



Management of infants born to mothers with suspected or confirmed COVID-19 infection:

Considerations for Labor and Delivery and Newborn Medicine

Definitions

SARS-CoV-2: coronavirus that causes COVID-19

COVID-19: symptomatic respiratory illness caused by the SARS-CoV-2 coronavirus

PUI: person under investigation

PPE: Personal protective equipment

Current evidence supports transmission of SARS-CoV-2 by respiratory droplet and is not currently believed to be transmitted by airborne transmission. Despite this, when available, isolation rooms with negative air pressure should optimally be used for the care of patients with confirmed COVID-19. As such rooms may be limited or unavailable, they should be reserved for patients with COVID-19 who require respiratory procedures or supports (e.g., invasive suctioning, nebulizer treatments, CPAP, intubation, mechanical ventilation) that may result in mechanical aerosolization of respiratory secretions.

There is some limited evidence of possible vertical transmission of COVID-19 from mother to baby (Dong 2020, Kimberlin 2020). Out of an abundance of caution, we will treat all newborn infants born to mothers with suspected or confirmed COVID-19 infection as if they were infected until proven negative. Whenever possible, they will be isolated separately from the mother, ideally in a negative pressure room, until their test is confirmed to be negative. Infants of mothers who develop symptoms consistent with COVID after delivery will be managed differently, as described below.

Endotracheal intubation and the use of heated and humidified high flow nasal cannula (HFNC), continuous airway pressure (CPAP), or non-invasive positive pressure ventilation (NIPPV), all increase the aerosolization of respiratory viral particles and increase risk of transmission of the virus to health care workers (HCW). The highest risk to HCW in past outbreaks of coronaviruses has been in exposure to patients requiring intubation (Tran 2012). Bag mask ventilation, tracheal suctioning, and nebulizer treatments also result in aerosolization (Chan 2018) and may pose added risk to HCW.

From all available evidence, infants born to mothers with COVID-19 infection are thought to be at **low risk** to have the infection themselves. It is unlikely that they have viral particles in their respiratory secretions, and they are not thought to be at increased risk of respiratory illness. Regardless of COVID-19 status, respiratory distress is common among newborn infants. Respiratory distress syndrome, transient tachypnea of the newborn, or meconium aspiration syndrome are the usual etiologies. The standard of care for these disorders includes the use of HFNC, CPAP, NIPPV and, in some cases,

intubation and mechanical ventilation. These modalities will still be used to support infants born to mothers with COVID-19 (or who are under investigation for COVID-19) who have respiratory distress, but staff will need to take extra precautions during their care. For infants requiring procedures or treatments that could result in aerosolization of secretions, HCW will utilize airborne plus droplet precautions. These precautions should be continued pending the results of the infant's testing for COVID-19.

The following guideline is designed to provide appropriate care to newborn infants while protecting health care providers from possible infection.

Triage and Admission of OB Patients with suspected or confirmed COVID-19 infection on presentation

1. Patients will be roomed in an LDR.
2. Prenatal NICU consultation should be requested and will be done via phone/video conferencing.
 - a. NICU team will confer with OB and Mother-Baby team prior to the consult regarding options for post-natal management for baby, either rooming in with mother and following **alternative well newborn care guidelines** vs. admitting baby to the NICU
 - b. Based upon options available, NICU team will ascertain mother's wishes regarding rooming in in vs. separating and make a plan for moving forward.
 - c. NICU team will give anticipatory guidance and education to family regarding perinatal and postnatal COVID-19 and in addition to addressing other concerns.
 - d. Mother will be encouraged to pump to provide expressed breast milk for her infant
 - i. At this time, direct breastfeeding is not encouraged but could be considered on a case by case basis when following **alternative well newborn care guidelines**.
3. Patients and their significant others should be informed that if baby is admitted to the NICU:
 - a. Infant will initially be admitted to a private room in the NICU, if available
 - b. Persons with COVID-19, or who are under investigation (PUI) for COVID-19 may not visit the NICU until cleared by infection control

Labor and Delivery

1. The NICU team will don appropriate PPE for Airborne, Contact and Droplet Precautions*** when attending all deliveries (vaginal and cesarean) of women with suspected or confirmed COVID-19 infection
2. **Vaginal deliveries**
 - a. For HIGH RISK deliveries, where the infant may require resuscitation, only the neonatologist, charge nurse, and respiratory therapist (RT) will enter the DR
 - i. The resident and admitting nurse (when available) will remain outside of the DR, ready to assist if needed.
 - b. For LOW RISK deliveries, where assistance is not expected, the entire NICU team will remain outside the room, ready to don PPE, if needed.
 - i. The baby nurse will take care of baby in the DR and will call in the NICU team if needed

