THE REPUBLIC OF THE UNION OF MYANMAR

MINISTRY OF HEALTH

DEPARTMENT OF MEDICAL SERVICES

Pediatric Clinical Management Guidelines for COVID-19 Acute Respiratory Disease (Version 3)

Version - **DoMS/COVID-19/Pediatric/Version 3-2022**

Date - **3rd March 2022**

Pediatric Clinical Management Guidelines for COVID-19
Acute Respiratory Disease (Revised on 3-3-2022), version-3

I. Clinical syndromes associated with COVID-19 infection

Uncomplicated illness	**Uncomplicated upper respiratory tract viral infection**	**Non-specific symptoms such as;** • Fever • Cough • Sore-throat • Nasal congestion • Malaise • Headache • Muscle pain
	Immunosuppressed	Atypical symptoms. No signs of dehydration, sepsis or shortness of breath
Mild pneumonia	**Non severe pneumonia**	• Cough • Difficulty breathing • Fast breathing ➢ <2months - ≥60 breaths/min ➢ 2-11months – ≥50 breaths/min ➢ 1-5years – ≥40 breaths/min • No signs of severe pneumonia
Severe pneumonia	**Child with cough or difficulty in breathing plus at least one of the following;**	• Central cyanosis or SpO2 <90% • Severe respiratory distress (e.g., grunting, very severe chest indrawing)
	Signs of pneumonia with a general danger sign;	• Inability to breastfeed or drink • Lethargy or unconsciousness • convulsions
	Other signs of pneumonia may be present;	• chest indrawing • fast breathing ➢ <2months - ≥60 breaths/min ➢ 2-11months – ≥50 breaths/min ➢ 1-5years – ≥40 breaths/min

	• The diagnosis is clinical; chest imaging can exclude complications	
Acute respiratory distress syndrome	• Onset ; new or worsening respiratory symptoms within one week of known clinical insult • Chest imaging (radiograph, CT scan or Lung ultrasound); ✓ Bilateral opacities, not fully explained by effusions ✓ Lobar or lung collapse or nodules ✓ Origin of edema; respiratory failure not fully explained by cardiac failure or fluid overload.	
Sepsis	• Suspected or proven infection and ≥2 SIRS criteria 1. Core Temperature - > 38.5^{o}C or <36^{o}C (Rectal, Bladder, Oral, or Central catheter). 2. Tachycardia – mean heart rate >2 SD above normal range for age in absence of external stimuli, chronic drugs or painful stimuli; OR unexplained persistent elevation over 0.5-4 hour; OR in children <1 year old persistent bradycardia over 0.5 hour 3. Respiratory rate >2 SD above normal range for age or acute need for mechanical ventilation not related to neuromuscular disease or general anesthesia. 4. Leukocyte count – elevated or depressed for age (not secondary to chemotherapy) or >10% immature neutrophils • Of which one must be abnormal temperature or white blood cell count.	
Septic shock	**Any hypotension (SBP <5th centile or >2 SD below normal for age or 2-3 of the following**;	• Altered mental status • Tachycardia • Bradycardia ✓ HR <90 bpm or >160 bpm in infants ✓ HR <70 bpm or >150 bpm in children • Prolonged capillary refill (>2 sec) • Warm vasodilation with bounding pulses

		• Tachypnoea • Molted skin or petechial rash or purpuric rash • Increased lactate • Oliguria • Hyperthermia • Hypothermia
MIS-C	1.Age 0 to 19 years; AND 2.Fever for ≥ 3 days; AND 3.Clinical signs of multisystem involvement (at least two of the following): A. rash, bilateral nonpurulent conjunctivitis, or mucocutaneous inflammation signs (oral, hands, or feet); B. hypotension or shock; C. cardiac dysfunction, pericarditis, valvulitis, or coronary abnormalities (including echocardiographicfindings or elevated troponin/BNP); D. evidence of coagulopathy (prolonged PT or PTT; elevated D-dimer); E. acute gastrointestinal symptoms (diarrhoea, vomiting, or abdominal pain); AND 4.Elevated markers of inflammation (e.g. ESR, CRP, or procalcitonin); AND 5.No other obvious microbial cause of inflammation, including bacterial sepsis and staphylococcal/streptococcal toxic shocks yndromes; AND 6.Evidence of SARS-CoV-2 infection with ANY of the following:positive SARS-CoV-2 RT-PCR; positive serology; positive antigen test; contact with an individualwith COVID-19.	

