More than a year has passed since people began receiving the first authorized COVID-19 vaccine in the US. By early January of this year, nearly 210 million people, or two-thirds of the eligible population, had received either 2 doses of an mRNA vaccine or 1 dose of an adenovirus vaccine to protect against SARS-CoV-2 infection. On top of that, 75 million people, or more than a third of those eligible, had received a booster dose.

While millions of COVID-19 cases and hospitalizations have been prevented and hundreds of thousands of lives saved, the pandemic still rages, with US daily case and hospitalization counts hitting record highs beginning right around the anniversary of the first vaccinations outside clinical trials.

On January 6, JAMA Associate Editor Preeti Malani, MD, MSJ, a professor of medicine in the Division of Infectious Diseases at the University of Michigan Medical School and the university's chief health officer, sat down with Amanda Cohn, MD, of the US Centers for Disease Control and Prevention (CDC), to discuss the first year of COVID-19 vaccines and what the future of vaccination against SARS-CoV-2 might look like.

Cohn, former Executive Secretariat of the Advisory Committee on Immunization Practices who remains deeply involved with vaccine policy for the CDC, coauthored a JAMA Viewpoint with CDC Director Rochelle Walensky, MD, MPH, and CDC colleague Barbara Mahon, MD, MPH, that reviewed COVID-19 vaccines’ first year.

The following is an edited version of the conversation between Malani and Cohn.

**DR MALANI:** My favorite statement in the Viewpoint is “Vaccines do not save lives. Vaccinations do.” Can we dig into this a bit?

**DR COHN:** That comment has been made by many of my mentors in the immunization world. It reminds us that we have these amazing scientific accomplishments that can save lives, reduce the burden of disease, and get people back to normal. But it doesn’t help to just have the technology. You’ve got to get it in arms.

We have done everything over the past year to make these vaccines as accessible as possible. Yet, 1 in 4 people are still choosing not to get vaccinated, and we’re still losing more than 1000 lives a day from COVID, almost all of them unvaccinated individuals.

I think we started writing the Viewpoint before we knew about Omicron. When we finished it, we knew that Omicron could be a problem. We didn’t know what a huge problem it would be, but it is a stark reminder that vaccines are critical to saving lives. Cases are much milder among vaccinated rather than unvaccinated people.

**DR MALANI:** A year ago, there was this portion of people who immediately wanted to get vaccinated. Then some needed a little time, a little bit of a nudge to feel comfortable, and others had issues with access. What is being done today to turn vaccines into the vaccinations?

**DR COHN:** Our options are getting more limited. Early on, there were barriers to vaccination that I didn’t anticipate: the digital technology that was needed to make appointments, the elderly being able to get to appointments, people who were the most vulnerable having the hardest time accessing vaccines. We were able to address those with support from community organizations. People jumped in and took people to get vaccinated. That was so amazing.

Now we’re shifting to a demand problem. There’s probably still a small minority who may have trouble getting those vaccines, but almost the entire group of unvaccinated people are individuals who have concerns about vaccine safety and just don’t trust vaccines. It’s really hard to convince people with accurate information when they’re getting so much disinformation and misinformation thrown at them. People may not trust CDC.

We need anybody who is in the health care space to tell family and friends and patients, “These vaccines are safe. These vaccines will protect you from what can be a very serious disease and from potentially long-term COVID and things that we still don’t understand.”

**DR MALANI:** In the US, a relatively small group of people received the Janssen, or J&J, vaccine compared to the 2 mRNA vaccines. There have been some well-described safety concerns that are very rare but potentially devastating. Most notable is cerebral venous sinus thrombosis. You were involved in this discussion in December when the CDC...
Results after 2 doses of the Pfizer vaccine did not meet the level of immunogenicity that they wanted to see. There's been a lot of discussions about whether these vaccines should be a 3-dose series even in adults, and they're testing an additional dose in the youngest children. Remember that the 5- to 11-year-olds' dose of the Pfizer vaccine is actually a third of the adult dose. The dose they're testing in kids under 5 is even smaller than that. I hope that we will have vaccines available for that age group by late spring. For now, we need to stick with what FDA has authorized and make sure everyone around those young children is vaccinated and gets booster doses.