3. Cesarean sections

- a. A second neonatologist should be called in to attend C/S deliveries of a COVID-19 positive mothers IF maternal general endotracheal anesthesia (GETA) is anticipated OR delivery will occur in main OR.
 - b. Only the neonatologist, charge nurse, and respiratory therapist (RT) will enter the resuscitation room and/or OR
 - i. The resident and admitting nurse (when available) will remain outside the room, ready to don PPE and assist if needed.
 - c. If the C/S occurs in a room without negative pressure with regional anesthesia
 - i. Newborn will be transferred to resuscitation room in basinet
 - ii. NICU team can leave resuscitation room at will, doffing PPE per BMC policy
 - d. If the delivery occurs in a room without negative pressure with GETA, the goal is to not open the OR doors for 30 minutes after the intubation to limit COVID-19 spread.
 - i. Newborn will be transferred to resuscitation room in basinet
 - ii. NICU team should remain in the resuscitation room for 30 minutes, if possible
4. Viral filters should be used in all respiratory support devices
 5. Baby will be transported to the NICU in a transport isolette
 - a. Staff will doff personal protective equipment, per BMC policy during transport, but may keep mask and shield in place
 - b. If ongoing contact with the infant is required (such as while holding bag-mask CPAP in place), staff will don appropriate PPE to do so and utilize the port holes fitted with sleeves.

Clinical Scenarios (Also see

1. Mother is COVID-19 Positive at the time of delivery

- a. Baby will be admitted to the NICU and will be placed on Airborne, Contact and Droplet Precautions***
- b. Baby will undergo Full Testing (per Table 1)
- c. Subsequent care depends on the results of baby's testing
 - i. Baby's OP/NP PCR is negative x 2
 1. Airborne, Contact and Droplet Precautions*** can be discontinued IF cleared by infection control
 2. Contact precautions should continue* until baby is discharged home
 - ii. Baby's OP/NP PCR is positive
 1. Baby may be reunited with mother, if possible
 2. Baby must remain on Airborne, Contact and Droplet Precautions***
 3. Further evaluation and management to be done in collaboration with pediatric ID service

2. Mother is a PUI for COVID-19 at the time of delivery

- a. Baby will be admitted to the NICU and will be placed on Airborne, Contact and Droplet Precautions***
- b. Baby will undergo testing as follows:
 - i. If mother's OP/NP PCR is Negative AND she is cleared by infection control before baby is 24 hours old, baby will undergo NO TESTING and will be reunited with the mother
 - ii. If mother's OP/NP PCR is still Pending when the baby is 24 hours of age, baby will undergo LIMITED testing (Table 1)
 - 1. If the mother's testing is subsequently negative, but the baby's testing is still pending at that time, mother and baby can be reunited, but baby should remain on Airborne, Contact and Droplet Precautions*** until cleared by infection control
 - 2. If the mother's testing is subsequently negative and the baby's testing is also negative, mother and baby may be reunited and may be changed to "Universal Precautions" IF both are cleared by infection control
 - 3. If the mother's testing is subsequently negative and the baby's testing is positive, mother and baby may be reunited but mother and baby must remain on Airborne, Contact and Droplet Precautions.*** Baby will undergo FULL diagnostic testing (Table 1) at that time.
 - 4. If mother's testing is subsequently positive, baby will be managed as if mother was COVID-19 positive at delivery (see Scenario 1), including FULL diagnostic testing and continued Airborne, Contact and Droplet Precautions.***
 - iii. If mother's OP/NP PCR is Positive when the baby is 24 hours of age, baby will undergo FULL Diagnostic Testing (Table 1) & be managed per Scenario 1
- c. For infants born to PUI mothers who test positive for COVID-19, subsequent care depends on the results of baby's testing
 - i. Baby's OP/NP PCR is negative x 2
 - 1. Airborne, Contact and Droplet Precautions*** can be discontinued IF cleared by infection control
 - 2. Contact precautions* should continue until baby is discharged home
 - ii. Baby's OP/NP PCR is positive
 - 1. Baby may be reunited with mother, if possible
 - 2. Baby must remain on Airborne, Contact and Droplet Precautions***
 - 3. Further evaluation and management to be done in collaboration with pediatric ID service

