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# COVID-19: Personal Protective Equipment (PPE) for Neonatal Resuscitation

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## Background

This document complements Public Health Ontario's (PHO) list of aerosol-generating medical procedures (AGMPs)[1] and aims to clarify the need for the use of additional precautions by health care workers and first responders during neonatal resuscitation. The safety of health care workers and first responders is of utmost importance. This technical brief provides guidance on personal protective equipment considerations during the neonatal resuscitation of babies born to mothers with suspect or confirmed COVID-19.

## Evidence for Vertical Transmission

There is some evidence for the vertical transmission of SARS-CoV-2, specifically intrauterine transmission from mother to child; however, the overall risk of vertical transmission is low. A full summary of the evidence is available in the document, What we know so far about… Routes of Transmission; however, in brief, the majority of case series have not documented vertical transmission.[2-9] In nine systematic reviews and meta-analyses, ranging from 74 to 1,316 newborns, there were SARS-CoV-2 RNA-positive newborns by PCR but no evidence of intrauterine transmission.[10-17] So while there are several reports that suggest that it may occur,[18-21] it does not appear to be common and would be more likely to occur in a critically unwell mother with a short duration of symptoms (i.e., no antibody response) who may have viremia.

## Evidence for Neonatal Resuscitation as an AGMP

There is limited data on significant aerosol generation during neonatal resuscitation to consider it an aerosol-generating medical procedure. Neonatal Continuous Positive Airway Pressure (CPAP) and bag and mask ventilation are not associated with epidemiological data that indicate it significantly increases the risk of infection to health care workers within close range of the procedure. In theory, given the lower lung volumes and the lower pressures required to ventilate neonates[22], the risk is likely much lower than in adults.

## Conclusion

At this time, given the low risk of vertical transmission and the low risk of aerosol exposure from neonatal resuscitation, Droplet and Contact precautions can be used during neonatal resuscitation for babies born to mothers with suspect or confirmed COVID-19. This recommendation does not replace the need for healthcare workers and first responders to select personal protective equipment based on a point of care risk assessment. In higher risk scenarios (i.e., critically unwell mother), healthcare workers

involved in the direct airway management (i.e., intubation) of a neonate may choose to wear an N95 respirator; however, the aerosol risk is unlikely to extend beyond the individual involved in direct airway management and as a result, Droplet and Contact Precautions can be used by the rest of the delivery and support team unless otherwise indicated for maternal management. PHO will continue to monitor the evidence and update this guidance as new evidence arises.

# References


1. Ontario Agency for Health Protection and Promotion (Public Health Ontario). IPAC recommendations for use of personal protective equipment for care of individuals with suspect or confirmed COVID-19 [Internet]. Toronto, ON: Queen's Printer for Ontario; 2020 [cited 2020 Apr 8]. Available from: https://www.publichealthontario.ca/-/media/documents/ncov/updated-ipac-measures-covid-19.pdf?la=en

2. Khan S, Peng L, Siddique R, Nabi G, Nawsherwan, Xue M, et al. Impact of COVID-19 infection on pregnancy outcomes and the risk of maternal-to-neonatal intrapartum transmission of COVID-19 during natural birth. Infect Control Hospital Epidemiol. 2020;41(6):748-50. Available from: https://doi.org/10.1017/ice.2020.84

3. Zhu H, Wang L, Fang C, Peng S, Zhang L, Chang G, et al. Clinical analysis of 10 neonates born to mothers with 2019-nCoV pneumonia. Transl Pediatr. 2020;9(1):51-60. Available from: https://dx.doi.org/10.21037/tp.2020.02.06

4. Fan C, Lei D, Fang C, Li C, Wang M, Liu Y, et al. Perinatal transmission of COVID-19 associated SARS-CoV-2: should we worry? Clin Infect Dis. 2021;72(5):862-4. Available from: https://dx.doi.org/10.1093/cid/ciaa226

5. Chen H, Guo J, Wang C, Luo F, Yu X, Zhang W, 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):809-15. Available from: https://doi.org/10.1016/S0140-6736(20)30360-3

6. Chen R, Zhang Y, Huang L, Cheng BH, Xia ZY, Meng QT. Safety and efficacy of different anesthetic regimens for parturients with COVID-19 undergoing Cesarean delivery: a case series of 17 patients. Can J Anaesth. 2020 Mar 16 [Epub ahead of print]. Available from: https://doi.org/10.1007/s12630-020-01630-7