**DR MALANI:** A few months ago the thought was it's unlikely that we're going to need boosters because the vaccines are so great. Then they were doing boosters in Israel, and we were talking about third doses in profoundly immunocompromised individuals. Then it was nursing homes and health care workers. Soon it was older adults and then all adults, and just a few weeks ago, the CDC added 16- to 17-year-olds. And last week Dr Walensky approved boosting 12- to 15-year-olds.

Is the definition of “fully vaccinated” shifting? What data have informed these incremental recommendations? Some parents are concerned about that myocarditis risk in younger kids, which thankfully is very rare. But severe COVID-19 in this group is also rare.

**DR COHN:** The booster dose recommendations did evolve quickly, but they were iterative and incremental. Even though cases are milder, there is such widespread disease right now. There is evidence that a third dose may not prevent Omicron infection but will reduce transmission and likely provide more protection than 2 doses.

“Fully vaccinated” initially referred to the primary series—2 doses for mRNA vaccines and 1 dose for the J&J vaccine. With additional doses for immunocompromised persons and then booster doses for people who aren’t immunocompromised, that language doesn’t make sense for everyone. The CDC’s trying to shift to language that says “up-to-date on your vaccines.” This is the type of language we use all the time with schoolchildren.

For an immunocompromised person, that might mean 3 doses, and then 6 months later, a booster dose. For somebody who’s not immunocompromised, that would mean 2 doses of an mRNA vaccine and then a booster dose. These might change over time. For 5- to 11-year-olds it is still just 2 doses.

Rising disease rates and concerns about people traveling and the holidays pushed forward the desire to have booster doses more broadly available. At the same time, we were able to get additional data from Israel that demonstrated that the myocarditis risk after a booster dose is actually lower than the myocarditis risk after the second dose. The risk after a first dose for myocarditis is very low. It’s really after the second dose, primarily in adolescent boys, that the risk was higher.

To protect against Omicron, we still have to mask and socially distance. But a booster will add an additional layer of protection for adolescents and adults.

We constantly get feedback that we’re changing our recommendations too often and too quickly, but we have changing data coming in. It’s that balance of do you make the right call based on the science in that moment, knowing it may shift, or do you not? It’s been incredibly challenging.

**DR MALANI:** Do you expect fourth doses? There are some data now suggesting that maybe a fourth dose would be helpful for people who are immunocompromised. What data will the CDC be looking at to sort this out?

**DR COHN:** I think there are 2 questions. One is will there be a need for a fourth dose. The other is do we need a new vaccine as the virus evolves, like we do for the flu vaccine every year. That remains to be seen. There was...
a lot of talk about, and I think the companies even started working on, vaccines for Delta, but as soon as we got through Delta, Omicron happened. It’s really hard to change the vaccine quickly enough to be impactful.

There’s a lot of discussion about what the overall goals of the vaccine program are. Is it to prevent severe disease, hospitalization, and deaths, or can it help reduce transmission and get people back to normal? These vaccines clearly will not eliminate transmission. They’re not going to solve the pandemic. If we got vaccination coverage up really high, we could have much more endemic, less severe disease, and we could move on.

The thinking is that this is going to be an endemic virus, and we’re going to continually work to keep rates low and to keep morbidity and mortality low. Hopefully, there’ll be therapeutics that will help with that in the near future, but vaccines are the 1 tool that could help us move closer to normal and get those masks off.

We’re not going to make progress until we get those unvaccinated individuals vaccinated. We can vaccinate the vaccinated individuals over and over again, but we’re still going to see deaths and we’re still going to have overburdened hospitals and an exhausted health care system because 25% of the US population is unvaccinated, representing millions and millions of people.

I think we’ll likely need more doses, especially primarily in immunocompromised persons and potentially in older adults. We keep saying that after this next phase maybe we’ll have more limited transmission and won’t need an annual vaccine or a dose every 6 months against COVID.

