Pocket Book of Clinical Management of COVID-19 in Healthcare Setting

Second Edition with Revision

Adapted from:

Interim Clinical Guidance for Care of Patients with COVID-19 in Healthcare settings, NMC, third update, August 2021; COVID-19 Clinical Management Living Guidance, January 2021; and Therapeutic and COVID-19: Living Guidance, September 2021, WHO

Prepared by:

Epidemiology and Disease Control Division
Department of Health Services,
Teku, Kathmandu

TABLE OF CONTENTS

ACKNOWLEDGMENT

The Director General, Dr. Dipendra Raman Singh, Department of Health Services, Ministry of Health and Population, Nepal expresses sincere gratitude to all of the authors and reviewers of **"Pocket Book of Clinical Management of COVID 19 in Healthcare Setting: Second Edition"** particularly to World Health Organization, Nepal and all others who contributed to this concise, yet comprehensive book.

List of Contributors

1. Dr. Roshan Pokharel, Chief Specialist, MoHP
2. Dr. Guna Raj Lohani, Division Chief, MoHP
3. Dr. Krishna Prasad Paudel, Director, EDCD
4. Dr. Amrit Pokhrel, EDCD
5. Dr. Sagar Raj Bhandari, Director, STIDH
6. Dr. Anup Banstola, STIDH
7. Dr. Nisha Jyoti Shrestha, Kanti Children Hospital
8. Dr. Samir Kumar Adhikari, Chief, HEOC
9. Dr. Guna Nidhi Sharma, Sr. Health Administration, MoHP
10. Dr. Santa Das, TUTH
11. Dr. Ashish Shrestha, PAHS
12. Dr. Achyut Karki, Bir Hospital
13. Dr. Prabin Nepal, APF
14. Dr. Rajan Pandey, Bheri Hospital
15. Dr. Sher Bahadur Kamar, Seti Hospital
16. Dr. Reuben Samuel, WHO
17. Prof. Dr. Arunkumar Govindakarnavar, WHO
18. Ms. Shirley McQuen Patterson, WHO
19. Prof. Dr. Shital Adhikari, WHO
20. Dr. Subash Neupane, WHO
21. Dr. Ela Singh Rathaur, USAID's SSBH Activity

INTRODUCTION TO THE SECOND EDITION

This is the second edition of the Ministry of Health and Populations, Pocket book for Case Management of COVID-19 in the Healthcare Setting.

The first edition was adapted from the Interim Guidance for Caring of Patients with COVID-19 in Healthcare settings, Nepal Medical Council (NMC) and aligned with Clinical management of COVID-19, Interim Guidance, WHO (May 27, 2020).

The rationale for this updated edition has been to expand the scope of the earlier guidance, bringing together recently updated recommendations from WHO's Clinical Management: Living Guidance January 2021 and Therapeutics and COVID-19 (Living Guidelines, 24 September 2021), as well as the Clinical Care for Severe Acute Respiratory Infection: Toolkit-COVID-19 Adaptation: WHO 2020 and advice from subject matter experts.

This edition provides updated technical guidance in several case management clinical areas as follows:

- Revision of the release from the COVID-19 clinical pathway criteria
- Addition of Treatment of acute co-infections
- Addition of prevention of complications, immunomodulators and other adjunct therapies
- Revision of recommendations on use of antivirals and cortico-steroids in COVID-19
- Assessment of severity by National early Warning Score 2 (NEWS 2)

PURPOSE OF THE POCKET BOOK:

The purpose of this pocketbook is to help physicians, and healthcare workers, to properly manage persons with suspected or confirmed COVID-19 and to standardize case management of COVID-19 cases throughout the country. It is not meant to replace clinical judgement or specialist consultation, but rather to strengthen frontline clinical management.

TARGET GROUPS:

The intended target audience are physicians, nurses, other healthcare personnel, involved in the clinical management of COVID-19 cases.