7. Liu Y, Chen H, Tang K, Guo Y. Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy. J Infect. 2020 Mar 5 [Epub ahead of print]. Available from: https://doi.org/10.1016/j.jinf.2020.02.028

8. Li Y, Zhao R, Zheng F, Chen X, Wang J, Sheng X, et al. Lack of vertical transmission of severe acute respiratory syndrome coronavirus 2, China. Emerg Infect Dis. 2020;26(6):1335-6. Available from: https://dx.doi.org/10.3201/eid2606.200287

9. Yu N, Li W, Kang Q, Xiong Z, Wang S, Lin X, 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 [Epub ahead of print]. Available from: https://doi.org/10.1016/S1473-3099(20)30176-6

10. Huntley BJF, Huntley ES, Di Mascio D, Chen T, Berghella V, Chauhan SP. Rates of maternal and perinatal mortality and vertical transmission in pregnancies complicated by severe acute respiratory syndrome coronavirus 2 (SARS-Co-V-2) infection: a systematic review. Obstet Gynecol. 2020;136(2):303-12. Available from: https://doi.org/10.1097/aog.0000000000004010

11. Pettirosso E, Giles M, Cole S, Rees M. COVID-19 and pregnancy: a review of clinical characteristics, obstetric outcomes and vertical transmission. Aust N Z J Obstet Gynaecol. 2020;60:640-59. Available from: https://doi.org/10.1111/ajo.13204

12. Diriba K, Awulachew E, Getu E. 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. Eur J Med Res. 2020;25:39. Available from: https://dx.doi.org/10.1186/s40001-020-00439-w

13. Simões E Silva AC, Leal CRV. Is SARS-CoV-2 vertically transmitted? Front Pediatr. 2020;8:276. Available from: https://dx.doi.org/10.3389/fped.2020.00276

14. AlQahtani MA, AlDajani SM. A systemic review of vertical transmission possibility in pregnant women with coronavirus disease 2019-positive status. J Family Med Prim Care. 2020;9(9):4521-5. Available from: https://doi.org/10.4103/jfmpc.jfmpc_475_20

15. Chi H, Chiu N-C, Tai Y-L, Chang H-Y, Lin C-H, Sung Y-H, et al. Clinical features of neonates born to mothers with coronavirus disease-2019: a systematic review of 105 neonates. J Microbiol Immunol Infect. 2020;54(1):69-76. Available from: https://dx.doi.org/10.1016%2Fj.jmii.2020.07.024

16. Neef V, Buxmann H, Rabenau HF, Zacharowski K, Raimann FJ. Characterization of neonates born to mothers with SARS-CoV-2 infection: review and meta-analysis. Pediatr Neonatol. 2021;62(1):11-20. Available from: https://doi.org/10.1016/j.pedneo.2020.10.001

17. Islam MM, Poly TN, Walther BA, Yang HC, Wang CW, Hsieh WS, et al. Clinical characteristics and neonatal outcomes of pregnant patients with COVID-19: a systematic review. Front Med (Lausanne). 2020;7:573468. Available from: https://doi.org/10.3389/fmed.2020.573468

18. Zeng H, Xu C, Fan J, Tang Y, Deng Q, Zhang W, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. JAMA. 2020;323(18):1848-9. Available from: https://doi.org/10.1001/jama.2020.4861

19. Dong L, Tian J, He S, Zhu C, Wang J, Liu C, et al. Possible vertical transmission of SARS-CoV-2 from an infected mother to her newborn. JAMA. 2020;323(18):1846-8. Available from: https://doi.org/10.1001/jama.2020.4621

20. Zeng L, Xia S, Yuan W, Yan K, Xiao F, Shao J, 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;174(7):722-5. Available from: https://doi.org/10.1001/jamapediatrics.2020.0878

21. Alzamora MC, Paredes T, Caceres D, Webb CM, Valdez LM, La Rosa M. Severe COVID-19 during pregnancy and possible vertical transmission. Am J Perinatol. 2020;37(8):861-865. Available from: https://doi.org/10.1055/s-0040-1710050

22. Stark AR, Goldman MD, Frantz ID 3rd. Lung volume changes, occlusion pressure and chest wall configuration in human infants. Pediatr Res. 1979;13(4 Pt 1):250-6. Available from: https://doi.org/10.1203/00006450-197904000-00008

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