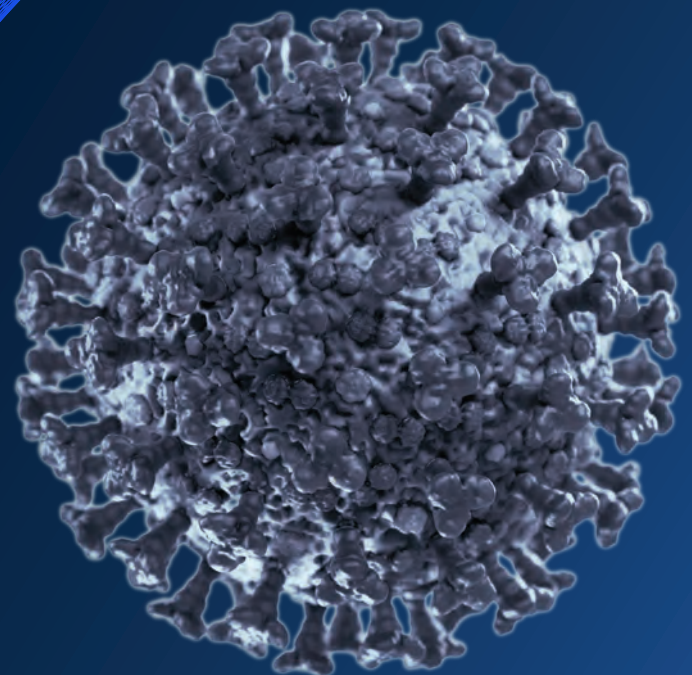


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Healthcare Systems & Services Practice

McKinsey on Healthcare: Perspectives on the pandemic

Selected articles from 2020 and 2021



December 2021



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Foreword

Since early 2020, the healthcare industry has been on the frontlines of seeking solutions for COVID-19.

Even while treating critically ill patients, members of the healthcare industry at all levels accelerated change in the pandemic to create positive impact. That speed, however, has come with enormous challenges, including vaccine adoption, delays in elective or preventative care, strained critical capacity, uncertain financial stability, and a workforce struggling with mental health and burnout.

We are thankful to have the opportunity to help during these times. We published research broadly and in a timely manner to inform your judgment. We offered organizations guidance on how to immediately build “nerve centers” to identify and effectively manage crises in communities. We helped leaders think through the public health aspects of COVID-19, such as how to mitigate strains on capacity. We gave examples of internal actions state leaders could take to implement fiscal recovery and offered insights on how to address the specific needs of vulnerable populations. We continue to offer expertise on COVID-19 testing, vaccine administration, and diagnostics value chains.

By the end of 2021, we expect to have published more than 75 healthcare-specific articles regarding COVID-19.

We hope this curated selection offers an opportunity to read and reflect on some of our core insights. In these 16 articles, we have focused on four crucial areas:

- The evaluation of critical care needs and potential impact of COVID-19 on the workforce
- The creation and adoption of vaccines and therapeutics
- The impact of the pandemic on mental health, especially on our most vulnerable communities
- Our reflections for the future and how healthcare stakeholders can begin planning

As we reflect on COVID-19, we would like to acknowledge the phenomenal healthcare workers on the frontlines, whose commitment remains steadfast through the challenges. We know it has not been easy.

To them, and to others in the industry who are reading this compendium: we offer our thanks and gratitude for your time, knowledge, and service. We look forward to our continuing conversations and partnership.

Sincerely,

Shubham Singhal, Drew Ungerman,
Scott Blackburn, Jennifer Rost, and
Nikhil Sahni

Disclaimer: *These materials reflect an accelerated response to the COVID-19 crisis. These materials reflect general insight based on currently available information, which has not been independently verified and is inherently uncertain. Future results may differ materially from any statements of expectation, forecasts or projections. These materials are not a guarantee of results and cannot be relied upon. These materials do not constitute legal, medical, policy or other regulated advice and do not contain all the information needed to determine a future course of action. Given the uncertainty surrounding COVID-19, these materials are provided “as is” solely for information purposes without any representation or warranty, and all liability is expressly disclaimed. References to specific products or organizations are solely for illustration and do not constitute any endorsement or recommendation. The recipient remains solely responsible for all decisions, use of these materials, and compliance with applicable laws, rules, regulations and standards. Consider seeking advice of legal and other relevant certified/licensed experts prior to taking any specific steps.*

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Selected quotes from our conversations with leaders

Evaluating the critical care and workforce impact

When you care for your people—put their health, safety, and well-being at the center of everything you do—you will watch them make the business a far better business.



Leena Nair
Chief Human Resources Officer,
Unilever



Alexandra Drane
Co-founder and CEO,
ARCHANGELS

Being a caregiver is a job, and like any job it has intensity. Seeing each other in that role and supporting each other through it is one of the greatest opportunities our nation has to truly recover—and not just from COVID-19.

[Big problems] are not going to be solved by just one group, whether it's the private sector or governments. They're going to be solved by interesting collaborations between the private and public sectors and different groups and institutions working together.



Seth Berkley
CEO, Gavi

The next normal arrives: Trends that will define 2021—and beyond

Kevin Sneader and Shubham Singhal

January 4, 2021

The COVID-19 pandemic has changed the world, and its effects will last. Here are some factors that business leaders should keep in mind as they prepare for the next normal.

Businesses have spent much of the past nine months scrambling to adapt to extraordinary circumstances. While the fight against the COVID-19 pandemic is not yet won, with a vaccine in sight, there is at least a faint light at the end of the tunnel—along with the hope that another train isn't heading our way.

2021 will be the year of transition. Barring any unexpected catastrophes, individuals, businesses, and society can start to look forward to shaping their futures rather than just grinding through the present. The next normal is going to be different. It will not mean going back to the conditions that prevailed in 2019. Indeed, just as the terms “prewar” and “postwar” are commonly used to describe the 20th century, generations to come will likely discuss the pre-COVID-19 and post-COVID-19 eras.

In this article, we identify some of the trends that will shape the next normal. Then we discuss how they will affect the direction of the global economy, how business will adjust, and how society could be changed forever as a result of the COVID-19 crisis.

Part one: How the COVID-19 crisis and the recovery are shaping the global economy

The return of confidence unleashes a consumer rebound

There are lines outside stores, but they are often due to physical-distancing requirements. Theaters are dark. Fashions are in closets rather than on display. If the Musée du Louvre were open, the lack of tourists might even create the opportunity for an unobstructed view of the Mona Lisa. In these and other ways, consumers have pulled back.

As consumer confidence returns, so will spending, with “revenge shopping” sweeping through sectors as pent-up demand is unleashed. That has been the experience of all previous economic downturns. One difference, however, is that services have been particularly hard hit this time. The bounce back will therefore likely emphasize those businesses, particularly the ones that have a communal element, such as restaurants and entertainment venues.

That isn't to say that consumers will act uniformly. McKinsey's most recent consumer survey, published in late October, found that countries with older demographics, such as France, Italy, and Japan, are less optimistic than are those with younger populations, such as India and Indonesia. China was an exception—it has an older population but is conspicuously optimistic.

But China's profile proves a larger point. The first country to be hit by the COVID-19 pandemic, it was also the first to

emerge from it. China's consumers are relieved—and spending accordingly. On Singles Day, November 11, the country's two largest online retailers racked up record sales. That wasn't just a holiday phenomenon. While manufacturing in China came back first, by September, so had consumer spending. Except for international air travel, Chinese consumers have begun to act and spend largely as they did in precrisis times. Australia also offers hope. With the pandemic largely contained in that country, household spending fueled a faster-than-expected 3.3 percent growth rate in the third quarter of 2020, and spending on goods and services rose 7.9 percent.¹

How fast and deep confidence will recover is an open question. In late September, for example, the US consumers surveyed were more optimistic than before but still cautious, reporting that they planned to buy holiday gifts for fewer people and keep an eye on discretionary spending.² Only around a third had resumed out-of-home activities, compared with 81 percent of consumers in China, 49 percent in France—and just 18 percent in Mexico. New lockdowns and, critically, the rollout of COVID-19 vaccines have and will affect those numbers. The point is that spending will only recover as fast as the rate at which people feel confident about becoming mobile again—and those attitudes differ markedly by country.

**Leisure travel bounces back
but business travel lags**

People who travel for pleasure will want to get back to doing so. That has been the pattern in China. The CEO of one

major travel company told us that, beginning in the third quarter of 2020, business was “pretty much back to normal” when referring to growth. But it was a different normal: domestic travel was surging, but international travel was still depressed given pandemic-related border restrictions and concerns about health and safety. In China as a whole, hotel occupancy and the number of travelers on domestic flights were more than 90 percent of their 2019 levels at the end of August, and over the October Golden Week holiday, more than 600 million Chinese hit the road, around 80 percent of last year's figure.³ Because of confidence in the country's health and safety measures, domestic travel is almost back to the level seen prior to the pandemic, and high-end domestic travel is actually ahead of it.

By definition, leisure travel is discretionary. Business travel is less so. In 2018, business-travel spending reached \$1.4 trillion, which was more than 20 percent of the total spending in the hospitality and travel sector.⁴ It also brings in a disproportionate share of profits—70 percent of revenues globally for high-end hotels, for example. During and after the pandemic, though, there is a question about business travel: Exactly when is it necessary? The answer is almost certain to be not as much as before. Video calls and collaboration tools that enable remote working, for example, could replace some onsite meetings and conferences.

The larger context is also informative. History shows that, after a recession, business travel takes longer than leisure travel to bounce back. After the 2008–

**Barring any unexpected catastrophes,
individuals, businesses, and society can start
to look forward to shaping their futures rather
than just grinding through the present.**

09 financial crisis, for example, international business travel took five years to recover, compared with two years for international leisure travel.

Regional and domestic business travel will likely rebound first; some companies and sectors will want to resume in-person sales and customer meetings as soon as they safely can. Peer pressure may also play a part: once one company gets back to face-to-face meetings, their competitors may not want to hold back. All told, however, a survey of business-travel managers found that they expect business-travel spending in 2021 will only be half that of 2019.⁵ While business travel will return at scale, and global economic growth will generate new demand, executives in the field think that it may never recover to the 2019 level.

In short, leisure travel is driven by the very human desire to explore and to enjoy, and that has not changed. Indeed, one of the first things people do as they grow more prosperous is to travel—first close to home and then further afield. There is no reason to believe that the rise in global prosperity will reverse itself or that human curiosity will diminish. But the effective use of technology during the pandemic—and the economic constraints that many companies will face for years after it—could augur the beginning of a long-term structural change in business travel.

The crisis sparks a wave of innovation and launches a generation of entrepreneurs

Plato was right: necessity is indeed the mother of invention. During the COVID-19 crisis, one area that has seen tremendous growth is digitization, meaning everything from online customer service to remote working to supply-chain reinvention to the use of artificial intelligence (AI) and machine learning to improve operations. Healthcare, too, has changed substantially, with telehealth and biopharma coming into their own.

Disruption creates space for entrepreneurs—and that's what is happening in the United States, in particular, but also in other major economies. We admit that we didn't see this coming. After all, during the 2008–09 financial crisis, small-business formation declined, and it rose only slightly during the recessions of 2001 and 1990–91. This time, though, there is a veritable flood of new small businesses. In the third quarter of 2020 alone, there were more than 1.5 million new-business applications in the United States—almost double the figure for the same period in 2019.⁶

Yes, many of those businesses are single-person establishments that could well stay that way—think of the restaurant chef turned caterer or the recent college graduate with a cool new app. So it's intriguing that the volume of “high-propensity-business applications” (those that are likeliest to turn into businesses with payrolls) has also risen strongly—more than 50 percent compared with 2019. Venture-capital activity dipped only slightly in the first half of 2020.

The European Union has not seen anything like this response, perhaps because its recovery strategy tended to emphasize protecting jobs (not income, as in the United States). That said, France saw 84,000 new business formations in October, the highest ever recorded,⁷ and 20 percent more than in the same month in 2019. Germany has also seen an increase in new businesses compared with 2019; ditto for Japan. Britain is somewhere in between. A survey published in November 2020 of 1,500 self-employed people found that 20 percent say they are likely to leave self-employment when they can.⁸ At the same time, however, the number of new businesses registered in the United Kingdom in the third quarter of 2020 rose 30 percent compared with 2019, showing the largest increase seen since 2012.⁹

On the whole, the COVID-19 crisis has been devastating small business. In the United States, for example, there were

The COVID-19 crisis has created an imperative for companies to reconfigure their operations—and an opportunity to transform them. To the extent that they do so, greater productivity will follow.

25.3 percent fewer of them open in December 2020 than at the beginning of the year (the bottom was in mid-April, when the figure was almost half).¹⁰ US small-business revenue fell more than 30 percent between January and December 2020.¹¹ But we'll take good news where we can get it, and the positive trend in entrepreneurship could bode well for job growth and economic activity once recovery takes hold.

Digitally enabled productivity gains accelerate the Fourth Industrial Revolution

There's no going back. The great acceleration in the use of technology, digitization, and new forms of working is going to be sustained. Many executives reported that they moved 20 to 25 times faster than they thought possible on things like building supply-chain redundancies, improving data security, and increasing the use of advanced technologies in operations.¹²

How all that feeds into long-term productivity will not be known until the data for several more quarters are evaluated. But it's worth noting that US productivity in the third quarter of 2020 rose 4.6 percent, following a 10.6 percent increase in the second quarter, which is the largest six-month improvement since 1965.¹³ Productivity is only one number, albeit an important one; the startling figure for the United States in the second quarter was based in large part on the biggest declines in output and hours seen since 1947. That isn't an enviable precedent.

More positively, in the past, it has taken a decade or longer for game-changing technologies to evolve from cool new things to productivity drivers. The COVID-19 crisis has sped up that transition in areas such as AI and digitization by several years, and even faster in Asia. A McKinsey survey published in October 2020 found that companies are three times likelier than they were before the crisis to conduct at least 80 percent of their customer interactions digitally.¹⁴

That evolution has not always been a seamless or elegant process: businesses had to scramble to install or adapt new technologies under intense pressure. The result has been that some systems are clunky. The near-term challenge, then, is to move from reacting to the crisis to building and institutionalizing what has been done well so far. For consumer industries, and particularly for retail, that could mean improving digital and omnichannel business models. For healthcare, it's about establishing virtual options as a norm. For insurance, it's about personalizing the customer experience. And for semiconductors, it's about identifying and investing in next-generation products. For everyone, there will be new opportunities in M&A and an urgent need to invest in capability building.

The COVID-19 crisis has created an imperative for companies to reconfigure their operations—and an opportunity to transform them. To the extent that they do so, greater productivity will follow.

Part two: How businesses are adjusting to the changes prompted by the COVID-19 crisis

Pandemic-induced changes in shopping behavior forever alter consumer businesses

In nine of 13 major countries surveyed by McKinsey, at least two-thirds of consumers say they have tried new kinds of shopping.¹⁵ And in all 13, 65 percent or more say they intend to continue to do so. The implication is that brands that haven't figured out how to reach consumers in new ways had better catch up, or they will be left behind. We expect that, in developing markets—Brazil and India, for example—the pandemic will accelerate digital shopping, albeit from a low base. Consumers in continental Europe have bought more online but aren't as enthusiastic as those in Britain and the United States to continue doing so.

Specifically, the shift to online retail is real, and much of it will stick. In the United States, the penetration of e-commerce was forecast in 2019 to reach 24 percent by 2024; by July 2020, it had hit 33 percent of total retail sales.¹⁶ To put it another way, the first half of 2020 saw an increase in e-commerce equivalent to that of the previous ten years.¹⁷ In Latin America, where the payments and delivery infrastructure isn't as strong, e-commerce use doubled from 5 to 10 percent. In Europe, overall digital adoption is almost universal (95 percent), compared with 81 percent at the start of the pandemic. In normal times, getting to that level would have taken two to three years. Strikingly, the biggest increases came in countries that had previously been relatively cautious about shopping online. Germany, Romania, and Switzerland, for example, had the three lowest online-penetration rates prior to the COVID-19 crisis; since then, usage increased 28, 25, and 18 percentage points, respectively—more than in any other markets.

Dig a little deeper, though, and there are some cautionary notes, such as the

conspicuous lack of brand loyalty among online buyers. Perhaps most telling, in a recent McKinsey survey, only 60 percent of consumer-goods companies say they are even moderately prepared to capture e-commerce-growth opportunities.¹⁸ As one executive told us, “when it comes to selling directly to consumers, we don't really know where to start.” That concern is certainly valid. Direct-to-consumer selling requires the development of new skills, capabilities, and business and pricing models. But the trend is clear: many consumers are moving online. To reach them, companies have to go there, too.

Supply chains rebalance and shift

Think of it as “just in time plus.” The “plus” stands for “just in case,” meaning more sophisticated risk management. The COVID-19 pandemic revealed vulnerabilities in the long, complicated supply chains of many companies. When a single country or even a single factory went dark, the lack of critical components shut down production. Never again, executives vowed. So the great rebalancing began. As much as a quarter of global goods exports, or \$4.5 trillion, could shift by 2025.

Once businesses began to study how their supply chains worked, they realized three things. First, disruptions aren't unusual. Any given company can expect a shutdown lasting a month or so every 3.7 years. Such shocks, then, are far from shocking; they are predictable features of doing business that need to be managed like any other.

Second, cost differences among developed and many developing countries are narrowing. In manufacturing, companies that adopt Industry 4.0 principles (meaning the application of data, analytics, human-machine interaction, advanced robotics, and 3-D printing) can offset half of the labor-cost differential between China and the United States. The gap narrows further when the cost of rigidity is factored in: end-to-end optimization is more important than the sum of individual transaction costs. That's one reason why

agencies such as the US Department of Defense are diversifying their networks of suppliers for essentials, such as in health-care manufacturing and microelectronics.

And third, most businesses do not have a good idea of what is going on lower down in their supply chains, where sub-tiers and sub-sub-tiers may play small but critical roles. That is also where most disruptions originate, but two-thirds of companies say they can't confirm the business-continuity arrangements with their non-tier-one suppliers. With the development of AI and data analytics, companies can learn more about, audit, and connect with their entire value chains.

None of those things means that multinationals are going to ship all or most of their production back to their home markets. There are good reasons to take advantage of regional expertise and to be in place to serve fast-growing consumer markets. But questions on security and resiliency mean that those companies are likely to be more thoughtful about the business cases for such decisions.

The future of work arrives ahead of schedule

Before the COVID-19 crisis, the idea of remote working was in the air but not proceeding very far or fast. But the pandemic changed that, with tens of millions of people transitioning to working from home, essentially overnight, in a wide range of industries. For example, according to Michael Fisher, president and CEO of Cincinnati Children's Hospital Medical Center, there were 2,000 telehealth visits recorded at the organization in all of 2019—and 5,000 a week in July 2020.¹⁹ Fisher thinks telehealth could account for 30 percent of all healthcare visits in the future. In Japan, fewer than 1,000 institutions offered remote care in 2018; by July 2020, more than 16,000 did.

The McKinsey Global Institute (MGI) estimates that more than 20 percent of the global workforce (most of them in high-skilled jobs in sectors such as finance,

insurance, and IT) could work the majority of its time away from the office—and be just as effective. Not everyone who can, will; even so, that is a once-in-several-generations change. It's happening not just because of the COVID-19 crisis but also because advances in automation and digitization made it possible; the use of those technologies has accelerated during the pandemic. Microsoft CEO Satya Nadella noted in April 2020 that “we've seen two years' worth of digital transformation in two months.”²⁰

There are two important challenges related to the transition to working away from the office. One is to decide the role of the office itself, which is the traditional center for creating culture and a sense of belonging. Companies will have to make decisions on everything from real estate (Do we need this building, office, or floor?) to workplace design (How much space between desks? Are pantries safe?) to training and professional development (Is there such a thing as remote mentorship?). Returning to the office shouldn't be a matter of simply opening the door. Instead, it needs to be part of a systematic reconsideration of what exactly the office brings to the organization.

The other challenge has to do with adapting the workforce to the requirements of automation, digitization, and other technologies. This isn't just the case for sectors such as banking and telecom; instead it's a challenge across the board, even in sectors not associated with remote work. For example, major retailers are increasingly automating checkout. If salesclerks want to keep their jobs, they will need to learn new skills. In 2018, the World Economic Forum estimated that more than half of employees would need significant reskilling or upskilling by 2022.

Evidence shows that the benefits of reskilling current staff, rather than letting them go and then finding new people, typically costs less and brings benefits that outweigh the costs. Investing in employees can also foster loyalty, customer satisfaction, and positive brand perception.

The McKinsey Global Institute estimates that more than 20 percent of the global workforce could work the majority of its time away from the office—and be just as effective.

Workforce development was a priority even before the pandemic. In a McKinsey survey conducted in May 2019, almost 90 percent of the executives and managers surveyed said their companies faced skill gaps or expected to in the next five years.²¹ But only a third said they were prepared to deal with the issue. Successful reskilling starts with knowing what skills are needed, both right now and in the near future; offering tailored learning opportunities to meet them; and evaluating what does and doesn't work. Perhaps most important, it requires commitment from the top that inculcates a culture of lifelong learning.

The biopharma revolution takes hold

The announcement of several promising COVID-19 vaccines has been a much-needed shot of good news. There will be challenges to rolling out these vaccines on the scale needed, but that does not lessen the accomplishment.

Unlike previous vaccines, many of which use an inactivated or attenuated form of a virus to create resistance to it, the vaccines created by Moderna and the BioNTech–Pfizer partnership use mRNA. This platform has been under development for years, but these are the first vaccines that have secured regulatory approval. The “m” is for “messenger” because the molecules carry genetic instructions to the cells to create a protein that prompts an immune response. The body breaks down mRNA and its lipid carrier within a matter of hours. (WHO lists 60 candidate COVID-19 vaccines that have advanced to clinical trials; many don't use mRNA.)

Just as businesses have sped up their operations in response to the COVID-19 crisis,

the pandemic could be the launching point for a massive acceleration in the pace of medical innovation, with biology meeting technology in new ways. Not only was the COVID-19 genome sequenced in a matter of weeks, rather than months, but the vaccine rolled out in less than a year—an astonishing accomplishment given that normal vaccine development has often taken a decade. Urgency has created momentum, but the larger story is how a wide and diverse range of capabilities—among them, bioengineering, genetic sequencing, computing, data analytics, automation, machine learning, and AI—have come together.

Regulators have also reacted with speed and creativity, establishing clear guidelines and encouraging thoughtful collaboration. Without relaxing safety and efficacy requirements, they have shown just how quickly they can collect and evaluate data. If those lessons are applied to other diseases, they could play a significant role in setting the foundation for the faster development of treatments.

The development of COVID-19 vaccines is just the most compelling example of the potential of what MGI calls the “Bio Revolution”—biomolecules, biosystems, biomachines, and biocomputing. In a report published in May 2020, MGI estimated that “45 percent of the global disease burden could be addressed with capabilities that are scientifically conceivable today.”²² For example, gene-editing technologies could curb malaria, which kills more than 250,000 people a year. Cellular therapies could repair or even replace damaged cells and tissues. New kinds of vaccines could be

applied to noncommunicable diseases, including cancer and heart disease.

The potential of the Bio Revolution goes well beyond health; as much as 60 percent of the physical inputs to the global economy, according to MGI, could theoretically be produced biologically. Examples include agriculture (genetic modification to create heat- or drought-resistant crops or to address conditions such as vitamin-A deficiency), energy (genetically engineered microbes to create biofuels), and materials (artificial spider silk and self-repairing fabrics). Those and other applications feasible through current technology could create trillions of dollars in economic impact over the next decade.

Portfolio restructuring accelerates

The COVID-19 crisis provoked divergent, even dramatic, reactions, with some industries taking off and others suffering badly; the effect was to shake up historic norms. When the economy settles into its next normal, such sectoral differences can be expected to narrow, with industries returning to somewhere around their previous relative positions. What is less obvious is how the dynamics *within* sectors are likely to change. In previous downturns, the strong came out stronger, and the weak got weaker, went under, or were bought. The defining difference was resilience—the ability not only to absorb shocks but to use them to build competitive advantage. Over the course of a decade, companies can expect losses of 42 percent of a year's profits from disruptions.²³

In October 2020, McKinsey evaluated 1,500 companies by “Z-Score,” which measures the probability of corporate bankruptcy. The higher the score, the stronger the company's financial position. The research found that the top 20 percent of companies (the “emerging resilient”) that had improved their Z-Scores during the current recession had increased their earnings before interest, taxes, depreciation, and amortization by 5 percent; the others had lost 19 percent.²⁴

The emerging resilient, the evidence shows, are pulling away from the pack.

The implication is that there is a resiliency premium on recovery. Top performers won't sit on their strengths; instead, as in previous downturns, they will seek out ways to build them—for example, through M&A. That's why we expect to see substantial portfolio adjustment as companies with healthy balance sheets seek opportunities in a context of discounted assets and lower valuations. In fact, that may already be happening: deal making began to pick up midyear.

A second factor that tilts the odds in favor of portfolio restructuring is the availability of private capital. Special-purpose acquisition companies, which merge with a company to take it public, are “having a moment” in 2020, as McKinsey recently noted.²⁵ Through August 2020, they had accounted for 81 out of 111 US IPOs.

Much more important is private equity (PE). Globally, PE firms are sitting on almost \$1.5 trillion of “dry powder”—unallocated capital that's ready to be invested. The COVID-19 crisis has hurt in some ways, with global deal value down 12 percent compared with the first three quarters of 2019 and deal counts down 30 percent.²⁶

On the other hand, global fundraising has stayed strong—\$348.5 billion through September 2020, on par with the previous five years—and deal making in Asia has more than doubled.²⁷ The PE industry has a reputation of zigging when others are zagging, making deals in difficult times. And it has history on its side: returns on PE investments made during global downturns tend to be higher than in the good times. Put it all together, and we don't think the PE industry is going to keep its powder dry for much longer; there are simply going to be too many new investment opportunities.

Green, with a touch of brown, is the color of recovery

All over the world, the costs of pollution—and the benefits of environmental sustainability—are increasingly recognized. China,

some of the Gulf States, and India are investing in green energy on a scale that would have been considered improbable even a decade ago. Europe, including the United Kingdom, is united on addressing climate change. The United States is transitioning away from coal and is innovating in a wide array of green technologies, such as batteries, carbon-capture methods, and electric vehicles.

To cope with the 2008–09 financial crisis, there were substantial government stimulus programs, but few of them incorporated climate or environmental action. This time is different. Many (though by no means all) countries are using their recovery plans to push through existing environmental policy priorities:

- The European Union plans to dedicate around 30 percent of its \$880 billion plan for COVID-19-crisis plan to climate-change-related measures, including the issuance of at least \$240 billion in “green bonds.”
- In September 2020, China pledged to reduce its net carbon emissions to zero by 2060.
- Japan has pledged to be carbon neutral by 2050.
- South Korea's Green New Deal, part of its economic-recovery plan, invests in greener infrastructure and technology, with the stated goal of net-zero emissions by 2050.
- While campaigning, US president-elect Joe Biden pledged to invest \$2 trillion in clean energy related to transportation, power, and building.
- Canada is linking recovery to climate goals.
- Nigeria plans to phase out fossil-fuel subsidies and to install solar-power systems for an estimated 25 million people.
- Colombia is planting 180 million trees.

The imperative for businesses is clear along two fronts. First, businesses need to respond to the sustainability concerns

of investors. It's possible, albeit speculative, that the COVID-19 crisis foreshadows what a climate crisis could look like: systemic, fast moving, wide ranging, and global. There is a case, then, for businesses to take action to limit their climate risks—for example, by making their capital investments more climate resilient or by diversifying their supply chains.

More significantly, the growth opportunities that a green economy portends could be substantial. BlackRock, a global investment company with around \$7 trillion in assets under management, noted in its *2021 Global Outlook* that, “contrary to past consensus,” it expects that the shift to sustainability will “help enhance returns” and that “the tectonic shift towards sustainable investing is accelerating.”²⁸ Green growth opportunities abound across massive sectors such as energy, mobility, and agriculture. Just as digital-economy companies have powered stock-market returns in the past couple of decades, so green-technology companies could play that role in the coming decades.

Part three: How the COVID-19 crisis could change society

Healthcare systems take stock—and make changes

Healthcare system reform is difficult. While caution is necessary when lives are involved, one consequence is that modernization is often slower than it needs to be. Learning from the experiences associated with COVID-19 can show the way to build stronger postpandemic healthcare systems.

Consider the case of South Korea. When the MERS virus struck in 2015, resulting in the deaths of 38 Koreans, the government was stung by widespread public criticism that it had not responded well. As a result, it took action to improve its pandemic preparedness—and it was ready when COVID-19 hit in January 2020. Large-scale testing, as well as tracing and quarantine measures, began almost immediately. And it worked. While the country began seeing a signifi-

cant increase in new cases in December, fewer than 1,000 South Koreans died from COVID-19 in all of 2020.

No doubt, governments all over the world will set up task forces, inquiries, and commissions to examine their actions related to the COVID-19 crisis. The key is to go beyond the temptation simply to assign blame (or credit). Instead, the efforts need to be forward thinking, with an emphasis on turning the painful lessons of COVID-19 into effective action.

Being better prepared for the next pandemic, on both national and international levels, has to be a high priority. Too often, investments in prevention and public-health capabilities are undervalued; the experience of COVID-19 demonstrates how costly, in both lives and livelihoods, such thinking can be. An upgrade of public-health infrastructure and the modernization of health-care systems, including the wider use of telemedicine and virtual health, are two areas to address.

Business will also have a role. Employers should take the opportunity to learn from the pandemic how to redesign workplaces, build healthier work environments, and invest effectively in employee health.

The hangovers begin as governments tackle rising debt

The scale of the fiscal response to the COVID-19 crisis was unprecedented—and three times bigger than seen for the 2008–09 financial crisis. In the G-20 alone, fiscal packages are estimated at more than \$10 trillion. Few question the humanitarian and economic cases for

strong action. But even in an era of low interest rates, the reckoning could be painful.

In February 2020, Janet Yellen, who is Joe Biden's choice to become Secretary of the Treasury, said that “the US debt path is completely unsustainable under current tax and spending plans.”²⁹ Since then, the US federal government has allocated trillions in COVID-19-crisis relief. That has put the country into new fiscal territory, with the US public debt projected to be bigger than the economy in fiscal year 2021—the first time that has been the case since shortly after World War II.

Canada is projecting a deficit of 343 billion Canadian dollars—an increase of more than 1,000 percent over the deficit in 2019—pushing national debt above 1 trillion Canadian dollars for the first time. In China, the \$500 billion fiscal stimulus will raise the country's fiscal deficit to a record 3.6 percent of GDP. In the United Kingdom, debt rose to more than £2 trillion, a record and more than 100 percent of GDP. In the eurozone, the combined budget deficits in October were 11.6 percent of GDP, compared with 2.5 percent in the first quarter of 2020; total debt hit a record 95 percent of GDP. That looks comparatively trivial compared with Japan, which has the world's highest debt-to-GDP ratio, at more than 200 percent. And while debt repayments from 73 poor countries have been frozen, the obligations still exist.

As the pandemic recedes, governments will have to figure out how to address their fiscal difficulties. Although interest rates are generally low, that could mean raising taxes or cutting spending—or both. Doing so could

As the pandemic recedes, governments will have to figure out how to address their fiscal difficulties. Although interest rates are generally low, that could mean raising taxes or cutting spending—or both.

risk slowing the recovery and stimulating political backlash. But high levels of public debt carry their own costs, crowding out private debt and limiting the resources available to governments as they service their debt.

While interim measures, such as improving government operations, monetizing assets, and reducing fiscal leakages, can be helpful, the long-term answer is growth and productivity. That's largely how the United States managed to reduce its national debt from 118 percent of GDP in 1946 to a low of 31 percent in 1981.³⁰ Promoting growth will require supportive regulation, well-trained workforces, and the continued diffusion of technologies. Most of all, it will require individuals, businesses, and governments to be willing to embrace change.

Paying down debt isn't exciting to do. But for economic stability—and in fairness to future generations—it needs to be taken seriously, not kicked down the road.

Stakeholder capitalism comes of age

The idea that businesses should seek to serve the interests of consumers, suppliers, workers, and society, as well as shareholders, isn't new. The American chocolate maker Milton S. Hershey put it this way more than a century ago, "business is a matter of human service." In 1759, capitalism's philosopher king Adam Smith noted in *The Theory of Moral Sentiments* that the individual is "sensible too that his own interest is connected with the prosperity of society, and that the happiness, perhaps the preservation of his existence, depends on its preservation."³¹ Moreover, the free market itself has been a positive social force, fueling the economic growth that has brought dramatic advances in health, longevity, and general prosperity around the world.

Even so, there is widespread distrust for business as usual, as a number of surveys and elections have shown. That's where stakeholder capitalism comes in—as a bridge between businesses and the communities of which they are a part. The COVID-19 crisis has highlighted the

interconnectedness of business and society. "It will be a true inflection point," says Rajnish Kumar, chairman of the State Bank of India.³² "And whatever we learn through this process—it must not go to waste."

The increasing prominence of the idea of stakeholder capitalism is more than just talk (although there is admittedly still a good deal of talk). For example, companies that become certified B Corporations are legally required to consider the interests of all stakeholders in their decision making, including by changing their governance structures to that effect. The first B Corporations were certified in 2007; now, there are more than 3,500 of them.

None of that means that companies should eschew the pursuit of profit. As some of our colleagues recently noted, "There is a term for an enlightened company with the most perfect intentions that does not make money: defunct."³³ Instead, it's an argument to infuse profit, a readily measured metric, with a sense of purpose—something that humans naturally seek.

We do not believe there is a conflict between the two. In a study that looked at 615 large- and midcap US publicly listed companies from 2001 to 2015, MGI found that those with a long-term view—something that's a core of stakeholder capitalism—outperformed the rest in earnings, revenue, investment, and job growth. And a McKinsey Global Survey in February 2020 found that a majority of the executives and investment professionals surveyed said they believed that environmental, social, and governance programs already create short- and long-term value and will do so even more five years from now.

Stakeholder capitalism isn't about being the most woke or about fending off pesky activists. It's about building the trust—call it the "social capital"—that businesses need to keep doing business. And it's about recognizing that creating long-term shareholder value requires more than just focusing on shareholders.

In March 2020, some of our McKinsey colleagues argued that the COVID-19 crisis could be the “imperative of our time.”³⁴ A month later, we noted that it could bring a “dramatic restructuring of the economic and social order.”³⁵ We stand by those assertions. The COVID-19 pandemic has been an economic and human catastrophe, and it’s far from over. But with vac-

cines beginning to roll out, it’s possible to be cautiously optimistic that the next normal will emerge this year or next.

And we believe that, in some ways, that normal could be better. With good leadership, from both business and governments, the changes we described—in productivity, green growth, medical innovation, and resiliency—could provide an enduring foundation for the long term.

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This article was edited by Cait Murphy, a senior editor in the New York office.

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All in the mix: Why US COVID-19 cases rose and fell, and what comes next

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Some people get out and about more than others. That might be a key and overlooked factor in recent declines in US COVID-19 case counts—and could have implications as society reopens.

New US COVID-19 cases rose sharply in late 2020 and declined nearly as steeply during the first few months of 2021 until recently. This is similar to the pattern of other respiratory viruses in the winter months, but in this case many are not sure precisely why it has happened. In this article, we examine one potential, under-explored factor: the different patterns of human interaction. Some people come in close contact with a lot of other people, while others have fewer connections. Epidemiologists call this “heterogeneous mixing,” though most models of the spread of COVID-19 don’t account for it; they assume everyone interacts in similar ways. It’s also not well understood by the general public.

We factored the more disparate ways people mix into our standard epidemiological model for COVID-19 and found that the model’s forecasts of case counts, adjusted for uneven mixing patterns, better reflect actual case counts. As with every aspect of COVID-19, it’s too soon to assert causation; there’s still too much

about the disease we don’t understand. But we think this connection is worth examining, as are its implications for the speed at which society reopens. A critical concern is the group of people who have not seen many other people in the past year but may now reengage with society, even if they are not vaccinated. Public-health leaders may wish to think through their messages for this group.

Human beings are social beings

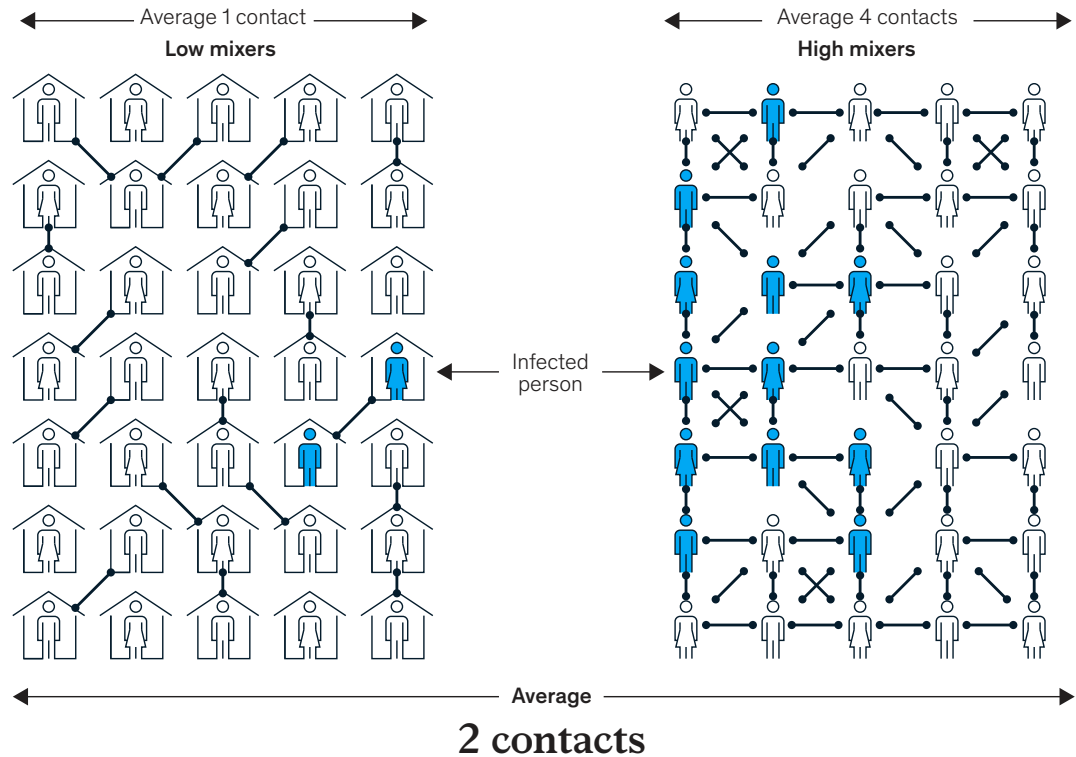
In the course of a day, some people interact with many others. Retail workers, teachers, delivery drivers, and many others meet with lots of people every day, as part of their jobs. And others (spring-breakers, for example) may feel that the threat of the disease to them is low, so they continue to maintain their daily interactions. We would consider people in both of these groups “high mixers.” In contrast, low mixers would include people who can work from home or who tend to be risk averse.

Traditional epidemiological models typically assume populations mix in about the same ways, at least within age groups; they don’t account for different types of mixing by different age groups. Research on this topic is somewhat limited, with data on mixing difficult to find and concrete conclusions not readily apparent.¹ Exhibit 1 outlines the potential for different conclusions, depending on whether an epidemiological model assumes even

Exhibit 1

The dynamics of uneven mixing can expand COVID-19 transmission.

Number of interactions and COVID-19 infections within 2 weeks with uneven mixing in a population (illustrative)



Source: McKinsey analysis

or uneven mixing. In both, the average number of contacts per person is two. But in a model that considers high and low mixers, the average comes from a small number of people with a lot of contacts (about four times that of the larger group that sees fewer people, according to research from the University of California, Berkeley),² and a large number of people who see only a single other person. Introduce COVID-19 into the population, and you'd expect more transmission in high mixers than in lower mixers.

It's a critical difference, as we explore next.

Rapid spread, rapid decline

To further understand the phenomenon, we need to know the proportions of the two groups, high and low mixers. Mobile-phone data suggests that most of us are

homebound or remaining close to home, though some people remain quite active.³ Data on air travel suggests something similar: passenger levels in 2020 were about 70 percent below 2019 levels.⁴ Researchers at the University of California, Berkeley, surveyed Americans about their contacts at different times during the pandemic and gauged the extent to which interpersonal contact has declined.⁵ They found that, on average, we have about 82 percent less close contact than we did prior to the pandemic.

Using these sources, we estimate that in late 2020, about 70 percent of the population are low mixers, while 30 percent are highly active (and include people attending so-called super-spreading events). We used these estimates, along with estimates of the number of contacts

each group has on average (two and eight) based upon the UC Berkeley research, in the McKinsey Global COVID-19 epidemiology model, to estimate the progression and decline in cases for the period starting January 11, 2021 (near the peak of actual cases) and ending March 9, 2021 (Exhibit 2). The uneven-mixing scenario closely fits the sustained decline seen in the line representing actual cases, and corresponds much more closely than does a projection using the traditional epidemiological assumption of even mixing within age groups in the population. We also confirmed that the increase in cases at the end of 2020 is plausible under the uneven-mixing scenario.

It seems plausible that high mixers, with their much wider networks of interaction, could be responsible for a substantial

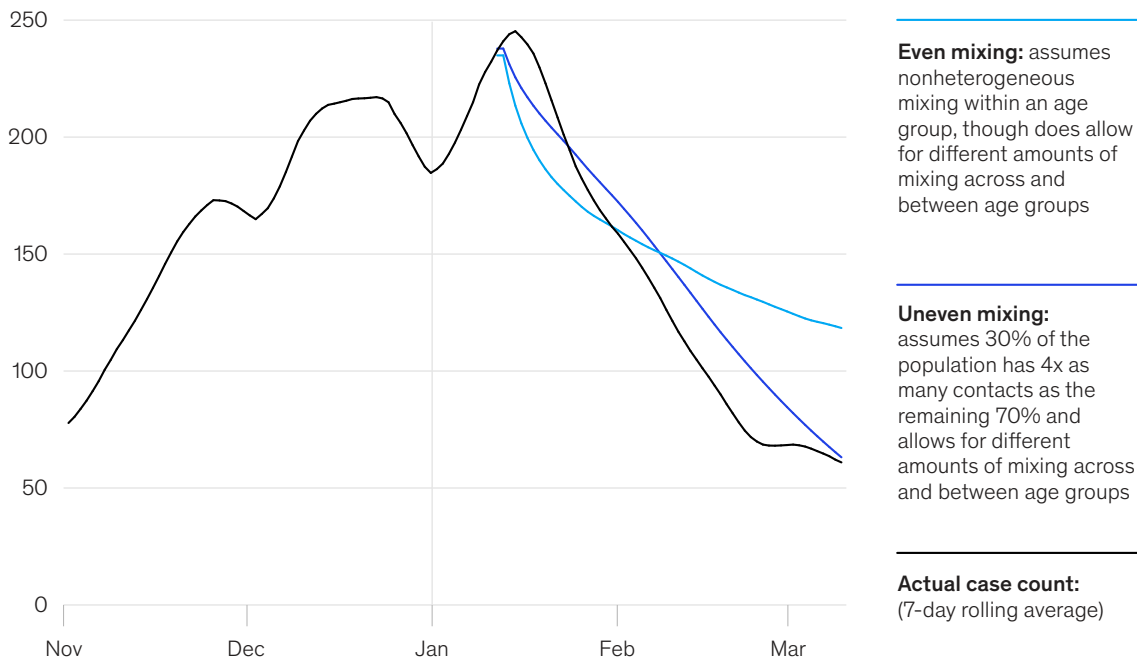
portion of the steep rise in cases in late 2020; in particular, gatherings of friends and family over Thanksgiving, December holidays, and New Year's Day may have hastened transmission, even if much of it was asymptomatic. (Some low mixers likely also participated in the holiday festivities, and then retreated to their previous behaviors.⁶) Subsequently, these high mixers may have recovered quickly—the UC Berkeley research finds that many are young men—and as their disease has receded, they have stopped spreading it. Put another way, the people in the population most likely to get sick and spread the disease may have done just that—and with that burst of transmission out of the way, overall case counts have fallen.

Super-spreading events have captured the popular imagination and are certainly

Exhibit 2

A projection based on uneven mixing best approximates the drop in COVID-19 cases.

US daily detected cases under various mixing scenarios,¹ thousands



Even mixing: assumes nonheterogeneous mixing within an age group, though does allow for different amounts of mixing across and between age groups

Uneven mixing: assumes 30% of the population has 4x as many contacts as the remaining 70% and allows for different amounts of mixing across and between age groups

Actual case count: (7-day rolling average)

¹ Nov 1, 2020–Mar 9, 2021. Source: Our World in Data; McKinsey Global COVID-19 Epidemiology model

a factor in the rise and fall of case counts. But in our estimate, the group of high mixers, many of whom might have attended these events, may be even more important to consider.

It takes all kinds to make a herd

One endpoint of the pandemic will come when a society reaches what we call herd immunity—when enough of the population has immunity from the virus that spread is minimal. Vaccination is, of course, a critical variable in the calculation, but so too is natural immunity. High mixers and low mixers will likely make different contributions to that outcome, as they likely have different levels of natural immunity to COVID-19 after recovering from infection. We estimate that, as of mid-January 2021, 45 to 55 percent of high mixers could have natural immunity, versus about 15 to 25 percent of low mixers. Recent McKinsey consumer research⁷ indicates that high mixers are also less likely to get vaccinated against COVID-19 or follow public-health guidelines (for example, those unlikely to get vaccinated are 3.5 times more likely to not wear a face mask properly in indoor public places and almost twice as likely to go to bars and attend indoor events than individuals likely to get vaccinated).⁸ Natural immunity may be the high mixers' path to protection, for better or worse. Our analysis suggests that, based on the past few months of case trends, high mixers could have relatively high levels of immunity by summer of 2021; this group already has a substantially lower proportion of people susceptible to the original COVID-19 strain than low mixers.

That's an important factor in the quest for herd immunity. As long as high mixers and low mixers do not change their behaviors significantly and the rise of variants does not meaningfully increase the number of susceptible high mixers, the threshold for herd immunity is lower than it would be if

people mixed evenly. Social butterflies are unlikely to become introverts, and people whose jobs call for them to meet the public will continue to have lots of contacts. The behavior to watch for is when countries reopen and unvaccinated low mixers start to reengage with others. We expect more of that in the second quarter of 2021, as regions and countries start to reopen and contend with the rise of variants.⁹ What happens then? It's one of the three implications that leaders should consider and that we'll continue to study.

Three implications of uneven mixing

Our analysis highlights three implications for leaders as they consider the timing of reopening and continue to ensure that populations are safe.

1. ***Pay attention to the low mixers.*** What they do next matters a lot. As the decline in cases has tapered in recent weeks (and even reversed, with new case growth in some geographies), one can assume mixing patterns have not stayed constant—it's likely that more people are beginning to mix, especially as areas begin reopening. There is likely a gradient of risk-taking behavior in the low-mixer group, though we can consider three potential types of people: those who will maintain their behaviors until they are vaccinated or public-health guidelines change, those who are already vaccinated and beginning to mix again, and those who will resume daily activities without being vaccinated or without public-health guidelines changing. As societies reopen, the first group may have fewer contacts than they did before the pandemic, and the second group may have more, due to pent-up demand.¹⁰ The second group may be less of a worry because they are vaccinated; they are less susceptible to severe illness, and also less likely to contribute to transmission. However, as less risk-

averse individuals in the third group see others mixing and increasing interactions or reach their limits of pandemic fatigue, they may begin to gradually take steps toward mixing, even without being vaccinated. The number of people who will resume daily activities without natural or vaccine-mediated immunity has immense implications for safely reopening, especially as variants take hold. This group could drive reopening dynamics and should be top of mind for public- and private-sector leaders.

2. *The true effect of variants is still unknown.* New variants that are potentially more infectious and to which high mixers could have low cross-immunity¹¹ may lead to a renewed rise in cases similar to what we saw after the 2020 holidays. If mixing remains the same as we suspect it has been recently, the effect of variants on case counts may be shorter than the original COVID-19 strain, as variants could spread faster in the group of people mixing. Another factor that may limit the spread of variants is the natural seasonality of respiratory viruses.

On the other hand, If unvaccinated low mixers start mixing more (due to, for example, nicer weather, resumption of travel, or loosening of local public-health guidelines) they could fuel a variant's rise before the vaccine race is won. We are already seeing potential evidence of more mixing, and this could fuel another wave of cases.

3. *The race to vaccinate is on.* Vaccines have generally proved effective, and may be the best tool we have to reduce potential adverse outcomes of increasing the amount of mixing in the population. This will require relatively high vaccine coverage rates and continued public messaging regarding the importance of vaccines to end the COVID-19 pandemic.

