GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR

MINISTRY OF HEALTH AND SPORTS

DEPARTMENT OF MEDICAL SERVICES

Clinical Management Guidelines for COVID-19 Acute Respiratory Disease

Version - **DoMS/COVID-19/clinical/Version 03-2020**

Date - **6th March 2020**

Clinical Management Guidelines for Corona Virus Disease (COVID-19)

Version (3/2020) (updated as of 6 March 2020)

Department of Medical Services

Surveillance case definitions for COVID-19

Suspect case

A) A patient with acute respiratory illness (fever **and** at least one sign/symptom of respiratory disease (e.g., cough, shortness breath),

AND

with no other aetiology that fully explains the clinical presentation

AND

a history of travel to or residence in a country/area or territory *reporting local transmission of COVID-19 disease during the 14 days prior to symptom onset.

OR

B) A patient with any acute respiratory illness

AND

having been in contact with a confirmed or probable COVID-19 case in the last 14 days prior to onset of symptoms;

OR

C) A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g., cough, shortness breath)

AND

requiring hospitalization

AND

with no other aetiology that fully explains the clinical presentation.

***Note: "Reporting local transmission of COVID-19 disease" should be checked in WHO updated situation report**

Probable case

A suspect case for whom testing for SARS-CoV-2 is inconclusive or is tested positive using a pan-coronavirus assay and without laboratory evidence of other respiratory pathogens.

Confirmed case

A person with laboratory confirmation of SARS-CoV-2 infection, irrespective of clinical signs and symptoms.

*see *https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technicalguidance/laboratory-guidance* for latest case definitions

Criteria for severe acute respiratory infection requiring hospital admission

Anyone of the following parameters:

- Respiratory rate ≥ 30 breaths/min
- Severe respiratory distress
- SpO_2 - 90% on room air
- Systolic blood pressure ≤ 100 mmHg
- Altered mental status (GCS < 15)

Definition of contact

A contact is a person that is involved in any of the following:

- Providing direct care without proper personal protective equipment (PPE) for COVID-19 patients Staying in the same close environment of a COVID-19 patient (including workplace, classroom, household, gatherings).
- Traveling together in close proximity (1 m) with a COVID-19 patient in any kind of conveyance within a 14-day period after the onset of symptoms in the case under consideration.

Monitoring of contacts of probable and confirmed cases :

- Contacts should be monitored for 14 days from the last unprotected contact.
- Contacts should self-limit travel and movements.
- Monitoring by public health authorities can be done through household or virtual visits or by telephone to check for symptoms.
- Any contact who becomes ill and meets the case definition becomes a suspect case and should be tested

- Any newly identified probable or confirmed cases should have their own contacts identified and monitored
- As a special consideration, samples maybe taken from close contacts of confirmed cases even if the contacts are without symptoms and not PUI.

I. History taking

Name: ---------- Age: ----------

Sex: ---------- R/N: ----------

Address: ----------

Detail of Travel History----------

Contact History----------

Complaints

Fever ……Cough …… Sore throat……..Headache…….Muscle pain……Shortness of breath…….Diarrhoea……Reduced urine output etc……..

II. Physical Examination

Vital signs: GCS: …… Temperature……. Cyanosis……. BP: ….. ……

HR: …… SpO_2: …… RR: …….. Lungs: ……..

Features of Septic shock, Acute kidney injury

Updated as of 6 March 2020

Management Protocol for COVID-19 Acute Respiratory Disease (*Version 03*)

Attendance of patients in hospital, OPD, Community clinics

↓ At Triage area

A **History of travel to or residence in a country/ area or territory reporting local transmission within past 14 days** **OR** **History of close contact with a person known to have COVID-19 illness within past 14 days**

B **Presenting fever, symptoms of acute respiratory disease (e.g; cough, shortness of breath)**

C **Presenting fever, symptoms of severe acute respiratory disease and with no other clear aetiology**

