CLINICAL MANAGEMENT PROTOCOL FOR CONFIRMED PEDIATRIC COVID-19 CASES
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1. BACKGROUND

This document is intended for clinicians involved in the care of children less than 12 years with confirmed COVID-19 cases at the Jigme Dorji Wangchuck National Referral Hospital. Bhutan had its first confirmed case of COVID-19 on 05 March 2020. As of 12th April 2021, Bhutan has recorded 921 confirmed cases with only one death so far.

2. CONFIRMED CASE

A person with laboratory confirmation (RtPCR positive) of COVID-19 infection, irrespective of clinical signs and symptoms.

3. CLINICAL SYNDROMES AND MANAGEMENT ASSOCIATED WITH COVID-19 INFECTIONS

a) Mild illness

Patients with uncomplicated upper respiratory tract viral infection, may have non-specific symptoms such as fever, fatigue, cough (with or without sputum production), poor feeding, malaise, muscle pain, sore throat, nasal congestion, anosmia, ageusia, headache, diarrhoea, loss of appetite, nausea and vomiting.

Atypical symptoms like skin rash, conjunctivitis, axial hypotonia with or without drowsiness and moaning have also been reported.

Management:

- Counsel parents / attendants
- Admit in the designated isolation ward
- Treatment
  i. Symptomatic treatment paracetamol, Vitamin C, Zinc
  ii. Tab Oseltamivir if flu A positive (doses as shown in Annexure1)
- Monitor patient for signs and symptoms of complicated disease
- If patients develop complicated disease, urgent referral to designated referral centre

b) Pneumonia
• Cough or difficulty in breathing **PLUS** fast breathing
• Fast breathing:
  ✓ Age <2 months: ≥60 breaths/min
  ✓ Age 2 – 11 months: ≥50 breaths/min
  ✓ Age 1 – 5 years: ≥40 breaths/min
• No signs of severe pneumonia
• SpO₂>90% in room air

**Management:**

- Counsel parents / attendants
- Admit in the designated isolation ward
- Investigations
  i. CBC, CRP, ESR, Ferritin, LDH
  ii. Blood cultures if indicated
  iii. CXR
- Treatment
  i. Symptomatic treatment paracetamol, Vitamin C, Zinc
  ii. Tab Oseltamivir if flu A positive (doses as shown in Annexure1 )
  iii. **Start on Tab/ Syr Amoxycillin if less than 5 years. In those more than 5 years, if suspicion of secondary bacterial pneumonia.**
  iv. Avoid IV fluids
- Monitor patient for signs and symptoms of complicated disease
- If patients develop complicated disease, urgent referral to designated referral centre
  o **# Risk factors:** -Chronic lung disease, Heart disease, Diabetes, Asthma, CKD, Immunocompromised

c) **Severe pneumonia**

• Cough or difficulty in breathing or Fast breathing

**PLUS AT LEAST ONE OF THE FOLLOWING** (signs of severe pneumonia)

• Central cyanosis or SpO₂<90%
• Severe respiratory distress (grunting, very severe chest in-drawing)
• Signs of pneumonia with a general danger sign
  ✓ Inability to breastfeed or drink
✓ Lethargy or unconsciousness or convulsions

d) Sepsis

**Children**: Systemic inflammatory response syndrome (SIRS) is present when a child has:

✓ an abnormality of temperature (fever or hypothermia) OR
✓ age-specific abnormality of the white blood cell count AND
✓ one of the following: tachycardia, bradycardia, respiratory distress, or pulmonary condition requiring mechanical ventilation