The world has rightly focused on the big puzzle pieces of the pandemic, such as vaccines and variants. Uneven mixing is another such piece that leaders should consider as they plan for a post-pandemic world.

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⁴ TSA checkpoint travel numbers (current year[s] versus prior year/same weekday), Transportation Security Administration, March 15, 2021, tsa.gov.

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⁶ David Lazer et al., "The COVID State Project #34: Update on holiday gatherings in December 2020," January 25, 2021, covidstates.org.

⁷ Jenny Cordina, Eric Levin, and George Stein, "COVID-19 Consumer Healthcare Insights: What 2021 may hold," September 2, 2021, McKinsey.com.

⁸ "COVID-19 Consumer Healthcare Insights: What 2021 may hold," January 22, 2021, February 19, 2021, McKinsey.com.

⁹ Sarun Charumilind, Matt Craven, Jessica Lamb, Adam Sabow, and Matt Wilson, "When will the COVID-19 pandemic end?" January 20, 2021, McKinsey.com.

¹⁰ *The consumer demand recovery and lasting effects of COVID-19*, McKinsey Global Institute, March 17, 2021, McKinsey.com.

¹¹ Such as P.1 or B.1.351.

Nursing in 2021: Retaining the healthcare workforce when we need it most

Gretchen Berlin, Meredith Lapointe, Mhoire Murphy, and Molly Viscardi

May 5, 2021

How healthcare stakeholders can understand, support, and empower the nursing workforce in the wake of the global health crisis.

Twenty-two percent¹: That's how many nurses indicated in a recent McKinsey survey that they may leave their current position providing direct patient care within the next year. At a time when nurses are most needed, a significant strain in the workforce exists due to the COVID-19 pandemic. Health systems and other employers of nurses recognize this challenge and are actively designing and deploying new strategies.

The pandemic fundamentally forced the healthcare industry to think differently about how care is being delivered and how workforces are managed. On a positive note, providers incorporated technology into care models, enacted new flexibility in workforce planning and deployment, and rapidly reskilled their teams. However, increasing demands placed on healthcare workers created both a physical strain on those working on the frontlines, and a psychological strain² for those losing patients, or in some tragic cases, coworkers and loved ones.

Moving forward, pressure will likely arise to quickly “rebuild” healthcare workforces as they once were. But instead of a focus

on “rebuild,” we propose a “new” build: a vision for the workforce that incorporates learnings and aspirations for the future of work (for example, technology-enabled care models) and creates a realistic plan to make it happen.

In our 2021 Future of Work in Nursing Survey, we surveyed some 400 frontline nurses across settings to understand their experiences working during COVID-19, their intention to stay in their nursing role and their motivation, their willingness and excitement to try different care delivery models, and what they most want from their employers in terms of support. We offer these insights to help inform healthcare organizations as they evolve their strategies.

We learned—unsurprisingly—that the nursing workforce is an incredibly diverse group of individuals who have had a range of experiences, desires, and opinions. While we found no “silver bullet,” we distilled our findings into four strategies for consideration:

- 1. Make workforce health and well-being part of the fabric.** Surveyed nurses, similar to employees across all sectors, are looking for more support from the organizations that employ them. Recognition (appreciation and economic rewards commensurate with their value), communication, and breaks to recharge are paramount. Also important are increased availability and accessibility of resources (for example, mental health resources).

2. Increase workforce flexibility. COVID-19 accelerated the introduction of scheduling and staffing approaches to create additional flexibility in workforce deployment, and nurses were largely enthusiastic.

3. Reimagine delivery models. Organizations may consider how to leverage digital tools and adapt care models based on patient and employee preferences. For example, some employers may continue (or expand) clinician use of telemedicine platforms, allowing nurses to work remotely more often.

4. Strengthen talent pipelines and build skills for the future. Demand for talent

is increasing, and skill sets and capabilities required are shifting. Organizations will need to reskill in some areas, as well as bolster their recruiting pipeline for clinical roles—in some cases leaning on new partners or professional development pathways.

While nurses are strong, the workforce is fragile

Of the 22 percent of nurses who indicated they may leave their current positions, 60 percent said they were more likely to leave since the pandemic began, driven by a variety of factors, with insufficient staffing, workload,

Exhibit 1

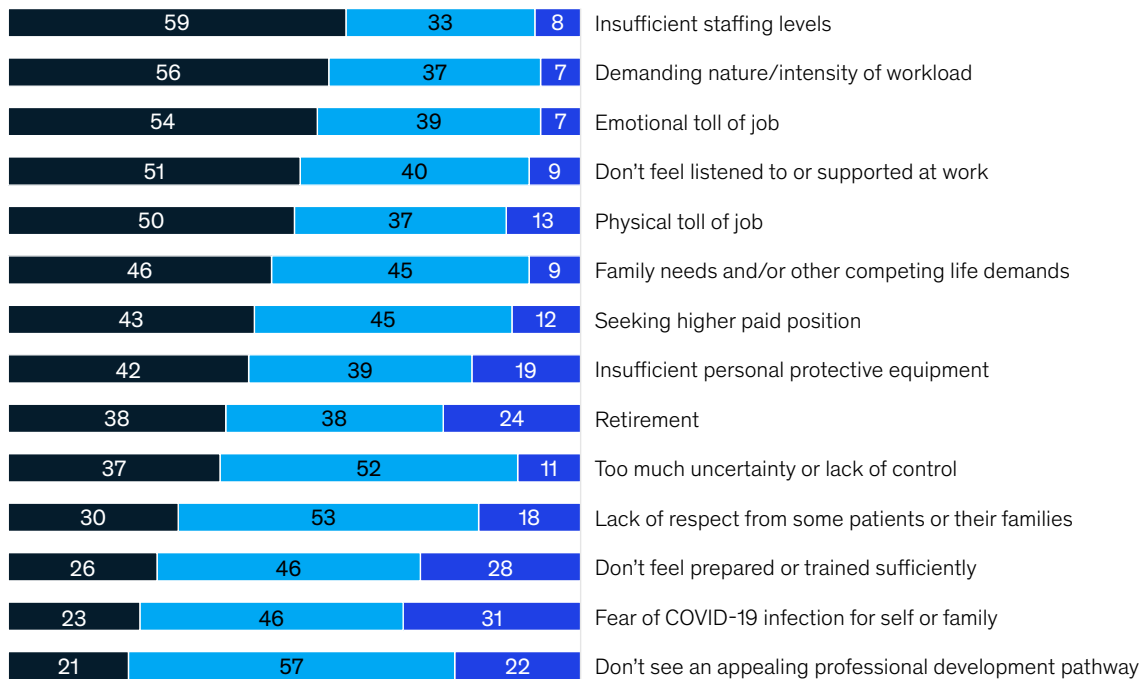
Staffing, workload, and the emotional toll of the job are the most important factors in nurse respondents' decision to leave.

Over half of nurses reported insufficient staffing levels, intensity of the workload, and emotional toll of job as important factors in the decision to leave current position.

Factors influencing decision to leave current position^{1,2,3}

% of respondents, n = 314

■ Important ■ Neutral ■ Not important



¹ FACTORSLEAVE: Rate the following factors for how important they would be in a decision to leave your current role providing direct patient care, if you were to decide to leave.

² Excludes respondents who indicated "other" (n = 29). This group most frequently noted "management support," and similar variations, which were consistent with "don't feel listened to or supported at work." Figures may not sum to 100%, because of rounding.

³ Responses were categorized as follows: Not important (1-3), In between (4-7), Important (8-10).

Source: 2021 Future of Work in Nursing Survey

and emotional toll topping the list (see Exhibit 1). This level of turnover is costly and disruptive for healthcare systems, and can impact morale, disrupt the nurse and patient experience, and exacerbate an already pressing shortage of qualified talent in key geographies and specialties.

Not all nurses experienced the pandemic the same way, and not all nurses will make career decisions the same way. While differences may exist among populations, the pandemic has created several care settings where nursing workforce dynamics are even more fragile than before. For example, nurses in long-term care or home settings said they were 1.5 times more likely to leave than their inpatient peers. In addition, female nurses were two times more likely than male nurses to say they intended to leave their jobs.

Of the 22 percent of nurses surveyed who indicated that they may leave their current position providing direct patient care within the next year, over half said they were seeking another career path, a non-direct care role, or planning to retire or leave the workforce entirely.

On a brighter note, 17 percent of nurses surveyed said they are more likely to stay in the nursing profession given their experience during COVID-19. The strongest drivers of their decision to stay were economic—including favorable compensation and economic stability—as well as flexibility in hours or shifts. However, nurses also reported support of management, impact on patients' and families' lives, and pride of being a nurse as key drivers. Healthcare organizations have an opportunity to bolster sources of engagement and purpose to strengthen their workforce.

Understand what they want and need—listen to your nurses

Nurses value open lines of communication and input into decision making.

Nurses—unsurprisingly—told us that they value a variety of supports from their employers. During COVID-19, nurses reported that their employers took actions across a number of dimensions, including increasing safety equipment (for example, personal protective equipment), compensation, and mental health and well-being resources.

About a quarter of nurses reported that they received mental health or well-being resources or support during COVID-19. A little over 10 percent reported that they received family or domestic support (for example, help with child care). This finding, too, varied within the nursing workforce. Nurses working in the inpatient setting were 20 percent more likely to have received mental health or well-being support and resources. This disconnect between nurses not perceiving adequate mental health support despite employers' efforts in this area parallels findings in McKinsey's recent national employer survey,³ where 71 percent of employers with frontline staff reported supporting mental health well or very well, compared with 27 percent of frontline employees who agreed.

The COVID-19-related changes that nurses were most interested in retaining include compensation increases, scheduling flexibility, and elements of virtual or remote care strategies in the post-COVID-19 world.

When asked about how employers can support their well-being, nurses responded that more appropriate and sufficient recognition, open lines of communication, and more breaks embedded in the nursing operating model would be most effective (see Exhibit 2). Monitoring nurses' distress, offering proactive outreach, and increasing availability and accessibility of support resources (including mental health resources) were also important.

Nurses ask for virtual models and flexible schedules

Our survey found that more than 40 percent of frontline nurses have delivered care virtually within the last year, with highest rates reported by nurses practicing in ambulatory and home care settings. As hospital systems contemplate new ways to embed virtual elements into nursing workflows to improve safety, quality, and efficiency, they are likely to find an enthusiastic workforce. Roughly two-thirds of frontline nurses are interested in providing virtual care in the future.

Virtual care has become a more popular option for patients during the pandemic,⁴ but it also offers a workforce alternative for nurses. It may be particularly appealing for nurses struggling with the physical demands of direct in-person care who are evaluating whether they want to leave the workforce. By thinking in new ways around these virtual work models, employers may be able to tailor

work schedules to incorporate a hybrid option for an expanding set of clinicians.

Strategies to create more flexibility will be critical—our survey indicated nurses that experienced more flexibility in hours and scheduling during the pandemic were highly interested in retaining that flexibility going forward. For those nurses who indicated plans to stay in their current direct patient care role, flexibility in hours and shifts was an influential factor.

Nurses want opportunity to grow and develop new skill sets

One of the most surprising findings from the survey was the extent to which nurses “floated” across units, acuity levels, and settings during the pandemic. More than 60 percent reported “floating” across these multiple contexts last year, nearly two times the rate pre-pandemic. Interest in continuing this kind of work arrangement moving forward varied: of those that floated, about a third were interested in continuing to do so. Looking ahead, iden-

Exhibit 2

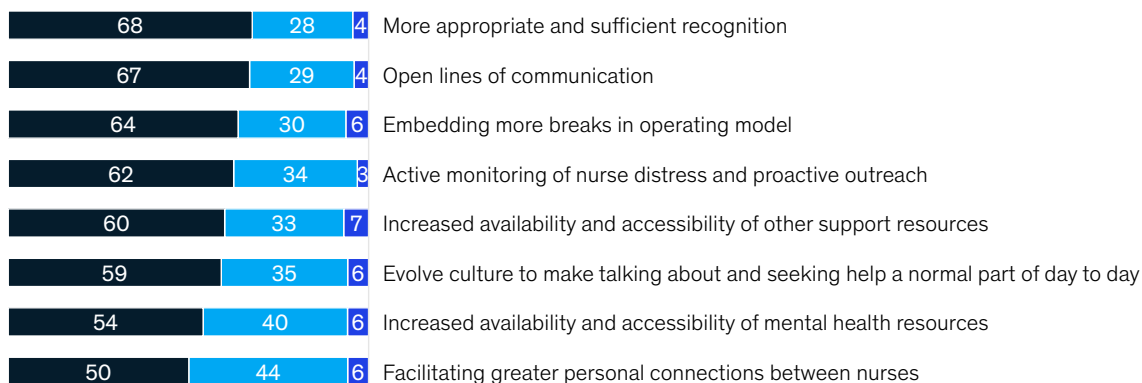
Respondents said recognition, communication, and embedding more breaks are the most desired initiatives for supporting their well-being.

64% of nurses selected embedding more breaks (eg, during shifts, formal paid time off, rotations) as important for well-being.

Perception of effectiveness of support initiatives¹

% of respondents, n = 395

■ Important ■ Neutral ■ Not important



¹ QSUPPORT: Rate each of the following initiatives for how effective you feel they would be in supporting the well-being of nurses given the pressures of the pandemic response and other ongoing dynamics of your job [1 = Not at all effective; 10 = Extremely effective]? Figures may not sum to 100%, because of rounding. Source: 2021 Future of Work in Nursing Survey

tifying and creating opportunities for this interested segment of the workforce could help provide critical flexibility to meet demand across settings and specialties (where clinically feasible).

A critical enabler of these novel care models, and of preparing all nurses for the future, will be training and skilling. In our survey, one-third of frontline nurses said they are not confident that they have the skills necessary for future success in their evolving role. They look to their employers for clearer clinical guidelines (especially with regard to technology) and additional employer-sponsored or on-demand trainings.

Conclusion

The US nursing workforce reflects millions of workers with varied experiences and desires, but also a unified vision in

major areas: they seek compensation commensurate with their expertise and effort, support from their employer, and flexibility in their working model.

Although the experiences of 2020–21 have impacted every profession, few have been more impacted than the nursing workforce. The trauma and moral distress of the past year have exacerbated workforce vulnerabilities, but also provide a unique opportunity to accelerate changes (for example, technology-enabled care models) and make bold investments in what the future of nursing could look like. Health systems, higher education institutions, the public sector, and others have recognized this critical need and have a time-sensitive opportunity to recommit to the support and development of the nursing workforce, and ensure all nurses are set up for future success.

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This article was edited by Elizabeth Newman, an executive editor in the Chicago office.

¹ 2021 McKinsey Future of Work in Nursing Survey. Turnover rate for bedside registered nurses in 2019 was 15.9 percent (see *2021 NSI National Health Care Retention & RN Staffing Report*, Nursing Solutions Inc., March 2021, [nsinursingsolutions.com](https://www.nsinursingsolutions.com)).

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Not the last pandemic: Investing now to reimagine public-health systems

Matt Craven, Adam Sabow, Lieven Van der Veken, and Matt Wilson

May 21, 2021

The COVID-19 crisis reminds us how under-prepared the world was to detect and respond to emerging infectious diseases. Smart investments of as little as \$5 per person per year globally can help ensure far better preparation for future pandemics.

This article was originally published in July 2020 to make an economic case for investments in infectious-disease surveillance and preparedness. The overall message remains as clear now as it was a year ago: the returns from smart investments in preparedness and response are likely to be large multiples of their costs. We have refined the article with three updates that build on our prior work:

- *We sharpened some cost estimates based on further analysis and new information that has become available over the past year. For example, the importance of genomic sequencing, “ever warm” vaccine manufacturing capacity, and R&D platforms has been made ever clearer by the trajectory of the COVID-19 pandemic.*
- *We have included more detail on our line-item cost estimates and a deep dive on surveillance costing (available for download on McKinsey.com).*
- *We have included new cost analyses, including cost per capita and the share of spend at the global, regional, and country levels.*

The COVID-19 pandemic has exposed overlooked weaknesses in the world’s infectious-disease-surveillance and response capabilities—weaknesses that have persisted in spite of the obvious harm they caused during prior outbreaks. Many countries, including some thought to have strong response capabilities, failed to detect or respond decisively to the early signs of SARS-CoV-2 outbreaks. That meant they started to fight the virus’s spread after transmission was well established. Once they did mobilize, some nations struggled to ramp up public communications, testing, contact tracing, critical-care capacity, and other systems for containing infectious diseases. Ill-defined or overlapping roles at various levels of government or between the public and private sectors resulted in further setbacks. And the challenges, including difficulties with vaccine rollouts, lingering vaccine hesitancy, and difficulties in managing second and third surges, have continued as the pandemic has entered its second year.

Correcting these weaknesses won’t be easy. Government leaders remain focused on navigating the current crisis, but making smart investments now can both enhance the ongoing COVID-19 response and strengthen public-health systems to reduce the chance of future pandemics. Investments in public health and other public goods are sorely undervalued; investments in preventive measures, whose success is invisible, even more so. Many such investments would have to be made in countries that cannot afford them.

Nevertheless, now is the moment to act. The world has seen repeated instances

of what former World Bank president Jim Kim has called a cycle of “panic, neglect, panic, neglect,” whereby the terror created by a disease outbreak recedes, attention shifts, and we let our vital outbreak-fighting mechanisms atrophy.¹ The Independent Panel for Pandemic Preparedness and Response published its findings in May 2021, describing the COVID-19 pandemic as the 21st century’s “Chernobyl moment” and making clear that if investment doesn’t occur now, “we will condemn the world to successive catastrophes.”²

While some are calling the COVID-19 crisis a 100-year event, we might come to see the current pandemic as a test run for a pandemic that arrives soon, with even more serious consequences. Imagine a disease that transmits as readily as COVID-19 but

kills 25 percent of those infected and disproportionately harms children.

The business case for strengthening the world’s pandemic-response capacity at the global, national, and local levels is compelling. The economic disruption caused by the COVID-19 pandemic could cost more than \$16 trillion³—many times more than the projected cost of preventing future pandemics. We have estimated that spending approximately \$85 billion to \$130 billion over the next two years and approximately \$20 billion to \$50 billion annually after that could substantially reduce the likelihood of future pandemics (Exhibit 1). This equates to an average of about \$5 per person per year for the world’s population. Approximately 27 percent of this spend would take place at the global and regional

Exhibit 1

Assuming a COVID-19-scale epidemic is a 50-year event, the return on preparedness investment is clear, even if it only partly mitigates the damage.

Estimated costs, \$ billion

Epidemic preparedness

We estimate that an initial 2-year investment of...

~85–130



...followed by annual maintenance investments of...

~20–50



...over 10 years could dramatically reduce the risks of future outbreaks

~285–430



Minimum economic loss from COVID-19 pandemic

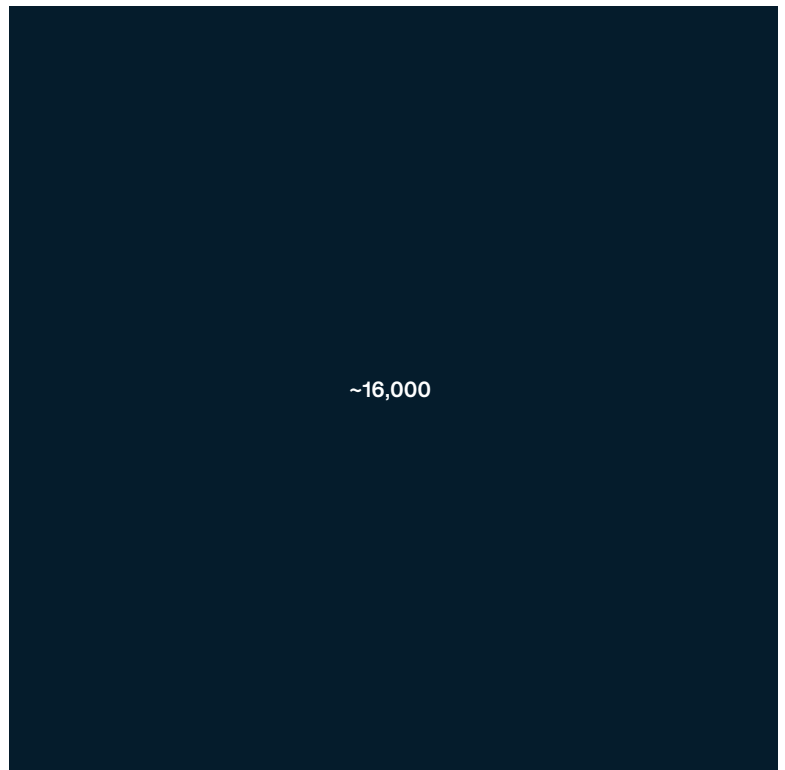







Exhibit 2

Five shifts in healthcare systems can help reduce the chance of future pandemics.

	From	To	Rationale
	“Break glass in case of emergency” response systems	“Always on” systems and partnerships that can scale rapidly during epidemics	Outbreak response is most effective when it uses regularly applied mechanisms
	Uneven disease surveillance	Strengthened global, national, and local mechanisms for detecting infectious diseases	Effective detection capacity is needed at all levels
	Waiting for outbreaks	Integrated epidemic-prevention agenda	Targeted interventions can reduce pandemic risk
	Scramble for healthcare capacity	Systems ready to surge while maintaining essential services	Epidemic management requires ability to divert healthcare capacity quickly without lessening core services
	Underinvestment in R&D for emerging infectious diseases	Renaissance in infectious-disease R&D	Response to COVID-19 pandemic has shown speed possible in moving against infectious diseases when motivated

levels, and about 73 percent would take place at the country level (8 percent in high-income countries and 65 percent in middle- and low-income countries).

These are high-level estimates with wide error bars. They include pandemic-specific strengthening of health systems but not the full health-system-strengthening agenda. Cost estimates will continue to evolve as new information emerges. We hope the overall message is clear: infectious diseases will continue to emerge, and a vigorous program of capacity building will prepare the world to respond better than we have so far to the COVID-19 pandemic.

In this article, we describe and estimate the cost of five areas that such a program might cover: building “always on” response systems, strengthening mechanisms for detecting infectious diseases, integrating efforts to prevent outbreaks, developing healthcare systems that can handle surges while maintaining the provision of essential services, and accelerating R&D for diagnos-

tics, therapeutics, and vaccines (Exhibit 2). Details of the costing analysis are available for download on [McKinsey.com](https://www.mckinsey.com).

We estimate that these five pillars of preparedness can be achieved at a total cost of \$357 billion over 10 years (Exhibit 3).

From ‘break glass in case of emergency’ response systems to always-on systems and partnerships that can scale rapidly during pandemics

Responding to outbreaks of infectious diseases involves different norms, processes, and structures from those used when delivering regular healthcare services. Decision making needs to be streamlined; leaders must make no-regrets decisions in the face of uncertainty. But much of our present epidemic-management system goes unused until outbreaks happen, in a “break glass in case of emergency” model. It is difficult to switch on those

latent response capabilities suddenly and unrealistic to expect them to work right away.

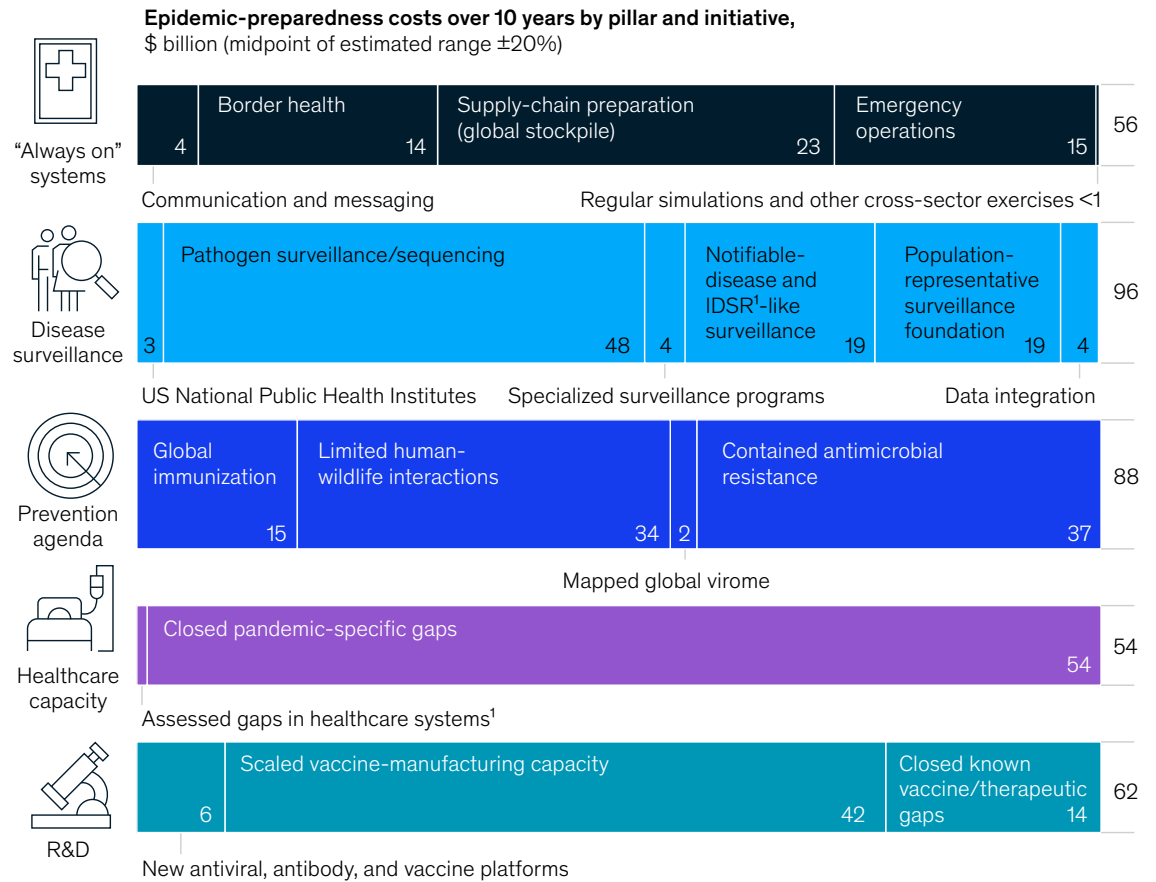
A better system might be founded on a principle of active preparedness and constructed out of mechanisms that can be consistently used and fine-tuned so they are ready to go when outbreaks start (Exhibit 4). We see several means of instituting such an always-on system. One is to use the same mechanisms that we need for fast-moving outbreaks (such as COVID-19) to address slow-moving outbreaks (such as HIV and tuberculosis) and antimicrobial-resistant pathogens. Case investigation and contact tracing are skills familiar to specialists who manage HIV and tuberculosis. But few areas have deployed their experts effectively in responding to the COVID-19 pandemic.

Both the public and private sectors have played major roles in the response to the COVID-19 crisis, but collaboration has not always been as smooth as it might have been if collaboration channels had been preestablished. There have been notable exceptions, including collaborations to increase access to ventilators.⁴

The principle of active preparedness might also lead governments to strengthen other aspects of pandemic response. For example, the past year has highlighted gaps in the manufacturing and stockpiling of personal protective equipment, the sharing of information with the public through risk-communication systems, and the different stakeholders' capability of maintaining border health at points of

Exhibit 3

Five pillars of preparedness can be built for \$357 billion, in our estimate.

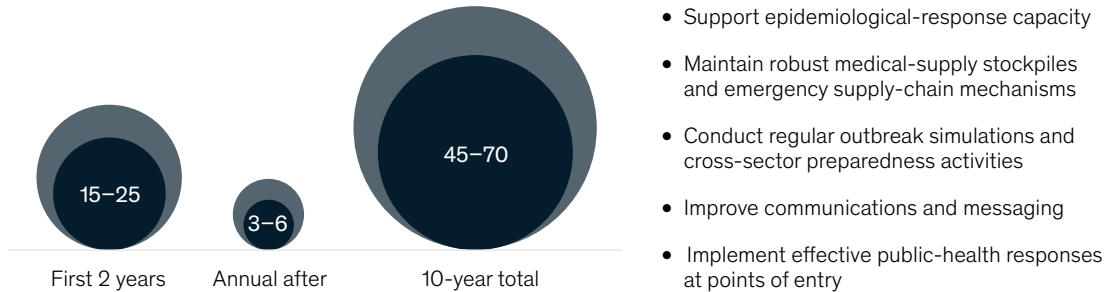


Note: Figures may not sum to listed totals, because of rounding.
¹Integrated Disease Surveillance and Response (framework from US Centers for Disease Control and Prevention).

Exhibit 4

Building ‘always on’ epidemic-management systems means they are ready as soon as outbreaks start.

Summary of estimated epidemic-preparedness initiatives and investments, \$ billion



Source: Gavi, the Vaccine Alliance; Georgetown University; Global Virome Project; National Academy of Medicine; *Nature*; *The Lancet*; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Organisation for Animal Health

entry. Predefining response roles for different stakeholders at the global, national, and local levels is also an important part of active preparedness, since well-defined roles prevent delays and confusion when an outbreak occurs.

Last, governments can keep outbreak preparedness on the public agenda. Iceland offers an example of how to do that effectively. Since 2004, the country has been testing and revising its plans for responding to global pandemics. Authorities there also encourage the public to take part in preparing for natural disasters. The government’s efforts to heighten public awareness of the threat posed by infectious diseases and to engage the public in the necessary response measures aided the country’s successful always-on early-response systems to the COVID-19 pandemic.

To build always-on systems around the world, an up-front two-year investment of \$15 billion to \$25 billion and ensuing annual investments of \$3 billion to \$6 billion (for a ten-year total of \$45 billion to \$70 billion) would go into the following areas:

- supporting epidemiological-response capacity with emergency operations centers (EOCs) that function during all types of major crises

- maintaining robust stockpiles of medical supplies and emergency supply-chain mechanisms at the subnational, national, or regional levels (depending on the setting)
- conducting regular outbreak simulations and other cross-sectoral preparedness activities
- strengthening communications and messaging through established risk-communication systems, internal and partner communication and coordination, public communication and engagement with affected communities, dynamic listening, and rumor management
- ensuring national border health by establishing routine capabilities and effective public-health responses at points of entry

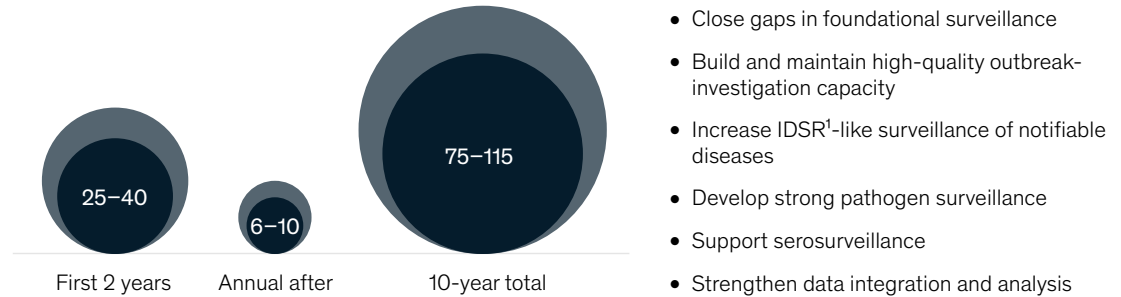
From uneven disease surveillance to strengthened global, national, and local mechanisms to detect infectious diseases

Retrospective analysis shows that SARS-CoV-2 was circulating in a number of countries well before it was first recognized. Failures to detect the disease meant that

Exhibit 5

Strong disease-surveillance mechanisms help stop chains of transmission sooner.

Summary of estimated epidemic-preparedness initiatives and investments, \$ billion



¹Integrated Disease Surveillance and Response (framework from US Centers for Disease Control and Prevention). Source: Gavi, the Vaccine Alliance; Georgetown University; Global Virome Project; National Academy of Medicine; *Nature*; *The Lancet*; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Organisation for Animal Health

chains of transmission had been firmly established before countries began to respond. Such problems occur in part because disease surveillance is often based on old-fashioned practices: frontline health workers noticing unusual patterns of symptoms and reporting them through analog channels. Most countries are far from realizing the potential of data integration and advanced analytics to supplement traditional event-based surveillance in identifying infectious disease risks so that authorities can initiate efforts to stop individual chains of transmission. Data fragmentation has hindered the efforts to respond to the COVID-19 pandemic in many parts of the world (Exhibit 5). The past year has also highlighted the critical role that genomic sequencing can play in the management of outbreaks.

Stopping individual chains of transmission requires strong detection and response capabilities at the national and local levels. Those capabilities are important to have in place across the globe, especially in parts of the world where frequent human-wildlife interactions make zoonotic events (transmission of pathogens from animals to people) more likely. Many developing countries will need external funding and support to build up their disease-surveillance

systems. Donor countries might think of their investments in those systems as investments in their own safety.

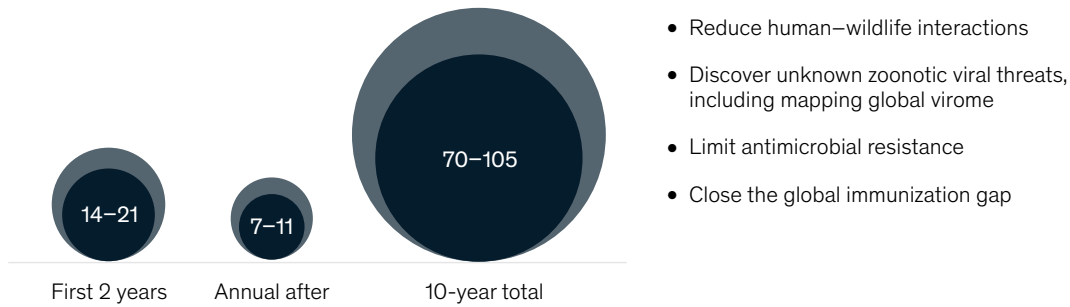
Recognizing that one country’s infectious-disease threat is a threat to all nations—a lesson reinforced by outbreaks of SARS in Toronto, cholera in Haiti, MERS in South Korea, and Zika across the Americas—previous generations created the International Health Regulations (IHR) to promote cooperation and coordination on outbreak response. However, compliance with the IHR has been imperfect because countries may be reluctant to suffer the economic consequences of admitting to a major outbreak. Weak cooperation efforts were identified as a factor in the slow initial response to the West Africa Ebola outbreak. As the COVID-19 crisis continues, leaders are finding reasons to renew their commitments to global and regional mechanisms for coordinating outbreak responses—for example, through the proposed new international pandemic treaty, currently under discussion.⁵

Such an agenda might include closing gaps in population-representative foundational surveillance; strengthening notifiable disease, lab-based, and pathogen surveillance; and improving data integration and the use of data. An invest-

Exhibit 6

Outbreak prevention calls for new approaches to zoonosis, antimicrobial resistance, and immunization.

Summary of estimated epidemic-preparedness initiatives and investments, \$ billion



Source: Gavi, the Vaccine Alliance; Georgetown University; Global Virome Project; National Academy of Medicine; *Nature*; *The Lancet*; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Organisation for Animal Health

ment program of \$25 billion to \$40 billion for the first two years and \$6 billion to \$10 billion per year thereafter (for a ten-year total of \$75 billion to \$115 billion) would pay for the following:

- closing the gaps in foundational surveillance, such as through civil-registration and vital statistics, sample registration systems, and mortality surveillance
- building and maintaining high-quality, flexible outbreak-investigation capacity in all geographies: most countries have a field-epidemiology-training program of some kind, but many of them are underfunded and place their graduates onto uncertain career pathways; strengthening such programs is likely to be one of the most effective investments that a country can make in developing its outbreak-investigation capacity
- increasing the use of notifiable disease surveillance, such as the US Centers for Disease Control and Prevention’s Integrated Disease Surveillance and Response framework
- developing strong pathogen surveillance, including through genomic sequencing

- supporting serosurveillance and vaccine-effectiveness monitoring
- strengthening data integration and analysis, such as by US National Public Health Institutes

From waiting for outbreaks to an integrated epidemic-prevention agenda

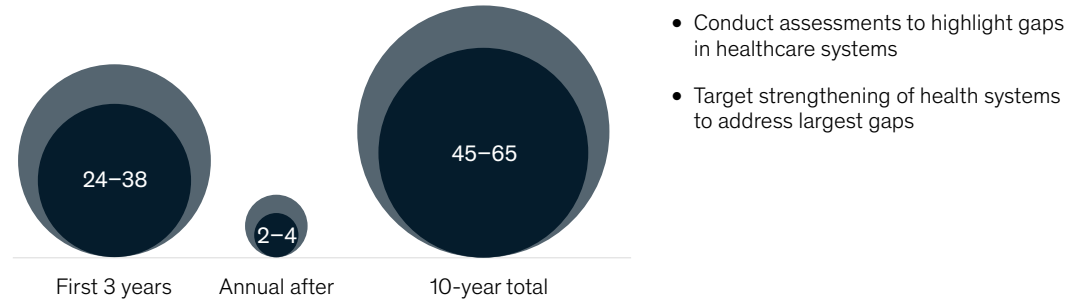
While we cannot prevent all epidemics, we can use all the tools in our arsenal to prevent those we can. Four approaches to doing so stand out: reducing the risk of zoonotic events by discovering unknown viral threats, reducing the risk of zoonotic events by limiting human and wildlife interactions, limiting antimicrobial resistance (AMR), and administering vaccines more widely (Exhibit 6).

Zoonotic events, in which infectious diseases make the jump from an animal to a human, touched off some of the most dangerous recent epidemics, including of COVID-19, Ebola, MERS, and SARS. Zoonosis can’t be eliminated, but their occurrence can be reduced. Areas with high biodiversity and places where humans frequently encounter wildlife present the greatest risk of zoonotic events and therefore require special attention

Exhibit 7

Local healthcare systems can be made ready to handle surges in demand while still delivering essential services.

Summary of estimated epidemic-preparedness initiatives and investments, \$ billion



Source: Gavi, the Vaccine Alliance; Georgetown University; Global Virome Project; National Academy of Medicine; *Nature*; *The Lancet*; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Organisation for Animal Health

to and investment in research. Another root cause is ecosystem degradation, which makes zoonotic events more likely by increasing interactions between humans and wildlife. Scientists have estimated that a large portion of zoonotic-disease outbreaks can be linked to changes in agriculture, land use, and wildlife hunting over the past 80 years. Economic incentives, legal changes, and public education can lessen contact between humans and wildlife and help protect forests and wilderness areas, thereby decreasing the likelihood of zoonosis. There is also much more to learn about the threats we face through wider mapping of the viruses that exist in animal populations.

Limiting AMR—the evolution of pathogens to be less susceptible to antimicrobial agents—is another important way to prevent epidemics. AMR is a public-health crisis to be managed in its own right. It is also a potential accelerant of future outbreaks: as pathogens become resistant, diseases that are currently controllable can spread more widely. Conveniently, managing AMR requires many of the same tools and techniques that support responses to acute outbreaks, including surveillance, case investigation, information sharing, and special protocols for

healthcare settings. Efforts to improve AMR management, therefore, not only strengthen outbreak-response capabilities but also help prevent outbreaks in the first place.

Finally, the unprecedented R&D effort that has been launched to develop a vaccine against COVID-19 serves as a reminder that we are not realizing the full benefit of existing vaccines. Recent outbreaks of measles, for example, show that places with lower vaccination rates are more susceptible to diseases that vaccines can prevent. Achieving full global coverage of all of the vaccines in our arsenal would save millions of lives over the coming decades. It will be especially important to jump-start immunization efforts after the current pandemic with catch-up campaigns for children who have missed scheduled vaccines.

The approaches we have described represent important steps toward preventing outbreaks. We estimate that it would cost approximately \$14 billion to \$21 billion for two years and then \$7 billion to \$11 billion per year thereafter (for a ten-year total of \$70 billion to \$105 billion) to limit human exposure to wild animals, map more of the global virome, slow the spread of AMR, and close the global immunization gap.

From a scramble for healthcare capacity to systems ready to surge while maintaining essential services

Exponential case growth during some phases of the COVID-19 pandemic has compelled officials in some countries to rapidly redirect much of their healthcare capacity to treating patients with COVID-19. The current challenges in India and elsewhere highlight the need to ensure that healthcare systems are prepared to respond to demand surges (Exhibit 7). Some gaps, such as the need for ad hoc conversions of spaces to care for patients with highly contagious diseases, have been common across many countries. Others, such as a lack of oxygen concentrators, have been especially acute in low- and lower-middle-income countries.

To prepare, health systems can establish plans detailing how capacity can be diverted to pandemic management and how additional capacity can be added quickly (for example, by converting non-

medical facilities to temporary healthcare facilities and by establishing field hospitals). Some places used existing plans of that type to respond to the COVID-19 pandemic; others created emergency plans during the outbreak. More can be done to codify and improve such plans. While universal healthcare is an important long-term goal, we consider only the portion of health-system-strengthening costs that are most relevant to pandemic preparedness. Tools such as Service Availability and Readiness Assessment (SARA) and joint external evaluations (JEEs) can help assess overall system readiness and identify the highest-priority needs for pandemic preparedness.

Surge-capacity plans for pandemics should account for the need to maintain essential healthcare services (Exhibit 8). It is becoming increasingly clear that the secondary impacts of the COVID-19 pandemic on population health are of a similar magnitude to those directly attributable to the disease. This is caused

Exhibit 8

To mitigate the secondary health effects of public-health crises, health systems need to plan for surges and continuation of essential services.

Example secondary health effects of health crises



Under-5 mortality progress stalled during Nigeria's economic crisis in the 1980s and 1990s

The under-5 mortality rate had been dropping steadily prior to the crisis in the 1980s and 1990s, then stalled for 15 years before resuming a downward trajectory after the crisis



Immunization rates dropped after the 2010 earthquake in Haiti and subsequent cholera outbreaks

Low baseline coverage and temporary suspension of campaigns resulted in lowered DTP3 immunization coverage and a concurrent diphtheria outbreak



Maternal mortality increased across 3 West African countries during the 2014–16 Ebola crisis

Maternal mortality in Guinea, Liberia, and Sierra Leone was correlated with a decrease in skilled birth attendance and prenatal care, with additional disruptions in family planning



Deaths occurred in excess of expected rates across a number of states in the US during COVID-19 crisis

US Centers for Disease Control and Prevention estimated 5–10% excess deaths above expected baseline, excluding COVID-19-related deaths that were not fully attributable to the disease itself, with >5,000 deaths in New York City alone at peak crisis

by crowded-out urgent-care resources for other conditions, delayed screening and health maintenance, and increased burden on mental health.⁶

Certain investments can help prepare healthcare systems to handle surges while delivering essential and routine services. An initial three-year outlay of \$24 billion to \$38 billion and yearly spending of \$2 billion to \$4 billion thereafter (for a ten-year total of \$45 billion to \$65 billion) would pay for the following actions:

- conducting relevant assessments (such as SARA and JEEs) to highlight gaps and address the challenges identified in scaling healthcare capacity
- strengthening health systems in targeted ways to prepare for future pandemics: while building resilient health systems around the world is a multidecade agenda, closing the largest gaps in care capacity offers disproportionate benefit (the total cost of building high-quality, resilient health systems will be far higher than the cost of closing capacity gaps and goes beyond the scope of the analysis presented in this article)

From underinvestment in R&D for emerging infectious diseases to a renaissance

Humans have done more to overcome the threat posed by infectious diseases in the past 100 years than during the previous 10,000. The widespread availability of antibiotics allows us to manage most bacterial infections. HIV remains a serious condition, but it isn't usually an immediately life-threatening one for people with access to antiretroviral therapy, thanks to the innovations of the past 35 years. And the past decade has seen remarkable progress in our ability to cure hepatitis C.

However, important gaps remain. Public-health leaders have frequently called attention to the threat posed by emerging infectious diseases. Even before the

COVID-19 outbreak, the pandemic threat posed by known pathogens such as influenza and by an unknown "pathogen X" was well understood.⁷ The pace of innovation in antibiotics is not keeping pace with the increases in antimicrobial resistance. Current regulatory and incentive structures fail to reward innovations that can help counteract emerging infectious diseases or resistant bacteria. It is difficult for companies to project the financial returns from interventions for diseases that emerge sporadically and may be controlled before clinical trials are complete (as happened during the West Africa Ebola outbreak). That is especially true of interventions for diseases that mainly affect people in low-income countries.

R&D efforts in response to the COVID-19 pandemic have been unprecedented. Vaccine-development records have been smashed, both for time to market and for the number of candidates advanced in a short period of time. The bar for vaccine development during a crisis has been raised: CEPI (Coalition for Epidemic Preparedness Innovations) has suggested that for a future pandemic, it may be possible to develop a vaccine within 100 days.⁸ On a less positive note, the limits of what can be achieved through drug repurposing have become clearer. No one expects that we will go back to the prepandemic R&D model, but it will be important to ensure that the product-development lessons of the pandemic are fully internalized.

Building on the momentum created by COVID-19-related R&D, there is potential to spark a renaissance in infectious-disease R&D (Exhibit 9). The renaissance might focus on several necessities that the response to the COVID-19 pandemic has highlighted. One necessity is closing gaps in the tool kit to respond to known threats, such as influenza. A second is maintaining platforms that will allow us to respond rapidly to newly discovered diseases (as mRNA has done for SARS-CoV-2, for example). A third is sustaining

the ability to manufacture billions of vaccine doses quickly to ensure equitable access to the fruits of innovation.

Delivering such necessities will require building on the early success of initiatives such as CEPI to reimagine product-development pathways, from funding models and collaboration platforms to regulatory review and access agreements. Spending \$16 billion to \$24 billion in the first two years and \$4 billion to \$6 billion per year thereafter (for a ten-year total of \$50 billion to \$75 billion) would fund these activities:

- closing gaps in vaccine and therapeutic arsenals against known threats, including influenza, for which effective R&D might yield significant advances
- scaling vaccine-manufacturing capabilities to produce 15 billion doses in a six-month period to provide sufficient coverage to immunize the global population
- investing in the development of new vaccine, antibody, antiviral, and therapeutic platforms against emerging infectious diseases

Bringing it all together

As we continue to respond to the COVID-19 pandemic, countries should make deliberate

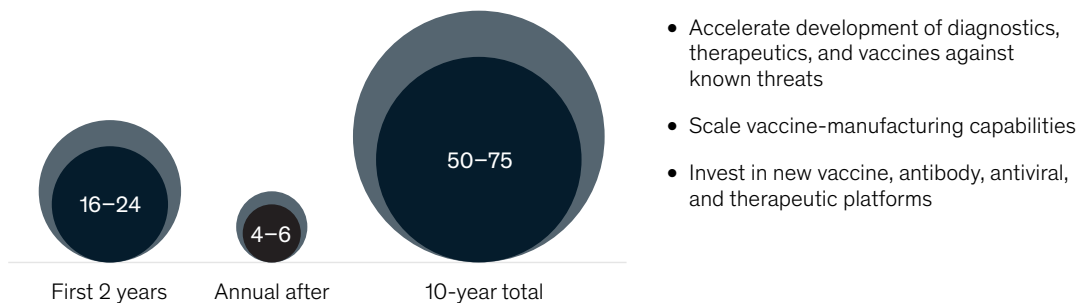
investments to reduce the chance of such a crisis happening again. We estimate that an initial global investment of \$85 billion to \$130 billion over the next two years (\$40 billion to \$65 billion per year), followed by an investment of \$20 billion to \$50 billion per year to maintain always-on systems, would significantly reduce the chance of a future pandemic. Those figures, totaling \$285 billion to \$430 billion over the next decade, include spending at the global, country, and subnational levels (Exhibit 10).

The playwright Edward Albee once said, “I find most people spend too much time living as if they’re never going to die.”⁹ So it is with the global response to infectious diseases: we have spent too much time behaving as though another deadly pathogen won’t emerge. Outbreaks of SARS, MERS, Ebola, and Zika led to some investments in pandemic preparedness over the past 20 years, but few of them are the lasting, systemic changes needed to detect, prevent, and treat emerging infectious diseases. And now, even with all of humanity’s knowledge and resources, millions of people have been killed by a disease that was discovered less than 18 months ago. The COVID-19 pandemic won’t be the last epidemic to threaten the world. By taking action and funding changes now, we can better withstand the next one.

Exhibit 9

The efforts behind the COVID-19 response may start a renaissance in infectious-disease R&D.

