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When will the COVID-19 pandemic end? March 2022 update

After the short, sharp shock of Omicron, the pandemic phase of COVID-19 looks to be ending for most locations, unless a significant and severe new variant emerges. This update discusses what we've learned from Omicron, the prospects for the rest of 2022, and presents three potential criteria for defining COVID-19 as endemic.

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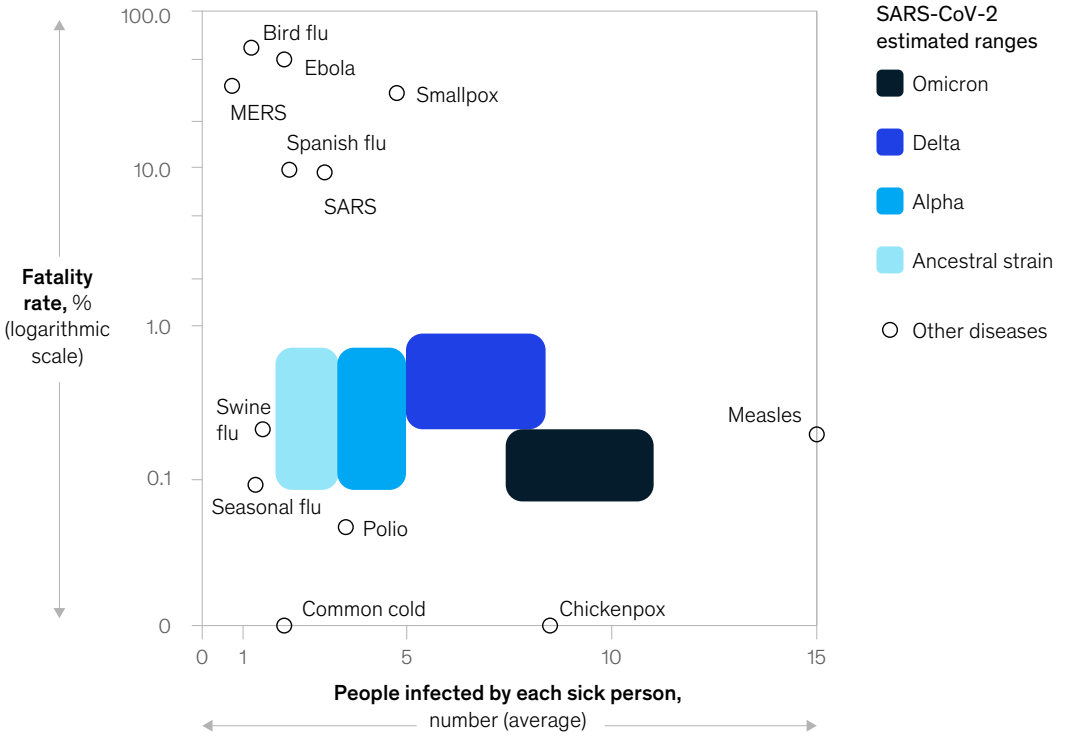
Since the Omicron variant of COVID-19 was named by WHO on November 26, 2021, it has moved at lightning speed. In less than three months, Omicron has spread around the world, caused record peaks in cases in many places,[1] and is now declining just as quickly. In most places, the worst of the Omicron wave has passed leading some locations to loosen public-health measures to a degree not seen in almost two years. In contrast, some locations, such as Hong Kong,[2] are seeing their worst peak yet, and continuing to tighten restrictions.

The most likely scenario we discussed in the December 2021 edition of this article has proved to be largely accurate—Omicron is more infectious than any previous variant and evades the immunity provided by both prior infection and incomplete vaccination[3] (Exhibit 1). These factors, combined with limited behavior change from pandemic-weary populations—and the twin accelerants of transmission, holiday travel and gatherings—meant that Omicron moved through the population with remarkable speed. Fortunately, the early evidence that Omicron is, on average, less severe than Delta also proved right.[4] The worst-case scenarios were avoided. The even more infectious BA.2 sub-variant of Omicron may have worsened the wave but has not substantially changed this narrative to date.[5]

Exhibit 1

Omicron is more infectious than other common viruses, and less fatal than Delta.