A	B	A and B	C
• Home or hospital quarantine for person who had contact with confirmed case • Community surveillance for person with travel history within past 14 days	Further investigation for diagnosis and treatment	• Isolate the patient in a separate room (e.g, Fever room) • Take strict IPC measures depending on severity • Take complete and detail history and physical examination • Inform immediately to DoMS [09 449621202], CEU [067 3420268], State and Regional Health Department	

Person Under Investigation (PUI) for suspected Pneumonia

- Move the patient to isolation room
- Take specimen and send to NHL (To follow specimen collection guidelines)
- Follow "**Clinical Management Guidelines for Corona virus disease (COVID-19)**"

Uncomplicated illness

Symptomatic treatment

Mild Pneumonia (Suspected)

Symptomatic treatment
Oral antibiotics

Severe Pneumonia (Suspected)
(if any of following signs/symptoms is present)

1) Respiratory rate > 23 breaths/min
2) Severe respiratory distress
3) SpO_2 <90% on room air
4) Systolic Blood Pressure ≤ 100 mmHg
5) Altered mental status (GCS <15)

Result (-)

Result (+)

Result (-)

Result (+)

Confirmed case

- Refer to designated hospital with standard precaution
- Supportive treatment including fluid therapy
- Antibiotic/antiviral
- Treatment of complications
- Isolate patients for 14 days (after last exposure)

Result (+)

- High flow O_2 5L/min
- Supportive treatment including fluid therapy
- IV antibiotics
- Treatment of complications
- Assess for ventilator & specialist care

Discharge ← Recover

Discharge message

Death – proper disposal of the dead

DoMS : Department of Medical Services CEU : Central Epidemiological Unit NHL: National Health Laboratory

III. Categorization of Patients

Uncomplicated illness

Patients with non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain without any signs of dehydration, sepsis or shortness of breath. Elderly and immunosuppressed may present with atypical symptoms.

Mild pneumonia

Patient with pneumonia and no signs of severe pneumonia.

Severe pneumonia

Patients with fever or suspected respiratory infection, plus one of respiratory rate ≥ 30 breaths/min, severe respiratory distress, or SpO_2 <90% on room air.

Acute Respiratory Distress Syndrome

- New or worsening respiratory symptoms within one week of known clinical insult.
- Bilateral opacities on CXR, not fully explained by effusions, lobar or lung, collapse, or nodules.
- Respiratory failure not fully explained by cardiac failure or fluid overload.

Sepsis

- Life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection.
- Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate or hyperbilirubinemia.

Septic shock

- Patients with persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥65 mmHg and serum lactate level >2 mmol/L.

The SOFA score ranges from 0 to 24 and includes points related to 6 organ systems: respiratory (hypoxemia defined by low PaO_2/FiO_2),
coagulation (low platelets), liver (high bilirubin),
cardiovascular (hypotension),
central nervous system (low level of consciousness defined by Glasgow Coma Scale), renal (low urine output or high creatinine).

Sepsis is defined by an increase in the Sequential [Sepsis-related] Organ Failure Assessment (SOFA) score of ≥2 points. Assume the baseline score is zero if data are not available

SOFA Score (Sequential (Sepsis related) Organ Failure Assessment Score)

System or organ and measure	SOFA score				
	0	1	2	3	4
Respiratory:					
P_aO_2/FiO_2, mm Hg	≥400	300-399	200-299	100-199 with respiratory support	<100 with respiratory support
Coagulation:					
Platelets, × 10^3/µL	≥150	100-149	50-99	20-49	<20
Liver:					
Bilirubin, µmol/L (mg/dL)	<20 (1.2)	20-32 (1.2-1.9)	33-101 (2.0-5.9)	102-204 (6.0-11.9)	>204 (12.0)
Circulatory:					
Mean arterial pressure, mm Hg	≥70	<70	Low dose dopamine or any dose dobutamine	Low-medium dose noradrenalin or adrenalin; medium dose dopamine	High dose noradrenalin, adrenalin, or dopamine
Central nervous system:					
Glasgow Coma Scale score	15	13-14	10-12	6-9	<6
Renal:					
Creatinine, µmol/L (mg/dL)	<110 (1.2)	110-170 (1.2-1.9)	171-299 (2.0-3.4)	300-440 (3.5-4.9)	>440 (5.0)
Urine output, mL/day	–	–	–	<500	<200