BACKGROUND

1. COVID-19 Overview[1,2]

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a single-stranded RNA virus that was first recognized in Wuhan, Hubei province, China, in December 2019. Epidemiology and virologic studies suggest that transmission mainly occurs by close contact through respiratory droplets or by direct contact with infected persons, or by contact with contaminated objects or surfaces, or by aerosols from both symptomatic and

[1] COVID-19 Clinical Management, Living Guidance 25 January 2021

[2] Clinical management of COVID-19 Interim Guidance: May 2020:WHO

asymptomatic people. Clinical and virologic studies have found that shedding of SARS-CoV-2 is highest in the upper respiratory tract (URT) (nose and throat) early in the course of the disease, within the first 3 days from onset of symptoms. The incubation period for COVID-19 is 5-7 days but can be up to 14 days. Some infected persons can be contagious, from 1–3 days before symptom onset (presymptomatic period).

An asymptomatic case is a person infected with SARS-CoV-2 who does not develop symptoms.

Among symptomatic patients, the duration of infectious virus shedding has been estimated at 8 days from the onset of any symptoms. About 17% (14-20%) patients will be asymptomatic throughout their illness. A living systematic review (4 studies, 462051 women) found that pregnant and recently pregnant women with COVID-19 appear to be less likely to be symptomatic or manifest common symptoms such as fever, dyspnoea and myalgia, compared with nonpregnant women of reproductive age.

Case definition including common symptoms are given in table 1.

Older age, smoking and underlying noncommunicable diseases (NCDs), such as diabetes, hypertension, cardiac disease, chronic lung disease and cancer have been reported as risk factors for severe COVID-19 disease and death. However, most patient with COVID-19 develop only mild (40%) or moderate (40%) disease approximately 15% develop severe disease that requires oxygen support, and 5% have critical disease with complications such as respiratory failure, acute respiratory distress syndrome (ARDS), sepsis and septic shock, thromboembolism, and/or multiorgan failure, including acute kidney injury and cardiac injury. (Table 2)

COVID-19 is also associated with mental and neurological manifestations, including delirium or encephalopathy, agitation, stroke, meningoencephalitis, impaired sense of smell or taste anxiety, depression and sleep problems. In many cases, neurological manifestations have been reported even without respiratory symptoms. Anxiety and depression appear to be common amongst patient hospitalized for COVID-19.

There are few data on the clinical presentation of COVID-19 in specific populations, such as children and pregnant women. Clinical manifestations of COVID-19 are generally mild in children compared with adults. However, most recently, an acute presentation with a hyperinflammatory syndrome leading to multiorgan failure and shock has been described, as '*multisystem inflammatory syndrome temporally associated with COVID-19 in children and adolescents'*.

While most people with COVID-19 recover and return to normal health, some people can have symptoms that last for weeks or even months after recovery from acute illness named post COVID condition. Even people who are not hospitalized or have mild symptoms can experience persistent or late symptoms.

SARS-CoV-2- Variant of Interest (VOI)

A SARS-CoV-2 isolate that is phenotypically changed compared to a reference isolate or that has a genome with mutations that lead to amino acid changes associated with established or suspected phenotypic implications, AND has been identified to cause community transmission/multiple COVID-19 case clusters, or has been detected in multiple countries.

OR

is otherwise assessed to be a VOI by WHO in consultation with the WHO SARS-CoV-2 Virus Evolution Working Group (VEWG).

SARS-CoV-2 Variant of concern (VOC):

A VOI (as defined above) that, through a comparative assessment, has been demonstrated to be associated with:

- Increase in transmissibility or change in the epidemiology,
- Increase in virulence or change in disease presentation; or
- Decrease in effectiveness of available diagnostics, vaccines, therapeutics, or public health and social measures.