Disease fatality and infection rates[1]



[1]Average case-fatality rates and transmission numbers are shown. Estimates of case-fatality rates can vary. The preliminary estimates for the new coronavirus are shown in the SARS-CoV-2 ancestral-strain area.
Source: *New York Times*, Ancestral, Alpha, Delta, Omicron CFR, Omicron RO

[1] WHO Coronavirus (COVID-19) Dashboard, World Health Organization, February 2022, covid19.who.int.
[2] Farah Master and Clare Jim, "Hong Kong considers mass testing as COVID fight intensifies," Reuters, February 17, 2022, reuters.com.
[3] "Omicron Variant: What You Need to Know," Centers for Disease Control and Prevention, February 2, 2022, cdc.gov.
[4] Ibid.
[5] "Omicron subvariant BA.2 likely to have same severity as 'original' – WHO," Reuters, February 2, 2022, reuters.com.

What we've learned

The Omicron wave has taught us several lessons about the effectiveness of various societal responses. First, up-to-date vaccination status, including a recent booster, proved to be especially important in protecting against Omicron[6,7,8]. Countries where a significant portion of those at risk had received three doses of vaccine, including at least one dose of mRNA vaccine, saw hospitalizations substantially decouple from cases.[9] This meant that many European countries had more cases but fewer hospitalizations during this wave than prior ones. On the other hand, locations with lower up-to-date vaccine coverage, including parts of the United States, set all-time records for hospitalization and deaths. As in previous waves, lower-income countries and those with younger populations were somewhat protected,[10] even though inequalities in global vaccine access have meant that few there have received three doses, and most have not yet received a single dose.

Second, the link between cases and behavioral adjustments is largely broken. Data shows that more and more people have concluded that the health risks of COVID-19 are not significant enough for them to change their behavior, either because of their vaccination status, their youth, or a desire to move on from the pandemic.[11] Third, and consistent with this trend, some governments have concluded that the total societal costs of lockdowns, restrictions on business, or masking outweigh the benefits at this phase of the pandemic.[12,13] Other governments, however, are maintaining or strengthening public-health policies, including vaccine mandates.[14] Many workplaces remain relatively cautious in their policies,[15] but public-health responses to Omicron have typically been less forceful than those of prior waves with similar disease burdens.

The next ten months

Prospects for the rest of the year and beyond hinge on the questions of whether and when future variants will emerge. As long as Omicron remains the dominant variant, there is reason for relative optimism. Our scenario analysis suggests that Omicron-related hospitalizations are likely to continue to decline in the United States and remain at relatively low levels through the spring and summer (Exhibit 2). We might then expect to see a seasonality-driven wave of disease next fall and winter, but hospitalizations would likely peak well below the level of the wave we just experienced.

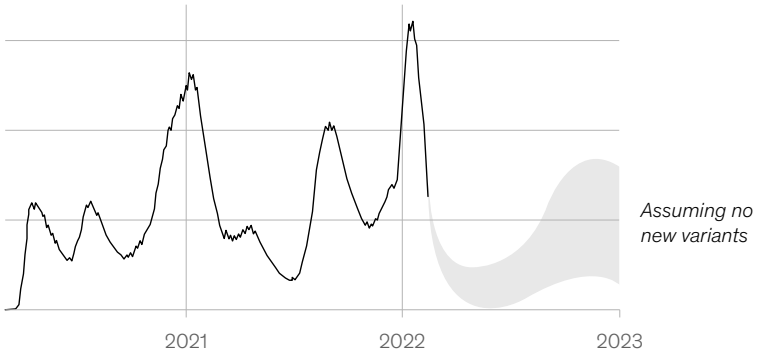
The default scenario, in which Omicron remains the dominant variant, represents a continuation of the transition toward managing COVID-19 as an endemic disease that is already underway in many locations. With Omicron as the dominant variant, the pandemic phase will feel like it is over for more and more people, though certainly not all.

