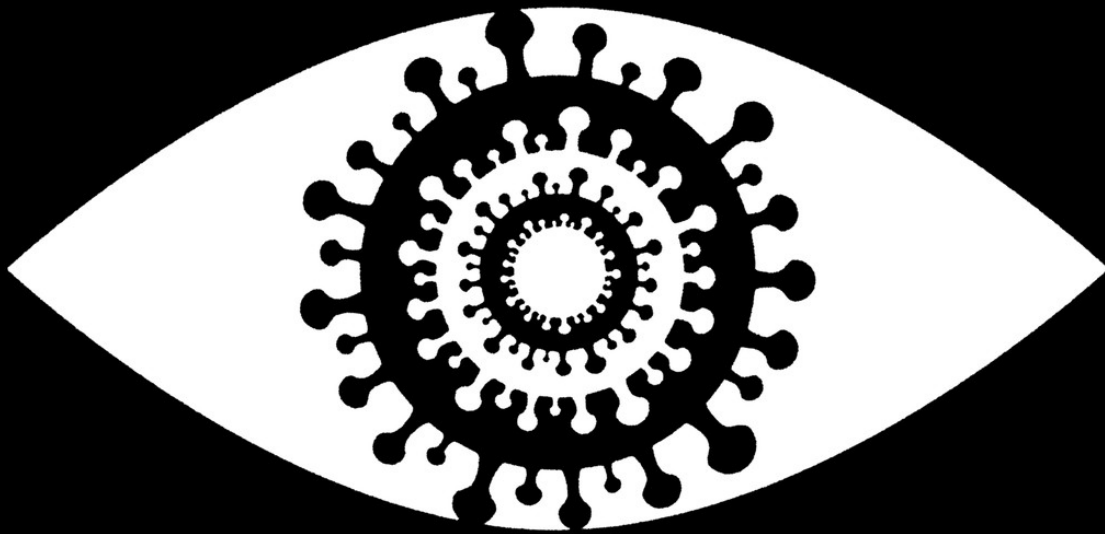




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HEALTH

HOW THE PANDEMIC NOW ENDS

Cases of COVID-19 are rising fast. Vaccine uptake has plateaued. The pandemic *will* be over one day—but the way there is different now.

By Ed Yong

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IN SEPTEMBER 2020, just before COVID-19 began its wintry surge through the United States, I wrote that the country was trapped in a pandemic spiral, seemingly destined to repeat the same mistakes. But after vaccines arrived in midwinter, cases in the U.S. declined and, by summer's edge, had reached their lowest levels since the pandemic's start. Many Americans began to hope that the country had enough escape velocity to exit its cycle of missteps and sickness. And though experts looked anxiously to the fall, few predicted that the Delta variant would begin its ascent at the start of July. Now the fourth surge is under way and the U.S. is once again looping through the pandemic spiral. Arguably, it never stopped.

This new surge brings a jarring sense of *déjà vu*. America has fallen prey to many of the same self-destructive but alluring instincts that I identified last year. It went all in on one countermeasure—vaccines—and traded it off against masks and other protective measures. It succumbed to magical thinking by acting as if a variant that had ravaged India would spare a country where half the population still hadn't been vaccinated. It stumbled into the normality trap, craving a return to the carefree days of 2019; in May, after the CDC ended indoor masking for vaccinated people, President Joe Biden gave a speech that felt like a declaration of victory. Three months later, cases and hospitalizations are rising, indoor masking is back, and schools and universities are opening uneasily—again. “It’s the eighth month of 2021, and I can’t believe we’re still having these conversations,” Jessica Malaty Rivera, an epidemiologist at Boston Children’s Hospital, told me.

But something *is* different now—the virus. “The models in late spring were pretty consistent that we were going to have a ‘normal’ summer,” Samuel Scarpino of the Rockefeller Foundation, who studies infectious-disease dynamics, told me.

“Obviously, that’s not where we are.” In part, he says, people underestimated how transmissible Delta is, or what that would mean. The original SARS-CoV-2 virus had

a basic reproduction number, or R0, of 2 to 3, meaning that each infected person spreads it to two or three people. Those are average figures: In practice, the virus spread in uneven bursts, with relatively few people infecting large clusters in super-spreading events. But the CDC estimates that Delta's R0 lies between 5 and 9, which "is shockingly high," Eleanor Murray, an epidemiologist at Boston University, told me. At that level, "its reliance on super-spreading events basically goes away," Scarpino said.

