### Neonatal Management Pathway-Highlight of changes overtime

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| April 9, 2020                          | Continue N95 for neonatal resuscitation of baby from Positive Covid Mother or mother with ILI till further evidence collected. | There is a lack of evidence to indicate the need for N95 in the immediate newborn resuscitation period. This in conjunction with logistics of quickly changing PPE for location changes, supports a “risk stratification” approach to NRP and the use of N95 masks. Example:  
  - Low risk delivery- in which there is a low risk of baby requiring intubation- attended by NICU/Baby RN as well as LDR nurse, the RT stays outside room unless needed and N95 readily available if needed  
  - Moderate risk delivery- moderate risk of baby needing intubation- NICU/Baby nurse with N95, Physician and RT outside of room, N95 readily available  
  - High risk delivery- NRP team wears N95 |
| April 9, 2020 V.11                     | Specify timing for specimen collection for COVID-19 testing in neonates born to suspect/confirmed COVID mothers | All neonates born to suspect/confirmed COVID-19 mothers get first nasopharyngeal swab collected within 24 hours after birth as close to before discharge as possible (trying to detect virus from baby instead of surface contamination during birth)  
  If the first swab is positive, attempt will be made to collect a second swab to differentiate between surface contamination versus persistent viral shedding from infection of the neonate  
  If the first swab is negative:  
  - Neonates that have been discharged home will only be tested if symptoms suspicious for COVID-19 infection develop  
  - Neonates who requires hospital admission since birth will be tested again on day 5 to rule out perinatal infection to assess need for contact and droplet precaution |
| April 9, 2020                          | Transport neonate to destination following local protocols | The baby is not considered infectious at this time and there are no special requirements for an isolette to transport between the LDR/OR and the postpartum/newborn area or NICU. |
| April 9, 2020                          | Addition of an appendix of rationale behind recommendations | |


Delivery Room Neonatal Management for 2019 Novel Coronavirus Infection (COVID-19)

**Pregnant women with Confirmed or Suspected COVID-19**

Case review among care providers (primary provider, midwives, obstetrics, neonatology) to decide on site of delivery and attendance as per existing site guideline. Neonatal resuscitation team to attend delivery as per site-specific policy.

**Neonate born to Mother with Confirmed or Suspected COVID-19**

- CONTACT & DROPLET PRECAUTIONS if no resuscitation/AGMP is required (procedure mask with visor or procedure mask with face shield/goggles, gown and gloves)
- CONTACT & DROPLET PRECAUTIONS with N95 mask if resuscitation/AGMP* required. (Resuscitation team to wear N95 mask, face shield/goggles, gown and gloves)
- Contact site IPC about delivery

If required, resuscitation in room where mother is in labour: Delivery Room or Operating Room

Resuscitation as per Neonatal Resuscitation Program (NRP)

Transport neonate to destination following local protocols.

Ongoing care see next pages

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**Key Messages**

- As of date, there is no evidence of transplacental/intrauterine infection of fetus among pregnant women infected with COVID-19
- Only one support person who is not positive for COVID-19, not under self-isolation, and not symptomatic is allowed in room.
- If resuscitation team is required for the neonate(s), only essential personnel should be attending the resuscitation and no learner should participate
- Call site IPC if there are any questions.

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**Aerosol-Generating Medical Procedures (AGMP)**

Intubation or extubation
Cardiopulmonary Resuscitation
Respiratory supportive therapies including High Flow nasal cannula, CPAP, BiPAP, Non-Invasive Mechanical Ventilation (NIMV), High Frequency Oscillatory Ventilation (HFOV) and High frequency Jet Ventilation (HFJV), nebulized therapy and open airway suctioning.
NP swab or aspirate is NOT an AGMP

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*Do not use designated resuscitation rooms
- Delay skin-to-skin contact for neonate until mother is able to do hand hygiene, don mask, has abdomen/chest wash and baby has been assessed and deemed stable
- Always have mother perform hand hygiene and wear a procedure mask before holding baby until mother is known to be negative for COVID-19 and other infectious causes for her symptoms
Neonatal Management for 2019 Novel Coronavirus Infection (COVID-19)