[6] *Effectiveness of a Third Dose of mRNA Vaccines Against COVID-19–Associated Emergency Department and Urgent Care Encounters and Hospitalizations Among Adults During Periods of Delta and Omicron Variant Predominance — VISION Network, 10 States, August 2021–January 2022*, Centers for Disease Control and Prevention, January 28, 2022, cdc.gov.
[7] Ibid.
[8] Emma K. Accorsi, Amadea Britton, Katherine E. Fleming-Dutra, et al, "Association Between 3 Doses of mRNA COVID-19 Vaccine and Symptomatic Infection Caused by the SARS-CoV-2 Omicron and Delta Variants," January 21, 2022, jamanetwork.com.
[9] New COVID-19 cases worldwide, Johns Hopkins University & Medicine, February 20, 2022, coronavirus.jhu.edu.
[10] Nurith Aizenman, "Africa may have reached the pandemic's holy grail," NPR, January 28, 2022, npr.org.
[11] Sarah Feldman and Catherine Morris, "Omicron worries America, but not enough to precipitate change," Ipsos, December 14, 2021, ipsos.com.
[12] Nicholas Casey and Norimitsu Onishi, "Crack down hard, or wait and see? Europe splits on Omicron response," *New York Times*, December 20, 2021.
[13] Michael Ollove, "Amid Omicron Uncertainty, States Resist New Mandates," PEW, December 10, 2021, pewtrusts.org.
[14] Anna Engberg, "COVID-19: Vaccine mandate enforced in Austria," Healthcare IT News, February 1, 2022, healthcareitnews.com.
[15] Stephan Kahl, Damian Shepherd, Faris Mokhtar, Claire Che, Nic Querolo, Sarah Holder and Natalie Wong, "Omicron Suddenly Upends the World's Return to the Office," Bloomberg, December 20, 2021, bloomberg.com.

Exhibit 2

If Omicron remains the dominant variant, US hospitalizations will likely stay low throughout 2022.

Scenario for US COVID-19 hospitalizations (Omicron only) through December 2022 (illustrative)



Note: ~73–83% of total population may have immunity to current variants, after accounting for immunity from natural infection, vaccines (including booster doses), and waning immunity. Model assumes vaccine effectiveness against infection of 45–95% to pre-Omicron variants versus 20–40% to Omicron; vaccine effectiveness against hospitalization of 90–98% to pre-Omicron variants versus 45–70% to Omicron; immunity after natural infection of 90% to pre-Omicron variants versus 20–50% to Omicron; and waning immunity to infection and to hospitalization over 6 months to a plateau of 14–70% and 51–91%, respectively. Booster campaign assumed to start one year after initial vaccine rollout and dose uptake of 60% among the total population within 6 months. Model estimates a constant case detection rate in the period January 15, 2022–current date, using the latest available data. Hospitalizations depicted include only those due to COVID-19, and not those that incidentally may have asymptomatic COVID-19. IFR for Omicron is assumed to be –85% to –70% of that of Delta. Model assumes uniform mixing of population. Stricter nonpharmaceutical interventions (NPIs) are imposed when ICU utilization reaches 20–25% of total capacity. Model assumes no emergence of a significant new variant and that deployment of therapeutics is not yet at scale.
Source: McKinsey Global COVID-19 epidemiology model; Our World in Data

As ever, different parts of the world will experience the coming phase differently. Countries with high rates of current immunity and widespread booster uptake will be better protected. Age demographics will continue to be an important risk driver. The dynamics of seasonality may cause differences between the northern and southern hemispheres. And government policy still matters—in particular, the few remaining countries with zero-COVID-19 strategies may also experience the coming months differently as they choose whether to continue or relax their border policies.