In simple terms, many people who caught the original virus didn't pass it to anyone, but most people who catch Delta create clusters of infection. That partly explains why cases have risen so explosively. It also means that the virus will almost certainly be a permanent part of our lives, even as vaccines blunt its ability to cause death and severe disease.

The U.S. now faces a dispiriting dilemma. Last year, many people were content to buy time for vaccines to be developed and deployed. But vaccines are now here, uptake has plateaued, and the first surge of the vaccine era is ongoing. What, now, is the point of masking, distancing, and other precautions?

The answer, as before, is to buy time—for protecting hospitals, keeping schools open, reaching unvaccinated people, and more. Most people will meet the virus eventually; we want to ensure that as many people as possible do so with two doses of vaccine in them, and that everyone else does so over as much time as possible. The pandemic isn't over, but it will be: The goal is *still* to reach the endgame with as little damage, death, and disability as possible. COVID-19 sent the world into freefall, and although vaccines have slowed our descent, we'd still be wise to steer around the trees standing between us and solid ground. "Everyone's got pandemic fatigue—I get it," Rivera told me. "But victory is not you as an individual getting a vaccine. It's making sure that SARS-CoV-2 doesn't bring us to our knees again."

1. Now

THE U.S. IS not back to square one. The measures that stymied the original

T coronavirus still work against its souped-up variant; vaccines, in particular, mean that half of Americans are heavily protected in a way they weren't nine months ago. Full vaccination (with the mRNA vaccines, at least) is about 88 percent effective at preventing symptomatic disease caused by Delta. Breakthrough infections are possible but affect only 0.01 to 0.29 percent of fully vaccinated people, according to data from the Kaiser Family Foundation. Breakthroughs might *seem* common—0.29 percent of 166 million fully vaccinated Americans still means almost 500,000 breakthroughs—but they are relatively rare. And though they might feel miserable, they are much milder than equivalent infections in unvaccinated people: Full vaccination is 96 percent effective at preventing hospitalizations from Delta, and unvaccinated people make up more than 95 percent of COVID-19 patients in American hospital beds. The vaccines are working, and working well. Vaccinated people are indisputably safer than unvaccinated people.

But although vaccinated *individuals* are well protected, highly vaccinated *communities* can still be vulnerable, for three reasons. First, unvaccinated people aren't randomly distributed. Instead, they tend to be geographically clustered and socially connected, creating vulnerable pockets that Delta can assault. Even in places with high vaccination rates, such as Vermont and Iceland, the variant is still spreading.

Read: The 3 simple rules that underscore the danger of Delta

Second, Delta could potentially spread from vaccinated people too—a point of recent confusion. The CDC has estimated that Delta-infected people build up similar levels of virus in their nose regardless of vaccination status. But another study from Singapore showed that although viral loads are initially comparable, they fall more quickly in vaccinated people. That makes sense: The immune defenses induced by the vaccines circulate around the body and need time to recognize a virus intruding into the nose. Once that happens, “they can control it very quickly,” Marion Pepper, an immunologist at the University of Washington, told me. “The same amount of

virus might be there at the beginning, but it can't replicate in the airways and lungs." And because vaccinated people are much less likely to get infected in the first place, they are also much less likely to transmit Delta than unvaccinated people, contrary to what some media outlets have claimed.

Still, several lines of evidence, including formal outbreak descriptions and more anecdotal reports, suggest that vaccinated people *can* transmit Delta onward, even if to a lesser degree than unvaccinated people. That's why the CDC's return to universal indoor masking made sense, and why vaccinated people can't tap out of the pandemic's collective problem. Their actions still influence Delta's ability to reach their unvaccinated neighbors, including immunocompromised people and children. "If you're vaccinated, you did the best thing you can do, and there's no reason to feel pessimistic," Inci Yildirim, a vaccinologist and pediatric infectious-disease expert at Yale, told me. "You're safer. But you will need to think about how safe you want people around you to be."

Third, Delta's extreme transmissibility negates some of the community-level protection that vaccines offer. *If no other precautions are taken*, Delta can spread through a half-vaccinated country more quickly than the original virus could in a completely unvaccinated country. It can even cause outbreaks in places with 90 percent vaccination rates but no other defenses. Delta has "really rewound the clock," Shweta Bansal, an infectious-disease ecologist at Georgetown University, told me. "Communities that had reached safety are in danger again." Vaccines can still reduce the size and impact of its surges, turning catastrophic boils into gentler simmers. But the math means that "there's not really a way to solve the Delta problem through vaccination alone," Murray said.

