



CARE OF NEWBORNS OF SUSPECTED/CONFIRMED COVID19 MOTHERS

PREGNANT COVID 19 POSITIVE

IMMINENT DELIVERY

**STABLE MOTHERS
(Not in respiratory distress)**

**UNSTABLE MOTHERS
(In respiratory distress)**

**Stable Term/
Late Preterm**

- HCP wears double gloves/PPE
- Do early cord clamping
- Hook to pulse oximeter
- Test for COVID19
- Admit initially in Isolation Room, preferably with negative pressure
- May give expressed mother's own milk (MOM) or pasteurized, if available
- If positive, room-in with mother and breastfeed with respiratory and hand hygiene.
- If negative, baby stays in Isolation Room and given MOM or pasteurized breastmilk
- After 24hrs do NBS
- Have hearing screen if available
- Discharge baby early with Mom with instructions to continue breastfeeding applying necessary precautions
- If Mom still needs treatment, discharge baby early with caregiver designated by mother
- Schedule follow-up within 48-72 hours initially by phone

Unstable Term/Preterm

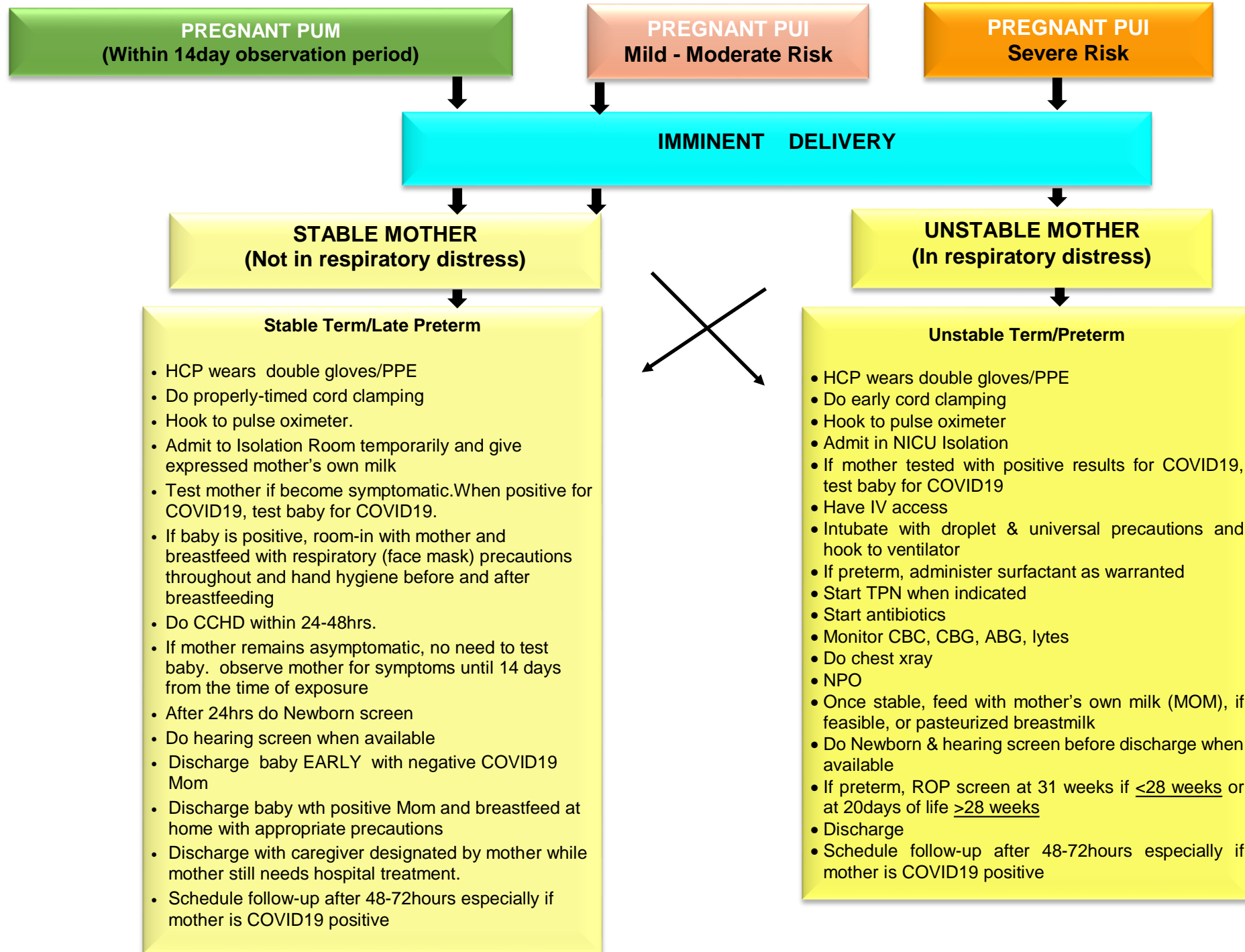
- HCP wears double gloves/PPE
- Do early cord clamping
- Hook to pulse oximeter
- Test for COVID19
- Admit in NICU Isolation
- Have IV access
- Intubate with droplet & universal precaution and hook to ventilator
- Administer surfactant as warranted in preterm
- Start TPN when indicated
- Start antibiotics
- Monitor CBC, CBG, ABG, lytes,
- Do chest xray
- NPO
- Once stable, feed with mother's own milk (MOM), or pasteurized breastmilk
- If positive COVID19, room-in with mother and breastfeed with precautions
- Once feeding, do NBS
- Have hearing screen when available
- In preterm, schedule ROP screen at 31 weeks if <28 weeks or at 20 days of life if >28 weeks
- Discharge when improved.
- Schedule follow-up within 48-72 hours initially by phone

