

# Child India

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Monthly e-Newsletter of Indian Academy of Pediatrics



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## Editor's Note

Dear colleagues,

Greetings from the June issue of Child India.

With expectations of the 3rd wave of COVID 19 and predictions for it to be pediatric centric, Child India decided to also chip in – like many other journals and the very popular IAP webinar – COWIN UDAY – and dedicate its June issue to COVID in children.



A 55-year-old individual from Hubei province in China may have been the first person to have contracted COVID 19 way back on Nov. 17, 2019 and the 1st reported confirmed case in India was on January 27, 2020 - a 20 yr old female who presented to the Emergency Department in General Hospital, Thrissur, Kerala.

And after slightly more than 1 ½ years of the pandemic, 174,945,012 cases and 3,771,086 deaths worldwide, many questions about this illness remain unanswered.

Everything regarding this illness – pathogenesis, symptomatology in various age groups, diagnostic parameters, treatment and vaccines – are dynamic and what we consider as evidence based today, is obsolete tomorrow. And this statement is specially true as far as pediatric COVID is concerned.

This issue has articles that detail our present knowledge about pediatric COVID and we take this opportunity to thank all contributors, specially our guest author, Dr Shekhar Sheshadri and his team for their valuable contributions.

Happy reading. Keep safe.

**Dr Jeison C Unni**

**Editor-in-Chief**

## President's Address

Dear colleagues,

Greetings.

1½ yrs of the COVID pandemic has outdone the calculations of infectious disease experts. This was because simple epidemiological and statistical models were employed by them for the global pandemic prediction. Due to a high level of uncertainty and lack of essential data, these standard models have shown low accuracy for long-term prediction. This pandemic has exhibited a nonlinear, complex nature and the numerous known and unknown variables involved in its spread, the complexity of behaviour of various populations around the world, the differences in containment strategies, COVID vaccine availability and immunisation rates has deranged prediction accuracy.

There is no textbook definition of what constitutes a wave in an epidemic. The term is used generically to describe the rising and declining trends of infections, that resembles the shape of a wave, over a prolonged period of time. Smaller regions within a country would have their own waves - Delhi, for example, has so far experienced four waves. India as a whole has had 2 waves - 1st peaking on Sept 16th and the 2nd on May 6th. The national curve seems to have entered a declining phase now and if current trend continues, it is expected that by July, India would reach the same level of case counts as in February. A fresh national surge (ignore the local surges in different parts of the country that are not powerful enough to change the direction of the national curve) would get classified as the third wave.

Usually, it is expected that every fresh wave would be weaker than the previous one as there would be far lower number of susceptible people. This logic, however, has been turned on its head in India's case. The reasons for the decline of cases after mid-September last year after only a very small fraction of the population had got infected and the five-month continuous lull in cases thereafter is still not very well understood. The 2nd wave took a heavier toll unlike expected and therefore the apprehensions that the third wave might be even stronger. There is also the fear that mutant strains could escape the immune responses developed in the already infected people, or those vaccinated. The IAP task force on COVID states that, unlike many predictions, it is highly unlikely that the third wave will predominantly or exclusively affect children'

However, we need to be prepared for the 3rd wave with more in-patient beds and intensive care beds for children. IAP has already developed the management protocol for disease categories in children. There is no reason to panic. Our preparations are in full swing.

Let us all continue working with missionary zeal to ensure care for children of our country throughout this pandemic and further on....

Warm regards - Stay safe

**Piyush Gupta**

National President, IAP 2021



## Secretary's Message

Dear All,

Greetings!

It has been an eventful month at the IAP Child India May 2021. We had a very successful Administrative Meeting via Video Conferencing with the IAP Office Bearers on 11th May 2021. My heartfelt thanks to everyone involved for participating in this meeting.



We have had many other committees that met this month like The IAP Website Committee Meeting, MISC Committee Meeting, IAP Core Committee Meeting, IAP Child Welfare Committee held in the month of May 2021, We also had the Periodic Review Meeting of CIAP staff on 10th May 2021.

This month we have conducted 50+ virtual workshops of our flagship program Mission Co-Win Uday. We are organizing virtual events all over India. So far, we have conducted programs in Delhi, Punjab, West Bengal, Odisha, Jharkhand, Maharashtra, Gujarat, Karnataka, Kerala, Tamilnadu, Telangana, Uttar Pradesh, Northeast, etc. There are many more such programs in the pipeline for upcoming days.

I also would like to mention about the TASK Module Zonal ToTs which organized excellently by South Zone ToT on 1st May 2021, North Zone ToT on 8th May 2021, East Zone ToT on 15th May & West Zone ToT on 22nd May accordingly. We also conducted WAR Program in Punjab State on 21st and 22nd May 2021. I am very happy to mention that; we also have the Dysbiosis module Program start from 5th June onwards.

It gives me immense pleasure to inform you all that the IAP Thrissur Branch Celebrated World Asthma Day on 4th May 2021, World Breast Feeding Protection day. IAP Navi Mumbai Branch celebrated International Thalassemia Day on 7th May 2021, and we look forward to having more such activities in future.

Overall, the month of May has been very fruitful and focused on academic growth for their members and we look forward to having more such activities in the coming months.

Jai IAP!! Jai Hind!!

Sincere Regards,

**Dr G V Basavaraja**

Hon. Secretary General 2020 & 21

# Management of Acute Covid-19 infection in Children

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## Introduction

Corona virus disease 2019 (Covid-19) was declared as pandemic by World health organization on 11 March 2020. Preparatory epidemiological information envisioned that the COVID-19 infection in children would be rare. Since then several case series have reported the clinical characteristics of COVID-19 in children and describe predominantly as asymptomatic or milder illness severity in pediatric population as compared with adults. As we progressed in the pandemic it was observed that children can present with a wide spectrum of disease severity ranging from acute respiratory distress syndrome (ARDS) to diverse hyperinflammatory states leading to hospitalization and intensive care admission.

## Epidemiology :

According to a published report by American Academy of Pediatrics, more than 3.63 million children have tested positive, since the beginning of the pandemic, which constitute about 13.6% of all cases. The rate of hospitalization and mortality is about 0.8% and 0.06% respectively. Recent Indian Council of Medical Research (ICMR) data revealed population below 20 years comprised 11.73% of total cases in India. Reports show a lower need for hospitalization, but 10-20% of hospitalized children may need admission in intensive care unit (ICU). Mortality rate (0-0.7%) in children is lower as compared to adults. The reasons may be due to low expression of ACE 2 and TMPRSS2 receptor, robust innate immunity and weak adaptive immunity, decrease expression of toll like receptors (TLR) and increase regulatory T cells and greater capacity of endothelial regeneration.

Clinical Manifestation - Symptom-based screening for identification of SARS-CoV-2 in

children particularly challenging due to the lack of specificity of signs or symptoms and significant proportion of asymptomatic infections.

- Fever
- Respiratory tract – Cough, nasal congestion or rhinorrhea, new loss of taste or smell, sore throat, shortness of breath or difficulty breathing.
- Gastrointestinal - Abdominal pain, diarrhea, nausea or vomiting, poor appetite. Rarely pancreatitis and hepatitis.
- General – Fatigue, headache, myalgia

## Investigation

- Evaluate all admitted children with CBC, LFT, RFT, CRP, d -dimer, chest x-ray. Send blood culture if bacterial co-infection is suspected. Repeat laboratory investigation after 48-72 hours if clinically indicated.
- Possible tropical infections like malaria, typhoid, dengue, scrub typhus and Leptospira to be ruled out
- Selected patients with shock or cardiac involvement may need Echocardiography, ECG and cardiac biomarkers( (troponin, CK, CK MB and NT-proBNP)
- ABG, Lactate, Ferritin, Procalcitonin, Coagulation profile in severe and critically ill patients.

## Chest X-ray (CT Thorax is best –

Chest C–ray should be considered in patients with COVID-19 presenting with moderate-to-severe acute respiratory illness symptoms. However, sensitivity and specificity is less, a negative chest radiograph does not exclude pulmonary involvement.

Commonly reported chest radiographic

Severity	Clinical Presentation
<b>MILD</b>	<b>Fever and or any of the following -</b> 1. URTI – Cough, sore throat, coryza, nasal obstruction) 2. Diarrhoea and/vomiting with no dehydration/ some dehydration with good oral intake and good urine output 3. Loss of taste or smell (>8 year)
<b>MODERATE</b>	<b>Moderate to high grade temperature for 4 days or more and or</b> 1. <b>Fast breathing</b> (age based) ≥ 60/min for <2 months, ≥ 50/min for 2-12 months, ≥ 40/min for 1-5 years, ≥ 30/min for >5 years. 2. SPO <sub>2</sub> - <94% 3. Diarrhoea and /vomiting with severe dehydration and decreased oral intake 4. Decreased activity in between the fever spikes, decreased feeding.
<b>SEVERE</b>	1. <b>Severe pneumonia</b> Pneumonia with any of these, - Cyanosis (SpO <sub>2</sub> < 90%) - Increased respiratory efforts (grunting, severer retraction) 2. Lethargy, refusal to feed 3. Altered sensorium and/ seizure 4. Tachycardia disproportionate to the temperature. 5. Hypotension/shock 6. Fulfils MIS-C Criteria
<b>CRITICAL</b>	1. Refractory/super refractory status epilepticus. 2. Coma with GCS persistently < 8/15. 3. ARDS 4. Shock requiring inotropic agents 5. Myocarditis/Features of Heart failure 6. Oliguria/Acute Kidney Injury 7. Acute thrombotic Events 8. MODS

*Children with Co-morbidity (chronic neurological disorder, chronic respiratory disease, congenital heart disease, patients on immunosuppressive agents, chronic kidney disease) are high risk group and may contribute to 10-42% hospitalization.*

findings of COVID-19 pneumonia in children – Bilateral distribution peripheral and/or subpleural GGOs and/or consolidation.

## Chest CT Scan

- Should not be used for screening and diagnosis.
- Chest CT should be reserved for symptomatic hospitalized patients with worsening clinical course, not responding to supportive therapy and to rule out pulmonary thromboembolism.
- Following resolution of the acute infection CT may be needed to assess for development and/or evolution of fibrotic lung disease in patients with persistent alterations in pulmonary function tests

### Management –

#### MILD DISEASE

1. Home isolation (17 days from symptom onset)

2. Supportive care
  - a. Adequate hydration and feeding.
  - b. ORS for diarrhoea and vomiting.
  - c. Monitoring of vitals and activity.
  - d. Vitamin C, Vit D and Zinc may be considered. (No proven evidence)
3. Symptomatic care:
  - a. Paracetamol (10-15mg/kg/dose, not more than 5 times/day, minimum 4 hours gap between 2 doses)
  - b. Anti-histaminic / Saline nasal drops/ Decongestant drops may be considered to alleviate URTI symptoms.
  - c. Zinc ± probiotics for diarrhoea.
  - d. Domperidone/Ondansetron for vomiting.
4. Danger signs to be explained in details
5. Report to health care facilities if danger signs develops.

#### Danger signs – Any one of the following.

- Persistent fever for ≥ 5 days,
- Reappearance of fever,
- Reduced oral intake,
- Decreased urine output or signs of dehydration,
- becomes lethargic,
- Shortness of breath and SpO<sub>2</sub> < 94%

#### MODERATE DISEASE

1. Hospitalisation in Isolation/dedicated Pediatric covid ward settings.
2. Supportive Care
  - a. Adequate hydration and feeding. May need iv fluids and /or Nasogastric feeding.
  - b. ORS/IV fluids according to standard protocol.
  - c. Zinc ± probiotics to be considered for diarrhoea.
3. Symptomatic Care:
 

Oral Paracetamol (10-15mg/kg/dos, (not more than 5 times/day, minimum 4 hours gap between 2 doses)

## Domperidone/Ondansetron for vomiting.

3. Oxygen therapy: Give supplemental oxygen through nasal prongs/ face mask if oxygen saturation is less than 94 %.
4. MDI with Salbutamol and/Ipratropium may be considered in patients with pre-existing Reactive airway disease who presented with wheezing.
5. Avoid Nebulization
6. Systemic steroid: To be started if SpO<sub>2</sub><94%.\*
7. Consider awake proning in children > 8 yrs.
8. Remdesivir on case-to-case basis (respiratory)
9. Empirical antibiotics if bacterial co-infection is suspected.

## Severe and Critical Disease

Severe pneumonia - Child with clinical signs of pneumonia at least one of the following:

- Central cyanosis or SpO<sub>2</sub> < 90%
- Severe respiratory distress (e.g. grunting, very severe chest indrawing)
- Any of the general danger signs: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions.

## Pediatric ARDS –

- Acute onset (within 7 days of known clinical insult)
- Respiratory failure (not fully explained by cardiac failure or fluid overload) with
- Chest imaging findings of new infiltrate consistent with acute parenchymal disease with
- Exclusion of perinatal related lung disease with
- Mild -  $4 \leq OI < 8$ ,  $5 \leq OSI < 7.5$
- Moderate -  $8 \leq OI < 16$ ,  $7.5 \leq OSI < 12.3$
- Severe -  $OI \geq 16$ ,  $OSI \geq 12.3$

OI - Oxygenation Index ( $FIO_2 \times \text{mean airway pressure} \times 100$ )/PaO<sub>2</sub>,

OSI - Oxygenation Saturation Index ( $FIO_2 \times \text{mean airway pressure} \times 100$ )/SpO<sub>2</sub>

## Mild to Moderate ARDS

1. Start with High Flow Nasal Oxygen (HFNO) or

Non-invasive ventilation(NIV) as per the work of breathing.

2. Consider awake proning in older children
3. HFNO –
  - Flow rates @1.5-2L/kg/min up to 12kg, plus 0.5 L/kg/min for each kg above 12kg (to a maximum of 50 LPM) ,
  - FiO<sub>2</sub> - 21-50% .
  - Target SpO<sub>2</sub> > 94% at initial phase, later on 92-96% when patient stabilized.
  - FiO<sub>2</sub> requirement >60% and Flow 2 ml/kg - consider escalation to NIV
  - Provide Surgical mask to patient > 6 yrs
  - endotracheal intubation in case the patient acutely deteriorates, Haemodynamically unstable or poor GCS ( $\leq 8$ )
4. Non-invasive ventilation/BiPAP –
  - Helmet mask is ideal to reduce aerosol generation.
  - Mask should be properly fitted to minimize leak. Choose appropriate size full face mask.
  - Start with PIP(IPAP) – 10, PEEP(EPAP) – 5, FiO<sub>2</sub>-40%.
  - Escalate according to work of breathing (WOB), RR, SpO<sub>2</sub> .
  - Target SpO<sub>2</sub> – 92-96%.
    - Maximum increase of support PIP (IPAP)-15, PEEP(EPAP) – 8, FiO<sub>2</sub>-> 60% (persistently) – Escalate to Invasive Mechanical Ventilation(IMV)

## Severe ARDS

Tracheal intubation and invasive mechanical ventilation should be initiated if NIV failed. There should not undue delay for mechanical ventilation.

5. Invasive Mechanical Ventilation (IMV)
  - Try to avoid bagging prior to or after intubation
  - Should be intubated with a cuffed endotracheal tube.
  - Use of video laryngoscopy may be considered for intubation if available
  - Personal protective equipment (PPE) should be worn for intubation and extubation.

