

Coronavirus (COVID-19) and Pregnancy: What Maternal-Fetal Medicine Subspecialists Need to Know

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On March 11, 2020, the World Health Organization declared the COVID-19 outbreak [caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)] a pandemic. In light of this declaration, communication to obstetric care providers about this disease and how best to advise pregnant patients is imperative. This document complements the recent [American College of Obstetricians and Gynecologists \(ACOG\) Practice Advisory](#) and rapidly evolving guidance from the Centers for Disease Control and Prevention (CDC) on this topic, with a specific focus on maternal, fetal, and neonatal implications.¹

How is COVID-19 spread?

COVID-19 likely emerged from an animal source but now is spreading from person to person.² Human coronaviruses can spread from an infected person to others through a variety of means, such as droplets from coughing, sneezing, or talking; close personal contact, including touching and shaking hands; and touching one's nose, mouth, or eyes before washing one's hands. It is currently unknown if the virus can be spread through semen, vaginal secretions, sexual intercourse, or fecal-oral route, although it can be passed on through kissing and close contact during sex. Transmission from contact with an asymptomatic infected person can also occur.

Infection prevention measures are of critical importance for preventing the spread of infection. **The CDC recommends that all individuals take measures to prevent the spread of COVID-19 by practicing frequent hand washing, social distancing, and wearing a mask or face covering when around others. Face masks and cloth face coverings are a critical tool in the fight against the spread of COVID-19. There is increasing evidence that cloth face coverings and face masks help prevent individuals with COVID-19 from spreading the virus.**^{3,4} The CDC provides general recommendations for infection prevention in the management of COVID-19⁵ (<https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html>) as well as specific guidance for inpatient obstetric care⁶ (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>).

What is known about COVID-19 in pregnancy?

In general, pregnant women experience immunologic and physiologic changes that make them more susceptible to viral respiratory infections. The initial characterization of pregnant women as a high-risk group was based largely on this fact, as well as on historical experience with other viruses. Pregnant women have been reported to be at greater risk for severe illness, morbidity, or mortality compared with the general population with related coronavirus infections [including severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV)] and other viral respiratory infections, such as influenza.

Anecdotal experience in the United States indicates that pregnant women are as likely as the general public to develop symptoms if infected with SARS-CoV-2. The CDC released a [Morbidity and Mortality Weekly Review \(MMWR\)](#) on June 25, 2020,⁷ in which they reviewed surveillance data on nonpregnant and pregnant women of reproductive age who were infected with SARS-CoV-2. These data indicate that pregnant women were more likely to be hospitalized; however, data were not available to distinguish hospitalization for COVID-19–related reasons from hospital admission for pregnancy-related reasons. Furthermore, they could not determine whether escalations in care were due to worsening COVID-19–related clinical morbidity or to either obstetric morbidity (eg, postpartum hemorrhage) or obstetric-related concerns (eg, lowered threshold for escalation of care given potential airway concerns in the context of pregnancy). Nevertheless, after adjusting for age, presence of underlying medical conditions, and race/ethnicity, pregnant women were found to be 1.5 times more likely to be admitted to the intensive care unit (ICU) (1.5% vs 0.9%; 95% CI, 1.2–1.8) and 1.7 times more likely to receive mechanical ventilation (0.5% vs 0.3%; 95% CI, 1.2–2.4) than those who were not pregnant. The data did not show an increased risk of death in pregnant versus nonpregnant patients. The most commonly reported underlying chronic conditions were chronic lung disease (21.8% pregnant; 10.3% nonpregnant), cardiovascular disease (14.0% pregnant; 7.1% nonpregnant), and diabetes (15.3% pregnant; 6.4% nonpregnant).

Although there were limitations in the data regarding race/ethnicity, the CDC surveillance data suggest that pregnant women who are Hispanic and Black might be disproportionately affected by COVID-19 infection during pregnancy. When stratified by race/ethnicity, ICU admission was more frequent among pregnant women who were Asian (3.5%), Hispanic or Latino (1.6%), or Black (1.9%) than among all pregnant women (1.5%).