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Abbreviations	MOM - mother's own milk
PUM - person under monitoring	NPS - nasopharyngeal swab
PUI - person under investigation	CBC - complete blood count
PPE - personal protective equipment	CBG - capillary blood glucose
IV – intravenous	ABG - arterial blood gas
AOG - age of gestation	TPN - total parenteral nutrition
CCHD - critical cyanotic heart disease screen.	NBS - newborn screen
NPO - nothing per orem	ROP - retinopathy of prematurity

Operational Definitions

COVID-19 (Coronavirus Disease-2019) - the SARS-CoV-2 disease identified at the end of 2019 in the Wuhan Region, China.

PUM - person exposed to confirmed case of COVID 19 but is asymptomatic

PUI - person with history of either foreign travel or exposure to a confirmed case of COVID 19 who has any of the following symptoms: fever, cough, sore throat or abdominal symptoms

Severe risk - pregnant mother with any of the following like fever, cough, colds, diarrhea PLUS either of the following such as: breathing difficulty, hemoptysis, chest pain, intolerance to liquid intake, less responsiveness, or signs of dehydration.

Moderate risk - pregnant woman with co-morbidities like hypotension, diabetes, obstetric issues like preterm labor and inability to care for herself nor arrange follow-up

Low risk - pregnant woman with any of the following symptoms: fever, cough , colds and abdominal symptoms

Suspect Case - person any of the following:

1. person with acute respiratory illness (fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness of breath), AND with no other etiology that fully explains the clinical presentation AND a history of travel to or residence in a country/area or territory reporting local transmission of COVID-19 disease during the 14 days prior to symptom onset

2. person with any acute respiratory illness AND having been in contact with a confirmed or probable COVID- 19 case in the last 14 days prior to onset of symptoms

3. person with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease like cough, shortness breath) AND requiring hospitalization AND with no other etiology that fully explains the clinical presentation.

Probable case - suspect case for whom testing for COVID-19 is inconclusive.