Here, then, is the current pandemic dilemma: Vaccines remain the best way for *individuals* to protect themselves, but *societies* cannot treat vaccines as their only defense. And for now, unvaccinated pockets are still large enough to sustain Delta surges, which can overwhelm hospitals, shut down schools, and create more chances for even worse variants to emerge. To prevent those outcomes, "we need to take advantage of every single tool we have at our disposal," Bansal said. These should

include better ventilation to reduce the spread of the virus, rapid tests to catch early infections, and forms of social support such as paid sick leave, eviction moratoriums, and free isolation sites that allow infected people to stay away from others. In states where cases are lower, such as Maine or Massachusetts, masks—the simplest, cheapest, and least disruptive of all the anti-COVID measures—might be enough.

States such as Louisiana and Florida, where Delta is spreading rapidly, “really need to be talking about a powerful response like closing indoor dining and limiting capacity at events,” Murray said. Louisiana has now reinstated an indoor mask policy, as have several counties and cities in other states. But several Republican governors, including Greg Abbott of Texas and Ron DeSantis of Florida, have preemptively blocked local governments or schools from imposing such mandates, even as Asa Hutchinson of Arkansas now seeks to reverse a similar law that he regrets passing.

There are better ways to do this. On a federal level, Congress could make funding contingent on local leaders being able to make their own choices, Lindsay Wiley of American University, an expert in public-health law, told me. On a state level, leaders could pass mask mandates like Nevada’s, which is “ideal,” Julia Raifman, a health-policy expert at Boston University, told me. It automatically turns on in counties that surpass the CDC’s definition of high transmission and shuts down in counties that fall below it. An off-ramp is always in sight, the public can see why decisions have been made, and “policy makers don’t have to constantly navigate the changing science,” Raifman said.

Vaccine mandates can help too. Emily Brunson, an anthropologist at Texas State, has studied vaccine attitudes and thinks that broad, top-down orders “wouldn’t play well, and the pushback could do more harm than good.” But strong mandates that tie employment to vaccination are easily justified in hospitals, long-term-care facilities, and prisons—“high-risk settings where vulnerable people don’t have a choice about being exposed,” Wiley told me. Mandates are also likely for university students, government employees, and the military, who already have to meet medical conditions for attendance or employment.

The calculus around safety has shifted in another important way. In the first three

surges, older people were among the most vulnerable to COVID-19; now 80 percent of Americans over 65 are fully vaccinated. But kids under 12 remain ineligible for vaccines—and the timeline for an emergency-use approval stretches months into the future. Children are less likely to become seriously ill with COVID-19, but more than 400 have already died in the U.S., while many others have developed long COVID or the inflammatory condition called MIS-C. Rare, severe events are more poignant when they affect children, and they can accumulate quickly in the Delta era. As my colleague Katherine J. Wu reports, pediatric COVID-19 cases are skyrocketing and hospitalizations have reached a pandemic high.

Read: The messiest phase of the pandemic yet

Virtual learning took a huge toll on both children and parents, and every expert I asked agreed that kids should be back in classrooms—with protections. That means vaccinating adults to create a shield around children, masks for students and staff, better ventilation, and regular testing. “Schools must continue mitigation measures—I feel very strongly about this,” Caitlin Rivers, an epidemiologist at Johns Hopkins, told me. Otherwise, Delta outbreaks are likely. Such outbreaks have already forced nine Mississippi schools to go remote and put 800 people from a single Arkansas district in quarantine. And other respiratory illnesses, including respiratory syncytial virus (RSV), are already showing up alongside COVID-19. “Schools have no choice but to close once there’s a large outbreak,” Brunson said. “A whole generation of children’s education and well-being hangs in the balance.”

The coming weeks will mark yet another pivotal moment in a crisis that has felt like one exhausting string of them. “I think people are right to be hurting, confused, and angry—things didn’t have to turn out this way,” Eleanor Murray, the epidemiologist, told me. But “piecemeal, half-assed responses” allowed for the uncontrolled spread that fostered the evolution of Delta and other variants. “People should be demanding that we don’t repeat those same mistakes from last year.”

“I feel dispirited too, but when the virus moves, we have to move—and sometimes,

that means going backwards,” Rivers told me. Daily caseloads are now 36 per 100,000 people; once they fall below 10, “and preferably below five, I’ll feel like we’re in a better place.”

2. Next

BUT THEN WHAT? Delta is transmissible enough that once precautions are lifted, most countries “will have a big exit wave,” Adam Kucharski, an infectious-disease modeler at the London School of Hygiene and Tropical Medicine, told me. As vaccination rates rise, those waves will become smaller and more manageable. But herd immunity—the point where enough people are immune that outbreaks automatically fizzle out—likely cannot be reached through vaccination alone. Even at the low end of the CDC’s estimated range for Delta’s R_0 , achieving herd immunity would require vaccinating more than 90 percent of people, which is highly implausible. At the high end, herd immunity is mathematically impossible with the vaccines we have now.

