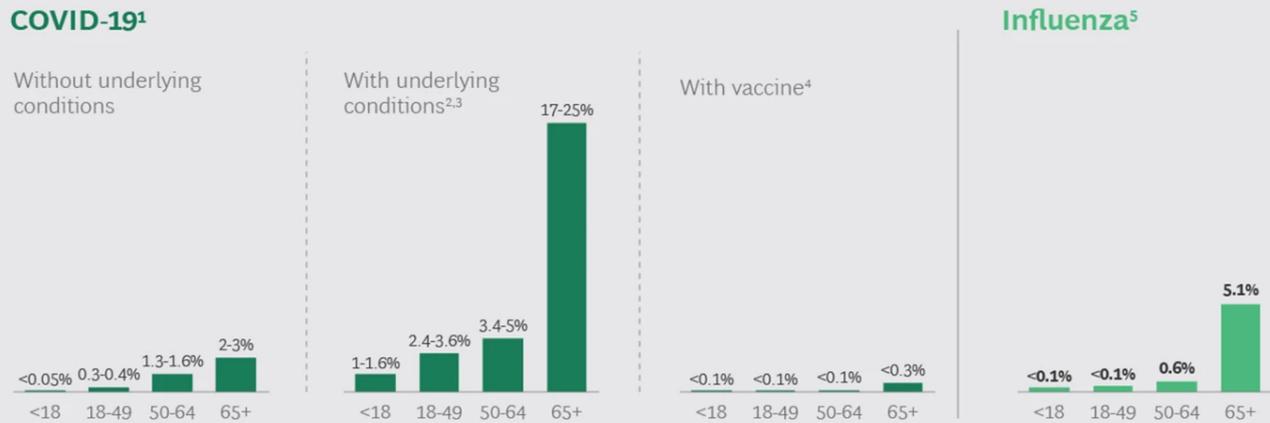
“

COVID-19 will likely continue to smolder, like the flu, long after the pandemic has been brought under control.

The most likely outcome is that COVID-19 will continue to smolder, like the flu, long after the acute, deadly pandemic phase has been brought under control. Far too many people die from the flu each year—hundreds of thousands globally—but the influenza virus and the risk of disease do not cause broad public health crises and economic devastation. Hospitals are rarely constructing makeshift ICUs to care for flu patients; large swaths of the economy are not forced into suspended animation; lives outside immediate family and friends are rarely upended. The flu is manageable, but it remains a threat—in fact, the initial data suggest vaccinated individuals are at less risk of landing in the hospital from COVID-19 than the flu. (See Exhibit 2.)

EXHIBIT 2 | With Vaccines, COVID-19 Becomes Less Risky Than Influenza

Estimated infection hospitalization rates



Sources: CDC; New York City Department of Health and Mental Hygiene; real-world data in South Korea and Israel; BCG analysis.
¹Infection hospitalization rates estimated in late fall 2020; these have not been updated to reflect potential changes due to virus mutations.
²Derived using the CDC’s data on COVID-19 net hospitalization, South Korea’s hospitalization data, and data from the New York City Department of Health and Mental Hygiene.
³Preconditions are those identified by the CDC definition that are more vulnerable to coronavirus, including obesity (BMI >40), diabetes, chronic heart disease, respiratory disease, and kidney and liver disease.
⁴Based on real-world data in Israel which shows a 35x reduction in hospitalizations after vaccination; there is insufficient evidence yet to disaggregate impact on subgroups.
⁵Weighted average based on five seasons of influenza in US (2015-2020); estimated asymptomatic population based on average ratio of asymptomatic to symptomatic infections (see CDC data).

National COVID vaccination and containment strategies should recognize this reality. Governments should already be planning permanent processes to conduct sustained testing and perform regular booster shots, even as they work to rapidly vaccinate the vulnerable.

WHAT ABOUT HERD IMMUNITY?