- Regular training and practices on mannequin will make the procedure safe and smooth
  - Avoid frequent disconnection, Close loop inline suction, HMEF, , nebulization (Use MDI or inline nebulization)
  - Use bacterial/viral filters at the expiratory limb of the patient circuit
  - Beware of endotracheal tube occlusion due to plugging caused by tenacious secretions
6. Mechanical Ventilation Strategy - Lung protective
- Low tidal volume (4-8 ml/kg – Lower TV in severe ARDS)
  - Peak pressure < 28-32 cmH2O
  - Mean Airway Pressure -18-20 cmH2O, Driving pressure < 16 cmH2O
  - PEEP – 6-10 cmH2O (higher in refractory hypoxia – titrate according to individual patient)
  - FiO2 - < 60%
  - Target Spo2 88–92% for severe ARDS, Permissive Hypercapnia – Pco2 up-to 55-60 if Ph > 7.2
  - Adequate Sedation- Analgesia ± Neuromuscular Blocked
  - Neuromuscular blockade -Consider early for 24–48hr if Pao2/Fio2 < 150; OI ≥ 16; OSI ≥ 10
  - Prone ventilation – 16 hrs/day in severe ARDS - if Pao2/Fio2 < 150; OI ≥ 16; OSI ≥ 10, especially if there is concomitant reduced lung compliance.
  - If refractory, HFOV, ECMO
  - Daily assessment for weaning and early extubation
7. General Supportive Care
- Restricted fluids, calculate fluid overload %age (FO%) and try to keep FO% <10%, Judiciously use diuretics.
  - Enteral nutrition as early as possible, try to achieve full feeds by 72 hours
  - Transfusion trigger Hb < 7 gm/dl if stable oxygenation and hemodynamic and < 10 g/dL if refractory hypoxemia or unstable shock.
8. Corticosteroid – Patient with moderate disease, requiring oxygen and severe disease/critical disease
- Inj Dexamethasone 0.15mg/kg/day as a single dose(maximum 6mg/day) for 5 to 14 days according to severity of the disease and clinical response.
  - Equivalent dose of other [ Prednisone (1 mg/kg/day, up to 40 mg/day)/Methylprednisolone (0.5-1 mg/kg in 2 divided doses, Maximum 80 mg ) steroids may be given.
  - Dose of corticosteroid is different for MIS-C.
9. Remdesivir – There are no comparative clinical data evaluating the efficacy or safety of remdesivir for COVID-19 in pediatric patients
- May be beneficial in children with emergent or increasing need of oxygen.
  - 3.5kg to 40 kg: 5mg/kg on day 1 and then 2.5mg/kg from day 2 to day 5.
  - >40 kg: 200mg on day 1 and then 100mg once daily from day 2 to day 5
  - To be used within 10 days of onset of Symptoms
  - Contraindicated if ALT/AST> 5 times normal and /or Creatinine Clearance <30 ml/min
10. Anticoagulant -Prevalence of thrombotic complication is 0.7% out of the global cohort and 1.1% out of the hospitalised patients in children.
- Recommendations on use/non-use of anticoagulant thromboprophylaxis in children hospitalized for COVID-19–related illness

Scenario	D-dimer >5 times upper limit of normal values	Non-COVID-19 clinical risk factors for HA-VTE (see Table 2)	Anticoagulant thromboprophylaxis suggested
Hospitalized for COVID-19	Yes	N/A	Yes
	No	One or more	Yes
– related illness		No	No

### Risk Factors for Venous Thromboembolism (VTE)

- Adolescents
- Obesity
- CVC
- Mechanical ventilation
- prolonged length of stay (>3 d)



- malignancy, nephrotic syndrome, inflammatory condition, congenital or acquired cardiac disease, post-splenectomy, Hemoglobinopathy, cystic fibrosis exacerbation

- Previous or family h/o VTE, known thrombophilia,
- Known thrombophilia (eg: protein S, protein C, or antithrombin deficiency; factor V Leiden; factor II G20210A; persistent antiphospholipid antibodies)

Dose – Low molecular Weight Heparin (LMWH)

- Prophylactic: 0.5 mg/kg SC BD
- Therapeutic dose: 1 mg/kg SC BD – Established thrombosis
- No contraindication or high risk for bleeding
- Unfractionated Heparin (10-12 U/kg/hr) if renal impairment

High Risk of Bleeding –

- Marked thrombocytopenia (eg, platelet count < 50,000
- hypofibrinogenemia (eg, fibrinogen activity < 100 mcg/Dl
- Recent major bleeding
- Intake of Aspirin > 5 mg/kg/d likely

Monitoring - Target anti-Xa activity of 0.5–1.0 U/mL) once daily

Duration -Still hospital stay .Patient with High risk of Thrombosis - 6-14 days after discharge

## **Tocilizumab (Off-label) –**

- Severe and critical disease (preferably within 24-48 hrs),
- Progressive symptoms with increasing inflammatory markers (CRP and/or IL-6) despite steroids
- No active bacterial, fungal, HIV or tubercular infection.
- NO active hepatitis (total bilirubin or AST/ALT raised > 5 times ULN), ANC < 500- 2000/mm<sup>3</sup> and platelet count
- 8 mg/kg (max 800 mg) IV infusion over 4 hrs. If no response or worsening, can repeat in 8-24 hrs
- Monitored for secondary infections, neutropenia,

and thrombocytopenia.

Children with Chronic Disease and SARS-CoV-2-Positive.

They are high-risk population from an infectious point of view and, prone to develop more severe COVID-19

General Measures –

- Educate about Covid appropriate Behaviour
- Regular sleep, adequate nutrition and proper exercise
- Ensure regular Tele-consultation
- Ensure timely report of appearance of any respiratory or gastrointestinal symptoms
- Continue vaccination schedule, including seasonal influenza vaccination
- Modification, reduction or suspension of usual therapies are not indicated without a specific clinical indication

Immunocompromised patients (organ transplantation, rheumatological disease, chronic kidney disease, inflammatory bowel disease, chronic liver disease )

- Hospitalization for COVID-19-related moderate-severe respiratory symptoms. Even mild symptomatic children can be hospitalized on case to case basis.
  - Modification of COVID-19-specific therapies should be undertaken as per underlying organ involvement ( e.g. renal, hepatic)
  - Balance of immunosuppressive therapies should be considered on the basis of disease severity and medication used.
  - If discontinued, immunosuppressive therapy should be resumed after two weeks or after complete clinical resolution in symptomatic patients.
- Bronchial Asthma –**
- Risk of COVID-19 death in patients with uncontrolled Asthma
  - Make sure that all patients have a written asthma action plan
  - Increase controller and reliever medication when

- asthma worsens
- Acute exacerbations of asthma should be treated promptly with the use of corticosteroids if necessary
- During acute phase of COVID-19 biological drugs for uncontrolled asthma may be suspended.

#### Patients with hemato-oncological diseases -

- Withholding treatment until COVID-19 symptoms have resolved is recommended
- A patient recovering from COVID-19 -Decisions about administering cancer-directed therapy should be made on a case-by-case basis
- Asymptomatic SARS-CoV-2-positive patients - controversial whether chemotherapy should be delayed in

#### Patients with Type 1 Diabetes

- In pediatric and adolescent ages T1D does not appear to predispose to SARS-CoV-2 infection.
- Maintain a good glycemic control to avoid complications of infection. Follow sick day rule.
- Telemedicine plays an important role to improve metabolic control even during quarantine.
- Do not hesitate to refer a child with suspected onset of diabetes to a specialized center to carry out the appropriate diagnostic tests

#### Nephrotic Syndrome -

- Risk of AKI - due to hypovolemia or aggressive use of diuretics.
- Reduction of immunosuppression to acceptable levels, balancing the risk of disease relapses against infection.
- Low threshold for inpatient monitoring of infected patients.
- Steroid dosing - should follow standard practices regarding stress dosing
- Relapses may be treated with a lower dose of prednisolone.

#### DISCHARGE CRITERIA

- Patient is out of all organ support or in pre-morbid condition
- Marinating Saturation >94% in room air for 72

hours

- Afebrile for 72 hours.
- Accepting oral feed well.
- Mother is Confident to take care at home
- No repeat testing is required in Mild to moderate disease
- Follow up after 1-2 wks followed by 4-6 wks.

### Suggested Reading

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## Laboratory Diagnosis of COVID 19 in Children



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### Introduction

The second wave of COVID-19 in India has left parents looking for information on protecting their children and the steps to take if their child, or a family member, has symptoms of COVID-19, or tests positive. As the number of people across India testing positive for the COVID-19 has increased, the number of children contracting the virus has also increased. However, we have not seen a sudden spike in the overall percentage of children affected by COVID-19 in India. One of the features of the new wave is that now entire households are becoming infected with the virus, more so than in the first wave. Early and accurate diagnosis of SARS-CoV-2 infection is essential for prevention and pandemic containment. The heterogeneity of the clinical presentation, from asymptomatic individuals to severe cases, and the relevant diversity of non-specific clinical manifestations of COVID-19, reinforce the need for complementary tests with good sensitivity and specificity. This article summarizes the diagnostic tests available for direct identification of the infectious agent and complementary tests that indicate the risk or presence of complications.

### Tests For Etiological Diagnosis

#### RTPCR (Real time polymerase chain reaction)

The most commonly used method for identifying the genetic material of SARS COV2 is rRT-PCR. The test involves the reverse transcription of SARS CoV 2 RNA into its complementary DNA stands followed by amplification. Commonly three regions with conserved genetic sequences are then used as primers and probes. The RdRP Gene [RNA dependent RNA Polymerase] gene, the E gene [Envelope Protein Gene] and N gene [Nucleocapsid gene]. (1). Kits using different regions of the genome are

commercially available. Several serial amplification cycles are performed to identify these targets: The cycle threshold or Ct value of a RT-PCR reaction is the number of cycles at which fluorescence of the PCR product is detectable over and above the background signal. Theoretically, the Ct value is inversely proportional to the amount of genetic material (RNA) in the starting sample and lower Ct values generally correlate with high viral load and presumed disease severity and infectiousness. However, the recent ICMR guidelines advise against the use of numerical Ct values to decide the infectiousness or the severity of disease and its management protocols. Several reasons include the lack of evidence for correlation, the variability with different kits, different methods of collection and various environmental factors and stage of disease process in host (2).

The RT PCR is considered to be the gold standard for diagnosis of SARS -COV-2 with sensitivity estimated to be approximately 71% and 95% specificity (3). Many factors can interfere with the results such as procedure and handling of the material or even to the viral load of the sample (area of the swab collected, duration of symptoms, and disease severity).

It is very important to note that no test is 100 % reliable. The interpretation of even this gold standard test is dependent on the test result AND the pre test probability of the disease. Hence single negative test in an individual with a characteristic clinical picture [high pre test probability] should not discard the possibility of COVID-19. Such subset of patients with RTPCR negative test, may require other tests including High Resolution Computerised Tomography [HRCT] scan based on clinical pattern of symptoms and signs to diagnose COVID pneumonia. This is very important to educate patients and their families so as to curtail

the spread of infection and guide appropriate treatment.

### RAT (Rapid Antigen Testing)

The COVID-19 Antigen Rapid Test is a fast, cassette-based chromatographic immunoassay for the qualitative detection of SARS-CoV-2 antigens in nasopharyngeal swab samples from individuals with suspected SARS-CoV-2 infection. SARS-CoV-2 antigens are generally detectable in upper respiratory specimens during the early phase of coronavirus infection when this virus is actively replicating [4]. Its quick and suitable for point of care testing during the pandemic when case burden in the community is high. Sensitivity varies from 34 % - 80 %. Suspected individuals who test negative for COVID-19 by rapid antigen test should be definitely tested sequentially by RT-PCR to rule out infection, whereas a positive test should be considered as a true positive and does not need reconfirmation by RT-PCR test (4).

### Serological tests

Antibody testing has been investigated as it is easy to perform blood test and attempts to detect those missed by the RT PCR testing. However the sero conversion takes a long time [ $> 10$  days] making it less useful for early detection. Although IgM is expected to rise before IgG in some cases the IgG response comes earlier than the IgM response due to immune cross reactivity with other similar viral exposures in the past (5) Children produce a different antibody response as compared to adults with less antibody against the nucleocapsid and more spike protein antibodies seen(6). The quality of the antibody and the titres vary in children as compared to adults and these need to be factored while using similar standards of detection(6).

Currently the clinical utility for antibody testing is only testing the IgG levels showing remote evidence of SARS CoV 2 infection which is essential for diagnosis of multisystemic inflammatory syndrome in children (7).

### Complementary tests

These are laboratory or imaging tests that demonstrate characteristic manifestations of COVID-19, its complications, and/or risk factors for complications. The below mentioned tests are as per the Indian Academy of Pediatrics guideline for

evaluation of children with COVID-19(8,9).

#### Indications for laboratory testing

It is important to take into account disease severity prior to performing laboratory tests in children.

Those children falling into moderate and severe disease category will require further blood tests.

**1) Asymptomatic and children with mid disease-** do not require any investigations unless they develop red flag signs such as rapid breathing, oxygen saturations less than 95%, persistent fever for more than 3-5days, lethargy and poor feeding. In such cases, alternative diagnoses must be considered and actively ruled out with following investigations.

Complete Blood Count

C reactive Protein

Urine routine

Chest X-ray

Blood culture

Rule out associated tropical infections -Dengue Serology, Typhoid IgM, Malaria on smear, Rickettsia serology

Consider Liver and Kidney Function test, D Dimer and Fibrinogen

#### 2) Moderate disease

A child could be classified as moderate COVID 19 if he or she has the following

1) Rapid respirations (age based) as follows

Respiratory rate more than 60/min for less than 2 months

Respiratory rate more than 50/min for less than 2 to 12 months

Respiratory rate more than 40/min for 1 to 5 years

Respiratory rate more than 30/min for more than 5 years

2) Presence of hypoxia (oxygen saturations 90-94% on room air)

#### Investigations

Complete Blood Count

C-Reactive Protein

Renal Function Test

Liver Function Test

D-dimer

Lactate dehydrogenase

Ferritin

Chest X-ray

HRCT chest if child is hypoxic ( oxygen saturations less than 94% in room air)

### 3) Severe or Critical Disease

Pneumonia with any of the following

Oxygen saturations < 90%

Grunting, severe retractions

Increased respiratory efforts

Lethargy, somnolence or seizure

Severe vomiting, diarrhea or abdominal pain

Critical disease (a subset of severe disease) is defined, if any of these is present

ARDS

Shock

Multiorgan dysfunction syndrome

Acute thrombosis

### Investigations

Complete Blood Count

ABG

Lactate

C-Reactive Protein

Renal Function Test

Liver Function Test

D-dimer

Lactate dehydrogenase

Ferritin

ECG

Trop I

Pro BNP

ECHO

HRCT chest

### Laboratory investigation Findings

Laboratory findings are variable in children. In a recent meta-analysis (10) of 66 studies in children that included 9335 children (0 to 19 years) with documented SARS-CoV-2 (including 1208 with MIS-C), the following laboratory abnormalities were (mean proportion):

Elevated C-reactive protein (CRP) – 54 percent

Elevated serum ferritin – 47 percent

Elevated lactate dehydrogenase – 37 percent

Elevated D-dimers – 35 percent

Elevated procalcitonin – 21 percent

Elevated erythrocyte sedimentation rate – 19 percent

Elevated leukocytes – 20 percent

Lymphocytopenia – 19 percent

Lymphocytosis – 8 percent

Elevated serum aminotransferases – 30 percent

Elevated creatine kinase myocardial band – 25 percent

### Interpretation of lab studies

#### Complete Blood Count

Evidence from adult based studies have demonstrated that lymphopenia (ALC < 1000) and neutrophil/lymphocyte ratio  $\geq 3.13$  are related to greater severity and worse prognosis (11,12 and 13). Tan et al. proposed a prognostic model based on lymphocyte counts at two time points: patients with less than 20% lymphocytes at days 10–12 from the onset of symptoms and less than 5% at days 17–19 had the worst outcomes in this study (11).