Summary of estimated epidemic-preparedness initiatives and investments, \$ billion



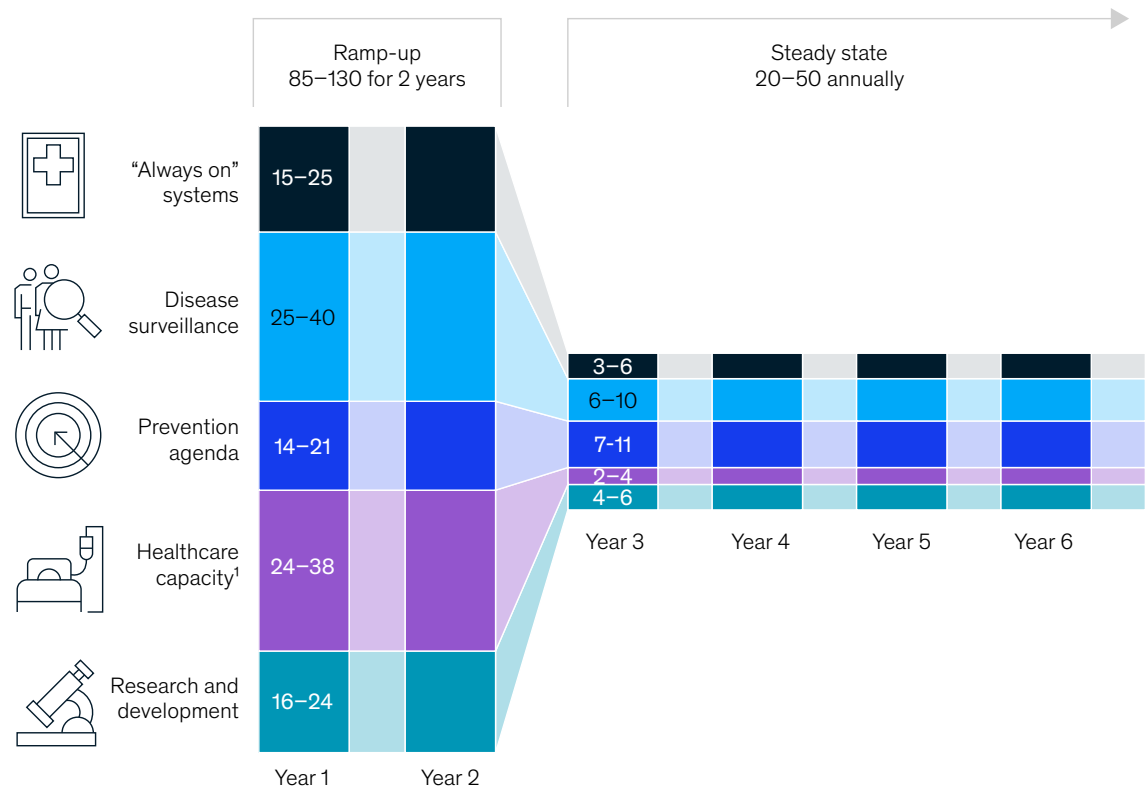
Source: Gavi, the Vaccine Alliance; Georgetown University; Global Virome Project; National Academy of Medicine; *Nature*; *The Lancet*; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Organisation for Animal Health

Exhibit 10

Funding for epidemic preparedness requires an up-front investment to close current gaps.

Illustrative funding needed to invest in epidemic preparedness, \$ billion

- 1 A “ramp up” phase is needed to close epidemic-preparedness gaps
- 2 Steady-state preparedness reduces the likelihood and average severity of future outbreaks



¹ Initial investment in healthcare capacity takes place over 3 years.

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Selected quotes from our conversations with leaders

Vaccines and therapeutics: What we learned

If it weren't for the extraordinary people I work with—who are selfless, mission-driven, and committed to building the best version of Moderna possible—we would not be where we are today.



Stéphane Bancel
CEO, Moderna



Richard Hatchett
CEO, CEPI

What's gone well is attributable to the sense of global scientific solidarity—the degree to which the global science community came together to understand the virus, to understand its epidemiology, and to develop countermeasures.

The COVID-19 pandemic has changed us so profoundly in so many ways, whether it's at work or at home. Many of the lessons we learned for drug development throughout this journey are replicable.



Angela Hwang
Group President,
Pfizer Biopharmaceuticals Group

COVID-19 vaccines meet 100 million uncertain Americans

Tara Azimi, Michael Conway, Tom Latkovic, and Adam Sabow

December 18, 2020

More than 100 million Americans are uncertain about vaccination. Public- and private-sector leaders can take action to support adoption, including incremental investment in the range of \$10 billion.

The rapid progression of COVID-19-vaccine candidates over the past several months has been a historic scientific accomplishment. With the vaccine developed by the BioNTech and Pfizer partnership receiving an Emergency Use Authorization in the United States, and the Moderna vaccine nearing the same milestone as of December 18, 2020, we must turn our attention to the next challenge ahead of us: supporting Americans in vaccine adoption. The difference between about 100 million Americans (those who say they are interested) and about 200 million (including those currently uncertain) getting vaccinated could mean saving many thousands of lives and generating hundreds of billions of dollars of incremental GDP to restore livelihoods in the United States (see sidebar “Insights on COVID-19 vaccination in the United States”).

There are at least five challenges to at-scale COVID-19 vaccine adoption: historical analogues consistently demonstrate the challenges of public-health-initiative adoption in the United States; about 50 to 70 percent of Americans, including those in at-risk segments, convey uncertainty toward COVID-19 vaccination; the drivers of vaccine uncertainty are complex; many

of the most credible influencers, physicians, and nurses are uncertain; and mis- and disinformation exists and could increase. These five challenges confront the United States at present. However, there is potential that uncertainty will subside as vaccine adoption progresses with prioritized populations in the coming months. We won't know for some time, and by the time that we do, it might be too late to act.

Successful analogues suggest that achieving large-scale vaccine adoption will require creating much stronger conviction among patients and influencers, providing high levels of convenience, and ensuring that vaccination is truly costless or better for consumers.

Delivering conviction, convenience, and costlessness will require four major shifts in the actions of stakeholders across sectors:

- public and private sectors coming together to launch an unprecedented campaign to support vaccine adoption at scale
- government action to develop and innovate the infrastructure further to support vaccine adoption
- healthcare providers and payers with vaccination at the top of their agendas
- employer mobilization and action to support employees to get vaccinated

Such collective action will require investment in the range of an incremental \$10 billion. The incremental economic benefits of widespread COVID-19-vaccine adoption, however, would be orders of magnitude higher, and the value in lives saved and negative long-term health effects avoided would be immeasurable.

Very-high rates of vaccine adoption would be epidemiologically and economically beneficial

In our article “When will the COVID-19 pandemic end?” we explore two time frames to end the pandemic: first, an epidemiological end point, in which herd immunity is reached and public-health-emergency interventions deployed in 2020 are no longer needed; and second, and likely an earlier end point, a transition to normalcy, when almost all aspects of social and economic life can resume by vaccination of the highest-risk populations, improved testing and therapeutics, and strengthening of public-health responses which, combined, can significantly reduce mortality.¹

While the level of vaccine adoption required to return to normalcy is unknown, the benefits of driving toward full herd immunity are clearer. Full herd immunity would reduce COVID-19-related morbidity, mortality, and associated treatment costs, release pressure from states to continue related safeguarding, and enable stronger economic growth.

If we take a 70 percent adoption rate among Americans 12 and older as the level needed to reach immunity, it implies that 195 million

of 280 million eligible Americans would get vaccinated (see sidebar “Vaccine and immunity assumptions and scenarios”).

Higher vaccine adoption would likely enable stronger economic growth by increasing confidence in the safety of economic and social activities. To the extent that COVID-19 exists beyond the point at which we “return to normalcy,” it could prevent large portions of the population from feeling safe enough to eat out, attend events, send their children to in-person school, or show up to work in person. Herd immunity could also increase business confidence against the risk of COVID-19 resurgence and inspire greater investment and hiring.

According to analysis by McKinsey in partnership with Oxford Economics, the difference between a partially effective or regionalized response to COVID-19 versus a highly effective control could bring forward the return of GDP to where we were at the end of 2019 by three to six months. This could amount to about \$800 billion to \$1.1 trillion in additional GDP by the end of 2022. Achieving herd immunity would likely contribute, if not be the definitive contributing factor, to achieving the more favorable outcomes.

Sidebar 1

Insights on COVID-19 vaccination in the United States

The analysis and perspectives in the article are most relevant to the extent that policy makers and other healthcare leaders in the United States conclude that the benefits of large-scale COVID-19 vaccination outweigh the risks. The evidence base on COVID-19 vaccines is still developing, and there are many unknowns on the vaccine candidates’ long-term safety and effectiveness—more so than any other vaccine used at scale in the United States. We understand that current assessments of the vaccines by leading scientific experts at the US Food and Drug Administration, National Institutes of Health, and CDC, among others,

have carefully considered the risks and benefits of vaccination with the best available information and will continue to closely review the emerging evidence over the coming months and years. Furthermore, we recognize vaccination is a personal choice—balancing personal healthcare choices with public health benefits. In that context, the perspectives in the article focus on how to ensure that the conditions to support adoption (assuming that the vaccines continue to be deemed safe and effective) are in place and that consumers are fully equipped to make decisions about and access vaccination if they want it.

The challenge: Five potential challenges to at-scale vaccine adoption

An optimist might note that hundreds of millions of Americans now wear masks, the flu vaccination rate in 2020 approached a record-high 50 percent, and a recent Gallup Poll found that 58 percent of Americans would be willing to receive a coronavirus vaccine.

Digging deeper presents a much murkier reality, with at least five potential challenges to at-scale vaccine adoption. These five challenges confront the United States at present. However, there is potential that uncertainty will subside as vaccine adoption progresses with prioritized populations in the coming months. We won't know for some time, and by the time that we do, it might be too late to act.

1. Historical analogues consistently demonstrate the challenges of public-health-initiative adoption in the United States

Low adoption of public health measures is the norm, not the exception, in the United States. Among many examples, only about half of American adults get the flu vaccine despite decades of safety and efficacy evidence and widespread availability; rates of other adult vaccinations in populations under 65 are even lower. It took 33 years from 1983 to 2016 for seat belt use to increase from 14 percent to 90 percent. It has taken 38 years from 1980 to 2018 for the percentage of Americans receiving fluoridated water to increase from 50 percent to 63 percent. One of the most successful public health interventions, to reduce smoking, has taken 20 years to reduce the adult-smoking rate alone by nine percentage points, from 23 percent to 14 percent.

2. Approximately 50 to 70 percent of people, including those in at-risk segments, convey uncertainty toward COVID-19 vaccination

According to our most recent US-consumer research, 63 percent of respondents are cautious about or unlikely to adopt COVID-19 vaccination.² The “cautious,” who comprise 45 percent of respondents (the largest segment),

are those who will wait and see how a vaccine performs in the “real world” before deciding if they will get vaccinated. Another 18 percent say they are unlikely to vaccinate. The relative proportion of consumers in the “interested,” “cautious,” and “unlikely” segments has remained largely consistent in the past five months, with some slight positive shifts in subsegments of the cautious, even following positive readouts from the clinical trials of the Moderna and Pfizer–BioNTech vaccines.³

At-risk Americans are also uncertain. Despite the well-documented risks that elderly people face when contracting COVID-19, only 65 percent of respondents older than 65 years reported that they are interested in getting vaccinated. Only 31 percent of Black respondents and 36 percent of Hispanic respondents said that they are interested. Other recent surveys show similar results. While 60 percent of those earning more than \$100,000 per year report that they are interested in getting vaccinated, only 31 percent of those who earn less than \$25,000 report the same. These findings are consistent with observed, historical behavior among higher-risk segments with respect to other vaccines.

Consumer sentiment does not always predict actual behaviors, of course. First, sentiment can and does evolve. Second, there has always been a gap between what people say they will do about public health and what they actually do. That said, the research suggests that about 30 to 50 percent of people are interested in getting vaccinated against COVID-19, and the other 50 to 70 percent are uncertain or unlikely. That means that among the 195 million Americans who would likely need to be vaccinated to reach herd immunity in the population, about 100 million to 150 million would need to be engaged further to decide and take action to get vaccinated.

3. The drivers of vaccine uncertainty are complex

The most commonly cited reasons Americans give for not being vaccinated, including with respect to flu shots, are concerns with vaccination side effects. This has been true for decades. Today, many Americans are concerned

about the safety and side effects of a COVID-19 vaccine, especially given the unprecedented speed at which the vaccines were developed and the limited time in which we have monitored the safety. Indeed, in our research, 40 percent of consumers stated that the most important factor in their decision to vaccinate against COVID-19 was the side effects. Such fears could well be amplified as new information

emerges, including the recent announcement that as many as 15 percent of those receiving a COVID-19 vaccine could suffer side effects that “can last up to a day and a half” including “fever, chills, muscle aches, and headaches.”

Other well-documented reasons for low vaccine adoption include “free rider” challenges and inertia.⁴ Most people understand that if enough other people get vaccinated,

Sidebar 2

Vaccine and immunity assumptions and scenarios

Our analysis suggests that achieving full herd immunity to COVID-19 may require a significant majority of the adult population to be vaccinated, even after considering the proportion with some level of immunity from natural infection. Depending on the lower end of the age range for vaccination (for example, 12 or 18 years old) and the scenarios for vaccine effectiveness in reducing transmission (for example, 95 percent versus 75 percent), achieving herd immunity will require the immunization of between 56 and 93 percent of the eligible population.

In a scenario in which only adults aged 18 and older receive a COVID-19 vaccine (consistent with the initial trial readouts) and the vaccines all have efficacy of 95 percent (as seen in the trials of the vaccines developed by Moderna and the team of BioNTech and Pfizer), then 61 to 81 percent of adults would need to be vaccinated to reach herd immunity.

In a scenario in which the vaccines are safe and effective for those aged 12 and older (consistent with Pfizer–BioNTech’s and Moderna’s current trials underway), then vaccination of 56 to 73 percent of that population would be sufficient to reach herd immunity.

However, there is still significant uncertainty around efficacy levels. The COVID-19 vaccine developed by the team of AstraZeneca and the University of Oxford, for example, showed only 62 percent efficacy with a full-dose regimen. The pivotal trials of the Moderna and Pfizer–

BioNTech vaccines measure transmission reduction in symptomatic disease, which is not the same as reducing transmission—the result needed to reach herd immunity.

In a scenario in which vaccines are, on average, only 75 percent effective in reducing transmission, and only those aged 12 and older are vaccinated, then achieving herd immunity would require vaccinating 70 to 93 percent of that population.

Such scenarios are consistent with statements made by Moncef Slaoui, the leader of Operation Warp Speed, that approximately 70 percent of the population will need to be immunized to return to normal. In order to reach an adoption rate of 70 percent, approximately 195 million of the approximately 278 million residents in the United States aged 12 and older would need to be vaccinated.

We include all Americans aged 12 and older, even if they have tested positive for COVID-19 or have had positive serology tests, for three reasons. First, we don’t yet know how long natural immunity lasts or how natural-immunity duration might vary based on the severity of clinical disease (asymptomatic versus mild versus severe). Second, diagnostic and serology tests have variable performance and may have rendered false-positive results for some people. Finally, it may be logistically challenging and costly to determine millions of individuals’ serological-marker status reliably.

they themselves will have less benefit from the vaccine. This phenomenon could be exacerbated during the initial launch of the vaccine, when the media will likely focus on the substantial number of people taking the vaccine and the (hopefully) reductions in mortality. For many Americans, a vaccine is simply not a priority. Even if they aren't worried about the safety, they aren't sufficiently convinced to take the time to be vaccinated.

4. Many of the most credible influencers, physicians, and nurses are uncertain

The entities most active in developing COVID-19 vaccines to date have been the federal government and the pharmaceutical industry. When consumers are asked, however, about who they trust most, it is other stakeholders that are highest on the list—most notably their physicians and nurses. It will be critical that these other influencers complement and reinforce the messages shared by the government and pharmaceutical companies. The challenge is that many physicians and nurses, the most critical authority figures for many people, are also uncertain. We surveyed more than 300 physicians in late September, and 29 percent were either uncertain or unlikely to recommend vaccination to their patients. An even larger proportion, 36 percent, were uncertain or unlikely to get COVID-19 vaccination themselves. In contrast, 90 to 95 percent of physicians typically say they recommend flu shots to their patients. An October 2020 survey of 12,939 nurses by the American Nurses Association and American Nurses Foundation showed that only 15 percent were “very confident that a COVID-19 vaccine will be safe and effective” and only 34 percent said they would voluntarily be vaccinated. Eighty-four percent believe that vaccine development is occurring too quickly. Although we anticipate that the recent trial results could shift some of these perspectives more favorably, we expect that uncertainty will remain, as it has with consumers. Without these critical influencers on board, it will be difficult to educate and engage wary consumers.

5. Mis- and disinformation exist and could increase

Americans have a relatively low understanding of disease and vaccines, in general. Indeed, many respondents to our last consumer survey were unable to name the leading COVID-19-vaccine manufacturers and had limited knowledge of the vaccine candidates' key attributes. There are multiple reasons for this reality including the emergence of social media as a major source of information and the well-documented growth of the “antivaccination” movement.⁵⁻⁷ A recent in-depth analysis of online narratives about vaccines on social media by the organization First Draft found that the majority of social media discussions about COVID-19 focus on “political and economic motives” of actors and institutions involved in vaccine development and the “safety, efficacy, and necessity” concerns around vaccines.⁸

Regardless of which vaccines emerge, it is reasonable to assume that significant amounts of incorrect or misleading information will be spread. This is especially problematic given that, based on our most recent survey, more consumers source their COVID-19-vaccination information from social media (27 percent) than from physicians (16 percent) and from state-, local-, and federal-government officials (22 to 24 percent).

The antidote: Conviction, convenience, and costlessness (or better)

What will support adoption among consumers? There are clues from analogues where high portions of the population have adopted a protocol or taken action, including child vaccination, fluoridated water, and mask wearing. As shown in Exhibit 1, we can conclude that some combination of at least three highly interrelated conditions are required for broad adoption: conviction, convenience, and costlessness (or better).

1. Conviction

Conviction is more than openness: it is a committed belief, deeply held. As we've described, some 100 million or more Americans are uncertain about receiving a COVID-19 vaccine. We'd expect that high adoption rates would be

marked by millions of Americans holding the conviction that getting vaccinated as soon as possible is worth it.

People don't necessarily need to build conviction that a vaccine will be risk-free; no medication is without risk. Rather, people need to believe that the benefits of vaccination are greater than the perceived risks and costs and that the evidence supports this statement. One way to build conviction is to demonstrate that a COVID-19 vaccine could make the recipient safer. Social obligations—do the right thing, protect others, open the economy—can be powerful motivators as well. In our research, respondents who said they were interested in vaccination were evenly split in their rationale between the personal (“I think it will protect me”), at 57 percent, and the communal (“it’s the right thing to do”), at 53 percent. Conviction can also emerge from understanding the consequences of not receiving a vaccine.

Conviction can be created or deepened with three complementary approaches: education, influence, and peer-based normalization.

Education

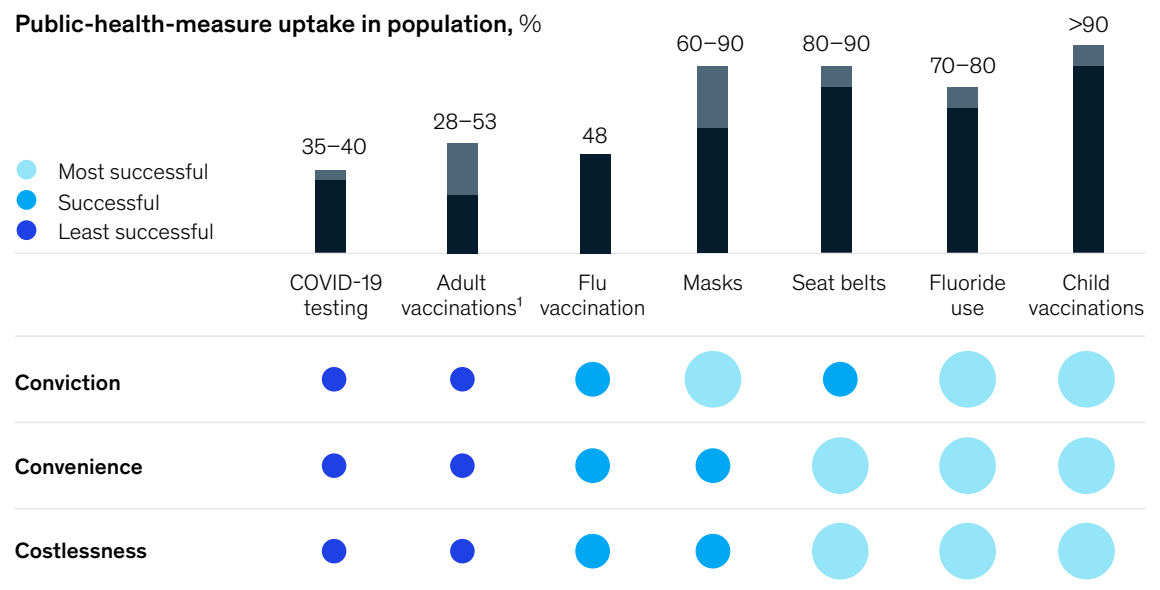
People who are uncertain need facts, evidence, and transparency to help inform decision making. We queried respondents as to how important seven different types of information would be to their deciding whether or not to be vaccinated against COVID-19, with data points that addressed clinical information, side effects, setting, experience, and financial considerations. Respondents indicated that all seven types of information were highly relevant. Effective education will require dynamic information sharing, including responding to new evidence and anecdote to include efficacy and side effects.

Influence

American’s views are highly affected by people and institutions perceived to be credible. Prominent influential voices include social, entertainment, and faith leaders, but vary significantly by segment of the population. Our research suggests that consumers across all segments most trust physicians’ advice on COVID-19 vaccination. Nurses and pharmacists will also play an important influencing role. However, the relative power of influencers varies across

Exhibit 1

Widespread adoption of public-health initiatives correlates with high levels of conviction, convenience, and costlessness.



¹CDC adult vaccination composite measure for adults aged 18 years and older, excluding flu. Range represents proportion of adults in that age group receiving routinely recommended age-appropriate vaccines based on CDC’s 2017 National Health Interview Survey.

segments. For example, respondents aged 65 and older in our survey said that they relied less on their physicians for COVID-19-vaccination advice relative to respondents from other age groups; 18-to-24-year-olds were more than 170 percent more likely to rely on family members for COVID-19-vaccination advice. Effectively engaging the uncertain requires mobilizing not just physicians but a broader set of influencers relevant to different consumer segments.

Peer-based normalization

Our peers may be the most potent influencers of all, and peer encouragement will be vital if COVID-19 vaccines are to become the norm. Normalization can occur based on social-media posts, sharing with friends, and even wearing “I was vaccinated” stickers. The reciprocal approach—the social stigma of going against the group—is also powerful, sometimes even more so. If the consequences of harming other people by not being vaccinated can be demonstrated, a stigma could attach to those who eschew the vaccine and are perceived as harming others.

2. Convenience

Decades of experience, including during the pandemic, teach us that even minor inconveniences significantly reduce adoption of public health measures, including vaccinations. This may be especially relevant for uncertain people “looking for an excuse” to not be vaccinated.

Consumers are heterogenous and place different emphasis on different aspects of convenience. To one person, convenience is being able to schedule an appointment via text and be vaccinated via drive through or at home. To another it’s the ability to walk in at midnight without a wait since they work second shift. To another it’s the ability to be vaccinated during their check-in with the orthopedist.

That said, all else equal, the more sites, the more embedded access is, the greater the physical proximity of sites, the more diversity in settings, the lower wait times are and the easier it is to identify and navigate, the more likely it is that more people will be vaccinated.

In Exhibit 2, we identify several key aspects of convenience and a set of measures that state and local governments could use to inform the degree of convenience they are achieving.

3. Costless (or better)

For consumers who have decided that they would like to be vaccinated, the cost of the vaccine (real or perceived) can serve as a barrier to adoption. Cost barriers can include direct costs of paying for the vaccination and associated visit (including being billed for it later) and indirect costs of vaccination such as the cost of transportation, time off of work, missing work in case of side effects, and securing child care. Furthermore, consumers want to be confident that they will not bear personal costs (such as lower government benefits and deportation) from getting vaccinated. Addressing these cost barriers proactively could be especially critical to supporting the low-income segment of the population to access COVID-19 vaccination if they want it.

In addition to addressing the costs of vaccine access, one could also raise the question of whether incentives should be considered. This is a complex question, and we should note that any benefits (or penalties) associated with vaccination need to be considered with a deep concern for equity and avoidance of unfavorable, unintended consequences. Options to be considered include financial incentives, nonfinancial benefits, and social recognition (for example, social-media badges).

Delivering the antidote: Four shifts for an unprecedented campaign across the public and private sectors

Supporting COVID-19-vaccine adoption among the 100 million or more currently uncertain Americans will require four major shifts across stakeholders:

1. *Public and private sectors coming together to launch an unprecedented campaign to support vaccine adoption at scale.* While significant cross-sector collaboration has occurred across the overall response to the COVID-19 pandemic and on the supply side of vaccines (such as R&D and the supply chain), the same has not yet occurred on supporting adoption. Public- and private-sector leaders need to come together on an integrated vision and agenda to support

Exhibit 2

There are multiple opportunities to make vaccinations more convenient.

Specific actions to increase vaccination convenience

Frictionless	<input type="checkbox"/> Vaccinations embedded into life activities (eg, school, work)
Many high-proximity sites	<input type="checkbox"/> High number of administration sites per capita <input type="checkbox"/> Short walking distance, particularly for urban residents or employees <input type="checkbox"/> Short driving distance or short distance from public transportation <input type="checkbox"/> Sites in more distributed rural communities
Diverse settings	<input type="checkbox"/> Physician offices offering vaccine (including specialists) <input type="checkbox"/> Pharmacies <input type="checkbox"/> Alternative sites (eg, in-home, drive-throughs, community centers, places of worship)
Broad availability	<input type="checkbox"/> Vaccine sites with extended hours (eg, before and after work) <input type="checkbox"/> Vaccine sites with weekend hours
Predictable, low wait times	<input type="checkbox"/> Number of available appointments <input type="checkbox"/> Lower median wait times across sites <input type="checkbox"/> Sites with vaccination on demand
Ease of identification and navigation	<input type="checkbox"/> Transparent, reliable information—including wait times—for all vaccine sites <input type="checkbox"/> Omnichannel communication (eg, via phone, internet, app) <input type="checkbox"/> Rapid scheduling (eg, web-based app) <input type="checkbox"/> Push reminders for second dose appointment

vaccine adoption at scale. This will require collaboration and orchestration across government, payers, providers, employers, manufacturers, community organizations, and influencers to remove barriers to adoption comprehensively, rapidly, and effectively. It will require innovation and new ways of doing things.

2. **Government action to develop and innovate further the infrastructure to support vaccine adoption.** The current approach and infrastructure to enable adult vaccine immunization is underdeveloped and is unlikely to adequately support the adoption levels needed in the time frame aspired. Investments in new approaches (for example, at-home immunization, solving the economics for providers) that will be critical to addressing the challenges associated with the COVID-19 pandemic can also create lasting impact for the system in the long term.

3. **Healthcare providers and payers with vaccination at the top of their agendas.** The healthcare system sees COVID-19 vaccination as a civic duty, an act of responsibility—among the system's many other responsibilities in delivering diagnosis and treatment of COVID-19—to bring this pandemic to an end. Providers and payers have one of the most important roles to play in supporting vaccination, but realizing the full impact of this role will require them to prioritize vaccination, invest in it, and partner with governments and employers to make a step change in how to approach adult vaccination.

4. **Employer mobilization and action to support employees to get vaccinated.** Employers today express uncertainty about their roles in vaccination and are grappling with difficult questions about how to enable vaccination among their workforces. Many are searching for counsel on what to

do. There is an opportunity for employers to act now to engage employees—such as by addressing logistical and financial barriers to vaccination (for example, offering paid time off, reimbursing employees for costs incurred), sharing relevant information with employees to help them make informed vaccination decisions, and making vaccination as convenient as possible (for example, by offering on-site vaccination).

Within the context of these shifts, there are critical roles for each stakeholder group—and unique actions to take (Exhibit 3).

More than \$10 billion additional investments to support vaccine adoption

To date, the federal government alone has spent more than \$10 billion to address the supply-side challenges associated with a COVID-19 vaccine, including product development, manufacturing scale-up, and product acquisition.⁹ The US Department of Health and Human Services (HHS) has also partnered with

retail pharmacies to scale availability of COVID-19 vaccines to 60 percent of the pharmacies in the country, and to additionally deliver COVID-19 vaccination to long-term-care facilities.

Current investments in vaccine adoption are insufficient to support it at scale

The planned investment to support COVID-19-vaccine adoption is more modest. For administration, Medicare plans to reimburse providers \$28.39 to administer single-dose vaccines and, if two doses are needed, \$16.64 for the first dose and \$28.39 for the second.¹⁰ Medicaid typically reimburses at or slightly below Medicare rates, while private payers typically pay above Medicare rates. For education, HHS is leading two broad vaccine-education campaigns, including a \$250 million COVID-19-communications campaign called the “Building Vaccine Confidence” campaign (which is now ramping up), and the Centers for Disease Control and Prevention (CDC) “Vaccinate with Confidence” campaign. States have asked for \$500 million in federal funding to do COVID-19-vaccine outreach, but much of that money has not yet been allocated.

Exhibit 3

Key stakeholders can support vaccine adoption in different ways.

Potential actions for consideration



Government

- Define an adoption strategy, establish dedicated leadership, and allocate sufficient resources
- Prepare to measure adoption in all forms
- Engage and enlist a broad set of influencers
- Support the private sector to support adoption
- Amplify Medicaid's role in reaching at-risk populations
- Consider actions only government can perform (eg, accreditation, public events, policies)



Providers

- Make vaccination a business priority
- Set aspiration of high vaccination rates among current patients
- Prepare to deliver high levels of convenience
- Engage employed and affiliated clinical communities and strengthen their conviction
- Develop plan to proactively engage and educate existing patients
- Consider industry collaboration with benefit to society



Payers

- Make vaccination a business priority
- Adapt Medicare Advantage and Medicaid to engage members, consider in-home vaccination, address social barriers, and adapt provider incentives
- Support employers with messaging tool kits, enable or provide on-site vaccination, and leverage care-management infrastructure to engage employees and their families
- Consider industry-wide collaboration with benefit to society (eg, accreditation, public events, policies)



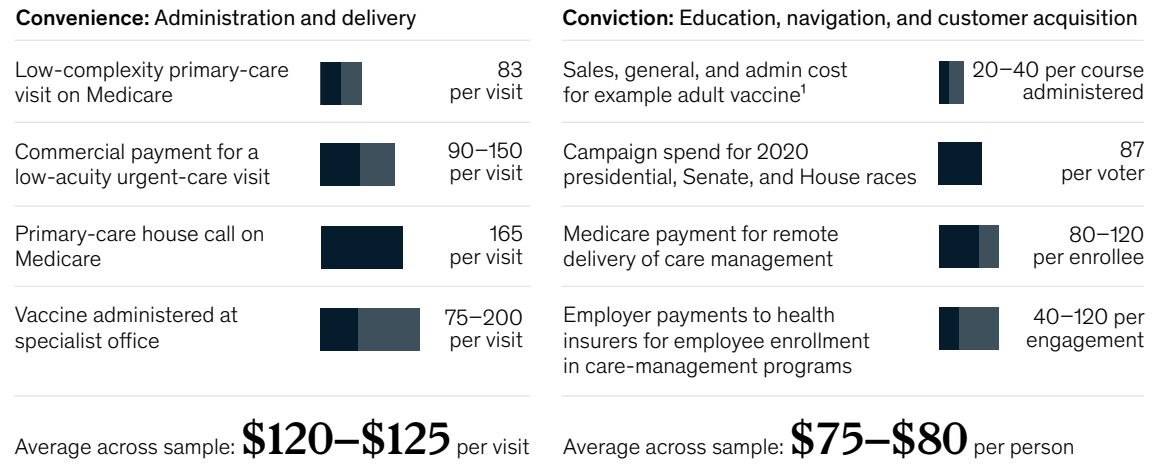
Employers/community

- Develop detailed plan to support vaccinations
- Amplify education and key messages in partnership with government and health-system actors
- Secure on-site vaccination or sponsor employees to take time off during the workday to be vaccinated (with pay)
- Address financial and logistical costs to vaccination (eg, transportation cost)
- Clarify what, if any, support from the government would help

Exhibit 4

Analogue investments to support convenience and cost for other health services suggest a range of \$80–120 per person.

Example spend to drive convenience and conviction in other healthcare services in the US, \$



¹Based on estimate of selling, general, and administrative spend of 10–20% of average price of flu, pneumococcal pneumonia, and zoster vaccines.

Our analysis suggests that this level of planned investment is unlikely to be sufficient. We looked to analogues to assess the level of investments that might be needed (Exhibit 4).

Administrative costs

Based on our analysis, the planned administrative fee level may be adequate to cover the cost associated with vaccine administration in existing settings with reasonably high volumes; however, it may not cover costs associated with more diverse clinical settings that would drive convenience for patients, nor does the administration fee fully compensate providers for conducting outreach to patients. For example, the commercial payments or reimbursement for more convenient forms of care, such as in-home care or urgent-care centers, can range from \$80 to \$165 per visit. Providers are also likely to consider the opportunity cost of vaccination (for example, the time to vaccinate that could have been used for other services), which we estimate at \$75 to \$200 per visit.

The recent experience with COVID-19-testing collection provides a case in point. Reimbursement for COVID-19-testing collection is approximately \$25 per test, a level that is broadly

in the range of Medicare's reimbursement levels for COVID-19 vaccination. That approach has not led to high conviction, convenience, or costlessness. In fact, there is significant anecdotal evidence that many consumers have faced an insufficient number of collection sites, ambiguity around out-of-pocket costs, long wait times, and inconsistent education. These challenges are likely part of the reason why, according to our research, only 36 percent of people with symptoms of COVID-19 even attempt to get tested.

Education and outreach

Several analogues suggest how expensive it is to motivate action among consumers. For example, vaccine manufacturers commonly spend between 10 and 20 percent of their revenues on selling, general, and administrative costs to market and sell their vaccines. For a \$200 vaccine (such as pneumococcal conjugate vaccines, some of the most widely used vaccines among adults aged 65 and older), this would amount to \$20 to \$40 per person vaccinated to educate them and their physicians. When payers or providers are paid directly to educate patients or achieve a specific outcome, payment is typically in

the range of \$50 to \$150 per person per outcome. Although these levels of per-person investment may be practically too high if we extrapolated them to 100 million people, they highlight that the current spending on education and adoption, which, by our count, is in the range of about \$5 per uncertain American, is far short of what might be needed to engage and educate consumers fully.

Investing for maximum effect

Although no analogue is perfect, and it is difficult to predict exactly how much investment could be needed to build conviction, offer convenience, and achieve costlessness for 100 uncertain Americans, the analogues in Exhibit 4 do offer reference points. If we make the assumption that each uncertain person will require some support (be it on conviction, convenience, or cost), and we take the lower end of the analogues, we estimate the lower end of the investment range to be \$80 per person. Given the scale of the COVID-19 vaccination context, we took a conservative estimate of the upper end of the investment of \$120 per person, as there are likely to be

scale efficiencies relative to the analogues. This upper end, which is equivalent to the \$120 per visit cost of the convenience analogues, assumes that some but not all people would benefit from investments in convenience (for example, 50 percent of people prefer to receive their two vaccine doses at alternative sites of care). These assumptions lead us to a top-down estimate of an incremental investment of \$80 to \$120 (and possibly more) per uncertain person, or about \$8 billion to \$12 billion to support adoption among 100 million uncertain Americans (Exhibit 5).

This approximately \$10 billion-plus amount in potential societal investment could be deployed to encourage favorable private-sector behaviors and to fund government-led actions. Some examples include the following:

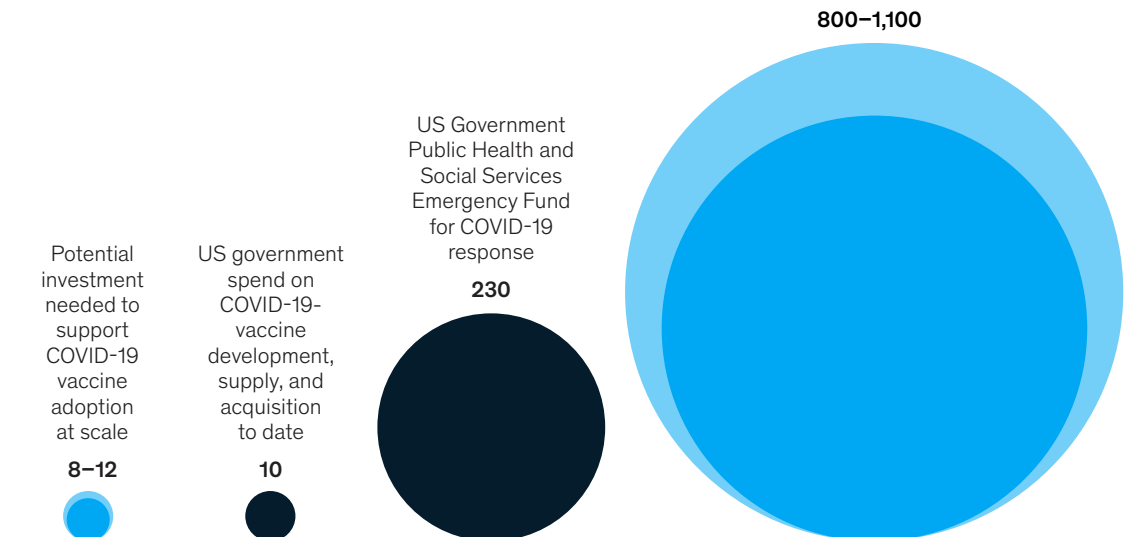
- Increase and possibly make variable the administration fee to providers to improve patient convenience (such as more staff to reduce wait times, more flexible hours, and at-home offerings) and to encourage them to educate and engage their patients proactively. The government or health insurers could create performance bonuses based

Exhibit 5

Investing to support COVID-19-vaccine adoption could have outside economic impact.

Investment and potential return, \$ billion

Difference in US GDP between partially effective regional vaccine adoption vs widespread national vaccine adoption



Source: Oxford University; US Department of Health and Human Services; US Government Accountability Office; McKinsey

on operational metrics (for example, wait times) and patient-vaccination rates.

- Offer payers support to educate and engage members and support employers in patient engagement. Payers have the most scaled at-home capability to drive convenience for those who prefer to be vaccinated at home. Possible performance incentives could be, for example, in the form of higher Star Ratings to Medicare Advantage plans with higher vaccine-adoption rates.
- Support pharmacies to scale convenient COVID-19-vaccine services to the remaining 40 percent of operators, likely more independent pharmacies. This could be pursued through upfront funding to increase pharmacist capacity but also supplemented with performance-based funding for pharmacies that have relatively higher vaccination rates. A logical focus would be pharmacies that serve traditionally underserved populations.
- Fund private community-based organizations to do outreach and education at a local level. Such outreach could be especially effective in engaging underserved communities that may have less exposure to broad public-health campaigns.
- Additional investment could also be used to underwrite the creation of the actions and

interventions that governments are exclusively able to perform described in the previous section (such as state-specific registries, “vaccine accreditation,” and high-volume sites).

This incremental investment must be considered in the context of the impact on lives and livelihoods. As we noted earlier, achieving herd immunity through vaccine adoption at scale could mean the difference between a partially effective or regionalized response to the COVID-19 pandemic and a highly effective control. The latter economic scenario would bring forward the return of GDP to where we were at the end of 2019 by three to six months, amounting to approximately \$800 billion to \$1.1 trillion in additional GDP by the end of 2022. It is worthwhile to invest now to increase the probability of a confident and rapid economic recovery and to simultaneously build the infrastructure to support broader adult vaccination.

It’s easy to contend that, with the recent clinical-trial results, Americans will adopt COVID-19 vaccines at scale. However, many facts suggest otherwise. Now is the moment of truth for leaders across public and private sectors to work together—and invest—to support vaccine adoption at a scale that puts the United States quickly and firmly on the path to societal and economic recovery.

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This article was edited by David Schwartz, an executive editor in the Tel Aviv office.

¹ Sarun Charumilind, Matt Craven, Jessica Lamb, Adam Sabow, Shubham Singhal, and Matt Wilson, “When will the COVID-19 pandemic end?,” August 23, 2021, McKinsey.com.
² Aliza Apple, Tara Azimi, and Jenny Cordina, “COVID-19 vaccine: Are US consumers ready?,” December 10, 2020, McKinsey.com.
³ “How Americans report feeling about COVID-19 vaccinations,” July 16, 2021, covid-tracker.mckinsey.com.
⁴ For a summary of the history of free-rider challenges across different vaccines, see Tammy Leonard, et al., “Do traditional economic theories of free riding behavior explain spatial clustering of HPV vaccine uptake?” *SSM: Population Health*, August 2019, ncbi.nlm.nih.gov.
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⁶ Jan Hoffman, “How anti-vaccine sentiment took hold in the United States,” *New York Times*, September 24, 2019, nytimes.com.
⁷ David Crow and Kiran Stacey, “Why is the ‘anti-vaxxer’ movement growing during a pandemic?,” *Financial Times*, August 20, 2020, ft.com.
⁸ Rory Smith et al., “Under the surface: Covid-19 vaccine narratives, misinformation and data deficits on social media,” *First Draft News*, November 12, 2020, firstdraftnews.org.
⁹ Investments to date include approximately \$10 billion for R&D and manufacture for several COVID-19-vaccine candidates, some \$10 billion more for the vaccine product (booked through prepurchase deals), and about \$500 million for vaccine supply chain through the Biomedical Advanced Research and Development Authority.
¹⁰ Payers plan to reimburse providers for the administration costs associated with COVID-19-vaccine delivery in line with historical precedent and those associated with other vaccines. The Centers for Medicare & Medicaid Services (CMS) states that “these rates recognize the costs involved in administering the vaccine, including the additional resources involved with required public health reporting, conducting important outreach and patient education, and spending additional time with patients answering any questions they may have about the vaccine.” Commercial payers and those involved in Medicaid typically follow Medicare policy and will likely offer similar administration fees. “Medicare COVID-19 vaccine shot payment,” CMS, December 3, 2020, cms.gov.

On pins and needles: Tracking COVID-19 vaccines and therapeutics

Gaurav Agrawal, Michael Conway, Jennifer Heller, Adam Sabow, and Gila Tolub

February 18, 2021

In this update, we track the progress of COVID-19 vaccines and therapeutics as new clinical data and virus variants emerge.

Since we shared our perspectives on COVID-19-vaccine development in July 2020, the pandemic has grown in proportion across most of Europe and North America, with more than a million new cases every two days, and more than 10,000 deaths per day. Even communities that managed to flatten the curve in the spring and summer of 2020 found themselves backsliding in the fall. The loss of lives and livelihoods has been devastating—and that isn't over yet—but there are some reasons to be cautiously optimistic about global recovery, not the least of which is the progress made to date on the pursuit of vaccines and other treatments for the novel coronavirus (SARS-CoV-2).

At least six vaccine manufacturers and two antibody-medicine manufacturers have shared preliminary results on the efficacy of their products—data that have outperformed the initial expectations of most experts. Already, the first vaccinations have been administered in more than 50 countries, including Brazil, Canada, China, India, Israel, Russia, the United Arab Emirates, the United King-

dom, most countries in western Europe, and the United States. Such progress has instilled hope in many that vaccines may, indeed, “save the world.”

But while COVID-19 vaccines will almost certainly be one of the most critical tools for moving the world toward an epidemiological end to the pandemic, they will likely not be the only ones: diagnostics, antibody medicines, and other therapeutics will be important complements. A lot of work must also be done to ensure sufficient vaccination coverage for communities to reach herd immunity. “Sufficient” coverage would be between 60 and 70 percent of the population, although the figures are now possibly higher, given the emergence of new, more easily transmitted variants of SARS-CoV-2.¹

In this article, we review the initial results from clinical trials of COVID-19 vaccines and explore several remaining uncertainties that are relevant to stakeholders across the globe: How many doses will we have and by when? How will the logistics work for distribution and administration? And, critically, will consumers agree to be vaccinated?

Initial data from clinical trials

COVID-19-vaccine candidates from BioNTech and Pfizer (in partnership) and from Moderna have demonstrated a rate of about 95 percent protection from infection with symptoms after two doses are

Exhibit 1

These are the data available on Phase III trials for several vaccine candidates.

		Moderna	Pfizer/ BioNTech	AstraZeneca	Johnson & Johnson	Gamaleya National Center	Novavax
Technology		mRNA	mRNA	Viral vector	Viral vector	Viral vector	Protein subunit
Dose schedule		2 doses, 4 weeks apart	2 doses, 3 weeks apart	Varies by trial arm: • 2 full doses, 4 weeks apart • 1 half dose and 1 full dose, 12 weeks apart	1 dose	2 different doses (with different viral vectors), 3 weeks apart	2 doses, 3 weeks apart
Efficacy	Symp-tomatic infection	94%	95%	70% across dosing regimens 90% for a half dose plus a full dose 62% for 2 full doses	66% overall and by region: US: 72% Latin America: 66% South Africa: 57%	92%	UK ¹ : 89% South Africa ² : 49% overall 60% in population that was HIV negative
	Severe disease	100%	89%	100%	85% (28 days) 100% (49 days)	100%	100% (consistent across regions)
Thermo-stability		-20°C shipped/stored for 6 months; 2-8°C for 30 days	-70°C shipped/stored for 6 months; 2-8°C for 5 days	2-8°C for 6 months	2-8°C for 3 months; -20°C for 2 years	-18°C	4-8°C

¹New variant B.1.1.7 was detected in more than 50% of confirmed positive cases.

²More than 90% of confirmed cases were B.1.351 variant.

Source: AstraZeneca; Bloomberg; clinicaltrials.gov; FDA; *Guardian*; J&J; Moderna; Novavax; Oxford University; Pfizer; WBUR

administered several weeks apart.² Additionally, a vaccine candidate from AstraZeneca has demonstrated a range of efficacy that depends on the trial protocol: 90 percent for a half plus a full dose, 62 percent for two full doses, and 82 percent for two full doses with a longer interval between them.³ Recent reports from Johnson & Johnson and Novavax have also been encouraging. Johnson & Johnson demonstrated that its single-dose vaccine confers 66 percent immunity against infection in a multiregion, multivariant data set, with 72 percent efficacy in the United States, 57 percent in South Africa, and 66 percent in Latin America. It also demonstrated 85 percent (28 days) and 100 percent (49 days) efficacy against severe disease.⁴ A vaccine

candidate from Novavax demonstrated efficacy of 89 percent in a UK trial and 49 percent in a South Africa trial⁵ (Exhibit 1).

Specific ranges of efficacy vary among these vaccine candidates, but each has demonstrated an efficacy of at least 85 percent against severe disease.

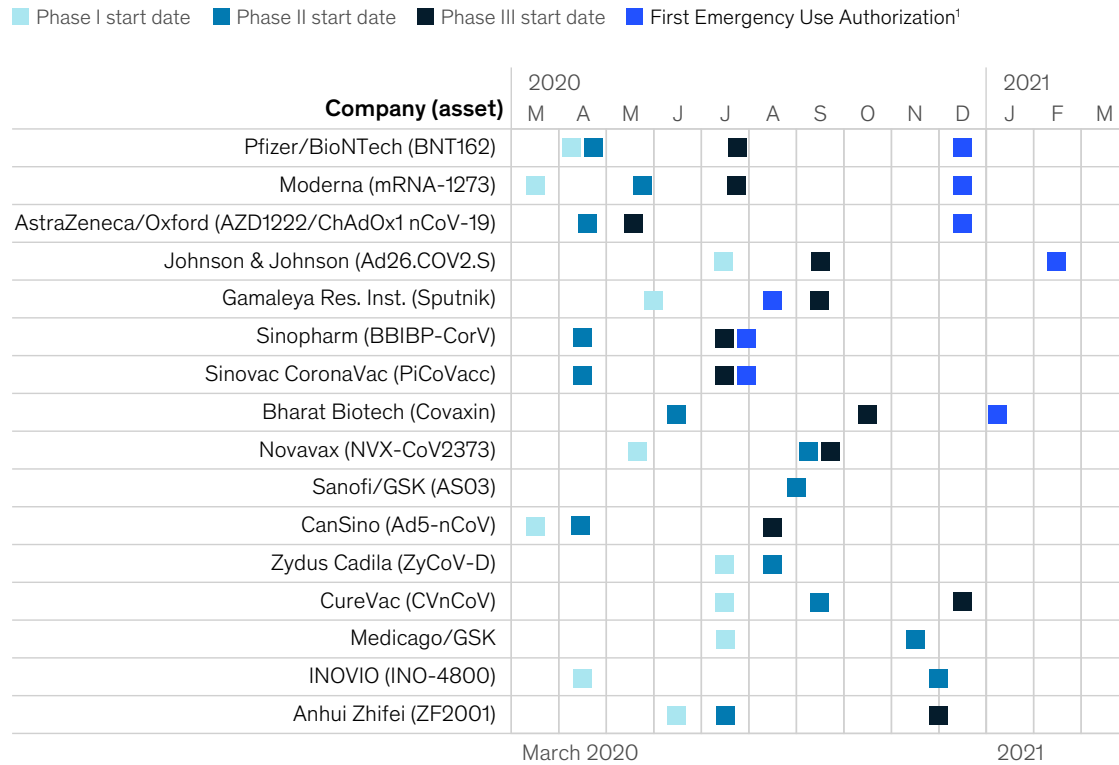
This is all good news for several reasons: individuals will benefit from the health protection offered by the vaccine, the positive outcomes may encourage others to get vaccinated, and the proportion of the population required to reach herd immunity may be reduced.