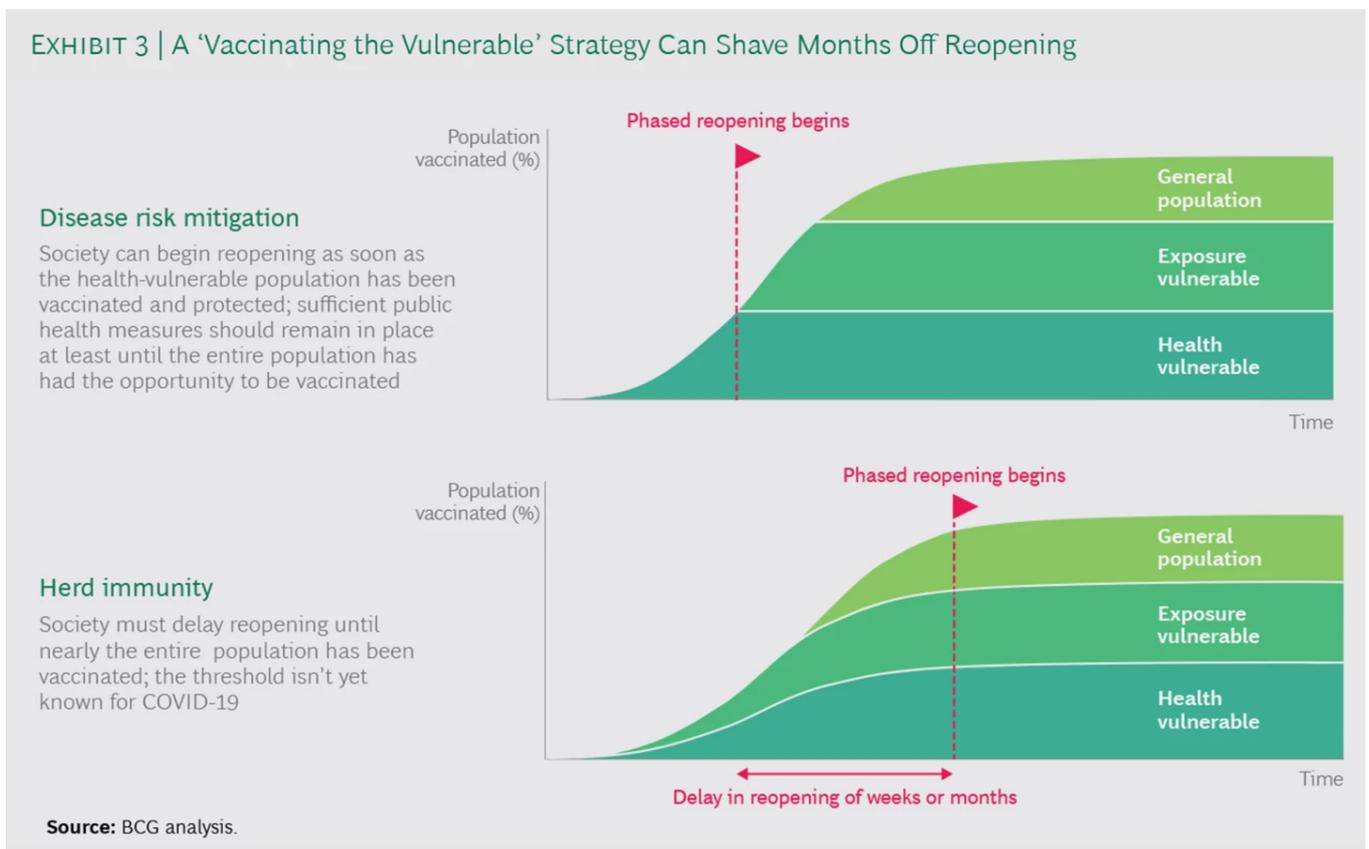
Minimizing the risk of disease and treating COVID as endemic are not the only potential aims of a vaccination strategy. Another is disease elimination through herd immunity. When a sufficient number of people have recovered or been vaccinated—and fewer and fewer people are left to infect—outbreaks fail to take hold across a population and the disease retreats into the background. It will likely take 60% to 80% of the population to be fully immune to COVID-19, either naturally or via vaccination, to reach this state. Full immunity requires immunity from disease, infection, and transmission.