Lymphopenia results from consumption of lymphocytes by SARS-CoV-2 and reflects severe disease (14).

Thrombocytopenia was associated with critical illness and has been described as an early finding in patients with COVID-19 (15). Thrombocytopenia is suspected to be multifactorial and could be due to cytokine storm or direct effects of SARS-CoV-2 on bone marrow, host immunity, or lung parenchyma

In a single centre retrospective pediatric COVID study,

Kainth et al demonstrated that elevated white blood cell count and C-reactive protein level are associated with greater illness severity (16).

### C- Reactive Protein And Other Inflammatory Markers

In observational studies involving children with COVID-19 disease, elevated inflammatory markers (eg, CRP, Procalcitonin, Interleukin 6, Ferritin, D-dimer) at admission or during hospitalization have been associated with severe disease in children (16,17 and 18).

In another multi center trial involving children, lower absolute lymphocyte count (OR 8.33 per unit decrease in 109 cells/L, 95% CI 2.32-33.33, P = .001) and greater C-reactive protein (OR 1.06 per unit increase in mg/dL, 95% CI 1.01-1.12, P = .017) were predictive of severe MIS-C (19). CRP especially above 100mg/L is an inexpensive and valuable tool to detect MIS-C and check response to treatment(20).

### IL6 levels

Several adult studies have demonstrated the role of IL6 as a marker of severe disease, in a recent adult study IL 6 > 24 pg/ml at initial assessment served as an excellent predictor of severe disease. [21] . A recent review also suggests its role in monitoring therapeutic response (20). In children there is some evidence that it may also serve as an early marker of disease severity (22) .

### D-Dimers

D-dimer is a product of degradation of fibrin acting as a surrogate marker for fibrinolysis and is usually elevated in thrombotic events (23). In an observational cohort study conducted on 398 children with confirmed COVID-19, multivariate regression analysis showed that COVID-19 severity in children was significantly higher among children with higher levels of D-dimer, hypoxia, shock and mechanical ventilation (24).

Visveswaran et al. (25) reported extensive venous thrombosis, severe venous outflow obstruction with painful swollen and gangrenous limb associated with SARS-CoV-2 infection in a 12-year-old girl. Venous thromboembolism is frequent in COVID-19.

### Cardiac Biomarkers

Several cardiac biomarkers are available including LDH, creatine kinase (CK), creatinine kinase-muscle/brain activity (CK-MB), myoglobin (Mb), cardiac troponin I [Trop I] and N-terminal of the prohormone brain natriuretic peptide (NT-pro BNP). Of which the latter two have good correlation with disease severity and cardiac involvement directing therapy (20)

NT-pro BNP was an independent risk factor of in-hospital death in patients with severe COVID-19 in adults (26).

### Renal Function Tests

In a recent multi centre, point prevalence AKI study among critically ill children with COVID19, authors found high prevalence of AKI among critically ill children with COVID-19 (44%)(27) This matches what has been seen in adult ICU AKI studies on COVID-19(28). In another cohort study by Kari et al, authors examined eighty-nine children who were hospitalized with COVID-19 (29). In another these, 21 % developed Acute Kidney Injury (AKI), which is lower than previously reported by Stewart et al. in their cohort of 52 children admitted to the Great Ormond Street Hospital (30). In their report, approximately 29 % of children developed AKI.

AKI was associated with increased morbidity and mortality, and residual renal impairment at time of discharge in critically ill children with acute COVID 19 infection.

In contrast, most children with MIS-C experience a mild AKI. A recent retrospective study Lipton et al (31) showed that AKI was a common finding among pediatric patients hospitalized with COVID-19 associated MIS-C. Older age, increased inflammation, and left ventricular systolic dysfunction may be risk factors for AKI in children with MIS-C. While children with MIS-C may develop AKI, this study demonstrates that most experience mild disease, swift resolution and promising outcome.

Hyponatremia is also another common finding in MIS-C. Serial monitoring and prompt correction of dyselectrolytemia is imperative in children with myocardial dysfunction as children with MIS-C are prone for arrhythmia including heart blocks, ventricular ectopic and ventricular tachycardia.

We target Serum ionised calcium (4.0-5.0mg/dl), Magnesium (1.8-2.0mg/dl) and Potassium (4.0-4.5mmol/L).

### Liver Function Tests

In COVID-19 patients the most common hepatic manifestation is represented by elevated hepatic transaminases, both aspartate aminotransferase (AST) and alanine aminotransferase (ALT); mild elevations in gamma-glutamyl transferase (GGT), alkaline phosphatase (ALP) and total bilirubin are also reported, although less frequently. Serum albumin is decreased in severe cases although a significant impairment of liver function as the cause of death in COVID-19 rarely occurs.

MIS-C cases hypoalbuminemia occurs as a marker of inflammation(20) Deranged coagulation and hyperfibrinogenemia must be looked for in MIS-C. In case of abnormal liver function tests, consider secondary HLH

### Summary

The various laboratory markers are very useful adjuncts in the diagnosis and prognostication of Covid 19 illness in children. Knowledge on the various markers of Inflammation, Organ dysfunction and markers of severe disease will help in managing the sick children.

The gold standard for the diagnosis of SARS-CoV-2 infection is the identification of viral genetic material by RT-PCR, in different samples, with greater sensitivity in bronchoalveolar lavage and nasopharyngeal swab. Many factors related to the individual, the collection procedure, and the test technique interfere with the sensitivity of these tests. Therefore, a negative test in a patient with a characteristic clinical picture should not discard the possibility of COVID-19.

Laboratory findings are often normal in acute COVID infection, but may include leukopenia, lymphocytopenia, and elevated procalcitonin or C-reactive protein. It is important to take into account disease severity prior to performing laboratory tests in children. Mild cases do not need ANY investigations. The children with comorbidities and prolonged fever do require further work up to check inflammatory markers and organ dysfunction parameters also to rule out other coexisting conditions. Moderate and severe disease requires more detailed evaluation.

CBC and CRP are important investigations that needs to be repeated every 48-72 hrs In the MIS-C group, only lower ALC and increasing CRP at admission were independent predictors of severity. It is important for clinician to be aware of common laboratory abnormalities and have high index of suspicion in children presenting with possible MIS-C as early recognition and treatment carries better outcomes. Biomarker panels and trends of biomarkers give important clues to the disease severity and progression and response to treatment

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## COVID-19 in Pregnancy and Newborn



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### Background

COVID-19, caused by the severe acute respiratory infection corona virus 2 (SARS-CoV-2) was first detected in Wuhan, China in December 2019. Due to its very high transmissibility it has spread all over the world causing significant loss of human life. Pregnant women, their fetuses, and newborns are likely to represent a high-risk population. In spite of all the precautionary measures, pregnant women were reported to be positive for COVID-19 from the beginning of the pandemic. A significant viral load in the placenta, amniotic fluid and vaginal secretions have been reported which are indicative of possible vertical transmission. Horizontal transmission accounted for the bulk of neonatal infection, evidence of significant viral load in the breast milk raises concern over the segregation of baby from mother. Pregnant women and neonates require special attention regarding the prevention, diagnosis and management of COVID-19.

### Pathophysiology of COVID-19 in pregnancy

SARS-CoV-2 trigger a cytokine storm in the body, producing a series of immune responses, and causing changes in peripheral leukocytes and immune system cells, leading to pregnancy complications. The expression of ACE2 receptors in the vascular endothelium may explain the histological changes of placentas from pregnant women infected by SARS-CoV-2. Placentas from infected patients show inflammatory, thrombotic, and vascular changes that have been found in other inflammatory conditions.

There occurs modulation of immune response in pregnancy. Because of more active T helper 2 cells (Th2) compared to T helper 1(Th1) cells, humoral immune response takes upper hand as compared to cellular immune response. There is also decrease in circulating natural killer (NK) cells and circulating plasmacytoid dendritic cells in pregnancy. The increase in progesterone levels may help in lung repair. There is also alteration of innate immune system, including change in Toll-like receptors (TLRs). However, the effect of all these changes in immune system, on the pregnant women is still remains to be determined. The mechanical effect of gravid uterus during late pregnancy cannot be ignored. Due to decreased total lung capacity and inability to clear secretions, they may be more susceptible to severe symptoms in respiratory diseases.

### Clinical feature of COVID-19 in pregnancy

The effect of COVID-19 on pregnancy is not clear. Pregnant women who become COVID-19-positive are usually either asymptomatic or mild-to-moderately symptomatic, similar to non-pregnant women. Pneumonia is one of the commonest outcomes in pregnant women with COVID-19. Pregnant women with COVID-19 with co-morbidities have increased risks of complications. Pregnant women with COVID-19 pneumonia show similar clinical characteristics compared with non-pregnant counterparts. Evidence is not clear on effect of COVID on early pregnancy. It is not found to be teratogenic till now. To date, majority of studies have

been reassuring and the risk of severe COVID-19 in pregnancy appears to be no greater than for the general population. In one of the largest cohorts from United States; pregnancy was associated with significant increased chance of hospitalization, ICU admission and need for mechanical ventilation. In the third trimester, COVID-19 can cause premature rupture of membranes, premature labour and fetal distress.

### Management

If a pregnant lady becomes COVID positive and asymptomatic, she should be home isolated for 14 days. However, if fever persists or respiratory symptoms develop, it is wise to be admitted in a hospital for both fetal and maternal monitoring. Oxygenation status should be monitored by pulse oximeter with a goal to maintain saturation level more than 94%. In severe maternal disease, decision may have to be taken about the mode of delivery. If less than 24 weeks of gestation, medical termination of pregnancy (MTP) may be considered (if legal). After 24 weeks, vaginal delivery is to be tried first. Indications for cesarean section include septic shock, acute organ failure or fetal distress. One should always remember that COVID-19 infection itself is not an indication for induction of labour or cesarean section. Mode of delivery should be guided by their obstetric assessment and physiological stability.

### Maternal adverse outcome

During the COVID-19 pandemic, there is an increase in maternal deaths, stillbirth, ruptured ectopic pregnancies, and maternal depression. There is significant disparity between high-resource and low-resource settings. Safe, accessible and equitable maternity care is the need of hour.

### Neonatal Care during COVID-19

Delivery of a newborn during COVID-19 pandemic is associated with disruption of standard neonatal care practices. It not only puts fear and stress on the family members but also poses a significant challenge in accessing the hospitals and doctors. Health care professionals also need personal protection and timely information on changing evidence based guidelines. Though SARS-

CoV-19 virus has been documented in amniotic fluid, placenta and breast milk, vertical transmission is extremely rare. Intrapartum and postnatal transmission are the usual mode of transmission of COVID-19 to neonate.

### Clinical importance

Delivery of a baby during COVID-19 pandemic is associated with different clinical scenario. A mother may be COVID positive or symptomatic at the time of delivery. The neonate delivered may be stable or sick. Symptomatic neonate needs special care during this pandemic.

### Delivery room practices

A mother needs a COVID test (RAT/ RT-PCR) before delivery, to document COVID status and triaging. Mother with RAT or RT-PCR positive within last 2weeks need to be admitted in COVID isolation unit.

### Neonatal resuscitation for babies born to mother with suspected / confirmed COVID-19:

The primary goal is to prevent neonate from developing SARS-CoV-2 infection. During labor and delivery, an infected mother can disseminate the virus through droplets, aerosols, body fluids, and fomites. Need of respiratory support further increases the risk by generating aerosol. Precautionary measures need to be adopted during neonatal resuscitation of babies born to suspected or confirmed COVID-19 pending further evidence against the same. The aerosol generating procedures such as intubation, airway suctioning, surfactant administration and application of nasal canula with a flow of >2L/min are at the high risk procedures.

1. COVID-19 status of mother should be communicated to the neonatal team. Discussion with the expectant mother and family must include risk of infection to newborn, measures to minimize infection risk, pros and cons of skin-to-skin contact, postpartum care, feeding options and disposition of baby.
2. All personnel attending neonatal resuscitation should don N95 particulate respirator mask, goggles or face shield, full length water resistant

- gowns and gloves. Donning of mask by the patient is recommended.
- Resuscitation corner should be 2 meter away from the delivery table.
3. Minimizing the resuscitation equipment laid on the resucitaire prevent wastage through contamination.
  4. The resuscitation algorithm and basic principles of newborn stabilisation remains the same.
  5. There is no evidence of increased risk of vertical transmission through delayed cord clamping; however immediate cord clamping and avoiding skin-to-skin contact reduces contact time with maternal body fluids potentially reducing risk of infection.
  6. Bulb suctioning reduces generation of aerosol and preferred over mechanised continuous suctioning. Plexiglas head box may be used if available.
  7. CPAP via nasal mask is preferred over nasal prong CPAP. Intubation with the most experienced team member and use of video laryngoscope if available is recommended.
  8. A dedicated transport route with accompanying staff in full PPE should be identified for transport of sick neonate.

## Choosing the area of care of a neonate

A neonate after delivery needs to be classified and triaged depending upon the COVID status of the mother and sickness and maturity of the baby. Periodic assessment is needed during the course of illness.

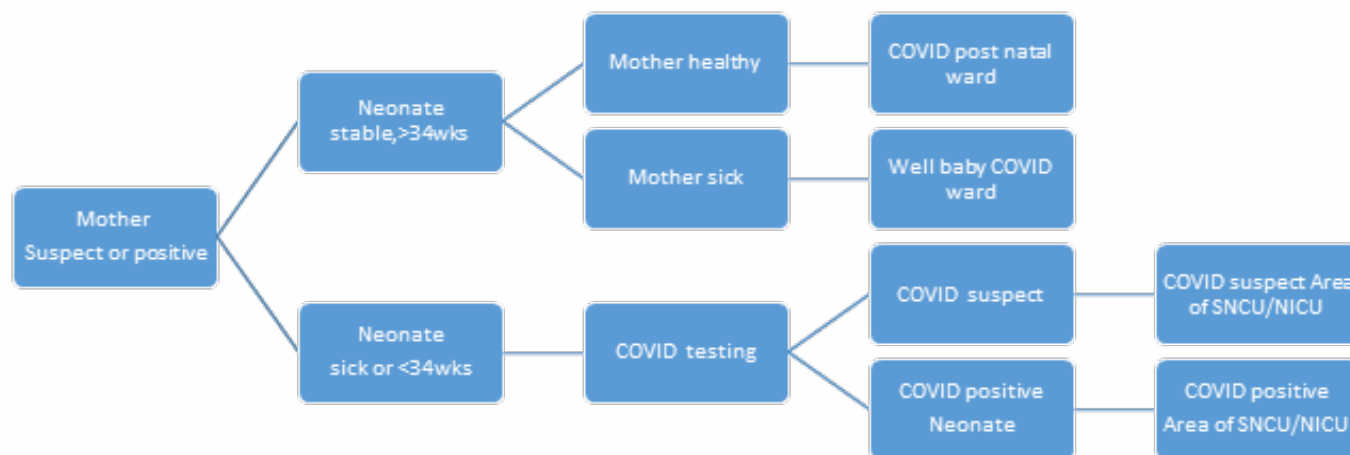
Sick or premature (<34wks gestation) babies born to a suspect or COVID positive mother need urgent attention and to be screened for COVID status by RT-PCR test. Pending the RT-PCR report, it need to be admitted in 'COVID suspect area in SNCU/ NICU'. A RT-PCR positive sick neonate to be shifted to 'COVID positive area in SNCU/ NICU'.