Based on these data, the CDC is recommending that pregnant women should be counseled about the potential risk for severe illness from COVID-19, and measures to prevent infection with SARS-CoV-2 should be emphasized for pregnant women and their families. This counseling should be balanced by the reassurance afforded by the relatively low absolute risk increase observed in ICU admission (0.6%) and utilization of mechanical ventilation (0.2%).

The CDC released two MMWRs on September 16, 2020,^{8,9} from two different surveillance systems ([Vaccine Safety Datalink](#) and [COVID-NET](#)) regarding the severity of COVID-19 in pregnancy and perinatal outcomes among a combined 703 pregnant women and 551

completed pregnancies. They reported on 598 hospitalized pregnant women with COVID-19, and noted the following in these populations:

- *Hospitalized pregnant women have a higher risk of mechanical ventilation than nonpregnant women:* Among the 272 pregnant women with COVID-19 who presented with symptoms, 16.2% (44) required ICU admission and 8.5% (23) required mechanical ventilation, compared with published estimates in which 15% to 20% of nonpregnant individuals require hospitalization, but only 3% to 5% require ICU admission. The overall proportion of mechanical ventilation in pregnant women appears consistent with other studies of pregnant women.^{10,11} Cumulatively, these data continue to indicate that illness may be slightly more severe among pregnant women admitted to the hospital with acute illness than nonpregnant women.
- *Black/Hispanic women are affected disproportionately:* The proportion of those who identify as Hispanic, Black, or both requiring admission was higher than the proportion of each race/ethnicity in the catchment area for COVID-NET.
- *Obesity and gestational diabetes were associated with hospitalization for COVID-19-related illness:* Prevalences of obesity and gestational diabetes were higher among pregnant women hospitalized for COVID-19–related illness (eg, worsening respiratory status) compared with those admitted for obstetric or other non-COVID-19 indications.

Who should be tested for COVID-19?

Clinical judgment, local test availability, community spread, and other local policies should be used to decide which patients are tested for COVID-19.¹² Signs and symptoms of COVID-19 range from mild to severe and include fever, myalgias, cough, and difficulty breathing as well as gastrointestinal symptoms and anosmia in some patients. According to the CDC, epidemiologic factors, such as the prevalence of COVID-19 in the local community, may also be used to guide testing.

As of April 4, 2020, CDC guidance recommends that pregnant women admitted with suspected COVID-19 or who develop symptoms concerning for COVID-19 during admission should be prioritized for testing. Clinicians are also encouraged to test these women for other causes of respiratory illness, as appropriate. COVID-19 testing recommendations are likely to change frequently, and maternal-fetal medicine (MFM) subspecialists are encouraged to check the CDC website for evolving guidance.¹² For more information, please refer to the CDC guidance [Evaluating and Testing Persons for Coronavirus Disease 2019 \(COVID-19\)](#).

Current testing for COVID-19 is by polymerase chain reaction (PCR), and availability varies by location. Health care providers or facilities should notify their local or state health department when evaluating a person under investigation (PUI) for COVID-19. As testing availability increases, this guidance may be subject to change.

Is there evidence of in-utero transmission of COVID-19?

Data suggest that receptors established for SARS-CoV-2 cell entry are only minimally expressed within the human placenta, indicating that SARS-CoV-2 is unlikely to infect the placenta through these established mechanisms and that in-utero transmission may be

less likely.¹⁴ SARS-CoV-2 PCR samples of placenta, amniotic fluid, and cord blood from several case series are rarely positive, and many positive cases are often due to contamination.^{15,16} Several reports describe a few neonates with SARS-CoV-2 IgM detectable in cord blood. However, given the imperfect specificity of IgM and lack of clinical evidence of disease in the neonates, it is not clear that these cases actually represent in-utero transmission.^{17,18} To date, only one published clinical case has demonstrated clear evidence of in-utero infection with clinical sequelae in the infant.¹⁵ In this case, maternal SARS-CoV-2 infection was diagnosed at 35 and 2/7 weeks of gestation in the context of clinical symptoms of COVID-19. The fetal heart rate tracing was nonreassuring, and a cesarean delivery was performed. The placenta, amniotic fluid, and neonatal blood, rectal, and nasopharyngeal samples all tested positive for SARS-CoV-2 by PCR, and the neonate exhibited transient neurological compromise. Collectively, these data suggest that in-utero transmission of SARS-CoV-2 is rare but possible. It is important to emphasize the limitations of the data available, and, given the novel nature of this virus, that robust data from women who became infected with SARS-CoV-2 in the first or early second trimester of pregnancy are not available.

