

GUIDELINES ON MANAGEMENT OF CORONAVIRUS DISEASE 2019 (COVID 19) IN NEONATES

Introduction

There is little information regarding vertical transmission to the fetus and on outcomes of neonates born to pregnant women with COVID-19. This protocol is subject to change as new information regarding the coronavirus COVID-19 becomes more available.

1. Definition

1.1 Definition for neonates suspected of COVID-19 infection:

- a) Neonates born to the mothers who are PUI or confirmed COVID-19 infection between 14 days before delivery and 28 days after delivery, or
- b) Neonates directly exposed to those who are PUI or confirmed COVID-19 infection (including family members, caregivers, medical staff, and visitors).

All suspected neonates are under consideration in this guideline regardless of whether they are symptomatic or asymptomatic.

1.2 Definition for neonates with confirmed COVID-19 infection:

A neonate with laboratory confirmation of infection with the COVID-19

Refer COVID-19 (Garis panduan) - Guidelines COVID-19 Management in Malaysia No 04/2020 (Edisi Keempat) Annex 5a. Guidelines on Laboratory Testing for COVID-19 for Patients Under Investigations
<http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>

2. Neonatal unit COVID-19 plan outline:

2.1 Organisation of Care

2.1.1 Possible categories of infection in the neonates:

- 1) Neonates born to mothers who are PUI or confirmed cases of COVID-19
 - a) Asymptomatic
 - b) Symptomatic
- 2) Neonates referred as PUI or confirmed COVID-19 infection

2.2 Neonatal Unit COVID-19 Action Plan

2.2.1 Neonates born to mothers with PUI COVID-19 or confirmed COVID-19

A. Preparation prior to delivery

1. Referral to the specialist of NICU.
2. The number of health care workers handling the neonate should be kept to a minimum
3. Neonatal team for resuscitation should be identified and prepared with adequate time given to don personal protective equipment (PPE)
4. Neonatal team must put on personal protective equipment (PPE) before entering Delivery Room. COVID-19 (Garispanduan) *Annex 8C: The Infection Prevention and Control Measures*
<http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
5. A designated resuscitaire, transport incubator and single use equipment (preferable) should be used.

B. Immediate care of the neonate after delivery

1. The Obstetric nurse should hand the neonate to the Neonatal team.
2. Stabilization of the neonate should be according to Neonatal Resuscitation Program (NRP) Guidelines.
3. Delayed cord clamping (DCC) is not recommended
4. Post stabilization, the neonate should be transferred into the designated transport incubator without undergoing any non-urgent neonatal care.
5. The transporting of neonate should follow *Annex 8E: The Infection Prevention and Control Measures*
<http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
6. All non-urgent neonatal care and examination should be carried out in the isolation room e.g. weighing, immunization.
7. All neonates should be separated from their mothers with **NO SKIN TO SKIN** contact.
8. If the neonate is delivered in an undesignated hospital, the neonate should be transferred to the designated hospital from the delivery room
9. The equipment used should undergo terminal cleaning or disposed of based on universal recommendations following a biohazard decontamination protocol.

C. Postnatal care of the neonate in the isolation room

1. PPE must be worn by all attending healthcare workers.
2. All body fluids and linens are treated as potential biohazards.
3. If the same neonatal team who attended the delivery are also attending to the neonate in the isolation room, they should perform hand hygiene, doff the PPE used during the transfer and don new PPE
4. In the isolation room, the neonate should be cleaned, weighed and immunized including given Vitamin K injection. There is no contraindication to vaccination
5. Soiled linen should be disposed of according to COVID-19 (Garis panduan) *Annex 8J: The Infection Prevention and Control Measures*. <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
6. An incubator is not required for isolation unless indicated
7. Promptly notify infection control team
8. Complete the Communicable Diseases Notification Form. COVID-19 (Garis panduan) *Annex 7: Notification Form* <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
9. The neonate should not receive breastmilk until mother status has been confirmed to be negative of COVID-19
10. If the mother is still keen on breastfeeding prior to confirmation of COVID-19 infection despite counseling, it should be documented in the clinical notes
11. Terminal cleaning and disinfection of the isolation room should be done following discharge of the neonate. COVID-19 (Garis panduan) *Annex 8H: The Infection Prevention and Control Measures*. <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>

2.2.2 Neonates referred as PUI or confirmed case of COVID-19

These neonates should be admitted to the isolation room regardless of whether they are symptomatic or asymptomatic.