Stable and >34 weeks' baby born to a suspect/ positive mother need not require RT-PCR testing. Rooming-in and breast feeding to be started and continued with COVID appropriate behavior. Baby to be kept in 'COVID post-natal ward' if mother is stable. If mother is sick, baby to be nursed in 'Well baby COVID ward' with EBM feeding.

## Diagnosis of COVID-19 in neonate:

Delivery of a newborn during the pandemic at hospital itself is a high risk situation for contacting the infection. All precautions need to be followed with due care so as to prevent transmission of SARS-CoV-19 virus infection to the baby. Vertical transmission is extremely rare. However, prevalence of perinatal transmission and horizontal transmission is 8% and 1.5% respectively. Positive RT-PCR within 24hr suggest vertical transmission, but not a routine practice due to the rarity of vertical transmission. Positive RT-PCR within 72 hr of life is due to perinatal transmission and after 72hr due to horizontal transmission.

Diagnosis of a COVID-19 neonate is usually made if RT-PCR of the nasopharyngeal or oropharyngeal specimen tested positive for SARS-CoV-2.



(Figure: Algorithm of area of care of a newborn born to a suspect or COVID positive mother)

## Clinical Presentation of COVID-19 neonate

COVID-19 in neonate are mostly asymptomatic. Among symptomatic neonates, most morbidities are related to associated prematurity and perinatal events. Neonatal presentation can be early onset, late onset, or features of MIS-C as in older children. MIS-C in neonates are extremely rare and restricted to few case reports.

### Rooming-in and breast feeding

Breast feeding improves survival and provides lifelong health and development advantage to newborns and infants. WHO recommends breastfeeding and skin-to-skin care irrespective of the COVID status of the mother. Masking, hand hygiene and maintaining a distance of 2- meter other than for breastfeeding, rooming in and breastfeeding may be supported. A COVID positive mother should perform proper hand hygiene and wear a mask during breast feeding and chest need to be washed if she has been coughing on it. Breast need not be washed before every feeding. Baby may be cared by a healthy care provider at other times. If the mother is sick enough to feed the baby, expressed breast milk (EBM) may be offered to baby till the mother is well enough to breastfeed. Counseling of the mother by a trained counselor is very important for successful breastfeeding.

### Immunization

Routine immunization of newborn baby should be followed. A healthy care provider with proper contact and droplet precaution should be available for assisting immunization.

### Communication and Counseling

A good communication and proper counseling are very important. Families should be informed and involved right from the beginning regarding the COVID-19 status, risk of transmission, benefit of breastfeeding, rooming-in, routine immunization and follow-up. Correct masking, hand hygiene and restriction of visitors are to be followed in addition to the standard care of the mother and baby.

## Discharge advise of COVID positive neonate

As most of the symptoms in COVID-19 positive neonates are due to the associated perinatal conditions, the baby can be discharged once medically stable. Early discharge policy with appropriate follow up is better during the pandemic. Confidence of the mother and family members can be improved by providing the online consultation facility at the time of discharge. The risk of transmission to other family members is a potential risk and can be minimised by universal COVID appropriate behavior (social distancing, correct masking and hand hygiene).

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# Multisystem Inflammatory Syndrome in Children (MIS-C)

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The COVID 19 pandemic has created a new world with many new challenges.

Initially it was believed that children do well with COVID 19 and

are largely asymptomatic or have mild infection. However, since April 2020,

Paediatricians have been alerted to a new disease affecting children related to delayed immune activation to the COVID 19 virus. It has been previously called as the Paediatric multisystem Inflammatory Syndrome(PIMS) or as Multisystem Inflammatory Disorder in Children temporally associated with COVID 19(MISC).

This often starts after recovery from COVID infection or

sometimes along with active COVID infection. The child could have been totally asymptomatic when they had the COVID 19 infection and infact may not even have been tested due to lack of symptoms. MISC Post COVID can affect all ages, from the newborn exposed in utero to COVID19 with transplacental antibody transfer to older adolescents and young adults. In the western nations ,it has affected older children especially with high BMI and some comorbidities, but in India looking at the various series reported so far, the median age appears to be around 6 years and the majority of those previously healthy without comorbidities.

The cases start appearing about 3 weeks after the peak of COVID 19 in a community. While the case definitions from the CDC, Atlanta, the RCPCH ,UK and the WHO are very comprehensive the important message is to suspect MISC whenever there is a

1. Child presenting with fever > 1 day
  2. Multisystem involvement with or without external features of KD , with or without shock or hemodynamic compromise.
  3. Link with COVID 19- proven, suggestive history in patient or close contacts or hailing from area of high prevalence, positivity on PCR, antigen or antibody testing. Quite often, the link is revealed only after considerable probing .
- **Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C)**

- An individual aged <21 years presenting with
- fever<sup>i</sup>,
- laboratory evidence of inflammation<sup>ii</sup>, and
- evidence of clinically severe illness requiring hospitalization, with multisystem (≥2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological);
- **AND**
- No alternative plausible diagnoses;
- **AND**
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms
- Additional comments
- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

The importance of suspicion and early recognition is because early immunomodulation can be lifesaving in these patients. It is important to note that many of these children would otherwise have been diagnosed

as sepsis or as Toxic Shock syndrome and treatment in most of these scenarios may not have included immunomodulation.

Thus cases of MISC started being reported in India on May 8th the first report came from Kolkata; on May 9th from Chennai in mainstream newspapers. And the first Indian academic case report was published in Indian Journal of Paediatrics by Abdul Rauf et al in May

2020 followed by a large series reported in the following month from Chennai. To date, there are 6 case series reported from across India

and a few more awaiting publication. Newborn babies have been reported with MISC as have older adolescents and a case definition for MIS-A (Multisystem Inflammatory Syndrome in Adults) has also been published.

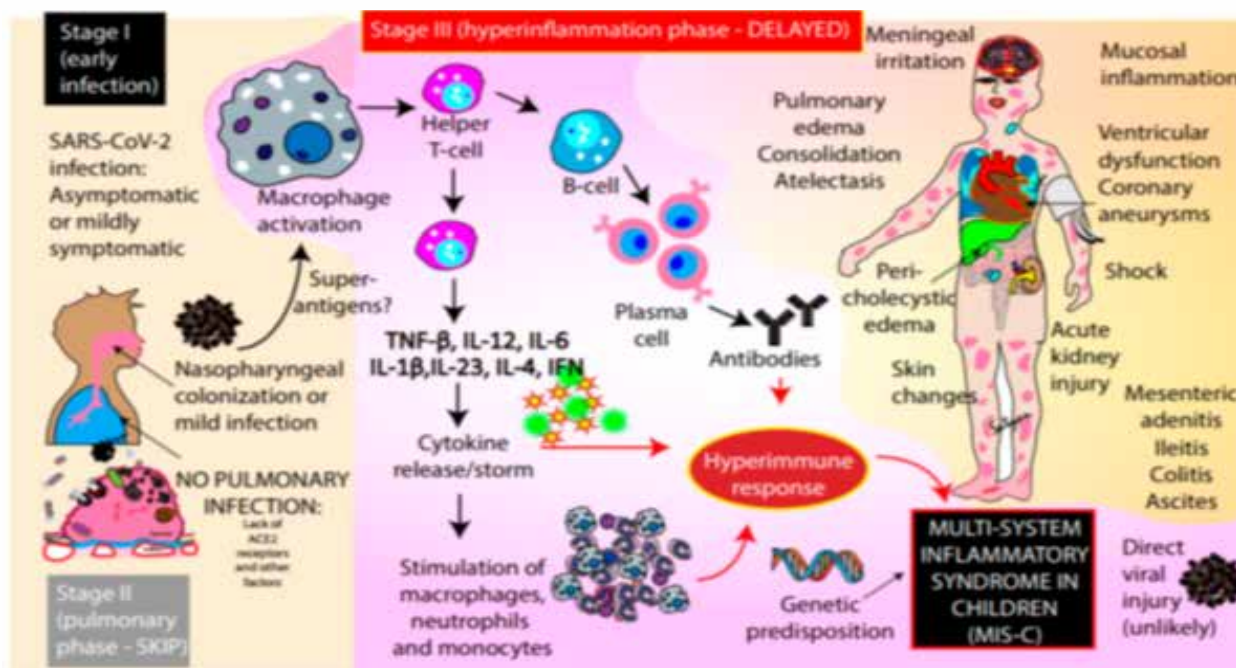
Over the past year, there has been increased understanding of the pathogenesis of MISC. Possible mechanisms include antibody or T-cell recognition of self-antigens (viral mimicry of the host) resulting in autoantibodies, antibody or T-cell recognition of viral antigens expressed on infected cells, formation of immune complexes which activate inflammation, and viral superantigen sequences which activate host immune cells triggering a polyclonal stimulation of T cells to effect a massive production of cytokines, particularly IL1 which are responsible for the clinical effects observed.

Most children present primarily with fever, following which gastrointestinal symptoms like pain abdomen, vomiting and diarrhoea, sometimes with features suggestive of intussusception /appendicitis. Mucocutaneous changes like conjunctival congestion, red lips and tongue, polymorphous rashes and lymphadenopathy are all noted with increasing frequency as well. About half the children can present in a shocked state, often a warm shock. Fatigue and excessive sleepiness, lethargy, irritability and neck pain with stiffness are also reported. Bradyarrhythmias and heart blocks secondary to the myocarditis can also cause severe presentations as are those that present with features of an acute kidney injury (AKI).

Some children present as an Atypical Kawasaki Disease presentation with some mucocutaneous manifestations of KD and fever without shock or severe multisystem involvement.

20-30% of the patients with MISC can present in the waning phase of COVID 19 infection, with an RT-PCR +vity. The associated COVID 19 pneumonia is usually not seen. Antibody positivity with IgM +/- IgG are seen in about 80% of patients.

Some children can present as a febrile illness with or without mild mucocutaneous changes but looking otherwise well despite significantly high inflammatory markers. Detailed evaluation would have ruled out other causes for the fever. This is called the Febrile Inflammatory state.





## Management

Consideration of the possibility of MISC in all children presenting with fever +/-shock

A good number of these children will require ICU admission

Multidisciplinary care with the General Paediatrician, Pediatric intensivist, Pediatric Cardiologist , Rheumatologist and other specialists as indicated.

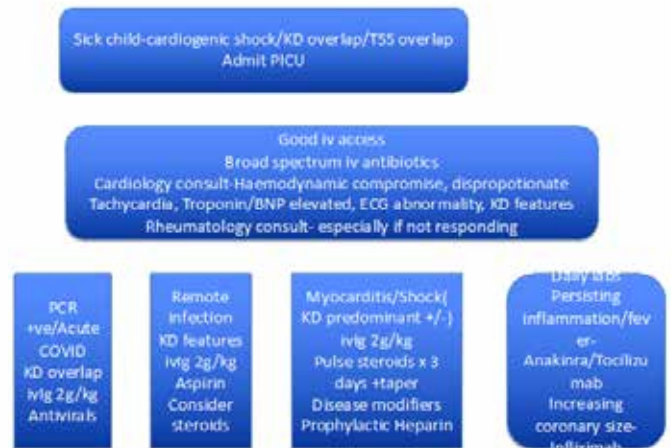
In definitive cases/children with MODS & shock-Tier1 & Tier 2 investigations straight away

In suspected cases-Tier 1 investigations and if significant- Tier 2 investigations to be done

COVID 19 testing- RTPCR for active infection and IgM & IgG for previous infection will help in addition to history to establish COVID link but treatment must not be based on getting the report

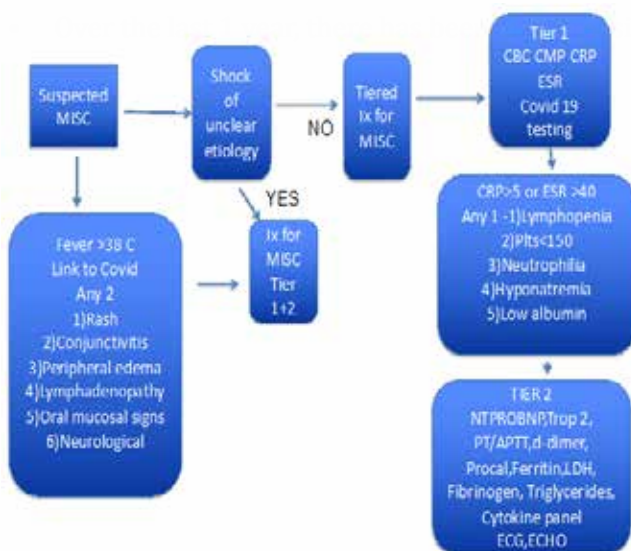
Do not delay commencement of immunomodulation. In children with shock, supportive measures like cautious fluid boluses, early initiation of inotropes as well as initial pulse with methylprednisolone can help to stabilise the child initially. Shock can be vasoplegic or due to myocarditis and the infusion of intravenous immunoglobulin at considerable volumes can necessitate needing to electively intubate and ventilate the child to allow for immunomodulatory medications to go through. Unless in severely impaired cardiac function or renal failure, aiming to infuse the ivIg over 12-16 hours can have a significant benefit over slower rates of infusion.

### MANAGEMENT RECOMMENDATIONS



understanding that steroids have significant benefits in the early management of MISC. A recent Retrospective cohort study from France drawn from a national surveillance system with propensity score-matched analysis has shown that ( 111 patients, 34-ivIg alone ,72-ivIg +steroids) combining the two was superior to the use of ivIg alone with regard to treatment failure, duration of hemodynamic support, duration of intensive care and later occurring Left Ventricular Failure. Various series from India have also shown good outcomes with increasing use of early pulsed iv steroids. The children who present without shock and HLH predominant phenotype can often be managed with steroids alone.

- The second wave has also given rise to a phenotype of patients with fever, without shock or significant organ involvement but with signs of systemic inflammation -a group called the Febrile Inflammatory State. It is important that these children are observed while excluding other causes for the fever . If inflammation persists/progresses and other causes are excluded this group of patients can be managed with 1-2mg/kg/day of iv methylprednisolone followed by a rapid taper and stop over 3 weeks. One would discourage treating children with unexplained with oral steroids on Outpatient basis.
- Complications
- In the short term, a 2% mortality has been described So while PICU's have been registering spikes of MISC patients in the last 6 months, there is another silent wave that is picking up that mustn't be ignored. In India children above 12 are variably cared for by Adult physicians as well as Paediatricians, and the sensitisation of adult physicians to MISC has not been as robust.



Investigation Algorithm

This has also led to late recognition of a similar form of illness in young adults, now officially termed as MIS-A. The overall outcomes of MISC are excellent with a mortality rate of <2% however the reported outcomes of MIS-A are not as good. Does delayed recognition and reduced awareness have something to do with this?

COVID 19 has heightened the public understanding of Primary public health principles in an outbreak- of social distancing, masking, avoiding crowds etc. In the medical community it has renewed the importance of understanding the immune response and the non-binary approach to disease, including infectious disease. The realisation that infection and inflammation can happen simultaneously and it isn't about antibiotics vs immunomodulation, perhaps understanding the dominant dynamic to plan the judicious use of the right weapon is key in management.

The key features to note are that the cases start appearing about 3 weeks after the peak of COVID 19 in a community. Children, so far considered to be at lower risk from severe Covid 19 respiratory disease, are the main affected by this post infectious immune dysregulatory illness. While the case definitions are adequately detailed, the important message is to suspect MISC whenever there is a

1. Child presenting with fever > 1 day
2. Multisystem involvement with or without external features of KD, +/-shock or hemodynamic compromise is present
3. Link with COVID 19- proven, suggestive history in patient or close contacts or hailing from area of high prevalence, positivity on PCR, antigen or antibody testing.

