

The mass vaccination campaign across the US will be drawing to a close sooner rather than later

By DREW ARMSTRONG

After three months of vaccination across the US, a majority of American adults have gotten shots, and the effort will soon shift from mass inoculation to mop-up. As of Saturday, 138.6 million people in the US have received at least one COVID-19 vaccine shot. About 1.3 million more are getting a first dose every day, according to the Centers for Disease Control and Prevention. While the rate of new vaccinators is declining, even if it were immediately cut in half, it would mean that six weeks from now more than half of the population of the US and its territories will have had a dose.

Almost all of those who get a first dose are likely to get their second, according to one CDC study. On top of that, more than 80% of people age 60 or over—the most vulnerable group—have had a dose and will likewise complete vaccination.

That may be sufficient, at least to see a significant impact on US caseloads. The US is currently where Israel's vaccine campaign was in mid-February, three weeks before cases there began to plunge. (Israel has, in total, vaccinated just under 60% of its population with two shots and just over 60% with one.)

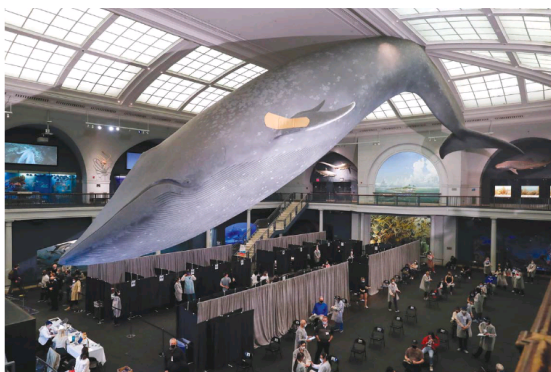
But in the next few weeks, what the vaccine campaign is going to look like is going to change dramatically. The Biden administration is pursuing a strategy of abundance, which the White House has referred to as an "overwhelm the problem" approach. That means that there will likely still be widespread shipping of vaccines to pharmacies and health centers, inoculation clinics and mobile vaccine resources.

But what's likely to disappear are lines and scarcity. "It's OK if there's not a long line of 1,000 people," Natalie Quillan, the White House's deputy coordinator of its COVID-19 response, told Bloomberg. "That's good. That was the plan." There are many signs that's already happening. In New York City, which had some of the tightest vaccine availability at the start of the rollout, the Health Department announced Friday that appointments were no longer needed at city sites and people could walk in for shots.

All of this points to a US mass vaccine campaign that's closer to the end than the beginning. For more than three months now, the Bloomberg "vaccine tracker" has published a daily figure of how many doses were reported administered in the US. After months of mostly going up, that figure is now starting to decline. The goal of a vaccine campaign is to run out of people to vaccinate. That's where the country is now headed.

That doesn't mean an end to the vaccine efforts; it just means that they look different. Jeff Zients, the White House's COVID-19 response coordinator, said on Friday that the vaccine campaign is entering its "next phase."

"Going forward, we expect daily vaccination rates will moderate and fluctuate," he said at a briefing in Washington. "We've gotten vaccinations to the most at-risk and those most eager to get vaccinated



NEW YORKERS receive coronavirus vaccinations last month under the model of a blue whale that hangs at the American Museum of Natural History. (Shannon Stapleton/Reuters)

as quickly as possible. And we will continue those efforts, but we know reaching other populations will take time and focus."

IT ALSO MEANS that how the vaccine rollout has been measured so far will be different. There will likely be no more days of four million doses administered. On Saturday, the US administered three million doses, the lowest Saturday total since March 20. Success will mean chipping away at the increasingly small group of people who haven't gotten a shot yet. If that effort is working, the daily vaccine rates should continue to fall as health workers run out of people who need to be vaccinated.

It also means a looser supply chain. The US is now reasonably assured of having enough vaccine. It has contracted for 600 million shots from Pfizer Inc. and Moderna Inc., and the drugmakers are delivering those doses faster than they are being used. About 28 million shots are being shipped each week, and 21 million are being used.

Johnson & Johnson's one-dose vaccine, which was on a brief safety hold after concerns about rare blood clots, is likely to end up an also-ran in the US. Given how much Pfizer and Moderna is being shipped versus how much is being consumed, J&J's shot may end up as a comparatively niche product, or be used mostly abroad, or reworked as a booster shot.