If COVID-19 is indeed endemic and continuing to circulate, herd immunity is a distant and perhaps unattainable goal. Minimizing infection and transmission is especially

challenging with the current vaccines and emerging variants.

Under these circumstances, the continued pursuit of herd immunity would almost certainly delay progress toward a full recovery from the pandemic. If a nation's reopening milestones are tied to reaching certain herd immunity thresholds, such as vaccination rates of 60% to 80% across the total population, society will likely remain shut down longer than if it first vaccinated the vulnerable and then protected the rest of the population.

In the latter case, governments still should keep sufficient public health measures in place in the near term, even after the health vulnerable are vaccinated. This will help contain the virus, minimize the disease risk, and give all those who choose to be vaccinated a chance to do so. Once those aims are achieved, public health measures can be more fully relaxed. By focusing on the vulnerable and a disease risk mitigation strategy, nations can likely shave months off what should be a gradual reopening timetable. (See Exhibit 3.)

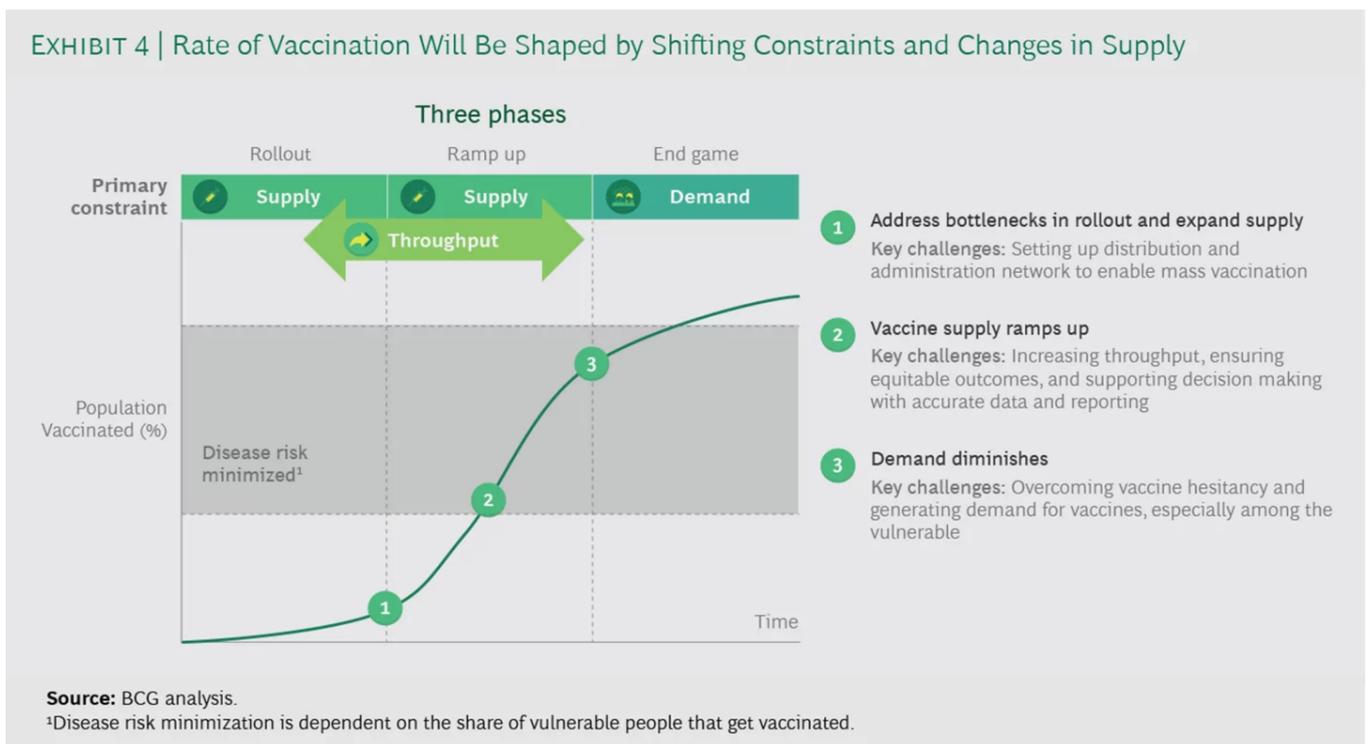


Before the approval of vaccines, we advocated protecting the health vulnerable through a **set of polices** involving high-quality masks, frequent testing, sheltering in place, and other

measures—in effect, surrounding individuals in a bubble of safeguards. For a large country such as the US, with more than 100 million health vulnerable people—subject to a disparate set of policies involving many levels and departments of government—maintaining those safeguards has been a challenge, to say the least. Now those same people can be protected with one or two shots.

A THREE-PART PLAN FOR VACCINATION PROGRAMS

