



Is there vertical transmission of SARS-CoV-2 in pregnancy?

Authors: Joey Tabula, MD, FPCP jatabula@gmail.com

Date of Review: 06-APRIL-2020 (version 1)

Last Updated: 06-APRIL-2020 (version 1)

KEY FINDINGS

There is limited evidence on the vertical transmission of SARS-CoV-2 in pregnancy.

- **SARS-CoV-2 is primarily transmitted person-to-person via respiratory droplets and contact routes.**
- **Vertical transmission is uncertain.**
- **There is limited and conflicting evidence on vertical transmission of SARS-CoV-2 in pregnancy.**
- **Guidelines do not totally exclude the probability of vertical transmission.**

Disclaimer: The aim of these rapid reviews is to retrieve, appraise, summarize and update the available evidence on COVID-related health technology. The reviews have not been externally peer-reviewed; they should not replace individual clinical judgement and the sources cited should be checked. The views expressed represent the views of the authors and not necessarily those of their host institutions. The views are not a substitute for professional medical advice.

Copyright Claims: This review is an intellectual property of the authors and of the Institute of Clinical Epidemiology, National Institutes of Health-UP Manila and Asia-Pacific Center for Evidence Based Healthcare Inc.

RESULTS

Karimi-Zarchi et al. included 1 online news and 3 case series were included in the review [2]. A total of 31 pregnant women with COVID-19 were reported. No COVID-19 infection was detected in neonates.

The Panahi et al. included 13 articles with a total of 37 pregnant mothers with COVID-19 and 38 newborns (2 twins) [3]. Five of the studies were case reports or series. Other studies were correspondence, commentary or letters to the editor. There was no report of vertical transmission.

Schwartz included 5 case reports/series China with a total of 38 pregnant mothers with COVID-19 (only 37 were confirmed by RT PCR) and 39 newborns (1 twin) [4]. There was no report of vertical transmission.

Mullins et al. included 23 studies with a total of 30 neonates [5]. Among 25 tested neonates, all were negative for COVID-19.

All the 12 case reports/series, with a pooled total of 41 neonates, reported no SARS-CoV-2 in pharyngeal swabs of neonates [6-17] born to mothers with COVID-19. IgM antibodies and cytokines levels (e.g. Interleukin-6, IL-6) immediately after birth were elevated in 3 neonates [14-15]. IgM antibodies do not cross the placenta from the mother to the neonate because of their large structure. Cytokines such as IL-6 are elevated in patients with COVID-19. These markers of possible in-utero infection conflict with the negative pharyngeal swabs.

CONCLUSION

There is limited and conflicting evidence on vertical transmission of SARS-CoV-2 from mother to fetus. Larger studies are needed for a robust evidence on vertical transmission in pregnancy.

REFERENCES

1. World Health Organization. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. Scientific brief. March 29, 2020. Retrieved on April 2, 2020 from <https://www.who.int/publications-detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>
2. Karimi-Zarchi et al. Vertical Transmission of Coronavirus Disease 19 (COVID-19) from Infected Pregnant Mothers to Neonates: A Review. *Fetal Pediatr Pathol.* 2020 Apr 2:1-5. doi: 10.1080/15513815.2020.1747120. [Epub ahead of print]
3. Panahi et al. Risks of Novel Coronavirus Disease (COVID-19) in Pregnancy; a Narrative Review. *Arch Acad Emerg Med.* 2020 Mar 23;8(1):e34. eCollection 2020.
4. Schwartz, et al. An Analysis of 38 Pregnant Women with COVID-19, Their Newborn Infants, and Maternal-Fetal Transmission of SARS-CoV-2: Maternal Coronavirus Infections and Pregnancy Outcomes. *Arch Pathol Lab Med.* 2020 Mar 17. doi: 10.5858/arpa.2020-0901-SA. [Epub ahead of print] Retrieved on April 5, 2020: <https://www.archivesofpathology.org/doi/pdf/10.5858/arpa.2020-0901-SA>
5. Mullins et al. Coronavirus in pregnancy and delivery: rapid review. *Ultrasound Obstet Gynecol.* 2020 Mar 17. doi: 10.1002/uog.22014. [Epub ahead of print]
6. Yu, et al. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective, single-centre, descriptive study. *Lancet Infect Dis.* 2020 Mar 24. pii: S1473-3099(20)30176-6. doi: 10.1016/S1473-3099(20)30176-6. [Epub ahead of print] Retrieved on April 5, 2020: [https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(20\)30176-6/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30176-6/fulltext)
7. Liao, et al. Chest CT Findings in a Pregnant Patient with 2019 Novel Coronavirus Disease. *Balkan Med J.* 2020 Mar 26. doi: 10.4274/balkanmedj.galenos.2020.2020.3.89. [Epub ahead of print] Retrieved on April 5, 2020: http://balkanmedicaljournal.org/uploads/pdf/pdf_BMJ_2196.pdf

