



Women's Law Project

Authors: Catherine Sham, Julian Tanjuakio

Last Updated: September 23, 2020

COVID-19, pregnancy, and breastfeeding: What is the current medical consensus on how COVID-19 may affect pregnant individuals who contract the virus? Likewise, what is the current medical consensus on COVID-19 and breastfeeding?

1. Background

Coronavirus disease 2019 (COVID-19) is a respiratory viral illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which has rapidly spread throughout the world. SARS-CoV-2 virus belongs to the same family as MERS-CoV and SARS-CoV, both of which were involved in prior respiratory illness epidemics [1]. COVID-19 is thought to have originated in Wuhan, China with the first cases reported in December 2019 [2]. As of September 23, 2020, the total number of cases in the U.S. has been reported at 6,874,982 and the total number of deaths has been 200,275 [3]. COVID-19 is thought to primarily spread through respiratory droplets, such as when a person coughs, sneezes, or speaks [4]. Transmission and spread are still under investigation, but the average number of people infected by one person with COVID-19 is currently estimated to be 2.5 people [5]. Clinical severity varies from self-limiting, mild cold-like symptoms to critical cases with multi-organ failure necessitating intensive care unit (ICU) admission and even death. Based on data from similar outbreaks of MERS and SARS in the past, pregnant women are thought to be at higher risk for a more complicated clinical course [6]. Given normal immunologic and physiologic changes during pregnancy, pregnant women are considered to be high risk and extensive precautions have been recommended to ensure proper hygiene and social distancing with potential exposures [7]. With a constant stream of new information, medical bodies such as the Center for Disease Control (CDC), American College of Obstetricians and Gynecologists (ACOG), Royal College of Obstetricians and Gynecologists (RCOG), and American Academy of Pediatrics (AAP) continue to update their recommendations regarding pregnancy and breastfeeding in the COVID-19 era.

2. COVID-19 and Pregnancy

a. Disease course and severity

Although early data suggested that pregnant women were not at increased risk of COVID-19 [8,9,10,11], a study released by the CDC in June 2020 highlighted data that pregnant women may be a particularly vulnerable population [12]. The CDC compiled and analyzed data from 8,207 pregnant women with COVID-19 between January 22–June 17 that showed increased hospitalization rates (31.5% vs 5.8%), increased ICU admission rates (1.5% vs 0.9%),

and increased mechanical ventilation rates (0.5% vs 0.27%) compared to non-pregnant women [12]. After adjusting for confounding factors, the study concluded that pregnant women are 5.4 times more likely to be hospitalized and 1.5 times more likely to be admitted to the ICU. However, death rates between pregnant and non-pregnant women appeared similar. In light of this study, the CDC released a statement warning that pregnant people may be at an increased risk for severe illness from COVID-19 [13]. ACOG also released a statement in light of this new data and are currently considering modification to clinical guidelines [14]. ACOG also highlighted the importance of including pregnant and lactating patients safely in clinical trials for vaccines. Overall, this new data suggests pregnant women with COVID-19 should be followed closely for worsening disease. Since the release of these statements, further systematic reviews have continued to show greater disease severity in pregnant women. A recent systemic review of 1316 pregnant women showed an ICU admission rate of 31.3% and an increased mortality rate of 2.7% [15].

Physiologic changes in pregnancy, including cardiorespiratory, immunologic, and respiratory, tend to increase a woman's susceptibility to severe infection. Such changes include increased maternal oxygen demands related to increased metabolism, gestational anemia, and fetal oxygen consumption; such changes commonly result in physiologic shortness of breath in pregnancy and must be distinguished from pathologic shortness of breath related to COVID-19 [7]. Additional pulmonary changes in pregnancy predispose these women to hypoxemic respiratory failure due to the rapidly progressive COVID-19 pneumonia. These changes may account for the greater disease severity observed in pregnant women.

