## GHILDREN





# **CLINICAL FEATURES**





Majority of children with covid infection may be asymptomatic or mildly symptomatic

 Common symptoms include- fever, cough, breathlessness/ shortness of breath, fatigue, myalgia, rhinorrhea, sore throat, diarrhea, loss of smell, loss of taste etc



Few children may present with gastrointestinal symptoms and atypical symptoms



A new syndrome named multi system inflammatory syndrome has been described in children. Such cases are characterized by:

- Unremitting fever > 38°C
- Epidemiological linkage with SARS CoV 2
- Clinical features suggestive of Multi System Inflammatory Syndrome

## MANAGEMENT OF COVID-19 IN CHARLES TO BE TO THE STATE OF COVID-19 IN CHARLES TO THE STATE OF COVID-19 IN COVID-19 IN COVID-19 IN COVID-19 IN COVID-19 IN COVID-19 IN COVID-19 I











Asymptomatic children are usually identified while screening, if family members are identified

 Require monitoring for development of symptoms & subsequent treatment according to assessed severity



Children with mild disease may present with sore throat, rhinorrhea, cough with no breathing difficulty. Few children may have gastrointestinal symptoms

They do not need any investigations



These children can be managed at home with home isolation & symptomatic treatment



Children with underlying comorbid conditions including congenital heart disease, chronic lung diseases, chronic organ dysfunction, obesity may also be managed at home

## CHILDREN





# MILD CASES TREATMENT: HOME ISOLATION

(1/2)





**For Fever**: Paracetamol 10-15 mg/kg/dose; may repeat every 4-6 hours



**For Cough**: Throat soothing agents like warm saline gargles in older children & adolescents



**Fluids & feeds**: Ensure oral fluids to maintain hydration, and nutritious diet



Antibiotics: Not indicated

## GHILDREN







(2/2)





There is no role of Hydroxychloroquine, Favipiravir, Ivermectin, lopinavir/ritonavir, Remdesivir, Umifenovir, Immunomodulators including Tocilizumab, Interferon B1a, Convalescent plasma infusion or dexamethasone



Maintain monitoring chart including counting of respiratory rates 2-3 times a day, look for chest indrawing, bluish discolouration of body, cold extremities, urine output, oxygen saturation, fluid intake, activity level, especially for young children



Parent/ caregivers to contact the doctor in case of emergency

## CHILDREN







(1/3)





A child to be categorized as moderate Covid-19 Case if he/she has the following:

- Rapid Respiration (Age based) as follows:
  - Respiratory rate >60/ min for less than 2 months
  - Respiratory rate >50/min for less 2 to 12 months
  - Respiratory rate >40/min for 1 to 5 years
  - Respiratory rate >30/min for more than 5 years
- And oxygen saturations in all these age groups to be above 90%



Child may be suffering from pneumonia which may not be clinically apparent

## CHILDREN







(2/3)





**Investigations**: No lab tests required routinely unless indicated by associated comorbid conditions



**Treatment**: To be admitted in Dedicated Covid Health Centre or Secondary level Healthcare Facility & monitored for clinical progress

- Maintain fluid & electrolyte balance
- Encourage oral feeds (breast feeds in infants)
- If oral intake is poor, intravenous fluid therapy should be initiated

## CHILDREN







(3/3)





#### Child to be administered:

- For fever: Paracetamol 10-15 mg/kg/dose. May be repeated every 4-6 hourly. (temperature > 38°C, i.e. 100.4°F)
- Amoxycillin to be administered, if there is evidence/strong suspicion of bacterial infection
- For SpO2 below 94%, oxygen supplementation is required
- Corticosteroids may be administered in rapidly progressive disease. Not required in all children with moderate illness, specifically during the first few days of illness
- Supportive care for comorbid conditions, if any

## CHILDREN





## SEVERE COVID-19 CASES (1/4)





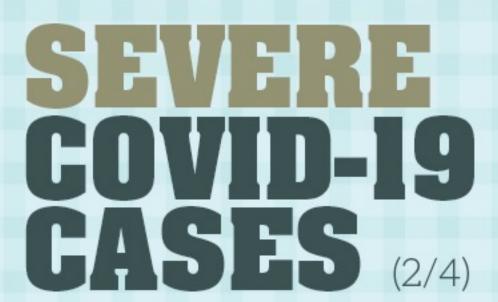
Children with SpO2 level less than 90% are categorized as having severe Covid-19 infection

- They may have severe pneumonia, Acute Respiratory Distress Syndrome, Septic Shock, Multi-organ dysfunction syndrome, or pneumonia with cyanosis
- Clinically, such children may present with grunting, severe retraction of chest, lethargy, somnolence, seizure
- Such children should be admitted in Dedicated Covid Hospital/ Secondary/ Tertiary level healthcare facility
- Few children may require HDU/ICU care & should be assessed for;
  - thrombosis, hemophagocytic lymphohistiocytosis (HLH) & organ failure