How do governments execute a strategy built around reducing the risk of serious disease rather than achieving herd immunity? It’s helpful to think of vaccination execution consisting of three phases: rollout, ramp up, and end game. In each phase, the challenge is to dynamically match supply and demand. (See Exhibit 4.)



Nations are at different points along this S-curve, but all will likely face similar challenges as they move along it. In rough economic terms, the curve describes a supply-constrained rollout, a throughput-constrained ramp up, and a demand-constrained end game.

Rollout. The goal here is simple: to get needles into the arms of those who are most health vulnerable. The US is a useful, if disheartening, example of a nation that has

struggled to complete this phase. Public health officials were overwhelmed at the beginning and still are. Data gaps delayed and frustrated decisions about the allocation of resources. Messaging has been inconsistent. Eligibility requirements vary by state. Registration and appointment systems continue to be confusing, and they often further social inequities in terms of who gets vaccinated first.

For nations still in this early phase, leaders should actively identify and inoculate the most health vulnerable. With demand far outstripping supply, governments should streamline and centralize registration rather than force citizens to solve the Rubik's cube of signup processes that US residents have endured the past three months. Countries such as Israel and UAE, two leaders in vaccinating sizable shares of the population, have been exemplars in creating workable registration and appointment systems. Governments should provide all populations with clear guidance on when, how, and where they can expect to get an appointment. Governments should also concentrate on creating a geographically diverse network of high-volume, high-throughput vaccination sites.

“

Nations should seriously consider a 'first doses first' strategy of vaccinating as many people as possible with their initial shots.