b. Complications during pregnancy and risk to neonates

The most commonly diagnosed clinical symptom of COVID-19 in pregnant women is pneumonia, present in up to 90% of cases [6,15]. A recent systematic review by Khalil et al. showed that the most common symptoms in this population are cough (71%), fever (63%), and dyspnea (34%), with 14.5% being asymptomatic at the time of presentation [16]. The most common complication was preterm birth before 37 weeks of gestation (21.8%), usually medically indicated based on COVID-19 effects such as severe maternal pneumonia or fear of sudden maternal decompensation. Half of patients delivered via cesarean section, which has increased risks in and of itself. Additional studies have also suggested a higher risk of miscarriage, preeclampsia, preterm premature rupture of membranes, and fetal growth restriction [6,15]. Despite higher complication rates, Khalil et al. showed rare perinatal and maternal mortality (<1%), which contrasts with other coronavirus outbreaks such as SARS and MERS that have mortality rates of 18% and 25%, respectively [16]. Overall, there appears to be no indication that COVID-19 infection in the mother leads to increased risk of neonatal morbidity or mortality. However, a number of case series of maternal deaths due to severe COVID-19 have been reported and emphasized the potential for maternal death and warn professional societies against providing unproven reassurance [17,18]. The CDC and ACOG both acknowledge the increased frequency of preterm birth and similar complications but have maintained that it is unclear if COVID-19 is the cause of this observation [13,19].

A major point of concern is the risk of vertical transmission to the neonate, which has been seen in select case reports. A Paris case study demonstrated transplacental transmission of COVID-19 in a neonate born to a mother infected in her last trimester of pregnancy [20]. Additionally, reports of IgM antibodies in neonatal blood at birth suggest possible intrauterine infection of SARS-CoV-2 [21,22,23]. Despite these findings, thus far there has been inconclusive evidence of vertical transmission during pregnancy [11,15]. In a small case series of 9 women who underwent cesarean delivery after diagnosis of COVID-19, testing of the amniotic fluid, cord blood and breastmilk were negative for viral load, suggesting no vertical transmission [21]. Due to the limited data regarding vertical transmission, vaginal deliveries are not contraindicated at this time. Despite this, a large majority of patients have electively decided to undergo cesarean section [22]. Additionally, increased rates of cesarean sections have been largely preformed electively due to belief that prompt delivery would improve respiratory disease. While the CDC and ACOG state that intrauterine transmission is uncommon, both indicate the need for more data [13,19]. With emerging evidence of possible vertical transmission, RCOG states that vertical transmission is possible [24].

While COVID-19 is not an indication to alter route of delivery, a study in Spain which compared vaginal delivery and cesarean section in COVID-19 patients, higher rates of clinical deterioration were seen in pregnant women who delivered via cesarean section (Adjusted OR, 13.4; 95% CI, 1.5-121.9; $P = .02$) [25]. In this study clinical deterioration was defined as the need for oxygen supplementation after delivery. These results have not altered clinical guidelines in regard to route of delivery, but they certainly raise concerns of potential adverse outcomes in COVID-19 mothers who undergo cesarean section. Although vertical transmission in utero does not seem to pose a significant risk to the fetus, a potential risk early in pregnancy is hyperthermia associated with COVID-19. Studies have shown that fever during the first trimester is associated with increased rates of congenital anomalies, neural tube defects, and miscarriage [26]. Unfortunately, limited data currently exists on the effects of COVID-19 infection and early pregnancy.