ASYMPTOMATIC NEONATE & MOTHER ABLE TO CARE FOR NEONATE

Neonate born to Mother with Confirmed or Suspected COVID-19 due to symptoms who is able to look after neonate
- CONTACT & DROPLET PRECAUTIONS if no resuscitation/AGMP is required (procedure mask with visor or procedure mask with face shield/goggles, gown and gloves)
- CONTACT & DROPLET PRECAUTIONS with N95 mask if resuscitation/AGMP* required. (Resuscitation team to wear N95 mask, face shield/goggles, gown and gloves)
- Contact site IPC about delivery

If infant becomes SYMPTOMATIC See page 3

If mother’s condition changes and unable to look after neonate See page 3

Neonate ASYMPTOMATIC will room-in with Mother who can look after neonate
- Confirm NP swab collected from mother is only suspect COVID
- Collect NP swab from neonate within first 24 hours after birth and as close to before discharge as possible (trying to detect virus from baby instead of surface contamination during birth)

- Admit neonate to single patient room with mother at appropriate unit for the site, e.g., post-partum or NICU
- CONTACT & DROPLET PRECAUTIONS
- Monitor neonate for symptoms - Vital Signs every 4 hours
- Support breastfeeding following mother’s hand and breast hygiene
- Mother to wear a procedure mask during breast feeding
- Aim for 2 meter separation when mother not providing direct care for baby
- Plan for early discharge of mother and baby if well and provide instructions for follow-up if there is clinical change in mother or baby

If still in hospital:
- Maintain contact & Droplet Precautions
- Mother/Family if positive for COVID-19 cannot visit NICU till infection has cleared
- Plan for early discharge of mother and baby if well and instructions for follow-up if there is clinical change in mother or baby
- Can breastfeed as long as mother does hand hygiene and wears a procedure mask during breast feeding
- Aim for 2 meter separation when not providing direct care for baby
- Contact Public Health before discharge

If discharged prior to test results:
- MRHP/MOH to communicate results to family and assess current conditions and confirm follow up instructions. Public Health to check Netcare results prior to home visit.

¥ Additional emotional support for family of neonate tested positive for COVID-19. Healthcare providers handle breast milk as per routine, i.e., body fluids.
Neonatal Management for 2019 Novel Coronavirus Infection (COVID-19)

ASYMPTOMATIC NEONATE & MOTHER CANNOT LOOK AFTER NEONATE

Neonate born to Mother with Confirmed or Suspected COVID-19 due to symptoms and cannot look after Neonate

- CONTACT & DROPLET PRECAUTIONS if no resuscitation/AGMP is required (procedure mask with visor or procedure mask with face shield/goggles, gown and gloves)
- CONTACT & DROPLET PRECAUTIONS with N95 mask if resuscitation/AGMP* required. (Resuscitation team to wear N95 mask, face shield/goggles, gown and gloves)
- Contact site IPC about delivery

Infant ASYMPTOMATIC and Mother cannot look after neonate

- Confirm NP swab collected from mother is only suspect COVID
- Collect NP swab from neonate within first 24 hours after birth and as close to before discharge as possible (trying to detect virus from baby instead of surface contamination during birth)

Separate baby from mother after delivery
- Maintain CONTACT & DROPLET PRECAUTIONS for both mother and neonate while in hospital
- Monitoring neonate for symptoms - Vital Signs every 4 hours
- Plan for early discharge of baby if separated from mother and baby remains well with instructions for follow-up if there is clinical change in baby

Mother COVID-19 negative
Neonate COVID-19 test expected to be negative

- Maintain Contact & Droplet precautions till other infectious causes of mother’s symptom has been ruled out for both mother and baby while one or both are still in hospitals
- Contact IPC for plan
- Routine Newborn care & Discharge planning

