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HEALTH

A grim warning from Israel: Vaccination blunts, but does not defeat Delta


With early vaccination and outstanding data, country is the world’s real-life COVID-19 lab

16 AUG 2021 · 3:55 PM · BY [MEREDITH WADMAN](#)



Medical staff at a COVID-19 isolation unit in Ashkelon, Israel, last week. Officials worry a steep surge in cases will soon fill Israeli hospitals.:10.1126/science.abl9630 GIL COHEN MAGEN/XINHUA VIA GETTY IMAGES

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“Now is a critical time,” Israeli Minister of Health Nitzan Horowitz said as the 56-year-old got a COVID-19 booster shot on 13 August, the day his country became the first nation to offer a third dose of vaccine to people as young as age 50. “We’re in a race against the pandemic.”

His message was meant for his fellow Israelis, but it is a warning to the world. Israel has among the world’s highest levels of vaccination for COVID-19, with 78% of those 12 and older fully vaccinated, the vast majority with the Pfizer vaccine. Yet the country is now logging one of the world’s highest infection rates, with nearly 650 new cases daily per million people. More than half are in fully vaccinated people, underscoring the extraordinary transmissibility of the Delta variant and stoking concerns that the benefits of vaccination ebb over time.

The sheer number of vaccinated Israelis means some breakthrough infections were inevitable, and the unvaccinated are still far more likely to end up in the hospital or die. But Israel’s experience is forcing the booster issue onto the radar for other nations, suggesting as it does that even the best vaccinated countries will face a Delta surge.

“This is a very clear warning sign for the rest of world,” says Ran Balicer, chief innovation officer at Clalit Health Services (CHS), Israel’s largest health maintenance organization (HMO). “If it can happen here, it can probably happen everywhere.”

Israel is being closely watched now because it was one of the first countries out of the gate with vaccinations in December 2020 and quickly achieved a degree of population coverage that was the envy of other nations— for a time. The nation of 9.3 million also has a robust public health infrastructure and a population wholly enrolled in HMOs that track them closely, allowing it to produce high-quality, real-world data on how well vaccines are working.

“I watch [Israeli data] very, very closely because it is some of the absolutely best data coming out anywhere in the world,” says David O’Connor, a viral sequencing expert at the University of Wisconsin, Madison. “Israel is the model,” agrees Eric Topol, a physician-scientist at Scripps Research. “It’s pure mRNA [messenger RNA] vaccines. It’s out there early. It’s got a very high level population [uptake]. It’s a working experimental lab for us to learn from.”

Israel’s HMOs, led by CHS and Maccabi Healthcare Services (MHS), track demographics, comorbidities, and a trove of coronavirus metrics on infections, illnesses, and deaths. “We have rich individual-level data that allows us to provide real-world evidence in near-real time,” Balicer says. (The United Kingdom also compiles a wealth of data. But its vaccination campaign ramped up later than Israel’s, making its current situation less reflective of what the future may portend; and it has used three different vaccines, making its data harder to parse.)

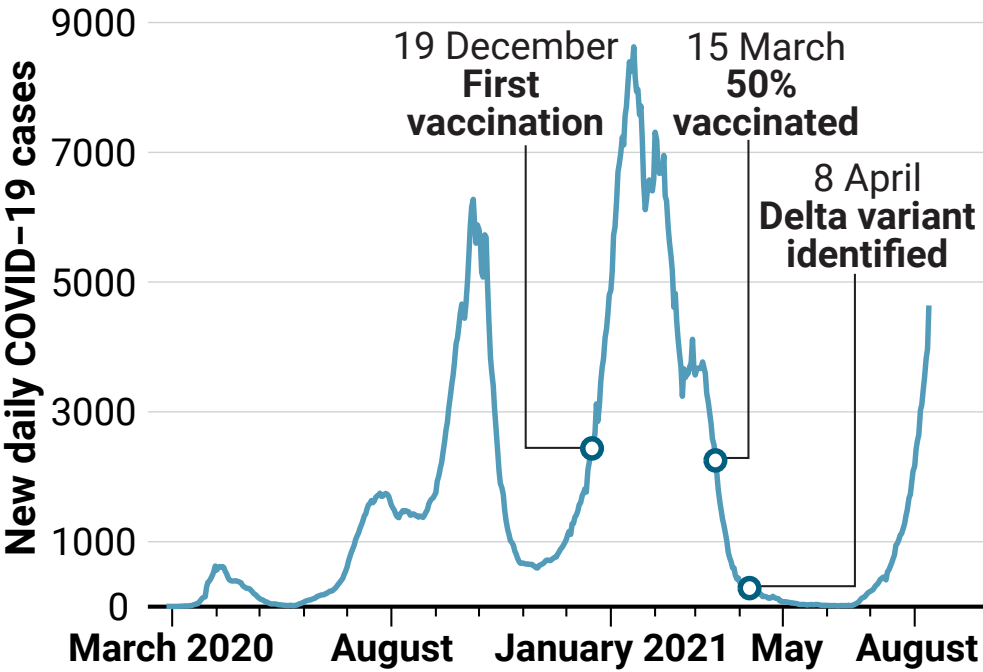
Now, the effects of waning immunity may be beginning to show in Israelis vaccinated in early winter; [a preprint](#) published last month by physician Tal Patalon and colleagues at KSM, the research arm of MHS, found that protection from COVID-19 infection during June and July dropped in proportion to the length of time since an individual was vaccinated. People vaccinated in January had a 2.26 times greater risk for a breakthrough infection than those vaccinated in April. (Potential confounders include the fact that the very oldest Israelis, with the weakest immune systems, were vaccinated first.)

