Will a COVID Vaccine Be Accepted?

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Many Americans are hoping that a safe, effective vaccine for COVID-19 will decisively defeat the pandemic, allowing them to return to their normal lives. But a vaccine will not be effective if a significant portion of the population hesitates to get it. Many patients, parents, and caregivers already reject well-established vaccines with excellent long-term safety records. US vaccination rates have been flat or falling for some infectious diseases, driving resurgent outbreaks. Now health officials face a unique challenge: How do they convince the public that getting a novel, fast-tracked vaccine is wiser than forgoing it?

The US government’s Operation Warp Speed task force is spending about $10 billion on public–private partnerships to expedite the development, manufacture, and distribution of coronavirus vaccines. Eight vaccine candidates are undergoing large-scale safety and efficacy testing known as phase 3 trials, which typically take years to complete. In late 2020 or 2021, however, the federal Food and Drug Administration (FDA) could approve a vaccine for emergency use if it is shown to be safe and effective so far. But if phase 3 trials are cut short, scientists could miss a vaccine’s rare side effects or its long-term health impacts. Many Americans worry that the process is being rushed. In an August 2020 Gallup poll, one in three respondents said that they planned to forgo an inoculation because of safety concerns. In September 2020, about half of US adults (51%) reported that they would definitely or probably get a vaccine to prevent COVID-19, according to a Pew Research Center poll. That was a drop from 72% in May.

“You can have the perfect vaccine, but if people aren’t willing to take it, it won’t help,” says Emily Brunson, a medical anthropologist at Texas State University and coauthor of a July 2020 report, The Public’s Role in COVID-19 Vaccination: Planning Recommendations Informed by Design Thinking and the Social, Behavioral, and Communication Sciences, by the Johns Hopkins Center for Health Security. “Creating a vaccine is a very complex technical endeavor. But the social, behavioral, and ethical sides of vaccination acceptance or hesitancy are equally complex.”

For decades, social and behavioral scientists have studied how to improve vaccination rates. This research sprawls across several disciplines including psychology, communications, public health, medicine, nursing, sociology, and behavioral economics. Using
In the second half of the nineteenth century, public resistance intensified against the first compulsory vaccines. Antivaccine publications spread unfounded rumors that inoculations were dangerous to public health and that they spread disease, as found in this volume by Charles Schieferdecker, a naturopathic physician (left). An advertisement in 1902 of the Anti-Vaccination Society of America. Image: Anti-Vaccination Society of America.

diverse approaches and methods, scientists have tested three theories about what motivates people to get vaccinated, according to Noel Brewer, a behavioral scientist at the University of North Carolina, Chapel Hill.

Do provaccination messages change how individuals think and feel about getting inoculated? The record suggests that the answer is “no” or “not very well.” Vaccine campaigns usually emphasize that an inoculation would protect individuals from harm. “This approach is shown to be either minimally effective or ineffective depending on what kind of data you look at,” says Brewer.

Do provaccination messages change how social, racial, religious, or other groups think and feel about getting inoculated? Campaigns increasingly enlist community influencers who can model positive behaviors such as accepting a vaccine themselves or framing inoculations as socially responsible measures to protect the most vulnerable. “The data are just starting to accumulate that this as a promising theory for improving vaccine acceptance, but we’re still not there yet,” says Brewer.

Do vaccination campaigns alter how people actually behave? “With this approach, you’re not trying to change what individuals or groups think or feel about vaccination but instead change their behavior directly,” says Brewer. “Some people call these ‘nudges.'”

Nudges can include a wide variety of incentives and mandates. Some clinicians, for instance, automate vaccination appointments for patients when inoculations are due or send out text reminders. Some nudges make vaccinating the default option, which improves inoculation rates in some studies. Patients, parents, or caretakers must take time to opt out. Hospitals have gone further and mandated inoculations for all healthcare workers, and public-school districts have required inoculations for teachers and students. “Unlike the other theories, there are a lot of high-quality data showing that these nudge-based interventions are effective,” says Brewer.

But accepting a vaccine is not an easy task when people are barraged by conflicting messages about its potential safety and effectiveness. Antivaccine misinformation is not a new problem, having been around since the mid-nineteenth century. In 1853, the United Kingdom established the first compulsory vaccination act, aimed at eradicating smallpox, but over the next two decades public resistance intensified. Wild rumors spread that vaccines included poisons and the blood of bats, rats, and other frightening animals. An 1881 handbill titled The Vaccination Vampire called inoculations the “universal pollution” of the “pure babe.” Today, antivaccine activists often spread unsubstantiated anxieties about supposedly dangerous chemical pollutants in vaccines.