*Our recommendation applies to patients with an infection and a SOFA score of ≥2.
P_aO_2 = partial pressure of oxygen (arterial). F_iO_2 = fraction of inspired oxygen.

IV. Investigations

- Collection of specimens – Nasopharyngeal and Oropharyngeal swab in ambulatory patient, Endotracheal or Bronchoalveolar lavage aspirate in severely ill for Viral PCR in NHL.
- Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients).
- Serology for diagnostic purposes is recommended only when RT-PCR is not available.
- Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens). When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton) and viral transport media.
- Sample collection technique & frequency will be followed NHL sample collection guidance. Samples will be sent to NHL.
- CP, ESR, CRP, RBS, ECG, U&E, Creatinine, LFT with Enzymes, Blood C&S, ABG, , CXR (PA)

Recommendations for laboratory testing

- Any suspected case should be tested for COVID-19 infection using available molecular tests. However, depending on the intensity of the transmission, the number of cases and the laboratory capacity, only a subset of the suspect cases may be tested.
- Based on clinical judgment, clinicians may opt to order a test for COVID-19 in a patient not strictly meeting the case definition, for example, if there are patients involved in a cluster of acute respiratory illness among healthcare workers or of severe acute respiratory infection (SARI) or pneumonia in families, workplaces or social network.

V. Treatment

A. Immediate implementation of IPC measures (Should start at the point of entry to hospitals)

At triage

- Give suspect patient a medical mask and direct patient to separate area, an isolation room if available.

- Keep at least 1meter distance between suspected patients and other patients.
- Instruct all patients to cover nose and mouth during coughing or sneezing with tissue or flexed elbow for others.
- Perform hand hygiene after contact with respiratory secretions.

Apply standard precaution

- hand hygiene (alcohol based hand rub/water and soap), use of PPE to avoid direct contact with patients' blood, body fluids, secretions and non-intact skin.
- prevention of needle-stick or sharps injury; safe waste management; cleaning and disinfection of equipment; and cleaning of the environment.

Apply droplet precaution

- Use medical mask if working within 1-2 metres of the patient.
- Use eye protection (face-mask or goggles)
- Limit patient movement within the institution and ensure that patients wear medical masks when outside their rooms.

Apply contact precaution

- Use PPE (medical mask, eye protection, gloves and gown) when entering room and remove PPE when leaving.
- If possible, use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers).
- If equipment needs to be shared among patients, clean and disinfect between each patient use.
- Minimal movement of patients or transport as much as possible.

Apply air-borne precaution

- Use PPE, including gloves, long-sleeved gowns, eye protection, and fit-tested particulate respirators (N95 or equivalent, or higher level of protection) when healthcare workers performing aerosol-generating procedures **(i.e. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation).**
- Avoid the presence of unnecessary individuals in the room.
- Care for the patient in the same type of room after mechanical ventilation commences.

B. Early supportive therapy and monitoring

Supplemental oxygen therapy

- For patients with SARI and respiratory distress, hypoxaemia, or shock.

- Target $SpO_2 \geq 90\%$ in non-pregnant adults and $SpO_2 \geq 92\text{-}95\%$ in pregnant patients.

Fluid management

- Use conservative fluid management in patients with SARI when there is no evidence of shock.

* Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation

Empirical antimicrobial treatment

- Give antimicrobials within one hour of identification of sepsis.
- Neuraminidase inhibitor when there is local circulation or other risk factors, including travel history or exposure to animal influenza viruses.
- Mild pneumonia PO Augmentin 625 mg tds + PO Azithromycin 500mg od x 5 days
- Severe pneumonia (community acquired)

  IV Augmentin 1.2 g 8h (ATD) for 7-14 days +
  IV Azithromycin 500 mg OD for 7 days

  OR

  IV Cefoperazone + sulbactam 2g 12hrly **plus**
  PO Clarithromycin 500mg bd or IV Azithromycin 500mg infusion od x 5 days

- Severe pneumonia (hospital acquired)

  IV Cefepime 1g 8h (ATD) + IV Meropenem 1g in N/S 100 ml (ATD) 8h, if needed add IV Moxifloxacin 400mg OD (ATD) for 7-14 days

  (Attending physician can modify antibiotic regimen if necessary)

Closely monitor patients with SARI for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately

Understand the patient's co-morbid condition(s) to tailor the management of critical illness and appreciate the prognosis. Communicate early with patient and family

C. Treatment of complications

Respiratory Failure & ARDS - Mechanical ventilation

Septic shock - Fluid resuscitation with isotonic crystalloid 30ml/kg in 1st 3 hours, Administer Noradrenalin if shock persists during or after fluid resuscitation, consider dobutamine if not responded to fluid and noradrenalin, etc.

* Do not use hypotonic crystalloids, starches, or gelatins for resuscitation.

Fluid resuscitation may lead to volume overload, including respiratory failure. If there is no response to fluid loading and signs of volume overload appear (for example, jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly in children)

Administer vasopressors when shock persists during or after fluid resuscitation. Norepinephrine is considered first-line in adult patients

Noradernaline Infusion

Rate	ml/hr				
	40kg	45kg	50kg	55kg	60 kg
0.05ug/kg/min	0.6	0.7	0.8	0.8	0.9
0.1 ug/kg/min	1.2	1.4	1.5	1.7	1.8
0.15 ug/kg/min	1.8	2	2.3	2.5	2.7
0.2 ug/kg/min	2.4	2.7	3	3.3	3.6
0.25 ug/kg/min	3	3.4	3.8	4.1	4.5

D. Prevention of complications

- For prophylaxis of venous-thromboembolism, consider LMWH (low molecular-weight heparin) OD or unfractionated heparin 5000 units subcutaneously twice daily) in adolescents and adults without contraindications. For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices).
- Turn patient every two hours
- Give early enteral nutrition (within 24–48 hours of admission)
- Administer H_2 blockers or PPI in patients with risk factors for GI bleeding.
- Actively mobilize the patient early in the course of illness when safe to do so

E. Specific treatment for COVID-19 DISEASE

There is no current evidence from RCTs to recommend any specific treatment for COVID-19 disease for patients with suspected or confirmed infection.
Investigational treatment can be used according to some case studies which showed improvement after treatment with anti-virals like Lopinavir + Ritonavir or Remdesivir.

F. Treatment of pregnant patients

- Pregnant women with suspected or confirmed SARS-CoV-2 should be treated with supportive therapies as described above.
- Use of investigational therapeutic agents outside of a research study should be guided by individual risk-benefit analysis based on potential benefit for mother and safety to fetus, with consultation from an obstetric specialist and ethics committee.
- Emergency delivery and pregnancy termination decisions are challenging and based on many factors: gestational age, maternal condition, and fetal stability.
- Consultations with obstetric, neonatal, and intensive care specialists (depending on the condition of the mother) are essential.

G. Management of hypoxemic respiratory failure and ARDS (For ICU Setting)

Recognize severe hypoxemic respiratory failure when a patient with respiratory distress is failing standard oxygen therapy.
Remarks: Patients may continue to have increased work of breathing or hypoxemia even when oxygen is delivered via a face mask with reservoir bag (flow rates of 10-15 L/min, which is typically the minimum flow required to maintain bag inflation; FiO2 0.60-0.95). Hypoxemic respiratory failure in ARDS commonly results from intrapulmonary ventilation-perfusion mismatch or shunt and usually requires mechanical ventilation.

