18th June 2021

Guidelines for Management of COVID-19 in Children (below 18 years)

Ministry of Health & Family Welfare

Government of India

Guidelines for Management of COVID-19 in Children

Asymptomatic

- Suspected contact
  [RAT or RTPCR negative or not available]
- Incidentally detected
  [RAT or RTPCR positive]

Home isolation (tele consultation SOS)

Mainstay of Treatment

- Infants and younger children to stay under immediate care of parents/guardians
- No specific medication required for COVID-19 infection
- Continue medications for other conditions, if any
- Promote COVID appropriate behaviour (mask, strict hand hygiene, physical distancing); please see **guide for using mask**
- Fluids and feeds: ensure oral fluids to maintain hydration and give a nutritious diet
- Advise older children and family to stay connected and engage in positive talks through phone, video-calls, etc.
- Parent/caregivers to contact the doctor in case of appearance of symptoms

Investigations

- No investigations needed

Mild

- Sore throat, rhinorrhoea
- Cough without breathing difficulty
- SpO_2 ≥94% on room air
- For other symptoms, see **COVID-19 symptoms – at a glance**

Home isolation (tele consultation SOS) or COVID Care Centre

Mainstay of Treatment

- For fever, give paracetamol 10-15mg/kg/dose; may repeat every 4-6 hours
- For cough, give throat soothing agents and warm saline gargles in older children and adolescents
- Fluids and feeds: ensure oral fluids to maintain hydration and give a nutritious diet
- No other COVID-19 specific medication needed
- Antimicrobials are not indicated
- Maintain monitoring chart including counting of respiratory rate 2-3 times a day, look for chest indrawing, cold extremities, urine output, oxygen saturation, fluid intake, activity level, especially for young children
- Promote COVID appropriate behaviour (mask, strict hand hygiene, physical distancing); please see **guide for using mask**
- Advise older children and family to stay connected and engage in positive talks through phone, video-calls, etc.
- Parent/caregivers to contact the doctor in case of deterioration of symptoms

Investigations

- No investigations needed

Moderate

- In addition to symptoms in mild cases, check for pneumonia which may not be apparent
- Rapid respiration (age-based): **<2 months** RR ≥60/min; **2-12 months**, RR ≥50/min; **1-5 years**, RR ≥40/min; **>5 years**, RR ≥30/min;
  AND/OR SpO_2 90–93% on room air
- For other symptoms, see **COVID-19 symptoms – at a glance**

Admit in DCHC or COVID-19 Hospital

Mainstay of Treatment

- Initiate oxygen if SpO_2 is <94% and maintain between 94–96%
- Maintain fluid and electrolyte balance
  - Encourage oral fluids (breast feeds in infants)
  - Initiate intravenous fluid therapy if oral intake is poor
- Corticosteroids are not required in all children with moderate illness; they may be administered in rapidly progressive disease
- Fever with temperature >38°C (or 100.4°F): Paracetamol 10-15mg/kg/dose; may repeat every 4-6 hours
- Anti-microbials to be administered if there is evidence/strong suspicion of superadded bacterial infection; please see **antimicrobial use guide**
- Supportive care for comorbid conditions, if any

Remdesivir (an emergency use authorization drug) is NOT recommended in children
There is lack of sufficient evidence on safety and efficacy with respect to Remdesivir in children below 18 years of age

Investigations

- Baseline: CBC including ESR, blood glucose
- Chest X-Ray

CT chest is not indicated in diagnosis or management of COVID-19 infection in children
Consider CT chest only if no improvement in respiratory status

Severe

- **SpO_2 <90% on room air**
- **Any of the following – signs of severe pneumonia, acute respiratory distress syndrome, septic shock, multi-organ dysfunction syndrome, or pneumonia with cyanosis, grunting, severe retraction of chest, lethargy, somnolence, seizure**
- **For other symptoms, see COVID-19 symptoms – at a glance**