This means that the “zero COVID” dream of fully stamping out the virus is a fantasy. Instead, the pandemic ends when almost everyone has immunity, preferably because they were vaccinated or alternatively because they were infected and survived. When that happens, the cycle of surges will stop and the pandemic will peter out. The new coronavirus will become *endemic*—a recurring part of our lives like its four cousins that cause common colds. It will be less of a problem, not because it has changed but because it is no longer novel and people are no longer immunologically vulnerable. Endemicity was always the likely outcome—I wrote as much in March 2020. But *likely* is now *unavoidable*. “Before, it still felt possible that a really concerted effort could get us to a place where COVID-19 almost didn’t exist anymore,” Murray told me. “But Delta has changed the game.”

Read: Your vaccinated immune system is ready for breakthroughs

If SARS-CoV-2 is here to stay, then most people will encounter it at some point in their life, as my colleague James Hamblin predicted last February. That can be hard to accept, because many people spent the past year trying very hard to avoid the virus entirely. But “it’s not really the virus on its own that is terrifying,” Jennie Lavine, an infectious-disease researcher at Emory University, told me. “It’s the combination of the virus and a naive immune system. Once you don’t have the latter, the virus doesn’t have to be so scary.”

Think of it this way: SARS-CoV-2, the virus, causes COVID-19, the disease—and *it doesn’t have to*. Vaccination can disconnect the two. Vaccinated people will eventually inhale the virus but need not become severely ill as a result. Some will have nasty symptoms but recover. Many will be blissfully unaware of their encounters. “There will be a time in the future when life is like it was two years ago: You run up to someone, give them a hug, get an infection, go through half a box of tissues, and move on with your life,” Lavine said. “That’s where we’re headed, but we’re not there yet.”

None of the experts I talked with would predict when we would reach that point, especially because many feel humbled by Delta’s summer rise. Some think it’s plausible that the variant will reach most unvaccinated Americans quickly, making future surges unlikely. “When we come through, I think we’ll be pretty well protected against another wave, but I hesitate to say that, because I was wrong last time,” Rivers said. It’s also possible that there will still be plenty of unvaccinated people for Delta to infect in the fall, and that endemicity only kicks in next year. As my colleague Sarah Zhang wrote, the U.K. will provide clues about what to expect.

If endemicity is the future, then masks, distancing, and other precautions merely delay exposure to the virus—and to what end? “There’s still so much for us to buy time for,” Bansal told me. Suppressing the virus gives schools the best chance of staying open. It reduces the risk that even worse variants will evolve. It gives researchers time to better understand the long-term consequences of breakthrough infections. And much like last year, it protects the health-care system. Louisiana, Florida, Arkansas, Mississippi, Alabama, and Missouri all show that Delta is easily

capable of inundating hospitals, especially in largely unvaccinated communities. This cannot keep happening, especially because health-care workers are already burning out and facing a mammoth backlog of sick patients whose care was deferred during previous surges. These workers need time to recover, as does the U.S. more generally. Its mental-health systems are already insufficient to address the coming waves of trauma and grief. COVID-19 long-haulers are already struggling to access medical support and disability benefits. The pandemic's toll is cumulative, and the U.S. can ill-afford to accumulate more. Punting new infections as far into the future as possible will offer a chance to regroup.

Curbing the coronavirus's spread also protects millions of immunocompromised Americans, including organ-transplant recipients and people with autoimmune diseases, such as multiple sclerosis and lupus. Because they have to take drugs that suppress their immune system, they benefit less from vaccines and have no choice in the matter. Even before the pandemic, they had to carefully manage their risk of infection, and "we're not helping them by making surges longer," Inci Yildirim, the Yale vaccinologist, said. She and others are testing ways of boosting their vaccine responses, including giving third doses, timing their doses around other medications, or using adjuvant substances that trigger stronger immune responses. But for any of that to work, "you need the luxury of some level of COVID-19 control," Yildirim said.

Finally, the U.S. simply needs more time to reach unvaccinated people. This group is often wrongly portrayed as a monolithic bunch of stubborn anti-vaxxers who have made their choice. But in addition to young children, it includes people with food insecurity, eviction risk, and low incomes. It includes people who still have concerns about safety and are waiting on the FDA's full approval, people who come from marginalized communities and have reasonable skepticism about the medical establishment, and people who have neither the time to get their shots nor the leave to recover from side effects. Some holdouts are finally getting vaccinated because of the current Delta surge. Others are responding to efforts to bring vaccines into community settings like churches. It now takes more effort to raise vaccination rates, but "it's not undoable," Rhea Boyd, a pediatrician and public-health advocate, told

me last month. Measures such as indoor masking will “give us the time to do the work.”