INCREASED RISK FOR SEVERE DISEASE

- Children who have a history of medical complexity (e.g., due to neurologic impairment, developmental delays, or genetic syndromes including trisomy 21),
- obesity,
- chronic cardiopulmonary disease, or who are immunocompromised

II. Treatment guidelines for children with confirmed COVID- 19 Infection

A. Treatment of uncomplicated COVID-19

• Isolate the patients in hospitals to contain virus transmission

• Symptomatic treatment such as antipyretics (paracetamol) for fever and pain

• Adequate nutrition

• Appropriate nutrition

• Counsel about signs and symptoms of complications that should prompt urgent care

• **Antibiotic therapy/prophylaxis is not recommended**

B. Treatment of mild Pneumonia (COVID-19)

• Isolate the patients in hospitals to contain virus transmission

• Antibiotics if there is clinical suspicion of bacterial infection according to MPS guideline.

• Monitor the patients for signs and symptoms of disease progression.

• Monitor RR, HR, SpO2, Chest In drawing and use of accessory muscle of respiration and urine output 4 hourly

C. Treatment of severe COVID-19: Severe Pneumonia treatment

• Immediate administration of supplemental oxygen therapy

HOW TO DELIVER INVASIVE OXYGEN

Start oxygen if

SpO2 <92% (haemodynamically stable patient) and start oxygen if patient is haemodynamically unstable)

- ✓ Start oxygen at 2-3L/min
- ✓ Use nasal prongs
- ✓ Assess response

⇩ If increasing respiratory distress or SPO2 <92%

- ✓ Use face mask
- ✓ Increase oxygen to 6-8L/min
- ✓ Assess response

⇩ If increasing respiratory distress or SPO2 <92%

- ✓ Use face mask with reservoir
- ✓ Increase oxygen to 10-15L/min
- ✓ Assess response

⇩ If increasing respiratory distress or SPO2 <92%

- ✓ Put on CPAP/ BiPaP in a separate closed room and the health care person needs to wear **Full PPE** with caution of aerosol generation.

• Monitor for signs of clinical deterioration, such as rapidly progressive respiratory failure and shock

• Use of empiric antimicrobials to treat all likely pathogens, based on clinical judgment, patient host factors and local epidemiology, within 1 hour of initial assessment if possible, ideally with blood cultures obtained first.

• Following investigations should be done

- ✓ CP, , RBS, U&E, Creatinine, CXR (PA)

• Antimicrobial therapy should be assessed daily for de-escalation

D. Treatment of sepsis or septic shock in children with Covid 19

1. Initial assessment and resuscitation

• Assess A,B,C

• Give high flow oxygen and consider intubation and ventilation as respiratory Compromise [Nasal CPAP where ventilator is not available]

• Obtain IV access or Intraosseous.

Take blood for; finger prick glucose, FBC, UEC, blood culture, blood group and matching, LFT and coagulation. If possible CRP,procalcitonin, BNP, D-Dimer, LDH, , ABG or capillary blood gas

- **In resuscitation for septic shock in children, give 10–20 mL/kg crystalloid fluid as a bolus in the first 30–60 minutes.**
- **Do not use hypotonic crystalloids, starches or gelatins for resuscitation.**
- Monitor vital signs after giving each 20ml/kg of IV fluid.
- If there is no response to fluid loading or signs of volume overload appear (e.g. jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly), then reduce or discontinue fluid administration.
- This step is particularly important in patients with hypoxaemic respiratory failure.

2. Management of septic shock

• Consider septic shock if no improvement after 40ml/kg of fluid resuscitation.

• Give IV antibiotics once septic shock is considered.

• **Uses of Inotrope and vasopressors**

In children, administer vasopressors if signs of fluid overload are apparent or the following persist after two fluid bolus: (40 ml/kg of IV bolus of crystalloid solution)

- signs of shock such as altered mental state;
- bradycardia or tachycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children);
- prolonged capillary refill (> 2 seconds) or feeble pulses;
- tachypnoea; mottled or cool skin or petechial or purpuric rash; increased lactate; oliguria persists after two repeat boluses;