The importance of suspicion and early recognition is because early immunomodulation can be lifesaving in these patients. It is important to note that many of these children would otherwise have been diagnosed as sepsis or sometimes as Atypical KD or as Toxic Shock syndrome and treatment in most of these scenarios may not have included immunomodulation.

The heightened webinar interactions and academic discussions post COVID 19 lockdowns and restrictions have contributed to more effective dissemination of information of a new disease. Thus cases of MISC started being reported in India- on May 8th the first report came from Kolkata; on May 9th from Chennai in mainstream newspapers. And the first Indian academic case report was published in Indian Journal

of Paediatrics by Abdul Rauf et al in May 2020 followed by a large series reported in the following month from Chennai.

While the western world reports higher case incidence in older children, those from ethnic minorities and more deprived areas, in India across the states we are seeing a significant number of young children being involved as well. The western trend of treatment has been to use ivIg as the first line with a low threshold for steroids, whereas in India especially in the older children, many of us are finding that less sick ones do well with steroids alone which helps at providing most cost effective treatment. Some children have required Infiximab (large coronary aneurysms) and some Tocilizumab (persistent inflammation). Access to antibody testing has been patchy and variable and thus link to COVID 19 has hinged on history more frequently in the earlier months. Treatment costs can be significant for families without insurance seeking treatment in the private sector since iv immunoglobulin, intensive care and biological medications if needed are all expensive commodities. One of the most severe cases has been a 10 year old child in Mumbai who developed thrombosis and gangrene of the small bowel necessitating the first living donor paediatric small bowel transplant in the world.

So while PICU's have been registering spikes of MISC patients in the last 6 months, there is another silent wave that is picking up that mustn't be ignored. In India children above 12 are variably cared for by Adult physicians as well as Paediatricians, and the sensitisation of adult physicians to MISC has not been as robust. This has also led to late recognition of a similar form of illness in young adults, now officially termed as MIS-A. The overall outcomes of MISC are excellent with a mortality rate of <2% however the reported outcomes of MIS-A are not as good. Does delayed recognition and reduced awareness have something to do with this?

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# The Pandemic and Child Mental Health - SAMVAD's Informational Series on COVID and Children



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## Introduction

SAMVAD (Support, Advocacy & Mental health interventions for children in Vulnerable circumstances And Distress) is a National Initiative & Integrated Resource for Child Protection, Mental Health and Psychosocial Care. This initiative, supported by the Ministry of Women & Child Development, Government of India, is located in the Dept. of Child & Adolescent Psychiatry, NIMHANS. With the aim of enhancing child and adolescent psychosocial well-being, through promotion of transdisciplinary and integrated approaches to mental health and protection, SAMVAD was established to extend its support and activities to all the states in the country. It comprises of a multi-disciplinary team of child care professionals, with expertise in training and capacity building, program and policy research pertaining to child mental health, protection, education and law.

The COVID-19 Pandemic has had a multitude

of impacts across different contexts and spaces. However, the most vulnerable in the pandemic have continued to remain the communities wherein people's socio-economic and psycho-social circumstances are marked by precarity and adversity. In the wake of the systemic and institutional challenges that have come to the fore, SAMVAD's 4-part informational series was conducted online to orient all concerned stakeholders (including parents, child care service providers, and statutory authorities) to the modes of intervention that are critical to effective mental health and child protection service-delivery.

## Part 1: Acting Upon Child Protection Vulnerabilities in the COVID Crisis

The 1st part of the series highlights the impact and consequences of mental health and child protection risks on children during the COVID crisis, and consequently, the implications for action in terms of placement-related decision-making in

the interest of children's safety and well-being. In light of the exigencies of the COVID Pandemic, there is an imperative to contextualise the suitability of institutional and non-institutional child care in any given case. To facilitate the same, the first part of the series deals with the role of psycho-social assessments in understanding the context of children's experiences. This perspective offers a systematic approach for all child care service providers involved in the decision-making process.

The health risks brought about by the first wave of the pandemic impacted mostly the older population and persons with underlying comorbidities (with older age identified as a risk factor for increased COVID mortality). In addition to this, the emergent socio-economic milieu in the wake of the pandemic led to adverse child protection and mental health consequences in two broad categories of children namely: i) Children in households/child care institutions (CCIs); and ii) children in difficult circumstances (circumstances here refers to adverse life experiences that threaten or challenge healthy development i.e., physical or sexual abuse, traumatic instances of loss and bereavement, chronic environments of neglect, experiences of discrimination; and factors of household disfunction like parental psychopathology and parental marital discord).

The second wave, however, has resulted in increased mortality amongst the middle-aged and younger adult population. Adding to the pre-existing risks and consequences for the two categories of children affected during the first wave, the second wave has resulted in loss of parents/caregivers, leaving many children orphaned and in the care of the state through various child care institutions (CCIs). This phenomenon has given rise to a new category comprised of children exposed to illness and/or loss and death of primary caregivers, and children who have been abandoned due to the severe financial strain of the pandemic.

### Implications for action: Placement of Children and Systematic Assessments

Having regard to the circumstances of these children, therefore, any intervention (particularly in terms of placement) must be cognizant of the existing socio-economic and psycho-social vulnerabilities of children, in addition to the exacerbating impact of

the pandemic, so as to be able to adequately assist these children in accessing requisite child protection and mental health services.

In the context of non-institutional/family-based care, the following assessments are critical to ensuring that the placement is in the best interest of the child:

#### a) Family-related assessments:

- Health of the Family/caregivers: It is important to assess the health and medical history of the family to know if the parents/caregivers are suffering from any chronic illnesses that may lead to the child assuming the role of a caregiver.
- History of abuse or violence in the family: It is critical to assess any history of violence or abuse experienced by the child in the context of family. The opinion that family is always the best place for a child leads to increased risks of abuse and violence in the family not being addressed.
- Financial capacity of the family: Assessing financial capacity includes understanding the financial status of the caregivers and their ability to support the child's educational needs, present living conditions, and assessing their routine to know if the child will be nurtured and cared for.
- Motivation of family: There is a need to assess the "reasons" for which a child is being adopted or fostered or taken care of by the extended family. It is important to analyse whether the family has vested monetary interests (namely property-related interests). It is important to reconsider any placement decision that compromises the child's safety and development.
- Perceptions/understanding of foster care/adoption: In cases of adoption and foster care, it is extremely important that the prospective adoptive parents or the foster family understands the child's issues, their contexts, their experiences of trauma, abuse and grief, and accept these experiences in order to ensure the child's growth and safety. Hence, pre-adoption counselling is a very important part of the process.

#### b) Child related assessments:

- Medical examination: It is important to conduct in-depth medical examinations of children who come under the care and protection of the State.

A child's health issues have to be assessed well in order to provide the necessary support for the growth and development of the child.

- **Developmental and mental health assessments:** The child must be assessed for any developmental deficits or delays. This also includes conducting mental health assessments of the child to understand if the child has any special needs. This ensures that the prospective adoptive parents and foster parents are informed of the child's special needs before placement. This needs to be done in order to ensure complete disclosure to the prospective parents so that the parents make an informed decision. Significantly, facilitating such informed decision-making ensures that children do not re-enter state care due to non-compatibility of the adoptive family and subsequent initiation of adoption dissolution procedures.
- **Child's readiness and decision (including preparation for adoption/foster care):** The most important stakeholder in the entire process is the child. As a result, the child must be prepared for adoption/foster care and it **MUST** be a process. The child must be introduced to the prospective parents via video call, face time etc. (in context of COVID) so that the child can be familiarized with their caregivers. Secondly, the child should be prepared and provided with relevant information like the reasons for leaving the CCI, information about the people they are meeting, and the next steps in the process. Assisting children during this transitory period is critical to upholding their right to participation, as envisaged by India's Juvenile Justice framework.

### **Part 2: Helping Children Manage Covid-Related Anxieties**

In light of the socio-economic and psychosocial risk factors during the COVID pandemic, it is imperative to address the ensuing anxieties and risks for mental health morbidity in children. If not dealt with, these anxieties can increase in severity, thus making it difficult for children to carry out their daily activities through the maintenance of structured routine. Children are currently experiencing anxiety and fear as primary emotions owing to the uncertainty of life in the pandemic. There is a sense of unpredictability in children with regard to the future, in addition to debilitating fears about the

well-being and health of loved ones and themselves.

The 2nd part of the series addresses some of the ways in which caregivers can be assisted in addressing anxiety-related concerns of children during the pandemic. It also enables caregivers to orient children to an age-appropriate and developmentally-sensitive understanding of COVID-related illness, through the use of creative methodologies, to equip children with techniques to cope with and manage their COVID-related anxieties.

#### **Some of the techniques discussed during SAMVAD's COVID Series to address children's COVID-related anxieties are:**

1. **Providing children basic information about COVID using facts and truth:** It should be explained in an age-appropriate manner for the child to truly understand COVID. Conversations with a 5-year-old child will differ from those with a 10-year-old child. Information shared during these conversations should always be accompanied by providing hope and reassurance. Different methodologies can be adopted to explain COVID, storytelling being the most effective. Research has disclosed that thoughts in children aged 4 to 7 years is significantly affected by 'magical thinking' i.e., inaccurate attribution of causality to unrelated events/behaviours. For example, children of this age-group might assume that severe illness in the caregiver is attributable to previous instances of their bad behaviour, thus prompting intense feelings of anxiety and guilt.

2. **Helping children maintain a routine** is a very impactful way of managing time in the pandemic: Given that the children are confined within 4 walls of the house/CCI, it is important for them to engage in activities that are creative and useful for their overall development. Having a routine also leads to the feeling of being in control and provides a sense of predictability which further helps them in managing anxiety. In order for mundanity to not set into their daily routine, different fun activities that the children enjoy, like dance, playing their favourite game, aerobics, art, etc. can be included in their routine. Inquiring from children about their preferred activities, and including it in their routine, is also a good way to ensure they adhere to the routine effectively.

3. Activities such as writing a letter to coronavirus, addressing good times and moments, difficult situations and important learnings during these times: These activities will aid children in minimizing their worries & concerns in the context of COVID-related uncertainty and unpredictability.

4. Reminding children that they are much more than their anxieties and fears: Helping children remember that they are more than their anxieties and fears, through an activity, is an effective method to help children deal with anxiety. They can be asked to list or narrate their different roles and responsibilities, their qualities and talents, and then their worries and anxieties. This will help them remember that their anxiety is a part of them and they are not a part of their anxiety.

5. Equipping children with different relaxation techniques: This could include deep breathing and guided imagery and physical exercises like free movement, skipping, dancing, catch etc.

6. Engage children in DIY (do it yourself) activities involving art work, best out of waste, getting to know their family members or peers: These activities include ensuring children maintain communication with their loved ones (through online mediums or regular telephone calls). Watching movies together on online streaming channels or zoom is also a good way for them to remain connected with their peers.

**There are some practices caregivers must not indulge in, in the context of COVID, as they increase children's anxiety. They are:**

1. Continuous exposure to distressing news about COVID and issues relating to the pandemic can be detrimental to the child's mental health and exacerbate anxiety.

2. Constant conversations about the pandemic around children is also an aggravating factor in relation to COVID-related anxieties. It is important to note that even when parents/caregivers do not directly speak to children, they are always listening or processing information in their own ways. In this regard, even very young children are attuned to adult's emotional states, and observe seemingly unexplained changes in behaviour. These can be perceived by children as threats, resulting in a state of anxiety.

3. Lying or giving false assurances about COVID pertaining to when it will end, what its consequences are, why people are dying etc. While caregivers might seek to protect children from overly distressing information by hiding information, providing false assurances and explanations for COVID-related phenomena, such approaches can have negative consequences on the mental health of these children. Children are observant and can sense changes in the parents/caregivers' emotional states, disruptions in normal routines, sudden disappearance of a known/trusted person. In this context, a lack of information can deepen children's anxieties about COVID, leading to imagined explanations for COVID phenomena, that might in fact be more distressing than the truth. Children may also become distrustful upon discovering that they were provided false information, thus reducing the parents/caregivers' ability to assist them in managing their anxieties.

### **Part 3: Disclosing Illness and Death to Children in the Covid Crisis**

The impact of the second wave of COVID has been devastating and has left children everywhere vulnerable. Over the last few months there have been several reports on the increased number of deaths of parent(s) and caregiver(s). Currently, it is estimated that over 9,300 children have been orphaned or abandoned in the wake of the on-going pandemic. There have also been cases where the children have been left at home alone, or in the care of extended family or friends, after both parents have fallen ill due to COVID.

The parents/caregivers, on the one hand, worry about their children, and the children who are left behind worry about the health of their parents and that of themselves. They struggle with difficult thoughts and emotions (such as sadness, anger and guilt) that emerge from the unpredictable and chaotic circumstances. Their fears not only revolve around losing a loved one, but are also associated with the secondary losses like the loss of education, shelter, financial support in case something untoward was to happen.

**As a result of the above, the following are some of the dilemmas faced by most child care service providers/ adults:**

- Would it scare children if they are told about sickness and death of a caregiver due to COVID Disease?
- What should one exactly say to a child?
- How much information would a child be able to process?
- What does the disclosure process actually entail?
- What should one do after making a disclosure?

Parents/ caregivers/ child care service providers often do not find the answers to these questions and they tend to deal with the discomfort created by these questions in their minds by staying silent, avoiding and using diversionary methods instead of addressing the questions, confusions in children's minds. They often forget and do not realize that children are highly observant and absorb information from their social environment, even when the aforesaid information is not directly communicated to them. They process and attribute meaning to the information based on their own experiences, observations and understanding of the world around them.

In this context, the unprocessed/wrongly processed information has the effect of worsening children's fears and anxieties.

In the 3rd Part of SAMVAD's Informational Series, the following information was provided to caregivers/service providers with concrete methods to break bad news and make disclosures about illness and death:

While disclosing information about an illness to a child, it is important to remember that it is not a one-off process. It is done over a period of time, during which information is first gathered on how much a child knows. Subsequently, the caregiver/service provider proceeds towards disclosing the aforesaid information layer by layer. As one undertakes the process of divulging such information, it is important to remember the salience of providing truthful and accurate information to a child, in an age-appropriate way, with hope and reassurance. While working with children, it is imperative to remain cognizant of the fact that children are curious, they want to know, they need to know and they have the right to know.

In this part of the informational series, participants were encouraged to build response

scripts, and practice non-threatening ways of making disclosures to children. A special comic developed by the SAMVAD Team, which could be used to facilitate disclosure by the child care service providers/caregivers, was also shared with participants online.

**The step-by-step guide to making disclosure, as described in the comic, is as follows:**

- Describing what being healthy means;
- Explaining the concept of sickness to children, and that all sicknesses are not the same - some sicknesses are 'Big' and some are 'Small'
- Providing information about the Corona Virus and COVID Disease to ensure that children have access to the right information
- Addressing worries/fears about COVID, through the process of explaining that for some people it is treatable and for some it could lead to serious consequences. It may not necessarily be a 'Big Sickness' for every person.
- An important part of making disclosure is also providing hope and reassurance
- And lastly, acknowledging children's emotions and encouraging questions. Children may not necessarily ask questions or respond right away. Instead, they may come back with stronger emotions and questions about the circumstances or the disease a while later.

#### **Part 4: Supporting Children through Loss and Grief Experiences in the COVID Crisis**

The 4th part of the COVID Series briefly explores effective ways of supporting children through their experiences of loss and grief following the difficult disclosures of illness and death. It is important for service-providers/caregivers to support children through the experiences of loss and grief. In this regard, there are various ways in which children can be helped to express the trauma of loss and grief, and remember their loved ones in ways that give them the courage and hope to move forward.