It's increasingly probable that multiple COVID-19 vaccines will be available in the coming months. Among others, CureVac,

Exhibit 2

Multiple vaccines are authorized; additional candidates may receive Emergency Use Authorization in the first quarter of 2021.

Clinical-trial timelines for vaccine candidates



[†]The geography in which the first Emergency Use Authorization was granted varies by vaccine. Source: BioCentury; clinicaltrials.gov; Milken Institute COVID-19 Treatment and Vaccine Tracker; press search

GlaxoSmithKline and Medicago (in partnership), and Inovio all have COVID-19-vaccine candidates in late-stage development (Exhibit 2). Several COVID-19-vaccine candidates from China, India, and Russia are also in late-stage development. For instance, in an interim analysis of data from a Phase III trial reported in *The Lancet*, the Sputnik V vaccine from the Gamaleya National Center of Epidemiology and Microbiology showed overall efficacy of 92 percent.⁶

None of the leading COVID-19 vaccine candidates reported serious side effects during clinical trials, but additional safety data are being collected, as required by regulatory guidelines for licensure. For example, during the initial rollouts in the United Kingdom, the United States, and

other markets of the COVID-19 vaccines from Moderna and Pfizer–BioNTech, there were some rare reports of anaphylaxis (2.1 cases per million and 6.2 cases per million, respectively, based on preliminary data), which led regulators to recommend that any person with a history of anaphylaxis related to food, a medicine, or a vaccine not receive the two COVID-19 vaccines.⁷

Additionally, it remains to be seen how long the protection from COVID-19 achieved by the vaccines will last. And because the trials haven't yet included children, it isn't known whether the efficacy will be comparable in those younger than the age of 18 years. More information will be revealed as the sample size grows and an increasingly diverse population is inoculated.

It's becoming increasingly clear that COVID-19 vaccines will play a crucial role in controlling the pandemic.

There has also been progress on the development of therapeutics for COVID-19. In November 2020, for instance, Eli Lilly's antibody medicine bamlanivimab was granted Emergency Use Authorization (EUA) by the US Food and Drug Administration. In clinical trials, it had demonstrated a 72 percent reduction in the rate of hospitalizations and emergency-department visits.⁸ Additionally, Regeneron Pharmaceuticals submitted its antibody cocktail REGN-COV2 for EUA in October 2020. In trials, the therapy had demonstrated a tenfold reduction in viral load, on average, and a 57 percent reduction in COVID-19-related medical visits.⁹ Those and other antibody medicines in development are part of a growing assortment of treatments and protocols related to COVID-19 that, collectively, could reduce mortality among hospitalized patients by between 18 and 30 percent.¹⁰

Additionally, it will be important to monitor the efficacy of vaccines and therapeutics against new variants of SARS-CoV-2 that have been identified in Brazil, South Africa, the United Kingdom, and other regions and that have in some geographies become the predominant strain. Multiple COVID-19 vaccines have demonstrated immune response to variant B.1.1.7, which was first identified in the United Kingdom. However, the B.1.351 variant, which was first identified in South Africa, has generated more concern in the scientific community; preliminary lab and clinical data across multiple vaccine candidates suggest that efficacy against this strain could be lower. Multiple vaccine manufacturers have reported preliminary data showing a severalfold reduction in antibody neutralization potency against the B.1.351 variant and relatively lower vaccine efficacy in

trials taking place in South Africa—for example, 50 to 60 percent efficacy in South Africa trial data versus 70 to 90 percent efficacy in trial data in regions where B.1.351 is not predominant.¹¹ This variant has also demonstrated evasion from the antibodies generated by natural infection (which are present in convalescent sera) and monoclonal-antibody therapies, suggesting the possibility of reinfection and limited effectiveness of the therapeutics currently available.¹²

Remaining uncertainties

It's becoming increasingly clear that COVID-19 vaccines will play a crucial role in controlling the pandemic.¹³ As vaccines' role in saving the world expands, the baton passes from vaccine manufacturers to governments and local jurisdictions to assess what else will be required to move from having an approved vaccine to completing large-scale inoculation. Through research and conversations with health-care experts in the field, McKinsey has identified several critical elements of an effective vaccination program as well as some of the remaining uncertainties associated with each¹⁴ (Exhibit 3).

Specifically, vaccines and the mechanisms for administering them must include the following features:

- **Available.** Will there be enough of the vaccine to inoculate the world and reach herd immunity?
- **Administrable.** Who will get the vaccine first, and where will it be available?
- **Accessible.** How will the logistics of the vaccine be managed, particularly if it has complex, cold-chain requirements?

- **Acceptable.** Will consumers (especially those at highest risk of contracting a severe form of the disease) have trust and conviction to get vaccinated?
- **Accountable.** What would a closed-loop surveillance system look like to build more confidence in the long-term safety of the vaccine?

Questions about availability and capacity are front of mind for many who have been facing direct and indirect health risks and economic shock related to the COVID-19 pandemic. The foresight (and urgency) shown by the biopharmaceutical industry, major donors, multilateral organizations, and governments allowed innovators to scale up the manufacturing capacity for COVID-19-vaccine candidates even before much was known about their safety and efficacy. The potential outcomes of those at-risk investments are now beginning to come into focus.

Will there be enough of the COVID-19 vaccines for the world?

If all COVID-19-vaccine innovators are successful in clinical trials, and if manufacturing commitments to scale up hold true, there may be enough capacity to vaccinate nearly 80 percent of the global population against COVID-19. According to manufacturers' public announcements, more than 14 billion doses' worth of capacity (including 2020 capacity) is planned for 2021 (Exhibit 4). Assuming that all innovators' vaccines are successful and require two doses (dosing remains uncertain for some of the vaccine candidates), full COVID-19-vaccine courses could be available for six billion individuals—approximately the size of the entire global adult population.

It may not be realistic to assume that every COVID-19-vaccine candidate will succeed. Some haven't made it through clinical trials

Exhibit 3

An effective COVID-19 immunization strategy addresses each component of vaccine adoption.

Key activities of vaccine adoption

Available	Administrable	Accessible	Acceptable	Affordable	Accountable
Vaccine is approved and in sufficient supply to reach the population.	Appropriate individuals can receive vaccination at convenient locations.	Vaccine is distributed and stored for use.	Consumers have accurate information they trust, and they choose to be vaccinated.	Costs of vaccine and administration are amenable to both payers (public/government and private) and consumers.	Patients receive full course of treatment, and monitoring is in place on postlaunch outcomes.
Technology portfolio and access	Population segmentation	Ordering	Public communications, messaging, and education	Funding	IT infrastructure and interoperability
Tech transfer and drug substance manufacturing	Vaccination dispensing strategy	Logistics, transport, and warehousing	Healthcare workforce education	Reimbursement strategy	Ongoing monitoring and reporting
Upstream/downstream sourcing and manufacturing					
Public-policy planning					

to the level of EUA; others still need to collect more data for Biologics License Application reviews in the first and second quarters of 2021. The vaccine manufacturers' capacity estimates may also be over- or understated, depending on whether in-process or planned increases were reported.

Global scale-up of the manufacturing capacity for COVID-19 vaccines will likely occur over the course of 2021. The details are still emerging, but innovators' estimates suggest that manufacturing capacity will ramp up over the course of 2021. In the first half of 2021, the United States is likely to have around 500 million doses of the Johnson & Johnson, Moderna, and Pfizer–BioNTech vaccines, based on the reported delivery deadlines.¹⁵

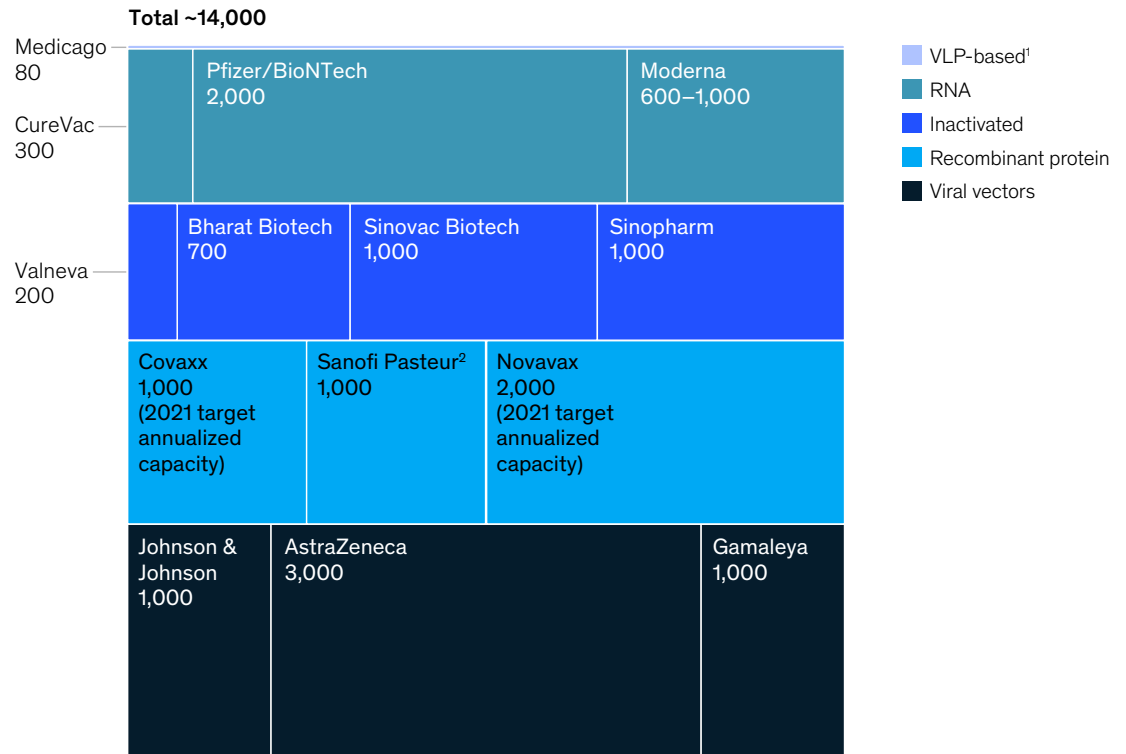
Given the contracted volume from those manufacturers, there will be sufficient vaccine doses available in the United States by the end of May for at least 300 million people—enough doses to immunize 100 percent of the adult population (Exhibit 5). AstraZeneca announced it will have enough capacity to produce 700 million doses of its COVID-19 vaccine for *global* distribution in the first quarter of 2021 and the remainder of its three billion doses later in the year.¹⁶

Depending on the success of COVID-19-vaccine candidates in late-stage development, the range of capacity scenarios may change. As mentioned previously, it's unlikely that all the vaccine candidates will be successful. Some developers have already

Exhibit 4

Public announcements indicate target global vaccine-manufacturing capacity of more than 14 billion doses by end of 2021.

Publicly announced vaccine-manufacturing capacity, million



¹Virus-like particle.

²Target capacity announced prior to announced plan to launch new Phase II trial with improved antigen formulation. Source: BioCentury; clinicaltrials.gov; Milken Institute; Nature; WHO

experienced setbacks (for example, the need to reformulate vaccines for certain populations) during late stages that have delayed their vaccine-development timelines. But even if we assume that only a few candidates will succeed and see broad uptake (for example, those vaccines that are currently authorized for emergency use or

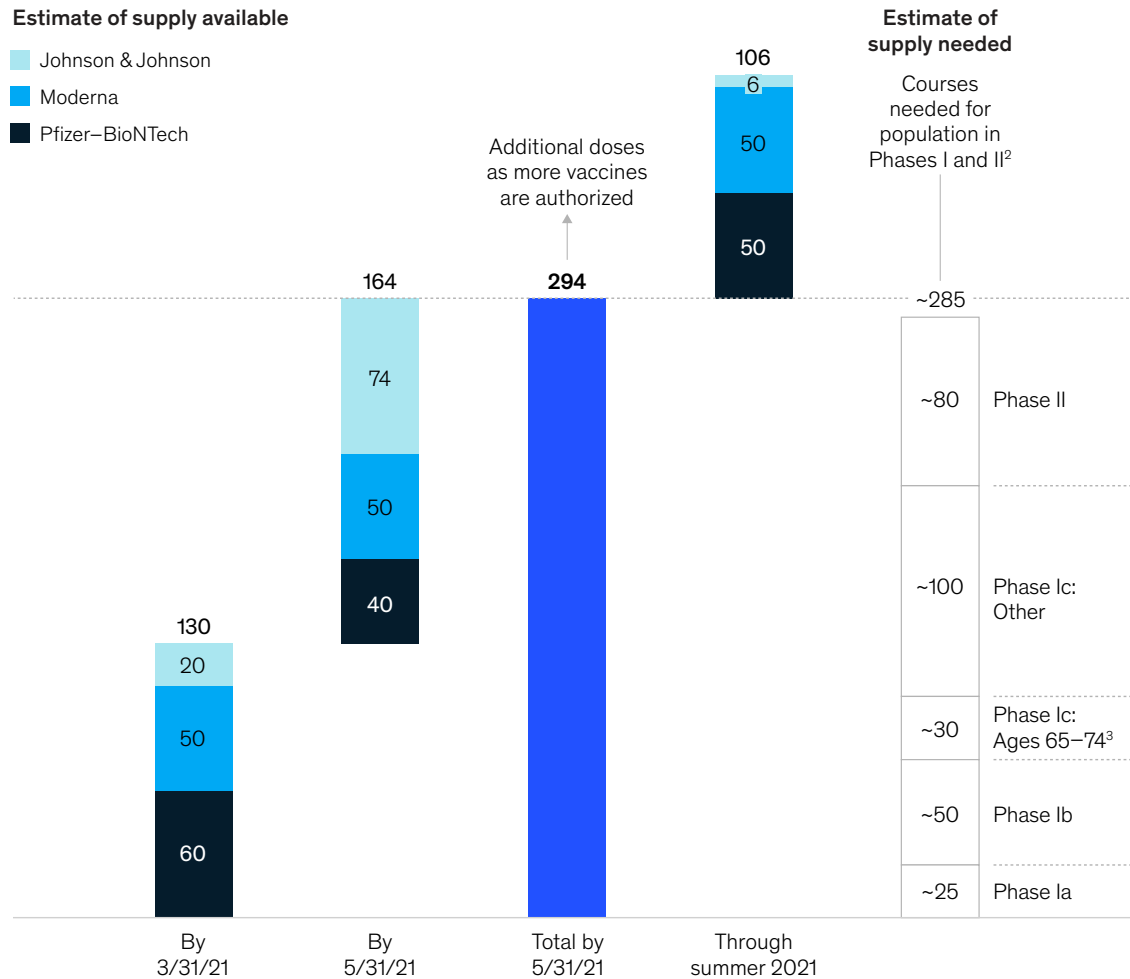
under review by the EU European Medicines Agency and the US Food and Drug Administration), there would be capacity to manufacture between 5 billion and 6 billion doses in 2021—enough to inoculate approximately 40 percent of the global population.

Moreover, if we assume the ultimate success of all vaccines currently authorized

Exhibit 5

Manufacturers have committed to deliver millions of COVID-19 vaccine doses in the United States.

Delivery commitments for vaccines with Emergency Use Authorization in the United States, millions of courses¹ (illustrative)

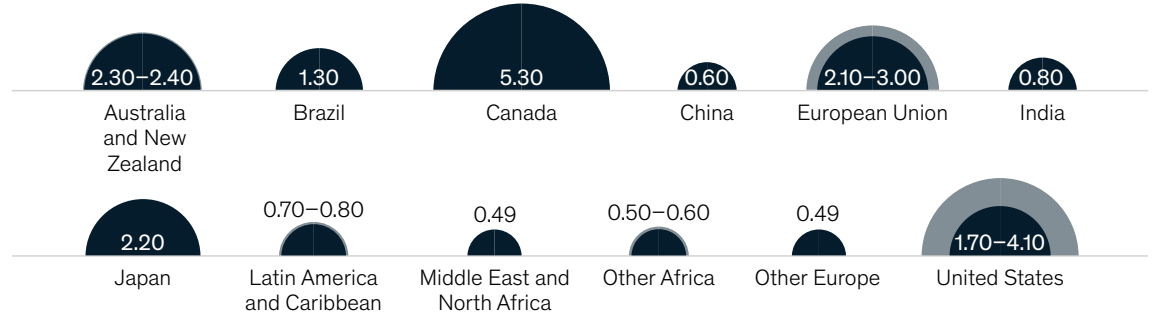


¹Two doses needed per person per course for Pfizer–BioNTech, Moderna vaccines; one dose per person per course for Johnson & Johnson vaccine.
²According to CDC ACIP interim recommendations (December 22, 2020), will vary as individual states are making their own decisions (CDC Phase Ia = healthcare personnel, long-term care-facility residents; CDC Phase Ib = frontline essential workers, persons aged ≥75 years; CDC Phase Ic = persons aged 65–74 years; persons aged 16–64 years with high-risk medical conditions; essential workers not recommended for vaccination in Phase Ib); Phase II estimate based on 2019 census population estimate of persons aged ≥16, less population accounted for in CDC estimates of persons covered in Phase Ia–c; CDC and Operation Warp Speed vaccination guidelines may evolve over time.
³Phasing and distribution strategy may change based on recent statements from the US Department of Health and Human Services.
 Source: Bloomberg; CDC; CNBC; Moderna; Pfizer; Reuters; US Department of Health and Human Services; *Wall Street Journal*

Exhibit 6

An overview of publicly announced supply contracts.

Course¹ per population ratio, publicly announced supply contracts, by region, nonexhaustive



¹Calculation assumes 1 course equals 2 doses for all vaccines except Johnson & Johnson, for which 1 course = 1 dose. Source: BBC; Bloomberg; *Economist*; FiercePharma; FOPH Switzerland; GlobalNews; Pharmaceutical Technology; Reuters; The Marker; UPI; company press releases

or under review in at least one geography, there should be capacity to manufacture approximately 12 billion doses of COVID-19 vaccines by the end of 2021—enough to vaccinate 85 percent of the global population.

There may be sufficient manufacturing capacity for global COVID-19-vaccine coverage, but individual countries' contracted doses vary significantly. Most of the global capacity for COVID-19-vaccine manufacturing (more than seven billion doses) has been contracted and reserved by individual governments and institutions, although COVAX recently announced that it had arrangements in place to access nearly two billion doses of COVID-19-vaccine candidates on behalf of 190 participating economies (Exhibit 6). Country-specific agreements vary significantly, depending on the region and the relative size of population.¹⁷

In fact, it's possible that a significant number of countries—particularly those with wealthier economies—have contracted doses that exceed the needs of their populations. We haven't even accounted for the possibility that some countries won't vaccinate recovered patients or that not every targeted citizen will choose to receive a vaccination.

Government leaders must consider how to manage the excess doses that will likely be available around the middle of 2021 to address the global challenge.

What other challenges remain?

Even as questions about COVID-19-vaccine availability and capacity become more clear, it will be critical in the coming months to monitor progress in other areas of vaccine development. Global attention is already shifting to the challenges associated with vaccine rollout and consumer adoption. Other underlying questions will also need to be addressed in the background, including those related to long-term safety, duration of protection, efficacy after the first dose of a multidose course (recent data show that some COVID-19 vaccines may be somewhat effective after only one dose¹⁸), impact of the vaccine on transmission of the virus, and efficacy in specific patient populations, including the pediatric population. To reach the ideal vaccine profile—that is, a single dose with an impeccable record of long-term safety, extended duration of protection (ideally, five years or longer), and high efficacy against the disease—it will be critical for developers and other key stakeholders to make progress in several areas.

Realizing a pipeline of COVID-19 vaccines

The early success of the first few COVID-19-vaccine candidates is exciting, but the world will likely need additional, next-generation candidates in the pipeline to provide additional capacity. The vaccines that may become part of endemic vaccination in a country's schedule may need to optimize for the other parameters (for example, dosing and duration of protection) as much as—or perhaps more than—they do for efficacy.

Shifting the paradigm of COVID-19-vaccine development

It will become difficult to recruit patients for clinical trials of the next generation of COVID-19 vaccines once the current vaccines with EUA are rolled out. Even if COVID-19 vaccines aren't available for everyone immediately, some segments of the population are likely to wait a few weeks or months to get a vaccine that demonstrates 95 percent efficacy rather than enroll in a trial with a 25 to 50 percent chance of them receiving a placebo (or a 50 to 75 percent chance of them receiving a vaccine of uncertain efficacy).

For future COVID-19-vaccine candidates, ethics guidelines may also recommend a head-to-head comparison with existing vaccines, which would make clinical trials operationally challenging, requiring hundreds of thousands (if not millions) of patients to reach efficacy endpoints comparable to a vaccine with 95 percent efficacy. Regulators will need to think through that dilemma in short order and provide guidance in the absence of defined correlates of protection.

Monitoring and adapting to emergent SARS-CoV-2 variants

Key COVID-19-vaccine stakeholders will need to continue to monitor and adapt to the new SARS-CoV-2 variants emerging across the globe to respond effectively. COVID-19-vaccine manufacturers should continue to rapidly test (for example, in nonclinical assays and animal models)

the effectiveness of their vaccines in provoking an immune response to new variants. Manufacturers have already announced new development plans in response to emerging variants. These include booster doses, new stand-alone vaccines matched to the new variants, and multivalent vaccines designed to confer immunity to multiple strains in one product.

For governments, health systems, and other stakeholders involved in immunization, the potential proliferation of vaccine products in response to new strains would create more complexity across the value chain (for instance, in procurement, administration, and manufacturing-capacity management).

Freeing up the production capacities and supply chains related to COVID-19 vaccines

Some COVID-19-vaccine manufacturers have aggressively partnered to ramp up their production capacities across geographies. Technology transfer at the required scale and in such a compressed time frame is complicated, and it's far from a done deal that it will work as intended. Governments, manufacturers, nongovernmental organizations, and others will need to deploy creative solutions to resolve issues or bottlenecks—for instance, by creating a knowledge-management infrastructure and applying digital tools and advanced analytics to technology transfers.¹⁹ Indeed, given the requirements of several of the COVID-19 vaccines, supply chains will likely present some challenges for manufacturers in low- and middle-income countries.²⁰ The infrastructure may not allow for large-scale distribution of a vaccine that requires the long-term, complex, cold-chain storage required by some mRNA vaccines.

Addressing the uncertainties about COVID-19 vaccination

Even if the R&D and supply-chain challenges related to COVID-19 vaccines are

resolved, the impact of the vaccines on the course of the pandemic is contingent upon equitable consumer access and adoption. Consumer-sentiment surveys in the United States show that around 100 million Americans don't sufficiently trust the vaccine-development process and are uncertain or ambivalent about getting vaccinated in the first six months following initial availability.²¹ To put the world on a path to societal and economic recovery, it will be critical to have public- and private-sector support for at-scale COVID-19-vaccine adoption.²²

There's clearly lots to cheer about when it comes to COVID-19-vaccine development, but there is just as much to ponder as the situation evolves. In the face of continuing ambiguity, it's important for all participants in the healthcare ecosystem to provide scientific and regulatory environments that will allow the further development of the vaccine pipeline; effective technology transfer, manufacturing, logistics, and distribution; and increased and equitable uptake by consumers. They all remain daunting challenges for the largest-ever public-health intervention in history.

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‘None are safe until all are safe’: COVID-19 vaccine rollout in low- and middle-income countries

Stephen Hall, Leah Kaplow, Ying Sunny Sun, and Tania Zulu Holt

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Despite persistent supply issues, in-country delivery and demand for COVID-19 vaccines is likely to be the next challenge for LMICs.

High-income countries (HICs) around the world have been deploying mass COVID-19 vaccination programs at varying speeds since December 2020. As of April 19, 2021, more than 500 million people worldwide had received at least one dose, a majority of HICs had administered at least one dose to over 20 percent of their populations, and a few outliers had provided at least one dose to well over 50 percent.¹

But in low- and middle-income countries (LMICs), the situation looks quite different. A large number of LMICs were yet to administer an initial dose to 1 percent of their populations as of April 19,² presenting a risk not only to their residents but also to global progress in preventing the spread of potential variants. As the global initiative on COVID-19 Vaccines Global Access (COVAX) stated: “With a fast-moving pandemic, no one is safe, unless everyone is safe.”³

In early March, COVAX announced the expectation to make some 1.8 billion doses available to Advanced Market Commitment countries by the end of 2021, corresponding to coverage of roughly 28 percent of those countries’

populations.⁴ Outside of COVAX, some LMIC regions and countries have secured additional doses through agreements with specific manufacturers.⁵ Now, the challenge is how to scale access, manage uncertainty amid new streams of information (for example, vaccine efficacy against variants or evolving safety profiles), and ensure vaccines distributed can effectively reach their target populations.

Globally, sizable attention has been paid to supply challenges for LMICs. Much less time and resources have been dedicated to in-country delivery of and demand for vaccines, which may quickly become the bottleneck as supply ramps up. Five critical factors LMICs can consider when designing rollout programs for COVID-19 vaccination include:

1. **Robust and efficient central nerve centers** are critical to drive target-setting made by policy makers, scenario planning, roadmap development, and decision making; oversee implementation; manage uncertainty; and conduct performance management of in-country vaccine rollout.
2. **Specific and robust in-country delivery strategies can drive effective rollout**, taking into account unique challenges and opportunities to ensure the availability, administration, accessibility, acceptability, and affordability of the vaccines, as well as the system’s accountability for rollout effectiveness.

3. *Agile strategies can adapt to evolving (and sometimes unpredictable) supply and demand dynamics.* Even though the idea of having significant supply in LMICs may seem like a remote scenario in the near term, countries need to actively plan for scaled supply so that their absorptive capacity does not become the bottleneck.
4. *LMICs may be able to leverage existing strengths from past experiences with immunization campaigns and outbreak response, while being mindful of ways in which COVID-19 vaccine rollout strategies could potentially disrupt ongoing immunization programs.* LMICs are facing a secondary health crisis, compounded by the pandemic, having seen major disruptions in routine immunization (with 2020 coverage levels dropping to those not seen since the 1990s)⁶ as well as in other health services (with increasing health burdens and excess deaths across major disease categories throughout the pandemic, in many cases exceeding deaths from COVID-19).⁷
5. *COVID-19 vaccination strategies can go beyond a one-time, siloed approach.* Efforts can intentionally build health system capacity and resiliency, strengthening traditional immunization efforts or other health services, such as through investments in delivery infrastructure, demand-creation activities, and new digital systems.

National and global healthcare stakeholders considering these five factors can develop actions to help more citizens receive the COVID-19 vaccine more effectively.

Critical strategic decisions for LMIC rollout of COVID-19 vaccines

Large amounts of funding are being dedicated to the procurement of COVID-19 vaccines for LMICs (although doses

procured to date are still not sufficient to cover LMIC populations), but far less is being invested in planning for and implementing in-country rollout. COVAX's recent reports indicate a cost for in-country vaccine rollout of roughly \$1.5 per dose in order to deliver vaccines to cover the first 20 percent of populations, not including the cost of the healthcare workforce. Of this, COVAX has estimated that approximately \$1 per dose would need to come from sources other than COVAX (for example, domestic, bilateral, or multilateral sources) at an estimated total of \$1.3 billion.⁸ COVAX already expects to provide more than 20 percent population coverage by the end of 2021, and many LMICs have sourced additional doses through regional and bilateral deals, so the total rollout funding requirement for 2021 alone could be substantially higher than this. Although the World Bank's \$12 billion lending programs could theoretically be leveraged for vaccine delivery activities, it is yet unknown whether countries will choose to use this financing mechanism.⁹

LMICs tend to have less well-resourced vaccination delivery systems to begin with, with more limited access to warehousing, cold-chain equipment, distribution capacity, dedicated staff, and needed information technology systems. Furthermore, LMICs will need to reach uniquely hard-to-serve populations, which can include:

- *Informal economies.* Large portions of LMIC economies are informal, including many workers with high exposure risk (for example, street vendors) or those employed by small and medium-size enterprises. These workers can be much more challenging to reach than those who work for larger, more formal employers in HICs.
- *Rural communities.* Many LMICs have substantial rural populations (LMIC urbanization rates are around 51 per-

Vaccine administration may be harder in rural communities, especially to ensure second dose provision.

cent, and only 33 percent in low-income countries, compared with 66 percent in upper-middle income countries (UMICs) and 81 percent in HICs).¹⁰ Rural populations can be much harder to reach (both logistically—limited infrastructure, transportation difficulties—and because of poor health coverage) and present serious efficiency obstacles for a mass vaccination program, including limited ability to host a single vaccination site that can reach a substantial population, vaccine utilization problems for multi-dose vials that need to be fully used in a short period of time, and follow-up challenges for those requiring a second dose. These challenges may require more labor-intensive vaccination outreach, which can be problematic for multidose vials that need to be fully used in a short period of time. Vaccine administration may be harder in rural communities, especially to ensure second dose provision.

- *Transient populations and humanitarian situations.* LMICs tend to face greater numbers of transient and hard-to-identify populations in humanitarian contexts, whether refugees, migrants, or mobile workers. These groups may be challenging to identify and access outside of formal settings (for example, in refugee camps).

The ACT-Accelerator and its partners have developed tools for country diagnostics and planning.¹¹ As a compliment to that, we focus on major design considerations for national programs for COVID-19 vaccine rollout.

Setting up robust and effective central nerve centers

Given the complexity and challenges associated with these components, countries have seen benefits from developing nerve centers to set a singular strategy and manage across activities. Countries across income bands have faced challenges with a lack of role coordination between multiple government entities and other stakeholders. As a result, these countries may experience a duplication of efforts as well as a failure to consider the holistic set of activities and resources required. Given the complexity and challenges associated with vaccine rollout, many countries have seen benefits from developing nerve centers to set a singular strategy and manage across activities. As a result, these countries may experience a duplication of efforts as well as a failure to consider the holistic set of activities and resources required.

LMICs can look to successful emergency operations center (EOC) examples, such as those developed in Nigeria to combat polio. In “Eradicating Polio in Nigeria” we describe one such effort, highlighting critical success factors for high-performing EOCs, including taking a “command center” approach that drives extensive collaboration; leveraging dedicated cross-functional talent; consistently iterating the approach based on regular synthesis of fast-paced analytics; ensuring extensive and early buy-in with senior stakeholders to enable rapid decision making; and conducting intensive program management with clear targets, debottlenecking processes, and rigorous tracking and monitoring.¹²

Some LMICs may already have such structures that can be leveraged for COVID-19 vaccination rollout. Others may find it critical to rapidly develop EOCs, and can take comfort knowing how valuable they may be beyond the COVID-19 response: a previous report, “Acting now to strengthen Africa’s health systems” details how EOCs, once set up, have been effectively used to pivot and respond to new outbreaks in real time in sub-Saharan Africa.¹³

In addition to centrally directed planning and coordination, locally driven approaches can also be effective. A microplanning model has been deployed in a number of countries,¹⁴ where a central body, such as a Ministry of Health, sets eligibility principles and makes allocation decisions while outsourcing other decision making (for example, site identification, demand generation) to regional or local stakeholders. Local knowledge may be invaluable to inform decision making in centralized systems; how much decision making itself is devolved may depend on how much new infrastructure (which may be allocated and funded centrally) is required for effective rollout.

Developing an end-to-end tactical rollout plan across delivery components

Overall, COVID-19 vaccine delivery should consider several components (see Exhibit). A number of critical factors can be considered for each component of the rollout strategy, with specific implications for LMICs:

Availability

LMICs are considering multiple potential levers to access additional doses. Countries will need to determine which levers to pursue, with what speed, and in what proportion. Each source has different considerations, including financing (some are at least partially funded, others require countries to self-finance),

access to diverse products, availability of sophisticated intermediaries to pool/negotiate on a country’s behalf, and expected timing of procurement tranches. In all likelihood, many LMICs will take a portfolio approach, combining levers to suit their needs. These levers include:

- *Additional COVAX doses.* It is possible (but not certain) that the COVAX mechanism will increase the volumes it can secure for LMICs beyond the current allocation announcement. It is not yet clear how likely this is to occur or by when, or how much LMICs would be asked to co-fund.
- *Regionally coordinated pooled procurement.* In a few cases, regional bodies have secured large volumes of doses to support the countries in their remit. For example, in March 2021, the African Union announced that it had secured up to 400 million doses.¹⁵
- *Bilateral deals.* Countries, including some LMICs, have already begun bilateral deals directly with manufacturers. Additional capacity for LMICs may become available over time, potentially driven by increasing demand saturation in HICs, deployment of new COVID-19 manufacturing facilities to ramp up supply (which may include manufacturing in LMIC regions, such as Aspen in South Africa),¹⁶ and potential approval of new COVID-19 vaccines.
- *Donations from over-supplied countries.* Although most HICs are still limiting vaccination eligibility as supply (and delivery infrastructure) continues to increase, HICs overall appear to have secured more doses than they might ultimately need, under current manufacturing expectations.¹⁷ Some have already indicated that they plan to contribute excess doses to LMICs,¹⁸ through COVAX or directly, although realizing these donations may take some time.

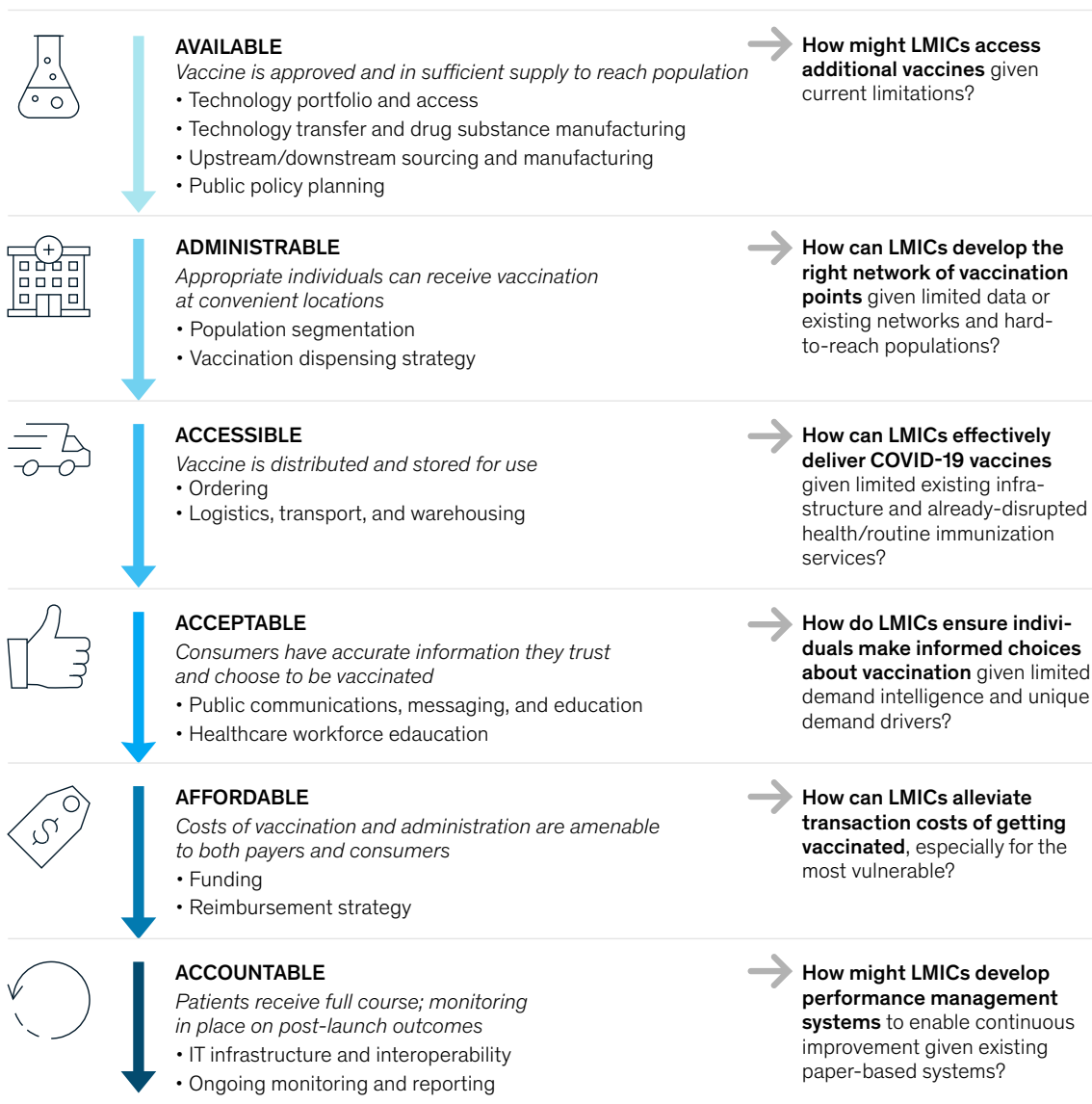
As described above, countries may benefit from preparing for a range of supply scenarios. This is likely to include ensuring the proper regulatory steps are taken to approve proven products; some countries have aligned national COVID-19 vaccine decision making with either stringent regulatory authority approvals or regional reliance frameworks that can enable efficient and high-quality regula-

tory decisions. As availability may change over time, countries could theoretically develop a phased scale-up approach to their distribution strategies based on an availability forecast. In reality, vaccine shipments may be uncertain and unpredictable, necessitating a more agile approach that can allow for successful implementation despite changing availability.

Exhibit

To date, the bulk of attention and support has been focused on vaccine access; ultimately the bottleneck to coverage may come from *in-country delivery*.

Requirements and critical considerations for effective vaccine roll-out



Countries will likely benefit from deploying multiple vaccination channel approaches to successfully reach target populations.

Administration

Administering an initial wave of vaccinations focused on healthcare workers (the approach most governments have taken) can be straightforward, as this group can be easier to identify, inform, and ensure access to a vaccination than the broader population. Many LMICs have not yet needed to deploy new vaccination sites and the limited vaccine volumes available are often being administered through the traditional healthcare system and its facilities. Ramping up thereafter—especially in an equitable way—can be challenging. In many HICs, this ramp-up has usually begun with existing points of care (hospitals, followed by general practitioner/primary care physician offices). HICs have often started by adding new vaccination points in densely populated areas (such as mass vaccination in stadiums or schools). They have then segued to mobile or smaller sites to reach specific or underserved populations. Although this approach has had some equity implications, it has allowed HICs to reach increasing numbers of target populations.

Countries will likely benefit from deploying multiple vaccination channel approaches to successfully reach target populations, balancing the need for efficiency and equity. Some LMICs have strengths to leverage in developing their approach: many have significant experience with campaign-based vaccination programs, (for example, polio) that can be brought to bear.¹⁹ To develop these strategies, countries may deploy the following approaches:

- *Mapping populations to existing infrastructure, leveraging local expertise.* Many countries have complemented

official sources (for example, census or other public records) by devolving efforts to local community leaders who can identify the strength of existing facilities as well as the size and location of population clusters for each target group (for example, municipal government staff in Brazil²⁰ and the healthcare workforce in Costa Rica²¹ have driven such efforts). More innovative data sources may also be available, such as mobile data or household geotagging.

- *Designing a temporal network.* Countries can choose to develop best-estimate forecasts of vaccination point capacity required over time, based on when vaccines are expected to arrive and the target populations they are intended for. Combining this with the mapping of populations and existing vaccination points, countries would help identify where different scaled vaccination points are most likely to be required, balancing efficiency (including cost implications) and equity (ensuring vulnerable populations that may be harder to access are reached).
- *Identifying solutions for each area with unmet need.* Countries can select the specific types and locations of sites to be fit-for-purpose with population needs. Many LMICs are also leveraging local community leaders to self-select vaccination points based on specific community contexts and preferences.

Even if an appropriate mix of vaccination sites is developed, HIC experience has shown challenges in managing through-

put capacity at these sites, balancing demand across sites, and minimizing waste; LMICs will need to develop systems and processes to address these challenges.

Accessibility

Multiple components are involved in an effective logistics system (various partners have collaborated on comprehensive checklists, as mentioned above). Three major elements of vaccine distribution logistics may prove especially challenging for LMICs:

- *IT/data systems* for appointment-making, to track stock levels of all relevant products, for vaccination points to place new orders, and for allocation approvals and rebalancing decisions to be made. As HICs have begun COVID-19 vaccine rollout, challenges with the quality and reliability of these systems have arisen, as they are often overloaded by demand or have not built in the decision-making processes required for proper utilization. Furthermore, some HICs have struggled to optimally manage second dose administration, including ensuring stock and appointments are available and that people actually return for their second dose at the appropriate time. LMICs can work to identify common flaws and incorporating solutions based on forecasts.
- *Distributors, warehousing, and storage* often involve multiple supply chain layers, depending on the country's size and complexity. Cold-chain equipment (CCE) may be especially difficult for LMICs. COVID-19 vaccines to date require some level of refrigeration, with some requiring ultra-cold-chain (UCC) storage temperatures. Most LMICs have limited ordinary cold-chain capacity for storage or distribution, let alone UCC capacity.²² At the last mile, cold-chain capacity can be even more limited (in terms of the lack of available equipment, outdated technology, and limited

power for non-solar CCE), creating a problem for vaccine storage at vaccination points.

- *Trained staff* to administer vaccines and vaccination points. As mentioned earlier, existing vaccinator staff may not be able to conduct all COVID-19 vaccination activities without disrupting other critical services. LMICs can develop strategies to maximize the number of staff that are qualified by ensuring that healthcare workers who can administer vaccines are working at the top of their license (that is, ensuring lower-skilled staff handle non-administration steps), and exploring task shifting if appropriate.

Many LMICs have experience with vaccination delivery processes and logistics, with varying degrees (and sophistication) of ordering, tracking, transportation, warehousing, cold-chain, and staffing infrastructure. However, multiple factors are expected to make COVID-19 vaccination logistics far more complex than routine immunization programs (see Sidebar, "Why are COVID-19 vaccines different?"), and a recent World Bank report notes that having a well-functioning child immunization system has not thus far been a strong predictor of readiness to roll out COVID-19 vaccines.²³ Furthermore, simply deploying existing vaccination infrastructure for COVID-19 vaccination efforts may be considered with care, given the potential to impact the already high levels of disruption of routine immunization efforts.

In HICs, vaccine delivery activities are often outsourced to the private sector, both before and during COVID-19, from leveraging third-party logistics providers to transport and store vaccines, to contracting private developers for IT systems to track vaccination rollout, to utilizing private pharmacies and healthcare centers to administer vaccines. When managed properly, private involvement in vaccine delivery can improve quality

and accountability. Such practices—especially for distribution—are relatively rare in LMICs, often because of cost concerns, reluctance to commit to sustained funding for third-party contractors, a lack of appropriate procurement frameworks (for example, public–private partnership [PPP] frameworks), insufficient capacity to manage private contracts, or low confidence that outsourcing processes will be fair and transparent. Some LMICs have been supported in supply chain outsourc-

ing,²⁴ with a few examples in Nigeria (where Lagos State outsources its vaccine supply chain)²⁵ and Senegal (where multiple third-party logistics providers have been contracted to manage delivery of a variety of public health products).²⁶

Some countries may explore outsourcing options, which could lead to broader vaccine supply chain innovation, provided the right conditions are met. Some LMICs can be supported through the strengthening of PPP frameworks, affordability costing,

Sidebar

Why are COVID-19 vaccines different?

COVID-19 vaccinations are different from traditional immunization programs for reasons that include:

- *Much higher volumes and new target populations.* Existing vaccination capabilities are primarily focused on routine immunization, a system at relatively smaller scale and pace (most routine vaccines need to reach a single birth cohort over the course of a year), with a different target demographic (with very few routinely used products targeting adults). Even most LMICs that have experience doing vaccination campaigns to respond to outbreaks (for example, polio, yellow fever) have still never conducted an emergency vaccination program at the scale required for COVID-19.
- *Availability of multiple products.* For most vaccine-preventable diseases, countries deploy a single vaccine. There are certainly a number of cases where an improved product or a new multivalent product has been introduced to replace an existing product, which must then be phased out, but it is unusual to have multiple (especially more than two) vaccines deployed in a single country for the same purpose. Today, many

COVAX countries are primarily receiving one vaccine, but many are already expecting to receive multiple COVID-19 vaccines from multiple sources. The system will need to be able to handle this complexity, as the right facilities will need to receive the right vaccines—as well as any vaccine-specific delivery products—and people’s specific vaccines will need to be tracked to properly enable second doses (or boosters if ultimately needed).

- *Shifting supply/demand dynamics over time.* Initially, demand may exceed supply at most vaccination points. Throughputs may vary but be reasonably predictable, and countries may deploy so-called “push” distribution approaches (for example, delivering a set amount of product on a schedule, with some supply rebalancing across vaccination points as needed). As more and more people are vaccinated, this dynamic may switch, with supply exceeding demand at many vaccination points. Thus, systems cannot continue pushing down doses on a fixed schedule but can consider how to incorporate clear demand signals into the supply chain.

efforts to ensure the process is (and is seen as) transparent and justly managed, and procurement/contract management capability-building (including support for performance management). If successful, private sector engagement developed for COVID-19 vaccine delivery could be expanded for broader immunization programs. On the other hand, countries with limited PPP capabilities, private sector options, or support may find it unwieldy to undertake such a transition during an already complex COVID-19 vaccine rollout.

Acceptability

Consumer confidence in COVID-19 vaccines varies by geography and, within countries, by population segments. In LMICs, limited data exists on COVID-19 vaccine acceptability, with even less information on demographic differences, trends over time, or root causes of hesitancy. This stands in sharp contrast to some HICs, where regular surveys are done that allow for micropattern detection.

A survey of more than 15,000 adults in 15 African countries conducted between August and December 2020 indicated that willingness to take COVID-19 vaccines varied from 94 percent in Ethiopia to 59 percent in the Democratic Republic of the Congo. Primary respondent reasons for vaccine hesitancy included a lack of trust in the safety of vaccines and a belief that the COVID-19 threat is exaggerated.²⁷ Some people in LMICs have a long-standing mistrust of adult vaccinations as a result of problematic clinical trial programs in the past,^{28,29} although vaccine acceptability has generally been stronger for pediatric vaccines.³⁰ Promisingly, some HICs saw decreases in vaccine hesitancy as COVID-19 vaccinations expanded.³¹

A recent World Bank report notes that less than 30 percent of countries have developed demand-generation strategies to encourage COVID-19 vaccine uptake.³² LMICs may be able to leverage

existing strengths in community engagement and demand generation from previous public health efforts (for example, HIV prevention), including from immunization programs specifically, where strategies have often leveraged deep engagement with trusted local leaders to directly address misinformation, build awareness, and provide information about how to get vaccinated. For example, in India's polio vaccination efforts, a thousands-strong "Social Mobilization Network" (SMNet) was created to communicate to underprivileged communities, engaging local officials and religious leaders, running campaigns in a highly iterative fashion to respond to community needs. SMNet's success was subsequently leveraged to expand its impact to other health areas.³³ For COVID-19, some LMICs (for example, Morocco)³⁴ have deployed local government staff or local organizations, who have gone door-to-door to inform eligible populations, answer questions, address concerns, and support appointment-making or location-finding efforts. Proper safety protocols should be applied to any in-person community outreach efforts.

LMICs may want to consider how COVID-19 vaccination efforts can be leveraged to increase acceptance and utilization of a broader set of health services, especially for vulnerable groups (for example, to ensure continued childhood immunization) or demographics that historically engage less with the health system (for example, adult men, older generations). Additionally, countries can consider providing information about primary care, or even rapid testing services, while individuals wait in line to be vaccinated.

Affordability

Today, LMIC populations are largely not expecting to be charged for COVID-19 vaccinations. As countries continue vaccination programs (which may include self-financed procurement), it is not yet known whether this will remain the case.

For example, some countries might charge more affluent segments, but keep vaccines free of charge for lower-income populations.

LMIC residents can face meaningful opportunity costs and indirect costs to getting vaccinated, such as taking time off from work, securing and paying for transportation to and from vaccination points, waiting in line, and managing childcare. Many may need to take time (and put themselves at some exposure risk) to help relatives and friends get vaccinated. Countries may consider how to reduce personal disruption or cost, such as by encouraging employers to allow employees to “take time” to get vaccinated.

Accountability

The COVID-19 vaccination rollout will need to be closely monitored to ensure the best use of scarce resources; rapidly adapt to changing supply, demand, logistical, and epidemiological circumstances; and continuously improve the approach. The need to ensure that populations requiring a second dose actually receive that second dose further complicates tracking efforts. Today, vaccination tracking and monitoring systems in many LMICs are highly manual—leveraging paper-based ledgers and reports—and delayed, often only reporting centrally every month or every quarter. These manual systems are likely to be insufficient to deal with the rapidly changing supply and demand dynamics of COVID-19 vaccines, which may require frequent load-balancing, reevaluation of site location and infrastructure strategies, and careful monitoring of wastage to inform reduction efforts. Countries may consider a range of system improvements, including lower-tech and lower-cost approaches (for example, simple mobile apps).