Admit in HDU/ICU of COVID-19 Hospital

Mainstay of Treatment

- **Initiate immediate oxygen therapy and maintain target SpO_2 94–96%**
- **Maintain fluid and electrolyte balance**
- **Corticosteroids therapy to be initiated**
- **Anticoagulants may also be indicated**
- **Exercise caution; see use of corticosteroids and anticoagulants guide**
- **In case Acute Respiratory Distress Syndrome (ARDS) or shock develops, initiate necessary management; see ARDS and Shock guide**
- **Antimicrobials to be administered if there is evidence/strong suspicion of superadded bacterial infection; see antimicrobial use guide**
- **May need organ support in case of organ dysfunction e.g. renal replacement therapy**

Investigations

- Baseline: CBC including ESR, blood glucose, CRP, LFT, KFT, serum ferritin, D-Dimer
- Chest X-Ray

COVID-19 symptoms in children – at a glance

Common symptoms		
Fever	**Sore throat/throat irritation**	**Diarrhoea**
Cough	**Body ache/headache**	**Anorexia/nausea/vomiting**
Rhinorrhoea	**Malaise/weakness**	**Loss of sense of smell and/or taste**

Differentiating symptoms/signs	Asymptomatic	Mild	Moderate	Severe
Respiratory rate/min	**Normal** with age dependent variation	**Normal** with age dependent variation	**Rapid respiration** (age based) <2 months ≥60/min 2-12 months ≥50/min 1-5 years ≥40/min >5 years ≥30/min	**Rapid respiration** (age based) <2 months ≥60/min 2-12 months ≥50/min 1-5 years ≥40/min >5 years ≥30/min
SpO_2 on room air	**≥94%**	**≥94%**	**≥90%**	**<90%**
Grunting, severe retraction of chest	✗	✗	✗	**+/-**
Lethargy, somnolence	✗	✗	✗	**+/-**
Seizure	✗	✗	✗	**+/-**

Management of Acute Respiratory Distress Syndrome (ARDS) and Shock guide

Management/treatment of ARDS

ARDS may be classified based on Pediatric Acute Lung Injury Consensus Conference (PALICC) definition into mild, moderate and severe

Mild ARDS

- High flow nasal oxygen (start with 0.5 L/kg/min to begin with and increase to 2 L/kg/min with monitoring) or non-invasive ventilation (BiPAP or CPAP) may be given

Moderate – Severe ARDS

- Lung protective mechanical ventilation may be initiated; low tidal volume (4-8 ml/kg); plateau pressure <28-30 cmH_2O; MAP <18-20 cmH_2O; driving pressure <15 cmH_2O; PEEP 6-10 cmH_2O (or higher if severe ARDS); FiO_2 <60%; sedoanalgesia ± neuromuscular blockers; cuffed ETT, inline suction, heat and moisture exchange filters (HMEF)
- Avoid frequent disconnection of ventilator circuit, nebulization or metered dose inhaler
- Restrict fluids; calculate fluid overload percentage, keeping it <10%
- Prone position may be considered in hypoxemic children if they are able to tolerate it
- Daily assessment for weaning and early extubation; enteral nutrition within 24 hours, achieve full feeds by 48 hours
- Transfusion trigger Hb <7g/dL if stable oxygenation and haemodynamics and <10 g/dL if refractory hypoxemia or shock

Management of shock

- Consider crystalloid fluid bolus 10-20 ml/kg cautiously over 30-60 minutes with early vasoactive support (epinephrine)
- Start antimicrobials within the first hour, after taking blood cultures, according to hospital antibiogram or treatment guidelines
- Consider inotropes (milrinone or dobutamine) if poor perfusion and myocardial dysfunction persists despite fluid boluses, vasoactive drugs and achievement of target mean arterial pressure
- Hydrocortisone may be added if there is fluid refractory catecholamine resistant shock (avoid if already on dexamethasone or methylprednisolone)
- Once stabilized, restrict IV fluids to avoid fluid overload
- Initiate enteral nutrition – sooner the better
- Transfusion trigger Hb <7g/dL if stable oxygenation and haemodynamics, and <10 g/dL if refractory hypoxemia or shock