<table>
<thead>
<tr>
<th>Age group</th>
<th>Heart rate (beats/minute)</th>
<th>Respiratory rate (breaths/minute)</th>
<th>Leukocyte count (leukocytes x 103/mm3)</th>
<th>Systolic blood pressure (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New born (0 days to 1 week)</td>
<td>&gt;180</td>
<td>&gt;50</td>
<td>&gt;34</td>
<td>&lt;59</td>
</tr>
<tr>
<td>Neonate (1 week to 1 month)</td>
<td>&gt;180</td>
<td>&gt;40</td>
<td>&gt;19.5 or &lt;5</td>
<td>&lt;79</td>
</tr>
<tr>
<td>Infant (1 month to 1 year)</td>
<td>&gt;180</td>
<td>&gt;34</td>
<td>&gt;17.5 or &lt;5</td>
<td>&lt;75</td>
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<tr>
<td>Toddler and preschool (&gt;1 to 5 years)</td>
<td>&gt;140</td>
<td>NA</td>
<td>&gt;22</td>
<td>&gt;15.5 or &lt;6</td>
</tr>
<tr>
<td>School age (&gt;5 to 12 years)</td>
<td>&gt;130</td>
<td>NA</td>
<td>&gt;18</td>
<td>&gt;13.5 or &lt;4.5</td>
</tr>
<tr>
<td>Adolescent (&gt;12 to &lt;18 years)</td>
<td>&gt;110</td>
<td>NA</td>
<td>&gt;14</td>
<td>&gt;11 or &lt;4.5</td>
</tr>
</tbody>
</table>

**Sepsis**: SIRS in the presence of suspected or proven infection constitutes sepsis.

**Management of Severe Pneumonia and Sepsis**
➢ Counsel parents / attendants
➢ Admit in the designated isolation ward
➢ Investigations
  i. CBC, CRP, ESR, RFT/serum electrolytes, Calcium, Magnesium, LFT, serum albumin, RBS, Ferritin, RBS, LDH, CPK, PT,INR,
  ii. Blood and urine cultures if indicated
  iii. CXR / USG chest
  iv. Consider CT chest
➢ Treatment
  i. Start Oxygenation and target SpO2 >90%
  ii. Tab Oseltamivir if flu A positive (doses as shown in Annexure1)
  iii. Inj Ceftriaxone
  iv. Add Azithromycin if atypical organism suspected
  v. Dexamethasone for those requiring oxygen
  vi. IV fluids - two third maintenance if required

e) Septic shock

Children: Septic shock refers to sepsis with cardiovascular dysfunction* that persists despite the administration of ≥40 mL/kg of isotonic fluid in one hour

*Cardiovascular dysfunction - Hypotension (SBP <5th centile), or reliance on a vasoactive drug to maintain blood pressure, or two of the following: metabolic acidosis, elevated arterial lactate, oliguria, or prolonged capillary refill more than 3 seconds.

Management
➢ Counsel parents / attendants
➢ Admit in the designated isolation ward
➢ Investigations
  i. CBC, CRP, ESR, RFT/serum electrolytes, Calcium, Magnesium, LFT, serum albumin, RBS, Ferritin, RBS, LDH, CPK, PT,INR
  ii. Blood and urine cultures if indicated
  iii. CXR
  iv. Consider CT chest
➢ Treatment
  i. Start Oxygenation and target SpO2 >90%
  ii. Tab Oseltamivir if flu A positive (doses as in Annexure1)
  iii. IV piperacillin/tazobactam / Meropenem or as per the culture report. If NA - give stat dose of Ceftriaxone
  iv. IV fluid resuscitation - use NS or RL for initial boluses with 20 -40 ml/kg
v. Initiate vasopressor treatment if not responding to fluids or in fluid overload and shock: start after initial bolus
   a. Warm shock: Noradrenaline
   b. Cold shock: Epinephrine
vi. If features of fluid overload appear (e.g. jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly in children), then reduce or discontinue fluid administration
vii. Dexamethasone for those requiring oxygen, mechanical ventilation
viii. Consider Central Venous Access if starting vasopressors
➢ Urgent referral to designated referral centre

f) Pediatric acute respiratory distress syndrome (PARDS)

I. Onset: within 1 week of a known clinical insult or new or worsening respiratory symptoms.

II. Chest imaging (Chest X-ray/CT scan/ lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse or nodules

III. Origin of pulmonary infiltrates: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of infiltrates/oedema if no risk factor present.