This can be done by developing an understanding and responding to children who are impacted by loss experiences by providing age-appropriate responses to their confusions and questions, enabling children to express their loss and grief experiences, and supporting them to move towards healing and recovery.

While creating spaces for children to express thoughts and feelings on loss and death experiences, these are few key principles that must be followed-

- Creating spaces for children to express thoughts and feelings on loss and death experiences.
- Providing age-appropriate responses to the child.
- Validating the child's emotions of sadness, anger and guilt, and making them feel supported and cared for by reassuring them.
- Responding to children's doubts and questions with facts, and taking the child's personal beliefs into consideration.
- Providing detailed responses to the child so that the child does not get confused.
- Using creative methodologies to help the child in expressing their emotions.

If the memory of death is experienced, internalized and remembered only in its negative or traumatic elements, it remains a life-long memory of pain. Through grief counselling, it is important to convert negative memories to positive ones by keeping alive positive memories of loved ones and using them to provide children the strength to move forward.

In furtherance of the above, the following are some ways in which the duty-holders/ caregivers can help children in remembering their loved ones:

- Lighting a candle/ diya/ agarbatti.
- Writing a letter to their loved one in case there was no opportunity to say goodbye.
- Planting a tree in the memory of the deceased person.
- Drawing the picture of the special person.
- Cooking the favorite food of their loved ones.
- Creating a photo album of happy memories.

Along with memory-work, it is also critical to shrink grieving spaces of children by encouraging them to resume their daily routine and activities, such as play and school, family and social interactions, so that their developmental trajectories are uninterrupted.

If the child's grieving patterns continue and the child shows the following signs and symptoms, even after providing the necessary first-level interventions (as mentioned above), it is important to refer the child to professional mental health services-

1. A child who is agitated and inconsolable even after 3 weeks.
2. A child who shows changes in eating or sleeping patterns even after 3 weeks.
3. A child who has started indulging in high-risk behaviors like self-harm or substance use.
4. A child who shows regressive behaviors like bed-wetting, thumb-sucking, security blanket, etc.

Through the course of SAMVAD's Informational Series, attendees actively participated throughout the interactive sessions online and shared some of their own experiences and learnings. The 4-Part Informational Series can be accessed at SAMVAD's YouTube Channel in English and Hindi on our YouTube Channel.

**You can reach SAMVAD through the following links:**

**YouTube Channel: SAMVAD-NIMHANS Child Protection**

**Website: [www.nimhanschildproject.in](http://www.nimhanschildproject.in)**

**Twitter: @nimhans\_CPC**

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# Covid 19 Pandemic and Children with special needs in India -

**Time to step up our solidarity ... and lessen the impact..**

**DR LEENA SRIVASTAVA**  
Developmental Pediatrician, Pune



“You may choose to look the other way but you can never say again that you did not know..”  
William Wilberforce.

The world reeled under a major change when the Covid 19 virus outbreak was declared a pandemic in March 2020 by the WHO. The lockdowns that followed, loss of income for few families, social distancing and resultant isolation, closure of schools with the shift to online mode of teaching all added to the woes of children and their parents. The scene in India was no different if not worse with the lockdowns, the ensuing financial losses, work from home, distancing from extended family and lack of usual domestic help adding to the stress.

Parenting is never easy and even more tough for parents of children with special needs. This with all these added stressors during the pandemic to the families with dwindling incomes, work from home, lack of domestic support, lack of socialization, looming fear of the illness itself along with closure of physical schooling, intervention and play made life for parents and children with special needs very challenging.

Children with special needs are much more vulnerable and disadvantaged than their peers in normal times too and the pandemic added an increased exposure to these vulnerabilities and a probable risk of abuse as well with the lockdown and its entailing effects.

Previous available data on UNICEF sites from the MICS data surveys (4) mentions that children with disability as compared to children without disability are-

- 18% less likely to have improved sanitization and drinking water; 10% less likely to have water and soap for handwashing in their households.
- 1.9% more likely to have diarrhea; 1.7% more likely to have respiratory infections; 1.5% more likely to have fever.

This data itself speaks a lot on their pre-existing disadvantage along with the added lack of ability to understand and follow preventive measures like social distancing, wearing masks etc.

The shift of physical intervention and schooling services to home based or online ones also will be a challenge as the same MICS data (4) suggests that children with disability are-

- 57% less likely to have children’s books in their households.
- 23% less likely to engage in early stimulation activities.
- 32% less likely to read books or to be read at home.

If this was the scenario in previous data then the present pandemic scenario would have multiplied their difficulties. Thus one of the groups bearing a big brunt from the pandemic scenario in addition to frontline workers are probable the families with children with special needs. The emotional stress of parents/ caregivers along with the social isolation and break in the daily routine of intervention, schooling, recreation and resultant exacerbation of behavioral problems in children had given rise to a vicious cycle of interaction and struggle in most families.

Major reasons for the increase in behavioral problems and stagnation of developmental goals which were the biggest challenges for these children seem to be a break in routine and intervention in addition to the families being hit badly by the pandemic.

- A structured routine provides a sense of security in children with special needs especially the ones with neurodevelopmental disorders like Autism spectrum disorder.
- The lack of accessibility to intervention put their developmental progress also on a halt or in few cases may have lead to a regression of recently acquired skills.
- The lack of social interaction had an adverse impact on most children with disability as much or maybe more than their typically developing peers.
- Difficulty in access to online special education services in children with disability both due to lack of internet access in many parts but also due to necessity of assistive devices or special curricula for their accessibility.
- The confinement to homes ,gloomy uncertainty of the situation with the blaring of news channels and mostly hassled parents could have aggravated the behavioral problems and anxiety, depression in those with cognitive abilities that make them comprehend the happenings.
- Excessive screen time an inadvertent consequence of being confined at home in most families which added to a negative impact on behaviour and sleep.
- The anxiety of increased chance of these children with disability of contracting Covid 19 both because of their inability to follow the precautionary measures and also due to the difficulties in their care taking have also added to the stress of their families.
- Parental stress with the multiple responsibilities while working from home, financial crisis, reduced access to services to share responsibility of the caretaking and the uncertainty of the situation.
- Stressors may lead to a negative impact on the interaction with the children and eventually on the children themselves with an added risk of neglect and abuse.

The major support for the families are probably the Pediatricians/ Developmental Pediatricians and their teams who are available in person or by online support and were there for them throughout these difficult times. Thus this can be a probable new era with the advent of online health care the pros and cons of which remain to be debated.

Physical health related problems have remained the mainstay of health care in the pandemic in general, and safety of these children, access to appropriate medical care and vaccination has rightly been the priority of Pediatricians. It is however the necessity of these times to make mental health an added objective in every connect with children and their families. This may support parents to manage these children better thus guiding them to lesser negative impact of the unavoidable present scenario. Few points that could be touched on these visits are-

- Parental psycho-social support for families with children with disability.
- Guidance on scheduling a daily routine for the child with engagement in home chores, learning new skills.
- Online interventional support resources.
- Child safety could be discussed along with general health and nutrition advice.
- Sleep hygiene and screen viewing guidance can be brought up with option of limited use of the screen for social interaction and video chatting with extended family in view of the social isolation and avoiding other screen time.
- Responsive caregiving, developmentally appropriate play and stimulation.
- Effective communication and explaining the scenario to the child in developmentally appropriate language updating them on the change in scenario from time to time helping to reduce the uncertainty in their minds.
- Use of social stories, videos, role plays for these children to help them understand the scenario and also preventive measures like hand hygiene, social distancing better.
- Avoiding sedentary lifestyle, excess junk food and obesity with emphasis on physical exercise.

Parents can thus be guided to manage children better at home and have realistic expectations from their children with a balanced lifestyle. The pandemic has actually truly thrown light on the needed emphasis on training our children on life skills and enhancing their adversity quotient in addition to the better known Intelligence and emotional quotients.

The silver lining however is that many families adjusted to the pandemic scenario early, built a routine and have used the time fruitfully to spend quality time with the children with regular inputs using online support. In fact many have reported better bonding and behavior than before. So obviously all is not dark but being a vulnerable population their difficulties must be studied in detail to guide further policy planning.

According to a UNICEF report around 80% of countries in Eastern Europe and Central Asia reported disruption in access to disability related health services. But the report also says that in most countries organizations have not been engaged in planning disability inclusive response strategies.(4)

The need for all stakeholders to strive for policies to include the children with special needs and their families in the short and long term strategy planning for the pandemic is essential to ensure safety and well-being of these children with special needs focussing on –

- child nutrition, safety and protection,
- access to online intervention help,
- tele-counseling availability/support groups for parents/caregivers psychological support and

- guidance with accessibility to special education services.

It is a time for us to show our solidarity using these unprecedented times to make a good start for collection of data specifically regarding the issues and service availability for these children to pave the way for advocacy for better services and accommodations to safeguard their physical and mental health in the future.

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## An insight into the online classes for the challenged children of Adarsh Charitable Trust, Cochin, Kerala, India



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**An insight into the online classes for the challenged children of Adarsh Charitable Trust, Cochin, Kerala, India**

### Introduction

In March 2020 when the schools were closed due Covid-19 pandemic, one of the main sections of the society affected was children with special needs. It was a difficult situation at that time in deciding what can be done for these children. The entire month of March, all the staff members were interacting with the children and their parents over phone either through voice call or video calls (Watsapp) to make sure that the children were active and were encouraged to move ahead to face the challenges happening due to the lockdown. By the end of March 2020, it was clear that school re-opening even in June 2020 would be difficult.

### VIA (Vocational, Information, Activity) programme

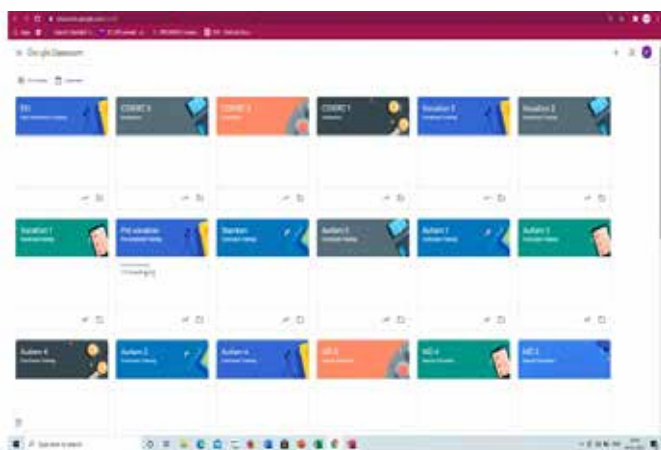
Finding these problems ahead, Adarsh Charitable Trust in association with TATA Consultancy Services, Cochin, and a start-up company Punarjeeva Technology Solutions decided to extend all the school activities to children through online platform. One of the major hurdles in front of Adarsh was lack of awareness about internet and smartphone among the parents. For that an innovative programme was launched on 31st March 2020, it is called VIA (Vocational Informative and Activity) programme. The VIA programme was first of its kind digital transformation journey for the differently abled children. The intention was to create awareness

about the potentials of online education, use of smartphones and various applications in it etc. Initially the number of participants were less later by Mid-April, the number increased significantly and Adarsh could produce positive vibe among the parents to go further. The VIA programme continued till the end of May 2020. During this period, various vocational activities like cooking sessions, art and craft sessions, activities through Augmented Realty from Google etc were introduced to parents and children. To enable continual physiotherapy, the children were introduced to digital therapy sessions using algorithms and techniques in Artificial Intelligence and Augmented Reality. Eminent people from different fields from the society talked to the parents to keep them motivated and different psychological sessions were given to encourage them to help their children at home. Shri Gopinath Muthukad well known magician, and Social Activist, Shri Sreejith Panikar, Psychologist, Dr. P H Kurian IAS, Dr Moahmmmed Asheel et al were some of them. The feedback from the parents were so encouraging that Adarsh decided to reopen the school on 1st June 2020 through online platform. An official "Pravesanotsavam" was held on 6th June 2020 on Google meet platform and around 250 parents attended the first official online function on the day.

### Adarsh Special School – Online activities

Adarsh main rehabilitation centre has 285 children on the rolls (Trust also takes care of another over 260 children through its other activities like Home Based Rehabilitation programme, Risk Baby

Unit and Child Development Evaluation Intervention and Research Centre) in June 2020. These children are segregated based on their disability and other various parameters in 28 different classes. Each class has a special educator and an assistant teacher (Ayah). Once the decision to start online classes made, the first thing Adarsh did was to start similar classes in Google classroom.



*Shown above was the screen shoot of Adarsh Special school's google classroom.*

Out of the 285 children, 155 children are under the age of 18 years. Their activities are classified based on their age, skills and their abilities. The activities including Early Intervention programmes, Academic training under NIOS syllabus, all therapy programmes like Physiotherapy, Speech therapy, Psychotherapy, Family counselling, Occupational therapy etc are being provided in google meet platform regularly.

Adarsh has 130 children above the age of 18 years. Various vocational skill-oriented training programmes are being given around 50 children online. Some of the online vocational activities are as follows:

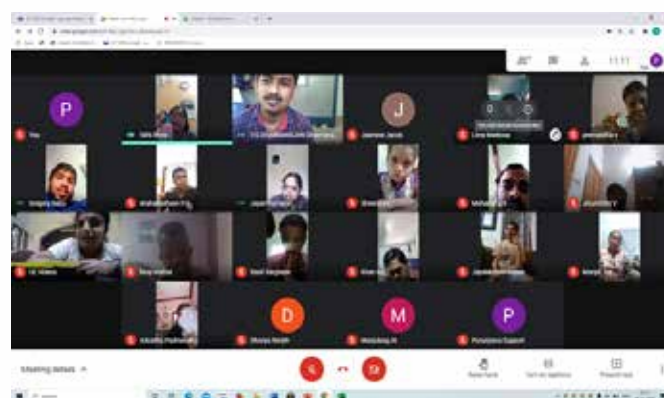
1. Paper Bag making
2. Flower making
3. Pen holder making
4. Mat making
5. Fabric painting
6. Pot painting
7. Bottle craft
8. Ornaments making

9. Greeting cards making

10. Mask making and Hand wash making

Rest of the 80 children above the age of 18 years are divided into 2 groups. One group of 25 children, who are intellectually good and at the same time with severe physical disability are pursuing computer training. Balance 55 children are severely challenged children who cannot do either any vocation or any other class-room activities, kept in the day care centre of ACT and are being given some kind of maintenance programmes through online classes.

These online live classes are being given every day for all the children. All these classes were conducted on google meet platform. Such 10-13 classes were conducted every day. On an average 70-80 live classes were conducted every week including on Saturdays and Sunday depending on the availability and convenience of parents (Since a good number of parents are working and smartphone will be available only when they are at home). Regular special education classes are given once a week. Additionally, Physiotherapy, Occupational therapy, Speech therapy, Psychotherapy, Family counselling, Music, Dance, Drawing, Arts and Craft etc are also provided once a week except therapies which are individual centric. Altogether Adarsh conducted over 4000 online classes for the children. Children who need intensive therapy got 3 sessions of therapy a week. Out of 320 children, 260 children attended these online sessions with an attendance percentage of 85%. Rest 15% children are either severely challenged or they have technical issues in attending classes. In their case a team of teachers and therapists contacted their parents on a regular basis and suggested home programmes. Some of them were visited at their home and provided support.