- or age-appropriate blood pressure targets are not achieved

- Consider to start inotrope of **adrenalin** if available and titrate epinephrine infusion according to MPS guidelines. If it is not available start with dopamine IV infusion from 5-10 ug/kg/ min and monitor vital signs and increase the dose gradually after 15-30 minute and maximal 20ug/kg/min. Norepinephrine can be added if shock persists despite optimal dose of epinephrine.
- If signs of poor perfusion and cardiac dysfunction persist despite achieving MAP target with fluids and vasopressors, consider an inotrope such as dobutamine.
- Give IV hydrocortisone if shock is poorly responsive to adequate fluid resuscitation and vasopressor and at risk of absolute adrenal insufficiency. [e.g. Congenital adrenal insufficiency, nephrotic syndrome and chronic asthma]

E. Antivirals, immunomodulators and other adjunctive therapies for COVID-19 Disease

- There are no specific antiviral/ other specific treatments for COVID-19 disease.
- Should be treated with supportive measures as necessary.
- For children, dexamethasone can be given for severely ill children who are on CPAP or ventilator support.
- **Dexamethasone** - Dose – 0.15mg/kg (maximum = 6mg) OD, IV/PO

daily for 10 days or until discharge, whichever is shorter.

- It should not be used for either prevention or treatment of mild to moderate COVID-19.
- Use of dexamethasone in patients who require other forms of supplemental oxygen support should be considered on a case-by-case basis and is **generally not recommended** for pediatric patients who require only low levels of oxygen support (i.e., nasal cannula only).

Alternatives steroids (Dexamethasone is not available)

Prednisolone

- 1mg/kg once daily (Max: 40 mg/dose, NG/PO, **Duration:** For up to 10 days)

Methylprednisolone

- 0.8 mg /kg/dose once daily, IV (Max: 32 mg/dose, **Duration:** For up to 10 days)

Hydrocortisone

- 0.5 mg kg/dose, IV (**Duration:** once daily for 3 days)

Remdesivir
(Not supported by evidence).

Can be used for patients with symptom **onset of within 10 days *and*** on respiratory support **after consultation** with consultant pediatrician.

Weight 3.5-<40 kg:

Loading dose : 5mg/kg IV once, followed by:

2.5mg/kg/dose IV Q24hr for 4 days.

If no improvement after a total of 5 days, can extend the treatment up to 10 days.

Weight ≧ 40 kg:

Loading dose **:** 200mg IV once, followed by:

100mg IV Q24hr for 4 days.

If no improvement after a total of 5 days, can extend the treatment up to 10 days.

Contraindications

 Hypersensitivity to remdesivir or any component of the formulation

 Patients with eGFR <30 mL/minute, unless the potential benefit outweighs the potential risk

 Patients with ALT ≥5 times the upper limit of normal

Monitoring:

 Labs before initiation and daily

 FBC, AST, ALT, alkaline phosphatase, bilirubin (total and direct), PT

 Consider discontinuation if ALT > 5 times upper limit of normal during treatment.

 Discontinue if ALT elevation is accompanied with signs of liver inflammation.

Adverse effects:

1. Increased liver enzymes
2. Infusion related hypotension
3. Drug-drug interactions CYP450
4. QT prolongation 5. Risk of Torsades de points
6. Avoid use with acetaminophen up to 15 days post-remdesivir treatment.

***** Obtain *informed consen*t from caregiver including discussion that medication is not yet FDA approved for patients < 12 years or <40 kg.**

F. Management of MIS-C

- Consider MIS-C as part of the differential diagnosis if: MIS-C is a rare complication temporally associated with COVID-19. Any child with suspected MIS-C should also be evaluated for infectious and non-infectious etiologies.
  - Bacterial sepsis, bacterial enteritis, toxic shock syndrome, Kawasaki, Kawasaki-like, hemo-phagocytic lympho-histiocytosis, macrophage activation syndrome.
  - Vasculitis, lupus
  - Viral syndrome (e.g., CMV, EBV, Adenovirus, Coxsackie virus, etc.)
- Initial evaluation should include measurement of vital signs, assessment of perfusion and oxygen saturation.
- Following investigations should be done:
  - FBC
  - CRP, ESR
  - Urea and electrolytes, Creatinine
  - LFT and albumin
  - Virology for SARS-CoV-2PCR and Blood serology for SARS-CoV-2