IV. At risk of developing PARDS: Children requiring FiO2 ≥40% to attain SpO2 88%–92% with nasal mask CPAP/BiPAP or those requiring age-based oxygen flow rate via mask or nasal cannula to maintain SpO2 88%–97% (<1 Year: 2 L/min, 1–5 Years: 4 L/min, 5–10 Years: 6 L/min and >10 Years: 8 L/min).

V. Oxygenation: Use PaO2-based metric when available. If PaO2 not available, wean FiO2 to maintain SpO2 ≤97% to calculate OSI or SpO2/FiO2 ratio. Cyanotic congenital heart has no OI or OSI based cut off for definition of PARDS
  ✓ Bilevel NIV or CPAP ≥5cmH2O via full face mask: PaO2/FiO2 ≤ 300mmHg or SPO2/FiO2 ≤ 264
✓ Mild ARDS (invasively ventilated): OI ≤ 8 OR OSI 5 ≤ 7.5
✓ Moderate ARDS (invasively ventilated): OI 8 ≤ 16 OR OSI 7.5 ≤ 12.3
✓ Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3

* OI (oxygenation index) = (FiO₂ x Mean airway pressure x 100) / PaO₂
* OSI (Oxygenation saturation index) = (FiO₂ x Mean airway pressure x 100) / SpO₂

Management

➢ Counsel parents / attendants
➢ Admit in the designated isolation ward
➢ Investigations
  i. CBC, CRP, ESR, RFT/serum electrolytes, Calcium, Magnesium, LFT, serum albumin, RBS, Ferritin, RBS, LDH, CPK, PT, INR
  ii. Blood and urine cultures if indicated
  iii. CXR
  iv. CT chest
➢ Treatment
  i. Start Oxygenation and target SpO₂ >90%
  ii. Tab Oseltamivir if flu A positive (doses as in Annexure1)
  iii. IV piperacillin/tazobactam / Meropenem or as per the culture report. If not available then give a stat dose of Ceftriaxone and refer
  iv. Dexamethasone
➢ Oxygenation
  ➢ Start with nasal cannula under a surgical mask. The maximum flow rate without humidification is 1 L/min in neonates, 2 L/min in infants, 4 L/min in preschool children and 6 L/min in schoolchildren.
  ➢ If requiring >5L via nasal cannula, change to face mask with reservoir bag at 8-10 L/min. Keep a surgical mask over the face mask if possible. Higher flow rates without effective humidification may cause drying of nasal mucosa, with associated bleeding and airway obstruction.
  ➢ Use HFN oxygen for children if available. Put a surgical mask over the face if possible
  ➢ If no improvement within 1-2 hours intubate and put on mechanical ventilator
➢ A lower level of plateau pressure (<28 cmH₂O) is targeted, and lower target of pH is permitted (7.15–7.30).
➢ Tidal volumes should be adapted to disease severity: 3–6 mL/kg PBW in the case of poor respiratory system compliance, and 5–8 mL/kg PBW with better preserved compliance.
➢ Prone ventilation may be considered in severe ARDS in children.
➢ In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested.
➢ PEEP of 10-15 cmH₂O which can be increased to >15 in case of severe ARDS.
➢ Permissive hypercapnia is acceptable for moderate to severe paediatric ARDS.
➢ Should receive effective targeted sedation.
➢ Neuromuscular blockade may be considered if sedation alone is inadequate to achieve effective mechanical ventilation.

➢ Urgent referral to designated referral centre.

G). Multisystem Inflammatory syndrome in children (MIS-C)

Children and adolescents 0–19 years of age with fever > 3 days

AND two of the following:
  a) Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs (oral, hands or feet).
  b) Hypotension or shock.
  c) Features of myocardial dysfunction, pericarditis, valvulitis, or coronary abnormalities (including ECHO findings or elevated Troponin/NT-proBNP).
  d) Evidence of coagulopathy (by PT, PTT, elevated d-Dimers).
  e) Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain).

AND Elevated markers of inflammation such as ESR, CRP, or procalcitonin.

AND No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes.