Management of Multisystem Inflammatory Syndrome (MIS-C) in children and adolescents temporally related to COVID-19

Multi System Inflammatory Syndrome in Children (MIS-C) is a new syndrome in children characterized by unremitting fever >38°C and epidemiological linkage with SARS-CoV-2

Diagnostic criteria (WHO)

- Children and adolescents 0–18 years of age with fever ≥3 days
- **And <u>any two</u>** of the following:
  - Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet)
  - Hypotension or shock
  - Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP)
  - Evidence of coagulopathy (PT, PTT, elevated D-Dimers)
  - Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain)
- **And** elevated markers of inflammation such as ESR (>40 mm), C-reactive protein (>5 mg/L), or procalcitonin
- **And** no other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes
- **And** evidence of recent COVID-19 infection (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19

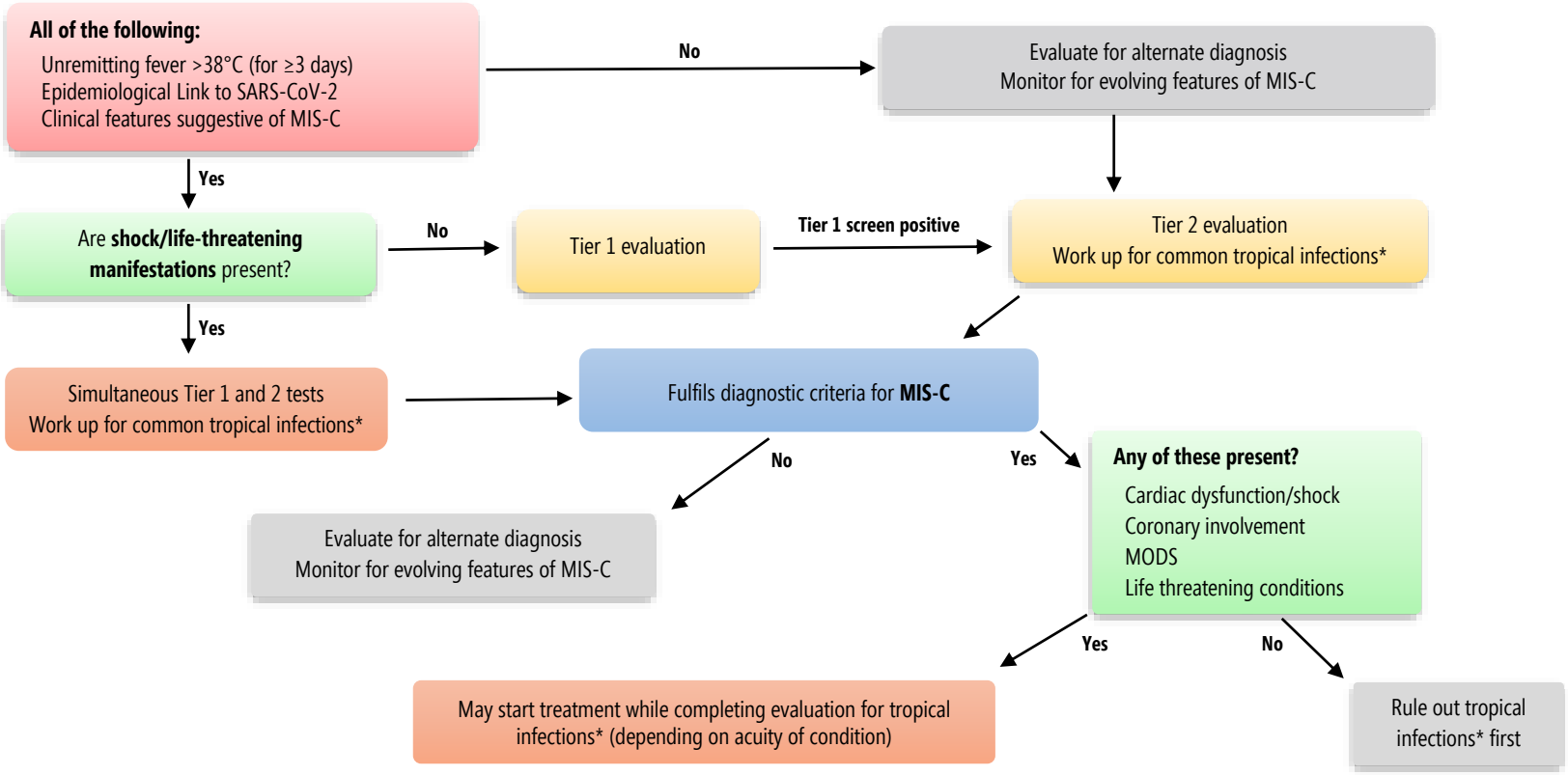
Alternative diagnoses that must be excluded before making a diagnosis of MIS-C