3. Eventually

PANDEMICS END. But this one is not yet over, and especially not globally. Just 16 percent of the world’s population is fully vaccinated. Many countries, where barely 1 percent of people have received a single dose, are “in for a tough year of either lockdowns or catastrophic epidemics,” Adam Kucharski, the infectious-disease modeler, told me. The U.S. and the U.K. are further along the path to endemicity, “but they’re not there yet, and that last slog is often the toughest,” he added. “I have limited sympathy for people who are arguing over small measures in rich countries when we have uncontrolled epidemics in large parts of the world.”

Eventually, humanity will enter into a tenuous peace with the coronavirus. COVID-19 outbreaks will be rarer and smaller, but could still occur once enough immunologically naive babies are born. Adults might need boosters once immunity wanes substantially, but based on current data, that won’t happen for at least two years. And even then, “I have a lot of faith in the immune system,” Marion Pepper, the immunologist, said. “People may get colds, but we’ll have enough redundancies that we’ll still be largely protected against severe disease.” The bigger concern is that new variants might evolve that can escape our current immune defenses—an event that becomes more likely the more the coronavirus is allowed to spread. “That’s what keeps me up at night,” Georgetown’s Shweta Bansal told me.

To guard against that possibility, the world needs to stay alert. Regular testing of healthy people can tell us where the virus might be surging back. Sequencing its genes will reveal the presence of worrying mutations and new variants.

Counterintuitively, these measures become *more* important nearer the pandemic endgame because a virus’s movements become harder to predict when transmission slows. Unfortunately, that’s exactly when “public-health systems tend to take their foot off the gas when it comes to surveillance,” Bansal told me.

As of May, the CDC stopped monitoring all breakthrough infections and focused only on those that led to hospitalization and death. It also recommended that vaccinated people who were exposed to the virus didn't need to get tested unless they were symptomatic. That policy has since been reversed, but it “allowed people to get lax,” said Jessica Malaty Rivera, who was also a volunteer for the COVID Tracking Project at *The Atlantic*. “We’ve never tested enough, and we’re still not testing enough.” With Floridians once again facing hours-long lines for tests, “it’s a recap of spring 2020,” Samuel Scarpino, the infectious-disease expert, told me. “We continue to operate in an information vacuum, which gives us a biased and arguably unusable understanding of COVID-19 in many parts of the U.S. That makes us susceptible to this kind of thing happening again.”

What we need, Scarpino argues, is a nimble, comprehensive system that might include regular testing, wastewater monitoring, genetic sequencing, Google-search analyses, and more. It could track outbreaks and epidemics in the same way that weather forecasts offer warnings about storms and hurricanes. Such a system could also monitor other respiratory illnesses, including whatever the next pandemic virus turns out to be. “My phone can tell me if I need to carry an umbrella, and I want it to tell me if I should put a mask on,” Scarpino said. “I’d like to have that for the rest of my life.”

[Read: Vaccines are great. Masks make them even better.](#)

Since last January, commentators have dismissed the threat of COVID-19 by comparing it to the flu or common colds. The latter two illnesses are still benchmarks against which our response is judged—*well, we don't do that for the flu*. But “a bad flu year is pretty bad!” Lindsay Wiley, at American University, told me, and it doesn't have to be. Last year, the flu practically vanished. Asthma attacks plummeted. Respiratory infections are among the top-10 causes of death in the U.S. and around the world, but they can often be prevented—and without lockdowns or permanent mask mandates.

The ventilation in our buildings can be improved. Scientists should be able to create vaccines against the existing coronaviruses. Western people can wear masks when they're sick, as many Asian societies already do. Workplaces can offer paid-sick-leave policies and schools can ditch attendance records "so that they're not encouraging people to show up sick," Wiley said. All of these measures could be as regular a part of our lives as seat belts, condoms, sunscreen, toothpaste, and all the other tools that we use to protect our health. The current pandemic surge and the inevitability of endemicity feel like defeats. They could, instead, be opportunities to rethink our attitudes about the viruses we allow ourselves to inhale.

This article originally suggested that immunocompromised people do not benefit from vaccines; in many cases, they do gain protection from vaccination, though usually at lower levels than immunocompetent people.