Confirmed case - person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Vertical transmission - transmission of a pathogen from a mother to her fetus or newborn before, during, or immediately after delivery

Suspected 2019 nCoV infection – those newborns born to the mothers with a history of 2019-nCoV infection between 14 days before delivery and 28 days after delivery, or the newborns directly exposed to those infected with 2019-nCoV (including family members, caregivers, medical staff, and visitors). Suspected infants are under consideration regardless of whether they present symptoms.

Confirmed 2019-nCoV infection - newborns with diagnosis confirmed with 2019-nCoV infection if one of the following etiological criteria is met:

1. Respiratory tract or blood specimens tested by real-time fluorescence polymerase chain reaction (RT-PCR) are positive for 2019-nCoV nucleic acid;
2. Virus gene sequencing of the respiratory tract or blood specimens is highly homologous to that of the known 2019nCoV specimens.

Transmission

Human-to-human transmission by close contact with a person with confirmed COVID-19 has been reported and is thought to occur mainly via respiratory droplets. Droplets can land in the mouths, noses, or eyes of people who are nearby or possibly be inhaled into the lungs of those within close proximity. One infected person can spread infection to four people. In crowded conditions, this can be much higher.

Since coronavirus can survive in air for 8 hours, it is now considered ‘airborne,’ that is, suspended in the air depending on factors such as heat and humidity. Airborne transmission can occur, especially with aerosol-generating procedures such as intubation, airway suctioning, nebulization, nasogastric tube insertion, high flow nasal cannula and non-invasive positive pressure ventilation (CPAP).

Viruses survive on surfaces for hours or days (as in plastic and glass) so that contact precautions are essential.

Viral shedding may continue to occur after patient has recovered from clinical illness. Some would do anal swab prior to discharge of the COVID19 positive newborn.

'Stealth transmissions' occur when the virus is spread by a person who is undetected, that is, one with mild, limited, or no symptoms, according to Jeffrey Shaman, a professor of environmental health sciences at Columbia University Mailman School of Public Health. According to the Washington Post, for every confirmed case of COVID-19, there were six undetected cases.

Local transmission indicates locations where the source of infection is within the reporting location. Imported cases only indicate locations where all cases have been acquired outside the location of reporting.

Community transmission is evidenced by the inability to relate confirmed cases through chains of transmission for a large number of cases, or by increasing positive tests through sentinel samples (routine systematic testing of respiratory samples from established laboratories).

The impact on perinatal transmission depends more on the severity of the maternal infection and on concomitant obstetric pathologies than on the SARS-CoV-2 infection itself. A possible neonatal SARS-CoV-2 infection might be the result of a transmission acquired from the mother via the respiratory route in the postpartum period rather than transplacentally. While previous Wuhan studies of Chen and Zhu ruled out vertical transmission, the most recent cohort study of Zeng refuted their claim with the early-onset SARS-CoV-2 disease.

Breast milk is not considered to be a transmission vehicle, based on current literature on COVID19. However, the current SARS-CoV-2 pandemic requires the promotion of breastfeeding with a proper health and hygiene approach, limiting the contagion by air and by contact with the respiratory secretions of infected patients (including mothers wearing face mask at all times and hand washing before and after feeding)

Risk of Pregnant Women

In as much as pregnant women are at greater risk of severe morbidity and mortality from respiratory infections like influenza and SARS-CoV, they should be considered an **at-risk** population for COVID-19, also named SARS-CoV2. (ACOG 2020)

Outcomes of Infants of COVID 19 Mothers

Adverse infant outcomes have been reported among infants born to mothers positive for COVID-19 during pregnancy. (ACOG2020).

Wang with the Chinese Perinatal-Neonatal 2019-nCoV Committee made a review of COVID 19. He described the clinical features of the newborns of COVID 19 mothers. They may be asymptomatic, mild, or severe. The incubation period is generally 3–7 days, with the shortest being 1 days, and the longest being 14 days (7,9,10).