AND Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

- Patients with MIS-C encompass a broader age range, have more prominent GI and neurologic symptoms, present more frequently in shock, and are more likely...
to display cardiac dysfunction (arrhythmias and ventricular dysfunction) than children with KD

- At presentation, patients with MIS-C tend to have lower platelet counts, lower absolute lymphocyte counts, and higher CRP levels than patients with KD
- Epidemiologic studies of MIS-C suggest that younger children are more likely to present with KD-like features while older children are more likely to develop myocarditis and shock

Management

➢ Counsel parents / attendants
➢ Admit in the designated isolation ward
➢ Investigations
  i. CBC, CRP, ESR, RFT/serum electrolytes, Calcium, Magnesium, LFT, serum albumin, RBS, Ferritin, RBS, LDH, CPK, PT,INR, pancreatic enzymes
  ii. ECG
  iii. Echocardiography
iv. Urine RE

- For MISC- IVIG 2gm/kg.
- Add low moderate dose (1-2 mg/kg/day) glucocorticoids for those with shock, organ threatening disease, persistent fever and symptomatic disease after IVIG,
- In patients who do not respond to IVIG and low-moderate dose glucocorticoids, high dose, IV pulse glucocorticoids (10-30 mg/kg/day) may be considered, especially if a patient requires multiple or high dose ionotropes
- In patients with refractory MIS-C despite a single dose of IVIG, a second dose of IVIG is not recommended given the risk of volume overload and hemolytic anemia associated with large doses of IVIG

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**Figure 2. Algorithm for Initial Immunomodulatory Treatment in MIS-C**

- Low dose aspirin (3-5 mg/kg/day; max 81 mg/day) should be used in patients with MIS-C and continued until normalization of platelet count and confirmed normal coronary arteries at ≥4 weeks after diagnosis. Avoid in patients with active bleeding, significant bleeding risk, and/or platelet count ≤80,000/µL.
➢ MIS-C patients with Coronary artery aneurysm and a maximal z-score of 2.5-10.0 should be treated with low dose aspirin. Patients with a z-score ≥10.0 should be treated with low dose aspirin and therapeutic anticoagulation with enoxaparin or warfarin
➢ Patients with MIS-C and documented thrombosis or an ejection fraction (EF) <35% should receive Enoxaparin for at least 2 weeks after discharge from hospital
➢ Indications for longer outpatient therapeutic enoxaparin dosing include: CA with z-score >10.0 (indefinite treatment), documented thrombosis (treatment for ≥3 months pending thrombus resolution), or ongoing moderate to severe LV dysfunction
➢ **Urgent referral to designated referral centre**

WHO severity definitions

Disease severity

<table>
<thead>
<tr>
<th>Non-severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of signs of severe or critical disease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>SpO₂ &lt; 90% on room air</td>
</tr>
<tr>
<td>Respiratory rate &gt; 30 in adults</td>
</tr>
<tr>
<td>Raised respiratory rate in children</td>
</tr>
<tr>
<td>Signs of severe respiratory distress</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires life sustaining treatment</td>
</tr>
<tr>
<td>Acute respiratory distress syndrome</td>
</tr>
<tr>
<td>Sepsis</td>
</tr>
<tr>
<td>Septic shock</td>
</tr>
</tbody>
</table>

Respiratory rate;

≥ 60 breaths/min in children < 2 months old;
≥ 50 in children 2–11 months old;
and ≥ 40 in children 1–5 years old;
> 30 in children > 5 years old

Signs of severe respiratory distress (accessory muscle use, inability to complete full sentences, and, in children, very severe chest wall indrawing, grunting, central cyanosis, or presence of any other general danger signs).
4. Care of baby born to COVID19 positive woman

➢ Provide early essential newborn care (EENC)
➢ Initiate direct breast feeding. If mother is not well enough - give expressed breast milk or donor milk
➢ Practice infection control measures* for the mother
➢ Keep women and their healthy babies together in the immediate postpartum period, if they do not otherwise require maternal critical care or neonatal care
➢ Shift baby to Isolation ward (observation area) if baby requires neonatal care or if mother cannot breastfeed and nurse baby in incubator.
➢ Testing for COVID 19 at 24 hours and repeat at 48 hours to be done for all babies born to COVID 19 positive mothers
   ❖ If two test negative, baby is stable and breastfeeding, keep with mother and repeat COVID 19 test before discharge of mother
   ❖ If two tests negative but baby is sick – shift to hospital NICU, separate room if available or nurse in a corner bed
   ❖ If two tests negative and baby stable and not on breastfeeds – discharge home
   ❖ If baby positive – manage as a case in the isolation ward.