Whether infection earlier in pregnancy can lead to in-utero transmission has yet to be determined.

Does COVID-19 cause miscarriage or congenital anomalies?

At this time, very limited data regarding risks associated with infection in the first and second trimesters exist. There are mixed data regarding the risk of congenital malformations in the setting of maternal fever in general. Currently, there are inadequate data about COVID-19 and the risk of miscarriage or congenital anomalies. Data from the SARS-CoV epidemic are reassuring, suggesting no increased risk of fetal loss or congenital anomalies associated with infection early in pregnancy.¹⁹

Are women infected with COVID-19 at increased risk for preterm birth and stillbirth?

Preterm delivery has been reported among women positive for COVID-19 during pregnancy. However, it appears that some of these cases may be iatrogenic and not due to spontaneous preterm labor.^{20,21,15}

Given the limited data available regarding COVID-19 during pregnancy, adverse obstetrical and perinatal outcomes reported with other respiratory viral infections have been extrapolated to COVID-19. Other respiratory viral infections during pregnancy, such as influenza, have been associated with adverse neonatal outcomes, including low birth weight and preterm birth, generally thought to be due to severe maternal illness. Infants have been born preterm, small for gestational age, or both to women with other coronavirus infections, including SARS-CoV and MERS-CoV, during pregnancy.^{22,23} However, it is not clear that the implications and outcomes associated with COVID-19 are the same as with these other infections. Further data are urgently needed.

A study from the United Kingdom indicated a significantly higher incidence of stillbirth during the pandemic period (9.31 per 1000 births) than during the prepandemic period (2.38 per 1000 births).²⁴ Although none of the stillbirths during the pandemic period were in patients with known COVID-19 infection, these findings pose questions of the impact

to changes in routine obstetric care. The authors noted a decrease in hypertension during the pandemic period, which could represent underdiagnosis due to changes in care and monitoring. The study also showed that there were no significant changes in births at less than 37 weeks of gestation during the pandemic period (7.6 per 1000 births) versus before the pandemic (6.8 per 1000 births) and at less than 34 weeks of gestation during the pandemic period (3.7 per 1000 births) versus before the pandemic (2.5 per 1000 births). Importantly, lack of information on the causes of stillbirth and the rates of asymptomatic infection in the study population are limitations of these data.

An MMWR released on September 16, 2020, reported a preterm delivery rate of 8.9% among 43,571 live births and stillbirths, and a stillbirth rate of 3.2% among pregnant women with SARS-CoV-2 infection, both symptomatic and asymptomatic.^{8,9} The study was unable to assess whether these outcomes were predominantly among those with more severe disease.

SMFM continues to encourage patients with high-risk conditions to receive necessary prenatal care and antenatal surveillance when indicated during this pandemic.

Should obstetric care appointments be altered?

Alternate prenatal care schedules have been proposed as a strategy to control the spread of COVID-19. Community mitigation efforts are important, although the implementation of such strategies depends on local practice and population factors and resources. Where available, telehealth (including telephonic and other remote services) can be used to allow access to care for these patients while implementing community mitigation efforts. Obstetrician-gynecologists and other prenatal care practitioners should ensure that patients with certain high-risk conditions continue to be provided necessary prenatal care and antenatal surveillance when indicated.

Do women with COVID-19 need additional antenatal surveillance?

During acute illness, fetal management should be similar to that provided to any critically ill pregnant woman. Continuous fetal monitoring in the setting of severe illness should be considered only after fetal viability, when delivery would not compromise maternal health or as another noninvasive measure of maternal status.