3. Clinical Manifestation

3.1 Clinical Findings

- 3.1.1 Neonates with COVID-19 infection are classified according to the presence or absence of apparent symptoms and signs
- 3.1.2 The clinical manifestations may be asymptomatic, mild, or severe

- 3.1.3 Clinical findings, especially in premature infants, are non-specific
- 3.1.4 Therefore, it is important to closely monitor vital signs, respiratory and gastrointestinal symptoms and signs.
- 3.1.5 The signs may include:
 - a) Temperature instability: the temperature of an infected infant may be elevated, depressed, or normal.
 - b) Respiratory and cardiovascular signs may include tachypnea, grunting, nasal flaring, increased work of breathing (WOB), apnea, cough, or tachycardia.
 - c) Other findings may include poor feeding, lethargy, vomiting, loose stools, and abdominal distension.

3.2 Laboratory finding

- 3.2.1 Laboratory examinations may be non-specific
- 3.2.2 Full blood count (FBC) may show normal or decreased leukocyte counts, or decreased lymphocyte counts.
- 3.2.3 Other findings may include:
 - a) mild thrombocytopenia, and
 - b) elevated levels of creatine kinase, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, and lactate dehydrogenase
- 3.2.4 COVID-19 can be detected in the:
 - a) Upper respiratory tract (URT; nasopharyngeal and oropharyngeal),
 - b) Lower respiratory tract (LRT; endotracheal aspirate, or bronchoalveolar lavage)
 - c) The blood
 - d) The stool

3.3 Radiography findings

- 3.3.1 Chest radiograph or lung ultrasound is likely to show pneumonia
- 3.3.2 Abdominal radiograph may show the characteristic radiographic features of intestinal ileus.

4. Guidelines for Management of Neonates with Suspected or Confirmed COVID-19 Infection

4.1 Suspected asymptomatic neonates

- 4.1.1 Laboratory tests

- a) FBC, C-reactive protein (CRP), and
 - b) COVID-19 detection by RT-PCR. It is recommended that samples are collected from the URT (nasopharyngeal and oropharyngeal)
- 4.1.2 Close monitoring and supportive care are essential
- 4.1.3 If both the neonate and mother who is a PUI are tested negative for COVID-19 infection (fulfill COVID -19 Garispanduan Annex 2b Management of PUI Admitted), breast feeding and rooming in with mother is allowed <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
- 4.1.4 If the neonate is a confirmed case of COVID- 19 infection, the neonate should be managed as per Diagnosed Confirmed Asymptomatic Neonates pathway (refer no 4.3)
- 4.1.5 If the mother is a confirmed case of COVID-19 infection, the neonate can be discharged after tested negative for COVID-19 two consecutive specimens (72 hours apart). The neonate must be monitored under home surveillance until Day 28 of life (refer no 5)

4.2 Suspected symptomatic neonates

- 4.2.1 Laboratory and radiography investigations
- a) FBC, CRP, Blood Culture
 - b) COVID-19 detection by RT-PCR
 - c) Chest radiograph ± lung ultrasound (recommended). COVID -19 (Garispanduan) Annex 24: Workflow and Work Process for Radiological Examination During COVID -19 Outbreak. <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
 - d) Other tests should be considered if necessary e.g. liver and kidney function tests.
- 4.2.2 Medical management according to neonatal unit guidelines. Antibiotics to treat presumed sepsis should be considered until results are available
- 4.2.3 If both the neonate and mother who is a PUI are tested negative for COVID-19 (fulfill COVID -19 Garispanduan Annex 2b Management of PUI Admitted), the neonate should be managed based on the individual unit guidelines for neonatal sepsis.
- 4.2.4 If the neonate is a confirmed case for COVID-19 infection, the neonate should be managed as per '**Diagnosed Confirmed Symptomatic Neonates**' pathway (refer no 4.4)

4.2.5 If the mother is a confirmed case of COVID-19 infection, the neonate can be discharged after tested (nasopharyngeal and oropharyngeal swabs) negative for COVID -19 two consecutive specimens (72 hours apart) and clinical signs have improved. The neonate must be monitored under home surveillance until Day 28 of life (refer no 5).

4.3 Diagnosed confirmed asymptomatic neonates

4.3.1 Laboratory and radiography investigations:

- a) FBC, C-reactive protein (CRP), and
- b) COVID-19 detection by RT-PCR
- c) Chest radiograph. COVID-19 (Garispenduan) Annex 24: Workflow and Work Process for Radiological Examination During COVID -19 Outbreak <http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>

4.3.2 Close monitoring and supportive care are essential

4.3.3 Consult pediatric infectious disease team

4.3.4 Upper airway specimens (nasopharyngeal and oropharyngeal swabs) should be collected and tested every 72 hours until 2 consecutive specimens show negative for COVID-19

4.3.5 Discharge Criteria: Upper airway specimens (nasopharyngeal and oropharyngeal swabs) are negative for COVID-19 two consecutive specimens