Where do we go from here?

Without minimizing the challenge of COVID-19 vaccines for LMICs, stakeholders can also reflect on bright spots.

The last time a mass vaccination program was needed in response to a major pandemic was in 2009, with H1N1. Then, the first vaccines arrived in Africa more than 20 weeks after the first (higher-income) countries started vaccinating. By contrast, although most LMICs are receiving COVID-19 vaccines more slowly than HICs, shipments to LMICs have taken place within 12 weeks of introduction in the first HICs.³⁵ The COVAX Facility has helped to move LMICs closer to parity with HICs, with initial vaccine shipments reaching 100 countries 42 days after its first international shipment.³⁶

As LMICs access larger volumes of doses over time, in-country delivery activities become more critical—and more challenging—as capacity can become stretched, making the next sets of target populations harder to reach. Furthermore, the future may only get more complex: unfolding epidemiological realities (for example, expanded or new variants) may present novel challenges, and the need for LMICs to vaccinate younger populations to achieve herd immunity³⁷ means that large new groups will need to be reached once effective pediatric vaccines are approved.

As approaches are developed, LMICs can identify opportunities to strengthen their broader health systems. Agile and robust nerve center capabilities can support response to future outbreaks. Private sector engagement and improved logistics/data systems can help expand supply chain capacity and effectiveness. Novel demand-generation approaches can bring new demographics into the healthcare system and support catch-up efforts for others. Even longer-term strategies, including broader pandemic preparedness tactics or local vaccine manufacturing, can help drive health security for the future.³⁸ Such strategies can serve the dual purpose of bolstering existing service provision while also improving LMICs' ability to respond to the next public health crisis.

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Vulnerable communities and understanding the mental health impact

With a commitment from the C-suite, organizations can change their culture, benefit programs, and work environment so that neurodiversity can be celebrated alongside other forms of diversity.



Garen Staglin
Chairman and Co-founder,
One Mind



Jerome Adams
Former United States Surgeon General

COVID-19 forced a reckoning in terms of the disparate impacts that certain risk factors and diseases have on certain communities. No one can argue against that anymore, because we saw how communities of color were ravaged by COVID-19.

This is everybody's concern, this is everybody's matter, this is everybody's lives—hopefully, we will be able to move as far upstream as we can and recognize that mental health is the goal, just as overall health is the goal. There's no such thing as overall health without mental health.



Paul Gionfriddo
Former President and CEO,
Mental Health America

Returning to resilience: The impact of COVID-19 on mental health and substance use

Erica Coe and Kana Enomoto

April 2, 2020

As governments race to contain COVID-19, it is important to know the actions society can take to mitigate the behavioral health impact of the pandemic and economic crisis.

The COVID-19 pandemic is a threat to our population, not only for its risk to human life and ensuing economic distress, but also for its invisible emotional strain. Recent days have seen the sharpest economic pullback in modern history and a record-breaking spike in unemployment. It is inevitable that the global pandemic, compounded by financial crisis, will have a material impact on the behavioral health of society. Following the global financial crisis in 2007–08, for example, many countries saw higher rates of depression, anxiety, and alcohol and drug use. In 2008, the Great Recession ushered in a 13 percent increase in suicides attributable to unemployment with over 46,000 lives lost due to unemployment and income inequality in that year alone.¹⁻³

Beyond the negative impact of a traditional economic downturn, COVID-19 presents additional challenges—fear from the virus itself, collective grief, prolonged physical distancing and associated social isolation—that will compound the impact on our collective psyche.^{4,5} As noted by the McKinsey Global Institute in *Safeguarding Lives and Livelihoods*,⁶ “Daily reports of increasing

infections and deaths across the world raise our anxiety and, in cases of personal loss, plug us into grief. There is uncertainty about tomorrow; about the health and safety of our families, friends and loved ones; and about our ability to live the lives we love.” A McKinsey national consumer survey⁷ from March 27–29, illustrates this widespread distress, exacerbated even further among those whose jobs have been adversely affected by COVID-19 (Exhibit 1). This confluence of factors poses an unprecedented threat to the current and future health of our society.

Theodore Roosevelt once said, “The more you know about the past, the better prepared you are for the future.” By examining the behavioral health impact of the Great Recession and other large-scale disasters, we can mitigate the negative impact to society from further economic loss and human suffering. Extensive research has documented the association of recessions, mass layoffs, and prolonged periods of unemployment with an increase in income inequality and devastating impact on health and life expectancy in the United States.⁸⁻¹⁰ An examination of these data show income inequality maps closely to the rate of suicides among working age adults (Exhibit 2). These effects may deepen through the course of the COVID-19 pandemic.

Not only do mental and substance use disorders stem from economic hardship, they also are known drivers of lower productivity, increased healthcare costs, and higher mortality.¹¹ The World Health Organization has noted that depression and anxiety

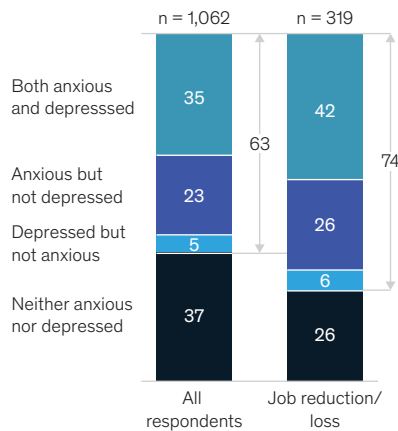
have an estimated cost to the global economy of \$1 trillion per year in lost productivity.¹² A likely surge of people experiencing acute behavioral health problems—both those with

new symptoms and those with existing conditions—has potential to further strain the healthcare system and add cost to an already unprecedented economic downturn.

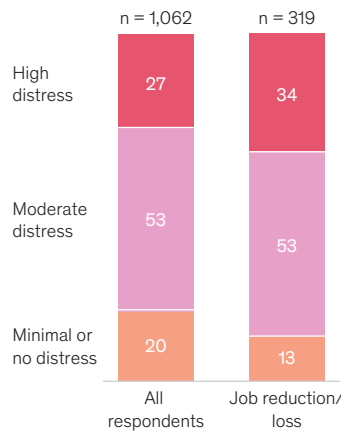
Exhibit 1

Reported signs of distress related to COVID-19 in the United States.

Respondents reporting feeling anxious or depressed in past week
% of respondents



Respondents' reported level of distress related to COVID-19
% of respondents



Respondents' levels of reported substance use

- 1 out of 4** reported **binge drinking*** at least once in the past week
- 1 out of 5** reported taking **prescription drugs** for non-medical reasons
- 1 out of 7** reported using **illicit drugs**

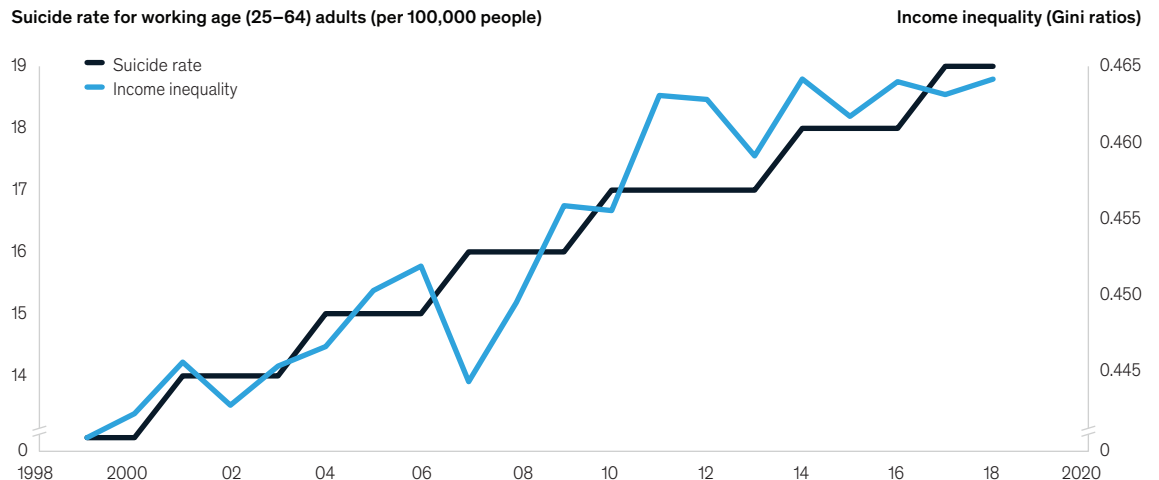
* As defined by National Institute on Alcohol Abuse and Alcoholism, >=5 drinks for men and >=4 drinks for women

QFEEL1. Over the past week have you felt anxious?
 QFEEL2. Over the past week have you felt depressed?
 QFEEL2a. Please indicate your level of distress related to the Coronavirus/COVID-19 pandemic (10-point scale from least distressed to most distressed. "High" is 8–10, "Moderate" is 4–7, and "Low" is 1–3).
 QEMP5. Since the Coronavirus/COVID-19 began impacting the US, has the number of hours you have worked increased, decreased, or stayed the same?
 Source: McKinsey COVID-19 Consumer Survey, 3/29/2020

Exhibit 2

Association between income inequality and suicide rate in the United States.

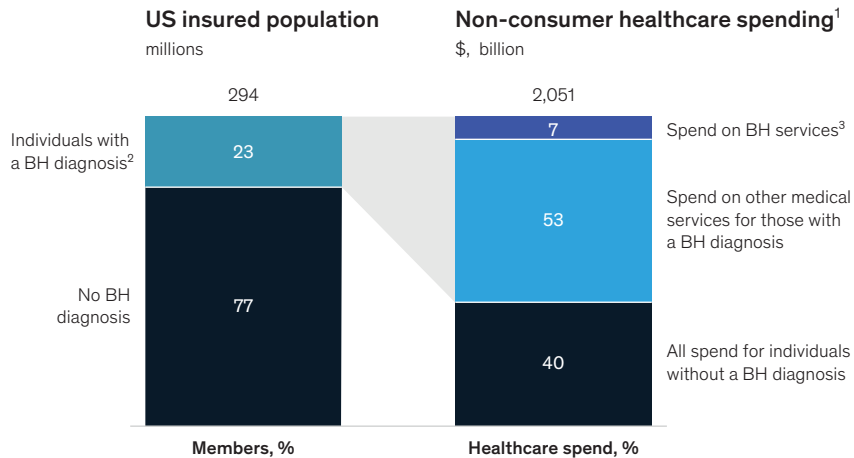
Suicide rate for working age adults vs income inequality



Source: CDC WISQARS, 2020; U.S. Census Bureau, Current Population Survey, 1968 to 2019 Annual Social and Economic Supplements (CPS ASEC)

Exhibit 3

Presence of behavioral health (BH) diagnosis and corresponding healthcare spend in the United States.



Note: Certain data used in this study were supplied by International Business Machines Corporation. Any analysis, interpretation, or conclusion based on these data is solely that of the authors and not International Business Machines Corporation.
¹ Payer-paid amount measures on medical and pharmacy claims (excludes copays, deductibles, or out-of-pocket payments).
² One or more medical claims with a primary or secondary diagnosis of any behavioral health condition.
³ Includes claims with a primary diagnosis of a BH condition, as well as CPT, HCPCS, and NDC codes specific to behavioral health.
 Source: Analysis includes claims data from the Medicare FFS Limited Data Set from the Centers for Medicare & Medicaid Services, deidentified Medicaid data, and the International Business Machines Corporation’s Truven MarketScan Commercial Database

To better understand behavioral health as a cost driver, McKinsey conducted an analysis of national insurance claims data and found that 60 percent of overall medical expenditures are driven by the 23 percent of members who have mental or substance use disorders (Exhibit 3). This disproportionate spend is driven largely by increased medical costs. For example, the cost to treat the diabetes of a patient with depression is, on average, almost \$20,000 higher than for a patient without depression, due to factors such as medical complications, reduced access to preventive care, and challenges with illness self-management.

As governments race to contain COVID-19, it is important to know the actions society can take to mitigate the behavioral health impact of the pandemic and economic crisis.^{13,14} For every one dollar spent on scaling up treatment for common mental disorders, a four-dollar return can be realized in improved health and productivity.¹⁵ In the United States, the Coronavirus Aid, Relief, and Economic Security (CARES) Act provides \$425 million for additional community-based

behavioral healthcare and suicide prevention. Given the urgency of this issue, no-regrets steps for healthcare stakeholders could include the following:

- **Strengthen community prevention:** Provide risk-stratified crisis counseling support to individuals and families directly affected by COVID-19, including individuals who lose their jobs, health-care and essential workers, older adults, people with disabilities, and individuals experiencing extended quarantine. Across whole communities, conduct outreach to promote resilience, normalize reactions, and let people know when and where to seek help.
- **Leverage data and technology:** In the initial “resolve” phase,¹⁶ use predictive analytics to direct prevention and clinical resources to those most at-risk for mental health or substance use problems and unmet basic needs. As we move towards recovery in the “return” phase, leverage and improve available data sources, encour-

age the use of artificial intelligence, and scale digital platforms (for example, digital therapeutics) to connect consumers seamlessly to evidence- and measurement-based care. As governments consider how they fund telehealth, examine what impact emergency waivers, flexibilities, and rate increases for telehealth under COVID-19 are having on care delivery.

- **Integrate behavioral and physical health services:** Initiate or accelerate efforts to reduce stigma and encourage understanding of behavioral health as fundamental to overall health. Implement universal screening and treatment for mental health and substance use problems in primary and specialty healthcare settings, including for individuals with or at high risk for COVID-19. Increase behavioral health competency of primary care providers, expand the use of peer counselors to enable timely behavioral healthcare, and strengthen capacity of the behavioral health workforce. Provide appropriate physical healthcare to individuals with ongoing behavioral health needs.

- **Address unemployment and income disparities:** To reduce long-term psychosocial risk from COVID-19, policy makers and employers may want to reimagine the future to alleviate economic disparities. More innovation may be valuable around accelerated skill redevelopment, job redeployment, supported employment, and incentivizing investments in local job growth. And, proven interventions can be applied, including enabling people to protect their health (for example, paid sick leave); and ensuring people whose livelihoods have been affected by COVID-19 are able to meet basic needs such as food, housing, and childcare.

In the turmoil around the economy and the coronavirus itself, society should be mindful of its collective resilience. The anxiety, stress, financial strife, grief, and general uncertainty of this time will undoubtedly lead to behavioral health crises. It is therefore important that communities seeking a “next normal” can draw from their inherent strength and compassion to recognize, treat, and support those experiencing this human toll of the COVID-19 pandemic.

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Insights on racial and ethnic health inequity in the context of COVID-19

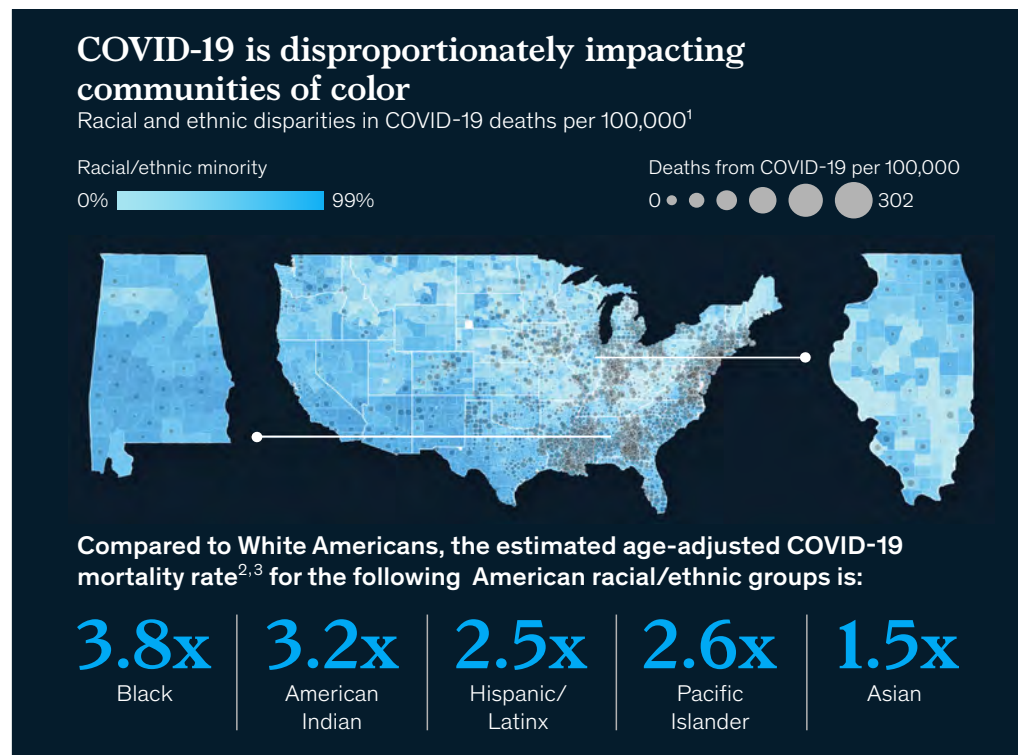
Erica Coe, Kana Enomoto, Alex Mandel, Seema Parmar, and Samuel Yamoah

July 31, 2020

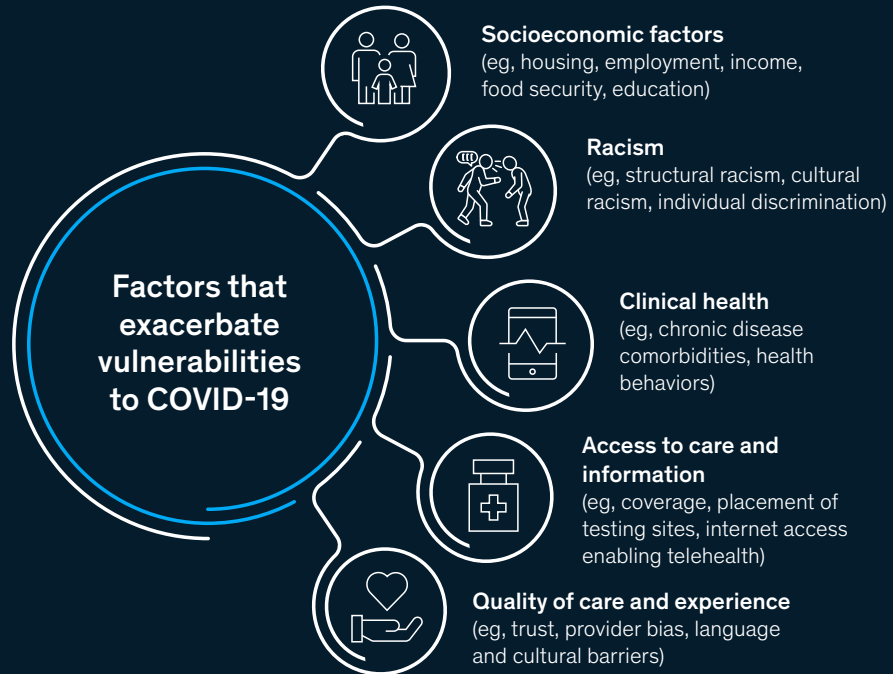
McKinsey's Center for Societal Benefit through Healthcare shares insights on underlying health inequities that contribute to the disproportionate impact of COVID-19 on communities of color and vulnerable populations.

The disproportionate impact that the COVID-19 pandemic has had on communities of color and vulnerable populations is well documented, and has put a necessary spotlight on longstanding racial and ethnic inequity in health and healthcare. In this infographic, we bring attention to factors that

contribute to health inequity in COVID-19 outcomes and beyond. These include socioeconomic factors and racism, which in turn affect clinical health, access to care, and quality and experience for Black and Hispanic/Latinx Americans, among other racial and ethnic groups. Insights are drawn from the McKinsey Center for Societal Benefit through Healthcare Vulnerable Populations Dashboard,¹ McKinsey COVID-19 Consumer Insights Surveys,² and publicly available data and academic research on COVID-19 and health equity. This publication builds on prior publications: "COVID-19: Investing in Black lives and livelihoods"³ and "Insights on physical health and behavioral health vulnerability."⁴



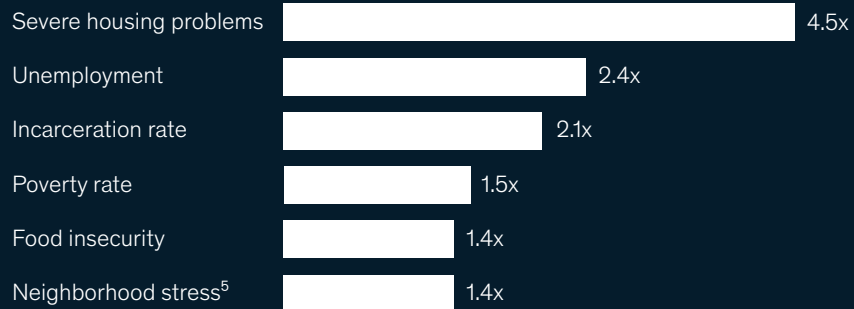
Disparities in COVID-19 outcomes expose underlying inequities



COVID-19 deaths are higher in areas with socioeconomic vulnerabilities, which intersect with race and ethnicity



Ratio of COVID-19 deaths per 100K in areas with a higher concentration of socioeconomic vulnerability⁴



⁴ A composite metric including income, employment, use of public assistance, transportation, single parent households, and education

(continued on the top of the next page)

Example intersections of socioeconomic vulnerability with race and ethnicity

20% of the lowest-paid, high-contact **essential jobs** are held by **Black Americans**, heightening risk of exposure to COVID-19⁶

33% Black and **23%** Hispanic/Latinx are a part of the **prison population** (despite being 12% and 18% of the general population, respectively)⁷

Mass incarceration is associated with worse mental and physical health outcomes,⁸ and in the context of COVID-19, jail conditions heighten risk—jail cycling (ongoing arrest and pre-trial detention practices) was associated with **16%** of COVID-19 cases in a single state⁹

84% Black and **88%** Hispanic/Latinx

live in **urban areas**,¹⁰ where about **90%** of COVID-19 cases are concentrated.¹¹ Historical systematic denial of government and private sector services, a form of structural racism, is among factors that exacerbate health disparities for a range of health conditions (eg, asthma, cancer)¹²

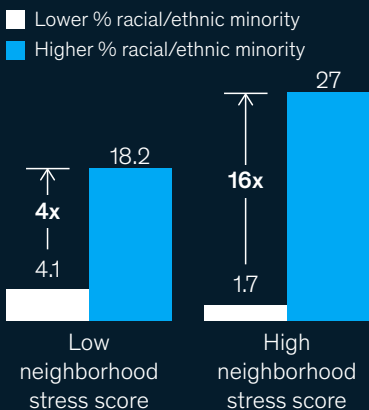
39% Black, **37%** Hispanic/Latinx, and **22%** White households with children have been estimated to be **food insecure** during the COVID-19 pandemic¹³

Socioeconomic vulnerabilities contributing to disparities in COVID-19 deaths have been shaped by structural racism¹⁴

Racism has been associated with stress and negative health outcomes



COVID-19 deaths per 100K across counties, by level of neighborhood stress score⁷ and concentration of racial and ethnic minorities¹⁵



Racism affects both physical and mental health, but the association between reported racism and **mental health** has been found to be twice as large as that for physical health¹⁶

Vigilance (including stress associated with anticipated exposure to racism) increases likelihood of **depressive symptoms, sleep difficulties, and hypertension** and contributes to racial differences for these outcomes¹⁷

Among women with low socioeconomic status, **27%** of women of color report mistreatment in maternity care, compared to **19%** of White women¹⁸

Black and Hispanic/Latinx Americans are at heightened clinical health risk for severe COVID-19 symptoms



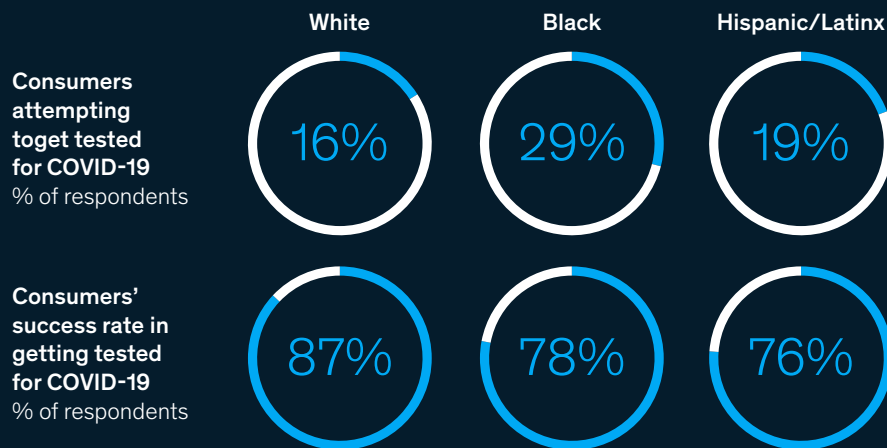
Black Americans have a **30%** higher likelihood of having a chronic condition compared to Whites¹⁹

Patients with hypertension or diabetes, both chronic conditions, were up to **2x** more likely to be admitted to the ICU or die from COVID-19²⁰

There are racial and ethnic disparities in access to care in the context of COVID-19



Black and Hispanic/Latinx Americans were **more likely to try to get tested** for COVID-19, but **less likely to successfully get tested**²¹



Black Americans were

3x

Hispanic/Latinx Americans were

2x

more likely to report loss of health insurance during the pandemic compared to White respondents.^{21 22} Other contributing factors to disparities in testing may include: geographic placement of testing sites, access to transportation, testing center hours of operation, and access to paid sick leave

There is an opportunity to more broadly improve healthcare quality and experience for Black and Hispanic/Latinx consumers

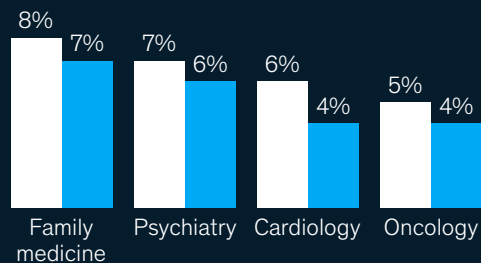


Greater representation could lead to more positive outcomes for communities of color

Examples of racial and ethnic inequity in healthcare quality and experience

Percent of physician specialists by race²³

■ Hispanic/Latinx ■ Black



Hispanic/Latinx and Black Americans make up 18% and 12% of the general population, but make up

6% and **5%** of physicians, respectively

32%

of Black Americans have reported being personally discriminated against when going to the doctor or health clinic²⁵

65%

of Black patients have reported that a doctor of the same race would understand their concerns best²⁴

Although language access is covered under the Civil Rights Act, only

61%

of hospitals offer linguistic and/or translation services

Healthcare organizations can innovate in-person, digital, and written solutions (eg, video remote interpreting, website usability)²⁶

Racial and ethnic representation in the healthcare workforce is an important factor for building trust-based, empathetic, and unbiased relationships²⁷

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Rebuilding clinician mental health and well-being after COVID-19

Sanjiv M. Baxi, Omar Kattan, and Pooja Kumar

December 15, 2020

The pandemic has exacerbated existing issues around the mental health of health-care workers. Providers can learn from other industries to develop an integrated framework promoting overall well-being.

The COVID-19 pandemic has presented unprecedented challenges for healthcare workers, highlighting critical vulnerabilities in the ability to manage the mental health consequences. This serious issue could have long-term ramifications for those affected—and for our healthcare system more broadly.

The healthcare sector may consider shifting its focus away from short-term mental health “fixes” in the aftermath of acute events and toward the development of an integrated framework to address clinician mental health and the long-term effects of trauma. While the precise formulation of individual programs will vary, there are a set of principles that should inform any new mental health framework. Providers can consider embedding mental health training through education, deploying regular risk assessments for all students and staff, establishing new structures within the organizational hierarchy to prioritize mental health and well-being, and procuring resources dedicated to supporting clinicians who require safety net services.

In figuring out the details of mental health services and structures they will offer, providers may undertake a robust internal monitoring and evaluation program, and learn from

other sectors and organizations. There has been considerable recent innovation in mental health and well-being programs outside of the healthcare sectors—particularly in fast-paced industries with high turnover, such as technology and financial services, and settings where there has been exposure to trauma. Providers can consider investigating whether these new programs and services might be effective in a healthcare setting.

This more extensive, better integrated mental health framework represents a departure from the current level of mental health provision for healthcare workers, and providers may need additional funding and resources from both federal and local governments. Private sector partnerships may be a way for public sector stakeholders to offer support to healthcare workers.

COVID-19 has exacerbated existing issues around the mental health of frontline healthcare workers

Prior work has established the myriad mental health challenges faced by healthcare workers endure, including suicidal thoughts, depression, and burnout.¹ Multiple studies have reported higher rates of suicide among physicians compared to the general public, with work dissatisfaction and burnout considered to be major factors.²

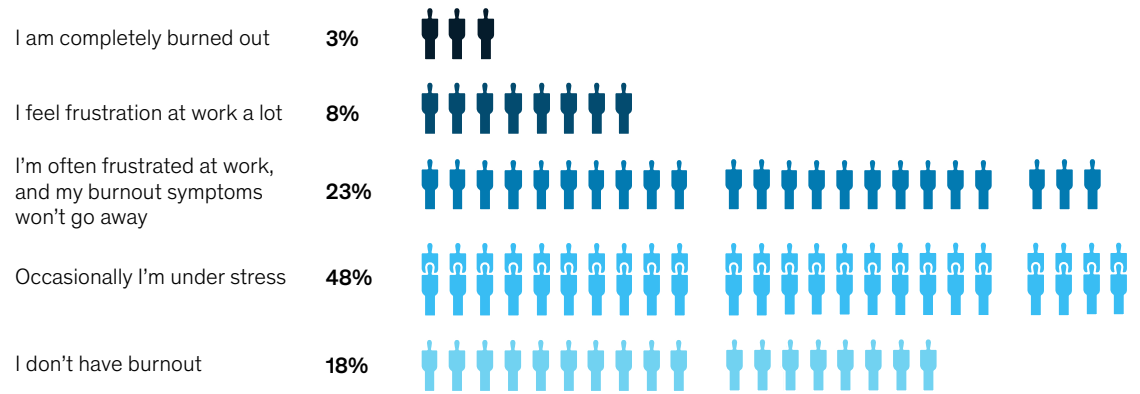
COVID-19 has amplified these existing issues, affecting healthcare workers at both work and home (Exhibit). In addition to the inherent stressors of addressing a pandemic, clinicians have faced increasing work hours and a simultaneous decrease in compensation, with 62 percent of US-based physicians reporting a

Exhibit

Physicians' levels of burnout vary.

Almost 43% of the respondents report experiencing burnout to some extent.^{1,2}

All respondents, n = 160



¹Answers to the question, "Overall, based on your definition of burnout, how would you rate your burnout level? (Select one.)"

²Some of the classic symptoms of burnout are fatigue, insomnia, anger or irritability, substance misuse, and high blood pressure.

decrease in pay or retirement contributions.³ Simultaneously, healthcare workers face considerable stress related to the risk of acquiring COVID-19 and transmitting it to their families,⁴ and many are also seeing less of their family and friends. Around the world, the virus has therefore heightened the risk of clinician burnout, anxiety, depression, and potential trauma-related stress disorders. In China, for example, 50 percent of health-care workers who were exposed to the virus in 2019 reported depression and 45 percent reported anxiety.⁵ In Italy, a May 2020 study found almost half of healthcare worker respondents reported post-traumatic stress symptoms, and almost 25 percent reported systems of depression.⁶

Before COVID-19, healthcare worker burnout and mental illness were underdiscussed, underrecognized, and undertreated. One silver lining of the crisis is a greater degree of external recognition of the challenges that healthcare workers face. These have ranged from messages of gratitude and support (such as television commercials, aerial salute flyovers, and designated hours in which citizens "clap for carers" in many countries) to discounts and perks (for example, retail

discounts or free coffees offered for health-care workers). Some providers have expanded access to mental health and well-being services (such as mental health counseling and expanded child care) or taken significant steps to increase awareness of mental health issues and where to go for support.

Healthcare providers can develop an integrated framework to address clinician mental health

The changes to mental health provision that have been made since the outbreak of the crisis have, for the most part, been temporary. They are designed to address the effects of an acute surge on an already burdened system. The sector may consider using the momentum of the current pandemic to fundamentally rethink the long-term mental health provision for healthcare workers. A new paradigm can help organizations support the mental health needs of their workers in the "next normal."

Existing evidence suggests that mental health and well-being programs can have a significant positive impact. Impaired well-being, such as burnout,⁷ is a key driver of physician turnover. In addition to the human cost, this

also have a considerable financial cost to the health system; replacing a physician costs two to three times a physician's annual salary.⁸ Programs with a focus on mental health resilience, for example, have been shown to improve clinician morale and job satisfaction, and to engender a sense of purpose.⁹ These initiatives can also have a positive impact on the financial performance of providers, though outcomes have varied; one meta-analysis showed that medical costs were lowered by approximately \$3 (and absentee day costs fell by about \$2) for every dollar spent on well-being programs.¹⁰ However, other studies have failed to show positive financial returns.¹¹

Individual health systems differ enormously—as do healthcare workers themselves—which means that there will be no simple one-size-fits-all solution. There are, however, some core principles for a new healthcare framework.

Embed mental health and resiliency training throughout education

Mental health awareness could be integrated into the curriculum of all healthcare worker training programs (for example, medical school, dental school, nursing school, counseling programs, and technician training) from day one. This is critical in ensuring that mental health is understood to be a fundamental part of overall health, and treated with the same urgency, skill, and compassion as other health conditions.

We propose establishing longitudinal tracks (for example, a mental health and well-being track) that move beyond the current model of providing periodic one-off lectures (once a quarter or annually, for example) and instead span the entire duration of medical training. Modules could be designed to focus on particularly challenging experiences (such as the daily realities of the poorest patients, interpersonal violence, and patient death) and could be standardized across systems and regions or—where necessary—tailored to the local context. Training would ideally include both a detailed introduction to mental health principles and interactive simulations on how to deal with potentially traumatic scenarios.

Deploy regular risk assessments for students, trainees, and staff

Clinical departments and educational programs could identify staff, trainees, and students at risk of mental health issues by assessing a variety of factors including personal background, work environment, and underlying health conditions. Such efforts should incorporate robust privacy protection measures that meet Health Insurance Portability and Accountability Act of 1996 guidelines. The goal is to help workers who may be experiencing trauma at an early stage and to highlight actionable issues that may have a negative impact on mental health (such as unsuitable housing). Some resident training programs already deploy assessments of this type to try to counteract increasing burnout and mental health issues. In one instance, a Resident Wellness Scale was designed to track residents' wellness longitudinally and was found to be a psychometrically strong measure.¹²

Risk assessments may be conducted in partnership with an external organization. An initial assessment would establish a baseline level of mental health and well-being on metrics, which should then be tracked over time, and all results should be integrated into a single, longitudinal data set. The information should be confidential, but the individuals themselves should be able to access the data and—when they wish—to share an anonymized version.

The frequency of assessments would vary. It may be appropriate, for example, to have mandatory assessments at each major transition (or once every three years) and offer optional annual assessments. These could be supplemented by shorter, more frequent surveys. As an example, a pharmacy student could have a baseline evaluation, a follow-up during their third year of pharmacy school, another assessment the following year when they enter their first residency, and another a year later if they enter a second residency. They would then have another test when they take a job, with follow-ups at least every three years thereafter.

Anonymized, longitudinal data sets would serve as a basis for much-needed research into mental health and treatments among healthcare professionals. They would also—within the bounds of what is possible while protecting privacy—help to identify those most in need of prevention or treatment efforts at the earliest possible juncture.

Establish new structure within the organizational model/hierarchy to prioritize mental health and well-being

One factor distinguishing effective programs from ineffective ones is the extent to which they are embedded into a new organizational model and prioritized by leadership. A number of structures can work, so providers will need to determine the best model—or mixture of models—for them.

Establish an office of well-being: Embedding new programs within a dedicated office has been a successful strategy for a number of organizations. The Stanford School of Medicine, for example, has established WellMD, which deploys a wellness survey, offers self-testing resources, and teaches a course aimed at chief wellness officers (CWOs).¹³ Mount Sinai recently launched a new Center for Stress, Resilience, and Personal Growth, which is designed to address the psychosocial impact of COVID-19 on the mental health of healthcare workers. It will offer resiliency training, stress and mental health self-screening services, and a range of interventions, including eight-session support groups, individual assessments, and mental health treatments.¹⁴ Keck Medicine of the University of Southern California launched the “Care for the Caregiver” program, which offers free housing, other amenities such as groceries and toiletries, and mental health support to staff at high risk of job-related stress.¹⁵ These programs operate in parallel to the traditional organizational hierarchy, reinforce confidentiality as essential and develop operating models that enable financial independence (such as by obtaining grant or fellowship funding).

Create a CWO position: Many academic institutions have CWOs to address staff burnout and mental health. CWOs would be an addi-

tion to the C-suite, where they would be equipped with the authority, budget, and staff to deliver enterprise-wide solutions for staff burnout and mental health. They should be accountable for organizational outcomes. There is a risk that CWOs are seen as a way to merely tick a box on an organizational checklist, and it is therefore vital that the CWO cultivates a close relationship with on-the-ground clinicians, has the support of the CEO to ensure that mental health and well-being is a top priority across the organization rather than a disjointed silo, and is able to demonstrate the value of any new initiatives to both the organization and frontline staff.

Train clinical department heads and chairs on burnout and mental health: Where the creation of a CWO is not necessary (or not sufficient), heads of department could be trained to play a similar role for the staff within their units. Spreading responsibility in this way can be beneficial, as these issues risk getting lost among the many other competing priorities of these heads of department. Performance evaluations could include metrics such as employee burnout and mental health scores.

Procure dedicated safety net resources to support clinicians navigating logistical challenges

Providers need to offer comprehensive support, which means recognizing that robust mental health is not just about what happens at work, and that the unique demands placed on frontline healthcare workers can create—and be exacerbated by—issues outside of the hospital. Providers should establish dedicated safety net resources to help both in the acute setting of a traumatic event and for long-term needs.

Resources needed during an acute setting or after a traumatic event:

- *Increased access to counseling services and on-the-ground support* in healthcare facilities, which should include well-being stations for nourishment, rest, and stress relief. Rush University System for Health, for example, offers a centrally located Wellness Resource Hub, where “any staff

member can receive confidential, on-site counseling support, escape busy clinical areas, process their emotions, and relax.¹⁶

- **Logistical support**, which should include assistance with childcare (perhaps through establishing on-site centers) and home management and housing assistance (including guidance and dedicated staff resources on how workers can avoid exposing their households to excessive risk).
- **Agile and flexible working models** that allow for healthcare workers to be transferred between departments when their situations require or schedule either a smaller number of longer blocks of time to work in an acute trauma setting or multiple shorter stints, as required.
- **Hazard pay**, to compensate clinicians for dangerous and difficult working conditions. Some states also have addressed hazard pay. In December, Vermont legislators approved additional funding for the Vermont Frontline Employees Hazard Pay Grant program, which means up to 20,000 Vermonters who work in healthcare, grocery stores, and other sectors in the spring will receive checks of \$1,200 or \$2,000.¹⁷

Long-term, baseline resources needed:

In addition to the above, a better baseline support model should be developed that allows for regular breaks for both trainees and fully trained staff. Schedules should be flexible enough to allow healthcare workers to take burnout and mental health breaks. Increasing work hour flexibility—which means building in additional coverage to ensure that there is some slack in the system—not only improves mental health but also increases productivity, commitment to the organization, and retention.¹⁸

Designing a robust mental health and well-being program

Ensuring robust mental health will require an ongoing commitment to improving the understanding of the science underlying the prevention, diagnosis, and treatment

of mental health illnesses and the related challenges that healthcare workers face—and to integrating new findings into existing program offerings.

Robust monitoring and evaluation efforts can track the impact of existing mental health programs. This effort should include regular surveying and testing to identify the impact of each individual service on key outcomes, and to understand differential affects by role, seniority, or demographic group. Results should then be used to iterate on the available set of interventions and to develop new offerings, as necessary. Agile principles are being adopted across a number of clinical operational topics and these principles should not be forgotten when it comes to clinician mental health and well-being programs.¹⁹

The medical establishment also can learn from other industries. In recent years, technology companies have been at the vanguard in terms of offering their employees innovative opportunities aimed at improving well-being. Some technology companies have, for example, created “napping rooms” to help employees recharge, while others have offered virtual therapy apps.²⁰ Gitlab developed initiatives that aim to maximize connectivity and minimize isolation for those working outside of an office environment.²¹ Financial services and consulting companies, where employees typically work long hours, may also provide important lessons for the healthcare industry. The financial services company, Blend, for example, enables employees to balance their professional and social obligations by offering flexibility to take additional leave or vacation between projects.²²

Healthcare providers should also draw inspiration from existing programs within other public service occupations. The US National Association for Social Work, for example, has recently increased its focus on compassion fatigue and secondary trauma. It provides regular self-assessments to members and has created a culture in which not addressing mental health challenges is considered an ethical violation.²³ Similarly, health systems and communities have rallied in support of

frontline healthcare workers who suffered primary and secondary trauma as a result of terrorist attacks. COVID-19 itself is already helping to push the frontiers of essential worker support; First Responders First is a partnership between the Harvard T.H. Chan School of Public Health, Thrive Global, and Creative Artists Agency Foundation—supported by a number of large private sector companies—that comprehensively addresses frontline healthcare worker needs. The program addresses everything from food and childcare to behavioral health interventions, including training, workshops, and coaching.²⁴ Providers can look to these existing efforts for inspiration in building their own mental health and well-being programs.

The path forward

The COVID-19 pandemic is far from over, and other challenges will emerge; providers need to find comprehensive, innovative models to ensure that they are capable of identifying, evaluating, and supporting workers who need help. In addition, there will be real costs with addressing the mental health needs of clinicians, and it should be a goal of all stakeholders to identify and institute appropriate funding mechanisms. Lessons can be taken from other sectors: only by adopting best practices and innovations from a wide range of settings can providers hope to transition healthcare worker mental health and well-being from reactive to proactive, treatment to prevention, and surviving to thriving.

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COVID-19 and rural communities: Protecting rural lives and health

Jesse Bradford, Erica Coe, Kana Enomoto, and Matt White

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Near-term actions can help rural communities as they manage the pandemic on three fronts: treating serious COVID-19 cases, curbing further spread of the virus, and addressing mental health and social needs.

As COVID-19 continues to spread

throughout the country, the 46 million Americans residing in rural counties bear an increasing burden from the pandemic, with viral transmission and death rates outpacing those of urban communities.

Unless stakeholders act with extraordinary speed in the months ahead, the impact on lives and livelihoods in rural communities will worsen.

In this article, we look closely at the impact of COVID-19 on rural communities leveraging data and analytics from Carrot Health, which provides consumer insights and social determinants of health scoring and monitoring for the healthcare industry. Specifically, we discuss four factors that appear to be contributing to the spread of the virus: underlying health status, socioeconomic vulnerability, access to care, and compliance with public health guidance.

Addressing these rural healthcare challenges will require a multifaceted approach: stakeholders should consider both healthcare delivery and broader social determinants of health to transform healthcare in rural areas. We suggest near-term actions

to save lives and safeguard livelihoods in rural communities as they manage the pandemic on three fronts: treating serious COVID-19 cases, curbing further spread of the virus, and addressing mental health and social needs.

COVID-19's disproportionate spread in rural communities

At the beginning of the COVID-19 pandemic, cases and deaths were concentrated in large urban centers. However, as the pandemic progressed, rural communities began to bear a higher burden from the virus (Exhibit 1). Rural residents account for 14 percent of the total US population but are 16 percent of all new COVID-19 deaths through February 2021. In that same time period, rural communities have experienced 175 deaths per 100,000 residents, compared with 151 deaths per 100,000 residents for urban communities. Death rates have risen in rural communities most months since March 2020.¹

The pandemic has also shed light on longstanding racial and ethnic inequities in health and healthcare.² As of February 2021, highly diverse counties have experienced 258 deaths per 100,000 residents, compared with 161 deaths per 100,000 residents for less diverse rural counties, that is, a 60 percent higher death rate.^{3,4} This discrepancy in mortality is higher than the discrepancy in urban areas, where, on average, highly diverse communities have reported a 13 percent higher death rate per 100,000 residents than less diverse communities.⁵

COVID-19 and highly diverse rural communities

The COVID-19 pandemic has cast a spotlight on racial and ethnic health inequities. While there is a growing body of research on the disproportionate impact of the COVID-19 pandemic on racial and ethnic minorities,^{6,7} the inequities in racially and ethnically diverse rural communities have largely been overlooked. It is worth noting that highly diverse rural communities—that is, those in which at least 33 percent of the population are people of color—represent 14 percent of the rural population and are home to 6.4 million people.⁸

With over half of the American Indian and Alaska Native (AI/AN) population living in rural communities and more than two-thirds in counties including or adjacent to tribal lands and reservations, it is important to note that the AI/AN population has the country’s highest COVID-19 hospitalization rate, at 281 per 100,000 residents.^{9,10} Aggregated national data on death rates show that AI/AN people are also experiencing the highest COVID-19

death rate, at 336 deaths per 100,000 individuals, followed by Black Americans, with 185 deaths per 100,000 individuals.¹¹ This trend also holds at the state level, where it is sometimes magnified—in New Mexico, for example, the age-adjusted case fatality rate is highest for AI/AN individuals, with 437 deaths per 100,000 individuals.¹² These data underscore the importance of understanding the intersection of geographic and racial and ethnic health disparities.

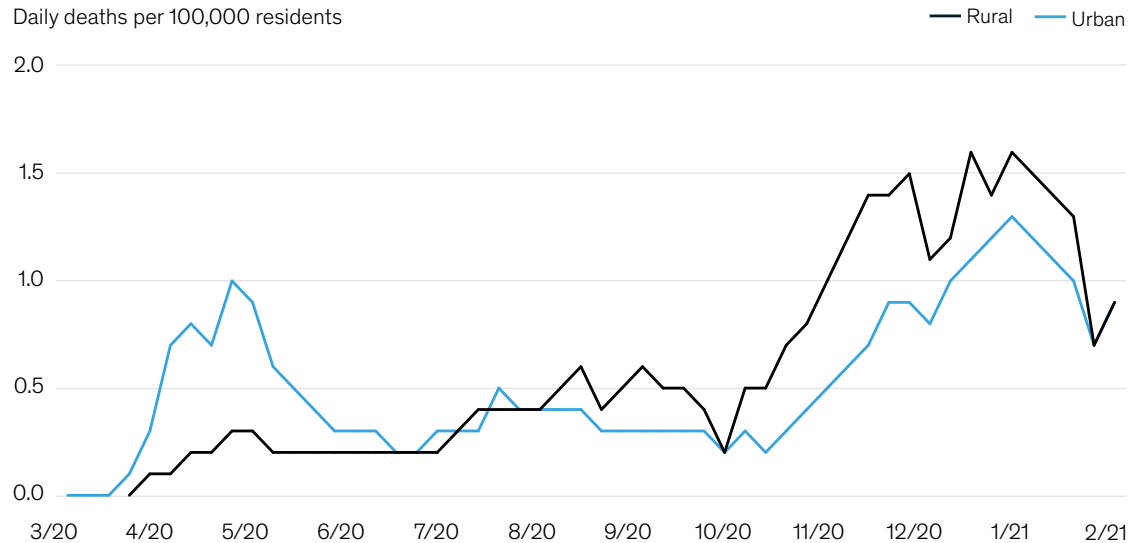
As referenced previously, the COVID-19 death toll across highly diverse¹³ rural communities, as of February 2021, is 258 per 100,000 residents. Eighty-two percent of these counties have had at least 150 deaths from COVID-19 per 100,000 residents, compared with 54 percent of less diverse rural counties (Exhibit 2).¹⁴ In Texas, 95 percent of the rural counties with a large Hispanic population have had more than 150 COVID-19 deaths per 100,000 residents, compared with 86 percent of all other Texas rural communities (to view this data, visit the Vulnerable Populations Dashboard).^{15,16}

Exhibit 1

Deaths from COVID-19 rose sharply in rural areas.