New variants: the big unknown

By and large, the six-month outlook in many countries is brighter than at any time in the past two years. But several uncertainties could temper the optimism, starting with the duration of immunity. Evidence suggests that both natural and vaccine-induced immunity wane over time, particularly against infection.[16] While we don't yet know the full extent of waning immunity for Omicron, new evidence indicates that those who have received three doses of vaccine may benefit from medium-term protection.[17] At the same time, booster uptake has been significantly lower than first- and second-dose coverage in many countries. For example, while 215 million Americans are fully vaccinated, only 93 million have also received a booster dose.[18] So, as we consider future waves, two critical questions remain about the duration of protection: how significantly will immunity wane? And will booster uptake continue to slow in each subsequent round of boosting?

[16] Daniel R. Felkin, Melissa M. Higdon, Laith J. Abu-Raddad, et al., "Duration of effectiveness of vaccines against SARS-CoV-2 infection and COVID-19 disease: results of a systematic review and meta-regression," *The Lancet*, February 21, 2022, thelancet.com.
[17] Frauke Muecksch, Zijun Wang, Alice Cho, et al., "Increased potency and breadth of SARS-CoV-2 neutralizing antibodies after a third mRNA dose," BioRxiv, February 15, 2022, biorxiv.org.
[18] "COVID-19 vaccinations in the United States," The Centers for Disease Control and Prevention, February 23, 2022, covid.cdc.gov.

The next wave of medical advances will also prompt questions. Pfizer and Moderna have indicated that modified vaccines targeted against Omicron could be available in the coming months,[19,20] but we don't yet know their efficacy, duration of protection, or the policies that will be set around fourth doses. Nor is it clear yet what the approval standards might be for multi-valent vaccines. On another front, there is hope that wider use of the oral therapeutics paxlovid and molnupiravir will further decrease the number of severe cases,[21,22] but the real-world impact of their use at scale is not yet known, and supplies of paxlovid are still scaling.[23]

While these uncertainties are important, they do not necessarily change the story of a transition toward endemicity under Omicron. The main risk to that transition is a significantly different new variant that replaces Omicron as the dominant strain. We made this point in the last four editions of this article, and unfortunately it remains as true as ever. SARS-CoV-2 will continue to mutate under all scenarios, but most mutations do not lead to stable new forms of the virus with an evolutionary advantage. Alpha, Delta, and Omicron have met this standard, and have changed the trajectory of the pandemic. Beta and Gamma have also affected the trajectory, but to a lesser degree; their evolutionary advantage was not great enough to become globally dominant.[24]

Omicron is already among the most infectious human viruses known to science.[25] While even greater infectiousness (such as the sub-variant BA.2 has exhibited) is possible, to become dominant a new variant would likely need to also partially or fully evade prior immunity, including that provided by Omicron infection. If such a variant emerged, its average clinical severity would then be critical. Exhibit 3 lays out three example scenarios for the potential characteristics and trajectory of the pandemic under a new dominant variant. This is not a complete list of possible future variants but some potential options. (Note: these scenarios are not related to the Omicron-hospitalization scenario shown in Exhibit 2.)

A new dominant variant will receive a Greek-letter name, but until then we have created more descriptive names for our scenarios. Under the "Omicron's twin" scenario, a variant that evaded prior immunity (including from Omicron) but was otherwise similar to Omicron in transmissibility and severity of disease might cause a wave of disease broadly similar to the one we have recently experienced, though perhaps slightly worse if the public response to it is even more muted and if vaccine-conferred immunity has waned. A worse case might be "Delta-cron", a variant that evades prior immunity and combines the infectiousness of Omicron with the average severity of Delta. This might occur if vaccines proved less effective in preventing severe disease, and could lead to the worst wave yet for many locations. The "Milder-cron" scenario would continue the trend toward less severe disease. Countries might then experience a smaller version of the recent Omicron wave, which might be managed similar to the way societies manage flu on an ongoing basis.