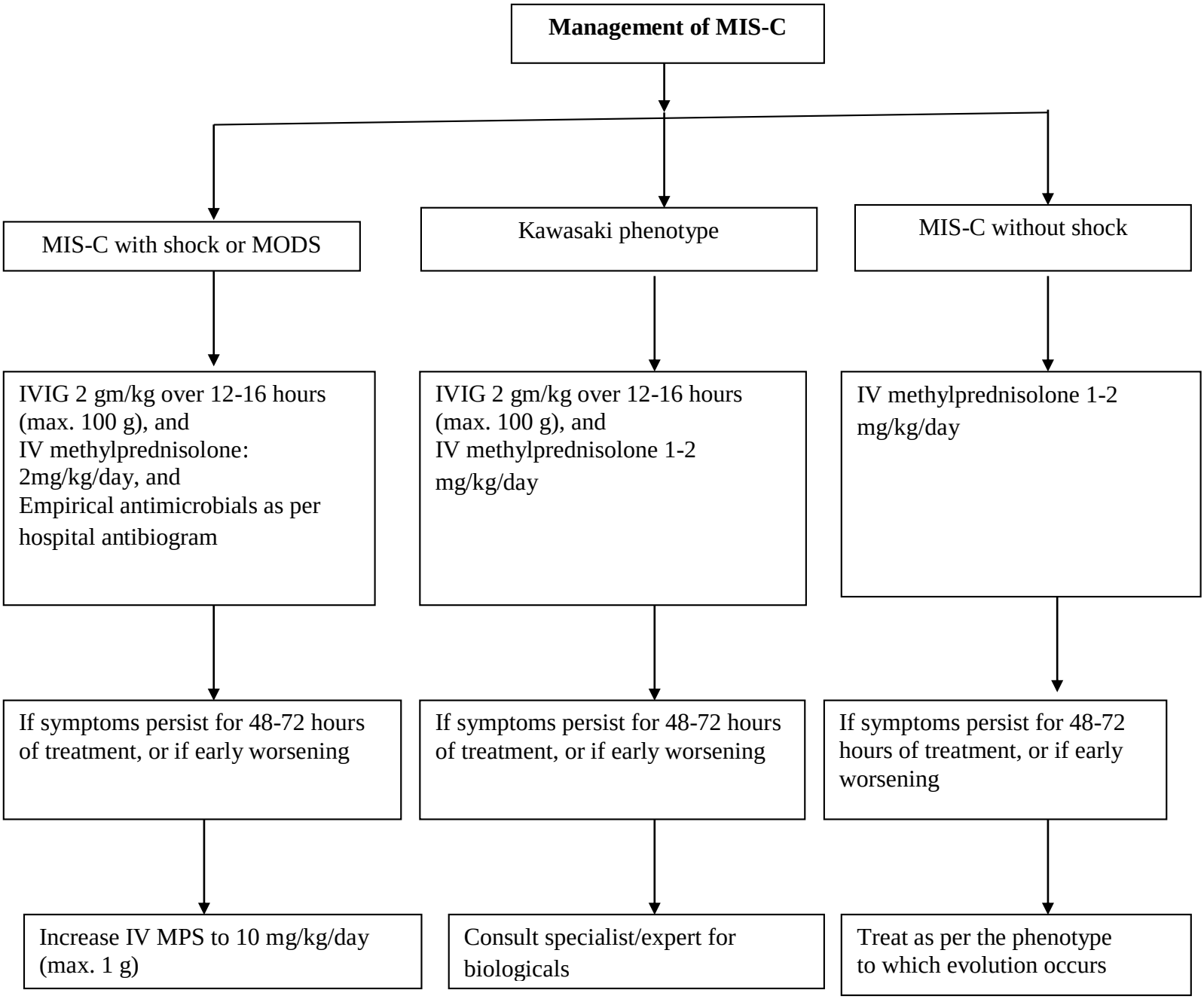
- Blood culture
- CXR, ECG, ECHO

If available, following investigations should be done:

- LDH,triglyceride, fibrinogen, Ferritin, PT, PTT, D-dimer, G6PD,Troponin, CPK, pro-BNP, amylase
- Blood film if highly suspicious of malignancy
- Viral serology blood PCR: EBV, CMV

- Appropriate supportive care is needed preferably in ICU (if available) for treatment of cardiac dysfunction, coronary involvement, shock or multi-organ dysfunction syndrome (MODS)
- IVIG to be given slower (over up to 48 hours) in children with cardiac failure/ fluid overload
- Taper steroids over 2-3 weeks with clinical and CRP monitoring
- Aspirin 3-5 mg/kg/day, maximum 75 mg/day in all children for 4-6 weeks (with platelet count >80,000/μL) for at least 4-6 weeks or longer for those with coronary aneurysms
- Low molecular weight heparin (**Enoxaparin) after consultation with pediatric hematologist and cardiologist** if patient has thrombosis or giant aneurysm

Management of MIS-C



III. Discharge criteria for confirmed COVID-19 disease

1. For symptomatic patients

(a)Patients with uncomplicated illness or mild pneumonia who are not severely immunocompromised

• 10 days after onset of symptoms, plus at least 1 additional day without symptoms (including without fever with no antipyretic and without respiratory symptoms and other covid-19 symptoms)

• At least 11 days is recommended to stay in hospital

***For Omicron positive patient, isolate 14 days in hospital and take swab with Standard Q RDT test on 10th day and continue isolation until test negative plus symptoms free for 48 hours.