COVID-19 deaths, by geography

Daily deaths per 100,000 residents

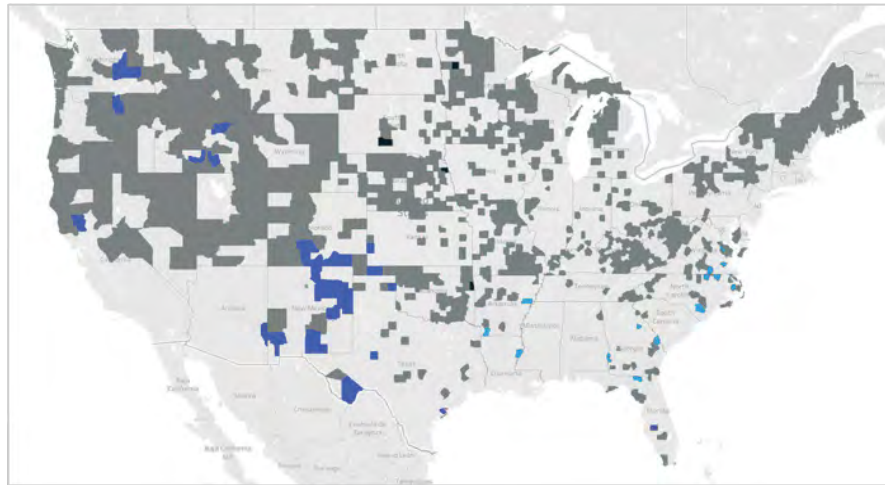


Source: USAFacts, as of February 2021

Exhibit 2

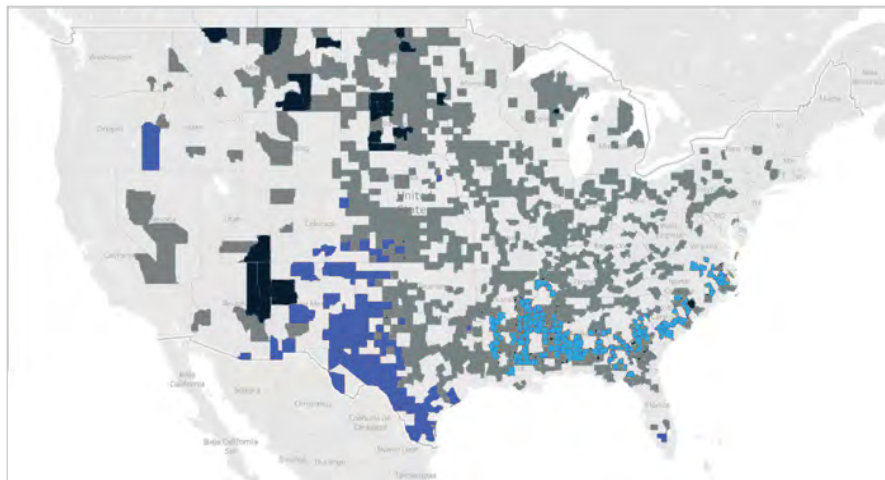
Highly diverse rural communities have had more deaths per capita than less diverse rural communities.

Rural counties with <150 COVID-19 deaths per 100,000 residents



- American Indian or Alaska Native
- Black or African American
- Hispanic
- Non-minority

Rural counties with >150 COVID-19 deaths per 100,000 residents



82%

of all the highly diverse rural counties (with 33% or more racial/ethnic minority residents)¹ have had at least 150 COVID-19 deaths per 100,000 residents (compared with 54% of other rural counties), as of February 2021

Mississippi

is the state with the most rural counties with a large Black or African American population that have had >150 COVID-19 deaths per 100,000 residents

100% of the state's rural counties have had >150 COVID-19 deaths per 100,000 residents, as of February 2021

Texas

is the state with the most rural counties with a large Hispanic population that have had >150 COVID-19 deaths per 100,000 residents

95% of the state's rural counties with a large Hispanic population have had >150 COVID-19 deaths per 100,000 residents (compared with 86% for all other rural Texas counties), as of February 2021

¹Rural minority communities include counties with at least one-third of the population in a particular racial/ethnic minority group. Minority counties are classified based on the plurality minority in each county. Non-minority communities are counties where White non-Hispanic residents are the only racial/ethnic group that make up at least one-third of the population.

Source: McKinsey Center for Societal Benefit through Healthcare Vulnerable Populations Dashboard, as of February 2021

Highly diverse rural communities¹⁷ have experienced 1.6 times more COVID-19 deaths per capita than other rural counties. Differences also exist across racial and ethnic minority groups. In rural counties where a single racial or ethnic minority group comprises more than 33 percent of the population, COVID-19 death rates are an order of magnitude higher than less diverse counties: 2.1 times where the largest group is AI/AN, 1.6 times where the largest group is Black or African American, and 1.5 times where the largest group is Hispanic.^{18,19}

Furthermore, racially and ethnically diverse rural communities face greater socioeconomic vulnerabilities when compared with less diverse rural communities (Exhibit 3). These socioeconomic vulnerabilities contribute to poor health outcomes: we find financial security, housing security, and risk of being uninsured are all 1.1 to 1.6 times greater

in highly diverse rural communities²⁰ than in other rural communities.²¹

Drivers of disproportionate spread and mortality

Four challenges may drive the disproportionate effect of the pandemic in rural areas: health status, socioeconomic vulnerability, access to care, and health behaviors.

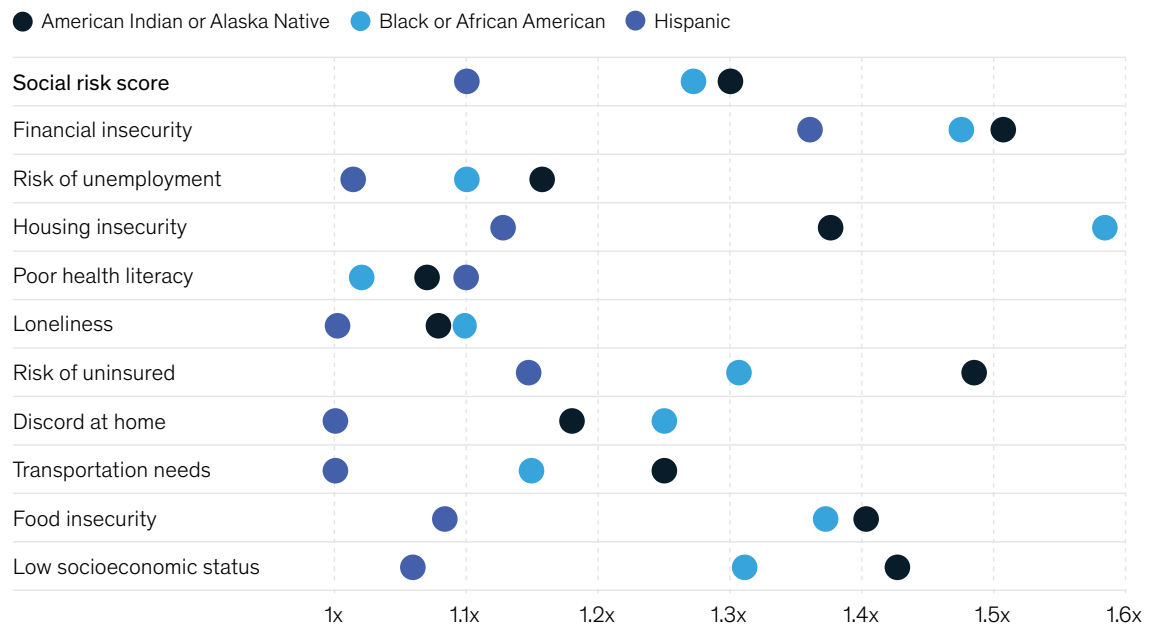
Health status

Older adults and individuals with serious underlying medical conditions face increased risk for developing severe COVID-19 symptoms, which contributes to higher hospitalization and death rates.²² Rural residents are more likely to be older and to have a health condition including cardiovascular disease, chronic obstructive pulmonary disease, diabetes, and obesity, that exacerbates the effects of COVID-19 (Exhibit 4).

Exhibit 3

Socioeconomic vulnerabilities are more prevalent in highly diverse rural communities.

Ratio of socioeconomic vulnerability in highly diverse rural communities, compared with other rural communities, multiplier

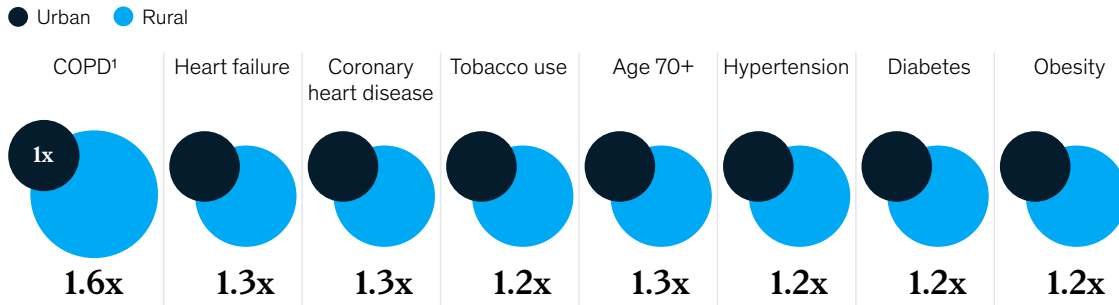


Source: Carrot Health Social Risk Grouper, as of September 2020

Exhibit 4

Rural residents are more likely to have risk factors that exacerbate COVID-19 and its effects.

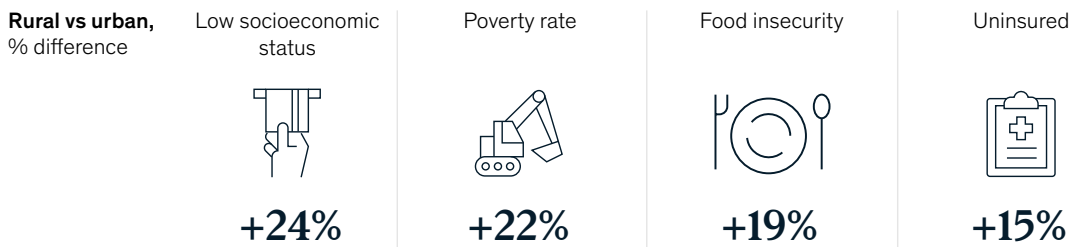
Likelihood of having a COVID-19 risk factor in rural counties, compared with urban counties, multiplier



¹COPD, chronic obstructive pulmonary disease. Source: McKinsey Center for Societal Benefit through Healthcare Vulnerable Populations Dashboard, as of January 2021

Exhibit 5

Rural communities face socioeconomic challenges that make them more vulnerable to the effects of the COVID-19 pandemic.



Source: Carrot Health Social Risk Group; McKinsey Center for Societal Benefit through Healthcare Vulnerable Populations Dashboard, as of September 2020

Socioeconomic vulnerability

Health and socioeconomic disparities are interconnected and associated with heightened likelihood of contracting COVID-19 or developing severe illness. For example, the likelihood of dying from COVID-19 per 100,000 residents is 4.5 times higher in communities facing severe housing problems, 1.4 times higher in communities with a high poverty rate, and 1.4 times higher in communities facing food insecurity.²³

This linkage of health and socioeconomic disparities drives higher rates of COVID-19 and cases of severe illness in already vulnerable populations.²⁴ Compounding socioeconomic vulnerability with rurality

results in even higher rates of those risk factors (for example, food insecurity, poverty, being uninsured, and low socioeconomic status) likely to exacerbate the effects of COVID-19 (Exhibit 5) (to view more SDoH data, visit the Vulnerable Populations Dashboard).

Access to care

Although rural populations are at greater risk of contracting COVID-19 and developing severe symptoms, they have lower access to healthcare professionals and critical care resources. Sixty-five percent of rural counties do not have a single intensive care unit (ICU) bed.²⁵ Overall, rural areas have between 37 and 42 percent fewer ICU beds per persons who are at

risk of developing severe COVID-19 based on age and comorbidities than persons in urban areas.²⁶ Like many of the hardest-hit urban areas, the rural healthcare system—already facing resource and workforce shortages—will need to manage severe capacity constraints, as the number of hospitalized COVID-19 patients continues to increase in some of America's most rural states.^{27,28}

While rural hospitals are not currently experiencing the dangerously high occupancy rates reported by urban hospitals—as of February 2021, rural hospitals reported an ICU bed occupancy rate of around 33 percent, compared with around 72 percent for the urban ones²⁹—hospital closures further compound access challenges in rural areas: 15 rural hospitals have shuttered since March 2020. This figure reflects an acceleration of a broader trend of rural hospital closures during the last 15 years.³⁰

Public health interventions

There is evidence that public health measures such as social distancing, stay-at-home orders, mask mandates, and travel restrictions help curb the spread of COVID-19. However, rural areas have lagged their urban counterparts in adopting these measures. Urban areas established stay-at-home orders more quickly and their residents were more likely to comply than rural residents.^{31,32} In an evaluation of public interventions by states, most urban states appear to have implemented more social distancing mandates than their rural counterparts.³³

In addition, a recent McKinsey survey found rural respondents reported being less likely to observe COVID-19-related

public health measures. Compared with urban residents, rural residents are 2.0 times less likely to limit the number of people they allow in their homes, 1.9 times fewer report that they wear a face mask in indoor public places, and 1.7 times less likely to report they maintain social distancing of at least six feet apart from other people.³⁴

Near- and longer-term challenges for rural communities

Left unabated, the continued spread of COVID-19 before we achieve widespread vaccination in rural communities will create serious challenges that could have long-lasting effects on overall health and well-being.

Near-term challenge: Potential for delayed impact of vaccine

States, in coordination with the federal government, local health departments, manufacturers, and providers, have begun COVID-19 vaccination programs nationwide. These programs differ across states, but consistently prioritize delivery of the vaccines to frontline healthcare workers and those most at risk, including people over 65.³⁵⁻³⁸ Rural areas have a greater share of certain high-risk populations but face more structural and social barriers that could impact vaccine distribution and adoption.³⁹

For example, given that rural areas have 30 percent fewer primary care providers,⁴⁰ rural areas may face lower rates of vaccine access and uptake than urban areas. Additionally, in a recent survey, rural residents were 1.2 times less likely than urban residents to indicate they would get the COVID-19

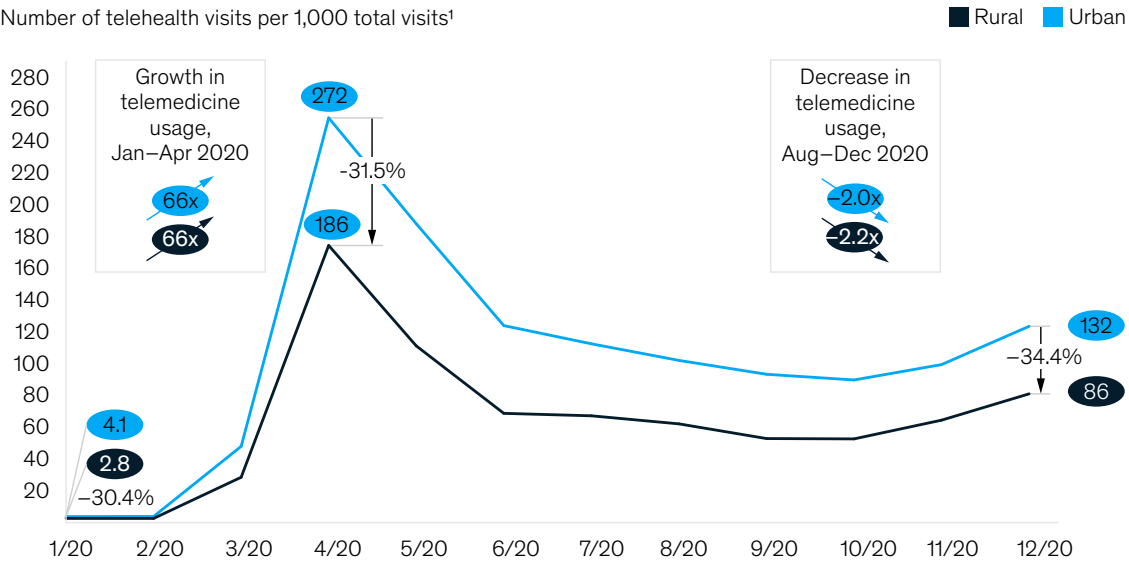
Rural areas have 37 to 42 percent fewer ICU beds per persons who are at risk of developing severe COVID-19 than persons in urban areas.

Exhibit 6

While telemedicine use has increased dramatically in rural areas since the onset of the pandemic, adoption is still ~34% lower than in urban counties.

Change in telemedicine usage rates for evaluation and management visits

Number of telehealth visits per 1,000 total visits¹



¹Analysis limited to counties with at least 2,000 total COVID-19 cases per 100,000 residents. Source: Compile, January–December 2020; www.compile.com

vaccine, with potential side effects indicated as the primary barrier.⁴¹ This finding is consistent with historic data on annual flu vaccine uptake, with rural counties showing 7 percent lower uptake than urban counties.⁴² This disparity in regular flu vaccination rates results in real health consequences for rural communities—very rural areas typically see 60 percent more flu-related deaths per 100,000 residents than major metro areas.⁴³

Longer-term concerns: Lasting health and healthcare challenges

The pandemic has led to a decrease in use of non-COVID-19 health services. In a recent survey of healthcare consumers, one in five respondents indicated they had not yet scheduled or received care for conditions that arose after the pandemic started.⁴⁴ In rural communities, healthcare utilization remains around 11 percent lower than pre-pandemic rates.⁴⁵ This level of delayed

or cancelled healthcare may create gaps in the care continuum and exacerbate undertreated or untreated conditions.

While the pandemic has spurred rapid, broad adoption of virtual care, aided by public and private policy shifts including reimbursement parity,⁴⁶ access to out-of-state healthcare professionals, increased pace of virtual care delivery platform rollouts,^{47,48} rapid release of provider guidelines for telemedicine use, and increased employer offerings for virtual care,⁴⁹ the adoption of virtual care in rural areas has lagged urban areas (Exhibit 6). This lag may be attributed to structural challenges as well as individual behaviors and preferences. Rural residents are eight times more likely than urban residents to lack access to broadband at home.⁵⁰ Furthermore, 64 percent of rural residents prefer a non-web-based modality of communication with healthcare providers, compared with 46 percent of urban residents.⁵¹

The COVID-19 crisis has also led to an increase in psychological distress, with almost four times more people reporting symptoms of depression and anxiety during the pandemic than in 2019.⁵² McKinsey survey data indicate levels of distress have increased over the course of the pandemic, with the percentage of rural respondents indicating high levels of distress rising from 17 percent in April 2020 to 28 percent in January 2021.⁵³

Unfortunately, Americans living in rural communities face significant obstacles to obtaining mental healthcare. Sixty-three percent of US counties do not have a practicing psychiatrist⁵⁴ and rural counties have 6.3 psychiatrists per 100,000 residents, while urban counties have 19 psychiatrists per 100,000 residents (Exhibit 7). With COVID-19 causing high levels of distress for rural residents, the challenge to rural behavioral health systems may be especially acute.⁵⁵

What can be done to save lives and safeguard livelihoods?

Public, private, and social sector stakeholders can consider a response to the disproportionate impact of COVID-19

with a dedicated focus on protecting rural communities. Ultimately, stakeholders should balance near-term actions with long-term steps to transform the rural healthcare system. We discuss actions that stakeholders could consider to protect rural residents during the pandemic.

Near-term actions

In the near term, rural stakeholders will be managing COVID-19 on three fronts. First, they are maintaining the resource-intensive effort of treating the greatest surge in COVID-19 cases since the onset of the pandemic. Second, many are redoubling efforts to contain the virus by strengthening public health strategies and vaccine administration. Finally, they are addressing the longer-term mental health and social well-being consequences of the pandemic, related economic challenges, and social isolation. Readiness may require exponential increases in testing capacity, hospital beds, medical equipment, and key segments of the healthcare workforce, such as intensivists, nurses, mental health workers, and peers. Below, we highlight several potential actions:

Exhibit 7

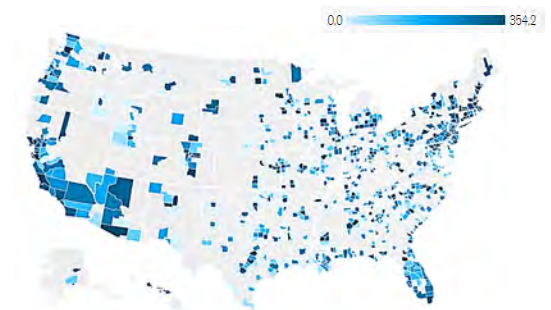
Urban counties have ~3x more psychiatrists per 100,000 residents than rural counties.

Psychiatrists per 100K residents in rural counties



Rural counties have an average of **6.3** psychiatrists per 100K residents.

Psychiatrists per 100K residents in urban counties



Urban counties have an average of **19** psychiatrists per 100K residents

Source: McKinsey Center for Societal Benefit through Healthcare Vulnerable Populations Dashboard, as of January 2021

Examine obstacles to implementing basic, evidence-based interventions with the potential to reduce the spread of COVID-19.

Treating COVID-19

- **Expand workforce capacity.** It is critical to protect the health and safety of the existing rural healthcare workforce, which could be supported by implementing swift vaccine programs as well as evidence-based safety policies and protocols and—if not already in place—establishing systems to monitor burnout and provide resources to address holistic needs (for example, personal wellness and mental health support, childcare, housing, transportation, meals). Stakeholders could also plan to expand system-wide workforce capacity in emergency situations. Potential strategies to expand the rural healthcare workforce include: shifting providers from regions with lower relative COVID-19 pressure, providing cross-training to upskill personnel to fill critical roles while ensuring appropriate oversight and support, increasing ancillary support for frontline workers, expanding the use of peers and community health workers, leveraging telemedicine to support patients and care teams, organizing hub-and-spoke support models for rural providers to consult with specialists at larger hospitals,⁵⁶ and establishing partnerships between rural and urban hospitals for clinically appropriate transfers when capacity, labor, or supply constraints are acute.
- **Ensure an adequate supply of essential resources.** For those systems that have not already done so, it may be helpful to establish models to support decision making in capacity planning and procurement of essential sup-

plies, including testing kits, personal protective equipment, and ventilators. Rural hospitals could consider developing contingency plans to ensure adequate bed capacity, including conversion of beds (for example, med-surg to ICU) and plans to share patient load with urban counterparts. Rural hospitals could also leverage policies implemented at large hospitals to conserve supplies (for example, intravenous pumps external to rooms, remote ventilator management, patient isolation bags).⁵⁷

Curbing the spread of COVID-19

Concerted efforts are also needed to reduce community spread of COVID-19. Stakeholders could consider the following data-driven actions:

- **Consistent implementation of public health measures across states.** Examine obstacles to implementing basic, evidence-based interventions with the potential to reduce the spread of COVID-19 that may be unique to rural areas, such as lack of transportation or increased social isolation. Consistent with the federal government's guidance and executive orders,⁵⁸ stakeholders should clearly communicate the benefits of basic public health measures, such as wearing face masks or social distancing (even **after** vaccination), and provide support to residents to deal with basic needs, such as obtaining food and other essentials.
- **Accelerate vaccine rollout and uptake.** Stakeholders should support vaccine allocation to priority populations in rural communities and distribute vac-

cines equitably. In addition, given levels of public hesitancy about the COVID-19 vaccine among certain populations, stakeholders should support rapid, effective, and targeted implementation of a vaccine strategy consistent with data as they become available.

Addressing other health and social needs

Finally, stakeholders need to ensure that non-COVID-19 health needs of rural residents are being met. Three priorities are outlined below:

- **Protect access to non-COVID-related treatments and services.** Stakeholders need to preserve access to healthcare for conditions other than COVID-19 in order to prevent exacerbation of latent or undetected health conditions. Potential strategies could include:
 - Providing resources for at-home care, including education about symptom management, guidance for escalating care to emergency room/urgent care, and at-home testing
 - Expanding telemedicine use to ensure that rural residents who prefer teleservices have timely access to care. Strategies to expand use include funding technical infrastructure (government agencies), and pursuing payer–provider partnerships. Where appropriate, telephone-only care is another strategy for increasing telehealth uptake among rural residents who lack broadband access or prefer the phone
 - Expanding rural provider networks, so members can seek care outside their community if rural hospitals are at capacity
- **Address behavioral health (mental health and substance use) needs.** COVID-19 testing, treatment, and vaccination programs can help to raise

awareness of behavioral health (BH) needs and resources. These critical contacts provide a timely opportunity to screen for signs of psychological distress and direct patients to self-help tools, national or local helplines, local supports, or virtual care.

Strengthening community prevention efforts to address suicide, substance use, and overdose may help mitigate long-term negative effects of pandemic-related increases in mental illness and substance use disorder. In addition to maintaining expanded access to care via telehealth, maintaining the flexibilities of mobile treatment, take-home dosing, and home delivery of medications for higher risk populations⁵⁹ may increase the ability of individuals with BH conditions in rural areas to adhere to evidence-based treatment protocols.

Integrating behavioral and physical health services in rural areas will also enable at-scale adoption of evidence-based treatments for behavioral health conditions. Finally, as the nation prepares for the rollout of 9-8-8 in 2022,⁶⁰ a three-digit number for individuals who are suicidal or experiencing mental health crises, rural communities can begin to enhance their crisis care continuum to ensure they are prepared for anticipated increases in community demand.

- **Address unmet social needs.** Community needs assessments will help identify the most pressing challenges in a community, including those that may be exacerbated by the pandemic such as food access and housing loss. For millions of rural Americans, the loneliness and social isolation resulting from the pandemic are also critical to address given the high likelihood that many seniors and other adults who live alone may be more isolated than ever before.

Longer-term actions

The COVID-19 pandemic has elucidated gaps in the rural healthcare delivery system. While the immediate priority is to save lives impacted by the coronavirus, public, private, and social sector stakeholders could also support medium- and long-term measures to transform access and care quality in the rural healthcare system. This is especially critical for the rural behavioral healthcare system, in the wake of the widespread psychological distress associated with the pandemic.⁶¹

This transformation can happen in a number of ways: pursuing new value-based care models, implementing more sophisticated population health measures, increasing the size of the healthcare workforce, increasing novel healthcare access points, investing in social determinants data to

better serve vulnerable populations, addressing unmet social needs that contribute to poor health, improving community health, investing in broadband and other telehealth infrastructure, ensuring the financial stability of rural providers, and ensuring that rural health workforce expansion efforts prioritize providers equipped to treat mental illnesses and addictions.

Conclusion

As the COVID-19 pandemic surges in rural communities, the need for closing the rural-urban health gap is more critical than ever. The differences in health status, socioeconomic vulnerability, health access, and care-seeking behaviors are deeply rooted and hard to solve. But if stakeholders act swiftly, rural Americans will benefit—both during the pandemic and beyond.

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Selected quotes from our conversations with leaders

Reflections on the next chapter

There were people that really didn't sleep much for months to support the crisis, and people volunteered to do that from their kitchen desktops—because they understood they were truly saving lives by bringing care to people.



Ido Schoenberg
Chairman and CEO,
Amwell



Dame Sally Davies
Master of Trinity College,
Cambridge

We've got to make sure digital tools address biases. . . In healthcare, you have to be struck by the power of digital technology—the Fourth Industrial Revolution—to totally change how we deliver healthcare.

When the history of the COVID-19 pandemic is written, I want Africa to be remembered for doing the right thing.



John Nkengasong
Director,
Africa CDC

Telehealth: A quarter-trillion-dollar post-COVID-19 reality?

Oleg Bestsenny, Greg Gilbert, Alex Harris, and Jennifer Rost

July 9, 2021

Strong continued uptake, favorable consumer perception, and tangible investment into this space are all contributing to the continued growth of telehealth in 2021. New analysis indicates telehealth use has increased 38X from the pre-COVID-19 baseline.

Early in the COVID-19 pandemic, telehealth usage surged as consumers and providers sought ways to safely access and deliver healthcare. In April 2020, overall telehealth utilization for office visits and outpatient care was 78 times higher than in February 2020 (Exhibit 1).

This step-change, borne out of necessity, was enabled by these factors: 1) increased consumer willingness to use telehealth, 2) increased provider willingness to use telehealth, 3) regulatory changes enabling greater access and reimbursement. During the tragedy of the pandemic, telehealth offered a bridge to care, and now offers a chance to reinvent virtual and hybrid virtual/in-person care models, with a goal of improved healthcare access, outcomes, and affordability.

A year ago, we estimated that up to \$250 billion of US healthcare spend could potentially be shifted to virtual or virtually enabled care.¹ Approaching this potential level of virtual health is not a foregone conclusion. It would likely require sustained consumer and clinician adoption and accelerated redesign of care pathways to incorporate virtual modalities.

As of July 2021, we step back to review the progress of telehealth since the initial COVID-19 spike and to assess implications for telehealth and virtual health² more broadly going forward. Our findings include the following insights:

- **Telehealth utilization has stabilized at levels 38X higher than before the pandemic.** After an initial spike to more than 32 percent of office and outpatient visits occurring via telehealth in April 2020, utilization levels have largely stabilized, ranging from 13 to 17 percent across all specialties.³ This utilization reflects more than two-thirds of what we anticipated as visits that could be virtualized.⁴
- **Similarly, consumer and provider attitudes toward telehealth have improved since the pre-COVID-19 era.** Perceptions and usage have dropped slightly since the peak in spring 2020. Some barriers—such as perceptions of technology security—remain to be addressed to sustain consumer and provider virtual health adoption, and models are likely to evolve to optimize hybrid virtual and in-person care delivery.
- **Some regulatory changes that facilitated expanded use of telehealth have been made permanent**, for example, the Centers for Medicare & Medicaid Services' (CMS) expansion of reimbursable telehealth codes for the 2021 physician fee schedule. But uncertainty still exists as to the fate of other services that may lose their waiver status when the public health emergency ends.
- **Investment in virtual care and digital health more broadly has skyrocketed,**

fueling further innovation, with 3X the level of venture capitalist digital health investment in 2020 than it had in 2017.⁵

- **Virtual healthcare models and business models are evolving and proliferating**, moving from purely “virtual urgent care” to a range of services-enabling longitudinal virtual care, integration of telehealth with other virtual health solutions, and hybrid virtual/in-person care models, with the potential to improve consumer experience/convenience, access, outcomes, and affordability.

Telehealth uptake

Since the initial spike in April 2020, telehealth adoption overall has approached up to 17 percent of all outpatient/office visit claims with evaluation and management (E&M) services. This utilization has been relatively stable since June 2020.

We are also seeing a differential uptake of telehealth depending on specialty, with the highest penetration in psychiatry (50 percent) and substance use treatment (30 percent) (Exhibit 2).

Consumer and provider perceptions of telehealth

Our consumer research⁶ shows that consumers continue to view telehealth as an important modality for their future care needs, but—as expected—this view varies widely depending on the type of care. Overall, consumer perception tracks closely to what we believe is possible telehealth uptake by various specialties (Exhibit 3).

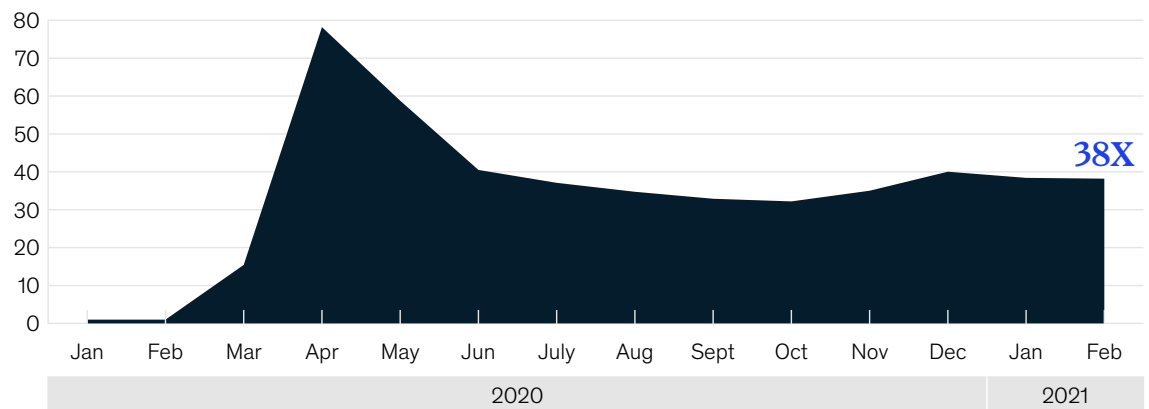
Around 40 percent of surveyed consumers stated that they believe they will continue to use telehealth going forward—up from 11 percent of consumers using telehealth prior to COVID-19.

Moreover, our research shows between 40 and 60 percent of consumers express interest in a set of broader virtual health solutions, such as a “digital front door” or lower-cost virtual-first health plan.⁷ However, a gap has historically existed between consumers’ expressed interest in digital health solutions and actual usage. Continuing to focus on creating a seamless consumer interface, breaking down silos in care provision (across virtual and in-person) with improved data integration and insights, and proactive

Exhibit 1

Growth in telehealth usage peaked during April 2020 but has since stabilized.

Telehealth claims volumes, compared to pre-Covid-19 levels (February 2020 = 1)¹



¹Includes cardiology, dental/oral, dermatology, endocrinology, ENT medicine, gastroenterology, general medicine, general surgery, gynecology, hematology, infectious diseases, neonatal, nephrology, neurological medicine, neurosurgery, oncology, ophthalmology, orthopedic surgery, poisoning/drug tox./comp. of TX, psychiatry, pulmonary medicine, rheumatology, substance use disorder treatment, urology. Also includes only evaluation and management visits; excludes emergency department, hospital inpatient, and psychiatry inpatient claims; excludes certain low-volume specialties.
Source: Compile database; McKinsey analysis

consumer engagement will all be important to sustaining and growing consumer use of virtual health as the pandemic wanes.

On the provider side, 58 percent of physicians continue to view telehealth more favorably now than they did before COVID-19, though perceptions have come down slightly since September 2020 (64 percent of physicians). As of April 2021, 84 percent of physicians were offering virtual visits and 57 percent would prefer to continue offering virtual care. However, 54 percent would not offer virtual care at a 15 percent discount to in-person care.⁸ Most health systems are closely monitoring reimbursement. Those in bed capacity-constrained environments and value-based care arrangements are looking to understand whether there is scalable volume decanting or cost savings potential at equivalent quality.

Regulatory changes

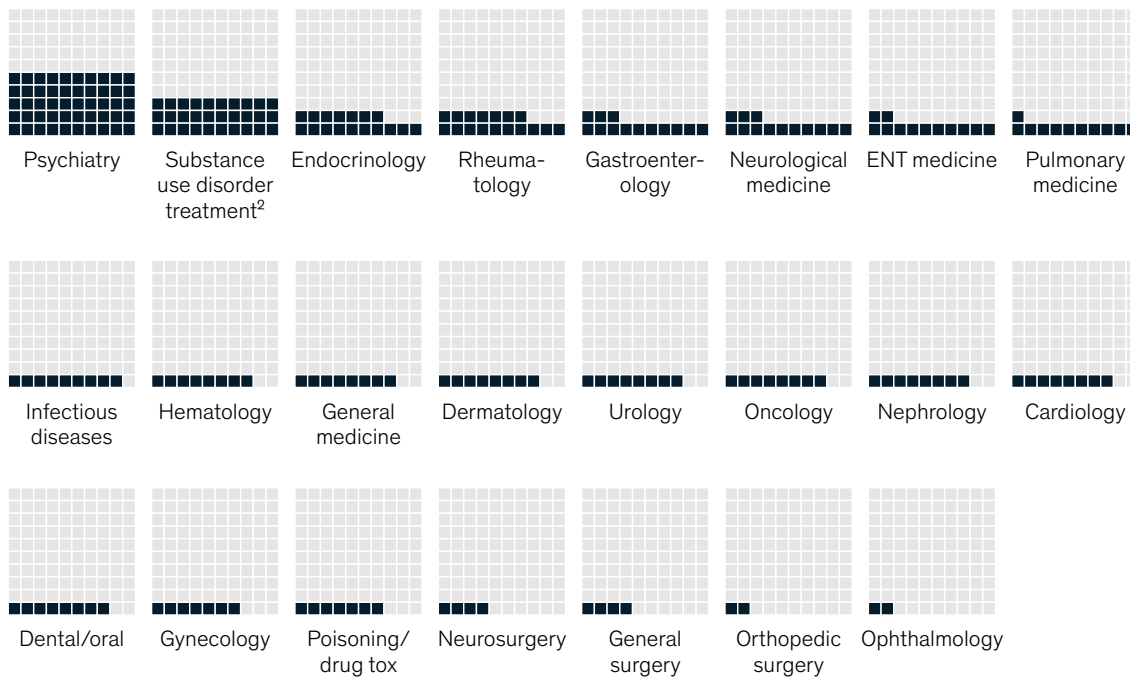
Some regulatory changes that enabled greater telehealth access during COVID-19 have been made permanent. For example, CMS allowed telehealth coverage for a number of current procedural terminology (CPT) codes permanent in the 2021 physician fee schedule final rule.⁹

However, other restrictions on telehealth may return to pre-COVID-19 normal when the public health emergency expires. For example, there were several dozen additional CPT codes that CMS allowed telehealth coverage for on a temporary basis in the 2021 physician fee schedule.¹⁰ In addition, a waiver for public health emergency allowed telehealth to be provided for Medicare beneficiaries outside of rural areas and from home rather than from a provider's office. The future of these provisions once the public health emergency ends is not yet clear.

Exhibit 2

Substantial variation exists in share of telehealth claims across specialities.

Share of telehealth of outpatient and office visit claims by specialty (February 2021¹), %



¹Includes only evaluation and management claims; excludes emergency department, hospital inpatient, and psychiatry inpatient claims; excludes certain low-volume specialties.

²Also includes addiction medicine and addiction treatment.

Source: Compile database; "Telehealth: A quarter-trillion-dollar post-COVID-19 reality?" May 2020, McKinsey.com; McKinsey analysis

Investor activity

Investment in virtual health continues to accelerate. Per Rock Health's H1 2021 digital health funding report¹¹ the total venture capital investment into the digital health space in the first half of 2021 totaled \$14.7 billion, which is more than all of the investment in 2020 (\$14.6 billion) and nearly twice the investment in 2019 (\$7.7 billion) (Exhibit 4). This increase would reflect an annualized investment of \$25 billion to \$30 billion in 2021, if this rate continues. In addition, total revenue of the top 60 virtual health players increased in 2020 to \$5.5 billion, from around \$3 billion the year before.¹²

As the investment into virtual health companies continues to grow at record levels, so does the pressure on the companies within the ecosystem

to innovate and find winning models that will provide sustainable competitive advantage in this quickly evolving space. This is good news for consumers and patients, as we are likely to continue seeing increased innovation in the virtual care delivery models.

The next chapter of telehealth

Telehealth appears poised to stay a robust option for care. Strong continued uptake, favorable consumer perception, the regulatory environment, and strong investment into this space are all contributing to this rate of adoption.

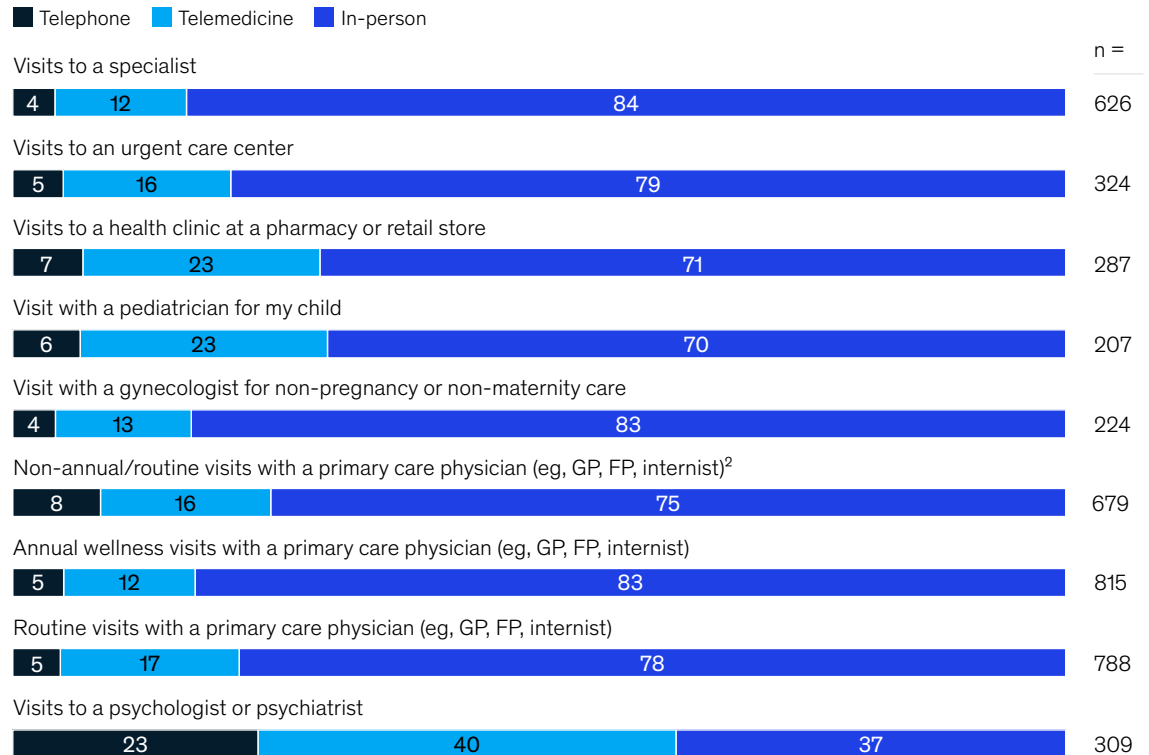
We are observing a quick evolution of the space and innovation beyond the "virtual urgent care" convenience. Innovations around virtual longitudinal care

Exhibit 3

Most recent care received utilized telemedicine, with some moderate increases since January.

Modality of most recent appointment by setting, current as of June 14, 2021

Respondents who reported receiving care in the specified setting (sample size varies by row),¹ %



APPT1. For each of the following types of care below, indicate whether your most recent appointment was either at an in-person appointment, or an online/video visit with a physician (eg, Doctor on Demand, Skype, FaceTime); also called telemedicine, or a telephone (voice call) appointment.

¹Figures may not sum to 100%, because of rounding.

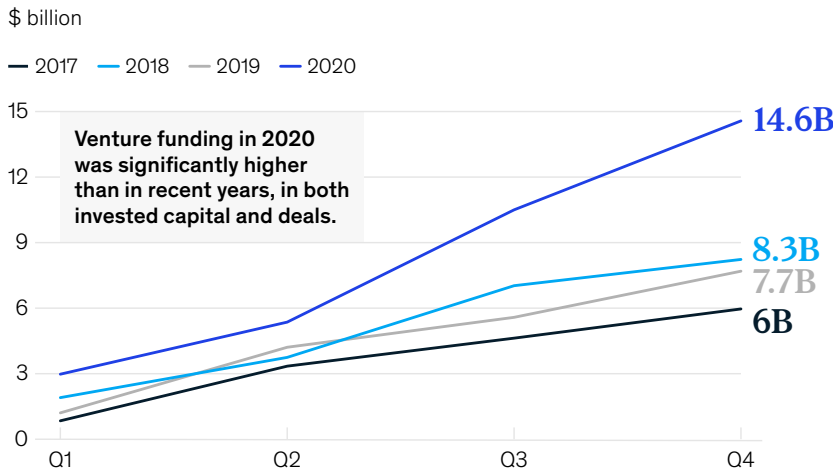
²FP, family physician; GP, general practitioner.

Source: McKinsey COVID-19 Consumer Survey 1/15/2021, 6/14/2021

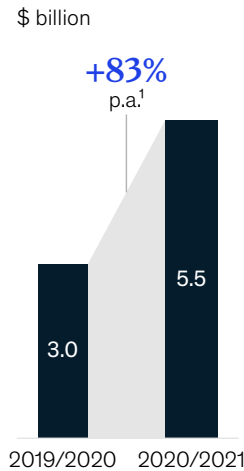
Exhibit 4

Investment in digital health and the revenues of telehealth players almost doubled compared to 2019.

Total venture funding for digital health companies, by year



Total annual revenues



¹ p.a., per annum.

Source: Adriana Krasniansky et al., "H1 2021 Digital Health Funding: Another Blockbuster Year...In Six Months," Rock Health, July 2021, rockhealth.com; McKinsey virtual health vendor database

(both primary and specialty), enablement of care at home through remote patient monitoring and self-diagnostics, investment in "digital front doors," and experimentation with hybrid "online/offline" models will bring new care models for consumers that help achieve healthcare's "triple aim."

In order to fully realize the potential of virtually enabled care models, both payers and providers should consider these new delivery models part of the core day-to-day value proposition to consumers across three areas:

— **Increasing convenience to receive routine care**

- *Integrating e-triage solutions with virtual visits to create a broader "digital front door"* for healthcare that enables consumers to easily get care when they need it, through the most convenient channels, and lowers the cost of care by avoiding unnecessary emergency department visits
- *Integrating care advocacy and telehealth solutions*, as evidenced by recent M&A activity with the value proposition to make it easy for consumers to access care and find the best provider for their individual needs

- *Experimenting with virtual-first health plans.* The number of virtual-first health plans grew from one in 2019 to at least eight in 2020. While these products are still nascent, they offer the potential of lower premiums and greater convenience, in return for seeing a virtual primary care provider as the first point of care. These advantages are attracting increasing attention from employers, brokers, and payers

- *Expanding the types of care that can be delivered virtually or near-virtually* with innovations in at-home diagnostics/equipment or combining virtual care with at-home nurse visits

— **Improving access, especially for behavioral health and specialty care**

- *Continuing to expand the range of behavioral health offerings* with potential to address provider shortages in many parts of the country. For example, 56 percent of counties in the United States are without a psychiatrist, 64 percent of counties have a shortage of mental health providers, and 70 percent of counties lack a child psychi-

- *Expanding access to specialty care capacity*, such as in rural areas where many specialties may not be available.¹⁴ Even outside of rural areas, provider-to-provider virtual health can improve experience and quality of care by rapidly getting specialist input
- **Improving care models and health outcomes, particularly for those with chronic conditions or in need of post-acute care support**
 - *Integrating remote monitoring and digital therapeutics with virtual visits, especially in value-based provider arrangements*, where incorporating virtual health into their care models could improve patient outcomes and overall performance
 - *Growing hospital-at-home and post-acute care-at-home models*
- The need for better data integration and improved data flows across the various players in the ecosystem, in light of the fast proliferation of point solutions, which are overwhelming consumers, payers, and providers alike
- The need for better integration of the virtual health-related activities into day-to-day workflows of clinicians, particularly to enable hybrid care models that combine online and in-person care delivery
- Alignment of incentives for virtual health activities with the broader movement toward value-based care, to break out of the fee-for-service mentality and the worry about reimbursement parity, especially for the virtual health models that aim to reduce total cost of care

Potential exists to improve access, quality, and affordability of healthcare, plus embrace the quarter-trillion-dollar economic opportunity represented by telehealth. Collectively, industry leaders have a chance to help consumers and providers improve access and quality through the power of telehealth.

Remaining challenges to scale

Even with these innovations, challenges remain to be worked through to realize the full potential of virtual care. These challenges include the following items:

Oleg Bestsenny is a partner in McKinsey's New York office. **Greg Gilbert**, **Alex Harris**, and **Jennifer Rost** are partners in the Washington, DC, office.

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¹ Oleg Bestsenny, Greg Gilbert, Alex Harris, and Jennifer Rost, "Telehealth: A quarter-trillion-dollar post-COVID-19 reality?," May 29, 2020, McKinsey.com.

² We define virtual health as a range of solutions for healthcare provider-patient interactions to occur outside of in-person visits, including telehealth (video/phone), text-based care, e-triage, and remote monitoring.

³ Compile data set, compile.com.

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Trends that will define 2021 and beyond: Six months on

Kevin Sneader and Shubham Singhal

July 21, 2021

In January 2021, we discussed how the COVID-19 pandemic could change the economy. How did we do?

In January 2021, we made a series of projections about trends that would characterize 2021 and the recovery from the COVID-19 pandemic (see sidebar, “Trends projected in January 2021”).¹ Since then, some countries have rolled out widespread COVID-19-vaccination efforts; in others, there have been reverses. Circumstances have changed.

Six months later, we have updated our work, with a focus on the United States. As an advanced economy that’s now largely open, it can to some degree be seen as a bellwether for postpandemic trends.

The return of confidence unleashes a consumer rebound

Personal savings in the United States spiked in April 2020 to 33.7 percent—the highest rate ever recorded.² With stores and entertainment venues shut down across the country, what was there to spend money on? US household savings have more than doubled, to \$3 trillion, since 2019. In January 2021, we suggested that spending “will only recover as fast as the rate at which people feel confident about becoming mobile again,” and that’s what appears to be happening.

A McKinsey survey published in May 2021 found that about half of US consumers wanted to indulge themselves—cautiously.³ Even among those who want to splurge, a large

number are waiting until they are more confident about eating in restaurants or traveling. One key distinction is between the vaccinated and the unvaccinated. For example, McKinsey research found that vaccinated Americans were spending more time and money away from home, and the way they were using leisure time was approaching prepandemic levels. In addition, 82 percent of millennials who make more than \$100,000 said they were ready to splurge—a level much higher than that of older generations. As younger Americans get COVID-19 shots, then, spending should pick up.