[19] "BioNTech: watchdogs' requirements may defer planned launch of Omicron shot," Reuters, January 25, 2022, reuters.com.
[20] Francesco Guarascio, "Moderna eyes COVID booster by August, not clear yet if Omicron-specific needed," Reuters, February 17, 2022, reuters.com.
[21] "Pfizer Shares In Vitro Efficacy of Novel COVID-19 Oral Treatment Against Omicron Variant," Pfizer, January 18, 2022, Pfizer.com.
[22] "Merck expects COVID-19 pill molnupiravir to be effective against Omicron," Reuters, January 11, 2022, reuters.com.
[23] CDC Health Advisory: Using Therapeutics to Prevent and Treat COVID-19, The Centers for Disease Control and Prevention (CDC), December 31, 2021, emergency.cdc.gov; Berkeley Lovelace, Jr., "Covid pills are easier to find as the Omicron surge subsides," NBC News, February 23, 2022, nbcnews.org.
[24] "Tracking SARS-CoV-2 variants," World Health Organization, who.int.
[25] See Exhibit 1.

Exhibit 3

Here are three example scenarios for a new dominant variant of COVID-19.

What's more difficult to estimate is when a new variant of SARS-CoV-2 will emerge. It could be a day after we publish this update, or six months , or years from now. The extraordinary progression we've already seen—in just over two years four strains in succession have become globally dominant—makes it dangerous to plan on a "no new variant" scenario. But it is possible that evolution will not produce epidemiologically significant new variants. The risk of new variants emerging is related to the number of cases in the world, since each infected individual represents a new opportunity for viral evolution. For this reason, the continued global rollout of COVID-19 vaccines remains an investment in our collective safety as well as an imperative to protect individuals.

Some have suggested that particular populations, such as those who are immunocompromised due to HIV or other causes, are disproportionately at risk of incubating new variants.[26] Others have posited a possible zoonotic origin of Omicron.[27] As scientific understanding of these potential pathways develops and genomic surveillance networks continue to expand, societies may get better at reducing the risk of variant emergence. For now, we remain bystanders as the virus evolves.

Pandemic to endemic: Where does one end and the other begin?

Several potential definitions of the transition from pandemic to endemic phase are possible (Exhibit 4). *Epidemiologically*, COVID-19 can be defined as endemic when it exists at a predictable level that does not require society-defining interventions.[28] While we all wish that level could be zero, eliminating the disease is not feasible for any country with open borders. Previous editions of this article invoked a comparison of the COVID-19 burden to that from other diseases such as flu. Just as the risk of flu is considered normal, so too might the risk of COVID-19.

In addition, what is considered acceptable by society will differ across countries. Countries currently reopening during Omicron wave downswings are doing so amid very different experiences of COVID-19 burden. For example, the COVID-19 death rate per capita in the past month for the United States is 50 percent higher than Argentina's and ten times greater than the Philippines'.[29]

