Caring for Newborns Born to Mothers With COVID-19: More Questions Than Answers

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As the coronavirus disease 2019 (COVID-19) pandemic continues, its impact on newborns remains uncertain. Early reports from China suggested that although severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection could be associated with adverse pregnancy outcomes, newborns did not appear to show clinical signs of infection and had negative viral testing results.[1,2] More recent reports suggest that, although low, risk of neonatal infection does exist. A recent (as we write this commentary) review identified 27 publications describing 217 newborns born to mothers with COVID-19, of which 21 publications describing 187 newborns were from China.[3] Of the 217 newborns, 7 (3%) had evidence of SARS-CoV-2 infection: 3 had positive serum levels of immunoglobulin G and immunoglobulin M antibodies with negative polymerase chain reaction (PCR) test results, and 4 had positive PCR test results. Beyond the immediate postnatal period, in several case studies, authors report positive SARS-CoV-2 test results in symptomatic newborns in the first month of life, and new reports are published frequently.[3–7] The mechanism of neonatal infection is unclear. Vertical transmission during pregnancy is not thought to be likely; SARS-CoV-2 test results on placenta, umbilical cord, amniotic fluid, vaginal secretions, and breast milk samples have uniformly been negative.[8] More likely is postnatal infection through horizontal transmission.

This uncertainty around neonatal infection risk has led to notable variations in care practices for newborns born to mothers with COVID-19. Hospitals, professional organizations, and public health agencies have interpreted the limited available data in the context of their local environments to develop practice recommendations that then are applied to a wide range of clinical and social conditions. Although there is some agreement on certain aspects of newborn care, such as the use of precautions for delivery room resuscitation or isolation of exposed infants requiring intensive care, approaches to other aspects of care differ widely, including the location of care and breastfeeding for term infants that are well and born to mothers without severe symptoms. Recommendations on these areas from several national-level organizations as well as the World Health Organization (WHO) are summarized in Table 1. In China, consensus guidelines for mothers who are COVID-19–positive suggest immediate cord clamping and no mother-infant contact in the delivery room, isolation of the infant for 14 days after birth, and avoidance of breast milk use until mother has recovered from the infection.[9,10] WHO supports skin-to-skin care, rooming-in, and breastfeeding for infants born to mothers with COVID-19.[11] The Italian Society of Neonatology, the Royal College of Paediatrics and Child Health, and the Canadian Paediatric Society support rooming-in and breastfeeding

TABLE 1 Guidance on Location of Newborn Care and Breastfeeding for Mothers With COVID-19 From Selected Organizations

	Location of Newborn Care	Breastfeeding
China[9,10]	Separation	No breast milk
WHO[11]	Rooming-in encouraged	Breastfeeding encouraged
Italy[12]	Rooming-in encouraged	Breastfeeding encouraged
Great Britain[13]	Rooming-in encouraged	Breastfeeding encouraged
Canada[14]	Rooming-in supported	Breastfeeding supported
AAP[15]	Separation preferred	Pumping preferred
CDC[16]	Shared decision-making	Shared decision-making

with appropriate infection prevention measures for these infants, unless mothers are too ill.[12–14] The American Academy of Pediatrics (AAP) suggests the separation of the mother who is COVID-19–positive and her infant when possible and use of expressed breast milk rather than breastfeeding.[15] The Centers for Disease Control and Prevention (CDC) suggest shared decision-making between the family and clinical team with regard to the location of care as well as breastfeeding.[16]

How can these disparate practice recommendations be reconciled? It seems unlikely that the differences between these recommendations are driven primarily by differences in resource availability or care environments. Rather, they are likely driven by differences in balancing the largely unknown risks and benefits of different approaches. Given that there appears to be some risk of acquiring neonatal infection after birth, it follows that the safest care for the newborn, in terms of minimizing this risk, would be separation from the infected mother. This approach may be particularly justified given the low neonatal infection rates in China, where consensus guidelines recommend mother-newborn separation. Conversely, separation limits opportunities for parent teaching, has known risks of breastfeeding disruption, and may have negative short- and long-term impacts on maternal mental health and mother-newborn bonding. Although separation would theoretically lower infection risk during hospitalization, the impact of separation on infection risk after discharge from the hospital is unknown. Rooming-in during hospitalization, by allowing for the demonstration and teaching of infection prevention practices to the family, might even lower the infection risk when the family is caring for the newborn at home; this may be particularly true for socially vulnerable families without alternatives to high-density living quarters. These uncertainties are reflected in clinical practice; practice surveys of hospitals in Massachusetts have revealed wide variation in protocols, with some centers following AAP guidance and recommending mother-newborn separation and other centers using CDC and WHO guidance to recommend shared decision-making or rooming-in.