“We need to recognize that there is always a continuum of vaccine acceptance,” said Julie Bettinger, a vaccine safety specialist with the Vaccine Evaluation Center at the University of British Columbia on an August 2020 National Academies of Sciences, Engineering, and Medicine (NASEM) webinar. “People can move up and down that continuum due to a variety of influences. At some point, each of us can be vaccine hesitant.”

On average, it takes about 10 years to develop a vaccine, but Operation Warp Speed aims to reduce that dramatically.
to just a number of months. Even people who have been committed to vaccination for themselves and their families might hesitate in getting an inoculation that lacks complete safety data. Some people will be desperate to get a COVID-19 vaccine, some will feel confident enough to accept it, some will be afraid to get it, and some might feel multiple emotions at the same time or different times. “A person might accept all vaccines in their regular life but may be incredibly hesitant about a COVID-19 vaccine and may decide to delay it,” said Bettinger.

In any case, most Americans will have time to think about their choices. Only a few million doses of a new vaccine would be initially available. It could take many months—well into 2021—or even longer for approved vaccines to reach most Americans who need it.

Herd or community immunity

COVID-19 is caused by the novel coronavirus SARS-CoV-2, which leaped from an animal host into the human population in the latter months of 2019. At the time, no one had immunity to the pneumonia-like respiratory disease. Immunity would have to be painstakingly built and sustained around the world.

There are two ways to establish immunity to an infectious disease: survive the illness or get inoculated. When the human body recognizes a foreign body such as an infectious pathogen, it mounts an initial defense with T cells, which are specialized white blood cells that attempt to neutralize the infection. Longer-lasting B cells then kick in. Host B cells produce antibodies that fight an infection over time. Early studies indicate that COVID-19 natural immunity, traditionally measured by host antibodies, survives at least three months. But scientists hope that both natural and vaccination immunity would sustain their strength much longer than that.

Nearly every vaccine now approved by the FDA introduces foreign proteins—usually part of a pathogen—into a healthy but nonimmune person. The body’s immune system learns to recognize these introduced proteins. When a virus comes along, the immune system can recognize it quickly as an invader, and the body’s cells generate antibodies to attack it.

About 135 COVID-19 vaccines are under development worldwide. Scientists do not know which vaccines will be most effective and safe. Pharmaceutical companies and governments are identifying and accelerating all of the most promising candidates into production. Traditional methods of growing vaccines in the laboratory are far too slow, requiring years of development. To save precious time, nearly all US COVID-19 vaccine developers are working on experimental approaches. For instance, Moderna, Inc., is developing a coronavirus vaccine based on RNA instead of proteins. Cells use RNA to provide instructions for making proteins. These instructions are like architectural blueprints for building a house. An RNA vaccine injects a new set of instructions into cells, which start pumping out antibodies that fight the virus. Despite successes in animals, Moderna’s method has never been applied in commercially approved vaccines. Its competitive advantage is speed. Manufacturing an RNA vaccine can be scaled up very quickly.

An effective COVID-19 vaccine must build herd immunity—also known as community immunity—which indirectly protects other people exposed to a pathogen. Herd immunity occurs when a certain percentage of a population has gained adequate antibodies to COVID-19. When susceptible people decrease in number, the virus cannot find new hosts to spread the infection.

But community immunity is typically not zero sum; it is developed by degrees. A community could reach significant immunity, but infections could flare up in hard-to-reach populations that lack access to healthcare vaccinations or resist them. For

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Nurse checking vital signs at a blood drive in 1960. The nation’s public health infrastructure has cracks from years of underfunding, reducing some local vaccination programs and other services. Photograph: National Library of Medicine.
Vaccines can cause many diseases, the reality is that they establish and ethics of "Big Pharma," instead often supporting the use of homeopathy and other "natural" medicines to fight infectious disease. Antivaccine activists, bots, and trolls on social media have helped raise public doubts about potential vaccine risks. Critics of vaccines typically question motivations of the medical establishment and ethics of "Big Pharma," instead often supporting the use of homeopathy and other "natural" medicines to fight infectious disease.