c. Hypercoagulability

Despite presenting as a predominantly respiratory illness, mounting evidence has shown an increased risk of hypercoagulability and subsequent thromboembolic events in patients with COVID-19 [27]. Prophylactic and therapeutic anticoagulation is currently the primary form of management for this hypercoagulable state, as treatment for COVID-19 itself is still being investigated. This observed hypercoagulability from COVID-19 is a particular issue of interest in pregnant woman as normal physiologic changes during pregnancy lead to a baseline hypercoagulable state, thus compounding the effects of COVID-19 [28]. Preferred anticoagulants during pregnancy with or without COVID-19 are heparin compounds, with low molecular weight heparin recommended [29]. Both the NIH and RCOG recommend use of low molecular weight heparin for prophylaxis in all pregnant women admitted to the hospital with confirmed or suspected COVID-19 [24,29]. Furthermore, the NIH approves use of unfractionated heparin, low

molecular weight heparin, and warfarin in breastfeeding women with COVID-19, as they do not accumulate in breast milk and therefore do not lead to anticoagulant effects in the newborn [29].

d. Steroid use in pregnancy

Use of corticosteroids is a standard of care for women delivering prematurely, prior to 37 weeks of gestation, in order to help induce fetal lung maturity and thereby improve neonatal outcomes. However, corticosteroids have been associated with worse outcomes in patients with COVID-19, including ICU admission, invasive ventilation, secondary infection, and death [30]. Although the steroid dosages are significantly less for prematurity than that initially used in the ICU setting for COVID-19 cases, it is important to reassess the use of corticosteroids and to weight the risks and benefits in COVID-19 positive pregnant women [30]. The World Health Organization (WHO) generally recommends avoidance of steroids but emphasizes the need for situation-specific decision making for pregnant women in preterm labor prior to 34 weeks of gestation [31]. ACOG initially recommended offering antenatal corticosteroids in women with suspected or confirmed COVID-19 prior to 34 weeks of gestation, but not offering corticosteroids between 34 and 37 weeks of gestation due to potential maternal harm [32]. However, ACOG has updated their recommendations based on more recent safety data and now recommend offering antenatal corticosteroids for all women at risk for preterm delivery prior to 37 weeks of gestation [32].

3. COVID-19 and Breastfeeding

Both ACOG and the CDC have maintained that maternal COVID-19 is not a contraindication to breastfeeding, as it is still unknown whether SARS-CoV-2 is transmitted through breastmilk [13,19]. The AAP also strongly supports breastfeeding in mothers with COVID-19 [33]. There have been a few reported cases of detectable SARS-CoV-2 RNA in nursing mothers known to be positive for COVID-19 [34,35]. However, further studies have shown that detection of viral RNA does not equate with infectivity as the presence of SARS-CoV-2 RNA does not represent replication-competent virus [36]. Although there is insufficient data to demonstrate viral transmission through breast milk, shared decision making is recommended as there is still risk of transmission through respiratory droplet when feeding. As a result, the CDC, ACOG, and AAP recommend appropriate preventive precautions including the use of a facemask and proper hand and breast hygiene while breastfeeding [13,19,33]. If a mother decides to use a breast pump, the baby should ideally be fed by a healthy individual and proper cleaning of all parts of the pump is recommended after each use [13,19]. Additionally, current data suggests no difference in risk of SARS-CoV-2 infection to the neonate when cared for in a separate room or in the mother's room, allowing for uninterrupted breastfeeding in the first few days of life [19,37]. Overall, the infant and maternal benefits of breastfeeding outweigh the risks of potential airborne exposure from the mother.

Breast milk is a source of passive immunity for infants, by transferring antibodies from mother to infant, which currently has limited data for COVID-19 immunity. A recent case report of a woman known to be positive for SARS-CoV-2 by throat swab was found to have IgG and

IgA antibodies to SARS-CoV-2 detect in breast milk, with no detection of viral RNA in breast milk [38]. This data points to potential immune protection against COVID-19 for infants. Although limited data exists regarding the presence of COVID-19 antibodies and potential for transferring immunity, some understanding can be gained based on data from previous coronavirus outbreaks. A systematic review by Huang et al. showed that the presence of antiviral antibodies depends on the timing of maternal infection, with median time to detection of IgG of 12 days for SARS-CoV-1, 11 days for SARS-CoV-2, and 16 days for MERS-CoV [39]. Additionally, levels of IgG were detectable for at least a year and provided possible protection from reinfection, although waning over time. Although not specific to breast milk, if antibodies are found to be present in breast milk, these results imply that protection against SARS-CoV-2 infection is possible, although likely transient.