High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure. The risk of treatment failure is high in patients with MERS treated with NIV, and patients treated with either HFNO or NIV should be closely monitored for clinical deterioration.
Remark 1: HFNO systems can deliver 60 L/min of gas flow and FiO2 up to 1.0; paediatric circuits generally only handle up to 15 L/min, and many children will require an adult

circuit to deliver adequate flow. Compared to standard oxygen therapy, HFNO reduces the need for intubation. Patients with hypercapnia (exacerbation of obstructive lung disease, cardiogenic pulmonary oedema), hemodynamic instability, multi-organ failure, or abnormal mental status should generally not receive HFNO, although emerging data suggest that HFNO may be safe in patients with mild-moderate and non-worsening hypercapnia. Patients receiving HFNO should be in a monitored setting and cared for by experienced personnel capable of endotracheal intubation in case the patient acutely deteriorates or does not improve after a short trial (about 1 hr). Evidence-based guidelines on HFNO do not exist, and reports on HFNO in MERS patients are limited.

Remark 2: NIV guidelines make no recommendation on use in hypoxemic respiratory failure (apart from cardiogenic pulmonary oedema and post-operative respiratory failure) or pandemic viral illness (referring to studies of SARS and pandemic influenza). Risks include delayed intubation, large tidal volumes, and injurious transpulmonary pressures. Limited data suggest a high failure rate when MERS patients receive NIV. Patients receiving a trial of NIV should be in a monitored setting and cared for by experienced personnel capable of endotracheal intubation in case the patient acutely deteriorates or does not improve after a short trial (about 1 hr). Patients with hemodynamic instability, multiorgan failure, or abnormal mental status should not receive NIV.

Remark 3: Recent publications suggest that newer HFNO and NIV systems with good interface fitting do not create widespread dispersion of exhaled air and therefore should be associated with low risk of airborne transmission.

Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions.

Remarks: Patients with ARDS, especially young children or those who are obese or pregnant, may desaturate quickly during intubation. Pre-oxygenate with 100% FiO2 for 5 minutes, via a face mask with reservoir bag, bag-valve mask, HFNO, or NIV. Rapid sequence intubation is appropriate after an airway assessment that identifies no signs of difficult intubation. The following recommendations in this section pertain to mechanically ventilated patients with ARDS. These focus on adults; consensus- based

recommendations for children are available.

Implement mechanical ventilation using lower tidal volumes (4–8 ml/kg predicted body weight, PBW) and lower inspiratory pressures (plateau pressure <30 cmH2O).

Remarks: This is a strong recommendation from a clinical guideline for patients with ARDS, and is suggested for patients with sepsis-induced respiratory failure who do not meet ARDS criteria. The initial tidal volume is 6 ml/kg PBW; tidal volume up to 8 ml/kg PBW is allowed if undesirable side effects occur (e.g. dyssynchrony, pH <7.15). Hypercapnia is permitted if meeting the pH goal of 7.30-7.45. Ventilator protocols are available. The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets. Although high driving pressure (plateau pressure−PEEP) may more accurately predict increased mortality in ARDS compared to high tidal volume or plateau pressure, RCTs of ventilation strategies that target driving pressure are not currently available.

In patients with severe ARDS, prone ventilation for >12 hours per day is recommended.

Remarks: Application of prone ventilation is strongly recommended for adult and paediatric patients with severe ARD but requires sufficient human resources and expertise to be performed safely.

Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.

Remarks: This is a strong guideline recommendation; the main effect is to shorten the duration of ventilation.

In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested.