2. SCREENING AND TRIAGE[1,2]

Screen all persons at the first point of care (POC) at the health facility e.g., OPD, emergency, triage area etc. Ensure IPC precautions are implemented when performing screening of persons (Annex 1). Follow the screening process as follows;

1. Screening questionnaire: Screen all persons presenting to the facility by using the simple screening questionnaire (Annex 2)

2. Temperature checks: All persons presenting to the facility should have their temperatures taken and recorded

! Preferably use a non-touch technique (e.g. infra-red thermometer)

- In the absence of a non-touch thermometer, clean the thermometers with 70% alcohol wipe after each use.
- Temperatures > 100.4*F or 38* C is considered as fever.

3. Co-morbidities: Febrile patients should be tested according to facility protocol, irrespective of the presence of respiratory signs and symptoms; screen for high risk of severe COVID-19 disease with priority. Consider other causes of illness (Annex 4 Differential Diagnosis Matrix)

4. Diagnosis: After screening, diagnose the patient according to the EDCD case definitions for COVID-19 (Table 1)

a) All suspect cases should be tested to determine if they are a confirmed case. Until proven negative, all suspected cases should remain in the COVID-19 care pathway.

b). Laboratory diagnostic testing:

i. Collection of upper respiratory tract (URT) specimens (nasopharyngeal and oropharyngeal) for testing by RT-PCR (consider using SARS-CoV-2 Antigen RDT when there is no access to RT-PCR) and, where clinical suspicion remains and URT specimens are negative, collect specimens from the lower respiratory tract (LRT) when readily available (expectorated sputum, or endotracheal aspirate/bronchoalveolar lavage in ventilated patient).
ii. In addition, testing for other respiratory viruses and bacteria should be considered when clinically indicated.
iii. If testing not available, the person becomes a probable case based on clinical suspicions and should be managed for in the COVID-19 pathway.

Consider, and test for other endemic diseases when clinically indicated e.g.:

Malaria,
Dengue,
Scrub Typhus,
TB etc.

Co-infections / morbidity with COVID-19 may be present

Recognize high risk groups for severe

***5. COVID-19 Pregnant and post-partum women*:** with pre-existing or pregnancy related co-morbidities e.g., pregnancy induced hypertension, gestational diabetes, should also be considered for close monitoring.

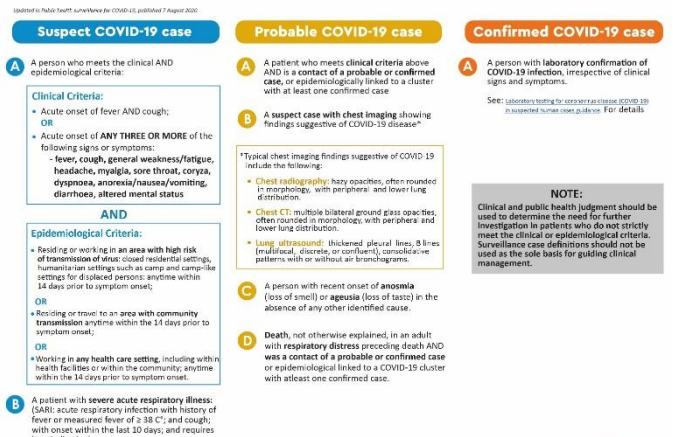
6. Isolation: All suspected or confirmed COVID-19 cases, with or without co-morbidities, should be given a medical mask to wear and entered into the COVID-19 pathway.

7. Documentation: All information gathered during the screening process, should be documented and recorded on individual patient forms.

PROTECT YOURSELF AND OTHERS

- Follow IPC measures at all times.
- Wear PPE according to the activity risk.
- Always follow & perform 5 moments of hand hygiene.
- Maintain physical distancing of > 2 meters.