4. Racial Disparities

As the pandemic has progressed, increasing information has revealed how the COVID-19 pandemic has disproportionately affected racial and ethnic minorities, with higher mortality rates in African American, Native American, and Latinx groups [40]. Minority pregnant women have further been affected by COVID-19, with one systematic review showing 50.8% of the women infected with SARS-CoV-2 in pregnancy to be from Black, Asian, or other minority ethnic groups [16]. Even prior to the COVID-19 pandemic, maternal mortality had disproportionately affected minorities, especially Black women [41]. The COVID-19 crisis has attracted national attention and brought these racial disparities, including maternal morbidity and mortality, to the forefront. The disproportionate impact on minorities can in part be traced to a foundation of structural racism and other societal factors [42]. Thus, essential structural and societal changes are required to allow for health equity that should be explored well beyond this paper.

4. Conclusion

Overall, our understanding of COVID-19 and pregnancy is limited by the amount of data currently available in the medical literature. As a result, medical recommendations are rapidly evolving as new data emerges. The statements and recommendations by CDC, ACOG, RCOG, and AAP as they relate to the effects of COVID-19 and pregnancy are outlined in **Table 1**. With recent data, the medical community, particularly the CDC and ACOG, have released statements warning that pregnant women represent a vulnerable population and may develop more severe disease compared to the general healthy counterparts. Clinical course in most cases manifests with cold-like symptoms, fevers and pneumonia. However long-term effects of COVID-19 on pregnancy have yet to be elucidated. Furthermore, most studies to date have described cases of pregnant women in the 3rd trimester or presenting in labor. Therefore, further studies would be needed to understand the effect of COVID-19 on pregnancy in the earlier stages of gestation. The most common fetal complications are mainly limited to preterm birth and cesarean sections and further studies will be needed to understand long term effects. The CDC, ACOG, and AAP are all in consensus that there is inconclusive data to suggest viral transmission through either transplacental exchange or breastmilk. As a result, vaginal delivery, unless contraindicated for other medical reasons, and breastfeeding are both encouraged.

The consensus is that COVID-19 does not affect the general management of pregnancy/labor and proper precautions similar to the non-pregnant population should be maintained. In light of the potential risk related to COVID-19 illness, ACOG recommends that clinicians counsel patients and emphasize the importance of preventative measures for pregnant women and families [19]. A better understanding of the effects of COVID-19 on pregnancy, birth and post-partum care will require more data including a larger set of patients across the all stages of pregnancy. Further investigations should also be targeted at racial disparities and socioeconomic factors in regard to COVID-19 and pregnancy.

Authors: Catherine Sham, Julian Tanjuakio

Last Updated: September 23, 2020

References:

