

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 (referred to as coronavirus) outbreak a pandemic. In light of this declaration, communication to obstetric care providers about this disease and how best to advise pregnant women 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 most commonly spread from an infected person to others through a variety of means, such as airborne droplets from coughing and sneezing; 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 or sexual intercourse.

Infection prevention measures are of critical importance for preventing the spread of infection. The CDC provides general recommendations for infection prevention in the management of COVID-19 (3) (<https://www.cdc.gov/coronavirus/2019-ncov/infection-control/control-recommendations.html>) as well as specific guidance for inpatient obstetric care (4) (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>).

What is known about COVID-19 in pregnancy?

Currently, there is limited information from published scientific reports about the susceptibility of pregnant women to COVID-19 and the severity of infection. Available data are reassuring but are limited to small case series. In general, pregnant women experience immunologic and physiologic changes that make them more susceptible to viral respiratory infections, including potentially COVID-19. It is reasonable to predict that pregnant women might be at greater risk for severe illness, morbidity, or mortality compared with the general population, as is observed with other 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, during pregnancy. Data from MERS-CoV and

SARS-CoV, although limited, suggest that infection in pregnancy may be associated with severe infection and adverse neonatal outcomes, including increased risk of miscarriage, fetal growth restriction, and preterm birth (5, 6). But again, data specific to COVID-19 are not yet available.

The currently published data on COVID-19 infection in pregnancy include 2 case series, totaling 18 women, only 1 of whom suffered severe respiratory morbidity requiring intensive care unit admission and mechanical ventilation (lower than the reported general population risk) (7, 8). While these data are reassuring that pregnant women did not have severe outcomes, they must be interpreted with caution given the small numbers. Early data from one series of hospitalized nonpregnant patients in China found that up to 32% of individuals developed severe pneumonia, and 19% of all infected, hospitalized patients progressed to acute respiratory distress syndrome (ARDS), with mortality ranging from 1.4% to 4.3% of all cases (9, 10). These data vary by region and by different testing strategies. Existing mortality rates are largely derived from areas in which testing of asymptomatic or mildly symptomatic patients is not routine and may therefore be inflated; rates vary from as low as 0.7% in Korea to as high as 4.9% in Italy (11). At this time, it appears that severe illness from COVID-19 occurs predominantly among the elderly and those with significant medical comorbidities.

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 on COVID-19 and the risk of miscarriage or congenital anomalies. Data from the SARS epidemic are reassuring, suggesting no increased risk of fetal loss or congenital anomalies associated with infection early in pregnancy (12).

Who should be tested for COVID-19?

Initial guidance from the CDC recommended that individuals who exhibit symptoms of COVID-19 (fever and/or cough, shortness of breath) and have had close contact with a laboratory-confirmed COVID-19 patient (being within 6 feet for a prolonged period of time or direct contact with infectious secretions) within 14 days of symptom onset, or have a history of travel from affected geographic areas within 14 days of symptom onset, be tested while other causes of illness are excluded. As of March 2, 2020, the CDC guidance expanded testing to a wider group of symptomatic patients. Clinical judgment should be used in the decision to test symptomatic patients with other than the previously listed epidemiologic risk factors (13). Clinicians are encouraged to test for other causes of respiratory illness, including influenza. COVID-19 testing recommendations are likely to change frequently, and MFM subspecialists are encouraged to check the CDC website for evolving guidance (13) (<https://www.cdc.gov/coronavirus/2019-nCoV/hcp/clinical-criteria.html>).

Current testing is by polymerase chain reaction (PCR), and availability varies by location. Health care providers should immediately notify their local or state health department in the event of a person under investigation (PUI) for COVID-19. As testing availability increases, this guidance may be subject to change. Currently, in some cases where PCR availability is limited,

computerized tomography (CT) imaging may be useful as an adjunct to diagnosis, as there are potentially pathognomonic findings for COVID-19, including ground-glass opacities (14). If CT imaging is considered to evaluate a pregnant patient with suspected or confirmed COVID-19 infection, the usual guidance regarding the risks and benefits of diagnostic radiation in pregnancy is warranted (14). In general, the risk of a chest CT scan with abdominal shielding results in radiation exposure to the fetus below that associated with teratogenic risk in pregnancy. However, as PCR becomes more readily available, it remains the preferred testing method.

Is there evidence of vertical transmission of COVID-19?

Chen et al. found no evidence of COVID-19 in the amniotic fluid or cord blood of 6 infants of infected women (8). While this report includes only a small number of cases, the lack of vertical transmission is consistent with what is seen with other common respiratory viral illnesses in pregnancy, such as influenza.