Table 1. Case Definitions



Updated in Public health surveillance for COVID-19, published 7 August 2020

Suspect COVID-19 case

A A person who meets the clinical AND epidemiological criteria:

Clinical Criteria:

- Acute onset of fever AND cough;
  OR
- Acute onset of **ANY THREE OR MORE** of the following signs or symptoms:
  - **fever, cough, general weakness/fatigue, headache, myalgia, sore throat, coryza, dyspnoea, anorexia/nausea/vomiting, diarrhoea, altered mental status**

AND

Epidemiological Criteria:

- Residing or working in **an area with high risk of transmission of virus:** closed residential settings, humanitarian settings such as camp and camp-like settings for displaced persons: anytime within 14 days prior to symptom onset;
  OR
- Residing or travel to an **area with community transmission** anytime within the 14 days prior to symptom onset;
  OR
- Working in **any health care setting**, including with in health facilities or within the community; anytime within the 14 days prior to symptom onset.

B A patient with **severe acute respiratory illness:** (SARI: acute respiratory infection with history of fever or measured fever of ≥ 38 C°; and cough; with onset within the last 10 days; and requires hospitalization).

Probable COVID-19 case

A A patient who meets **clinical criteria** above AND is **a contact of a probable or confirmed case,** or epidemiologically linked to a cluster with at least one confirmed case

B **A suspect case with chest imaging** showing findings suggestive of COVID-19 disease*

*Typical chest imaging findings suggestive of COVID-19 include the following:

- **Chest radiography:** hazy opacities, often rounded in morphology, with peripheral and lower lung distribution.
- **Chest CT:** multiple bilateral ground glass opacities, often rounded in morphology, with peripheral and lower lung distribution.
- **Lung ultrasound:** thickened pleural lines, B lines (multifocal, discrete, or confluent), consolidative patterns with or without air bronchograms.

C A person with recent onset of **anosmia** (loss of smell) or **ageusia** (loss of taste) in the absence of any other identified cause.

D **Death**, not otherwise explained, in an adult with **respiratory distress** preceding death AND **was a contact of a probable or confirmed case** or epidemiological linked to a COVID-19 cluster with atleast one confirmed case.

Confirmed COVID-19 case

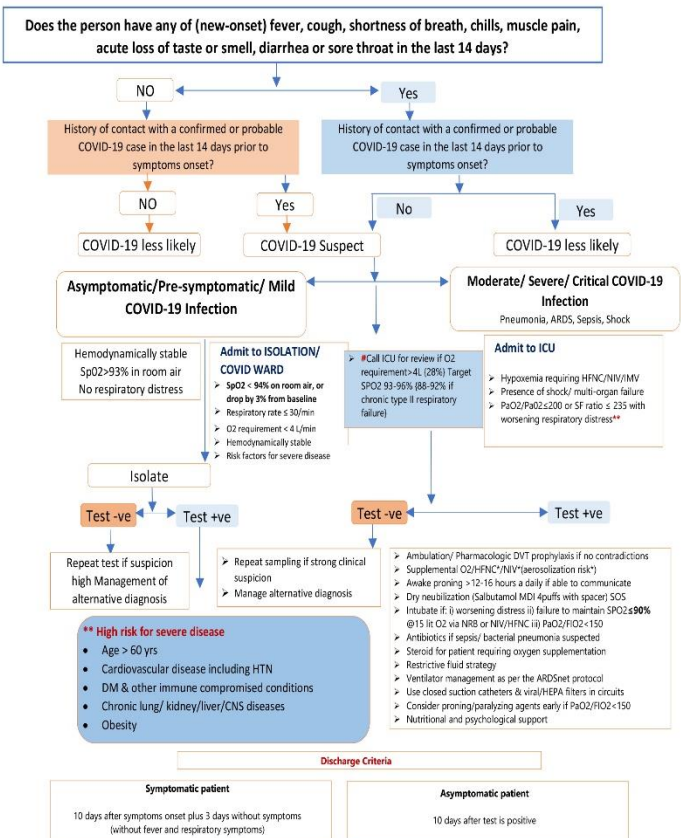
A A person with **laboratory confirmation of COVID-19 infection**, irrespective of clinical signs and symptoms.