3. Mother becomes a PUI After the delivery

- a. If baby was already exposed to mother, baby will be managed according to **alternative well newborn care** OR be admitted to the NICU depending on an

assessment of staffing, resources and parent preference and will be placed on Airborne, Contact and Droplet Precautions***

- b. Baby will undergo testing as follows:
 - i. If mother's OP/NP PCR is Negative AND she is cleared by infection control before baby is 24 hours old, baby will undergo NO TESTING and will remain with or be re-united with the mother
 - ii. If mother's OP/NP PCR is still Pending when the baby is 24 hours of age, baby will undergo LIMITED testing (Table 1)
 - 1. If the mother's testing is subsequently negative, but the baby's testing is still pending at that time, mother and baby can remain together or be reunited, but baby should remain on Airborne, Contact and Droplet Precautions*** until cleared by infection control
 - 2. If the mother's testing is subsequently negative and the baby's testing is also negative, mother and baby may remain together or be reunited and may be changed to "Universal Precautions" IF both are cleared by infection control
 - 3. If the mother's testing is subsequently negative and the baby's testing is positive, mother and baby may remain together or be reunited but mother and baby must remain on Airborne, Contact and Droplet Precautions.*** Baby will undergo FULL diagnostic testing (Table 1) at that time.
 - 4. If mother's testing is subsequently positive, baby will be managed as if mother was COVID-19 positive at delivery (see Scenario 1), including FULL diagnostic testing and continued Airborne, Contact and Droplet Precautions.*** If baby rooming with the mother, precautions outlined in **alternative well newborn care¶** will be continued.
 - iii. If mother's OP/NP PCR is Positive when the baby is 24 hours of age, baby will undergo FULL Diagnostic Testing (Table 1) at that time & be managed per Scenario 1. If baby rooming with the mother, precautions outlined in **alternative well newborn care¶** will be continued.
- c. For infants born to PUI mothers who test positive for COVID-19, subsequent care depends on the results of baby's testing
 - i. Baby's OP/NP PCR is negative x 2
 - 1. Airborne, Contact and Droplet Precautions*** can be discontinued IF cleared by infection control
 - 2. Contact precautions* should continue until baby is discharged home
 - ii. Baby's OP/NP PCR is positive
 - 1. Baby may remain with or be reunited with mother, if possible
 - 2. Baby must remain on Airborne, Contact and Droplet Precautions***

3. Further evaluation and management to be done in collaboration with pediatric ID service
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- d. If the baby had not been exposed to mother at the time she became a PUI, he/she should be managed as if the mother was PUI at the time of delivery
- e. **Any questions or concerns** regarding newborn placement on Mother-Baby should be directed to Dr. Susan Minear (Nursery Medical Director) and/or Ginny Coombs (Nurse Manager of Mother-Baby).

Table 1 Testing of Newborn Infants

	Limited Testing	Full Testing
24 hours of age	A single OP/NP swab (OP first, then NP) for SARS-CoV-2 PCR	A single OP/NP swab (OP first, then NP) for SARS-CoV-2 PCR Further testing per request of ID
48 hours of age (if remains hospitalized)		A single OP/NP swab (OP first, then NP) for SARS-CoV-2 PCR Further testing per request of ID

NICU Management

1. Patient should be admitted to a private room, preferably room 2 (negative pressure).
 - a. Infant should be placed in an isolette to reduce staff exposure
 - b. A filter should be used in the isolette (to be removed and discarded when Giraffe is cleaned)
 - c. If all private rooms are occupied in the NICU, alternate arrangements will be made on a case-by-case basis. Options could include:
 - i. Admission to the NICU in a quad room with the infant placed in an isolette
 - ii. Co-rooming with mother (for otherwise well newborns) according to **alternative well newborn care** guidelines
 - d. Mother may request to co-room with her newborn on a case-by-case basis and be managed according to **alternative well newborn care** guidelines
 - i. Co-rooming with mother on MB must first be approved by MB staff
2. All staff with don and doff appropriate PPE when entering room
 - a. Staff must don PPE for Airborne, Contact and Droplet Precautions* for infants requiring intubation, suctioning, to obtain nasopharyngeal culture, and for infants on non-invasive and invasive ventilation
3. **Newborn will be bathed as soon as possible**, based upon assessment of care team
4. Pediatric ID should be consulted at the time of admission, or when admission is imminent
5. Newborn infants can be fed (orally or by gavage) with mother’s expressed breast milk, regardless of her COVID-19 status