Very little is known about the natural history of pregnancy after a patient recovers from COVID-19. In the setting of a mild infection, management similar to that for a patient recovering from influenza is reasonable. It should be emphasized that patients can decompensate after several days of apparently mild illness, and pregnant individuals should be instructed to call or be seen for care if symptoms worsen, particularly if shortness of breath develops. Given how little is known about this infection, a detailed mid-trimester anatomy ultrasound examination may be considered following periconception or first-trimester maternal infection. Interval growth assessments could be considered depending on the timing and severity of infection, with the timing and frequency informed by other maternal risk factors. Antenatal testing is reserved for routine obstetrical indications. Please see [The Society for Maternal-Fetal Medicine COVID-19](#)

[Ultrasound Practice Suggestions](#) for further information. Signs and symptoms of preterm labor should also be reviewed.

Are there delivery considerations?

In general, maternal COVID-19 infection itself is not an indication for delivery.²⁰ Timing of delivery, in most cases, should not be dictated by maternal COVID-19 infection. For women infected early in pregnancy who recover, no alteration to the usual timing of delivery is necessary. For women infected in the third trimester who recover, it is reasonable to attempt to postpone delivery (if no other medical indications arise) either until a negative testing result is obtained or quarantine status is lifted to avoid potentially separating mother and infant and to decrease potential health care worker exposures. For women who are critically ill, preterm delivery may be considered if it is thought that it could potentially improve maternal status.

For additional intrapartum recommendations, please refer to [Society for Maternal-Fetal Medicine and Society for Obstetric and Anesthesia and Perinatology Labor and Delivery COVID-19 Considerations](#).

What protective measures can be taken for the neonate?

Current evidence suggests that the risk of a neonate acquiring SARS-CoV-2 from its mother is low. However, there is a potential risk of SARS-CoV-2 transmission to the neonate via contact with infectious respiratory secretions from the mother, caregiver, or other persons with SARS-CoV-2 infection, including just before the individual develops symptoms when viral replication may be high. At this time, the CDC recommends that infants born to mothers with known COVID-19 at the time of delivery should be considered to have suspected COVID-19 and should be tested and isolated from other healthy infants. The determination of whether to keep a mother with known or suspected COVID-19 and her infant together or separated after birth should be made on a case-by-case basis, using shared decision-making between the mother and the clinical team⁶ (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>). Providers are encouraged to check the [CDC site](#) frequently regarding this topic, as new guidance is added daily.

How can a postpartum visit be altered?

In areas where there are ongoing high rates of community transmission of SARS-CoV-2, it is reasonable to modify postpartum care to include telehealth. ACOG's [Managing Patients Remotely: Billing for Digital and Telehealth Services](#) provides resources on policies and coding for telehealth to support these services.

Contraception is a core component of the postpartum visit, and contraceptive choices may be limited by telehealth. Obstetric clinicians should discuss contraception options with patients during prenatal care and attempt to confirm a plan prior to delivery to facilitate immediate postpartum LARC utilization if desired.

What is the guidance for pregnant healthcare personnel?

Pregnant health care personnel (HCP) should follow the CDC risk assessment and infection control guidelines for HCP with potential exposure to patients with suspected or

confirmed COVID-19. While pregnant HCP may continue to work, facilities may consider limiting their exposure to patients with confirmed or suspected COVID-19, especially during higher-risk procedures (eg, aerosol-generating procedures). However, in settings with a higher burden of disease or limited staffing, this may not be feasible. The above recommendations should also be applied to other HCP considered to be at higher risk for severe complications of infection, such as older adults; people with chronic medical conditions (heart disease, diabetes, and lung disease); or those who are immunocompromised.

Summary

It is important for MFM subspecialists to learn about COVID-19 to optimize patient care and to protect themselves. **This is a rapidly changing landscape, and new information will continue to be updated frequently. As data on pregnancy accumulate, SMFM will continue to provide guidance to our members.**

For questions related to labor and delivery considerations and ultrasound practice suggestions during the COVID-19 pandemic, please refer to SMFM's other resources:

[Society for Maternal-Fetal Medicine and Society for Obstetric and Anesthesia and Perinatology Labor and Delivery COVID-19 Considerations](#)

[The Society for Maternal-Fetal Medicine COVID-19 Ultrasound Practice Suggestions](#)

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