Remarks: PEEP titration requires consideration of benefits (reducing atelectrauma and improving alveolar recruitment) vs. risks (end-inspiratory overdistension leading to lung

injury and higher pulmonary vascular resistance). Tables are available to guide PEEP titration based on the FiO2 required to maintain SpO2. A related intervention of recruitment manoeuvres (RMs) is delivered as episodic periods of high continuous positive airway pressure [30–40 cm H2O], progressive incremental increases in PEEP with constant driving pressure, or high driving pressure; considerations of benefits vs. risks are similar. Higher PEEP and RMs were both conditionally recommended in a clinical practice guideline. For PEEP, the guideline considered an individual patient data meta-analysis of 3 RCTs. However, a subsequent RCT of high PEEP and prolonged high-pressure RMs showed harm, suggesting that the protocol in this RCT should be avoided.41 Monitoring of patients to identify those who respond to the initial application of higher PEEP or a different RM protocol, and stopping these interventions in non-responders, is suggested.

In patients with moderate-severe ARDS (PaO2/FiO2 <150), neuromuscular blockade by continuous infusion should not be routinely used.

Remarks: One trial found that this strategy improved survival in patients with severe ARDS (PaO2/FiO2 <150) without causing significant weakness,43 but results of a recent larger trial found that use of neuromuscular blockage with high PEEP strategy was not associated with survival when compared to a light sedation strategy without neuromuscular blockade. Continuous neuromuscular blockade may still be considered in patients with ARDS in certain situations: ventilator dyssnchony despite sedation, such that tidal volume limitation cannot be reliably achieved; or refractory hypoxemia or hypercapnia.

In settings with access to expertise in extracorporeal life support (ECLS), consider referral of patients with refractory hypoxemia despite lung protective ventilation.
Remarks: A recent guideline made no recommendation about ECLS in patients with ARDS.33 Since then, an RCT of ECLS for patients with ARDS was stopped early and found no statistically significant difference in the primary outcome of 60-day mortality between ECLS and standard medical management (including prone positioning and neuromuscular blockade). However, ECLS was associated with a reduced risk of the composite outcome of mortality and crossover to ECLS, and a post hoc Bayesian analysis of this RCT showed that ECLS is very likely to reduce mortality across a range of prior assumptions. In patients with MERS-CoV infection, ECLS vs. conventional treatment was

associated with reduced mortality in a cohort study. ECLS should only be offered in expert centres with a sufficient case volume to maintain expertise and that can apply the IPC measures required for COVID-19 patients.

Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis. Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (for example, transfer to a transport ventilator).

VIII. References:

- World Health Organization, 2014. Clinical management of severe acute respiratory infections when novel coronavirus is suspected: what to do and what not to do. *2013-03-20]. http://www. who. int/csr/disease/coronavirus _ infections/InterimGuidance _ ClinicalManagement_Novel Coronavirus_l 1Fehl 3 u. pdf*. (28 Jan 2020).
- Global Surveillance for COVID-19 disease caused by human infection with novel coronavirus (COVID-19) Revised guidance 27 February 2020.
- World Health Organization, 2020. *Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected: interim guidance, January 2020* (No. WHO/2019-nCoV/IPC/v2020. 1). World Health Organization.
- World Health Organization, 2003. WHO hospital discharge and follow-up policy for patients who have been diagnosed with severe acute respiratory syndrome (SARS). *Geneva: The Organization*.
- Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China, Lancet, 24 Jan 2020.
- Update and Interim Guidance on Outbreak of 2019 Novel Coronavirus (2019-nCoV) in Wuhan, China, CDC, 2020.
- SARS: Fact Sheet on Isolation and Quarantine, CDC, 2004.
- Specialist hospital Waibargi SOP for Wuhan Pneumonia