1. “About COVID-19”. *Centers for Disease Control and Prevention*. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/cdcresponse/about-COVID-19.html>. Retrieved 8 September 2020.
2. “Question and Answers Hub.” *World Health Organization*, World Health Organization. Available at: www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub. Retrieved 8 September 2020.
3. “Cases in the U.S.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention. Available at: www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html. Retrieved 23 September 2020.
4. Klompas, M., Baker, M. A., & Rhee, C. (2020). Airborne transmission of SARS-CoV-2: theoretical considerations and available evidence. *JAMA*.
5. “COVID-19 Pandemic Planning Scenarios”. *Centers for Disease Control and Prevention*. Available at: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/planning-scenarios.html>. Retrieved 8 September 2020.
6. Di Mascio, D., Khalil, A., Saccone, G., Rizzo, G., Buca, D., Liberati, M., ... & D’Antonio, F. (2020). Outcome of Coronavirus spectrum infections (SARS, MERS, COVID 1-19) during pregnancy: a systematic review and meta-analysis. *American journal of obstetrics & gynecology MFM*, 100107.
7. Dashraath P, Wong JJJ, Lim MXK, et al. Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *Am J Obstet Gynecol*. 2020;222(6):521-531.
8. Guan, W. J., Ni, Z. Y., Hu, Y., Liang, W. H., Ou, C. Q., He, J. X., ... & Du, B. (2020). Clinical characteristics of coronavirus disease 2019 in China. *New England journal of medicine*, 382(18), 1708-1720.
9. Breslin N, Baptiste C, Gyamfi-bannerman C, et al. COVID-19 infection among asymptomatic and symptomatic pregnant women: Two weeks of confirmed presentations to an affiliated pair of New York City hospitals. *Am J Obstet Gynecol MFM*. 2020;:100118.
10. Verity, R., Okell, L. C., Dorigatti, I., Winskill, P., Whittaker, C., Imai, N., Cuomo-Dannenburg, G., et al. (2020). Estimates of the severity of coronavirus disease 2019: a model-based analysis. *The Lancet Infectious Diseases*, 20(6), 669–677.
11. Juan J, Gil MM, Rong Z, Zhang Y, Yang H, Poon LC. Effects of coronavirus disease 2019 (COVID-19) on maternal, perinatal and neonatal outcomes: a systematic review. *Ultrasound Obstet Gynecol*. 2020.
12. Ellington S, Strid P, Tong VT, et al. Characteristics of Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status — United States, January 22–June 7, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:769–775. DOI: [http://dx.doi.org/10.15585/mmwr.mm6925a1external icon](http://dx.doi.org/10.15585/mmwr.mm6925a1external%20icon).
13. “If You Are Pregnant, Breastfeeding, or Caring for Young Children.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 13 May 2020. Available at: www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnancy-breastfeeding.html. Retrieved 12 September 2020.
14. “ACOG Statement on COVID-19 and Pregnancy.” *ACOG*, 24 June 2020. Available at: www.acog.org/news/news-releases/2020/06/acog-statement-on-covid-19-and-pregnancy. Retrieved 6 September 2020.
15. Diriba, K., Awulachew, E., & Getu, E. (2020). The effect of coronavirus infection (SARS-CoV-2, MERS-CoV, and SARS-CoV) during pregnancy and the possibility of