The clinical findings, especially of premature infants, were not specific. There was need to closely monitor vital signs, respiratory symptoms and gastrointestinal symptoms, such as:

1. Temperature instability: [fever](#), hypothermia or normal temperature.
2. Respiratory and cardiovascular symptoms: [tachypnea](#), grunting, nasal flaring, work of breathing (WOB), apnea, cough, or [tachycardia](#).
3. Others: include poor feeding, lethargy, [vomiting](#), [diarrhea](#), and [abdominal distension](#).

Laboratory examinations were also non-specific. CBC, early on, may show leucopenia or lymphopenia but may be normal and [thrombocytopenia](#). Other findings include thrombocytopenia, and elevated levels of creatine kinase, [alkaline phosphatase](#), [alanine aminotransferase](#), aspartate aminotransferase, and lactate dehydrogenase. 2019-nCoV can be detected in the upper respiratory tract (URT; nasopharyngeal and oropharyngeal), the lower respiratory tract (LRT; endotracheal aspirate, or bronchoalveolar lavage), the blood and the stool. Chest radiographs/ultrasound may show pneumonia while abdominal films demonstrate intestinal ileus.(Wang 2020)

Zhu recently reported adverse effects on newborns such as fetal distress, premature labor, respiratory distress, thrombocytopenia, and even death although no causal relationship has been clarified. Clinically, other signs in the newborns like shortness of breath (n=6), but other initial symptoms such as dyspnea (n=6), [fever](#) (n=2), vomiting (n=4), abnormal liver function (n=2), [tachycardia](#) (n=1), [vomiting](#) (n=1), pneumothorax (n=1) and death (n=1) were observed. Only five newborns were discharged improved.

The case series of H Chen et al of Wuhan showed that the fetus was unlikely exposed during pregnancy. His study included nine newborns delivered by C-section who were negative for COVID19 by RT-PCR of the cord blood, throat swab and amniotic fluid. (HChen 2020). With no fetal infection, there was no predisposition to congenital defects (RCOG 2020).

Another case series, also in Wuhan, also showed no documented intrauterine transmission nor immediate evidence of symptomatic COVID-19 among the four infants. However, two newborns manifested with rashes due to maternal inflammatory toxin effect, one of whom had facial ulcerations and the other one developed respiratory distress needing non-invasive mechanical ventilation (nCPAP) for three days. All four were discharged improved. (YChen 2020)

The most recent study in Wuhan by Zeng documented neonates of 33 confirmed COVID19 mothers. Three newborns were tested positive. The most common symptom was shortness of breath (n=4). One out of three was premature (31weeks). Because strict infection control and prevention procedures were implemented during their delivery, the sources of the infection in the neonates' upper respiratory tracts or anuses were maternal in origin. Although 2 recent studies (mentioned above) have shown that there were no clinical findings suggestive of COVID-19 in neonates born to affected mothers, and all samples, including amniotic fluid, cord blood, and breast milk, were negative for SARS-CoV-2, the vertical maternal-fetal transmission cannot be ruled out in the current cohort. Therefore, it is imperative to screen pregnant women and implement strict infection control measures, quarantine of infected mothers, and close monitoring of neonates at risk of COVID-19.

Similarly, there was a report of a newborn who tested positive for Covid19 in London. Whether this is a case of vertical transmission due to intrauterine infection or not remains uncertain.

Delivery Room: All babies born to mothers with confirmed COVID 19 should be considered PUIs (CDC 2020, WHO 2020)

A member of the neonatal team, wearing the appropriate PPE (coverall, N95 and goggles) and waiting outside the DR, attends the delivery of the newborn of suspected/confirmed COVID-19 mother.

Dry the baby as normal, while the cord is still intact. Do properly timed cord clamping in stable babies but early clamping in babies in respiratory distress. Wang et al recommended early cord clamping to reduce the risk of the vertical transmission of 2019- nCoV.

Transfer the infant in a closed incubator and perform the laboratory procedures (including testing for COVID 19 preferably nasopharyngeal swab in a separate room.

