

Can moms pass COVID-19 immunity to their newborns?

By [Nicoletta Lanese - Staff Writer](#) 4 days ago



If a woman catches COVID-19 during pregnancy, can her baby pick up any immunity to the virus in the womb? Early data hint that the answer is yes, but many questions still remain.

In a new study, published Jan. 29 in the journal [JAMA Pediatrics](#), scientists analyzed blood samples from more than 1,470 pregnant women, 83 of whom tested positive for [antibodies](#) for SARS-CoV-2, the coronavirus that causes COVID-19, at the time of [delivery](#). Umbilical cord blood samples from the majority of babies born to these women also tested positive for antibodies, suggesting the babies picked up this passive immunity.

The number of antibodies passed to the baby largely depended on the type and quantity of antibodies that were present in the mother, and when she

caught COVID-19 during pregnancy.

"The longer [the] time between maternal infection and delivery, the greater the antibody transfer," study authors Dr. Karen Puopolo and Dr. Scott Hensley of the University of Pennsylvania Perelman School of Medicine wrote in an email. This correlation held true whether the mother developed symptoms of COVID-19 or remained asymptomatic during her infection.

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The transferred antibodies may provide protection to the newborn baby, but "work remains to be done to determine what levels and types of antibody are needed to protect newborns from SARS-CoV-2 infection, and how long those antibodies may last in the newborn circulation," the authors said. Another big question is how well the transferred antibodies "neutralize" the coronavirus, meaning block its ability to infect cells, they said.

"It is hopeful to have this data," said Dr. Flor Muñoz-Rivas, an associate professor of pediatric infectious disease at the Baylor College of Medicine in Houston, who was not involved in the study. By studying antibody transfer after natural COVID-19 infection, we can gather hints about whether vaccines given to pregnant people provide similar protection to newborns, she said.

Early findings

In the new study, the team specifically tested for antibodies that latch onto the coronavirus spike protein, a structure that sticks off the virus's surface; the antibodies the team looked for all target the "receptor-binding domain" (RBD), the part of the spike that binds directly to the receptor, or doorway, into cells. RBD antibodies are the most critical for neutralizing the coronavirus, [Live Science previously reported](#).

But not all RBD antibodies can cross the [placenta](#), Muñoz-Rivas said. That's

because the placenta allows only certain antibodies through, using a special receptor and protein that transports antibodies into the organ. Only small, Y-shaped antibodies called immunoglobulin G (IgG) can fit into the receptor, so they alone can reach the fetus and provide immune protection, she said.

Not all the babies got protection: 72 of the 83 babies born to antibody-positive mothers had IgG in their cord blood, and the overall quantity correlated with the IgG concentrations in their mothers' blood. The 11 remaining babies who tested negative for antibodies did so for two reasons.

Six of the babies' mothers had relatively low IgG levels, suggesting that they were likely "so early in their infection that there had not been time for them to produce and transfer antibody across the placenta," the authors said. Either that, or the mothers simply produced fewer antibodies than average, but this is a less likely scenario, they added. The other five babies' mothers only tested positive for so-called IgM antibodies, which cannot cross the placenta.

IgM antibodies appear early in an infection and then disappear once the infection clears, Muñoz-Rivas said, so the five moms who only tested positive for IgM were in the very early stages of infection. If IgM antibodies appear in a fetus or newborn, this indicates that the fetus was directly infected with the virus. In this study, no IgM for SARS-CoV-2 was detected in any cord blood samples, meaning no fetus caught COVID-19 while still in the womb.

However, the study cannot say for sure that SARS-CoV-2 is never transmitted to the fetus before birth, the authors said.

What does this mean for vaccines?

While the study shows that IgG antibodies can cross the placenta, scientists still need to determine how well the transferred antibodies protect against infection, the authors said.

Researchers can test how well antibodies block infection using "neutralization assays" — experiments in which they grow the virus in a dish with antibodies and human cells, to see if the antibodies prevent infection, [Live Science previously reported](#). The authors could also follow up on the babies born with antibodies, to see how long their antibodies persist and if any of the babies later catch COVID-19, Muñoz-Rivas said.

These kinds of studies would provide a benchmark of what to expect after a pregnant person catches COVID-19; the natural immune response could then be compared to what we see in vaccinated mothers and their newborns, Muñoz-Rivas said.

Right now, both the [Centers for Disease Control and Prevention](#) (CDC) and [World Health Organization](#) (WHO) recommend that only people at high risk of SARS-CoV-2 exposure or high risk of severe illness, [due to medical conditions](#), should consider getting the vaccine during pregnancy and that they should consult with a doctor before receiving one.

With other vaccines given in pregnancy, such as those for tetanus and [whooping cough](#), antibody levels in the newborn drop rapidly by the time the baby is two months old, Muñoz-Rivas wrote in an editorial published Jan. 29 in [JAMA Pediatrics](#). This decline then slows, and the antibody levels continue to fall steadily over the next four to eight months.

Similarly, for COVID-19 vaccines, the antibodies found in cord blood would be the "starting point," or the peak number of antibodies the baby gets before levels begin to drop, she said. To maximize the number of antibodies passed to the fetus, mothers would likely need to wait until the [second trimester](#) to be vaccinated; after about 17 weeks of gestation, the placenta grows big enough to pump a significant number of antibodies to the developing baby, she said.

Although it's encouraging that maternal vaccines could offer protection to newborns, "for COVID, as best as we know right now, the goal would be to

protect the mother," Muñoz-Rivas said.

Pregnancy increases the risk for severe illness and death from COVID-19, while most newborns who have tested positive have had mild or no symptoms and recovered from the virus, [according to the CDC](#). As with influenza infections, mothers appear especially vulnerable in the third trimester and are more likely to develop severe conditions, like pneumonia and respiratory failure, if they catch COVID-19 at that stage, Muñoz-Rivas said.

So the second trimester might be the best time to get vaccinated, she said. That way, potential side effects could be avoided in the first trimester, when conditions like [inflammation](#) and fever can disrupt fetal development, while the [immune system](#) would still have plenty of time to ramp up its response before the third trimester. Of course, scientists still need to conduct observational studies and clinical trials to figure out the best time during pregnancy to give the COVID-19 vaccine, Muñoz-Rivas said.

"If we can, in addition to that, protect the baby, that's a bonus," she said. That said, since COVID-19 vaccines won't be available for infants anytime soon, Muñoz-Rivas said that she would consider it a fairly significant bonus.

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