- Tropical fevers (malaria, dengue, scrub typhus, enteric fever)
- Toxic shock syndrome (staphylococcal or streptococcal)
- Bacterial sepsis

MIS-C with Kawasaki Disease (KD) phenotype is characterised by fever, conjunctival redness, oropharyngeal findings (red and/or cracked lips, strawberry tongue), rash, swollen and/or erythematous hands and feet and cervical lymphadenopathy

Guidelines for Management of COVID-19 in Children

Stepwise investigations in a patient with MIS-C

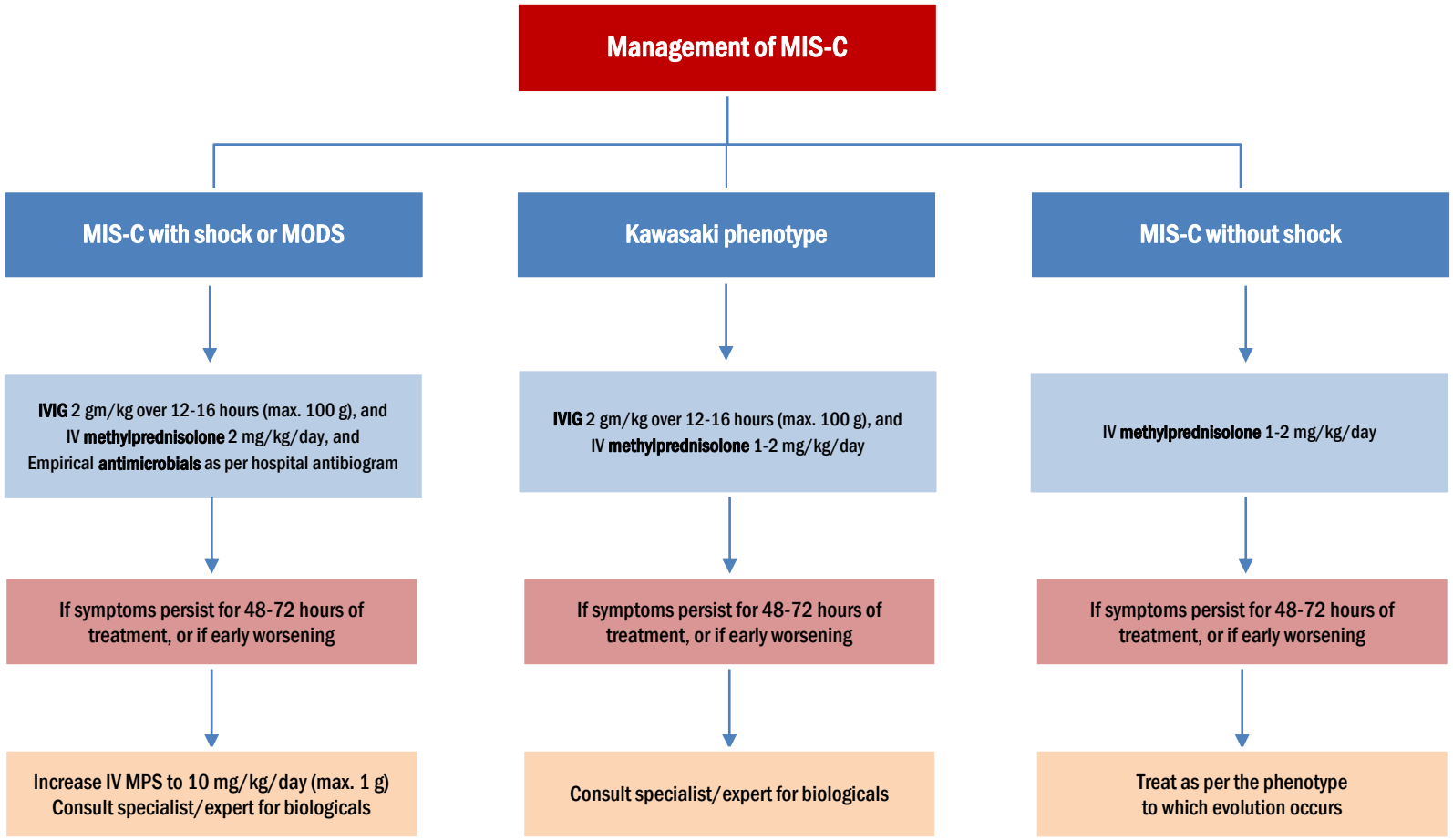


Tier 1 tests (may be done at Covid Care Centre, Dedicated Covid Health Centre): CBC, complete metabolic profile (LFT/KFT/blood gas/glucose), CRP and/or ESR, SARS-CoV-2 serology and/or RT-PCR, blood culture
Positive Tier 1 screen (***both*** of these should be present):

1. CRP >5 mg/L ***and/or*** ESR >40 mm/hour;
2. At least ***one*** of these: ALC <1000/µL, platelet count <150,000/µL, Na <135 mEq/L, neutrophilia, hypoalbuminemia

Tier 2 tests (may be done at Dedicated Covid Hospital): Cardiac (ECG, echocardiogram, BNP, troponin T); inflammatory markers (procalcitonin, ferritin, PT, PTT, D-Dimer, fibrinogen, LDH, triglyceride, cytokine panel); blood smear; SARS-CoV-2 serology
* Common tropical infections include malaria, dengue, enteric fever, rickettsial illness (scrub typhus), etc.

Guidelines for Management of COVID-19 in Children



- Appropriate supportive care is needed preferably in ICU 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) 1 mg/kg/dose twice daily s/c in >2 months (0.75mg/kg/dose in <2 months) if patient has thrombosis or giant aneurysm with absolute coronary diameter ≥8 mm or Z score ≥10 or LVEF <30%
- For children with cardiac involvement, repeat ECG 48 hourly & repeat ECHO at 7–14 days and between 4 to 6 weeks, and after 1 year if initial ECHO was abnormal

Use biologicals only after expert consultation and at tertiary care only

Suggested proforma for monitoring in children

Name: ..... Age: ..... Sex: ..... Date: .....