"Despite their success in preventing many diseases, the reality is that vaccines will always have some level of risks," writes Heidi J. Larson, anthropologist at the London School of Hygiene and Tropical Medicine and author of a 2020 book Stuck: How Vaccine Rumors Start—and Why They Don’t Go Away. Vaccines can cause rare cases of severe illness. Even so, vaccines are safer than ever, undergoing a gauntlet of clinical testing to prove safety and efficacy. "Today we are in the paradoxical situation of having better vaccine science and more vaccine safety regulations and processes than ever before, but a doubting public," she observes. "Some vaccines have more risks than others, with newly introduced, less familiar vaccines being particularly vulnerable to perceptions of risk and rumor."

Antivaccination groups received an unexpected public-relations gift when the Trump administration’s Operation Warp Speed task force rolled out with an unforced blunder. "Calling it Operation Warp Speed is probably the worst possible messaging you could imagine," says Jay Van Bavel, a psychologist and neural scientist at New York University. "Even vaccines with decades of well-proven, well-established safety and health benefits have huge communities of people who will not take them. Failure to think about the implications of ‘speed’ is quite remarkable." Numerous, scattered antivaccine groups are increasingly making common cause through the Internet and influencing the broader public to be wary of vaccination.

The country’s charged political environment could also limit how many people accept a COVID-19 vaccine. “The two most extreme kind of ideological positions that we see in American politics both share suspicions of science, government, and elites,” says Douglas McAdam, a sociologist at Stanford University.

Some deeply conservative or traditional societies have turned against vaccinations. In Amish, Somali immigrant, and Orthodox Jewish communities, antivaccine misinformation has spread in recent years, leading to outbreaks of vaccine-preventable infectious diseases—notably, mumps and measles. But antivaccination groups are also strong at the other end of the cultural or political spectrum. “There are examples of pretty financially advantaged and quite progressive communities that also have relatively high rates of antivax sentiment,” says McAdam.
COVID-19 vaccine campaigners will need persistence and stamina over many months or even years. Most vaccines under development will require two doses per person: a priming dose followed by a booster either three or four weeks later. But multidose inoculations have notoriously poor participation rates. And some vaccines have limited effectiveness. For instance, flu vaccine reduces the risk of someone having to go to the doctor with flu by only 40% to 60%. Also, some past vaccines have not worked as well for older adults, who do not generate an immune response as strong as younger adults do. Other new vaccines may be needed for older adults. A vaccine-acquired immunity can also fade over time. And COVID-19 might return seasonally, requiring updated or more frequent vaccinations and boosters.

**Targeted messaging**

Scientific facts alone rarely motivate many people to take action to protect their health, including accepting vaccination. But official vaccination messages are scientific and factual—and unmemorable. Antivaccination activists meanwhile tell stories that stimulate anger, fear, and mistrust. Their messages are remembered more vividly.

“We need to get better at storytelling,” says Brewer, founding and former chair of the National HPV Vaccination Roundtable. This consortium of over 70 national organizations promotes preteen vaccination against the human papillomavirus (HPV), a leading cause of cervical cancer. HPV vaccines were developed to prevent cervical cancer in women and genital warts in both men and women. The vaccines, which are typically delivered before puberty, have proved very effective.

“There are only so many ways you can share the number 31,200,” says Brewer. “That’s the number of HPV cancers that could be prevented every year if we could [improve vaccination rates]. But people don’t really get what a number means. So, we work with cancer survivors and people whose family members have been affected by HPV cancers to talk about their experiences” in YouTube videos. “Those stories or narratives are a very powerful way to help people focus and understand in personal terms what the problem really is.”

In movies and other popular culture, crowds are often shown panicking or behaving selfishly during a natural disaster or other crisis. But recent research has found that many individuals step up to help others in times of trouble and band together to work for their communities.

Human beings want to belong; we do not like being the only person doing something. “It starts with the fact humans are social creatures,” says Van Bavel. “We evolved in small social groups, and we needed to get along with others to survive. That’s baked into human DNA. You look to others like you for guidance about how to behave. Social norms matter. Wearing a mask, for instance, is not just about protecting yourself. It’s largely about protecting others around you and caring about them. You wear a mask because it’s the appropriate and expected and normative thing to do in your community that you belong in and that you care about.”

Humans tend to take social cues from people who are trusted by their community. Public-health officials increasingly collaborate with local influencers such as clergy, health care providers, business leaders, politicians, and even popular athletes. If an influencer wears a mask in public or gets a vaccine, it encourages others to follow. Influencers can also help officials tailor provaccine messages through social media, radio stations, and local newspapers that have credibility with those communities.