4.3.6 The neonate must be monitored under home surveillance until Day 28 of life (refer no 5).

4.4 Diagnosed confirmed symptomatic neonates

4.4.1 Laboratory and Radiological tests

- a) FBC, CRP, Blood Culture
- b) Blood gas analysis, acid-base studies
- c) Serum electrolytes, liver and kidney function with cardiac biomarkers
- d) COVID-19 detection by RT-PCR
- e) Chest radiograph. Lung ultrasound is recommended
- f) Other investigations as needed

- 4.4.2 Medical management is according to neonatal unit guidelines in consultation with pediatric infectious disease team. Antibiotics to treat presumed sepsis should be considered until results are available
- 4.4.3 Currently, there is no effective anti-coronavirus drug
- 4.4.4 Inappropriate use of broad-spectrum antibiotics should be avoided. If there is evidence of secondary bacterial infection, follow unit antibiotic guidelines
- 4.4.5 There is no evidence supporting the effectiveness of intravenous gamma globulin
- 4.4.6 Discharge Criteria:
- a) The temperature of the patient should be normal for more than 72 hours, symptoms should improve, and chest radiograph should show improvement AND
 - b) Upper airway specimens (nasopharyngeal and oropharyngeal swabs) are negative for COVID-19 two consecutive specimens
- 4.4.7 The neonate must be monitored under home surveillance until Day 28 of life (refer no 5).

5. Care after discharged: Home surveillance

5.1 Criteria for home surveillance:

- a) Neonates with confirmed COVID -19 infection
- b) Neonates born to mothers with confirmed COVID -19 infection
- c) Neonates who are directly exposed to contacts (including family members, caregivers, medical staff and visitors) with confirmed COVID-19 infection

5.2 Notify the nearest Maternal Child Health Clinic (MCHC) and 'Pejabat Kesehatan Daerah (PKD)' for home surveillance until the neonate is 28 days of life

5.3 Parents/caregivers should be given a '**Borang Pemantauan Harian Bagi Bayi Yang Dijangkiti COVID-19**' for home surveillance of the neonate's condition

5.4 Parents/caregivers should be given instructions to seek medical attention should the neonate develop any symptoms or signs of disease within 28 days after delivery

6. Visiting Restrictions

6.1 Parents can visit once they have been screened and confirmed not to have COVID-19 infection

- 6.2 If the neonate is diagnosed to be a confirmed case of COVID-19 infection and parents are tested negative for COVID -19 infection, the parents are not allowed to visit until the neonate has been confirmed negative

References:

1. COVID-19 (*Garis Panduan*). Guidelines 2019 Novel Coronavirus (COVID-19) Management In Malaysia No. 4/2020
<http://www.moh.gov.my/index.php/pages/view/2019-ncov-wuhan-guidelines>
2. Chinese expert consensus on the perinatal and neonatal management for the prevention and control of the 2019 novel coronavirus infection (First edition). *Laishuan Wang, Yuan Shi et al. on behalf of the Working Committee on Perinatal and Neonatal management for the Prevention and Control of the 2019 Novel Coronavirus Infection. Ann Trans Med 2020;8(3):47*
3. American College of Obstetricians and Gynecologists. Practice Advisory: Novel Coronavirus 2019 (COVID-2019). <https://www.acog.org/Clinical-Guidance-and-Publications/Practice-Advisories/Practice-Advisory-Novel-Coronavirus2019>

Appendix:

A: Borang Pemantauan Harian Bagi Bayi Yang Dijangkiti COVID-19

FLOWCHART 1: Management of Asymptomatic Neonate Admitted to the Ward

FLOWCHART 2: Management of Symptomatic Neonate Admitted to the Ward

APPENDIX A:

Borang Pemantauan Harian Bagi Bayi Yang Dijangkiti COVID-19

Nama	:	
No. Kad Pengenalan Ibu/ MyKid	:	
No. Telefon	:	Bimbit: Rumah:
Alamat Rumah	:	
Tarikh Pendedahan Terakhir Kepada: Kes*	:	

- Senaraikan KESEMUANYA, gunakan mukasurat yang seterusnya – jika perlu

JADUAL PEMANTAUAN HARIAN

ARAHAN:

Bagi sebarang gejala yang dilaporkan oleh kontak, sila tandakan (√) pada ruangan yang berkenaan,

Hari 1	Hari 2	Hari 3	Hari 4	Hari 5	Hari 6
Tarikh:/...../..... ..	Tarikh:/...../..... ..	Tarikh:/...../..... ..	Tarikh:/...../..... ..	Tarikh:/...../..... ..	Tarikh:/...../..... ..
Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()

