than three-quarters of the population is still susceptible to infection, meaning Indians "can't become complacent", adds Murhekar.

Elsewhere in the world, populations have not reached the levels of natural immunity seen in India's megacities, and the fall in cases since late January has instead been driven by lockdowns and social distancing.

For example, a meta-analysis of antibody studies, published in *The Lancet Global Health* on 8 March, found that India had one of the highest percentages of antibody prevalence in the general population of any country included in the analysis — with about 20% of people testing positive for antibodies against SARS-CoV-2 — but estimates reached as low as 7% in the Americas, 5% in Europe and 2% in western-Pacific nations (X. Chen *et al. Lancet Glob. Health* https://doi.org/gh7599; 2021). People who develop some immunity to SARS-CoV-2 are thought to be protected from severe disease, but researchers do not know how long that protection lasts.

If people in relatively low-prevalence regions start mixing again when restrictions are relaxed, cases could once more begin to rise, researchers warn.

And what happens in the United States — which accounts for almost one-quarter of all recorded worldwide COVID-19 cases so far — will have an important effect on the global trajectory. Although the proportion of the population that has tested positive for antibodies is lower in the United States than in India, in some states, more than one-quarter of the people tested had antibodies against the virus in January, says the US Centers for Disease Control and Prevention.

But the overall numbers don't reflect large variations within communities, says Marm Kilpatrick, an infectious-disease researcher at the University of California, Santa Cruz. Immune protection could explain the fall in some communities where people have been very highly exposed to the virus, but the drop in other communities is probably due to people hunkering down since the holiday period in November and December, says Kilpatrick. As some states lift restrictions, people could start to socialize again, he says.

"It worries me that the US is taking a strong step back from controls," adds Baker.

A similar situation is unfolding in the United Kingdom and parts of Europe, where plans to relax restrictions risk new waves of infection, says Sebastian Funk, an epidemiologist at the London School of Hygiene & Tropical Medicine. Focusing too much on global numbers overlooks significant variations nationally, he says.

The situation is murkier in many developing nations, where information about numbers of infections is scarce. If sub-Saharan Africa had seen similar surges to those observed in India and the United States, "then we would certainly be over the global peak", says Joseph Lewnard, an infectious-disease epidemiologist at the University of California, Berkeley. But these surges have not materialized.

Another unknown is how long immunity — either from vaccination or infection — will last, says Salje. If the protection is short-lived, larger outbreaks are possible in the future.

Race against time

Emerging variants are another source of uncertainty. A peak in cases in the United Kingdom followed the emergence and rapid spread of the highly infectious variant B.1.1.7. Funk says some European countries are at risk of a large wave of the variant, similar to that experienced by the United Kingdom late last year. This could already be happening in nations such as Italy, where numbers are again on the rise.

In other places, this might already have happened. There are some signs that a variant called P.1, currently sweeping Brazil, could evade pre-existing immunity and facilitate the virus's resurgence. These fears are centred around the Brazilian city of Manaus, which COVID-19 hammered last April. Researchers estimate that, by last October, up to 76% of the population could have already been infected and developed immunity, which contributed to a decline in cases.

But hospital admissions due to COVID-19 began to rise again in January — exceeding numbers observed last April. The rise coincided with the detection and rapid spread of P.1. "Manaus is telling us that a second wave is possible," says Ester Sabino, an infectious-disease researcher at the University of São Paulo in Brazil.

Cases continue to climb across Brazil, and the country could portend an ominous trajectory for other parts of the globe. "The variants of concern have not yet spread around the world, so I believe they could cause damage and increase the death rate again," says Sabino.

"One thing that gives me comfort here in the US is that that variant is very uncommon," says Rivers.

"We're in this race against time," adds Baker. "Can we vaccinate people fast enough so that we can avoid that future peak from these more transmissible variants?"

COVID ANTIBODY TREATMENTS SHOW PROMISE

But uptake has been low in the United States, where some therapies have been authorized for months.

By Heidi Ledford

Two clinical trials suggest that specific antibody treatments can prevent deaths and hospitalizations among people with mild or moderate COVID-19 — particularly those who are at high risk of developing severe disease.