In this issue of *Pediatrics*, Perlman et al[17] seek to inform these management questions by starting to address the paucity of data on newborn outcomes in models of care that include rooming-in. The authors share their experience with 31 newborns born to mothers with COVID-19 over a 3-week period at their center in New York City.[17] This complements obstetric-focused reports from 2 other New York centers in which brief descriptions of 18 and 29 exposed newborns are included.[18,19] Although all 3 series are modest in size, they likely are the largest published series from the United States, which is not surprising given the patterns of COVID-19 in this country.

In the Perlman report, the 31 newborns did well during their birth hospitalization. Twenty-nine were term, roomed-in with mothers, and breastfed depending on maternal choice. All had negative PCR test results for SARS-CoV-2 and were discharged from the hospital with their mothers at 1 to 2 days of life. Two were preterm, required continuous positive airway pressure, and have had uncomplicated courses in the NICU. Both had negative PCR test results at 1, 2, 7, and 14 days of life. The authors suggest their outcomes reflect the importance of several aspects of their care, including surge preparation, adequate personal protective equipment, rapid turnaround of SARS-CoV-2 test results, and their ability to minimize the risk of horizontal viral transmission through careful attention to infection prevention practices. The latter may be the most interesting; to what extent does this report address concerns for infection risk with a rooming-in approach to care?

The answer is likely some, but not much. Knowing that all term infants born to mothers with COVID-19 roomed-in with unremarkable newborn hospitalizations is clearly reassuring. Although the sample size is limited, it matches the largest reported series from China. However, much more needs to be known. What precautions were used to minimize infection risk during the postbirth hospital course? What was the approach to skin-to-skin care and direct mother-newborn contact? Were restrictions placed on family members? Were changes made to routine interventions such as hearing screens or circumcisions? What practices were in place around environmental cleaning? Most important, how did the newborns do after discharge?

This report highlights at least 3 critical and time-sensitive needs for

TABLE 2 Selected Multicenter and National Collaborations on COVID-19 and Newborns

Organization	Registry	Web Site
AAP Section on Neonatal Perinatal Medicine	NPC-19	https://services.aap.org/en/community/aap-sections/sonpm/
Vermont Oxford Network	COVID-19 Impact Audit	https://public.vtoxford.org/covid-19/
Imperial College of London	PAN-COVID	https://pan-covid.org/
European Society of Pediatric and Neonatal Intensive Care	EPICENTRE	https://espnic-online.org/COVID-19-Outbreak/EPICENTRE

EPICENTRE, European Society of Pediatric and Neonatal Intensive Care Neonatal COVID Pediatric Neonatal Registry; NPC-19, National Perinatal COVID-19 Registry; PAN-COVID, Pregnancy and Neonatal Outcomes for Women with Coronavirus Disease 2019.

research around neonatal care and outcomes related to COVID-19: (1) much larger sample sizes, reflecting diverse populations that allow for reliable measurement of outcomes; (2) detailed descriptions of care practices, particularly around infection prevention, with ability to assess the comparative effectiveness of different approaches; and (3) follow-up information on maternal and neonatal outcomes after the birth hospitalization. Clearly, single-center reports, even from New York, will not be able to address these needs. Fortunately, multicenter collaborations have already been launched that should. Several of these are summarized in Table 2.

SARS-CoV-2 has infected millions of people worldwide. Nevertheless, fundamental questions remain on how best to care for newborns born to mothers with COVID-19. Perlman et al[17] are to be applauded for driving forward this discussion and helping to identify critical questions; it will take all of us working together to answer them.

ABBREVIATIONS

AAP: American Academy of Pediatrics
CDC: Centers for Disease Control and Prevention
COVID-19: coronavirus disease 2019
PCR: polymerase chain reaction
SARS-CoV-2: severe acute respiratory syndrome coronavirus 2
WHO: World Health Organization

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