8. Fan, et al. Perinatal Transmission of COVID-19 Associated SARS-CoV-2: Should We Worry? *Clin Infect Dis*. 2020 Mar 17. pii: ciaa226. doi: 10.1093/cid/ciaa226. [Epub ahead of print] Retrieved on April 5, 2020: <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa226/5809260>
9. Zhu et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. *Transl Pediatr*. 2020 Feb;9(1):51-60. doi: 10.21037/tp.2020.02.06. Retrieved on April 5, 2020: <http://tp.amegroups.com/article/view/35919/28274>
10. Chen 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 Mar 7;395(10226):809-815. doi: 10.1016/S0140-6736(20)30360-3. Epub 2020 Feb 12. Retrieved on April 5, 2020: <https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2930360-3>
11. Liu et al. Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy. *J Infect*. 2020 Mar 4. pii: S0163-4453(20)30109-2. doi: 10.1016/j.jinf.2020.02.028. [Epub ahead of print] Retrieved on April 5, 2020: [https://www.journalofinfection.com/article/S0163-4453\(20\)30109-2/pdf](https://www.journalofinfection.com/article/S0163-4453(20)30109-2/pdf)
12. Li et al. Lack of Vertical Transmission of Severe Acute Respiratory Syndrome Coronavirus 2, China. *Emerg Infect Dis*. 2020 Jun 17;26(6). doi: 10.3201/eid2606.200287. [Epub ahead of print] Retrieved on April 5, 2020: https://wwwnc.cdc.gov/eid/article/26/6/20-0287_article
13. Wang et al. A case of 2019 Novel Coronavirus in a pregnant woman with preterm delivery. *Clin Infect Dis*. 2020 Feb 28. pii: ciaa200. doi: 10.1093/cid/ciaa200. [Epub ahead of print] Retrieved on April 5, 2020: <https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa200/5771323>
14. Dong et al. Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn. *JAMA*. 2020 Mar 26. doi: 10.1001/jama.2020.4621. [Epub ahead of print] Retrieved on April 6, 2020: <https://jamanetwork.com/journals/jama/fullarticle/2763853>
15. Zeng et al. Neonatal Early-Onset Infection With SARS-CoV-2 in 33 Neonates Born to Mothers With COVID-19 in Wuhan, China. *JAMA Pediatr*. 2020 Mar 26. doi: 10.1001/jamapediatrics.2020.0878. [Epub ahead of print] Retrieved on April 6, 2020: <https://jamanetwork.com/journals/jama/fullarticle/2763854>
16. Lee et al. Emergency cesarean section on severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) confirmed patient. *Korean J Anesthesiol*. 2020 Mar 31. doi: 10.4097/kja.20116. [Epub ahead of print] Retrieved on April 5, 2020: <https://ekja.org/upload/pdf/kja-20116.pdf>
17. Zambrano, et al. A pregnant woman with COVID-19 in Central America. *Travel Med Infect Dis*. 2020 Mar 25:101639. doi: 10.1016/j.tmaid.2020.101639. [Epub ahead of print] Retrieved on April 5, 2020: <https://www.sciencedirect.com/science/article/pii/S1477893920301071?via%3Dihub>
18. Chawla, et al. Perinatal-Neonatal Management of COVID-19 Infection - Guidelines of the Federation of Obstetric and Gynecological Societies of India (FOGSI), National Neonatology Forum of India (NNF), and Indian Academy of Pediatrics (IAP). *Indian Pediatr*. 2020 Apr 1. pii: S097475591600154. [Epub ahead of print] Retrieved on April 4, 2020: https://www.nnfi.org/assests/upload/announcement-pdf/FOGSI_NNF_IAP_COVID19_perinatal_neonatal_guideline_ver_1_01_March_26-2020.pdf
19. Chen et al. Expert consensus for managing pregnant women and neonates born to mothers with suspected or confirmed novel coronavirus (COVID-19) infection. *Int J Gynaecol Obstet*. 2020 Mar 20. doi: 10.1002/ijgo.13146. [Epub ahead of print]