*Infection control measures

- Perform frequent hand hygiene with soap and water or alcohol-based hand rub, especially before contact with her child.
- Perform respiratory hygiene: sneeze or cough into a tissue and immediately dispose of the tissue. Hands should immediately be washed with soap and water or alcohol-based hand rub.
- Clean and disinfect surfaces with which the mother has been in contact.
- Wear a medical mask until symptom resolution and criteria for release from isolation have been met.
- Additionally, breastfeeding mothers should be helped to clean her chest with soap and water if she has been coughing on it before breastfeeding. She does not need to wash her breasts prior to every breastfeed.
5. Advanced life support for children and neonates

i. General principles for resuscitation

➢ Protect themselves and their colleagues from unnecessary exposure
➢ Close the door, when possible, to prevent airborne contamination of adjacent indoor space
➢ Attach a bacterial / viral filter securely to any manual or mechanical ventilation device in the path of exhaled gas before administering any breaths
➢ Patients should be intubated with a cuffed tube, at the earliest feasible opportunity.
➢ Minimize the likelihood of failed intubation attempts by assigning the provider and approach with the best chance of first-pass success to intubate
➢ Pausing chest compressions to intubate
➢ Video laryngoscopy may reduce intubator exposure to aerosolized particles and should be considered, if available.
➢ Before intubation, use a bag-mask device (or T-piece in neonates) with a HEPA filter and a tight seal, or, for older children, consider passive oxygenation with non-rebreathing facemask (NRFM), covered by a surgical mask.
➢ If intubation is delayed, consider manual ventilation with laryngeal mask airway or bag-mask device with a HEPA filter.
➢ Minimize disconnections to reduce aerosolization.
➢ Use closed suctioning device

ii. Cardiac arrest on the ventilator

➢ Leave the patient on a mechanical ventilator with HEPA filter to maintain a closed circuit and reduce aerosolization.
➢ Adjust the ventilator settings to allow for asynchronous ventilation (time chest compressions with ventilation in newborns).
➢ Increase the FIO2 to 1.0.
➢ Change mode to Pressure Control Ventilation (Assist Control) and limit pressure as needed to generate adequate chest rise (6 mL/kg ideal bodyweight is often targeted, 4-6 mL/kg for neonates).
➢ Adjust the trigger to Off to prevent the ventilator from auto-triggering with chest compressions and possibly prevent hyperventilation and airtrapping.
➢ Adjust respiratory rate to 10/min for pediatrics and 30/min for neonates.
Assess the need to adjust positive end-expiratory pressure level to balance lung volumes and venous return.

Adjust alarms to prevent alarm fatigue.

Ensure endotracheal tube/tracheostomy and ventilator circuit security to prevent unplanned extubation.

If return of spontaneous circulation is achieved, set ventilator settings as appropriate to patients’ clinical condition.

Proned patients at the time of arrest

❖ For suspected or confirmed COVID-19 patients who are in a prone position without an advanced airway, attempt to place in the supine position for continued resuscitation.

❖ While the effectiveness of CPR in the prone position is not completely known, for those patients who are in the prone position with an advanced airway, avoid turning the patient to the supine position unless able to do so without risk of equipment disconnections and aerosolization. Instead, consider placing defibrillator pads in the anterior-posterior position and provide CPR with the patient remaining prone with hands in the standard position over the T7/10 vertebral bodies.

iii. Neonatal resuscitation

➢ Routine neonatal care and the initial steps of neonatal resuscitation are unlikely to be aerosol-generating; they include drying, tactile stimulation, assessment of heart rate, placement of pulse oximetry and electrocardiograph leads.