- vertical maternal–fetal transmission: a systematic review and meta-analysis. *European Journal of Medical Research*, 25(1), 1-14.
16. Khalil, A., Kalafat, E., Benlioglu, C., O'Brien, P., Morris, E., Draycott, T., ... & von Dadelszen, P. (2020). SARS-CoV-2 infection in pregnancy: a systematic review and meta-analysis of clinical features and pregnancy outcomes. *EClinicalMedicine*, 100446.
 17. Hantoushzadeh, S., Shamshirsaz, A. A., Aleyasin, A., Seferovic, M. D., Aski, S. K., Arian, S. E., ... & Naemi, M. (2020). Maternal death due to COVID-19 disease. *American journal of obstetrics and gynecology*.
 18. Takemoto, M. L., Menezes, M. O., Andreucci, C. B., Knobel, R., Sousa, L. A., Katz, L., ... & Melo, A. S. (2020). Maternal mortality and COVID-19. *The Journal of Maternal-Fetal & Neonatal Medicine*, 1-7.
 19. “Novel Coronavirus 2019 (COVID-19).” ACOG, 1 July 2020. Available at: www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/03/novel-coronavirus-2019. Retrieved 12 September 2020.
 20. Vivanti AJ et al. Transplacental transmission of SARS-CoV-2 infection. *Nature Communications* 2020.
 21. Chen H, Guo J, Wang C, et al. Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *Lancet*. 2020;395(10226):809-815.
 22. Dong L, Tian J, He S, et al. Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn. *JAMA*. 2020.
 23. Zeng H, Xu C, Fan J, et al. Antibodies in Infants Born to Mothers With COVID-19 Pneumonia. *JAMA*. 2020.
 24. “Coronavirus (COVID-19) Infection in Pregnancy Version 11.” *Royal College of Obstetricians and Gynecologists*; 24 July 2020. Available at: <https://www.rcog.org.uk/globalassets/documents/guidelines/2020-07-24-coronavirus-covid-19-infection-in-pregnancy.pdf>. Retrieved 14 September 2020.
 25. Martínez-Perez, Oscar et al. “Association Between Mode of Delivery Among Pregnant Women With COVID-19 and Maternal and Neonatal Outcomes in Spain.” *JAMA*, e2010125. 8 Jun. 2020, doi:10.1001/jama.2020.10125
 26. Edwards MJ. Review: Hyperthermia and fever during pregnancy. *Birth Defects Res Part A Clin Mol Teratol*. 2006;76(7):507-16.
 27. Abou-Ismaïl, M. Y., Diamond, A., Kapoor, S., Arafah, Y., & Nayak, L. (2020). The hypercoagulable state in COVID-19: Incidence, pathophysiology, and management. *Thrombosis Research*.
 28. Benhamou, D., Keita, H., Ducloy-Bouthors, A. S., & CARO working group. (2020). Coagulation changes and thromboembolic risk in COVID-19 obstetric patients. *Anaesthesia, critical care & pain medicine*, 39(3), 351.
 29. COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Available at: <https://www.covid19treatmentguidelines.nih.gov/adjunctive-therapy/antithrombotic-therapy/>. Retrieved 12 September 2020.
 30. McIntosh, J. J. (2020). Corticosteroid guidance for pregnancy during COVID-19 pandemic. *American journal of perinatology*, 37(8), 809.
 31. “Clinical Management of COVID-19.” *World Health Organization*, World Health Organization, 27 May 2020. Available at: [www.who.int/publications/i/item/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](http://www.who.int/publications/i/item/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected). Retrieved 12 September 2020.

32. American College of Obstetricians and Gynecologists. COVID-19 FAQs for obstetricians-gynecologists, obstetrics. Washington, DC: ACOG; 2020. Available at: <https://www.acog.org/clinical-information/physician-faqs/covid-19-faqs-for-ob-gyns-obstetrics>. Retrieved 12 September 2020.
33. Wyckoff, Alyson Sulaski. "AAP Issues Guidance on Infants Born to Mothers with Suspected or Confirmed COVID-19." *American Academy of Pediatrics*, 29 May 2020.
34. Tam, P. C., Ly, K. M., Kernich, M. L., Spurrier, N., Lawrence, D., Gordon, D. L., & Tucker, E. C. (2020). Detectable severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in human breast milk of a mildly symptomatic patient with coronavirus disease 2019 (COVID-19). *Clinical Infectious Diseases*.
35. Groß, R., Conzelmann, C., Müller, J. A., Stenger, S., Steinhart, K., Kirchhoff, F., & Münch, J. (2020). Detection of SARS-CoV-2 in human breastmilk. *The Lancet*, 395(10239), 1757-1758.
36. Chambers, C., Krogstad, P., Bertrand, K., Contreras, D., Tobin, N. H., Bode, L., & Aldrovandi, G. (2020). Evaluation for SARS-CoV-2 in Breast Milk From 18 Infected Women. *JAMA*.
37. Wyckoff, A. S. (2020). Rooming-in, with precautions, now OK in revised AAP newborn guidance. *AAP News*.
38. Dong, Y., Chi, X., Hai, H., Sun, L., Zhang, M., Xie, W. F., & Chen, W. (2020). Antibodies in the breast milk of a maternal woman with COVID-19. *Emerging microbes & infections*, 9(1), 1467-1469.
39. Huang, A. T., Garcia-Carreras, B., Hitchings, M. D., Yang, B., Katzelnick, L. C., Rattigan, S. M., ... & Lessler, J. (2020). A systematic review of antibody mediated immunity to coronaviruses: antibody kinetics, correlates of protection, and association of antibody responses with severity of disease. *medRxiv*.
40. Don Bambino Geno Tai, Aditya Shah, Chyke A Doubeni, Irene G Sia, Mark L Wieland, The Disproportionate Impact of COVID-19 on Racial and Ethnic Minorities in the United States, *Clinical Infectious Diseases*, , ciaa815, <https://doi.org/10.1093/cid/ciaa815>
41. Minkoff H. (2020). You Don't Have to Be Infected to Suffer: COVID-19 and Racial Disparities in Severe Maternal Morbidity and Mortality. *American journal of perinatology*, 37(10), 1052–1054. <https://doi.org/10.1055/s-0040-1713852>
42. Don Bambino Geno Tai, Aditya Shah, Chyke A Doubeni, Irene G Sia, Mark L Wieland, The Disproportionate Impact of COVID-19 on Racial and Ethnic Minorities in the United States, *Clinical Infectious Diseases*, , ciaa815, <https://doi.org/10.1093/cid/ciaa815>