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

Preterm delivery has been reported among infants born to women positive for COVID-19 during pregnancy. However, it appears that some cases were iatrogenic and not due to spontaneous preterm labor. It is not clear that these outcomes were related to maternal infection. All of the infants in this single report were clinically well, and no neonatal deaths were reported (8).

Given the limited data available regarding COVID-19 during pregnancy, knowledge of adverse outcomes from other respiratory viral infections may provide context and information. For example, 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 due to severe maternal illness. Infants have been born preterm and/or small for gestational age to women with other coronavirus infections, including SARS-CoV and MERS-CoV, during pregnancy (5, 6).

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 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. Given how little is known about this infection, a detailed midtrimester anatomy ultrasound examination may be considered following first-trimester maternal infection. For those experiencing illness later in pregnancy, it is reasonable to consider sonographic assessment of fetal growth in the third trimester.

Are there delivery considerations?

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 in an attempt to avoid transmission to the neonate. In general, COVID-19 infection itself is not an indication for delivery.

The reported series have included primarily cesarean deliveries, but the mode of delivery should be dictated by usual obstetric practice. The youngest individual to have documented infection with COVID-19 was a 36-hour-old neonate born by cesarean delivery, suggesting neonatal rather than vertical transmission (8).

At this time, the CDC recommends that facilities should consider temporarily separating (eg, separate rooms) a woman with confirmed COVID-19 or who is a PUI for COVID-19 from her infant until the woman's transmission-based precautions are discontinued (4)

(<https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>). Maternal-fetal medicine subspecialists are encouraged to check the CDC site frequently, as new guidance is added daily.

Can an infected woman breastfeed?

Chen et al. found no evidence of COVID-19 in the breast milk of 9 infected women (8).

Breastfeeding is encouraged and is a potentially important source of antibody protection for the infant. The CDC recommends that during temporary separation, women who intend to breastfeed should be encouraged to express their breast milk to establish and maintain milk supply. If possible, a dedicated breast pump should be provided. Before expressing breast milk, women should practice appropriate hand hygiene. After pumping, all parts of the pump that come into contact with breast milk should be thoroughly washed, and the entire pump should be appropriately disinfected per the manufacturer's instructions. Expressed breast milk should be fed to the newborn by a healthy caregiver. For women and infants who are not separated, the CDC recommends that if a woman and newborn do room-in and the woman wishes to feed at the breast, she should put on a facemask and practice hand hygiene before each feeding (4) (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html>).

What is the current travel and community protection guidance?

Guidance regarding travel is provided by the CDC and changes frequently. Maternal-fetal medicine (MFM) subspecialists are encouraged to check the CDC website frequently for guidance related to travel. Physicians are also encouraged to check with their local public health authorities for local guidance related to travel (15)

(<https://www.cdc.gov/coronavirus/2019-ncov/travelers/index.html>).

Pregnant women who have severe chronic medical illnesses such as heart, lung, or kidney disease should follow the CDC precautions for those at higher risk of severe illness. This guidance includes general practices such as stocking up on supplies, taking everyday precautions to keep space between themselves and others when out in public, keeping away from others who are sick, limiting close contact, and frequent hand washing. Further, the CDC

recommends avoiding crowds as much as possible and that during a COVID-19 outbreak in one's community, those with severe chronic illnesses should stay home as much as possible (16) (<https://www.cdc.gov/coronavirus/2019-ncov/specific-groups/high-risk-complications.html>).

Are there treatments for COVID-19?

Currently, no antiviral medications are approved for the treatment of COVID-19 by the US Food and Drug Administration. No vaccine currently exists for COVID-19.

Should obstetric care appointments be altered?

Alternate prenatal care schedules have been proposed as a strategy in the effort to control the spread of COVID-19. Community mitigation efforts are important however, the implementation of such strategies will depend on local practice and population factors and resources. Where available, telehealth (including telephonic and other remote services - [link to statement](#)) can be a tool leveraged to allow access to care for these patients while implementing community mitigation efforts. Ob-gyns 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.

What is the guidance for pregnant healthcare personnel?

Pregnant healthcare personnel (HCP) should follow the Centers for Disease Control 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 want to consider limiting their exposure to patients with confirmed or suspected COVID-19, especially during higher risk procedures (e.g., 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 healthcare personnel 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 who are immunocompromised.

Summary

In summary, it is important for MFM subspecialists to educate themselves regarding COVID-19 to optimize patient care and to protect themselves. **This is a rapidly changing landscape, and new information will continue to be updated daily. As data on pregnancy accumulate, the Society for Maternal-Fetal Medicine will continue to provide guidance to our members.**

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