

COVID-19 vaccines: experts answer your questions

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Two new COVID-19 vaccines, developed at record-setting speed, are

soon to be assessed by U.S. agencies for emergency use in combating the ongoing pandemic.

Advisory panels of infectious disease experts this week will assess a vaccine developed by pharmaceutical company Pfizer and German biotech firm BioNTech—a vaccine that Britain began administering to its most vulnerable citizens on Tuesday.

The committees will then turn their attention next week to a second vaccine developed by Moderna.

Approval of either or both vaccines will begin the largest vaccination effort ever undertaken.

The transition from hazy lab science to a very real vaccine-laden needle raises many questions for Americans. But experts have some answers:

When will the first Americans get their vaccines?

U.S. Food and Drug Administration and U.S. Centers for Disease Control and Prevention advisory committees will review the Pfizer-BioNTech vaccine this week, and if the nod is given then the vaccine rollout could commence at startling speed, said Dr. William Schaffner, a professor of infectious disease with the Vanderbilt University Medical Center in Nashville, Tenn.

"It could well be that the first people to get the vaccine could be within the next week or week and a half," Schaffner said.

Because Operation Warp Speed paid manufacturers to start producing doses even as their vaccine candidates underwent clinical trials, there will be stockpiles of both the Pfizer-BioNTech and Moderna vaccines that are ready to ship the second the green light is given, Schaffner said.

Warp Speed paid Pfizer nearly \$2 billion to manufacture and deliver 100 million doses, and Moderna received about \$1.5 billion for 100 million doses of its vaccine.

"We've stored a lot of vaccine already. It's one of the reasons we were able to move so quickly. We didn't wait until the trials were completed to start making and storing the vaccine," Schaffner said.

Who's in charge of distributing the vaccine?

Operation Warp Speed and the CDC will oversee national distribution of the vaccine, working in conjunction with the pharmaceutical companies, Schaffner said.

However, each state's health department will identify the specific locations that will receive the vaccine prior to individuals receiving their inoculation, Schaffner said.

Because the first two vaccines are based on highly fragile messenger RNA (mRNA), they need to be kept frozen at extremely low temperatures.

"The Pfizer vaccine has to be kept so cold, almost minus 100 degrees Fahrenheit, in really deep freeze, otherwise it begins to degrade," Schaffner said. "It will be going to a relatively small number of institutions, usually hospitals, where they have the facilities to deal with that and they have personnel who can be trained to administer the vaccine."

Upcoming vaccine candidates produced using more traditional methods are expected to be more hardy, and those likely will be distributed directly to pharmacies and the offices of participating physicians, Schaffner said.

How quickly can the vaccine be produced?

One advantage of the mRNA vaccines produced by Pfizer-BioNTech and Moderna is that they are fully lab-manufactured, said Dr. Paul Offit, director of the Vaccine Education Center at the Children's Hospital of Philadelphia.

"It's a synthetic molecule. You just make it in the lab. You don't have to worry about growing it up in cells, as is true for more classic vaccines," Offit said.

Because of this, Offit is hopeful that large amounts of these vaccines can be quickly churned out.

"The Pfizer vaccine is a 30-microgram dose. A microgram is a millionth of a gram. You can make kilograms of this stuff," Offit said.

However, there are 7.8 billion people in the world. Even with manufacturers working at a fast clip, it will take months to produce two doses for every adult on the planet.

And the United States will have to wait in line with other nations competing for the same resource. Pfizer has told the Trump administration that, because other countries have rushed to buy up most of its supply, substantial additional doses above the 100 million the U.S. government purchased earlier this year will not be available to the United States until late June or July, the *Washington Post* reported Tuesday.

Other vaccine candidates receiving approval in subsequent months could speed up efforts to immunize everyone, but at this point it's not clear how soon those will receive their turn at bat.

U.S. officials expect to have about 40 million doses of vaccines from Pfizer-BioNTech and Moderna distributed by the end of the year—just enough to immunize 20 million people with the two-dose vaccine, the *Post* said.

Who will get the vaccine first, and in what order?

The CDC has decided that health care workers and people working or living in long-term care facilities will be the first folks to get the COVID-19 vaccine. There are about 21 million [health care workers](#) and about 3 million people at long-term care facilities, so their inoculations will account for the first 48 million doses of the two-dose vaccine.

It's not clear who will be next in line. The CDC's Advisory Committee on Immunization Practices (ACIP) will meet in the coming weeks to make recommendations for the groups to be included in subsequent waves.

The next phase of priority vaccinations could focus on essential workers such as educators, food and agriculture workers, utility workers, police, firefighters, corrections officers and transportation employees, according to a slideshow presented at the Dec. 1 meeting of the ACIP.

This represents about 87 million people, and also would promote vaccination among minority communities that have been hit hard by the pandemic, the *Post* reported.

After that, people aged 65 and older (about 53 million) and adults with high-risk medical conditions (about 100 million) could be next in line for vaccination, the presentation noted.

The CDC likely will decide as part of its rollout strategy which high-risk conditions should be placed at higher priority than others, Schaffner

said.

For example, health officials will have to weigh placing people with compromised immune systems like cancer patients and transplant recipients in line ahead of people with heart or lung ailments, diabetics or folks who are obese.

How will I know when it's my turn and where I should go to get my shot?

Average folks probably will learn it's their turn for the COVID-19 vaccine from their local media, Schaffner said.

"State and local health departments will communicate that through TV, newspapers, radio and the like," Schaffner explained.

Health care workers are being advised by their employers that they will constitute the first wave of immunization, said Susan Mashni, chief pharmacy officer for the Mount Sinai Health System in New York City.