**DR MALANI:** I want to circle back to misinformation. In the Viewpoint, you write, “Although spreading vaccine hesitancy at the population level is easy, countering disinformation is uniquely challenging in the context of widespread use of social media. It often requires time for one-on-one discussions, active listening, attention to personal concerns, and thoughtful answers to questions.” I have 2 related questions that come to mind. One is the issue of confidence and transparency, and the other is more specifically related to misinformation. You mentioned [the cell phone–based post–COVID-19 vaccination health checker] v-safe in the Viewpoint. What has the CDC learned from v-safe?

**DR COHN:** Millions of people have reported into v-safe. It’s allowed us to see that the mild side effects in clinical trials are similar to those in the general population. We have people reporting 1 or 2 days’ worth of fever, soreness, things like that, after vaccination.

We’re also seeing that the number of times people are reporting that they had a medically attended or more severe adverse event is remarkably low. Things like myocarditis have been identified partially through v-safe but also from other types of studies done in other countries.

The other unique thing about v-safe is that we’ve enrolled tens of thousands of pregnant people. We have a v-safe pregnancy registry to follow up with moms, finding out about their deliveries, and looking at infant outcomes. I anticipate in the next month or 2 we’ll have our first set of papers that show we’re not seeing birth defects or other adverse events in infants.

**DR MALANI:** I’m glad to hear that because pregnancy has been one of the risk factors for severe disease. Vaccination has been a difficult choice for pregnant people, and as more data are out, physicians and others can use that to counsel people. What is your practical advice for people to effectively counsel patients?

**DR COHN:** I’ve watched my husband, a general internal medicine physician, try to counter vaccine misinformation for the last year, and it’s exhausting. Physicians aren’t given enough time in the office to have these discussions, which can be incredibly uncomfortable and hard. Active listening, trying to get at what the person is really concerned about, is important. Even if they’re not scientifically valid concerns from your perspective as a physician, they are likely valid concerns to that individual, who believes the information they’re hearing. It’s really important to try to convey that you’re much more scared of a patient having COVID than a vaccine adverse event. It may take multiple times, and the whole office has to be engaged in this. Educating your entire staff can help because it’s likely patients trust your nurses, medical assistants, and the front office staff as much as they trust you.

**DR MALANI:** I’d like to shift to the last part of the Viewpoint, “A Global Pandemic Must Be Met With Global Solutions.” You and your coauthors write, “The US and the global community must do all they can to ensure that populations have accurate information about the benefit of vaccines, that doses are available, and that countries have resources for administration.” The US has delivered nearly 300 million COVID vaccine doses to more than 100 countries. How do we better support vaccine equity worldwide?

**DR COHN:** Vaccine hesitancy is one of the biggest challenges. If we are concerned about misinformation being a problem in this country, it’s more expansive in countries where social media may be their primary source of information.

Vaccine hesitancy and access go hand in hand, for sure. We have to make sure vaccines are highly accessible so that it’s easy for individuals to make the choice to get vaccinated. This is especially true globally. We need to make sure that everyone can get access to vaccines super, super easily. With polio vaccines, we went into people’s homes and into those communities and villages across the world. It took extraordinary efforts to get that done. One of the key ways to increase vaccine demand is to normalize it in communities. If we think that every community in this country has its own perspective and challenges, that’s just times a million across the world.

**DR MALANI:** The last sentence in your Viewpoint reads, “The dissonance between highly effective vaccines and a virus that continues to evolve is a reminder that...”
while there have been some successes, it is essential to remain vigilant to what may come next.” My last question for you is what may come next?

**DR COHN:** I feel confident that we understand vaccine safety really well now. We understand the signals and that there will not be a big vaccine safety signal.

I do think it’ll be a potential change in a variant that even more greatly escapes protection from vaccines. That’s the most likely scenario, and we’ll have to either change the vaccine or have some other way to manage cases that are not preventable by vaccines.

With the new therapeutics and other ways to protect individuals, I hope we can evade a serious “next.” We’re still seeing about a thousand deaths a day with Omicron, which is not low enough, but we’re not yet seeing huge increases in deaths. But certainly, a mutation that escapes the vaccine entirely would be profoundly problematic.

On a positive note, though, I believe that if we do have that “next,” we have incredible scientists and manufacturing processes in place to rapidly change the vaccine strain to address it.

**Conflict of Interest Disclosures:** None reported.

**Note:** Source references are available through embedded hyperlinks in the article text online.