In addition to these online classes, children were visited at their homes once a month when the covid restrictions were relaxed after the first wave of the pandemic. Even selected children were given medical consultation with expert medical practitioners (Pediatric Orthopedics and Neurology) from Aster Medcity in the month of April 2021, anticipating this can be continued once every month. But the second wave forced Adarsh to stop all those field activities. Last year, with Give India, an NGO based in Mumbai, around 120 poor children and their families were helped with ration kit, sanitation kit and extended financial assistance to 30 selected children by reimbursing their monthly medical expenses.

Like in precovid time, Adarsh celebrated all the festivals and events online in a befitting manner. Onam, Christmas, Ramadan celebrations etc were really eye catching with the live performances of children. Events like World Environmental day, Independence Day, Children's day, International day for Person with Disabilities, World Cerebral Palsy Day, World Down syndrome day, etc were observed online.

## Feedback

Surprising to all of us in Adarsh, the online classes were a huge success. Almost all the children attended the sessions got improvement either in communication skills or in their socialization skills. The real time classes could replicate their normal classroom and children could interact with teachers and their peers in real time as they were doing it in normal classroom during precovid time. This really encouraged them to attend classes regularly. Even teachers too were excited to do more different activities for the children. The main objective of these classes was to keep the children encouraged and quality of their life is maintained. But gradually it was visible that children made good progress with the sessions. Special mention to speech therapy where children got remarkable changes in various aspects of their speech. Along with music class, parents admitted that children are getting marked changes in their communication skills. It is heartening to understand that even severe children with Cerebral Palsy, their physical condition was maintained without deterioration.

## Plans in front

The second covid academic year 2021-22 is already started. As usual all the activities are online. This year before the classes restarted after summer vacation, like last year, Adarsh launched another awareness programme called tedS (Technology-Entertainment-Development Sessions) for the parents, teachers and children. This programme too got wide range of appreciation from parents especially for the technology sessions on Robotics, Artificial Intelligence based movement and posture identification software etc. The robot also showed them a few movements that the children were able to imitate and could be further used in their therapy. The children and their beneficiaries were also provided insights into the Brain Computer Interface and its possibilities, where the magic of the brain could be decoded to understand the attention and concentration of the children. In addition to opening the doors of technological prospects for the children, they were also apprised about Hydroponics, Art of Bottle Crafts, Stress Management, the importance of "SMS" and some entertainment sessions. All the session were culminated on 12th June 2021. Parallely online classes are going on from 1st June 2021. This year the Trust has over 5000 classes in its academic calendar with additional special programmes like Yoga, Magic etc. On analysis it was found that among all the programmes only Physiotherapy has limitations. To strengthen Physiotherapy programme online, Adarsh envisaged a special programme for selected children with Cerebral Palsy who need regular Physiotherapy. These children will be provided with a Laptop with advanced Virtual Realty programmes installed. They can do those exercises using the software at home with the guidance of Physiotherapists. To start with only 15 children are selected. After one month of practice, next group of 15 children will be selected. This will be practiced till more Laptops are available. If this programme succeeds, children with Autism will be included in this programme where activities appropriate for children with Autism are installed in the Laptop. In 2021-22, a graduation batch (BA History) of 7 children who registered in IGNOU, was launched. This was launched based on the confidence of children and parents showed in our online classes. Also, it was found that children from many other special schools have problems in accessing classes

due to lack awareness and other technical issues. Adarsh is willing to support children from outside Adarsh too. who are interested in joining the online classes. Those who are interested may contact any one of the authors mentioned below.

## Conclusion

It is with pleasure and proud we inform that even though lockdown affected these children in different ways, all the children are physically and mentally well maintained without many issues. They have issues in socialization, lack of peer group interactions etc but to a certain extent it is very well managed with the online classes though it has its own limitations. Now after 10 months of online classes, children are acclimatised with the new situation, they learned new things, understood

different lifestyle etc. Adarsh has a big advantage that normally almost all the children's parents are with them during class hours. The objective was to learn the training methods and programmes so that they can imbibe them at home. This has really helped the children during the difficult period, especially in giving Physiotherapy and Occupational therapy. So Adarsh is confident that everything is well set to go forward to train these children and help them to lead a quality and dignified life ahead. In almost all the online classes one frequent question these children asked is "When is school reopening?". This shows how much they love the school atmosphere, their teachers, and their friends. Adarsh too wishes things to be under control soon so that activities are resumed to see the happy face of these children.

## Educating children in the times of the pandemic

**Dr Samir H. Dalwai**

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National Joint Secretary, IAP



*“Education is the manifestation of knowledge already inherent in man”- thus spoke Swami Vivekananda. The teacher and the process of education merely helps in unravelling and revealing to the learner that which is already known, which is already present.*

**Development** is the acquisition of new skills and (for) new functions. Developmentally, formal education is the continuation of early milestones wherein the child learns and continues to develop skills necessary for functional adaptation in the world. The world of education, as we see it, allows a child a structured, multi layered platform of opportunities to be exposed to, practice and learn and master new skills far beyond the possibilities afforded by the family and neighbourhood. These skills are not only information gathering but the ability to forge relationships, assess self and others’ competencies, to be able to adapt to situations and to be able to indulge in cooperative tasks while honing ones skills.

**The** Covid-19 pandemic has disrupted life as we know it, and far beyond the disease impact. It has silently ushered in a parallel pandemic of social and fiscal devastation, the immediate impact of which we are only now getting to be aware of.

**India** is home to 500 million children and adolescents.

**The** closure of schools is, of course, damaging to children’s education. But schools are not just a place for learning. They are places where kids socialise, develop emotionally and, for many, a refuge from troubled family life. The impact on education is the pervasive denominator across the world for all children. Almost every country in the world has seen lockdowns and education as we know it,

has been universally disrupted. The shift to online schooling has been an unequitable consequence. The presentations vary across the ages.

**Every** dark cloud has a silver lining; a storm should have many! The Covid era is not without its share of learning and benefits. In my practice as a Developmental Behavioral Pediatrician, I have seen that families who were well adjusted and organized even before the pandemic have, in fact, come out stronger; so also families who saw the storm coming and got their act together. Few ground rules and some guidelines helped families organize their day better; staying together for months on end helped heal old wounds and discover new co-interests and ways to co habit together. Nothing was as pleasing as learning to co-parent and co-manage the children together. Parents who took this up as opportunity rather than a challenge found that engaging with the child was both a revelation and a blessing. Children with special needs in fact blossomed in the sunshine of increased parental interaction. There were a few suggestions that could be useful for any parent to engage with the child more fruitfully and turn anxiety into joy!

**If** there has been anything that parallels the inequities in terms of health care it is the inequity in online education.

**To** those who had the luxury of privilege, education has shown various benefits. Children could learn at their pace without having to squirm under the questioning gaze of the teacher or worse, the admonition and bullying from ‘better’ students. With formal exams cancelled and pupils isolated from one another, children are now free to work at exactly their own pace. There is no pressure to get



20 questions done in 20 minutes because nobody can see what you are doing. Students can't see what their peers are doing and so also shed that fear of being "the slowest". The pressure of "having to keep up" has largely been eradicated. Distractions have in many ways been reduced as compared to the physical classroom. In lockdown the child is often on her own, the mobile can be on silent and nobody else can enter the virtual classroom. With traditional classroom teaching methods challenged, lockdown has allowed many to pause, take stock and create. As a result, students are enjoying a range of teaching styles and new programmes to explore. Adolescents have used the time available due to lockdown and online teaching for a diverse agenda like participate in online competitions happening globally and win prizes, apply for overseas University applications (essay writing + other application work) or to mobilize scholarships abroad.

**Unfortunately**, a great many children do not afford these privileges and it devolves upon parents and society to continue their education and development without the recourse to expensive and unaffordable privileges. Is that possible? Eminently so!

**Education is not only about garnering information from books! It is learning about how to live life and to live life happily with others!**

It is best to begin with you and your child making a schedule for yourselves. The schedule should include the child's daily personal chores as well as household chores appropriate to the child's age. The child can be a 'helper' for others in the family, for instance, simple day to day activities like cooking or watering the plants with their parent, playing with siblings and so on and being rewarded for the same. Nothing succeeds like success and nothing works like ego - make the child feel appreciated for contributing at home, in howsoever small way. Activities should be developmentally appropriate for the child. Keeping little 'Fun Corners' like a basket of colourful books and reading them together, or a corner marked for some messy painting, puzzles, blocks, clay, etc. are happy ideas. Music and movement go hand in hand; hold hands and dance! Looking and listening games are a great way of passing the time with fun- stand at the window and talk about what you can see and hear. Incorporate 'Clean Up Time' in a fun way so things don't get too cluttered; clean up together with the family with some music or cleaning up song!

Pandemics are interesting time of learning for young kids. You can begin by keeping the academic books away! Instead, keep a journal or scrap book or a project book as child's choice of topic. This should be a guided activity as the child may not do this on their own. It is a good idea to make models or do some science experiments- strictly under supervision! Provide good reading material as per the child's interests. Discuss what the child has read - ask the child to embellish it with his own words- this helps children improve their vocabulary and language skills. Use board games like Monopoly to encourage learning of money and planning, or chess and ludo for planning and strategy. Encourage stamp and coin collections and performing arts, like dance and drama and music. Children love dramatising stories - role models and social stories are a good way to instill the values of care, teamwork and ownership. Discuss appropriate current events. Have family debates and discussions or antakshri contests. Do not miss celebrating birthdays or return of a family member from the hospital together online. Academics can be scheduled in the first half of the day when the child is mentally fresh- try and revise what has been taught in online school; provide your own examples, incorporate stories or events that the child can relate to. This helps the child grasp better and enjoy it more. Do not push the child beyond the decided schedule- any compulsion will only make the child detest it.

Empathize with your adolescent; they are perhaps losing the best time of their life. Peer interaction, relationships and lifelong friendships are developed now and we should be happy to indulge this. Allow your teenager to connect with friends and extended family digitally. Try to be non-judgmental; instead, instill hope. Your parenting style is more of a role model now than ever before. Help in studies but do not stress for academics. Focus on the 'good behaviour' more than 'bad behavior; talk about what to do rather than what not to do. Be mindful never to over react. Avoid having hushed discussions- include them in all decision-making to give them a sense of control and self-belief. This period is an opportunity to learn responsibility, accountability, involvement, and collaboration.

At all ages, listening helps! Avoid the 'grown up' urge to offer instant advice. Remember the rather Calvin & Hobbs'que Mirza Ghalib admonition to parents and counselors alike- "Yeh kahan ki dosti hai ke baney hain dost naseh, Koi charasaaz hota koi

ghum-gusaar hota!” (I don’t need a friend to lecture and advise me; but a friend who will heal me, share my sorrows).

Similarly, ensure healthy nutrition and good physical health with a consistent routine at all ages. An hour or two of physical activity keeps the mind refreshed. A trampoline or other home equipment comes in useful. If permitted, the staircase area especially during are during non-frequented hours is useful for games. Yoga and meditation can be taught to older children. Limit exposure to news-an atmosphere of sad, gloomy, fearful information breeds anxiety and depression. Be watchful about gadget use- set rules and be consistent. Have screen free hours, zones and days. Keep screens safely away long before bedtime; do not permit the child to take the phone to bed. Prioritize as well as promote non-screen activities over screen time. Over exposure to screen time can induce a range of behavioral and psychological changes at all ages, from hyperactivity to speech delay in tiny tots; red eyes, sleep disturbance, headache and fatigue in older kids. Guiding adolescents about cyber safety is a must. Sleep must be adequate and regular; incorporate it into the regular schedule right away! To support and protect psychosocial well-being of children, our team at New Horizons Child Development Centre has proposed the ‘ARCH’ model for mental health workers, parents and teachers. ARCH is an acronym for Adapt and attempt, Resilience, Collaboration and care, and Humor and humility.

In an uncertain and evolving situation like this, children may be encouraged to adapt to the current scenario and attempt solutions in a new normal, rather than wait for familiar comfort zones. Options for physical activities have been drastically reduced. Children tend to spend their excessive free time on television or mobile phone. Introducing positive adaptation skills is essential. Children need to feel safe, secure, and positive about their present and future. Caregivers can help by focusing children’s attention on stories about how people come together, find creative solutions to difficult problems, and over-come adversity during the epidemic.

Since failure may be a likely outcome due to unprecedented challenges, resilience needs to be fostered. This entails ‘listening’ and being emotionally available to the child. Letting children express their concerns, and participating in their

activities are key initiatives. Children should be given an idea of what realistically to expect rather than painting rosy but ostensibly false pictures of the situation. Queries from children need to be answered with simple concrete explanations appropriate to their level of cognitive development. Being honest and supporting them with their challenges help build resilience in the situation.

Collaboration and care are imperative in a prolonged crisis. Children need to be encouraged to reach out to parents, siblings, peers, school mates, teachers, and other caregivers to pool resources and ideas, and work together collaboratively to find creative solutions to everyday challenges under super-vision and guidance, while caring for each other’s contributions.

Humor in daily life is vital for the child to withstand distress during these hard times, and inculcating humility is imperative to help the child to maintain a sense of calm acceptance and balance. Children with special needs need more care, attention and patience. Disruption in their day to day life, medical care and interventions affects them more. Making a daily schedule which incorporates their self-care and hygiene activities (brushing, toilet, bathing, eating, dressing) as well as preferred play and leisure activities help them adjust to the new normal as well as helps the parents organise their own day better. Involving the child in household chores at developmentally appropriate level is remarkably beneficial – most “therapy activities” can be incorporated herein in a natural way. Moreover, the appreciation from loved ones and the ability to contribute to the household is excellent reinforcement to learn desired behaviours. Tele-consultation with your child’s developmental pediatrician and team may help, provided there is a defined program with goals and outcomes. Medications, as advised, may be continued. Help your child to connect with family and friends on social media applications (always supervised) for some time every day. Family events like birthdays can be celebrated on video platforms. Avoid letting your child have unsupervised and unrestricted screen time.

Like all bad things, the pandemic will end too. For some, there will be irreparable loss; for most, things may slowly start getting better. Either ways, that is life and we have to move on. We are the role models for the child! That makes it two for the effort of one!

## Covid 19 vaccination in children

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Prevention of covid 19 infections has great public health implications. Even though most children have asymptomatic or mild infection, they are an important source of transmission to others. Studies have shown that infection and transmission in children and adults are similar. Severe infections and mortality have frequently been reported in young infants and children with comorbidities. Multisystem inflammatory syndrome is a rare but life threatening complication of Covid 19 infection which may rarely lead to long term coronary artery changes.

### Vaccination status in various countries

Some countries have started giving vaccines to children, while some have started clinical trials in children. In India trials have been started by Bharat Biotech (COVAXIN) in children aged 12 to 16 years and recruitment for clinical trials for the age group 2 to 6 years has also been started. United States had in May 2021 approved use of Pfizer – BioNTech vaccine for children above 12 years of age. Germany, Poland, Canada, UAE, Italy, Singapore are other countries which have approved vaccination for those above 12 years of age. UAE has started vaccination trial with Sinopharm in children aged 3 -17 years and China has approved emergency use of Sinovac vaccine (killed vaccine) for children 3 -17 years of age.

### Need for Vaccination of children

Vaccination would prevent children from getting severe infection. Infants and children with comorbidities like malignancy, neurological disease and immunosuppression are at increased risk of severe infection and mortality. More centers are reporting an increased incidence of severe infection in children including pulmonary disease 1 in three

admitted to the hospital requires ICU care. Children need to be vaccinated as they are an important source of infection. Wide spread vaccinations are important to stop the pandemic. It is important for preventing the virus from mutating and creating potentially dangerous variants. As schools reopen the possibility of schools acting as centers for covid outbreak is also a possibility.