“The goal is to understand what the objection is to vaccination within any particular community,” says McAdam. “For each cultural context, craft a message that is responsive to that community’s particular set of fears. And find the appropriate messengers, people that have great credibility and influence within the community in question.”
But high-profile leaders may not be the most effective influencers. Instead, small groups far from corridors of power drive many social changes. “When we think about a hub-and-spoke social network, we tend to focus on [individuals] at the hub as the influencers,” says Damon Centola, a sociologist at the University of Pennsylvania. “But when we look at the data, changes in belief take hold among very small groups of people at the periphery. They are the ones who spread change. When a social movement gets enough traction at the periphery, then it spreads to the middle and takes over the rest of the network. You can target certain individuals [for provaccine efforts], starting at certain parts of the community and allowing changes and beliefs [you want to develop] take hold. This is not done by just spreading information… but by spreading a social norm” such as the belief that getting a vaccination is responsible behavior that protects vulnerable people in the community.

**Distribution and access**

Who should get the COVID-19 vaccine first? Healthcare workers in high-risk settings—such as doctors and nurses—should be at the front of the queue, according to an August 2020 draft NASEM report. Next in line should be first responders such as emergency medical technicians and firefighters, plus people living in nursing facilities. Then inoculations should be approved for schoolteachers and other workers critical to society’s functioning; people living in homeless shelters, group homes, and prisons that are COVID-19 hotbeds; and staff working in these facilities.

Some public health experts argue that race or ethnicity should be a top priority criterion. Because higher percentages of African Americans, Latinos, and Native Americans are hospitalized or dying from COVID-19, they should be among the first to receive a vaccine, they contend. But that could backfire. Some hard-hit disadvantaged communities are especially distrustful of the medical establishment. African Americans have endured a history of medical neglect or abuse, including the infamous Tuskegee syphilis study, which failed to treat Black men with syphilis, and surgical experiments on enslaved women. African Americans also face ongoing disparities in the US healthcare system. “If you put African Americans first for a vaccine, they may feel that they are guinea pigs for experimentation,” says Brunson.
In an ideal world, COVID-19 vaccines would be made available at readily accessible locales: churches, pharmacies, barbershops, and schools in addition to traditional settings such as hospitals, public health centers, and doctors’ offices. But the leading vaccines under development must be distributed and stored at subzero temperatures. Moderna’s coronavirus vaccine candidate would require a storage temperature of –20 degrees Celsius (°C), and BioNTech and Pfizer’s potential vaccines need storage at –70°C.

Trump administration officials have called on states to build giant centralized vaccination centers. But the nation’s public health infrastructure is highly decentralized, under the principle that local officials know their communities best. State and local epidemiologists track infectious disease and vaccination patterns, identifying people who tend to fall through inoculation cracks. City and county health centers vaccinate many people who lack insurance or cannot afford to visit doctors. When a coronavirus vaccine becomes available, local health expertise will be necessary to administer it widely and effectively.

Unfortunately, public health systems have been crumbling under intense fiscal pressure for years. During the 2008 recession, almost 60,000 employees—nearly one-quarter of the nation’s public health workforce—lost jobs. Nurses, information specialists, epidemiologists, and other staff in state and city hospitals were never replaced. Some vaccination programs and other services were trimmed or eliminated and have not returned. Now, even more staff are leaving. In the March 2020 stimulus bill, Congress provided $100 billion for hospitals and health care providers while investing in public health infrastructure with $500 million. But public health systems will need additional funds to manage the COVID-19 crisis and future pandemics, experts say.

But there are reasons to be optimistic. Vaccine-acquired immunity plus natural immunity could dramatically weaken the spread of the virus. Nonmedical efforts such as mask-wearing and social distancing could continue stemming it—but only if Americans are willing to sustain those practices. Current COVID-19 therapies are reducing the disease’s lethality, and other promising therapies are in development. If history is a guide, the first COVID-19 vaccine will not be the best one to be developed. As scientists learn more about this infectious disease, they will develop improved vaccines. But it is very unlikely that a vaccine will be a silver bullet that stops the pandemic in its tracks. Instead, a combination of vaccines and therapies, plus social behaviors, testing, contact tracing, and other tools and methods would eventually shrink the spread of COVID-19. The virus would remain dangerous, but it would be managed.

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Further reading.

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