"We've already started internally town halls and huddles and manager meetings with staff to let them know they're going to be in the first wave of folks who are eligible," Mashni said of Mount Sinai.

Doctors who care for high-risk patients also are likely to promote outreach to those people when their turn comes, Mashni added.

"We will be doing outreach to our patient population, to let them know they're in that category and that we've received vaccine and are ready to accept the patients," Mashni said. "Physician groups within Mount Sinai have been advocating for their patients, to make certain that when we're getting the allocations that we're aware who the highest risk patients

are."

Will I get some proof that I got the vaccine, like a vaccine certificate?

It's expected that people who receive the COVID-19 vaccine will receive some sort of paperwork. The form of that documentation will be described in the emergency use authorization that each vaccine receives from the FDA, Mashni said.

"I believe we'll be giving people a card that shows the lot number of the vaccine they received," Mashni said. "Then we'll make certain at the time they get their first vaccine that they are also scheduled for their second vaccine."

One important reason for this paperwork is that a person must get the same vaccine from the same manufacturer for their first and second doses, Mashni and Schaffner explained.

The paperwork also will help health officials track vaccine distribution and make sure all doses are being efficiently disbursed, Schaffner added.

"Every dose of vaccine will have to be accounted for," Schaffner said. "The state health departments are going to be very tough about that. They will want to know that vaccine is not remaining unused in a refrigerator and they will want to know who received the vaccine, and which vaccine they received so that you can plan rigorously the second dose."

How long will I have to wait between doses?

The good news is that Pfizer's vaccine offers strong protection after the

first dose, *The New York Times* reported. The efficacy of the vaccine after the first dose is about 52%, and after the second dose, that rises to about 95%.

But you will have to wait three to four weeks between your first and second dose, depending on whether you get the Pfizer or Moderna vaccine.

"If you miss and you come in later, no problem, you don't have to repeat the first dose," Schaffner said. "We just don't want you to get the dose too soon. That's not optimal for your [immune system](#)."

If I've already had COVID-19, do I need to get the vaccine?

People who've had COVID-19 will need to receive the vaccine same as everyone else, Schaffner said.

"They will be asked to stand in line and get a vaccine also," Schaffner said. "There will be no distinction made, in part because we think there's no adverse event that will occur, and also the protection from the vaccine actually may be more long-lived, of longer duration than that you get from the natural infection."

Coronaviruses are notorious for promoting short-lived immunity in humans, explained Dr. Greg Poland, director of the Vaccine Research Group at the Mayo Clinic, in Rochester, Minn.

"With the four seasonal beta coronaviruses that circulate and cause all the upper respiratory infections you see in your practice, those people lose immunity in months to a year or two," Poland said. That's why people fall prey to the common cold again and again.

This happens because the body uses a relatively simple strategy to fight off common cold coronaviruses, and this strategy does not appear to make a lasting impression on immune system memory, Poland said. There's a chance people who had asymptomatic or mild cases of COVID-19 did not build up any lasting immunity; at this point it is unclear what sort of immunity is conferred even by severe cases.

More threatening coronavirus diseases like SARS (severe acute respiratory syndrome) and MERS (Middle East respiratory syndrome) appear to produce immunity that potentially lasts longer, but the data is limited because both viruses have infected far fewer people than COVID-19, experts said.

"This virus is so new that we don't know very much about levels of protection and their duration. We're all together on this, learning as we go along," Schaffner said.

How should I expect to feel after I get the vaccine?

The two-dose Pfizer-BioNTech and Moderna vaccines use what's called a "prime/boost" strategy, Schaffner said.

"The first inoculation kind of alerts the immune system, and it's the second inoculation that really gets the immune system worked up," Schaffner said.

People should not be surprised if they feel under the weather after receiving either dose, but especially the booster, Schaffner and Offit said.

"When your immune response is activated you have certain symptoms, which can be things like low-grade fever, headache, muscle ache and fatigue, enough so that you could actually miss a day of work," Offit

said. "I wish the immune system had a better public relations team working for it. This is just a natural consequence of having an activated immune system."

When it's your turn to get either dose, make sure you don't make any plans for the next day, Schaffner advises.

"This is not COVID. This is merely the immune system revving up and responding to the vaccine. But it is sufficient that some people might not want to go to work that next day," Schaffner said.

Hospitals are taking this into account when scheduling vaccinations for their employees, Offit said.

"You're not going to vaccinate your whole emergency department and have them potentially be out the next day," Offit said.

Do I get to resume normal life after receiving the vaccine?

Vaccination might produce delightful thoughts of throwing your mask away and hugging dear friends, but you will have to resist the urge. People will still need to maintain infection control habits even after they've received their shots.

"The trials have shown us that the vaccine prevents the occurrence of disease and severe disease. They were not designed to tell us whether it prevents infection," Schaffner said.

Given that, a person who received the vaccine might well be able to spread the novel coronavirus even though their risk of falling seriously ill with COVID-19 is low.

"You could be infected and you could be contagious even though you had the [vaccine](#)," Schaffner said. "We don't know that, but we don't know it's not true. We are going to ask everyone to keep masking and observing social distancing until we are complete."

How many Americans will need to be immunized before we achieve herd immunity?

The COVID-19 coronavirus has a transmission rate greater than three, meaning that every infected person can be expected to spread the virus to three other folks unless infection control measures are maintained.

"The goalpost for herd immunity has to be fairly high because this is a highly contagious virus," Schaffner said. "I would anticipate around 70%. That is a very high goal post, trying to get 70% of the United States population vaccinated to really flatten the curve of transmission."

More information:

The U.S. Food and Drug Administration has more about [COVID-19 vaccines](#).

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