Two consumer trends seem to be sticking. One is “home nesting”—the nationwide do-it-yourself and clean-up binge. Almost three in ten US households renovated their homes or added fitness equipment during the pandemic; the same percentage plan to treat themselves to more home improvements. The other is the disruption of consumer loyalty. About three-quarters of Americans changed their shopping habits in 2020, and 40 percent of these changed brands—twice the rate in 2019.⁴ Younger people were more likely than older ones to switch. The implication is that, more than ever, companies can’t take their customers for granted. Loyalty must be earned time and again.

In sum, American consumers are spending again and eager to spend more. But the pandemic has been a scarring experience, and they aren’t doing so with abandon. In May 2021, the latest month for which data are available, the savings rate was 12.4 percent, down more than two points from April but still very high by historical standards (Exhibit 1).⁵

Sidebar

Trends projected in January 2021

Which trends will define 2021 and beyond? Here are the projections we made on January 4, 2021¹:

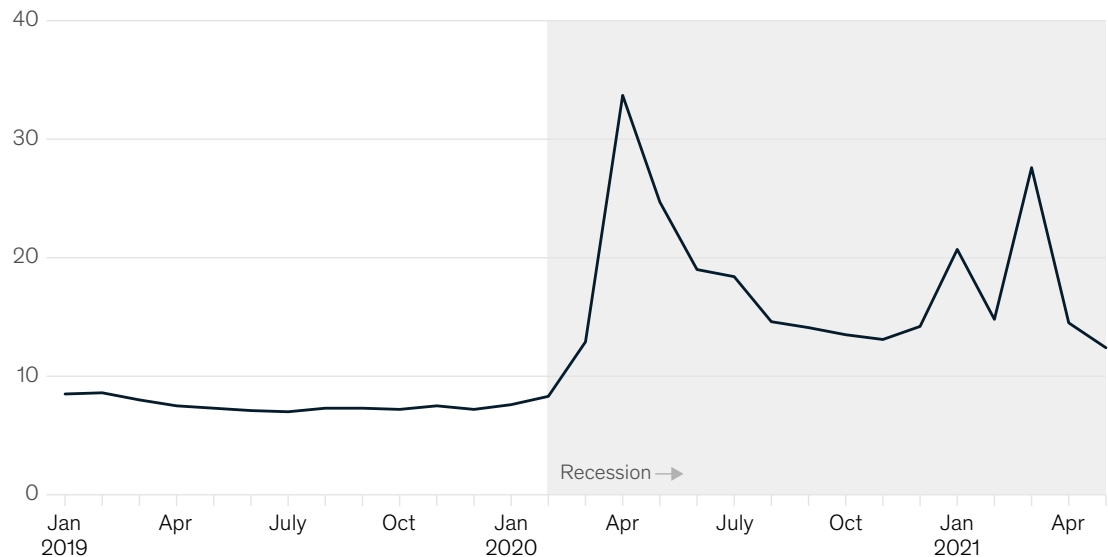
- How the COVID-19 crisis and the recovery are shaping the global economy:
 - The return of confidence unleashes a consumer rebound.
 - Leisure travel bounces back, but business travel lags behind.
 - The crisis sparks a wave of innovation and launches a generation of entrepreneurs.
 - Digitally enabled productivity gains accelerate the Fourth Industrial Revolution.
- How businesses are adjusting to the changes prompted by the COVID-19 crisis:
 - Pandemic-induced changes in shopping behavior forever alter consumer businesses.
 - Supply chains rebalance and shift.
 - The future of work arrives ahead of schedule.
 - The biopharma revolution takes hold.

¹ Kevin Sneader and Shubham Singhal, "The next normal arrives: Trends that will define 2021—and beyond," January 4, 2021, McKinsey.com.

Exhibit 1

Savings rates in the United States remain high, though lower than their record peak in 2020.

Personal-savings rate by month, seasonally adjusted, %



Source: FRED, Federal Reserve Bank of St. Louis, July 2021, fred.stlouisfed.org

Leisure travel bounces back, but business travel lags behind

Americans want to get moving again—to see friends and family or just to have a little fun outside their four walls and immediate neighborhoods. In 2020, spending on travel fell more than 40 percent and on business travel around 70 percent.⁶ Now more than 60 percent of Americans feel comfortable taking a vacation.⁷ Many are already doing so: travel around the July 4 holiday was near record highs. In the second half of June 2021, almost two million passengers a day traveled through US airports, roughly four times as many as during the same period in 2020 but still well down from 2019.⁸ The pace of future recovery is unclear, but a recovery in domestic travel is certainly under way.

International travel is a different story. Going overseas remains complicated by a patchwork of rules and regulations on testing, vaccination status, and quarantining. What matters for international travel is that it should be possible and relatively straightforward. On the whole, that isn't happening, and international travel is still reeling. In January 2020, 2.9 million Americans traveled outside the country; a year later, just 580,000 did—a 71 percent drop; visits to Europe were down 88 percent.⁹ The mildly good news is that growth was strong from January 2021 to March 2021, up 48 percent, and the allure of overseas travel is unchanged. But for now, Americans are opting to travel domestically.

Business travel looks likely to fall somewhere in the middle—a slower recovery than domestic travel but a faster one than international. US business travel fell by more than two-thirds in 2020,¹⁰ and in the meantime, companies have found new ways to connect, such as through videoconferencing and webinars. Month by month, as vaccination levels and confidence rise, we expect more businesspeople to get back on the road, with domestic business travel recovering faster than international.

By 2024, domestic travel will probably return to prepandemic strength, but we estimate that business travel will be at only 80 percent

and may never recover beyond that. For the many hotels and airlines that rely on business travelers for a disproportionate share of profits, “normal” isn't coming back any time soon. They will need to reevaluate their pricing, marketing, networks, digital strategies, and investment plans. In this instance, the past may not be prelude: reimagination will be the order of the day.

One factor to keep in mind is that for the airline industry, there can only be as many passengers as there are seats. Getting the physical and service infrastructure back—for example, by recalling furloughed pilots and preparing idled aircraft to fly again—will take time. No doubt this is a problem the airlines would love to have, compared with the catastrophe of the past 16 months, but it's still a problem.

The crisis sparks a wave of innovation and launches a generation of entrepreneurs

In January 2021, we noted the surge in new business applications in the third quarter of 2020—more than double the level for the same period in 2019. That included a 50 percent increase in applications for “high propensity” businesses, which are the kind most likely to employ additional people.

The number of start-ups couldn't keep on doubling indefinitely. But what's encouraging is that their growth is still going strong. Since the US Census Bureau started keeping statistics on the subject, in 2005, no month recorded as many as 340,000 new businesses—until June 2020.¹¹ Since then, every single month has at least matched that level (Exhibit 2). And the momentum is positive. The first five months of 2021 saw an average of 472,000 new business applications a month, many more than in the last five months of 2020 (410,000), even as the unemployment rate continued to fall.

Of course, many of these businesses will fail, and small business is still suffering: revenues are down more than 35 percent compared with January 2020.¹² But the fact that so many Americans are willing to bet on themselves is a sign of optimism and hope.

Innovation is more difficult to measure, but labor-force productivity is at least indicative. It's encouraging, then, that it increased 5.4 percent in the first quarter of 2021,¹³ even as hourly compensation and the number of hours worked rose too. Since January 2020, productivity has improved 4.1 percent, which is far above historical trends. This is critical: both history and economics demonstrate that productivity is essential to growth and higher living standards. It has to be good news that business investment rose 11.7 percent in the first quarter of 2021¹⁴—higher than the prepandemic peak—and orders for capital goods are also strong.

The COVID-19 pandemic changed how many businesses operate: retailers used industrial robots and offered curbside deliveries, and hotel companies converted rooms into office spaces. Digitization and remote working accelerated faster than anyone thought possible before the pandemic made the impossible a necessity. One concern, however,

is that many such changes appear to be concentrated in large leading companies—the strong are getting stronger. For innovation to translate into enduring productivity improvements, it needs to go deeper. Another factor to watch: 60 percent of the productivity potential comes from organizations seeking to reduce costs,¹⁵ and that could mean cutting jobs.

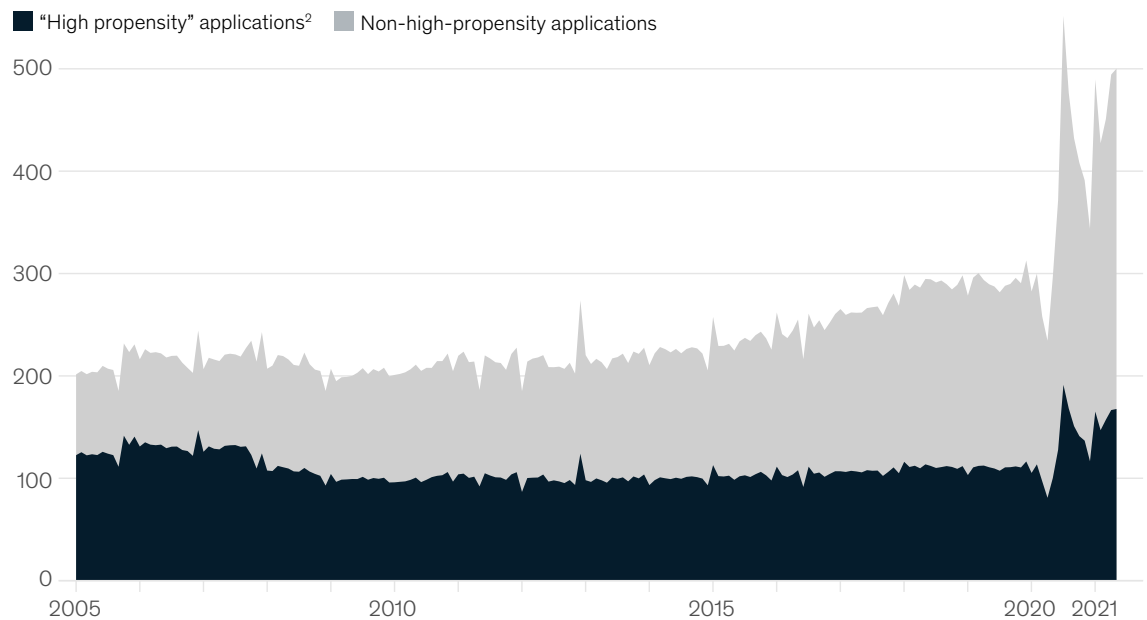
Digitally enabled productivity gains accelerate the Fourth Industrial Revolution

Our point about the Fourth Industrial Revolution—the application of AI, analytics, digitization, and other technologies to all phases of economic activity, from design to production—was speculative back in January 2021 and remains so now. What can be said is that digitization will be everywhere, and it will be critical to both national productivity and the success of individual companies and sectors. The COVID-19 pandemic sped up digitization

Exhibit 2

The entrepreneurial spirit in the United States has stayed strong.

Monthly total business applications, seasonally adjusted,¹ thousands



¹Utilities sector not seasonally adjusted.
²Applications for businesses most likely to employ additional people.
 Source: Business Formation Statistics, US Census Bureau, July 2021, census.gov

by three to seven years; what was considered best in class in 2018 is now below average. Digitization happened that quickly.

Executives know that this is only the beginning. In a survey conducted earlier in 2021, only 11 percent of respondents believed that their current business models would be economically viable through 2023, and almost two-thirds said their companies need to invest in digital technologies to adapt.¹⁶ This wasn't just talk; funding of digital and tech initiatives has risen over the course of the pandemic, even as businesses made painful cuts elsewhere. An in-depth study by the McKinsey Global Institute projects that current trends could raise productivity by one percentage point over the next few years.¹⁷ With investment in digitization, telehealthcare, and other rising technologies coming back strongly, productivity improvements could follow.

How all this connects to the Fourth Industrial Revolution is still a work in progress. But the direction is unmistakable.

Pandemic-induced changes in shopping behavior permanently alter consumer businesses

The big change in consumer behavior during the COVID-19 pandemic has been the shift to e-commerce and remote options. In the United States, e-commerce grew more than three times as quickly from 2019 to 2020 as it had during the previous five years,¹⁸ and many Americans even proved willing to buy cars without literally kicking the tires. Mass retailers' online sales rose 93 percent in 2020¹⁹; among apparel, fashion, and luxury retailers, online penetration rose to 26 percent, from 16 percent. These changes are sticking—mostly. People are still shopping online much more than they did before the pandemic but at lower levels than they did during its depths.

So far, so good—for those doing the buying. For consumer-goods companies and retailers, not so much. Cost cutting can go only so far. Moreover, e-commerce is often less

profitable than is in-store shopping. Instead, businesses will need to develop whole new capabilities (including data-driven marketing, distribution management, and sustainability) to create long-term value. E-commerce can drive rather than dilute profitability if companies consider their marketing investments, revenue-growth management, and warehousing and supply-chain costs. And yes, scale helps. While there has been substantial growth among small companies and niche products, bigger is often better.

Omnichannel isn't just the future. It's the present, so it needs to be integrated into strategy in a way it often isn't. A McKinsey survey of retail executives found that two-thirds of them don't consider the omnichannel implications when they make decisions for stores.²⁰

Telemedicine reveals a similar pattern. There has been a huge surge in adoption: in 2019, only 11 percent of US consumers had used the service; now, 46 percent have used it and 76 percent are interested, as regulators have liberalized rules and both patients and providers have grown more willing to use virtual care.²¹ And of those who have used such a service, three-quarters were satisfied with the experience. Neither that rate of growth nor its general use has been sustained, but telemedicine has gone from niche to routine.

McKinsey has estimated that telehealthcare could absorb up to \$250 billion in US spending on health. That could help improve both access and care. However, telehealthcare should be integrated more fully—for example, by addressing concerns about technology security, clarifying the regulatory framework, integrating virtual- and conventional-care models, and developing virtual-first health plans. While much remains to be done, the future for virtual care looks, well, healthy. As of April 2021, 84 percent of physicians were offering virtual visits and 57 percent said they would prefer to continue offering such care. And investment is accelerating: \$6.1 billion was recorded in the first quarter of 2021, well above the previous record in 2020.

Supply chains rebalance and shift

The sight of a 200,000-ton container ship blocking the Suez Canal in March 2021, holding up almost \$10 billion in goods, made people who had never given a thought to global supply chains realize just how vulnerable they can be. Addressing this vulnerability is still a priority for business. The US federal government has also taken note, conducting a supply-chain review to strengthen resilience and prevent disruptions, such as the semiconductor shortage that hobbled major automakers. The US Senate recently approved a bill that would, among other things, create a supply-chain crisis-response program and boost domestic semiconductor manufacturing. Companies have learned the hard way that supply chains are only as strong as their weakest link, and since large organizations have an average of 5,000 suppliers, that's a lot of links. If one breaks, the costs can be enormous. Even before the COVID-19 pandemic, such breaks were common: companies experienced a production-line shutdown lasting a month or more every 3.7 years.²²

These issues are more pressing in the United States because it satisfies a larger share of domestic demand for high-end manufactured goods through imports than do most of its competitors. Even so, efforts to strengthen and diversify supply chains have generally been hit or miss rather than systematic. The pandemic revealed the limits of that approach.

In the recent past, supply chains have been optimized according to cost and efficiency; now, resilience and agility—for example, identifying additional suppliers for critical parts, developing backup capacity to

reduce reliance on a single facility, and rethinking inventory management—are bigger parts of the equation.

The future of work arrives ahead of schedule

In January 2021, most Americans were working from home—something that would have seemed impossible a year before. Most have adapted well, and in many organizations, both productivity and customer satisfaction have improved.

If the rise in remote work was the defining feature of the economy associated with the COVID-19 pandemic, then that of the postpandemic economy is likely to be hybrid work: employees will be expected to show up at the office some of the time. Indeed, many want to do so—about two-thirds of college seniors, for example, want to be in the office some or most of the time.²³ Employers know that new employees miss being able to meet colleagues and that work-life balance has been disrupted.

In May 2021, a McKinsey survey of employers found that most of them believed that the office would again become the primary place for work²⁴; some are insisting on a full-time return to the office because they see the remote work of the pandemic period as an extraordinary shift forced by an extraordinary event, not as a new routine. As for employees, in a survey conducted in the spring of 2021, 63 percent of respondents said they preferred either fully remote or hybrid work; before the pandemic, almost exactly the same percentage preferred to be fully on site.²⁵ Parents are the most enthusiastic of all employees about hybrid-work models, suggesting that their effective implementa-

Efforts to strengthen and diversify supply chains have generally been hit or miss rather than systematic. The COVID-19 pandemic revealed the limits of that approach.

tion could be an important component of efforts to recruit and retain women in particular. Companies need to figure out their vision of the postpandemic future, both immediately and beyond. If remote workers are doing their jobs effectively, what does that imply for where and how these tasks are done?

Another leadership priority is to accelerate the shift toward getting work done using small teams focused on outcomes and characterized by a high degree of trust, collegiality, and apprenticeship. Rather than regularly evaluating progress, postpandemic leadership is becoming about clarifying goals and strategy, as well as coaching and motivating such teams. Companies that made systematic efforts along these lines report much higher productivity than do those that didn't.²⁶ Many companies are just beginning to absorb this change, which will be an essential feature of the way work gets done.

Figuring all this out is complicated, and norms and expectations are evolving. At the moment, what seems critical is to strike a balance between communicating immediate plans for a return from remote working in a simple, accessible way and building longer-term capabilities. The return to the office, to whatever degree, isn't just about opening the canteen and catching up with colleagues. It's about internalizing the lessons of the recent past and creating a better operating model—for both employees and companies. After all, employee satisfaction correlates directly with performance.

There may be downsides to continued remote working, both for companies and society. In interviews with more than 500 senior executives, McKinsey found that more than half believed that “the sense of belonging” didn't improve or got worse over the course of the pandemic.²⁷ Regardless of how well the transition went, there was broad concern about the effects of a fully virtual model on organizational and mental health.

There are also broader equity issues to consider. Much of the workforce, such as cashiers, restaurant staff, construction workers,

and home-health aides, don't have the option of remote working. Others struggle with expensive or unreliable broadband. Moreover, lower-paid occupations are also more vulnerable to automation, such as robots replacing warehouse workers. The result could be what one economist calls a “time bomb for inequality.”²⁸

The biopharma revolution takes hold

Yes, it's true that there is a revolution related to biopharmaceuticals—and developments around COVID-19 prove it. In January 2021, 60 vaccine candidates were in clinical trials, according to WHO. As of early July 2021, 105 were in trials, with an additional 184 in the preclinical phase.²⁹ Moreover, new vaccine platforms, such as mRNA and viral-vector platforms, have been validated, enabling new immunological approaches. These have also demonstrated uncanny speed and scalability: the first mRNA-platform-based drug product for COVID-19 was available only 42 days after the SARS-CoV-2 sequence was published. These technologies could be used to develop treatments against other intractable diseases, such as HIV, tuberculosis, malaria, and cancer.

In addition, the fight against COVID-19 has accelerated the formation of partnerships, both public and private, and the development of manufacturing infrastructure to scale up production in the biopharma industry. The COVID-19 pandemic fundamentally changed the way the industry operates, and its reputation in the United States has improved markedly.

On the whole, our projections from January 2021 have held up pretty well—in large part, admittedly, because six months is too short a time to be proved flat-out wrong. For a number of our themes, including e-commerce and the future of work, existing trends accelerated. In other cases, such as entrepreneurship, travel, and biopharma, conditions may have changed more fundamentally. In this sense, then, while the full picture is still forming, one thing is becoming clear: the next normal won't be a return to the norms of 2019.

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This article was edited by Cait Murphy, a senior editor in the New York office.

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When will the COVID-19 pandemic end?

Sarun Charumilind, Matt Craven, Jessica Lamb, Adam Sabow, Shubham Singhal, and Matt Wilson

August 23, 2021

This article updates our perspectives on when the coronavirus pandemic will end to reflect the latest information on vaccine rollout, variants of concern, and disease progression.

Among high-income countries, cases caused by the Delta variant reversed the transition toward normalcy first in the United Kingdom, during June and July of 2021, and subsequently in the United States and elsewhere. Our own analysis supports the view of others that the Delta variant has effectively moved overall herd immunity out of reach in most countries for the time being. The United Kingdom's experience nevertheless suggests that once a country has weathered a wave of Delta-driven cases, it may be able to resume the transition toward normalcy. Beyond that, a more realistic epidemiological endpoint might arrive not when herd immunity is achieved but when COVID-19 can be managed as an endemic disease. The biggest overall risk would likely then be the emergence of a significant new variant.

Since the March installment in this series, many countries, including the United States, Canada, and those in Western Europe, experienced a measure of relief from the COVID-19 pandemic¹ when some locales embarked

on the second-quarter transition toward normalcy that we previously discussed.² This progress was enabled by rapid vaccine rollout, with most Western European countries and Canada overcoming their slower starts during the first quarter of 2021 and passing the United States in the share of the population that is fully immunized.³ However, even that share has been too small for them to achieve herd immunity, because of the emergence of the more transmissible and more lethal Delta variant⁴ and the persistence of vaccine hesitancy.⁵

Among high-income countries, cases caused by the Delta variant reversed the transition toward normalcy first in the United Kingdom, where a summertime surge of cases led authorities to delay lifting public-health restrictions, and more recently in the United States and elsewhere. The Delta variant increases the short-term burden of disease, causing more cases, hospitalizations, and deaths.⁶ Delta's high transmissibility also makes herd immunity harder to achieve: a larger fraction of a given population must be immune to keep Delta from spreading within that population (see Sidebar, "Understanding the Delta variant"). Our own analysis supports the view of others that the Delta variant has effectively moved herd immunity out of reach in most countries for now,⁷ although some regions may come close to it.

While the vaccines used in Western countries remain highly effective at

preventing severe disease due to COVID-19, recent data from Israel, the United Kingdom, and the United States have raised new questions about the ability of these vaccines to prevent infection from the Delta variant.⁸ Serial blood tests suggest that immunity may wane relatively quickly. This has prompt-

ed some high-income countries to start offering booster doses to high-risk populations or planning for their rollout.⁹ Data from the US Centers for Disease Control and Prevention also suggest that vaccinated people who become infected with the Delta variant may transmit it efficiently.¹⁰

Sidebar

Understanding the Delta variant

The Delta variant of SARS-CoV-2, also called B.1.617.2, emerged in late 2020 and has since spread rapidly around the world. It first caused major waves of disease in India and the United Kingdom and more recently triggered serious outbreaks in many other countries. The Delta variant has also tended to displace all other variants to become the dominant variant. Its behavior and effects, with respect to several key measurable traits, are as follows¹:

Transmissibility—Delta is significantly more transmissible than either the ancestral COVID-19 variant or other variants. The R0 value for the Delta variant (the number of people who can be expected to contract a disease by a single infected person) has been estimated at 5 to 8 by the US Centers for Disease Control and Prevention. Limited evidence also suggests that vaccinated individuals who are infected by the Delta variant can transmit it to others as efficiently as unvaccinated people do.

Fatality—Limited evidence suggests that the case fatality ratio (the proportion of deaths among confirmed cases) of the Delta variant is roughly one and a half to two times greater than that of ancestral COVID-19.

Immunity—While data are still being gathered and existing evidence is not fully consistent, the general picture is that full vaccination with the vaccines used in Western countries generally provides strong protection against serious illness caused by the Delta variant. Evidence of protection against infection is more mixed, with a recent preprint suggesting that full vaccination provides only moderate protection.² Prior natural infection with a different variant appears to provide only partial protection against Delta.

SARS-CoV-2 continues to mutate, and so new variants are likely to emerge. Their behavior and effects, regarding these characteristics, will determine the extent to which they displace existing variants and affect the prospects for reaching the end of the pandemic.

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² Arjun Puranik et al., "Comparison of two highly-effective mRNA vaccines for COVID-19 during periods of Alpha and Delta variant prevalence," medRxiv, August 8, 2021, medrxiv.org.

Vaccine hesitancy makes it all the more difficult to reach the population-wide vaccination level rates that confer herd immunity.

These events and findings have raised new questions about when the pandemic will end. The United Kingdom's experience nevertheless suggests that once a country has weathered a Delta-driven wave of cases, it may be able to relax public-health measures and resume the transition toward normalcy.¹¹ Beyond that, a more realistic epidemiological endpoint might arrive not when herd immunity is achieved but when countries are able to control the burden of COVID-19 enough that it can be managed as an endemic disease. The biggest risk to a country's ability to do this would likely then be the emergence of a new variant that is more transmissible, more liable to cause hospitalizations and deaths, or more capable of infecting people who have been vaccinated.

Raising vaccination rates will be essential to achieving a transition toward normalcy. Vaccine hesitancy, however, has proven to be a persistent challenge, both to preventing the spread of the Delta variant and to reaching herd immunity.¹² The US Food and Drug Administration has now fully approved Pfizer's COVID-19 vaccine, and other full approvals may follow soon, which could help increase vaccination rates.¹³ Vaccines are also likely to be made available to children in the coming months,¹⁴ making it possible to protect a group that comprises a significant share of the population in some countries.

In this article, we review developments since our March update, offer a perspective on the situation and evidence as of this writing, and present our scenario-based analysis of when a transition toward normalcy could occur.

Even without herd immunity, a transition toward normalcy is possible

We have written previously about two endpoints for the COVID-19 pandemic: a transition toward normalcy, and herd immunity. The transition would gradually normalize aspects of social and economic life, with some public-health measures remaining in effect as people gradually resume prepandemic activities. Many high-income countries did begin such a transition toward normalcy during the second quarter of this year, only to be hit with a new wave of cases caused by the Delta variant and exacerbated by vaccine hesitancy.

Indeed, our scenario analysis suggests that the United States, Canada, and many European countries would likely have reached herd immunity by now if they had faced only the ancestral SARS-CoV-2 virus and if a high percentage of those eligible to receive the vaccine had chosen to take it. But as the more infectious Delta variant becomes more prevalent within a population, more people within that population must be vaccinated before herd immunity can be achieved (Exhibit 1A–C).

Vaccine hesitancy makes it all the more difficult to reach the population-wide vaccination level rates that confer herd immunity. Researchers are learning more about differences among individuals' attitudes, which include both "cautious" and "unlikely to be vaccinated."¹⁵ Meanwhile, social tolerance for vaccination incentives and mandates appears to be growing, with more European locations adopting vaccination

Exhibit 1

Because of the highly transmissible Delta variant, countries may have to reach higher COVID-19 vaccination rates to achieve herd immunity.

Vaccine coverage¹ and potential level for herd immunity,² % of population

Vaccine coverage, % Full 1 dose Potential coverage for herd immunity

Factors that lower/raise coverage that may be needed for herd immunity

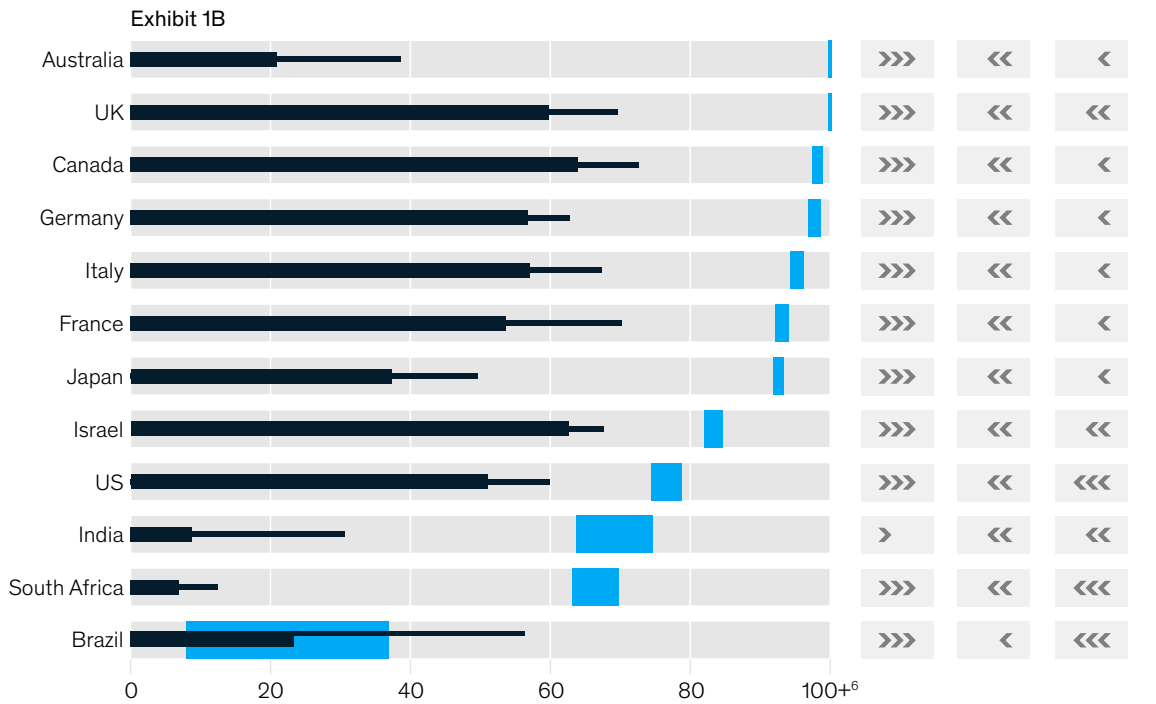
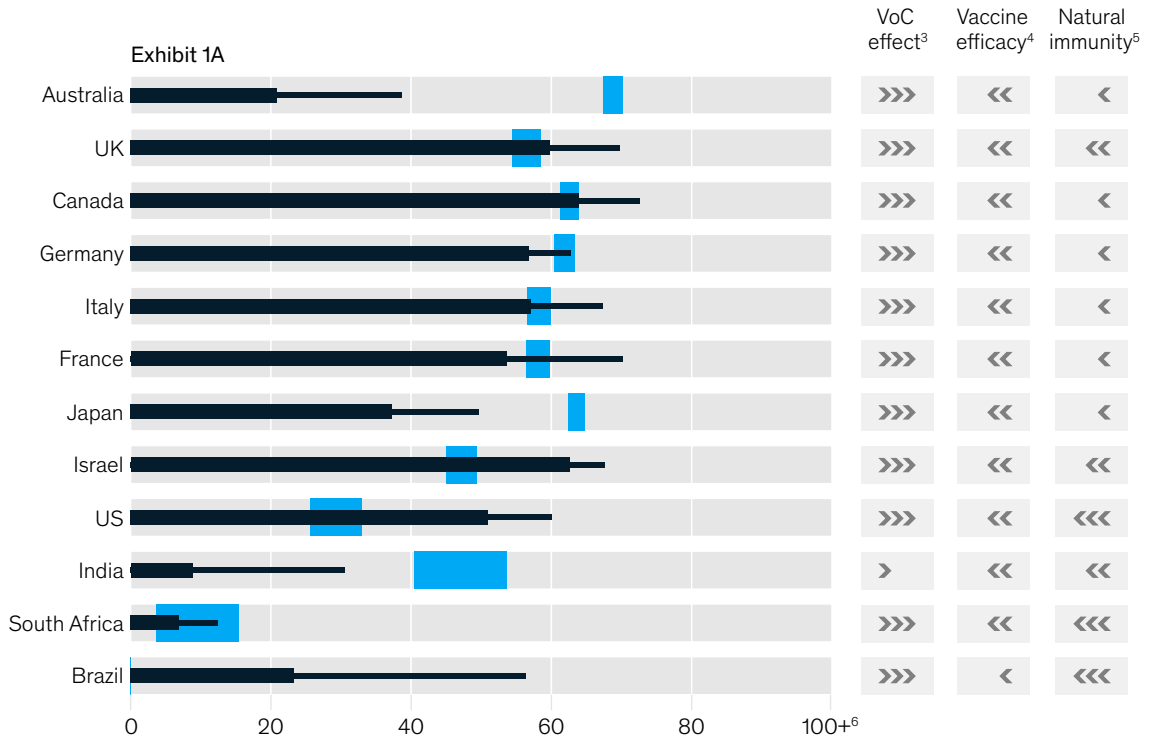


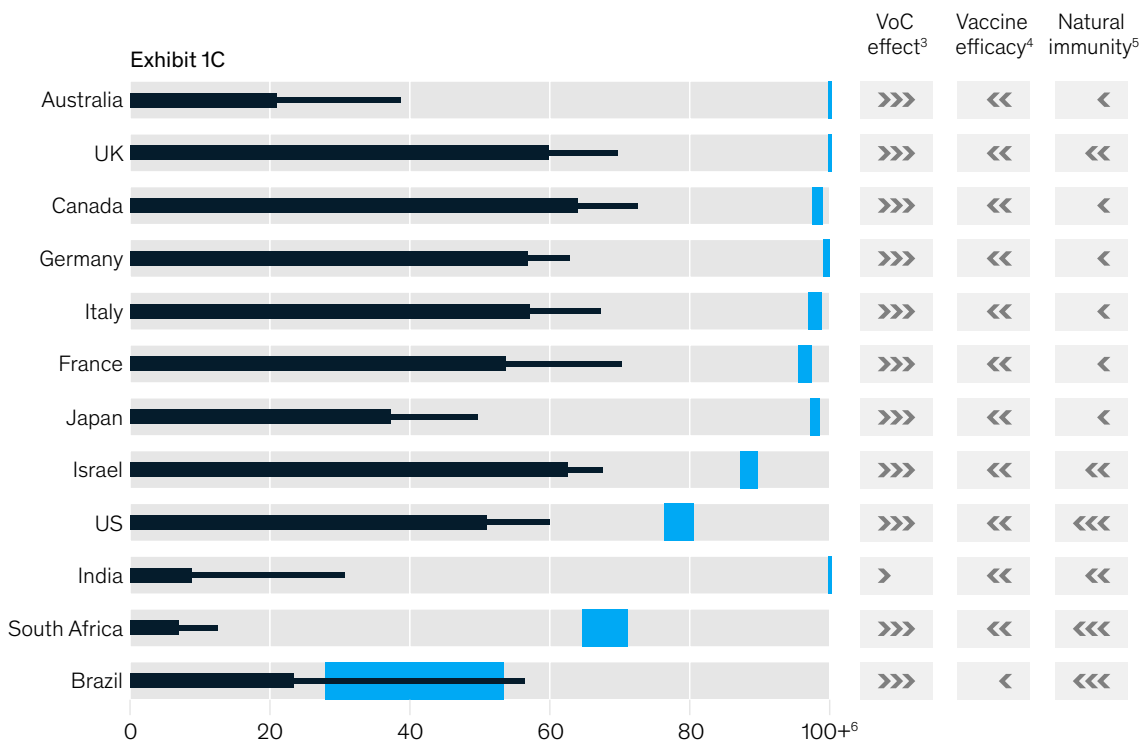
Exhibit 1 (continued)

Because of the highly transmissible Delta variant, countries may have to reach higher COVID-19 vaccination rates to achieve herd immunity.

Vaccine coverage¹ and potential level for herd immunity,² % of population

Vaccine coverage, % ■ Full — 1 dose ■ Potential coverage for herd immunity

Factors that lower/raise coverage that may be needed for herd immunity



¹ Population that has received vaccine, independent of vaccine efficacy.
² Key assumptions for simplicity: no additional cases of natural infection occur, natural immunity is close to 100% effective and lasts long enough to reach herd immunity, and no new variants of concern emerge. Herd-immunity threshold calculated as $1 - (1/R_0)$. Modeled estimates also assume that each member of a population mixes randomly with all other population members (in reality, people mix mostly with others whose patterns of interaction are similar to their own). Subpopulations with fewer interactions have lower thresholds for herd immunity than do those with more interactions. Potential range required to reach herd immunity based upon range of estimated natural immunity; this is based on available data and actual ranges may be higher or lower. Some individuals who already have natural immunity will also receive vaccinations.
³ Variant of concern effect, based on reported mix of variants of concern in the past 28 days and published estimates of their increased transmissibility.
⁴ Effective population-level vaccine immunity, based on type(s) and volume of vaccines distributed.
⁵ Natural immunity estimates based on reported age-stratified deaths and age-stratified infection mortality rates.
⁶ Mathematical estimates of potential vaccine-coverage levels for herd immunity may exceed 100%, because vaccines are not 100% effective.
 Source: Census data; Centers for Disease Control and Prevention; Moderna; Our World in Data; Outbreak.info; Pfizer; SeroTracker; web searches

passes¹⁶ and more large employers in the United States implementing vaccine mandates.¹⁷

While it now appears unlikely that large countries will reach overall herd immunity (though some areas might), developments in the United Kingdom during the past few months may help illustrate the prospects for Western countries to transition back toward normalcy.¹⁸ Having suffered a wave of cases

caused by the Delta variant during June and the first few weeks of July, the country delayed plans to ease many public-health restrictions and eventually did so on July 19, though expansive testing and genomic surveillance remain in place. UK case counts may fluctuate and targeted public-health measures may be reinstated, but our scenario analysis suggests that the country's renewed transition toward

Countries experiencing a Delta-driven wave of cases may be more likely to begin managing COVID-19 as an endemic disease after cases go into decline.

normalcy is likely to continue unless a significant new variant emerges.

The United States, Canada, and much of the European Union are now in the throes of a Delta-driven wave of cases.¹⁹ While each country's situation is different, most have again enacted public-health restrictions, thus reversing their transitions toward normalcy. The trajectory of the epidemic remains uncertain, but the United Kingdom's experience and estimates of total immunity suggest that many of these countries are likely to see new cases peak late in the third quarter or early in the fourth quarter of 2021. As cases decline, our analysis suggests that the United States, Canada, and the European Union could restart the transition toward normalcy as early as the fourth quarter of 2021, provided that the vaccines used in these countries continue to be effective at preventing severe cases of COVID-19. Allowing for the risk of another new variant and the compound societal risk of a high burden of influenza, respiratory syncytial virus, and other winter respiratory diseases, the question for these countries will be whether they manage to arrive at a different epidemiological endpoint, as we discuss next.

Endemic COVID-19 may be a more realistic endpoint than herd immunity

We have previously written about herd immunity as a likely epidemiological endpoint for some countries, but the Delta variant has put this out of reach

in the short term. Instead, it is most likely as of now that countries will reach an alternative epidemiological endpoint, where COVID-19 becomes endemic and societies decide—much as they have with respect to influenza and other diseases—that the ongoing burden of disease is low enough that COVID-19 can be managed as a constant threat rather than an exceptional one requiring society-defining interventions. One step toward this endpoint could be shifting the focus of public-health efforts from managing case counts to managing severe illnesses and deaths. Singapore's government has announced that it will make this shift, and more countries may follow its lead.²⁰

Other authors have compared the burden of COVID-19 with that of other diseases, such as influenza, as a way to understand when endemism might occur.²¹ In the United States, COVID-19 hospitalization and mortality rates in June and July were nearing the ten-year average rates for influenza but have since risen. Today, the burden of disease caused by COVID-19 in vaccinated people in the United States is similar to or lower than the average burden of influenza over the last decade, while the risks from COVID-19 to unvaccinated people are significantly higher (Exhibit 2). This comparison should be qualified, insofar as the burden of COVID-19 is dynamic, currently increasing, and uneven geographically. It nevertheless helps illustrate the relative threat posed by the two diseases.

Countries experiencing a Delta-driven wave of cases may be more likely to begin managing COVID-19 as an endemic disease after cases go into decline.²² The United Kingdom appears to be making this shift now (though cases there were increasing as of this writing). For the United States and the European Union, scenario analysis suggests that the shift may begin in the fourth quarter of 2021 and continue into early 2022 (Exhibit 3). As it progresses, countries would likely achieve high levels of protection against hospitalization and death as a result of further vaccination efforts (which may be accelerated by fear of the Delta variant) and natural immunity from prior infection. In addition, boosters, full approval of vaccines (rather than emergency-use authorization),

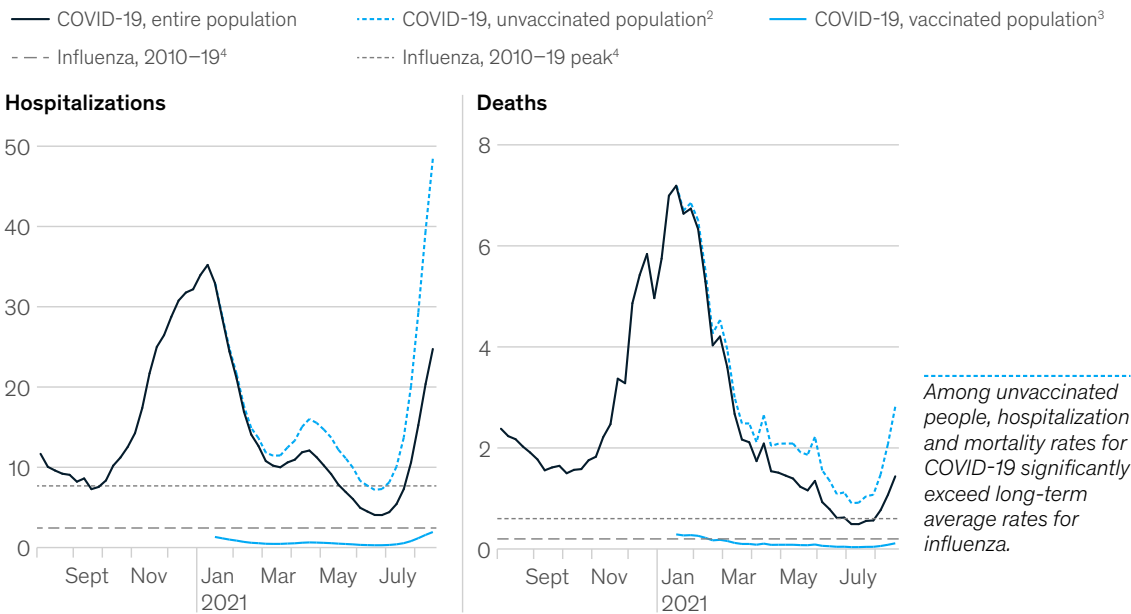
authorization of vaccines for children, and a continuation of the trend toward employer and government mandates and incentives for vaccination are all likely to increase immunity.²³

Our scenario modeling suggests that although the resulting level of population immunity may not be high enough to achieve herd protection, it would still protect a substantial portion of the population. Most serious cases of COVID-19 would occur in unvaccinated people. Flare-ups and localized epidemics would happen while COVID-19 is managed as an endemic disease, but scenario modeling suggests that these may have less of an effect on the whole of society than the waves seen to date. Booster vaccinations will be important in maintaining immunity

Exhibit 2

In the United States, incidence of COVID-19 cases in June and July was similar to long-term incidence of influenza cases, but now exceeds it.

Weekly incidence of COVID-19 and influenza cases,¹ rate per 100,000



¹ Estimates for recent seasons are preliminary and may change as data are finalized.
² Following Centers for Disease Control and Prevention (CDC) methodology, rate in unvaccinated = combined rate / ((1 - fully vaccinated coverage) + (1 - vaccine effectiveness)) * fully vaccinated coverage.
³ Following CDC methodology, rate in fully vaccinated = (1 - vaccine effectiveness) * rate in unvaccinated. At ~50% fully vaccinated with vaccine effectiveness rates of 87%/96%/96% at preventing symptomatic infection/hospitalization/death.
⁴ Influenza incidence rates are based on data from 2010-19; peak rates assume that all cases, hospitalizations, and deaths occur over a 4-month time period. Source: CDC; Our World in Data; Stowe et al., "Effectiveness of COVID-19 vaccines against hospital admission with the Delta (B.1.617.2) variant," preprint not certified by peer review, Public Health England, June 2021; USAFacts

levels over time.²⁴ A new variant that substantially evades existing immunity would remain the biggest overall risk.

Countries have varying prospects for reaching the end of the pandemic

Here, we offer a broader geographic view, comparing the current state as of the time of publishing in countries around the world. Our analysis suggests that countries fall into three general groups (within which national conditions can vary to some extent):

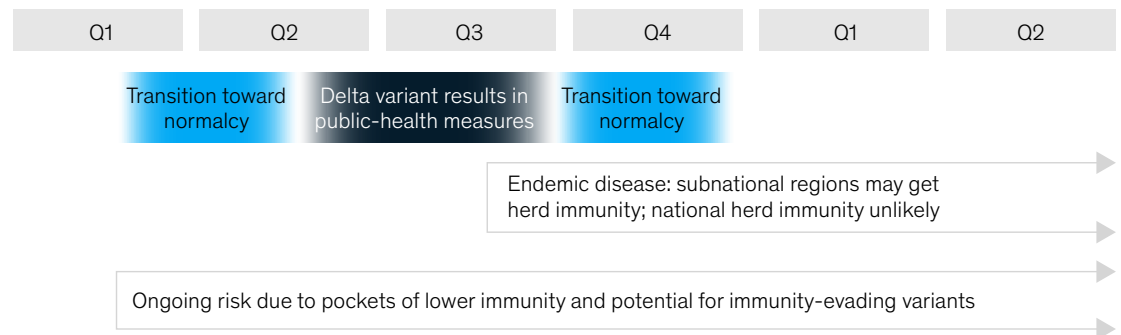
1. *High-vaccination countries.* These countries, primarily in North America and Western Europe, are the ones discussed above.
2. *Case controllers.* This group includes countries such as Singapore that have been most successful in

limiting mortality associated with COVID-19 to date.²⁵ They have typically maintained tight border restrictions and a strong public-health response to imported cases. Their residents have mostly enjoyed long periods of relative normalcy without public-health restrictions, aside from limits on international travel. Some countries in this group, such as Australia, have recently faced a Delta-driven surge in cases, but in absolute terms the burden of disease remains low relative to other countries. Unless these countries choose to maintain their border restrictions (such as hotel-based quarantine) indefinitely, they might accept the risk of endemic COVID-19 after governments determine that a sufficient portion of the population is vaccinated.²⁶ The pace of vaccine

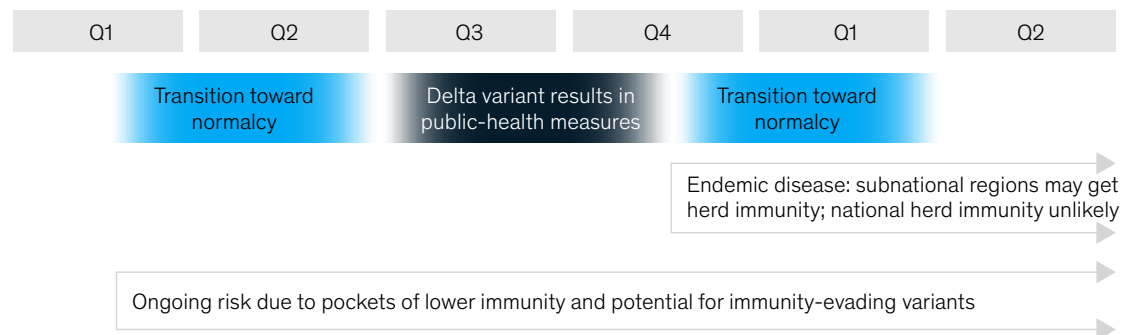
Exhibit 3

Some countries could resume a transition to normalcy and begin managing COVID-19 as an endemic disease after the recent wave of Delta-variant cases.

UK COVID-19 disease pattern



US COVID-19 disease pattern



rollout varies among the countries, but in many cases reopening of borders may not begin until 2022, dependent in part on public-health outcomes for countries in other groups.²⁷ The shift from a zero-COVID-19 goal to an endemic, low-burden goal may be challenging for some countries.

3. **At-risk countries.** Mainly comprising most lower-income and many middle-income countries, this is a group of nations that have not yet gained access to enough vaccine doses to cover a large portion of their populations. Estimates of their overall immunity remain low enough that there is still a risk of significant waves of disease. Recent projections suggest that it is likely to take until late 2022 or early 2023 for these countries to achieve high vaccine coverage.²⁸ The possible time frame for them to manage COVID-19 as an endemic disease is less clear.

Globally and nationally, the epidemiological and public-health situation remains dynamic, and the prospects for each country group are subject to uncertainty. Factors that could influence actual outcomes include:

- the potential for new variants to emerge (for example, a variant that evades vaccine-mediated immunity to the extent that it frequently causes severe disease in the vaccinated and spreads widely would likely have the most significant effect on any

country's prospects for reaching the end of the pandemic)

- further evidence of waning natural and vaccine-mediated immunity over time, and challenges with rolling out vaccine boosters quickly enough to maintain immunity
- further challenges with vaccine manufacturing or global rollout
- changes in the ways that countries define an acceptable burden of disease (for example, setting different targets for disease burden in vaccinated and unvaccinated populations)

The surge of COVID-19 cases resulting from the spread of the Delta variant and from vaccine hesitancy brought a sudden, tragic end to the transition toward normalcy that some countries had begun to make. But the United Kingdom's experience indicates that a transition toward normalcy may yet be possible before long, at least in countries where the vaccine rollout is well under way. Their task will be determining what burden of disease is low enough to warrant lifting of public-health restrictions, and how to manage the public-health impacts of endemic COVID-19. In countries where vaccination rates remain low, the prospects for ending the pandemic remain largely tied to the availability and administration of additional doses. Expanding the international vaccine rollout remains essential to achieving a postpandemic sense of normalcy worldwide.