(b)Patients with severe to critical illness or who are severely immunocompromised

• 10 days after onset of symptoms, plus at least 4 additional days without symptoms(including without fever with no antipyretic and without respiratory symptoms and other covid-19 symptoms)

• At least 20 days is recommended to stay in hospital

2. For asymptomatic cases

10 days after positive test for SARs-CoV-2

Remark: Home isolation for 7 days will be compulsory for all patients after discharge from the hospital.

Care giver of COVID-19 positive child

Care giver can take care a child with surgical mask and will be referred to Yangon General Hospital or designated hospital when a caregiver develops symptoms and signs of Covid 19 infection.

IV. References

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- Pediatric COVID/ MIS-C guidelines, Benioff Children Hospital,(Version 3: Final Last Updated: 11/12/2021)

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Management Protocol for COVID-19 Acute Respiratory Disease in Yangon Children Hospital (Revised on 1-02-2022)(*Version 06*)

Attendance of patients in Emergency and clinic OPD

(At Triage area)

A **History of close contact[1] with a confirmed[2] case of COVID-19 within past 14 days**

B **Presenting fever and acute onset of at least one of followings- cough, difficulty in breathing and shortness of breath)**

C **Presenting fever and symptoms of severe acute respiratory disease[3] and with no other clear aetiology**

Aonly but need admission for other reasons

- Hospital quarantine in **isolation ward** for **11** days
- Take specimen on 3rd to 5th day of last exposure,
- Report to State and Regional Health Department
- Take specimen (RDT) on Day 10 of hospital quarantine
- Discharge from hospital on Day 11 if RDT is negative

B or C only

Further investigation for diagnosis and treatment

A and B **A and C**

- Isolate the patient in a separate room **(isolation room) at OPD**
- Take strict IPC measures depending on severity
- Take complete and detail history and physical examination

Person Under Investigation (PUI) for suspected Pneumonia

- Move the patient to **isolation room (PR ward)**
- Inform immediately to focal person of YCH
- Take specimen and send to NHL[4] (To follow specimen collection guidelines)
- Start treatment for pneumonia/severe pneumonia according to "**Clinical Management Guidelines for Corona virus disease (COVID-19) for pediatrics**"

Results negative

Mild Pneumonia

- Symptomatic treatment
- Oral antibiotic

Severe Pneumonia

Treat according to MPS[6] guideline **in isolation room of medical ward**

Results positive

Confirmed case

- Isolate patients **in isolation room[5] (PR ward)**
- Treat according to "Clinical Management Guidelines for Corona virus disease (COVID-19) for pediatrics"

recover

Discharge with advice, Phone call if any problem during 2 weeks and follow up at 2 weeks by phone

Death – proper disposal of the dead

ANNEX

1. A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a confirmed case :
    - Face-to-face contact with a confirmed case within 1 meter and for more than 15 minutes;
    - Direct physical contact with a confirmed case;
    - Direct care for a patient with confirmed COVID-19 disease without using proper personal protective equipment;

    (For asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation).
2. Confirmed case – A person with laboratory confirmation of SARS-CoV-2 infection, irrespective of clinical signs and symptoms.
3. **severe acute respiratory disease**– a child with cough or difficulty in breathing, plus one of the followings:
    - Central cyanosis or $SpO_2 < 90\%$
    - Severe respiratory distress (grunting, very severe chest indrawing)
    - Signs of pneumonia with a general danger signs (inability to breastfeed or drink, lethargy or unconsciousness, or convulsions)
4. NHL- National Health Laboratory
5. According to discharge criteria in Pediatric Clinical Management Guidelines for COVID-19 Acute Respiratory Disease (Revised on 02-02-2022), version-3
6. MPS- Myanmar Paediatric Society

This Guideline was developed by Myanmar Pediatric Society (MPS).

Any suggestion for guideline : medicalcaredivision@gmail.com

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