# Children with Suspected or Confirmed COVID-19 Infection

***Executive summary***

**Introduction**

Children appear to have a similar likelihood of contracting COVID-19 as adults do but the infection is associated with a less severe illness. Children with pre-existing medical conditions such as immunocompromise, heart disease, chronic kidney disease or respiratory problems may be more severely affected. Children may also have a mixed infection with another respiratory virus or a secondary bacterial infection. Most children should, however, recover 1-2 weeks after the onset of symptoms.

**Target User**

* Doctors
* Nurses

**Target area of use**

* Ward

## Key areas of focus / New additions / Changes

Clinical care of patients under 16 years old with confirmed or suspected COVID-19 infection. Please see separate guideline for care of neonates, pregnant women and adults with COVID-19 as well as palliative care.

**Limitations**

The evidence base for managing COVID-19 infections is growing exponentially as we see more cases. For the most up to date information please see the links in the reference section below as our understanding and response to this disease will change over time. Currently we have no facilities for dedicated paediatric intensive care in The Gambia.

## Presenting symptoms and signs

Children will most often present with fever and cough. Other less common symptoms include rhinitis, dyspnoea, cyanosis, fatigue, headache, poor feeding and diarrhoea. Diarrhoea appears to be more common in children. Most children will be asymptomatic or just have mild symptoms and not require admission to hospital. In severe cases it may present as pneumonia, bronchiolitis or sepsis.

### Pneumonia

Pneumonia is defined as: cough or difficulty breathing AND fast breathing

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| **Definition of fast breathing as per WHO** | |
| <2 months old | ≥ 60 breaths/min |
| 2-11 months old | ≥ 50 breaths/min |
| 1-5 years old | ≥ 40 breaths/min |
| > 5 years old | >20 breaths/min |

Severe pneumonia is defined as:

Cough or difficulty breathing plus at least one of the following:

* Central cyanosis or SpO2 < 90%
* Severe respiratory distress (grunting or severe chest indrawing)
* Inability to breastfeed or drink
* Lethargic or unconscious
* Convulsions

### Septic shock

Septic shock is defined in children as:

* Hypotension (systolic blood pressure [SBP] < 5th centile or > 2 SD below normal for age)

OR

Two or more of the following:

* Altered mental state
* Bradycardia or tachycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children
* Prolonged capillary refill (> 2 sec) or feeble pulses
* Tachypnoea
* Mottled or cold skin or petechial or purpuric rash
* Increased lactate (not available at MRC lab)
* Oliguria
* Hyperthermia or hypothermia.

## Examination findings

Do not routinely examine ANY children’s throats during the COVID-19 pandemic as there are likely to be asymptomatic patients with pharyngeal carriage which increases exposure for healthcare professionals. It is reasonable to prescribe antibiotics for a possible streptococcal infection on the basis of history alone at this time.

Although most children will only have mild symptoms, it is important to specifically assess their:

* Breathing: Respiratory rate, work of breathing, presence of severe chest indrawing, SpO2 level
* Circulation: Heart rate, central capillary re-fill time, BP if available
* Hydration: Skin turgor, anterior fontanelle, mucous membranes
* Temperature and features of sepsis
* Blood glucose level if history of poor feeding or vomiting

## Investigations

Please see SOP-AIR-007 for how to do nasopharyngeal and throat swabs to confirm infection.

### Well child

There is no need to do any investigations for a child with confirmed COVID-19 who is well with mild symptoms.

### Unwell child

If the child looks unwell (specifically with persistent fever, dehydration or suspected sepsis, signs of liver dysfunction or respiratory failure) then they should be investigated with full blood count, blood culture and renal function tests.

In COVID-19 you would typically see normal or reduced white cell count with low neutrophil and/or lymphocyte counts. Some patients will also have low platelets too. In severe cases there may be elevated liver enzymes, if these persist then check coagulation as this may also be deranged. Liver function tests should not routinely be checked.

Radiological changes in children may be non-specific. Chest X-rays may show bilateral patchy airspace consolidation at the periphery of the lungs, peribronchial thickening and ground-glass opacities. Chest CT shows airspace consolidations and ground-glass opacities.

## Management

The majority of children with confirmed COVID-19 can be managed at home with good advice on hand hygiene, self-isolation and staying well hydrated. Hospital admission should be avoided wherever possible and is only indicated if the child requires oxygen therapy, feeding or fluid support or has a suspected bacterial infection.