Israel’s sobering setback

Israel, which has led the world in launching vaccinations and in data gathering, is confronting a surge of COVID-19 cases that officials expect to push hospitals to the brink. Nearly 60% of gravely ill patients are fully vaccinated.

At the same time, cases in the country, which were scarcely registering at the start of summer, have been doubling every week to 10 days since then, with the Delta variant responsible for most of them. They have now soared to their highest level since mid-February, with hospitalizations and intensive care unit admissions beginning to follow. How much of the current surge is due to waning immunity versus the power of the Delta variant to spread like wildfire is uncertain.

What is clear is that “breakthrough” cases are not the rare events the term implies. As of 15 August, 514 Israelis were hospitalized with severe or critical COVID-19, a 31% increase from just 4 days earlier. Of the 514, 59% were fully vaccinated. Of the vaccinated, 87% were 60 or older. “There are so many breakthrough infections that they dominate and most of the hospitalized patients are actually vaccinated,”



(GRAPHIC) K. FRANKLIN/SCIENCE; (DATA) H. RITCHIE ET AL., OURWORLDINDATA.ORG, 2020

says Uri Shalit, a bioinformatician at the Israel Institute of Technology (Technion) who has consulted on COVID-19 for the government. “One of the big stories from Israel [is]: ‘Vaccines work, but not well enough.’”

“The most frightening thing to the government and the Ministry of Health is the burden on hospitals,” says Dror Mevorach, who cares for COVID-19 patients at Hadassah Hospital Ein Kerem and advises the government. At his hospital, he is lining up anesthesiologists and surgeons to spell his medical staff in case they become overwhelmed by a wave like January’s, when COVID-19 patients filled 200 beds. “The staff is exhausted,” he says, and he has restarted a weekly support group for them “to avoid some kind of PTSD [post-traumatic stress disorder] effect.”

To try to tame the surge, Israel has turned to booster shots, starting on 30 July with people 60 and older and, last Friday, expanding to people 50 and older. As of Monday, nearly 1 million Israelis had received a third dose, according to the Ministry of Health. Global health leaders including Tedros Adhanom Ghebreyesus, director-general of the World Health Organization, have pleaded with developed countries not to administer boosters given that most of the world’s population hasn’t received even a single dose. The wealthy nations pondering or already administering booster vaccines so far mostly reserve them for special populations such as the immune compromised and health care workers.

Still, studies suggest boosters might have broader value. Researchers have shown that boosting induces a prompt surge in antibodies, which are needed in the nose and throat as a crucial first line of defense against infection. The Israeli government’s decision to start boosting those 50 and older was driven by preliminary Ministry of Health data indicating people over age 60 who have received a third dose were half as likely as their twice-vaccinated peers to be hospitalized in recent days, Mevorach says. CHS also reported that out of a sample of more than 4500 patients who received boosters, 88% said any side effects from the third shot were no worse, and sometimes milder, than from the second.

Yet boosters are unlikely to tame a Delta surge on their own, says Dvir Aran, a biomedical data scientist at Technion. In Israel, the current surge is so steep that “even if you get two-thirds of those 60-plus [boosted], it’s just gonna give us another week, maybe 2 weeks until our hospitals are flooded.” He says it’s also critical to vaccinate those who still haven’t received their first or second doses, and to return to the masking and social distancing Israel thought it had left behind—but has begun to reinstate.

Aran’s message for the United States and other wealthier nations considering boosters is stark: “Do not think that the boosters are the solution.”

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