Table 1. CDC, ACOG, RCOG, and AAP Recommendations on COVID-19 and Pregnancy

	Infection risk / disease severity	Risk to Baby	Anticoagulation	Breastfeeding
CDC¹	Potentially increased risk for more severe illness	Increased risk for preterm birth Vertical transmission unlikely	May be at increased risk for thrombosis No specific recommendation regarding treatment	Unlikely to be spread through breast milk Encourage safety precautions (e.g., wash hands, wear a mask)
ACOG^{2,3}	Potentially increased risk for severe illness (ICU admissions, mechanical ventilation) No increased risk of maternal mortality	Vertical transmission appears to be uncommon, although some reported cases	May be at increased risk for thrombosis Reasonable to consider anticoagulation	Unlikely to be spread through breast milk, no contraindication to breastfeeding Infants at risk of transmission through respiratory droplet, encourage safety measures
RCOG⁴	Similar severity to non-pregnant adults; most cases are mild/moderate Some reported cases of maternal death, although more data need	Vertical transmission may be possible; requires further investigation	Likely increased risk for thrombosis Hospitalized pregnant women with suspected or confirmed COVID-19 should receive heparin prophylaxis	No evidence of transmission through breast milk, recommend breastfeeding Encourage safety precautions
AAP⁵	-	-	-	No evidence of transmission through breast milk, strongly support breastfeeding Recommend strict preventive precautions (e.g., mask, breast & hand hygiene)

1. “If You Are Pregnant, Breastfeeding, or Caring for Young Children.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention; 2020. Available at: www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnancy-breastfeeding.html. Retrieved 14 September 2020.F
2. “Novel Coronavirus 2019 (COVID-19).” *ACOG*; 2020. Available at: www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2020/03/novel-coronavirus-2019. Retrieved 14 September 2020.
3. “COVID-19 FAQs for obstetricians-gynecologists, obstetrics.” *ACOG*; 2020. Available at: <https://www.acog.org/clinical-information/physician-faqs/covid-19-faqs-for-ob-gyns-obstetrics>. Retrieved 14 September 2020.
4. “Coronavirus (COVID-19) Infection in Pregnancy Version 11.” *Royal College of Obstetricians and Gynecologists*; 24 July 2020. Available at:

<https://www.rcog.org.uk/globalassets/documents/guidelines/2020-07-24-coronavirus-covid-19-infection-in-pregnancy.pdf>. Retrieved 14 September 2020.

5. "FAQs: Management of Infants Born to Mothers with Suspected or Confirmed COVID-19." *American Academy of Pediatrics*; 9 September 2020. Available at: <https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/faqs-management-of-infants-born-to-covid-19-mothers/>. Retrieved 14 September 2020.