### Respiratory Care

* Oxygen therapy should be given if SpO2 < 90%.
* If signs of severe pneumonia, shock, coma or convulsion aim for SpO2 ≥ 94%.
* Infants and young children can use nasal prongs or cannula (maximum flow rate 2L/min). Older children and adolescents should receive oxygen via a face mask. Face masks with reservoir bags should be reserved for those with severe disease to deliver 10 – 15 L/min. Head boxes or other devices to maximise oxygen delivery should be used where possible.
* CPAP is not currently available for children with confirmed or suspected COVID-19.
* Children with asthma should be treated as usual but with salbutamol given via a spacer rather than nebulized to reduce the risk of aerosolisation of COVID-19. Oral steroids should be used as normal for children with asthma.
* Diagnosis of Acute Respiratory Distress Syndrome (ARDS) is based on ventilatory or oxygen requirements, which is not available in our setting.

### Supportive Care

Feeding and hydration are very important. If a child is not feeding well then nasogastric feeds or fluids should be considered before IV fluids.

If IV fluids are required for fluid resuscitation of a child or infant with COVID-19 and sepsis then Ringer’s Lactate given at maintenance volume would be first choice unless there is hypotension or poor perfusion. If hypotension or poor perfusion is present then Ringers Lactate should be given cautiously at 10-20 ml/kg over 30-60 minutes to a maximum of 40 ml/kg. If Ringers Lactate is unavailable then 0.9% normal saline, 0.9%/5% dextrose saline or 5% dextrose could be used depending on availability. There are concerns about liberal fluid use in severe COVID-19 being associated with poorer outcomes.

Maintenance Fluids for Infants and Children

* 100 ml/kg/day for the first 10 kg of weight
* 50 ml/kg/day for the second 10 kg of weight
* 20 ml/kg/day for the weight over 20 kg
* Over a 24 hour period, females are unlikely to need more than 2000 ml and males 2500 ml

Infants and children of mothers with COVID-19 should continue to breastfeed freely, if clinically able.

Children with significant respiratory compromise should be fluid restricted to 2/3rds maintenance to reduce the risk of ARDS.

### Fevers

First line antipyretic for children with a fever should be paracetamol. There is currently no significant evidence that ibuprofen is associated with worse outcomes in COVID-19 infection. If ibuprofen is prescribed regularly for a pre-existing medical condition (e.g. for rheumatoid arthritis) then this should be continued. Tepid sponging is not recommended.

### Bacterial infection

Children who have signs and symptoms of sepsis at any stage in their illness, or if they are not clinically improving by day 3, should be assessed for possible bacterial infection and started on IV ceftriaxone following blood cultures within an hour of assessment. Duration of antibiotics should be guided by clinical course and blood culture results.

### Monitoring of children with COVID-19 infection

Hospitalised children need regular vital signs to identify deterioration.

### Treatments to avoid

* Although recommended in some papers for adults, the following medical treatments are not routinely recommended in children and may, in fact, have more side effects than potential beneficial effects: bronchodilators, steroids, antibiotics, antivirals and diuretics.
* Angiotensin converting enzyme (ACE) inhibitors have not yet been shown to be harmful to children with COVID-19 infections. Patients taking ACE inhibitors for a pre-existing condition should continue them.
* There is no evidence at the time of writing (March 2020) to support any specific treatment for COVID-19 in children. The use of anti-virals is not currently recommended in children

### Research

Clinical trials for COVID-19 are ongoing so please consider whether each patient might be eligible.

### Palliative

Please see separate guideline for advice on symptom-control and other considerations for the dying patient.

### Discharge

Self-isolation of a child will need to follow Ministry of Health guidance where possible but this may need to be adjusted on a case-by-case basis.

## Additional Information

For the most current case definition and details of countries with transmission, please see <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>

### For the WHO guidance for managing COVID-19 see: <https://apps.who.int/iris/handle/10665/331446>

## Online Resources:

<https://www.ncbi.nlm.nih.gov/research/coronavirus/>

<https://foamid.com/2020/03/17/covid-19-ultimate-resource-list/>

## Key Issues for Nursing care

* All the routine precautions for caring for patients with COVID-19 apply, see relevant guidelines.
* Given increased demand on staffing and for the comfort of the children, it will still be important for children 15 years and under to have an escort present even if their escort is confirmed negative or asymptomatic.
* Adults and children will be cohorted together on the same wards. Where possible, all children should be grouped together and be near to the nurses station to maintain their safety.

## References

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| **Reviewed by:** | Name: Helen Brotherton | Date: 10 April 2020 |
| **Version:** | **Change history:** | **Review due date:** |
| 1.0 | New document | 10 April 2022 |
| Review Comments (*if applicable)* |  |  |