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Who's left? Engaging the remaining hesitant consumers on COVID-19 vaccine adoption

Tara Azimi and Jenny Cordina

September 28, 2021

While more Americans receive and show openness to receiving the COVID-19 vaccine, concerns persist among guardians of children and other cautious segments.

More than 63 percent of the US population have received at least one dose of a COVID-19 vaccine, and more than 54 percent have been fully vaccinated, as of September 16, 2021, according to the Centers for Disease Control and Prevention. Approximate thresholds for herd immunity are benchmarked from 80 to 90 percent, which would require a minimum of roughly 80 million additional individuals to be vaccinated in the next few months.¹

Despite strong demand for COVID-19 vaccines in early 2021, by the end of May daily administration rates dropped to a third of their mid-April peak, reflecting waning consumer demand.² While daily administration rates climbed moderately at the end of August, as of September 10, around 567,000 doses were being administered daily, compared with nearly six times that in April.³ At the same time, the United States continues to experience regional outbreaks, in part due to new variants such as Delta.⁴ As new variants with potentially greater severity and transmissibility continue to emerge, the effectiveness of existing vaccines or strength of

immune response against these will be crucial to consider. This concern about emerging variants could potentially underscore the criticality of all eligible persons receiving the vaccine (Exhibit 1).

Many stakeholders are therefore evaluating how to reinvigorate vaccination rates, especially in light of potential federal requirements. Experts have sought to understand consumer decision making for adoption of COVID-19 vaccines. McKinsey consumer research, beginning in the summer of 2020, has understood consumer segments defined by their self-identified plans to receive a COVID-19 vaccine. These include four categories of consumers: 'Unlikely' (stated plans not to receive a COVID-19 vaccine), 'Cautious' (those who are uncertain whether to receive a COVID-19 vaccine), 'Interested' (those who have already scheduled or are planning to schedule their COVID-19 vaccination appointments), and 'Already vaccinated.'

The COVID-19 vaccination rollout has been unprecedented, with more than 300 million COVID-19 vaccine doses already administered so far in the United States. Some of the unique factors that enabled this effort have been the setup of mass vaccination clinics, the proliferation of drive-through and mobile clinics, and the ability of pharmacies to administer shots. Stakeholders, including state governments, employers, and providers, are already taking meaningful actions to address vaccine hesitancy. In addition to the options detailed in this arti-

cle, stakeholders may consider making fundamental shifts in their approach as the United States enters this next phase of COVID-19 vaccine rollout:

- **Expanded stakeholder engagement in driving adoption with a broader set of incentives.** To date, governments have helped lead community vaccination efforts with the support of providers, pharmacies, and other stakeholders. Moving forward, other stakeholders may decide to play an even larger role. This role could include businesses requiring patrons to be vaccinated where warranted, providers and pharmacists engaging in patient discussions regarding the vaccine, and insurers building in value-based care incentives for providers to deliver against vaccine adoption targets, for example. As of September 9, the Biden administration has made vaccination mandatory for federal employees, removing the option for testing weekly.⁵ The administration has also recommended that the Department of Labor’s Occupational Safety and Health Administration develop a new rule regarding vaccination. This

rule could require all employers of more than 100 people to either ensure 100 percent vaccination of their workforce or perform testing on a weekly basis to unvaccinated individuals. This recommendation has yet to play out, but could have a potential impact and lift on adoption of vaccination if enacted as recommended.

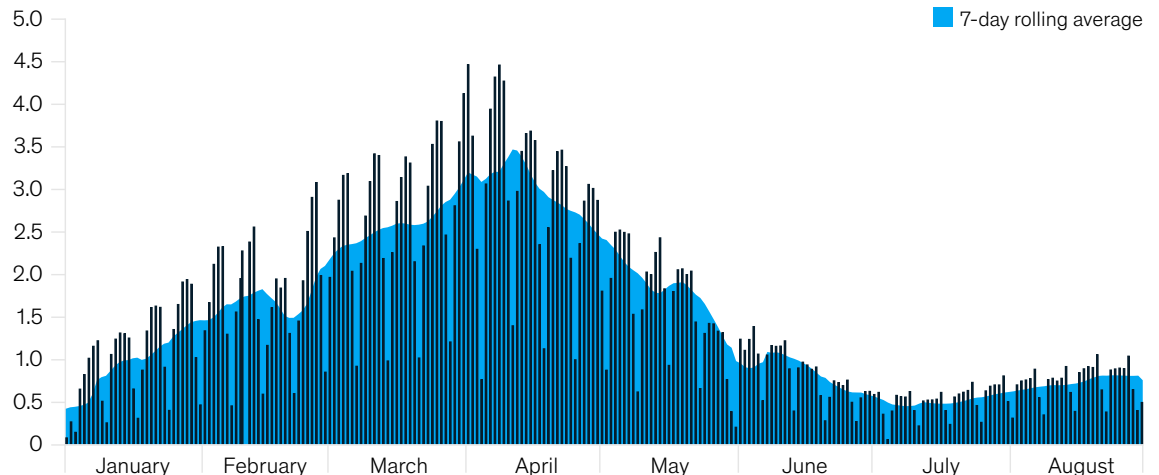
- **Personalized messaging and targeted engagement to address person-specific needs.** Marketing to consumers remains largely broad-based and through more traditional channels. The ability to tailor messages and engagement approaches to consumer segments could have outsized impact in informing consumers. Additionally, data reflects barriers and reservations consumers have to getting the vaccine. Messages can vary. For example, those concerned about safety or side effects value information from trusted sources that speak directly to specific concerns (for example, fertility). Some consumers are focused on the freedom to make their own choice. Others may consider the vaccine if it affects those they care about.

Exhibit 1

The daily administration rates of the COVID-19 vaccine in the United States.

Daily count of total COVID-19 doses administered and reported to the CDC by the date administered, United States

Millions of vaccine doses, 2021



Source: COVID-19 vaccinations in the United States, Centers for Disease Control and Prevention, September 1, 2021, covid.cdc.gov

— **Agile approach to rapidly test, learn, and adapt approaches quickly.** Several vaccine campaigns have been launched, but there may be room for improvement in how quickly these are tried, learned from, and modified. Best-in-class campaigns adjust on a daily basis, learning and adapting in real time to what marketers discover. Agile programs can adapt to the changing environment, learn what works and what doesn't, leading to greater effectiveness of spend while improving outcomes.

Here, we detail trends among the remaining unvaccinated, and discuss specific actions that could address the drivers of hesitancy within these populations.

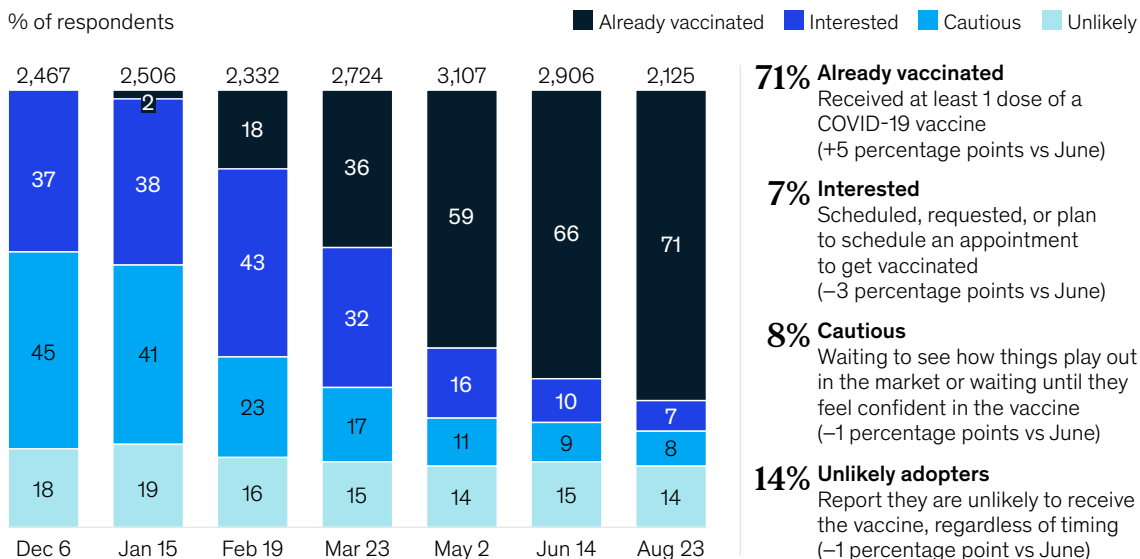
Given the minimal movement in 'Unlikely' vaccinators over time, we choose to focus

on the 'Cautious' segment here. Since December 2020, this segment has shrunk from 45 percent to 8 percent of respondents (Exhibit 2). Addressing the questions or concerns of even half of the 'Cautious' individuals and moving them to 'Interested' and eventually 'Vaccinated' status could translate to more than ten million Americans protected against severe COVID-19. A part of the 'Cautious' group represents decision makers for minors, and will strongly influence whether their children receive a vaccine. Across the 'Cautious' and 'Unlikely' groups, an opportunity exists to address potential barriers, including communication from trusted advisers, improved convenience, and the reduction or elimination of direct and indirect costs associated with getting the COVID-19 vaccine.

Exhibit 2

COVID-19 vaccination: The 'Cautious' segment continues to decline and the 'Unlikely' segment is steady.

Projected time frame of getting a COVID-19 vaccine¹



¹ Prior to February 2021, adoption segments were defined as: Interested: a. I would volunteer to get a vaccine as a participant in a clinical trial, b. I would get the first vaccine available under an Emergency Use Authorization (EUA), c. I would get the first vaccine available as soon as clinical trials are completed; Cautious: d. I would wait to get a vaccine until it has been on the market for 3–12 months, e. I would wait until I was confident that it has been proven to be safe; and Unlikely: f. I'm unlikely to get vaccinated. Beginning in February 2021, adoption segments are defined as: Already vaccinated: a. I have been vaccinated with 2 doses of a 2-dose vaccine, b. I have been vaccinated with 1 dose of a 1-dose, c. I have been vaccinated with 1 dose of a 2-dose vaccine, and have scheduled the second dose, d. I have been vaccinated with 1 dose of a 2-dose vaccine, and I am waiting for the appointment for the second dose to be scheduled, e. I have been vaccinated with 1 dose of a 2-dose vaccine, and I will not schedule the second dose; Interested: f. I scheduled an appointment for the first dose of a vaccine, but have not had the vaccination yet, g. I requested to schedule the first dose of a vaccine, and I am waiting for the appointment to be scheduled, h. I am planning to get a vaccine, but have not attempted to schedule an appointment to get vaccinated; Cautious: i. I will wait to get a vaccine until it has been on the market for more time, j. I will wait until I am confident that it has been proven to be safe; and Unlikely: k. I'm unlikely to get vaccinated.
Source: McKinsey Consumer Health Insights-COVID-19 Survey, 9/7/2020, 10/26/2020, 12/7/2020, 1/15/2021, 3/26/2021, 5/02/2021, 6/14/2021, 8/23/2021

Demand trends

Further enabling decreasing hesitancy among the ‘Cautious’

Certain population segments and demographics are disproportionately represented in the ‘Cautious’ segment. ‘Cautious’ adopters are more likely to identify themselves in our survey as women, to be in a household with less than \$25,000 total annual income, and live in a rural area compared with all respondents.

Among the ‘Cautious,’ the most common remaining concerns lie around safety and side effects, with nearly half of these respondents concerned about long-term side effects. Twenty-eight percent of these respondents have indicated that they received the flu shot in the 2020–21 flu season, demonstrating openness to vaccination once their concerns are addressed.

Multiple factors influence the likelihood of receiving a COVID-19 vaccine. As detailed in the article “COVID-19 vaccines meet 100 million uncertain Americans,”⁶ a combination of at least three highly interrelated conditions is required for broad adoption: “conviction” (desire to receive the vaccine), “convenience” (ability to access end-to-end vaccine processes without hassle), and “costlessness” (ability to take time away from work in order to get the vaccine).

Examining respondents in May who identified as ‘Cautious’ but received the vaccine later can offer clarity on motivation.

The top reasons these respondents waited before becoming vaccinated was to see how it impacted other people before getting it themselves (17 percent), difficulty getting an appointment (15 percent), and concern about long-term side effects (14 percent) (Exhibit 3). Correspondingly, ability for walk-in appointments and ability to pick the brand of vaccine they received were identified among the top influencers that resonated with them to receive a vaccine. Further, when asked why they ultimately chose to get the vaccine, the

top reasons included that they thought it was the right or responsible thing to do (12 percent), it would protect them (13 percent), or that they ultimately didn’t want to risk getting COVID-19 (13 percent).

Considering the ‘Unlikely’

In contrast with the ‘Cautious,’ survey respondents in the ‘Unlikely’ segment have shown minimal movement over the past eight months, remaining relatively steady at about 15 percent of respondents. This group has historically indicated hesitancy toward vaccination in general. Only 14 percent indicated that they received a flu vaccine in the 2020–21 flu season, and just 11 percent intend to get one for the upcoming 2021–22 flu season. Nonetheless, they indicated some interest in receiving a COVID-19 vaccine with incentives, particularly cash rewards or raffles for cash prizes (13 percent and 9 percent responding positively, respectively).

Attitudes of the unvaccinated are further complicating vaccination efforts. The unvaccinated have indicated pressure to get vaccinated has either little or an opposite effect on their willingness to do so. Almost a quarter (24 percent) of ‘Unlikely’ respondents state that they are less likely to get the COVID-19 vaccine because they do not like being told what to do. The ‘Unlikely’ are more extreme in this view than the ‘Cautious’ or ‘Interested.’ The unvaccinated also deny that their actions are contributing to the rise and spread of Delta, with only 8 percent of the ‘Unlikely’ agreeing with the statement that “The current spread of COVID-19 is being caused primarily from the people who won’t get vaccinated.”

If this population continues to remain unlikely to receive a COVID-19 vaccine, a higher burden will exist to vaccinate nearly all or most ‘Cautious’ and ‘Interested’ respondents to reach herd immunity. Likewise, because conviction-driven hesitancy may be difficult to address, stakeholders may want to focus on achieving full or near-full adoption of populations with cost or convenience-based constraints. This

Exhibit 3

Concerns ‘Cautious’ and ‘Unlikely’ segments may have about the COVID-19 vaccine.

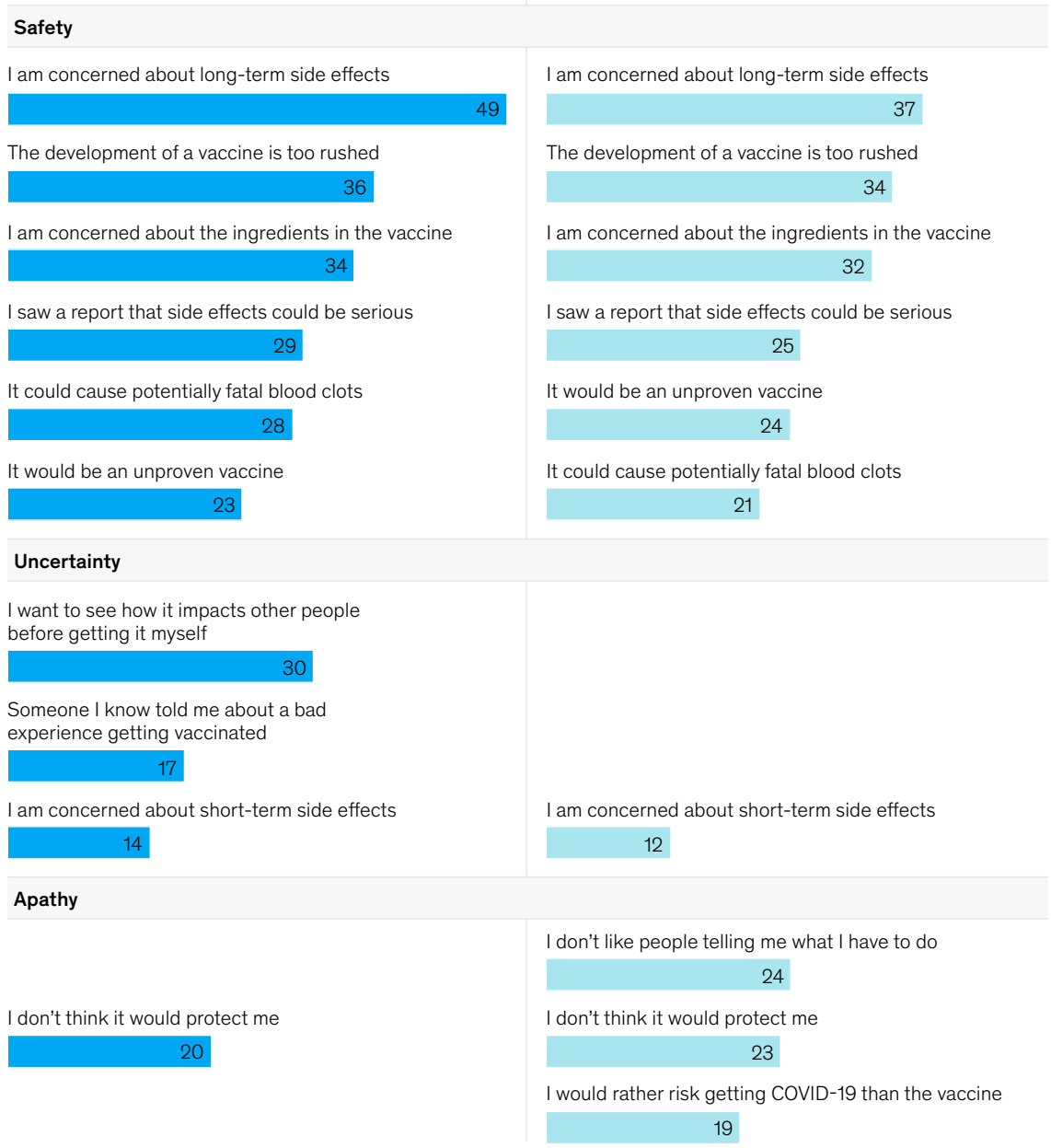
% of respondents ■ Concerns for the ‘Cautious’ segment, n = 160 ■ Concerns for the ‘Unlikely’ segment, n = 289

Respondents in the ‘Cautious’ segment (8%¹) tended to be most concerned with potential long- and short-term side effects and the safety of the vaccine.

Many respondents in this segment have received other vaccines, including 28% of whom said they received the flu vaccine in 2020–21 flu season and appear more receptive to a COVID-19 vaccine should their concerns be addressed.²

Respondents in the ‘Unlikely’ segment (14%¹) have a broad set of concerns, including 37% concerned about long-term side effects and have strong beliefs about not getting the vaccine (24% don’t like being told what to do, 10% believe COVID-19 is a hoax).

The ‘Unlikely’ segment is generally less receptive to a COVID-19 vaccine (14% received a flu vaccine in the 2020–21 flu season).²



¹Percent of respondents who identify themselves as either ‘Cautious’ or ‘Unlikely’ out of all respondents.
²Survey respondents answered each survey question individually across different topics such as how COVID-19 is affecting consumers’ daily activities, ability to receive healthcare, their mental health and well-being, their COVID-19 testing behavior, and COVID-19 vaccination history, perceptions, and attitudes.
 Source: McKinsey Consumer Health Insights 6/14/2021

concern is especially becoming critical as infections and deaths remain disproportionately high among the unvaccinated, with more than 99 percent of COVID-19-related deaths in June 2021 occurring among unvaccinated individuals.⁷ While there is an increased incidence of breakthrough infections with the Delta variant, the rate of infection and hospitalization for the vaccinated is respectively at one in 5,000 and one in a million per day.⁸

Addressing hesitancy in decision makers for minors

The big question on the mind of vaccinated parents is: How do I decide whether and when to vaccinate my children for COVID-19? In May 2021, the FDA authorized the use of the Pfizer/BioNTech vaccine in adolescents aged 12–15 years.⁹ At the time of this article, most states require parental consent to receive COVID-19 vaccination for children under the age of 18. Parents and guardians are critical decision makers who will influence rates of vaccination among adolescent and pediatric populations.

Parents who expressed hesitancy about vaccinating their children largely align with those who have concerns about receiving the vaccine themselves. Sixty-six percent of respondents who already received their vaccine are planning to vaccinate their children, compared with 9 percent of respondents in the 'Unlikely' segment. Around 45 percent of parents with children under age four said they planned to have them vaccinated once doses are approved for that age group and are available; this number climbs to around 53 percent when looking at children of all ages.

Approximately 20 percent of parents or guardians with children in the household said they are not likely to vaccinate their children. The primary reasons for this decision given by parents or guardians included a concern about potential vaccine long-term side effects (31 percent), a feeling that the development was too rushed (19 percent), that the vaccine is unproven

(21 percent), that side effects could be serious (21 percent), and concern about ingredients (15 percent). Therefore, engaging parents and guardians in a meaningful way could have outsized impact on overall vaccination rates.

Actions for stakeholders to consider

Addressing barriers to adoption will require joint mobilization across public and private stakeholders. States, healthcare providers, payers, pharmacies, and employers may each be positioned to take different approaches, but together can take actions that matter to consumers to increase the likelihood of receiving the vaccine.

Conviction

Many consumers either are unmotivated to get the vaccine or have unaddressed concerns. For example, some would rather take the risk of getting COVID-19 (17 percent), do not like needles (10 percent), or assume that they would only get mild symptoms from COVID-19 if they were to become infected (4 percent) (Exhibit 4).

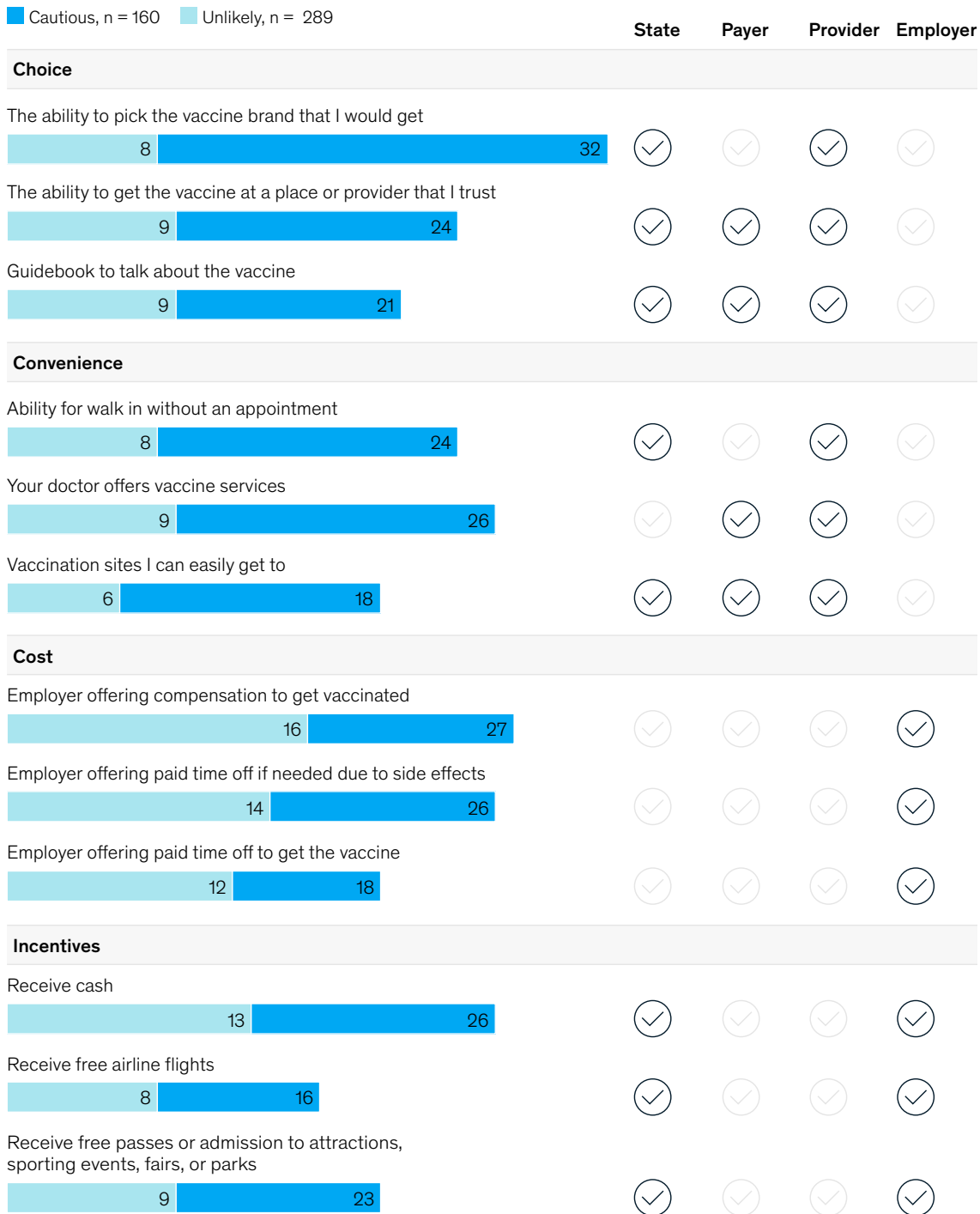
- Choice of vaccine brand was the highest reported driver of increased likelihood to receive the vaccine among the 'Cautious' and 'Unlikely' groups, with 32 percent 'Cautious' and nearly 8 percent 'Unlikely' saying that brand choice would increase their likelihood to receive the vaccine. States may want to consider allowing consumers the choice of vaccine when they schedule appointments, or help them find locations that offer their vaccine preference.
- Providers can lean on their existing relationships and trust with patients to engage in a meaningful fact-based dialogue in order to address concerns or unanswered questions, thereby increasing conviction. A large portion (27 percent) of the 'Cautious' look to their physician for information regarding the COVID-19 vaccine. Pediatricians play a

Exhibit 4

Potential approaches to take to help ‘Cautious’ and ‘Unlikely’ respondents become interested in receiving a COVID-19 vaccine.

Likelihood to get vaccinated by tactic, top choices

% of respondents indicating “significantly more likely” and “slightly more likely” for select approaches



QVAX_LIKELIHOOD: How would each of the following affect your likelihood to get a vaccination for COVID-19? Scale of 1 (significantly more likely) to 5 (significantly less likely).
Source: McKinsey Consumer Health Insights 6/14/2021

particularly important role in influencing likelihood of vaccination with parents of adolescents and children. Most parents in the ‘Cautious’ and ‘Unlikely’ groups have said they would prefer their children to be vaccinated at a hospital or doctor’s office.

This preference may be due to higher levels of comfort and trust fostered over the length of the physician-patient relationship, which would potentially allow individuals anxious about receiving the vaccine to get their questions answered in a more relaxed setting, rather than at large vaccination sites.

However, it is important for physicians to leverage this trust to provide recommendations that can influence the ‘Cautious’ and ‘Unlikely.’ Currently, many healthcare providers are not doing so, with 22 percent providing no recommendation about the COVID-19 vaccine, and more than 11 percent advising patients against receiving the vaccine.

Additionally, pediatricians are the most preferred source of advice for deciding whether to vaccinate their children. However, this finding decreases from 20 percent overall to only 8 percent for the ‘Unlikely’ parents or guardians, indicating a widening chasm in the level of trust toward physicians within this population.

- Healthcare provider sites that already offer the vaccine may consider various approaches to building trust with new and existing patients. For example, providers may engage in novel approaches to share information with patients, such as holding virtual ‘office hours,’ and leveraging digital tools and communication materials in order to answer patients’ questions. Physicians may also consider building upon vaccine services (for example, being able to schedule appointments directly with the doctor, getting follow-ups post-

vaccination), which ‘Cautious’ respondents noted would increase their likelihood to receive the vaccine.

Convenience

Many consumers cited hurdles, including concerns about missing work due to vaccine side effects, lack of transportation, not wanting to wait in line for the vaccine, or finding it difficult to make an appointment. Addressing these issues can help provide vaccine access to those in the ‘Cautious’ and ‘Unlikely’ groups who see value in getting the vaccine but are unable or unlikely to do so at the moment.

- Walk-in opportunities and appointment scheduling assistance may address some needs. Among initiatives targeting convenience, 24 percent of ‘Cautious’ and 8 percent of ‘Unlikely’ respondents report that having available walk-in appointments would increase their likelihood to be vaccinated, and a similar proportion would respond positively to the ability to schedule a vaccine appointment by phone.
- Employers and school systems can each separately help increase access to vaccines by setting up on-site clinics, conducting drives, and encouraging family vaccination days. Survey respondents reacted positively to such tactics. Twenty-four percent of ‘Cautious’ and 9 percent of ‘Unlikely’ individuals said vaccination at their doorstep would make them more likely to get the vaccine, while a similar percentage said they would be more likely to get the vaccine if they had vaccination sites they could easily access or were able to schedule a family appointment. Mobile clinics may help address these needs and expand access to those with difficulties traveling to vaccination sites. Around 21 percent of ‘Cautious’ and 10 percent of ‘Unlikely’ respondents said they would be more likely to get the vaccine if they had the ability to do so at their workplace.

- Another potential cause of inconvenience is travel to and from vaccination sites. States and cities may consider alleviating some of this inconvenience by arranging mobile clinics or temporary vaccination sites near rural health providers or grocery stores. Some cities, such as Philadelphia, have offered community shuttles and rideshares for individuals or groups trying to access vaccination sites. North Carolina is offering cash cards to individuals who help drive others to vaccine sites.

Costlessness

Further, some respondents indicated hesitation about getting the vaccine due to cost considerations (for example, not knowing whether they would be able to afford the vaccine) and several said they would be more likely to get the vaccine if their employer were to offer time off to get the vaccine or cope with the side effects.

- Employers may have an opportunity to support their employees in the next phase of vaccine uptake, as discussed in “Getting to work: Employers’ role in COVID-19 vaccination.”¹⁰ Twenty-five percent of ‘Cautious’ respondents said they would have increased likelihood of getting vaccinated if their employers offered compensation (such as a cash reward).
- Employers may also consider paid time off or flexibility in order to receive the vaccine and recover from any potential side effects. For example, retailers such as Trader Joe’s and Target¹¹ are offering hourly employees two hours of pay per vaccine dose taken, and companies such as Lidl¹² are offering a payment of \$200 per employee in order to cover any costs associated with vaccine administration. These costs include travel and childcare.
- States may consider incentives in cash or in kind in order to encourage vaccination. States like North Carolina¹³ have provided various incentives, such as cash cards, to those receiving first doses, and other states such as West Virginia, Minnesota, and New York¹⁴ are offering various prizes, including hunting or fishing licenses, state park passes, scholarships, and vacations.

Stakeholder enablement

These actions may not directly engage consumers, but can improve consumer conviction, convenience, or costlessness indirectly.

- Respondents who are covered under Medicaid indicated they are unvaccinated in greater proportions than other groups, with 50 percent unvaccinated compared with 29 percent unvaccinated overall.¹⁵ Medicaid providers have direct access to their patients and information about them and are thus well positioned to enact interventions. For example, managed care organizations can contact patients who may benefit from vaccination and share information regarding the vaccine.
- Payers could consider higher reimbursement rates for vaccination. The Centers for Medicare & Medicaid Services announced an increase in the Medicare payment amount to approximately \$80, from \$45, for the administration of vaccines requiring two doses, and \$40, from \$28, for the administration of vaccines requiring one dose each.¹⁶
- Payers may also use their networks to facilitate vaccine education among member populations and partner with nongovernmental organizations and health systems to expand their reach. The Blue Cross Blue Shield Association is one such example, collaborating with Feeding America[®] to access a population of 40 million through their network of food banks and share materials on topics related to the COVID-19 vaccine.¹⁷
- Federal and state governments can help normalize COVID-19 vaccination

and lower barriers to access by integrating this information into the routine well-child workflows, similar to other pediatric vaccinations. An example of this routinization is the inclusion of mental health screenings in primary care settings, which led to improved quality of life for patients and lowered costs, among other benefits.¹⁸

As the United States plans to prepare for an uncertain winter, many residents wonder what's next, and how to keep themselves and their families safe. Effective stakeholder actions to boost COVID-19 vaccination rates addressing the 'Cautious'

and 'Unlikely' could help protect millions against COVID-19. Even as many return to in-person work and activities, the lack of ability for children to be vaccinated, and the issues facing 'Cautious' and 'Unlikely' vaccine adopters, coupled with the urgency created by emerging variants of concern, should remind policy, business, and healthcare stakeholders that several hurdles remain to reach potential herd immunity levels. By considering joint mobilization of public and private sector entities to address vaccine accessibility concerns, the United States can protect more of its residents from infection and help reduce deaths due to COVID-19.

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Pandemic to endemic: How the world can learn to live with COVID-19

Sarun Charumilind, Matt Craven, Jessica Lamb, Shubham Singhal, and Matt Wilson

October 28, 2021

With prospects of herd immunity fading, endemic COVID-19 is upon us, and new “whole of society” approaches are needed.

A world that has been fervently hoping for a clean break with the COVID-19 pandemic may be disappointed. In many places, the pandemic continues unabated; some countries are currently suffering their highest rates of hospitalization and death. And even in areas where it has subsided, the end point continues to recede into the future. As we wrote in our most recent update to “When will the COVID-19 pandemic end?,”¹ few locations are likely to achieve herd immunity against SARS-CoV-2. The highly transmissible nature of the Delta variant, ongoing vaccine hesitancy, and incomplete protection against transmission by current public-health measures mean that a goal of “zero COVID-19” is very likely unachievable without stringent public health measures. Most societies, including the United Kingdom, the United States, and much of Europe, will need to learn to live with COVID-19, at least over the medium term.

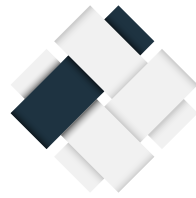
What’s happening now is not unusual. Epidemics end in one of two ways—either we close off all chains of transmission and drive cases to zero, as with all Ebola epi-

demics to date, or the disease becomes an ongoing part of the infectious-disease landscape, or endemic, as tuberculosis is today.² Occasionally, as with smallpox, a previously endemic disease is eradicated.³ But, for the most part, endemic diseases are here to stay. The shift from pandemic to endemic entails a number of practical considerations, as we discuss in this article. But the shift is also psychological, as we will be deprived of the satisfaction that a clean pandemic end point would bring. Instead, societies will have to adapt to living alongside COVID-19 by making some deliberate choices about how to coexist.

Endemic disease does not mean unmanaged disease. Rather, what’s needed is a shift from viewing COVID-19 as a one-time threat that defines society to seeing it as a part of everyday life that we must learn to endure. Around 38,000 Americans die every year in road-traffic accidents—far fewer than from COVID-19 over the past year but still a significant number.⁴ As a society, we have developed tools to make road travel safer—seatbelts, airbags, impaired-driving laws, and so on. Each road death is a tragedy, and carmakers, public-safety agencies, and many others continually strive to reduce fatalities. But most of us don’t spend much time thinking about road safety; we get in the car, buckle up, and go. Soon, the daily risks we run with COVID-19 may seem

Exhibit

A comprehensive approach to management of endemic COVID-19 has four interwoven imperatives.



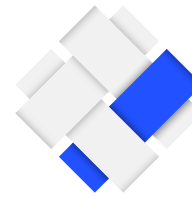
Define the new normal

- Set targets to define new normal in terms of burden of disease relative to other conditions, implications for the economy (eg, days of work lost), and other sectors of society (eg, school closures)
- Build widest possible public consensus around goals



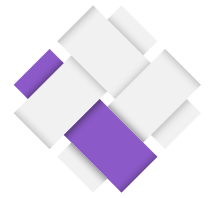
Track progress

- Monitor progress against targets through disease surveillance, tracking nonhealth burden across society, and response monitoring
- Use sequencing to track emerging SARS-CoV-2 variants
- Define framework and thresholds to activate or tighten public-health policies—eg, lockdowns, masking mandates, travel restrictions, taking seasonality into account
- Use predictive analysis to understand future scenarios



Limit illness and death

- Formalize and institutionalize vaccine infrastructure and integration with health system
- Develop tailored booster rollout plan based on emerging science
- Incentivize the development of new therapeutics and rapidly deploy new innovations to minimize case severity
- Develop surge plans and protocolize evidence-based COVID-19 management to ensure a consistently high standard of care
- Care for patients with “long COVID”



Slow transmission

- Define appropriate use for testing and ensure ubiquitous access
- Employ environmental and workplace modifications to enable safer interactions
- Coordinate across jurisdictions
- Respond rapidly to transmission hotspots

as much a part of normal daily life as the risks we run when we put the car in drive or navigate flu season each winter.

A complete approach to managing endemic COVID-19 requires the consideration of four interwoven elements. First, society will have to reach a consensus on what is an acceptable disease burden and use those targets to define an acceptable new normal. We will then need a comprehensive approach to track progress against this standard, define new disease-management protocols to limit deaths, and establish practices to slow transmission. Woven together, these four imperatives form a comprehensive approach to the management of endemic COVID-19 (Exhibit). The work is vast and will require action across all segments of society, including government, healthcare providers, employers, the life-sciences sector, and the general public.

Define the new normal

Societies need to set goals for what the new normal will look like and build consensus around them. Goals will vary across locations, but three guiding principles should apply. First, goals must *recognize the “whole of society” impact of COVID-19*. Targets for the health burden of the disease remain paramount, but countries can also introduce targets for economic and social disruption. Targets for the burden of death or severe disease (such as hospitalizations) and the related impact on healthcare-system capacity will continue to be as important as they have been during the pandemic. But beyond death or severe disease, COVID-19 has affected daily activities (learning and working, for example, and mental health). As such, measures of workdays lost, business closures, and school-absenteeism rates should also be considered.

Defining a new normal in a world where, for 18 months, societies focused on daily cases and test positivity is a material pivot that will need to be carefully communicated. The right metrics are likely to vary by geography: places where COVID-19 exposed the fragility of the health system may choose to focus primarily on not overwhelming their hospitals, while others may embrace a more integrated mix of economic, social, and health factors. Local demographics, citizen sentiment, economic resilience, vaccination status, and other factors should inform these goals. Viewing the target for the total burden of COVID-19 relative to other diseases will be important context.

Second, goals must be *realistic and balance the different needs of society*. In many countries, zero cases will not be the appropriate target, since it requires ongoing public-health measures that place significant restrictions on society, particularly on businesses and schools. Some countries are, therefore, resetting their expectations: “For this outbreak, it’s clear that long periods of heavy restrictions [have not gotten] us to zero cases,” said New Zealand prime minister Jacinda Ardern. “But that is OK. Elimination was important because we didn’t have vaccines. Now we do. So we can begin to change the way we do things.”⁵ Goals must also be realistic, or many sectors of society will quickly lose interest. And leaders must not set goals in a way that requires the most vulnerable in society to bear a disproportionate burden—for example, by requiring low-wage frontline workers to communicate or enforce policies.

Third, leaders must *build the widest possible consensus* around the goals through effective communication, emphasizing the whole-of-society nature of the targets. Much of the political discord created by COVID-19 over the past 18 months has arisen from differences of opinion about the relative importance of health, economic goals, and social goals. Not everyone will agree with every target, but part of managing endemic COVID-19 requires forging a social contract that recognizes the need

to control the health impact of the disease while normalizing society to the greatest extent possible. While governments will lead in setting targets, all sectors of society will play a role in providing input and helping to build support for a shared definition of the new normal. Targets will evolve over time as we continue to learn more about what works and what doesn’t, but clarity and consistency of communication will be critical.

Track progress

Once realistic, multisector goals have been established, jurisdictions should track progress against them in easy-to-follow, transparent ways. This can include disease-surveillance metrics, such as hospitalizations and deaths, as well as measures of the wider societal impact of the milder cases of COVID-19, such as lost school days and missed workdays. Public-health measures, such as masking, physical distancing, and testing requirements, should also be deployed based on predefined thresholds of these metrics. In today’s interrelated economies, metrics will have to be monitored globally to understand transmission dynamics and the emergence of new variants and to inform policy around travel restrictions.

As part of disease surveillance, ongoing genomic sequencing will be critical to monitor for the emergence of new variants that would necessitate changes in the approach to managing endemic disease. Many countries have made rapid progress this year in expanding their capacity to sequence SARS-CoV-2. Governments should take the next step and routinize that capability and integrate it with sequencing efforts for other pathogens.

As we better understand the virus and its transmission, monitoring systems should also include a real measurement of which interventions work and which do not. Over time, this information should let us better apply public-health measures in a way that is grounded in real evidence of how they work, with the aspiration of applying the minimum effective package for a given geographic area’s disease status.

With this data and a dedicated focus, our ability to conduct meaningful predictive analysis will continue to improve. New efforts such as the WHO Hub for Pandemic and Epidemic Intelligence in Berlin, the United Kingdom's plan for a Global Pandemic Radar, and the US Centers for Disease Control and Prevention's new Center for Forecasting and Outbreak Analytics should help build on the progress in epidemic prediction made over the past 12 months.⁶⁻⁸ As our understanding of factors such as seasonality, heterogeneous mixing, and prior immunity improve, our ability to make meaningful forecasts for particular geographies will increase.⁹

Lastly, communication of the monitoring data to the public must be simple and thorough. An analogy might be the fire-danger rating system in the United States, in which multiple factors are combined into a single rating—low, moderate, high, very high, extreme—that is communicated to the public, and which ties directly to policies used to mitigate the risks of fire.¹⁰

Limit illness and death

To achieve a new normal in which ongoing COVID-19 transmission is an accepted part of everyday life, societies need to effectively minimize immediate illness, the prevalence and persistence of long-term conditions (“long COVID”),¹¹ and COVID-19-related deaths. All are needed to limit the disruption to individuals' quality of life, societal well-being, and economic productivity.

The challenge to come will take place on four fronts: the development and administration of vaccines, scaling effective treatments, the preparation of health systems, and the particular needs of vulnerable populations.

Vaccines

The high efficacy of today's vaccines in preventing severe cases of COVID-19 is critical to normalizing society. Portugal illustrates the point: with 98 percent of those eligible fully vaccinated, severe

COVID-19 cases are now rare and almost all public-health restrictions have been lifted.¹² In the months ahead, we will encounter old and new complexities in the push for vaccines: convincing vaccine-hesitant adults to get immunized; expanding immunization to younger ages as regulators evaluate filings from vaccine makers; and scaling boosters across the population. Reaching and sustaining high levels of vaccination, particularly as acute disease subsides, will require sustained and novel efforts to engage and educate consumers. Public-sector policies, private-sector practices, and shared cultural values must create incentives for all of the above and make clear that immunization is a shared societal norm that is needed to effectively live with endemic COVID-19.

Moreover, as we transition from a heroic, one-time effort to stand up an infrastructure that put billions of doses in arms to a more routine program of booster vaccination, healthcare providers must integrate and institutionalize COVID-19 vaccinations into their broader ongoing operations.

To stay ahead of the virus, the vaccines themselves must continue to evolve.¹³ Vaccine strategy, from development and manufacturing to selection, procurement, and distribution, must adapt to emerging science on the prevailing mix of variants of concern, appropriate intervals for boosters, and risk–benefit considerations for subpopulations (for example, the elderly or immunocompromised).

Treatments

When people do get infected, effective treatments become critical. While monoclonal antibodies have proven very effective in a specific population, many COVID-19 patients are still being treated with a 50-year-old steroid (dexamethasone), fluids, and proning.¹⁴ New data hold promise for the next generation of oral antivirals that could be widely scaled to help prevent disease progression to hospitalization and death, with several new treatments garnering excitement in late-stage development.¹⁵ Improving the armamentarium

Reaching and sustaining high levels of vaccination, particularly as acute disease subsides, will require sustained and novel efforts to engage and educate consumers.

of treatments would go a long way to limit COVID-19 deaths and remains a huge priority.

As they arrive, new and proven therapeutics and care practices must be incorporated into the standard of care, especially in communities at higher risk of COVID-19 infection and death and those with historical challenges in accessing high-quality care. New treatments are also needed for long COVID. To help navigate this as a society, healthcare providers will need to better characterize the range of symptoms associated with long COVID and develop tailored therapeutics and new innovations that improve recovery and limit disability after infection.¹⁶

Health systems

Overwhelmed health systems and healthcare professionals faced with impossible decisions marked some of the darkest moments of the past 18 months. These moments have also been characterized by huge second-order health impacts, as excess deaths from other causes rapidly escalated.¹⁷ To help manage future outbreaks, care-delivery systems must develop surge plans that can be quickly triggered to increase care capacity rapidly in response to local or widespread outbreaks and expected seasonal fluctuations, while still ensuring that non-COVID-19 care needs are met.¹⁸ Effective management of endemic COVID-19 must also include catching up on preventive and elective care that was missed or delayed by the pandemic.¹⁹

Vulnerable populations

The final critical element of limiting death from COVID-19 is outreach to those who are most at risk.²⁰ Some groups, whether

because they live in crowded settings, suffer from socioeconomic disadvantage, or have limited access to healthcare, have been disproportionately affected by the pandemic to date. As the level of public attention focused on COVID-19 wanes, societies must be careful to avoid strategies that place a disproportionate burden on the most vulnerable. While some progress has been made, those with low-wage frontline jobs, those living in more crowded settings, and those with the least favorable access to healthcare have too often borne the greatest burden during the pandemic. Equity should be woven into all of the interventions to limit illness and death. Any approach to living with endemic COVID-19 must have tailored strategies for outreach to these communities, and programs to ensure access to the vaccines, treatments, and care that can best keep them safe.

Slow transmission

In a state of endemicity, slower transmission reduces the direct health burden of COVID-19, minimizes the likelihood that new variants arise, and mitigates the likelihood that epidemic outbreaks lead to societal disruption. In this new normal, we can expect four approaches to become a regular part of daily life: ubiquitous testing; safer interactions in workplaces, schools, and recreation and entertainment locales; and rapid response to transmission hotspots.

Widely available and rapid testing can help individuals and societies take the steps needed to limit further transmission. Current and future innovations in testing must be effectively deployed for specific uses

such as screening, diagnosis confirmation, and surveillance. Ubiquitous, frictionless access to testing for all members of society, especially those at higher risk, has proven effective at blunting transmission. What, exactly, this should look like is up for debate but should be available through a wide range of channels—whether widely available, rapid-turnaround tests for asymptomatic patients such as those the United Kingdom has deployed,²¹ regular employee testing like many employers have instituted, or simply the mass availability of rapid tests and institutionalized behavior of testing every runny nose. Who bears the cost of sustaining this infrastructure will likely be one of the next-order questions to arise.

Because transmission can occur wherever people congregate, most spaces—including workplaces, schools, events, and public areas—must consider how to enable safe *interactions*. The ways people work, learn, and socialize will return to normal or near normal, but must happen in safe ways that lessen the transmission of risk while being (and being accepted as) minimally disruptive (like wearing seat belts for road safety). The public and private sectors both have important roles to play: a range of policies and practices (like wearing masks in certain contexts or giving up handshakes²²) and disincentives and incentives (such as the ability to join public gatherings) will likely hasten the arrival of a new set of social and cultural norms. Over time, infrastructure improvements can continue to reduce the risk of transmission in indoor spaces. For example, reconfiguring workspaces to enable physical distancing, scaling the use of HEPA filters, and improving air flow can all reduce risk of transmission.²³

Lastly, when local outbreaks occur despite widespread safer interactions (and they will), societies must have *rapid-response infrastructure* in place to limit exponential transmission. While case-investigation and contact-tracing capacity have been overwhelmed at some points during the pandemic, they can play critical roles in

responding to more localized outbreaks.²⁴ Rapidly deployable mobile testing units, staffed by officials with good local knowledge, can be just as important. Collaboration across the public sector, private sector, and care-delivery system—including the use of common communication platforms and data sharing where possible—will be critical for responding quickly and containing hotspots. While many jurisdictions deployed these approaches too late on the upslope of COVID-19 to have the desired impact, they have a critical role to play on the downslope.

Collectively, the four strands for managing endemic COVID-19 will require a momentous societal shift. Every stakeholder will have an important role to play:

- Governments can build consensus on goals, communicate superbly, and set the right incentives.
- Employers likely have an elevated role, setting policies for their workplace and helping their employees think through the changes.
- Health systems can strike the right balance among competing demands and plan for the inevitable outbreaks and surges.
- Individuals can challenge the convictions they've developed in the past 18 months and adopt new behaviors.

The costs will be meaningful, as these imperatives require sustained investment, but the return from enabling normal economic activity will be astronomical. It is critical that leaders align incentives such that sufficient investment is made across sectors to manage endemic COVID-19. Perhaps the hardest of all is the mindset shift, as we slowly accept that COVID-19 is not a temporary phenomenon that we can bury in our memories but rather a structural shift in how we live, requiring permanent changes in behavior. But if we are to truly reclaim our lives, now is the moment to start building.

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