#	**Co-morbid conditions** (if any)	**Controlled** (yes/no)	**Drugs being taken**
1			
2			
3			

Template for recording of symptoms and signs (may be done more frequently for sicker children)

Time	**Lethargy/malaise***	**SoB****	**Temperature**	**BP#**	**Respiratory rate##**	**Chest indrawing**	**SpO_2*** & pulse rate**	**Physical activity**
	(yes/no)	(yes/no)	(record)	(record)	(record)	(yes/no)	(record)	(normal/low)
06:00 am								
12:00 noon								
06:00 pm								
12:00 am								

*Malaise: feeling of unwellness; **SoB: shortness of breath/breathing difficulty/breathlessness ***SpO_2: oxygen levels to be measured by pulse oximeter

measure BP if age appropriate BP cuffs are available; ## record respiratory rate in a calm or sleeping child

Guidelines for Management of COVID-19 in Children

Infection Prevention and Control (IPC)

Every COVID care facility should have a multidisciplinary hospital infection control committee; key components of infection control strategy are:

- Standard precautions
- Droplet precautions
- Airborne precautions
- Contact precautions and hand hygiene
- Physical distancing
- Cough etiquette/respiratory hygiene
- Well ventilated rooms
- Monitor healthcare associated infections
- Train all health care workers to develop IPC skills
- Environment cleaning, disinfection and sanitation
- Cleaning/disinfection of frequently touched surfaces/equipment
- Cleaning and disinfection of linen
- Safe management of bio-medical waste
- Triple layer mask to be worn by patient, as per guidance below
- Masks for care givers (home/hospital)

Guide for using mask

- Masks are not recommended for children aged **5 years and under**
- Children aged **6-11 years** may wear a mask depending on the ability of child to use a mask safely and appropriately under direct supervision of parents/guardians
- Children aged **12 years and over** should wear a mask under the same conditions as adults
- Ensure hands are kept clean with soap and water, or an alcohol-based hand rub, while handling masks

Antimicrobial use guide

COVID-19 is a viral infection, and antimicrobials have no role in the management of uncomplicated COVID-19 infection

Asymptomatic and mild cases: antimicrobials are not recommended for therapy or prophylaxis

Moderate and severe cases: antimicrobials should not be prescribed unless there is clinical suspicion of a superadded infection

Septic shock: empirical antimicrobials (according to body weight) are frequently added to cover all likely pathogens based on clinical judgement, patient host factors, local epidemiology and antimicrobial policy of the hospital

Use of steroids and anticoagulants

Steroids

Self-medication of steroids must be avoided

- **Steroids are not indicated and are harmful in asymptomatic and mild cases of COVID-19**
- Indicated only in hospitalized severe and critically ill COVID-19 cases **under strict supervision**
- Steroids should be used at the **right time**, in **right dose** and for the **right duration**
- Indications and recommended dose of corticosteroids – may be used in rapidly progressive moderate and all severe cases
  - Dexamethasone 0.15 mg/kg, maximum dose 6 mg once a day **OR**
  - Methylprednisolone 0.75 mg/kg, maximum dose 30 mg once a day
- Continue for 5-7 days and taper, up to 14 days, depending on clinical assessment on daily basis
- Avoid steroids in first 3-5 days since onset of symptoms as it prolongs viral shedding

Anticoagulants

- Not indicated routinely
- All hospitalized children should be monitored for thrombosis; on suspicion, confirm by appropriate investigations and start on low molecular weight heparin in therapeutic doses for period of 12 weeks with monitoring
- Predisposing risk factors for development of thrombosis – personal history of venous thrombotic events (VTE), family history of first-degree relative with VTE, presence of central venous line, decreased mobility from baseline, burns, active malignancy, estrogen therapy, flare of inflammatory disease, morbid obesity, severe dehydration, recent surgery or trauma
- Prophylactic anticoagulant is indicated in following circumstances (a) strong personal or family history of VTE, or (b) an indwelling central venous line and two or more additional risk factors, or (c) four or more risk factors
- The decision to administer prophylactic anticoagulation must be balanced with the child's bleeding risk
- Children already on anticoagulation therapy may continue same unless they develop active bleeding
- Dose of low molecular weight heparin (Enoxaparin), if indicated in severe cases
  - Prophylactic dose 0.5 mg/kg twice daily, till child is discharged from hospital
  - Therapeutic dose 1 mg/kg twice daily