### Limitations of adult data on vaccination

Data from adult studies cannot be always extrapolated to children, as the immune response in children may be different. Sometimes different doses are needed to achieve the same efficacy and safety profile. As of now studies in children have showed good efficacy and safety profile. More data will be available as the ongoing trials are completed and results published.

### Priority groups

Most pediatric Covid deaths have been seen in children with comorbidities. Hence vaccinating this group should be a priority. Some experts feel that these children should be offered vaccines under an expanded access or compassionate access program

### Concerns about vaccinating children

All the vaccines currently being used has obtained an emergency use authorization(EUA) for vaccinating people. But COVID cases are now decreasing and most cases in children are mild. With the report of myocarditis in teens and young adults (16 -30 / 1 million dose) after vaccination (causal link not established) many experts feel covid vaccines for children should be considered under BLA (biological license application) and not EUA so that agency considers data from a year or two before approval.

## Covid vaccination and myocarditis

There has been rare reports of myocarditis and pericarditis in adolescent and young adults after vaccination. CDC recommends continuation of vaccination in those above 12 years of age as known and potential benefits of Covid vaccination is considered to outweigh the risks. The causal relationship of Covid vaccine with myocarditis has not been established. Most cases of myocarditis have been reported within a week of vaccination, in patients above 16 years of age, typically after the second dose. Most patients with Myocarditis responded well to treatment and recovered quickly. The symptoms to look out for include chest pain, breathlessness, fast breathing, fluttering or pounding heart etc. in the week following vaccination.

### Vaccines recommended in children

Most countries are using Pfizer – BioNTech Covid 19 vaccine in children above 12 years of age. It is an mRNA vaccine with good efficacy and safety profile in children consistent with the adult studies. In China Sinovac (killed vaccine) is being used above 3 years of age. World Health Organization till now does not recommend vaccination for children below 16 years of age.

### Contraindications

Only contraindicated in children with history of serious allergy to any constituent of the vaccine. Children or teens who recently received any other vaccine should preferably wait for 2 weeks before Covid vaccination.

## Side effects

It is the same as in adults including local site pain, fever, lethargy, headache, myalgia, lymph node swelling. Allergic reaction including anaphylaxis can occur very rarely. As the results of ongoing clinical trials in children get published a clearer picture of safety and efficacy would evolve.

Stoppage of transmission of covid 19 infection and spread in community is of paramount importance, as longer the virus circulates higher is the chance of acquiring mutation which may evade immune recognition, hence vaccination and prevention of infection and transmission in children is a priority

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# Impact of the pandemic on education of children and adolescents in India

Dr Jeesson C Unni

The plan to return students to physical classrooms has suffered a major setback. The second wave of Covid-19 cases has mandated another set of lockdowns, with no telling when the situation will be back under control.

The silver lining is that government and educational institutions and children themselves want to facilitate a return to offline teaching. The current delay gives them more time to formulate a better roadmap for ensuring a safer transition back to school-based learning.

Some may question whether a return is necessary. After all, e-learning has been on the rise during the pandemic and is being heralded as the future of education.

However, while online pedagogy does a great job of supplementing offline education, it does not serve as the latter's replacement. This holds especially true in a developing economy such as India for several reasons.

## Why India cannot do without offline learning in the long run

To begin with, the digital medium can't replicate the interpersonal interactions that schools facilitate by bringing together young children from different backgrounds and cultures. In essence, they act as a melting pot of ideas and perspectives that serves to broaden the learners' perspective.

Interacting with their peers between classes also help students develop their social skills essential to their holistic growth and development.

Another aspect is that of equitable access. India is infamous for its wealth gap; a 2020 Oxfam report highlighted how the country's richest 10% own almost three-fourths (74%) of its wealth.

This disparity is further complicated by the digital divide between urban and rural India, leading

to issues with consistency and quality of learning.

Even developed countries such as the US have faced challenges with ensuring quality education to learners during the pandemic; McKinsey estimated that school closures until January 2021 would lead to an estimated 6-8 months of learning losses in the US, with low-income, black, and Hispanic students disproportionately affected by it.

India might fare even worse if offline learning is not resumed soon, given the inequities, bottlenecks, and challenges that already plague its education ecosystem. Students are often left confused during the online classes and the attention span for these sessions are miserable.

## Challenges in and prospective solutions for a return to physical classrooms

However, going back to school will not be plain sailing. Stakeholders from government, educational institutions, and regulatory bodies will need to ensure that the return to physical learning does not jeopardise the health and safety of the students.

A phase-wise repopulation of the classrooms, with staggered and rotational rosters, could be a prospective solution; only a given number of students, in keeping with social distancing norms, would be present in the classroom on any given day, with the remaining students attending via live chatrooms.

This would help with a safer transition to an offline-led learning module without increasing the number of daily classes assigned to educators.

Ultimately, we do not know when India will finally emerge from the pandemic's hold to resume offline learning.

However, stakeholders must prioritise the creation of a blueprint for the students' eventual return to school. For a majority of young

schoolchildren across the country, it is not a luxury but a non-negotiable necessity.

### Higher education

Public universities could be damaged “beyond repair” in the fallout from India’s COVID-19 catastrophe. Many educationists have succumbed to, got infected or are caring for sick family members. Campuses have been closed, with exams being held online or postponed.

There is no substitute to face-to-face learning in higher education. The policy makers are uncertain about how to handle the next academic year, such as admissions and exams. The majority of universities do not have the capacity to do either [online or in-person exams] under current conditions.

In the longer term, public institutions will likely become even more cash starved in the post-COVID era. Maintenance of institutions - infrastructure, payment of staff and teachers and need for layoffs is bound to have its impact and getting back on its feet is definitely going to be a problem.

Implementation of the ambitious National Education Policy, which outlined major expansion and internationalization of India’s higher education system lies in tatters.

Like last year, this year’s academic span will be shorter. Students may be able to start their first year in October or November. This will impact the rest of their academic timelines Research has taken a backseat.

Universities that reopened in January for a few months had to close shop.

The consensus is that the whole system of higher education in India has collapsed.

### Examinations and entrance tests

Central and state board exams have either been canceled or postponed, with several entrance exams for undergraduate (UG) and postgraduate (PG) admissions getting deferred. Decisions on how to evaluate children in their crucial XII board exams is pending. There are suggestions that students assessment could be based on class 10 scores and interviews. Whatever the decision, some children are bound to suffer.

The decisions on criteria for selections to higher education needs to be worked out. Children who prepared and worked their guts out for entrance

exams have been short changed and most children are in a state of anxiety, stress and some are on the verge of depression – most are weary of starting preparations all over again.

### Pursuing a foreign degree amid coronavirus outbreak

While the situation is worsening in India, foreign universities are looking forward to the September 2021 intake. Universities are offering flexibility to students at all stages of the student lifecycle. Now, they have a more extended deadline to submit applications along with a longer window to accept offers of admission and pay the tuition fee. Because of lockdowns in various cities in India, the Visa Application Centres’ (VACs) operations have also been impacted, causing visa approval delays for multiple students.

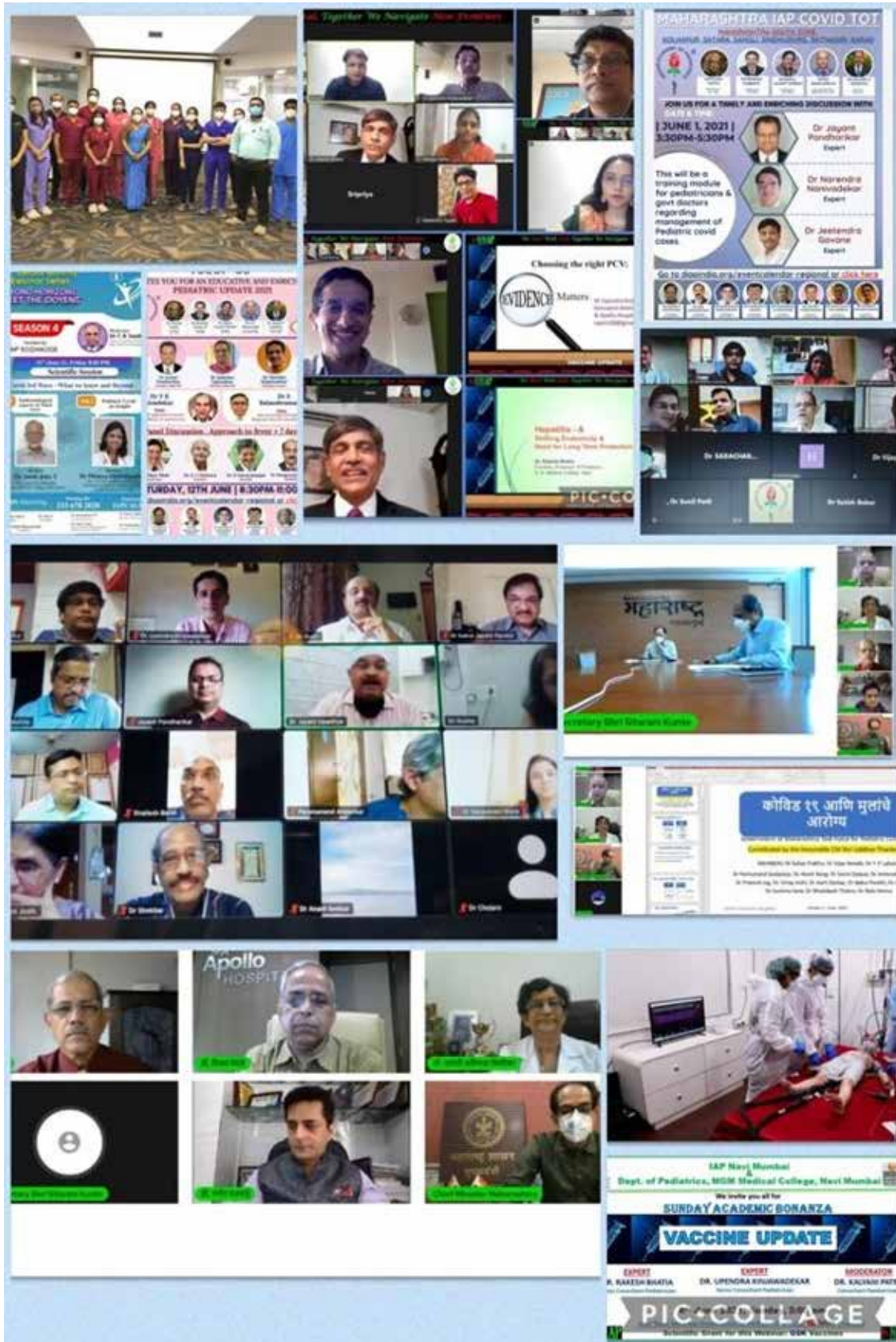
The western hemisphere is divided into the green and red zone. The green zone consists of countries such as Germany, New Zealand, Canada and the UK, who have very well-handled COVID-19. Universities in the UK and Canada are offering conditional admission offers to foreign students. Most students had deferred their admission offers in 2020 and will be joining this year, which will increase the competition. Earlier, students used to apply for 3-4 courses, but now universities are asking them to identify their most preferred course while applying.

Countries in the red zone such as the US have given a chance to the non-traditional study abroad choices as students are opting for a foreign degree with minimum expenditure. Universities will try to make the upcoming Spring intake as big as the Fall 2021 intake. The UK government has also promised vaccination for all international students through National Health Service (NHS) in the country.

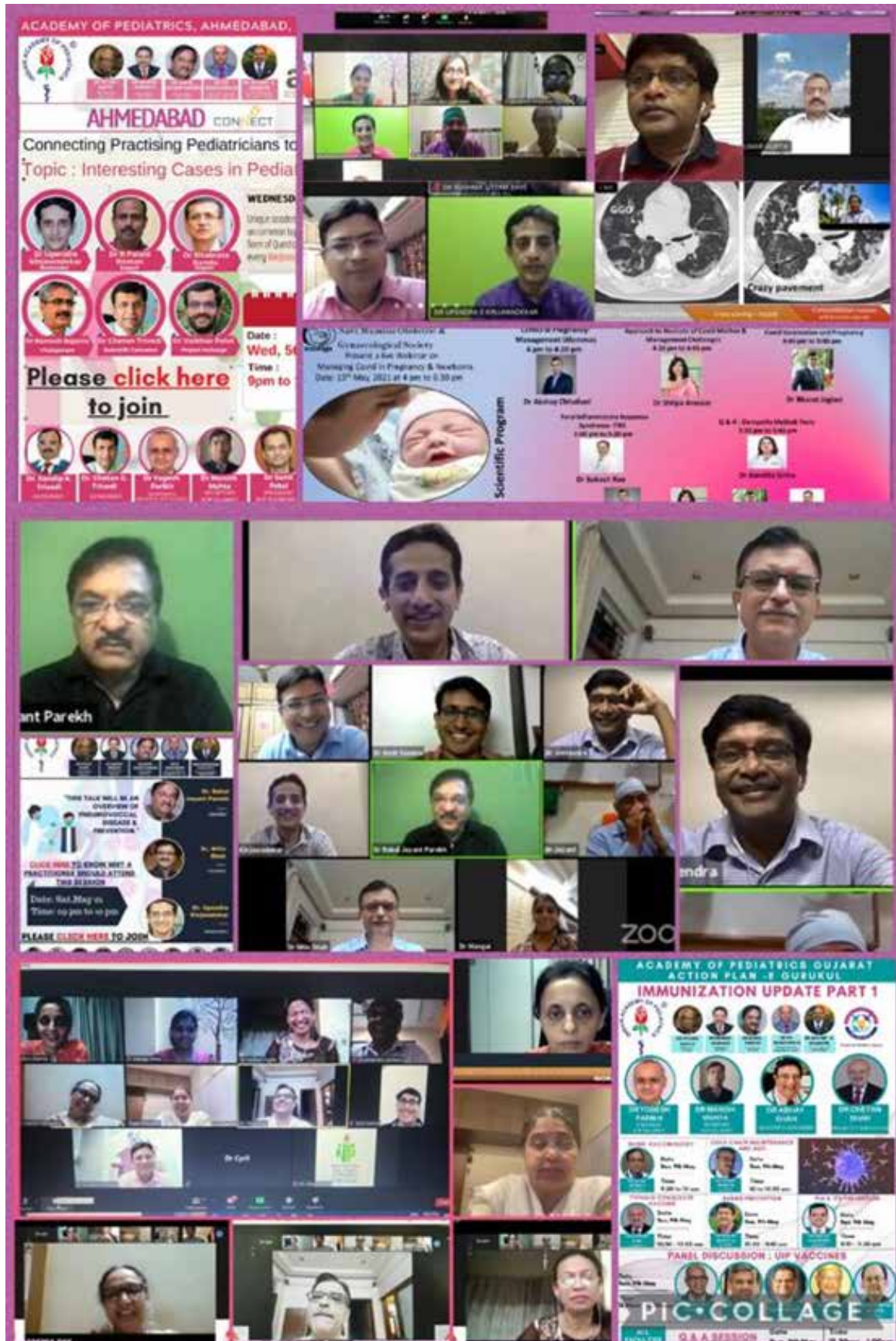
It is a new world and everyone needs to be updated on the changes in every field – and child, adolescent and young adult education is no exception.

Since child vaccination is not something we can expect in the near future - For the time being, in India where nearly 40 % of the population is less than 18 years of age, the best option to prevent disease in children is to vaccinate parents and other household contacts, (infact – all adults they come in contact with when schools reopen) who are the main source of infection in children during this lockdown period.

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 Invited Teacher for IAP Intensive Care Chapter  
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 2. First prize - Oral Paper presentation - "Driving Pressure in ARDS" - International Pediatric Critical Care Conference-2018  
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