All babies of women with confirmed COVID-19 must be tested for COVID-19. Also included are CBC, C-reactive protein (CPR), and chest radiograph if in distress. The 2019-nCoV detection by RT-PCR may be collected from multiple sites, including two specimen types: the upper respiratory tract (URT; nasopharyngeal and oropharyngeal), the lower respiratory tract (LRT; endotracheal aspirate, or bronchoalveolar lavage), and the blood.

Mothers under monitoring (PUM) who become symptomatic and mothers who have additional symptoms (PUI) must be tested for COVID 19 for better safety plan for their babies and the healthcare personnel. If results are positive, the baby must be tested. If results are negative, rooming-in or colocation is in order with precautions. Their babies should have appropriate close monitoring and early involvement of neonatal care, when needed.

Studies in China, Japan, South Korea, Thailand, Malaysia and Singapore advised temporary separation of the infected mother and her baby. Routine precautionary separation of a stable mother and a healthy baby should not be taken lightly, given the possible detrimental effects on feeding and bonding. Given the current limited evidence, the Royal College of Obstetrics and Gynecology and WHO, however, recommend nonseparation of stable mothers and their healthy infants not requiring additional neonatal care in the immediate postpartum period. However, little is known about transmission and infectivity of this virus. Current scenarios in the Philippines show rising cases of community transmission, infections identified among healthcare personnel (HCP), and shortages of face masks, N95 filtering face piece, N95 respirators, and coveralls (PPE) prompting the obstetricians, pediatricians and infectious disease specialists to advise temporary separation until test results for COVID 19 are available.

Healthy Baby

Admit in Isolation Room, preferably in a negative pressure room. Since infants born to mothers with confirmed COVID-19 should be considered PUIs, they should be isolated according to the IPC Guidance for PUIs. To reduce the risk of transmission of the virus that causes COVID-19 from the mother to the newborn, there should be temporary separation (e.g., separate rooms) between the mother

and baby. The mother has the option to express her own breastmilk for her baby, when she is unstable or breastfeed her baby with appropriate precautions when she is stable and when the COVID 19 tests permit.

If the mother is a confirmed COVID19 or a PUI, the option of separation of the mother and baby should be considered as the first choice. The risks and benefits of this separation and the consequences of not starting, continuing or suspending breastfeeding should be shared with the family members.(China, Italy, Japan, Korea, Malaysia, Singapore, Thailand). Should the mother and baby be temporarily separated, it is recommended that the mother be helped to maintain milk production through manual or mechanical expression, following the same rules of hygiene. One breast-pump and one healthcare worker per shift for COVID19 patients should be available. For all HCW and professionals who come in contact with pregnant women and newborn infants, preventive recommendations should be observed.

The advices on use of expressed (MOM) should be heeded: 1. Expressed breast milk should **not be pasteurised** before being given to the baby, as it is believed that, even if containing SARS-CoV-2, it would not be a vehicle of infection. 2. The use of expressed milk from a SARS-CoV-2 positive mother in NICUs follows specific **protocols**. Mother's fresh milk should be expressed with a manual or electrical breast pump. The mother should always wash her hands before touching bottles and all breast pump parts, following recommendations for proper washing of the breast pump after each use. After her every use, the breast pump should be adequately cleaned. 3. In cases of **severe maternal infection** (ARDS), expressing breast milk can be inappropriate and should be avoided due to the mother's general conditions (Italy 2020)

The decision to discontinue separation, therefore room-in, is based on results of laboratory testing for COVID-19. If both Mom and baby are stable and have positive test results, room-in (colocation) in a single room with the baby placed in a bassinet 6 feet (2 meters) apart from the head of the mother. To reduce the risk of transmission to the baby, preventive procedures such as hand hygiene (soap and water and the use of a face mask during feeds are advisable. The mother should breastfeed her baby accordingly. (CDC 2020, ABM 2020, WHO 2020, RCOG 2020, RCPCH 2020) She should wear face mask at all times. Encourage direct breastfeeding, as long as both the mother and baby are in good condition.