➢ Place baby in plastic bag / wrap

➢ Suctioning is an aerosol-generating procedure and is NOT indicated for uncomplicated deliveries.

➢ Avoid endotracheal medications: Endotracheal instillation of medications, such as surfactant or epinephrine, are aerosol-generating procedures, especially via an uncuffed tube.

➢ Intravenous delivery of epinephrine via a low-lying umbilical venous catheter is the preferred route of administration during neonatal resuscitation.

➢ Closed incubators: Closed incubator transfer and care

6. WHEN TO DISCHARGE

✓ Resolution of clinical symptoms for 3 consecutive days AND

✓ Documented virologic clearance of 2 samples 24 hours apart.

✓ Facility de-isolation for two weeks followed by RT-PCR:
If RT-PCR is negative, discharge home.
If RT-PCR positive, extend facility de-isolation for one more week if asymptomatic; re-assess if symptomatic.
✓ For asymptomatic patients, repeat RT PCR after 1 week.

7. REFERENCES


iii. https://emcrit.org/ibcc/covid19/


8. Annexures

Annexure 1: Drug doses

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Age</th>
<th>Dose</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Oseltamivir</td>
<td>&gt; 2weeks - &lt; 1 year</td>
<td>3mg/kg</td>
<td>BD</td>
</tr>
<tr>
<td></td>
<td>1 - 12 years (10 - 15Kg)</td>
<td>30mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 - 12 years (15 - 23 kg)</td>
<td>45mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 - 12 years (23-45 kg)</td>
<td>60 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-12 years (&gt; 40 kg)</td>
<td>75 mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>75mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 month – 18 years</td>
<td>15 – 30mg/kg</td>
<td></td>
</tr>
<tr>
<td>2. Ceftriaxone</td>
<td>1 month -11 years (body weight upto 50 kg)</td>
<td>50 -80 mg/kg</td>
<td>Once daily for 7 days</td>
</tr>
<tr>
<td></td>
<td>9 -17 years (body weight 50kg and above)</td>
<td>1 - 2 g</td>
<td></td>
</tr>
<tr>
<td>3. Azithromycin</td>
<td>Body weight &gt; 15kg</td>
<td>10mg/kg</td>
<td>Once a day for 3 days</td>
</tr>
<tr>
<td></td>
<td>Body weight 15 – 25kg</td>
<td>200mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body weight 26 – 35kg</td>
<td>300mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body weight 36 – 45kg</td>
<td>400mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Body weight &gt; 46kg</td>
<td>500mg</td>
<td></td>
</tr>
<tr>
<td>4. IVIG</td>
<td>2 gm/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Methyl prednisolone</td>
<td>10-30 mg/kg /day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Aspirin</td>
<td>3- 5 mg/kg/day</td>
<td>OD</td>
<td>At least 4 weeks</td>
</tr>
<tr>
<td>7. Dexamethasone</td>
<td>0.15mg/kg/day ( max 6 mg)</td>
<td>OD</td>
<td>10 days Then taper off</td>
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</table>