One study found that an antibody against the coronavirus developed by Vir Biotechnology in San Francisco, California, and GSK, headquartered in London, reduced the chances of hospitalization or death among participants by 85%. In another trial, a cocktail of two antibodies — bamlanivimab and etesevimab, both made by Eli Lilly of Indianapolis, Indiana — cut the risk of hospitalization and death by 87%.

The study results, both announced on 10 March, come from randomized, placebo-controlled, double-blind clinical trials, but have not yet been published. They add to a growing body of evidence that the treatments can help fend off severe disease when given early, says Derek Angus, an intensive-care physician at the University of Pittsburgh in Pennsylvania.

The antibodies "appear to be incredibly effective", he says. "I'm very excited about the results of these trials."

The body's natural response to viral infection is to generate a variety of antibodies, some of which are able to directly interfere with the virus's ability to replicate. In the early days of the pandemic, researchers raced to identify the antibodies that are most effective against the coronavirus and to produce them in bulk. The resulting 'monoclonal antibodies' have since been tested in a variety of settings as treatments for COVID-19.

Vir and GSK's antibody, called VIR-7831, was first isolated in 2003 from someone recovering from severe acute respiratory syndrome (SARS), which is caused by a similar coronavirus. The antibody was later found to bind to the spike protein on the virus SARS-CoV-2, too.

The companies also announced that in laboratory studies, VIR-7831 bound to SARS-CoV-2 variants — including the fast-spreading variant 501Y.V2 (also called B.1.351), first identified in South Africa (A. L. Cathcart *et al.* Preprint at bioRxiv https://doi.org/f284; 2021). They

attributed the resilience of the antibody to its target: a particular region of the spike protein that does not tend to accumulate mutations.

VIR-7831 joins a list of monoclonal antibodies that have been tested against COVID-19, some of which — including Lilly's combination — have already been authorized for use in the United States and elsewhere. But there has been relatively little uptake by US physicians and their patients, says Angus.

One problem, he says, is that although results have been press released, companies have yet to publish data from key clinical trials in peer-reviewed journals. The drugs are also expensive and must be administered by infusion in a specialized facility, such as a hospital or outpatient-treatment centre — a difficult task when medical resources have already been stretched by a surge in cases.

Mixed messages

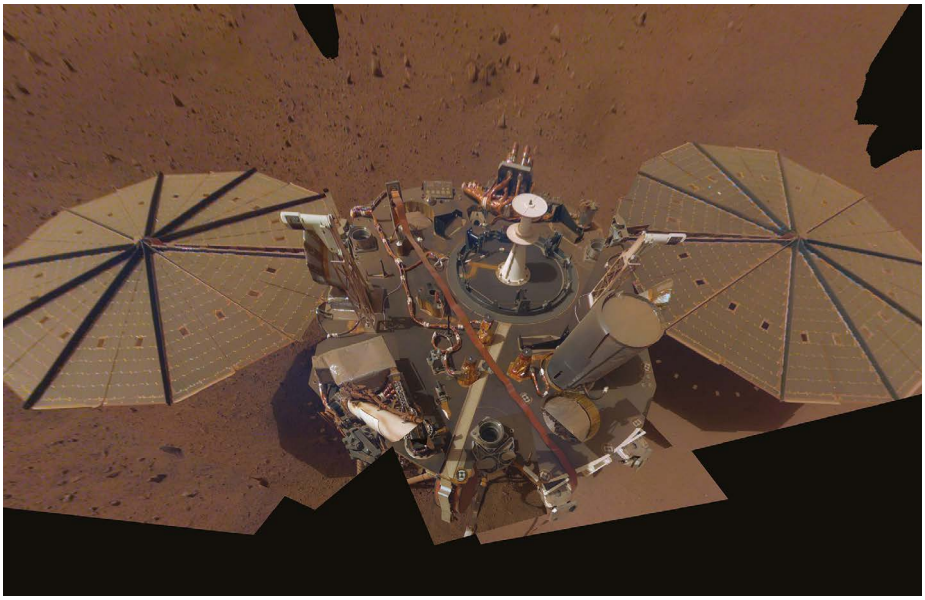
Another challenge has been mixed messaging. Earlier in the pandemic, some key clinical trials involving people who had been hospitalized with COVID-19 found no benefit from monoclonal antibodies. Many researchers had anticipated that result: monoclonal-antibody therapy is expected to work best early in disease, and the late-stage symptoms of severe COVID-19 are sometimes driven more by the immune system itself than by the virus.