Render practical breastfeeding support to enable mothers to initiate and establish breastfeeding and manage common breastfeeding difficulties. This support should be given by appropriately trained health care counsellors.

If the mother is in respiratory distress, the stable baby is tested for COVID19, admitted in Isolation Room, and is given expressed mother's own milk (MOM). The surfaces of breast pump and other equipment in contact with mother should be cleaned by the HCW. In case she cannot breastfeed, she can express her breastmilk.

Unstable Baby

The main thrust of treatment is supportive care and management of complications.

Admit in NICU Isolation for additional definitive care of respiratory distress (surfactant and invasive ventilation or even high frequency oscillatory ventilation), fluid and acid-base imbalance (IV fluids, bicarbonate), hypotension (inotropes), bleeding (blood transfusion), secondary bacterial infection/sepsis (antibiotics) and nutrition (parenteral nutrition, expressed breastmilk). For infants who go into acute kidney injury, continuous renal replacement therapy (CRRT) and extracorporeal membrane lung (ECMO) therapy are required.

At present, there is NO evidence supporting the efficacy of gamma globulin, interferon, or hormone therapy.

A multidisciplinary team (MDT) approach is recommended for critically ill neonates. The team includes the neonatologist, nephrologist, infectious disease specialist, specialist nurses, and respiratory therapist.

Once improved, the baby may be breastfed with appropriate precautions.

Screen the following: Newborn screen, Hearing screen and ROP screen, as recommended, prior to discharge.

Once at home

There is no clinical evidence that the virus can be transmitted through breast milk. The benefits of breastfeeding outweigh any potential risk of transmission of the virus through breast milk or by being in close contact between mother and baby at home. PUM and PUI mothers who tested negative should breastfeed their babies. However, the PUM who had no COVID19 testing should observe precautionary measures, that is, respiratory and hand hygiene at home especially if within the 14 days period from travel or exposure. The confirmed COVID19 mothers should likewise follow the respiratory and hand hygiene instructions upon discharge. Ultimately, breastfeeding is the decision of the mother. (RCPH 2020, ACOG 2020, WHO 2020).

Babies born to positive COVID-19 mothers will need neonatal follow-up and ongoing surveillance post-discharge after 48-72 hours. Follow-up may initially be done through phone call

DISCLAIMER: You can modify in accordance with your policies, available space, manpower, supplies and logistics. May be revised as the need arises.

SUMMARY OF RECOMMENDATIONS

State of the Mother	RNA-PCR testing on the mother for SARS-CoV-2 using pharyngeal swab	RNA-PCR testing on the newborn for SARS-CoV-2 using pharyngeal swab	Isolation of the mother	Management of the newborn during hospital stay	Breastfeeding
Confirmed COVID19 but stable	Already done	Yes	Yes	Admit in Isolation Room Roomed-in once baby's test results are positive Stays in Isolation Room if result is negative. May be discharged with caregiver designated by mother	Expressed MOM Breast feed once roomed-in together with respiratory and hand hygiene
Confirmed COVID19 but unstable	Already done	Yes	Yes	Admit in Isolation Room if stable. May be discharged with caregiver designated by mother. Admit in NICU Isolation if unstable	Expressed MOM
Mother under investigation but stable	Yes	Only if mother is positive	Yes, in a dedicated area of the Postpartum Ward, pending result of lab test	Admit in Isolation Room pending result of lab test. If mother has negative lab result, room-in with mother	Expressed MOM If mother has negative lab result, encourage breastfeeding
Mother under investigation but unstable	Yes	Only if mother is positive (lab or radiologic evidence of ARDS)	Yes, in the ICU Isolation	Admit in Isolation. May be discharged with caregiver designated by mother	Expressed MOM, if feasible, or pasteurized milk.

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