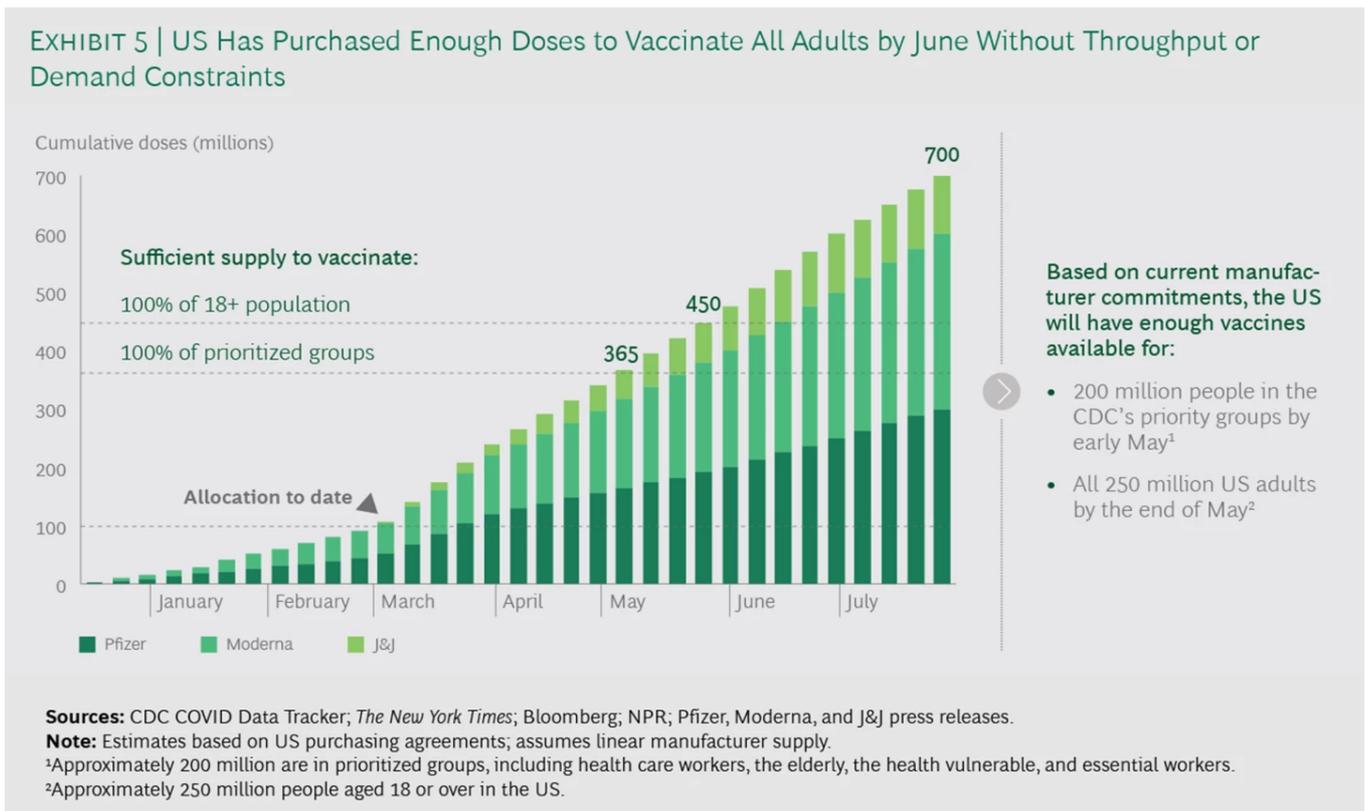
Nations that are several months behind Israel, the UAE, UK, and US in rollout should seriously consider a “first doses first” strategy of vaccinating as many people as possible with their initial shots. The data suggest that booster shots can be delayed by up to 12 weeks. This strategy would stretch supply and reduce the risk of overrunning health system capacity.

The UK has followed this approach to get an effective if not maximal level of protection for more people. Emerging evidence supports that decision: multiple studies out of Israel point to high levels of protection from the initial dose of vaccine while real-world evidence from the UK suggests 60% to 75% efficacy against symptoms in older adults after

a single dose of either Pfizer or Astra Zeneca’s vaccine—and even higher efficacy against hospitalization and death. What’s more, the AstraZeneca vaccine appears even more effective when doses are spaced 12 weeks apart rather than four weeks.

Ramp Up. During this phase, governments must expand throughput to accommodate a greater supply of vaccines and ongoing unmet demand. Operationally, their focus should be on volume, scale, and capacity and a continuing, relentless outreach to the health vulnerable.

The US is in the early days of ramp up. With the J&J vaccine becoming available and significant increases in supply from Pfizer and Moderna expected over the coming weeks, we anticipate that the US will have adequate supply to fully vaccinate the health vulnerable by early May and all adults by early June. (See Exhibit 5.)



At the same time, governments must work harder to ensure equitable distribution and administration across population groups. In the US, for example, the early vaccination

rates of Black and low-income people are lower than their shares of the population, even as their rates of infection have been higher.