There are just under 10 million J&J doses that have been delivered but are still unused, according to

CDC data. At the current rates of delivery and use of Moderna's and Pfizer's shots, about seven million doses of those vaccines are building up, as well.

Measuring the vaccine rollout in May the way it was measured in March gives the wrong picture. In the early days of the rollout, having seven million doses a week go unused would have been a failure. Now it's more of a necessity. If you want to get to hard-to-reach, potentially reluctant people, you need to make it easy for them. That means lots of vaccine on standby, sitting around on a shelf.

But it doesn't make for a razor-thin supply chain. Bloomberg has tracked the percentage of shots used over the course of the US effort. At the peak of demand, some states were reporting that well over 90% of every dose delivered to them was being used, often within a few days of delivery.

Those days will disappear, and those use-ratios will fall. Mass-vaccine clinics filled with eager shot-seekers are great at injecting every last dose at the start of a rollout. They're far less useful in attracting what one of Maine's top health officials, Nirav Shah, referred to this week as the "not able," the "not right now" and the "not ever."

Reaching those remaining people will be more of a steady grind. Many may get a dose at a doctor's office during a visit for another condition. Others will be vaccinated at work, at a mobile clinic, or when they get another scheduled vaccination, like a flu shot.

But those efforts are likely to begin to fade into the background hum of the day-to-day operations of US healthcare. Public health can go back to being boring again.

The start of the vaccine campaign was like a blockbuster movie that millions of people saw in theaters (remember those?).

Now we're heading for the phase when the people who missed it on the big screen are streaming it at home: "Oh, you finally got your shot?" "Yeah, I got it when it came out." (Bloomberg News/TNS)

Shots and buckets: Milwaukee Bucks to offer in-game COVID-19 vaccines

Basketball fans can obtain their first COVID-19 vaccine dose in an unusual venue this weekend—at a Milwaukee Bucks game.

Those aged 16 years and older attending Sunday's game against the Brooklyn Nets will be able to obtain their first dose of the Pfizer vaccine at a mobile vaccination site inside Fiserv Forum, which the Bucks are opening in partnership with the Milwaukee Health Department.

Tip off is at 2:30 p.m. CDT but doses will be available starting at 1 p.m. locally through the end of the

game inside the Panorama Club, one of the 17,341-capacity arena's VIP lounge areas.

"This is a critical time for all of us to take the necessary step that will help return our lives to normal," Bucks President Peter Feigin said in a written statement on Tuesday.

"Let's make this happen together." US President Joe Biden on Tuesday eased outdoor mask-wearing guidelines, citing "stunning progress" on the coronavirus pandemic, with the US Centers for Disease Control and Prevention reporting that more than half of all adult

Americans have received at least one dose of the COVID-19 vaccine. The team is widely believed to be the first in the National Basketball Association to offer in-game vaccinations, though numerous stadiums and arenas across the US opened their doors to inoculate residents during the pandemic, when not performing their usual functions.

Outside the US, fans at a Russian Premier League soccer match in St. Petersburg last month were offered free vaccinations for two hours before and after the game. (Reuters)

Rooted in history

Groundbreaking study examines how the UNESCO World Heritage archaeological site at Beit She'arim in the North can be saved from invasive tree roots without harming the trees themselves or the surrounding nature

By RACHELI WACKS
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The lower foothills of the Galilee region in northern Israel contain the intact burial caves of Beit She'arim, an ancient Roman-era Jewish village dating to the first century BCE to the third century CE. Decorated with paintings and inscriptions written in Greek, Aramaic and Hebrew, the necropolis was the final resting place for many Jewish dignitaries following the destruction of the Second Temple.

Located near Kiryat Tivon, the Beit She'arim site was recognized as a UNESCO World Heritage Site in 2015. In addition to the old town, synagogue and basilica, the local nature surrounding the site is one of the main attractions of Beit She'arim, which includes multiple hiking paths, natural vegetation, and many blooming ornamental trees.

In recent years, however, the site's structural integrity has been put in jeopardy, and not from nearby development and construction projects like one would normally expect. Rather, it is the roots of the trees above the subterranean site that are causing the problem as their root growth has penetrated through the soft limestone ceiling, putting the cave in danger of collapse.