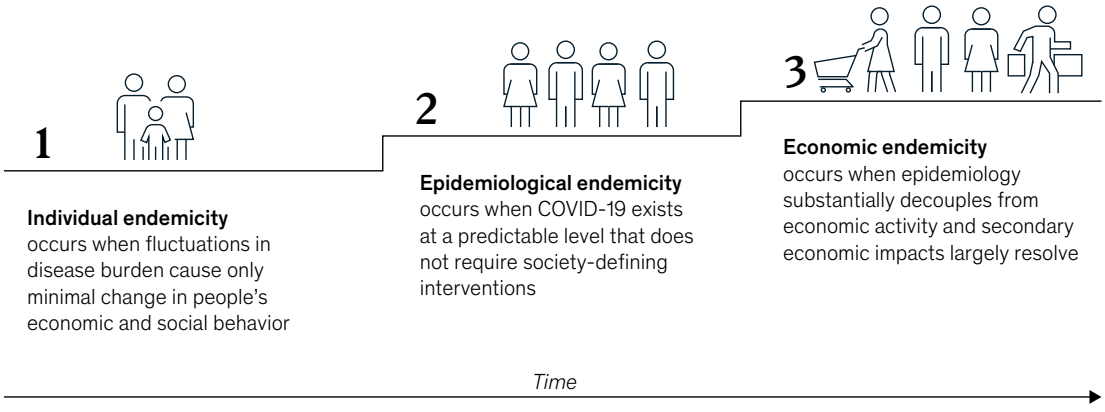
A *behavioral* threshold for endemicity would come when fluctuations in disease burden cause only minimal change in individuals' economic and social behavior. This is mediated by individual risk factors (age, underlying conditions, and so on), and their risk appetite.

Finally, an *economic* threshold for endemic COVID-19 will come when epidemiology substantially decouples from economic activity and secondary economic effects largely resolve. This economic definition is related to the individual behavior definition, but may take longer to reach because those secondary effects, including supply chain imbalances, labor market disruptions, and global asymmetries affecting travel and trade, may linger.

Exhibit 4

Three distinct definitions for COVID-19 endemicity are emerging.

The path to COVID-19 becoming endemic



[26] Lawrence Corey, Chris Beyrer, Myron S. Cohen, Nelson L. Michael, Trevor Bedford, and Morgane Rolland, "SARS-CoV-2 Variants in Patients with Immunosuppression," *The New England Journal of Medicine*, August 5, 2021, nejm.org.
[27] Helen Branswell, "Some experts suggest omicron variant may have evolved in an animal host," PBS, December 8, 2021, pbs.org.
[28] "Principles of Epidemiology in Public Health Practice, Third Edition: An Introduction to Applied Epidemiology and Biostatistics," Centers for Disease Control, November 2011, cdc.gov.
[29] "Mortality risk of COVID-19," Our World in Data, ourworldindata.org.

Until a new variant emerges, and under some scenarios even once it does, the United States and Europe will likely continue to move toward these definitions of endemicity. As that happens, countries across Europe are rolling back the last public-health restrictions.[30] England plans to end the isolation requirement for those testing positive (and is ending free asymptomatic testing).[31] The US CDC recently announced a change in its masking guidelines that serves to significantly reduce the number of areas where masking is recommended.[32] Airline passenger volumes in the United States are much closer to prepandemic levels than they were a year ago[33] and schools navigated the recent wave with less disruption than was caused by previous waves of disease.[34]

Endemic COVID-19 does not mean that the disease poses no risk. Globally, we should aim for an "always on" response system that can scale quickly. And as we have written previously, every society must do four things to manage COVID-19 effectively during the endemic phase:

— Choose a holistic set of health, economic, and social markets that they are managing for

— Monitor and track progress against them in ways that allow for targeted response escalation when needed

— Limit disease through effective use of vaccines, therapeutics, and other countermeasures

— Slow transmission through testing and environmental/workplace modifications

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A new variant may yet trigger another chapter in the COVID-19 pandemic and societies must be prepared to respond if and when that happens. But for now, the pandemic phase looks to be ending.

[30] Jamey Keaten, "More countries in Europe, recently the pandemic's epicenter, ease COVID restrictions," *Los Angeles Times*, February 2, 2022, latimes.com.
[31] Alistair Smout, "UK PM Johnson speeds up plan to end COVID self-isolation rule," Reuters, February 9, 2022, reuters.com.
[32] "Use and care of masks," Centers for Disease Control, February 25, 2022, cdc.gov.
[33] TSA checkpoint travel numbers (current year versus prior year(s)/same weekday), Transportation Security Administration, tsa.gov.
[34] Omicron: School closures must be 'avoided whenever possible, United Nations, December 17, 2021, news.un.org.

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