Hari 7	Hari 8	Hari 9	Hari 10	Hari 11	Hari 12
Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...
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Hari 13	Hari 14	Hari 15	Hari 16	Hari 17	Hari 18
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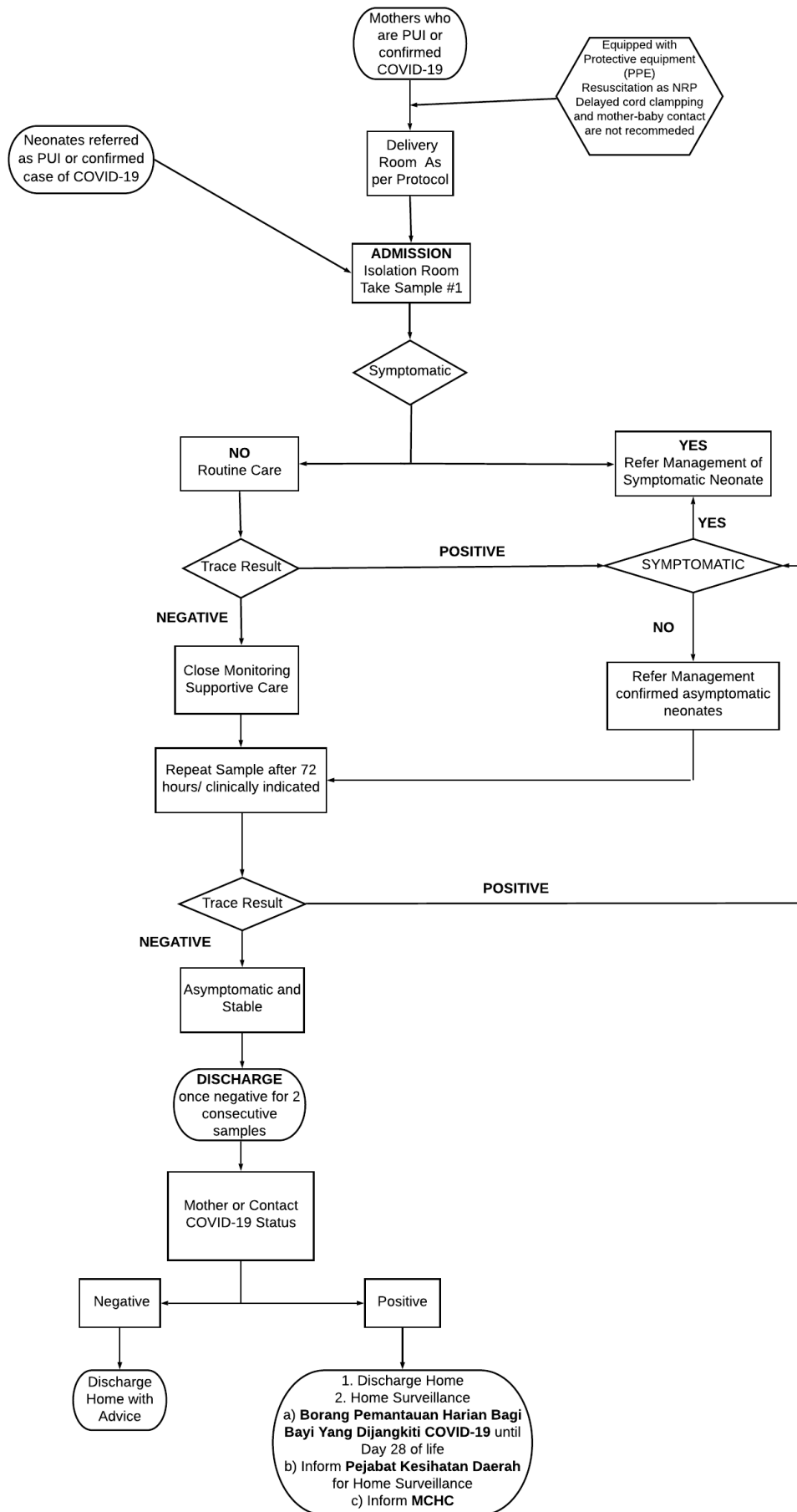
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Hari 19	Hari 20	Hari 21	Hari 22	Hari 23	Hari 24
Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...	Tarikh:/...../..... ...
Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()	Gejala : Demam () Batuk () Nafas Laju () Kurang Menyusu () Kurang Aktif ()

NOTA:

- *Hari 1 bermula pada tarikh bayi dibenarkan pulang*
- *Dipantau sehingga bayi berumur 28 hari*

FLOWCHART 1: MANAGEMENT OF ASYMPTOMATIC NEONATE ADMITTED TO THE WARD



FLOWCHART 2: MANAGEMENT OF SYMPTOMATIC NEONATE ADMITTED TO THE WARD