- a. See separate nursing policy on handling of EBM from mothers with suspected or confirmed COVID-19 infection
6. Infants with respiratory distress should be managed according to existing respiratory management guidelines, with the following precautions
 - a. Viral filters should be used, whenever possible
 - b. In-line suction catheters should be used for all suctioning after intubation

Visitation

1. BMC Pediatric Infectious Disease Physicians and Infection Control Clinicians prefer no visitors to the infant in the NICU, except the mother if she is able and cleared to visit
2. If the mother was PCR + for COVID-19, but the newborn is uninfected and requires prolonged hospital care in the NICU for any reason, the mother will not be allowed to visit the infant until she meets the CDC recommendations for suspending precautions:
 - a. Resolution of fever, without use of antipyretic medication for at least 3 days **AND**
 - b. Be at least 7 days from onset of symptoms **AND**
 - c. Negative results of molecular assay for COVID-19 from at least two consecutive nasopharyngeal swabs specimens collected ≥ 24 hours apart (total of two negative specimens). Outpatient testing for mothers is available at BMC ILI Clinic.
 - d. Mother must be cleared by BMC Infection Control prior to visiting baby in NICU.

Discharge

1. Well newborns should be discharged from the with the following specific considerations
 - a. Infants determined to be infected by molecular testing (or whose status cannot be determined due to lack of testing), but with no symptoms of COVID-19, may be discharged home on a case-by-case basis with appropriate precautions and plans for frequent outpatient follow-up contacts (either by phone, telemedicine, or in-office) through 14 days after birth.
 - i. Specific guidance regarding use of standard procedural masks, gloves and hand hygiene should be provided to all caretakers.
 1. See <https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-prevent-spread.html>
 - ii. Uninfected individuals >60 years of age and those with comorbid conditions should not provide care if possible.
 - b. Infants with negative SARS-CoV-2 molecular testing should optimally be discharged to the care of a designated healthy (non-infected) caregiver.
 - i. If the mother is in the same household, she should maintain a distance of at least 6 feet for as much of the time as possible, and when in closer proximity to the neonate should use a mask and hand hygiene for home newborn care until
 1. **EITHER:**
 - a. She has been afebrile for 72 hours without use of antipyretics, and
 - b. At least 7 days have passed since symptoms first appeared.

2. **OR** she has negative results of a molecular assay for detection of SARS-CoV-2 from at least two consecutive nasopharyngeal swab specimens collected ≥ 24 hours apart.
 - ii. Other caregivers in the home who remain under observation for development of COVID19 should use standard procedural masks and hand hygiene when within 6 feet of the newborn until their status is resolved.
2. Well newborns should receive all indicated care, including circumcision if requested
3. Discharge planning must be closely coordinated with the pediatrician to plan for subsequent management
 - a. A newborn who has a documented SARS-CoV-2 infection (or who remains at risk for postnatal acquisition of COVID-19 due to inability to test the infant) requires frequent outpatient follow-up via telephone, telemedicine, or in-person assessments through 14 days after discharge
 - i. Verbal “warm” hand-off should be given to outpatient provider prior to discharge
 - b. The need for any outpatient ID follow-up should be discussed with ID service prior to discharge

*** Contact Precautions:** gown and gloves

**** Droplet and Contact Precautions:** gown, gloves, standard procedural mask and eye protection (either face shield or goggles).

***** Airborne, Contact and Droplet Precautions:** gown, gloves, N95 respiratory mask with eye protection, or air-purifying respirator (powered air-purifying respirator (PAPR) or controlled air-purifying respirator (CAPR), both of which provide eye protection)

¶ Alternative well newborn care: (Per AAP Guidance): “If the mother chooses to room-in with her infant rather than be separated; or if the center does not have the capability of caring for the infant in a separate area, the infant should remain at least 6 feet from mother at all times, with expressed breast milk feeding. Placing the infant in an air temperature-controlled isolette rather than in a bassinet, or using a physical barrier such as a curtain between the mother and infant, may afford greater infant protection. If the mother also requests skin-to-skin contact with her infant, including direct breastfeeding, she should comply with strict preventive precautions, including the use of mask and meticulous breast and hand hygiene. Institutions could consider formal documentation of maternal decisions regarding the recommendations for separation.” Newborn will be bathed as soon as possible and pediatric ID and infection control should be consulted. Testing of baby (viral swabs and phlebotomy) may be done by NICU staff (when available), nursery NP, and/or nursery physicians.

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