In a new Israeli study, researchers set out to identify the tree species whose roots penetrated the caves in order to save the historical site from any further damage without destroying or eradi-



THE ENTRANCE to the Beit She'arim necropolis, the final resting place for many Jewish dignitaries following the destruction of the Second Temple. (Hadas Parush/Flash90)

cating the trees themselves. If you visit the site in the near future, you can easily see the tree roots sprouting from the ceilings of the underground caves.

"The roots have penetrated all the caves of Beit She'arim. This is a fundamental problem of the entire site," says Dr. Dror Ben-Yosef, an archaeologist from the Northern District of the Nature and Parks Authority and one of the leaders of the new research.

The clash between heritage and nature

Theoretically, all the vegetation that fills the site could all be simply cut down in order to protect the historic caves, although this solution is far from ideal, especially considering the site's World Heritage

designation. "The beautiful grove and forests of the local Israeli vegetation in Beit She'arim are part of the atmosphere and the experience of the visit," says Dr. Tamir Klein from the Department of Plant and Environmental Sciences at the Weizmann Institute of Science in Rehovot, one of the leaders of the new research.

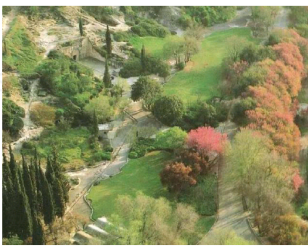
Recently published in the scientific journal *Plants, People, Planet*, the study aims to find a solution to the problem that will both preserve the physical site and minimize natural damage. "This is the first time in the world that this type of research has been done," says Ben-Yosef. "We have not found studies that discuss the relationship between roots

and antiquity and how to identify and eliminate invasive and pervasive roots."

The root of the problem "We quickly realized that the biggest problem is identifying the trees that are sending their roots so deep," Klein says. According to him, identifying a tree by its roots is a difficult and complex task.

"Sometimes we even smell or taste roots to identify which tree they belong to. Many times someone can swear it is the roots of a carob tree, for example, and in the end, it turns out that they are the roots of an oak tree."

The invasive roots were identified in Klein's laboratory by two methods: morpho-anatomical examination and DNA barcoding. One of



BEIT SHE'ARIM National Park. (Wikimedia Commons)

the main difficulties in the genetic aspect of the study was that Mediterranean plants are underrepresented in global DNA databases, so the researchers had little to compare with the samples they collected. Like fingerprints, an imprint itself carries little significance without a database full of identified species against which it can be compared.

"We had to add these species to the existing database," Klein says. "So, we went to the Tel Aviv Botanical Garden, which is the best authority in the field of tree-species identification, and we sampled the DNA of leaves belonging to 19 different Mediterranean species. After uploading these sequences to the database, we were able to compare the DNAs of the roots we sampled and find out which species the roots belong to."

After combining the results of both the anatomical and

genetic tests, the researchers were able to identify which tree species the 13 collected root samples collected from the caves belonged to. Seven root samples were identified as Pistacia, or mastic trees (four *Pistacia atlantica* and three *Pistacia palaestina*); two were identified as *Cupressus sempervirens*, or Mediterranean cypress; and the other root samples belonged to Aleppo pine (*Pinus halepensis*), cedar bush (*Capparis spinosa*), and bryonia (*Bryonia*, a flowering plant in the gourd family).

Following the study, the trees that were found to have invaded the caves were marked, and some were dried—the end results of which are similar to felling trees without the unwanted damage that felling may create (like

heavy trees falling over vulnerable caves).

Now, the Nature and Parks Authority is patiently and carefully examining the results of the study.

"The root will rot and leave a space inside the cave, which we will have to fill with a special material that will prevent additional cracking," says Ben-Yosef. If all goes well, Park Authority officials are expected to expand the activity to the other trees whose roots have invaded the caves as well, and later also remove the tree stumps from the area. At the same time, given the well-known and beloved status of Beit She'arim, the Information Division of the Nature and Parks Authority will inform the public of the actions taking place on the site and their importance.

"Identifying the roots enables the implementation of mutual solutions that combine the desire to preserve nature along with the desire to preserve the heritage," says Klein.

"The research that our team deals with on a daily basis focuses on researching the ecology of the forest through the roots," says Klein. "So it was nice that we could help with a matter that is different and special."