If baby discharged prior to test results:
- Communicate results to family

Mother COVID-19 positive

- Maintain Contact & Droplet Precautions for both mother and baby
- Plan for early discharge of mother and baby if well and instructions for follow up if there is clinical change in mother or baby.
- Can breastfeed as long as mother does hand and breast hygiene and wears a procedure mask during feeding
- If baby admitted to NICU for any reason, mother/family if positive for COVID-19 cannot visit until infection is cleared.
- Contact Public Health before discharge

If discharged prior to test results:
- Communicate results to family and assess current conditions and confirm follow up instructions
- If mother improves and can look after baby: can breastfeed as long as mother does hand & breast hygiene and wears a procedure mask during breast feeding
- Aim for 2 meter separation when not providing direct care for baby if in same room

Neonate COVID-19 negative

- Follow-up for neonate as arranged in community if discharged
- If the first NP swab within 24 hours is positive, collect a second specimen and repeat COVID-19 test

¥ Additional emotional support for family of neonate tested positive for COVID-19. Healthcare providers handle breast milk as per routine, i.e., body fluids.
SYMPTOMATIC NEONATE

Neonate

Born to Mother with Confirmed or Suspected COVID-19

OR

Exposed to Close Contact with confirmed COVID-19 while in nursery/NICU

- CONTACT & DROPLET PRECAUTIONS if no resuscitation/AGMP is required (procedure mask with visor or procedure mask with face shield/goggles, gown and gloves)
- CONTACT & DROPLET PRECAUTIONS with N95 mask if resuscitation/AGMP* required. (Resuscitation team to wear N95 mask, face shield/goggles, gown and gloves)
- PLEASE NOTE that upon admission, neonate to remain on CONTACT & DROPLET PRECAUTIONS and use N95 mask for AGMP as neonate might have been exposed to COVID-19 during delivery and to remain on precaution till consultation with site IPC

Neonate requiring NICU admission for any clinical reason

- Admit to single patient room in NICU
- Mother/Family if positive for COVID-19 cannot visit NICU till infection has cleared
- Managed in Incubator Isolette
- CONTACT & DROPLET PRECAUTIONS (with N95 mask if AGMP)
- Supportive Care as needed
- Investigations:
  - Collect NP swab (and endotracheal tube aspirate if intubated) at ~24 hours after birth for both Respiratory pathogen panel (RPP) & COVID-19 PCR
  - All other investigations as per NICU team

Mother COVID-19 negative

- Expect neonate COVID-19 negative

- Contact IPC
- Reassess Contact & Droplet Precautions based on underlying disease for mother and baby, i.e., other other infectious respiratory causes
- Routine Newborn care

Mother COVID-19 positive

- Neonate first specimen(s) COVID-19 negative

- Contact IPC
- Maintain Contact & Droplet Precautions (with N95 mask if AGMP)
- If neonate is still in hospital by day 5, repeat NP swab (and endotracheal tube aspirate if intubated) for COVID-19 and contact IPC regarding results to determine precaution status
- Can be discharged home as per routine if well
- Contact Public Health before discharge

Neonate COVID-19 positive ‡ in more than 1 specimens

- Contact IPC
- Contact & Droplet Precautions (with N95 mask if AGMP) while in hospital till mother’s and baby’s infection has cleared
- Can be discharged home as per routine if well
- Contact Public Health before discharge

Neonate COVID-19 positive ‡ only in first NP swab

- Repeat test
- NEG X2
- POS

‡ Additional emotional support for family of neonate tested positive for COVID-19. Healthcare providers handle breast milk as per routine, i.e., body fluids.
Feeding neonates born to Mother with Confirmed or Suspected COVID-19 Infection

- Breast milk is the BEST source of nutrition for most neonates. However, there are many unknowns about COVID-19. Therefore, families should participate in the decision to use breastmilk for infant feeding with the support of the healthcare providers.
- During temporary separation, mothers who intend to breastfeed should be encouraged to express their breast milk to establish and maintain milk supply.
- If possible, a dedicated breast pump should be provided. Prior to expressing breast milk, mothers should practice hand hygiene. After each pumping session, ALL breast pump parts should be thoroughly washed and the entire pump should be appropriately disinfected per the manufacturer’s instructions.