The US has not resolved the tension between simplified, centralized approaches and more diversified, neighborhood- and population-based efforts. The country has had some early successes from well-functioning megasites that vaccinate thousands, or even tens of thousands, of people a day. But it can do better in placing sites where they can reach target populations, and in dedicating resources to finding the health vulnerable and securing appointments for them without slowing down overall efforts. While supply and capacity have largely been managed at the state and county level, local groups and leaders will eventually need to be involved in ensuring equitable throughput.

Once the supply of vaccines exceeds demand, countries should be pushing harder to stoke demand. They should also consider reallocating supply to other regions within their nation—or even other nations, to address global supply inequities.

A looming concern for the ramp-up phase is the emergence of individual preferences for one vaccine over another. In France and Germany, for example, many people have balked at the AstraZeneca vaccine, despite its high effectiveness at preventing hospitalization. The same may happen in the US with the single-dose J&J vaccine. Differences in dosing regimens, efficacy against infection for mild and moderate disease, or even brand name may shape perceptions. Governments can address this challenge by promoting all vaccines—the best vaccine is the one you can get quickly, they should emphasize—while offering a choice to providers where supplies enable it. Additionally, governments should track access and uptake across population segments to sustain equitable distribution of the various vaccines.

Meanwhile, studies are underway in the UK into whether a third dose will prevent the emerging COVID-19 variants from causing serious illness. Such a development could suggest the need for constantly evolving vaccination programs, in which ongoing participation is more important than the initial choice of vaccine.

End Game. In this final stage, the centralization strategy that was so necessary to vaccinate the willing during ramp up becomes a hindrance in reaching the reluctant,

reclusive, and distrustful. Vaccine hesitancy may be the greatest challenge to ending the pandemic; a BCG survey conducted in late January in the [US suggests about 40% hesitancy](#) in the adult population among those who had not yet been vaccinated. The three most vaccine-hesitant groups were Black, middle-aged white, and lower-income people.

Much of that hesitancy is driven by fears around safety and efficacy, which means the rapidly growing body of reassuring evidence—as hundreds of millions of people are safely vaccinated—can help address those concerns. Unified and targeted messaging from public officials and scientists also matters, as the experiences of the UK (where hesitancy is falling) and France (where it is not) suggest.

As we progress through this third phase, execution moves from bringing arms to vaccines to bringing vaccines to arms. It moves from managing demand to managing fears and trust. In this phase, the centralized vaccine megasites will give way to pharmacies, churches, community health organizations, and other neighborhood locations.

The challenges in each part of the curve are large. But the opportunity is larger. Many nations are only months away from a return to something adjacent to normal. Others, especially low- and middle-income countries, are further behind. But they will have the benefit of best practices developed by the other nations. COVID-19 may always be with us, but it need not define us much longer.

Authors



Tristan Hunt
Alumnus



Johanna Benesty
Managing Director & Partner
Paris



Amanda Brimmer
Managing Director & Partner
Chicago



Marin Gjaja
Alumnus



Ben Horner
Managing Director & Partner, Global Leader, Health Care Payers, Providers, Systems & Services
London



Dan Kahn
Alumnus



Josh Kellar
Managing Director & Partner
Chicago



Emily Serazin
Managing Director & Senior Partner
Washington, DC

ABOUT BOSTON CONSULTING GROUP

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.

Our diverse, global teams bring deep industry and functional expertise and a range of perspectives that question the status quo and spark change. BCG delivers solutions through leading-edge management consulting, technology and design, and corporate and digital ventures. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, fueled by the goal of helping our clients thrive and enabling them to make the world a better place.

© Boston Consulting Group 2023. All rights reserved.

For information or permission to reprint, please contact BCG at permissions@bcg.com. To find the latest BCG content and register to receive e-alerts on this topic or others, please visit bcg.com. Follow Boston Consulting Group on [Facebook](#) and [X \(formerly Twitter\)](#).