Annexure 2 : Paediatric Treatment Based on Clinical scenario

<table>
<thead>
<tr>
<th>Clinical syndrome</th>
<th>Recommendations</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Asymptomatic or mild illness</td>
<td>Symptomatic treatment with pcm, zinc, vitC</td>
<td>CBC, CRP, ESR, ferritin, LDH,</td>
</tr>
</tbody>
</table>
| *(URTI)* | 2. Pneumonia < 5 years | - Symptomatic treatment with pcm, zinc, vitC  
- Start amoxicillin for 7 days |
|  | - Flu test  
- Blood cultures if indicated  
- CXR |
| 3. Pneumonia > 5 years | - Symptomatic treatment with pcm, zinc, vitC  
- Start amoxicillin if clinical suspicion of secondary bacterial infection |
|  | - CBC, CRP, ESR, ferritin, LDH,  
- Flu test  
- Blood cultures if indicated  
- CXR |
| 4. Severe Pneumonia | - Symptomatic treatment with pcm, zinc, vitC  
- Start Ceftriaxone +/- Azithromycin  
Add Dexamethasone if patient on O2 |
| 5. Sepsis | - CBC, CRP, ESR, RFT/SE, LFT, RBS, ferritin, LDH, PT, INR  
- Flu test  
- Blood cultures if indicated  
- CXR  
- Consider CT Chest |
| 6. Multisystem inflammatory syndrome in children (MIS-C) | - IVIG for MIS-C  
- Aspirin  
- Enoxaparin |
|  | - CBC, CRP, ESR, RFT/SE, LFT, RBS, ferritin, LDH, PT, INR  
- ECG  
- Echocardiography |
| 7. ARDS | - Start Piperacillin/Tazobactam / Meropenem  
Add Dexamethasone if patient on O2  
- IVF and inotropes for shock |
| 8. Septic shock | - CBC, CRP, ESR, RFT/SE, LFT, RBS, ferritin, LDH, PT/INR  
- Flu test  
- Blood cultures if indicated  
- CXR  
- Consider CT chest |
| 9. Neonate born to COVID19 Confirmed mother | - Provide early essential newborn care (EENC)  
- Initiate direct breast feeding, if mother is not well enough - give expressed breast milk or donor milk  
- Practice infection control measures* for the mother  
- Keep women and their healthy babies together in the immediate postpartum period, if they do not otherwise require maternal critical care or neonatal care  
- Shift baby to Isolation ward (observation area) if baby requires neonatal care or if mother cannot breastfeed and nurse baby in incubator.  
- Testing for COVID 19 at 24 hours and repeat at 48 hours to be done for all babies born to COVID 19 positive mothers  
- If two tests negative, baby is stable and breastfeeding, keep with mother and repeat COVID 19 test before discharge of mother  
- If two tests negative but baby is sick – shift to hospital NICU, separate room if available or nurse in a corner bed  
- If two tests negative and baby stable and not on breastfeeds – discharge home  
- If baby positive – manage as a case in the isolation ward. |
|  | - Nasal and Throat swab for COVID 19  
- Blood tests if clinically indicated only  
- CXR if respiratory distress |

* 1. Counsel parents  
2. Admit in the designated isolation ward  
3. Oseltamivir for 5 days if flu test positive  
4. Stop oseltamivir if flu test is negative
Annexure 3:

BLS Healthcare Provider
Pediatric Cardiac Arrest Algorithm for 2 or More Rescuers for Suspected or Confirmed COVID-19 Patients

Updated April 2020

Verify scene safety
- Don PPE
- Limit personnel

Victim is unresponsive, Shout for nearby help. First rescuer remains with victim. Second rescuer activates emergency response system and retrieves AED and emergency equipment.

• Provide rescue breathing using bag-mask device with filter and tight seal.
  • 1 breath every 3-5 seconds, or about 12-20 breaths/min.
  • Add compressions if pulse remains ≤60/min with signs of poor perfusion.
  • Activate emergency response system (if not already done) after 2 minutes.
  • Continue rescue breathing; check pulse about every 2 minutes. If no pulse, begin CPR (go to “CPR” box).

Normal breathing, has pulse

Monitor until emergency responders arrive.

Look for no breathing or only gasping and check pulse (simultaneously). Is pulse definitely felt within 10 seconds?

No normal breathing, has pulse

No breathing or only gasping, no pulse

CPR
First rescuer begins CPR with 30:2 ratio (compressions to breaths) using bag-mask device with filter and tight seal.
When second rescuer returns, use 15:2 ratio (compressions to breaths). Use AED as soon as it is available.

AED analyzes rhythm. Shockable rhythm?

Yes, shockable

Give 1 shock. Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check), Continue until ALS providers take over or victim starts to move.

No, nonshockable

Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check), Continue until ALS providers take over or victim starts to move.