Well Near-Term or Term Neonates ROOMING WITH their mothers

The feeding options are:

1. **Breastfeeding**
   - A symptomatic mother with confirmed or suspected infection should take all possible precautions to avoid spreading the virus to her infant, including washing her hands before touching the infant AND wearing a face mask while feeding at the breast
   - If a mother and newborn room-in and the mother wishes to feed at the breast, she should put on a facemask and practice hand and breast hygiene before each feeding.

2. **Feeding expressed breastmilk by bottle**
   - If expressing breast milk with a manual or electric breast pump, the mother should wash her hands before touching any pump or bottle parts and follow recommendations for proper pump cleaning after each use.
   - If possible, consider having someone who is well feed the expressed breast milk to the infant.

3. **Feeding infant formula by bottle**
   - For mothers to unwell to breastfeed or to express breastmilk with a breast pump and for mothers who have chosen formula to feed their infant.

Preterm Neonates, Ill or well near-term or term neonates SEPARATED FROM their mothers

The feeding options are:

1. **Feeding expressed breastmilk by bottle**
   - For near-term and term neonates where the mother is well enough to express breast milk with a manual or electric breast pump, the mother should wash her hands before touching any pump or bottle parts and follow recommendations for proper pump cleaning after each use.
   - If possible, consider having someone who is well feed the expressed breast milk to the infant.

2. **Feeding donor breastmilk**
   For neonates who qualify for donor breastmilk as per current NICU feeding guidelines.

3. **Feeding infant formula**
   For mothers too unwell to breastfeed or to express breastmilk with a breast pump and for mothers who have chosen formula to feed their infant.
APPENDIX

Synthesis of Literature as of April 4, 2020

- The risk of intrauterine/transplacental infection from COVID-19 is extremely low based on reported cases in scientific literature as of date. Even though COVID-19 is novel, genetically it is very close to SAR-CoV and is related to other common human coronavirus; there is no reported cases of intrauterine/transplacental infection from SARS-CoV 2003 and related coronavirus in general.
- There are few case reports of viremia in COVID-19 patients but persistent viremia has not been demonstrated. Respiratory viruses have not been identified as a blood-borne pathogen; viremia detected in molecular tests can represent naked RNA in blood stream instead of infectious virions.
- There are case reports of infectious virus in stool samples of some COVID-19 cases thus there is potential risk of exposure for the neonate during vaginal delivery or C/S with rupture membranes. Theoretically C/S with ruptured members is different from C/S with no ruptured membrane but an issue is identifying the duration of rupture membrane that contribute to increased risk.
- Incubation of COVID-19 is day 2 to 14 after exposure, so a positive NP swab if collected within first 24 hours that is confirmed by repeat positive tests demonstrating ongoing viral shedding (expect long duration of shedding) will represent intrauterine/transplacental infection. Ideally the first swab should be delayed as much as possible within the first 24 hours to avoid picking up surface contamination and follow-up tests.
- So far most of the 30+ babies born to COVID-19 positive mothers (except for 4 babies in published studies with positive but hard to interpret PCR tests and those reported on public media) were not infected so risk of infection from perinatal exposure is probably low as well. For neonates whom have been discharged home, they would be on self-isolation for 14 days from the day of last exposure, depending on the illness status in household members, as per public health guidelines. Those babies if readmitted would be isolated for 14 days from last exposure date. For babies admitted directly from birth to NICU and essentially separated from household cases of infectious COVID-19, current plan is to keep them on additional precaution during NICU stay as required for clinical reasons and a COVID-19 test can be repeated on day 5 (based on average incubation of ~5.2 days) as a second test to rule out perinatal infection so that need for additional precaution can be reviewed by site IPC if day-5 test is negative, to optimize resource utilization and feasibility in NICUs in the province.

Guidelines Reviewed:
- UK https://www.rcog.org.uk/coronavirus-pregnancy/
- UK https://www.rcpch.ac.uk/resources/covid-19-guidance-paediatric-services

References