## CHILDREN











**Investigations:** Complete blood counts, liver and renal function tests, Chest X-ray



**Treatment:** Intravenous fluid therapy

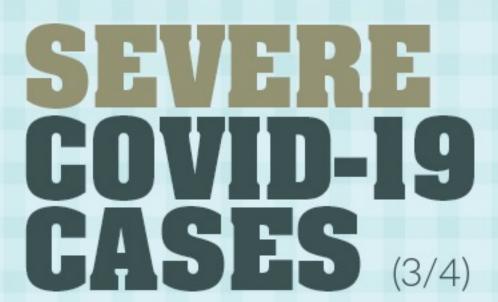
- Corticosteroids: Dexamethasone 0.15 mg/kg per dose (max 6 mg) twice a day. Equivalent dose of methylprednisolone may be used for 5-14 days depending on clinical assessment
- Antiviral agents: Remdesivir granted for EUA\*, to be used in a restricted manner within three days of onset of symptoms after ascertaining that child's renal & liver functions are normal & to be monitored for side effects
- Suggested doses (body weight based):
  - >40 kg: 200 mg on 1st day then 100 mg once daily for 4 days
  - 3.5 to 4 kgs: 5mg/kg on the 1st day, 2.5 mg/kg once daily for 4 days
  - No role of Hydroxychloroquine, Favipiravir, Ivermectin, lopinavir/ritonavir, Umifenovir

<sup>\*</sup>Emergency Use Authorization

## CHILDREN











Children may need organ support in case of organ dysfunction; e.g. Renal Replacement Therapy



## Management & Treatment of Acute Respiratory Distress Syndrome (ARDS):

- Mild ARDS: High Flow Nasal Oxygenation, Non-invasive ventilation may be given
- Severe ARDS: Mechanical ventilation may be given with low tidal volume
- If the child does not improve clinically even then, may consider (if available) High Frequency Oscillatory Ventilation, Extracorporeal Membrane Oxygenation
- Awake prone position may be considered in older hypoxemic children if they tolerate.

CHILDREN





## SEVERE COVID-19 CASES (4/4)





If the child develops septic shock or myocardial dysfunction then he/she may require:

 Crystalloid bolus administration: 10 to 20 ml/kg over 30 to 60 minutes; be cautious if cardiac dysfunction is there

 Early inotrope support with monitoring of fluid overload like any other cause of shock

IN CHILDREN & ADOLESCENTS
TEMPORALLY RELATED TO COVID-19

\*Multisystem Inflammatory Syndrome

### Traiting occiti intrairmitatory by maron

DIAGNOSTIC CRITERIA (1/2)









Children and adolescents, 0–19 years of age with fever ≥ 3 days AND two of these:

- Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs
- Hypotension or shock
- Rash or bilateral non-purulent conjunctivitis or muco-cutaneous inflammation signs
- Evidence of coagulopathy (by PT, PTT, elevated d-Dimers)
- Acute gastrointestinal problems (diarrhoea, vomiting, or abdominal pain)

AND	
$\Delta$ IIID	

IN CHILDREN & ADOLESCENTS
TEMPORALLY RELATED TO COVID-19

\*Multisystem Inflammatory Syndrome













Elevated markers of inflammation such as ESR, C-reactive protein, 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



Investigations: as listed above in criteria and investigations to rule out common differential diagnoses

## IN CHILDREN & ADOLESCENTS TEMPORALLY RELATED TO COVID-19

\*Multisystem Inflammatory Syndrome







(1/3)





Drugs to be used in case the child has cardiac dysfunction, shock, coronary involvement, multi organs dysfunction

- Steroids: Methylprednisolone
   1 to 2 mg/kg per day
- Intravenous Immunoglobulin 2 g/kg over 24 to 48 hours
- Antimicrobials



The child needs appropriate supportive care, preferably in ICU. In absence of cardiac dysfunction, shock, coronary involvement, multi organs dysfunction, one may use steroids or IVIG

## IN CHILDREN & ADOLESCENTS TEMPORALLY RELATED TO COVID-19

\*Multisystem Inflammatory Syndrome











If the child does not improve with the above treatment or deteriorates, options include:

- Repeat IVIg
- High dose corticosteroid (Methylprednisolone 10 to 30 mg/kg/day for 3 to 5 days)
- Aspirin: 3 mg/kg/day to 5 mg/kg/day max 81 mg/day (if thrombosis or Coronary Aneurysm Score is >2.5)
- Low Molecular Weight Heparin (Enoxaparin):
  - 1 mg/kg twice daily subcutaneously
  - Clotting Factor Xa should be between 0.5 to 1 (if patient has thrombosis/Coronary aneurysm score > 10 or LVEF < 30%)</li>

IN CHILDREN & ADOLESCENTS
TEMPORALLY RELATED TO COVID-19

\*Multisystem Inflammatory Syndrome







## TREATMENT

(3/3)



Steroids have to be tapered over 2 to 3 weeks while monitoring inflammatory markers



For children with cardiac involvement,

 Repeat ECG 48 hourly & repeat ECHO at 7 to 14 days and between 4 to 6 weeks
 (and after 1 year if initial ECHO was abnormal)