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Annexure 4:

BLS Healthcare Provider
Pediatric Cardiac Arrest Algorithm for the Single Rescuer
for Suspected or Confirmed COVID-19 Patients

Updated April 2020

Victim is unresponsive. Shout for nearby help. Activate emergency response system via mobile device (if appropriate).

- Define scene safety.
  - Don PPE
  - Limit personnel

No normal breathing, has pulse

No breathing or only gasping, no pulse

Witnessed sudden collapse?

Yes

Activate emergency response system (if not already done), and retrieve AED/defibrillator.

No

CPR

1 rescuer: begin cycles of 30 compressions and 2 breaths using bag-mask device with filter and tight seal.
(Use 15:2 ratio if second rescuer arrives.) Use AED as soon as it is available.

After about 2 minutes, if still alone, activate emergency response system and retrieve AED (if not already done).

AED analyzes rhythm.

- Shockable rhythm?
  - Yes
    - Give 1 shock. Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check). Continue until ALS providers take over or victim starts to move.
  - No, nonshockable
    - Resume CPR immediately for about 2 minutes (until prompted by AED to allow rhythm check). Continue until ALS providers take over or victim starts to move.

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Annexure 5:

Pediatric Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

1. Don PPE
   - Limit personnel

2. Start CPR
   - Ventilate with oxygen using bag-mask device with filter and tight seal, if unavailable use nonbreathing face mask
   - Attach monitor/defibrillator
   - Prepare to intubate

   - If rhythm shockable, go to step 9
   - If asystole/PEA, go to step 3

3. Shock Energy for Defibrillation
   - First shock 2 J/kg, second shock 4 J/kg, subsequent shocks 8-10 J/kg, maximum 10-20 J/kg or adult dose

4. Advanced Airway
   - Minimize closed-circuit disconnection
   - Use intubator with highest likelihood of first pass success
   - Consider video laryngoscopy
   - Prefer cuffed endotracheal tube if available
   - Endotracheal intubation or supraglottic advanced airway
   - Waveform capnography or capnometry to confirm and monitor ET tube placement
   - Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

5. Prioritize Intubation / Resume CPR
   - Pause chest compressions for intubation
   - If intubation delayed, consider supraglottic airway or bag-mask device with filter and tight seal
   - Connect to ventilator with filter when possible

6. CPR 2 min
   - IO/IV access
   - Rhythm shockable?

   - Yes: Shock

   - No: CPR 2 min
     - Epinephrine every 3-5 min

7. Shock
   - Rhythm shockable?

   - Yes: CPR 2 min
     - Epinephrine every 3-5 min

   - No: CPR 2 min
     - Treat reversible causes

8. CPR 2 min
   - Amiodarone or lidocaine
   - Treat reversible causes

9. Rhythm shockable?

   - Yes: CPR 2 min
     - Epinephrine every 3-5 min

   - No: CPR 2 min
     - Treat reversible causes

10. CPR 2 min
    - IO/IV access
    - Rhythm shockable?

   - Yes: Shock

   - No: CPR 2 min
     - Treat reversible causes

11. CPR 2 min
    - Treat reversible causes

12. CPR 2 min
    - Amiodarone or lidocaine
    - Treat reversible causes

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CPR Quality
- Push hard (≥ 60% of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- No advanced airway.
- 15:2 compression-ventilation ratio.

Drug Therapy
- Epinephrine: 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Repeat every 3-5 minutes.
- Amiodarone: 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory Vf or pulseless VT.
- Lidocaine: 1 mg/kg loading dose. Maintenance: 20-50 mcg/kg per minute infusion (repeat bolus dose if infusion interrupted >15 minutes after initial bolus therapy).

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes
- Hypovolemia
- Hypoxia
- Hypothermia
- Hyperglycemia
- Hypothyroidism
- Hypertension
- Tension pneumothorax
- Tamponade, cardiac
- Toxic
- Thrombosis, pulmonary
- Thrombosis, coronary

If no signs of return of spontaneous circulation (ROSC), go to 10 or 11
If ROSC, go to Post-Cardiac Arrest Care

Go to 5 or 7