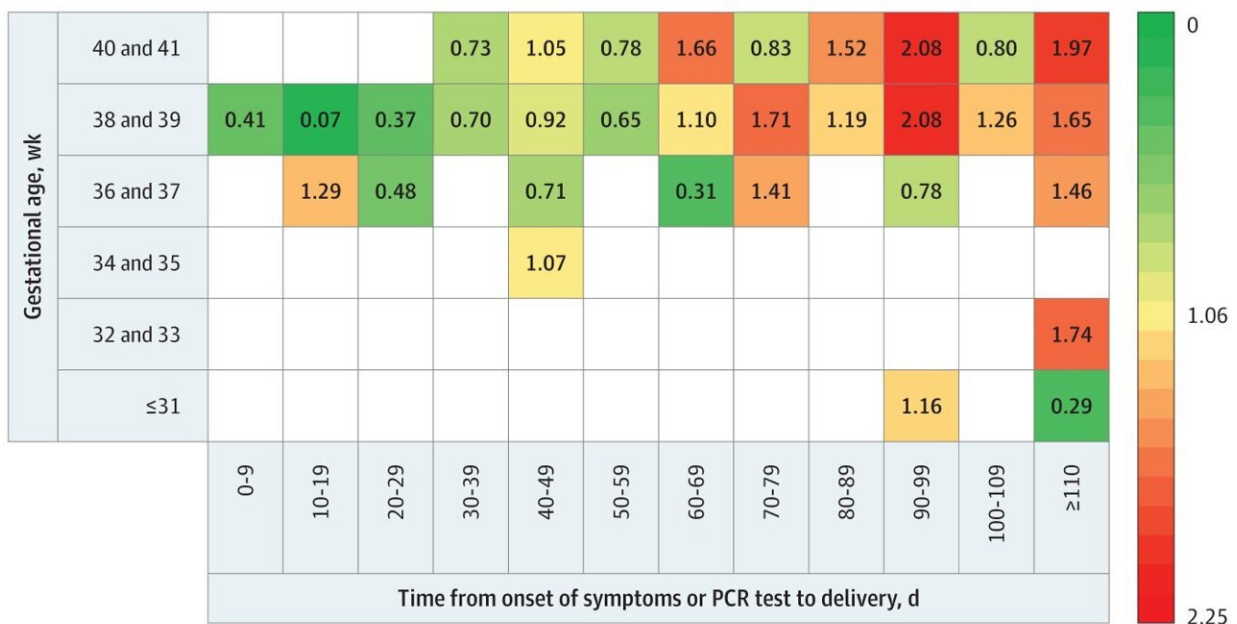


COVID-19 vaccination leads to higher antibody levels than natural infection in both pregnant people and their babies

November 9 2022

A 89 Individuals with onset of symptomatic infection up to 122 d before delivery



B 159 Individuals who received at least 1 dose of vaccine before delivery



Heat Map of Mean Transfer Ratio by Gestational Age vs. Time From SARS-CoV-2 Infection or First Vaccine Dose to Delivery. Each box displays the mean transfer ratio for the corresponding gestational age vs time from infection or first vaccine dose to delivery category among all persons contributing data (eFigure 3 in the Supplement). PCR indicates polymerase chain reaction. Credit: *JAMA Network Open* (2022). DOI: 10.1001/jamanetworkopen.2022.40993

Pregnant people who received one of the mRNA COVID-19 vaccines had 10-fold higher antibody concentrations than those who were naturally infected with SARS-CoV-2, a finding that was also observed in their babies, according to a new study by researchers at Children's Hospital of Philadelphia (CHOP) and the University of Pennsylvania.

The study, published today in *JAMA Network Open*, also found that vaccine timing played an important role in maximizing the transfer of antibodies, with antibodies detected as early as 15 days after the first vaccine dose and increasing for several weeks after.

"These findings suggest that COVID-19 vaccination not only provides robust protection for mothers during pregnancy—it also provides higher concentrations of antibodies to babies than COVID-19 infection," said first author Dustin D. Flannery, DO, MSCE, an attending neonatologist at Children's Hospital of Philadelphia and Assistant Professor of Pediatrics at the University of Pennsylvania. "Given that pregnancy is a risk factor for severe COVID-19, this study suggests pregnant people should prioritize getting vaccinated to protect themselves and their babies."

To compare antibody responses in pregnant people who had been vaccinated versus naturally infected, the researchers analyzed a unique timeframe: patients who gave birth at Pennsylvania Hospital between August 9, 2020 and April 25, 2021. COVID-19 vaccines were not widely available until December 2020, and booster shots were not available until September 2021, so by focusing on a period within the pandemic that shouldered the introduction of the first vaccines, the researchers could more easily tease out the origin of the patients' antibodies.

Dr. Scott Hensley's laboratory in the Penn Department of Microbiology

has taken a leading role in evaluating antibody responses to COVID-19 from the beginning of the pandemic. In collaboration with CHOP researchers, his laboratory evaluated cord blood serum from 585 pregnant people who had detectable SARS-CoV-2 antibodies.

Of the 585 pregnancies, they identified 169 patients who had been vaccinated but never infected and 408 who had been infected but not vaccinated. They found that [antibody levels](#) among vaccine recipients were approximately 10-times higher than in people who had been naturally infected.

The researchers detected IgG antibodies to SARS-CoV-2 in the cord blood from more than 95% of newborns (557 of 585) in the study. Of those newborns with detectable antibodies, the researchers found that levels were 10-times higher in the vaccinated group than in the naturally infected group.

However, they also observed that transfer ratios—that is, the extent to which the antibody levels in the cord blood match the antibody levels in the mother—were slightly lower in the vaccinated group compared with the naturally infected group. The researchers analyzed a variety of factors that might influence the transfer ratio, including gestational age at birth and maternal medical issues such as hypertension, diabetes and obesity.

"Our study suggests that time from infection or vaccination to delivery was the most important factor in transfer efficiency, and these findings can inform optimal COVID-19 vaccination strategy during pregnancy," said senior author Karen M. Puopolo MD, Ph.D., an attending neonatologist at Children's Hospital of Philadelphia and Chief of the Section on Newborn Medicine at Pennsylvania Hospital. "Patients should plan to get vaccinated with ample time before their due date, so that they—and their babies—can benefit from a robust immune response."

More information: Flannery et al, Comparison of Maternal and Neonatal Antibody Levels After COVID-19 Vaccination vs SARS-CoV-2 Infection, *JAMA Network Open* (2022). [DOI: 10.1001/jamanetworkopen.2022.40993](https://doi.org/10.1001/jamanetworkopen.2022.40993)

Provided by Children's Hospital of Philadelphia

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