Even so, those clinical-trial failures created a narrative that competed with positive results in studies of milder infections, says Angus. "People would say, 'But I thought it didn't work,'" he says. "It's totally getting in the way."

And although studies in mild infections have shown promise, they are too small to allow researchers to draw definitive conclusions, says Saye Khoo, a pharmacologist at the University of Liverpool, UK, who is leading the UK AGILE Coronavirus Drug Testing Initiative. Only a small fraction of people with mild COVID-19 will progress to severe disease, meaning that although the trials enrolled hundreds of participants, the number of those who were hospitalized or died was low.

But it will be a long wait until everyone is vaccinated, and monoclonal antibodies could provide an important bridge between vaccines and the treatments that work for people who are hospitalized, says Jens Lundgren, an infectious-disease physician at the University of Copenhagen and Rigshospitalet. "It is not a replacement for vaccines, but it is a plan B," he says, adding that the drugs could be particularly important for those who cannot mount an immune response to vaccination.

The speed with which these monoclonal antibodies were developed holds a lesson for future pandemics, says Khoo. "These compounds are without a doubt exciting," he says. "There will be other pandemics coming to us. This has been a real lesson in how to be prepared."



NASA/JPL-CALTECH

InSight snapped this dusty selfie in early 2019 after deploying its seismometer.

MARS'S CORE HAS BEEN MEASURED — AND IT'S SURPRISINGLY LARGE

Mars becomes the first inner planet after Earth to have the size of its core estimated.

By Alexandra Witze

Scientists have peered into the heart of Mars for the first time. NASA's InSight spacecraft, sitting on the Martian surface with the aim of seeing deep inside the planet, has revealed the size of Mars's core by listening to seismic energy ringing through the planet's interior.

The measurement suggests that the radius of the Martian core is 1,810–1,860 kilometres, roughly half that of Earth's. That's larger than some previous estimates, meaning the core is less dense than had been predicted. The finding suggests the core must contain lighter elements, such as oxygen, in addition to the iron and sulfur that constitute much of its make-up. InSight scientists reported their measurements in several presentations last week at the virtual Lunar and Planetary Science Conference, based in Houston, Texas.

Rocky planets such as Earth and Mars are divided into the fundamental layers of crust, mantle and core. Knowing the size of each of those layers is crucial to understanding how the planet formed and evolved. InSight's measurements will help scientists to determine how Mars's dense, metal-rich core separated from the overlying rocky mantle as the planet cooled. The core is probably still molten from Mars's fiery birth, some 4.5 billion years ago.

The only other rocky planetary bodies for which scientists have measured the core are Earth and the Moon. Adding Mars will allow them to compare and contrast how the Solar System's planets evolved. Similar to Earth, Mars once had a strong magnetic field generated by liquid sloshing around its core, but the field's strength dropped sharply over time, causing Mars's atmosphere to escape into space and the surface to become cold, barren and much less hospitable to life than Earth's.

Simon Stähler, a seismologist at the Swiss Federal Institute of Technology in Zurich, reported the core findings in an 18 March presentation for the virtual conference. Stähler declined an interview request from *Nature*, saying the team intends to submit the work for publication in a peer-reviewed journal.

The work builds on earlier findings from InSight that detected layers in the crust. "Now we start to have that deep structure down to the core," said geophysicist Philippe Lognonné in another pre-recorded talk. Lognonné, at the Paris Institute of Earth Physics, heads InSight's seismometer team.

The spacecraft, which cost nearly US$1 billion, landed on Mars in 2018 and is the first mission to study the red planet's interior. The stationary lander sits near the Martian