Clinical syndromes associated with COVID-19

Uncomplicated illness	Patients with uncomplicated upper respiratory tract viral infection, may have non-specific symptoms such as fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain or malaise. The elderly and immunosuppressed may present with atypical symptoms. These patients do not have any signs of dehydration, sepsis or shortness of breath.
Mild pneumonia	Child with non-severe pneumonia has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): <2 months, ≥60; 2– 11 months, ≥50; 1–5 years, ≥40 and no signs of severe pneumonia.
Severe pneumonia	Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO2 <90%; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): <2 months, ≥60; 2–11 months, ≥50; 1–5 years, ≥40. The diagnosis is clinical; chest imaging can exclude complications.
Acute Respiratory Distress Syndrome	Onset: new or worsening respiratory symptoms within one week of known clinical insult. Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules. Origin of oedema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of oedema if no risk factor present.
Sepsis	Children: suspected or proven infection and ≥2 SIRS criteria, of which one must be abnormal temperature or white blood cell count.

Septic shock	Children : any hypotension (SBP <5th centile or >2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR <90 bpm or >160 bpm in infants and HR <70 bpm or >150 bpm in children); prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.

Early supportive therapy and monitoring

Give supplemental oxygen therapy

Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive oxygen therapy during resuscitation to target SpO_2 ≥94%; otherwise, the target SpO_2 is ≥90%
Empiric antimicrobials will be given by the decision of attending paediatrician.

Management of septic shock

Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] <5th centile or >2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR <90 bpm or >160 bpm in infants and HR <70 bpm or >150 bpm in children); prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.
In resuscitation from septic shock in children in well-resourced settings, give 20 ml/kg as a rapid bolus and up to 40-60 ml/kg in the first 1 hr

Indication For Transfer ICU

- Haemodynamic Instability
- Recurrent Apnoea or Slow irregular
- Breathing Rising. R R. And PR
- Failure to maintain. SpO_2 < 92 % with 8 lit of O_2

Monitoring (Needing Children for admission)

- RR, HR, SpO_2, Chest Indrawing and use of accessory muscle of respiration be monitored by 4 hourly

Antibiotic Therapy

- Viral pneumonia - no need for antibiotics
- Bacteria pneumonia if high Temperatures > 38 degrees Centigrade, High RR, Chest Recession

Children < 5 years of age First line Antibiotic

- PO Amoxicillin 40 mg / kg per dose twice daily for 5 days

2nd line of Antibiotic

- Co-amoxicillin 30 mg/kg/dose 3 times per day x 5-7 days
- Second or third generation Cephalosporins (Cefurixine, Ceprozil)

Children > 5 year and Older

- **First line** - Amoxicillin
- **Second line -** high Suspicion of Atypical Pneumonia – Azthromycin

For. 6 months and 17 years 10mg / kg per dose

- (Maximum 500 mg. Od For 3 days)

Antibiotic therapy for in patient First line.

- Injection Ampicillin 50 mg / kg per dose IV / IM Gentamicin 7.5 mg / kg per dose
- Injection Benzyl Penicillin (C pen) 50, 000unit per kg per dose OD for 5 to 7 days

2nd line.

- Injection Ceftriaxone 50 mg/ kg per OD IV / I'm
- Injection Co Amoxi Clav 30 mg / kg of Amoxicillin 8 hourly Or IV / I M Injection Cefotaxime 200 mg / kg per day 3 divided dose IV / IM. OR Injection Cefuroxime 150 mg / kg per dose.

3rd line Injection Ceftazidime 30 mg / kg per dose 8 hourly

Other Aminoglycoside (Amikacin 2 mg / kg per dose 12 hourly if Sepsis is suspected)

Duration for In-patient settings

- Total duration - 7 days for mild to moderate patient More Severe case for 10 days
- Start with IV and Change Oral once
- The Clinical respond is good and the Child can Take Orally If the Child is vomiting
- Should be IV fluid. 80 % maintenance level and Serum Electrolyte.
- Should be mornitored
- It is important to maintain Sp O 2 > 92 % For Children who are restless, tachynoeic with severe chest indrawing, Cyanosis. Or not tolerate food
    - Nasal catheter , face mask or head box Posture Control
    - Oral paracetamol 15 mg/ kg per dose every 4 to 6 hourly to reduce the discomfort