See: Laboratory testing for coronavirus disease (COVID-19) in suspected human cases guidance. For details

NOTE:

Clinical and public health judgment should be used to determine the need for further investigation in patients who do not strictly meet the clinical or epidemiological criteria. Surveillance case definitions should not be used as the sole basis for guiding clinical management.

1. FLOW CHART: TRIAGE AND ISOLATION



3. THE COVID-19 CARE PATHWAY

The patient enters the COVID-19 Care Pathway and follows the continuum of care until they are released from the pathway. All persons enter the COVID-19 pathway *after s/he is screened* based on a standardized case definition and meets criteria for a suspected case.

- ✔ Suspected cases are persons under investigation and should be given and asked to wear a medical mask, and immediately isolated (single isolation rooms preferred) to contain the virus
    - If single isolation rooms are not available, groups the patients with similar diagnosis based on epidemiological risk factors with physical distancing of more than 2 meters apart
- ✔ Suspected cases should *not be* cohorted with confirmed cases.
- ✔ Probable cases are persons for whom testing for COVID-19 (SARS-CoV-2) is inconclusive or not available but clinical suspicion remains high or who meets the case definition of probable cases (Table 1)
- ✔ Confirmed cases are persons with laboratory confirmation of COVID-19.
- ✔ Consideration for co-infections and/or chronic diseases must be made within the COVID-19 pathway.

COVID-19 care pathways should be coordinated and multidisciplinary to ensure the delivery or safe and quality care in all levels of the health services.

Clinical monitoring of a COVID-19 patients can be done with National Early Warning Score (NEWS) 2. (Annex 4)

Routine tests in moderate, severe and critical COVID-19 disease

1. Complete blood count,
2. Urea, creatinine, sodium and potassium,
3. Liver function tests,
4. CRP, D-dimer. Troponin, ferritin, procalcitonin only if indicated,
5. Chest X-ray should be done in all hospitalized patients with fever, cough and shortness of breath. Common findings are patchy infiltrates in multiple areas.

3.1 Discontinue transmission-based precautions

(including isolation) and release from the COVID-19 care pathway as follows:[3]

- ✔ **For symptomatic patients:** 10 days after symptom onset, plus at least 3 days without symptoms (without fever, and respiratory symptoms).
- ✔ **For asymptomatic patients**: 10 days after testing positive for SARS-CoV-2.

    - ! **Release from the COVID-19 pathway** is *NOT* the same as clinical discharge from a facility or from one ward to another, e.g. some patients may require ongoing rehabilitation, or other aspects of care, beyond release for the COVID-19

[3] *Criteria for releasing COVID-19 patients from isolation: Scientific Brief 17 June 2020: WHO*

pathway, based on clinical needs in the COVID-19 pathway.

- **If discharge from the COVID-19 pathway** consider ongoing rehabilitation, medication reconciliation, plan for follow up with clinical provider in place, routine immunization etc.

4. DISEASE SEVERITY[1,2]

The COVID-19 disease is classified into following categories according to severity:

- **Mild disease-**See section 6.1; Algorithm 1
- **Moderate disease-** See section 6.2; Algorithm 2
- **Severe disease-**See section 6.3; Algorithm 3
- **Critical disease-**See sections 6.4, 6.5; Algorithms 4 & 5
    - ARDS
    - Sepsis
    - Septic shock
    - Or other conditions that would normally require the provision of life sustaining therapies such as mechanical ventilation (invasive or non-invasive) or vasopressor therapy

See Annex 5 for National Early Warning Score 2 to facilitate monitoring of the patient.

Table 2. Clinical Symptoms Associated with COVID-19 and Risk Factors[2]

Clinical Presentation	The spectrum of illness ranges from asymptomatic infection to acute respiratory distress, multiorgan dysfunction. About 40% of patients will be asymptomatic. Presenting signs and symptoms of COVID-19 vary. Most persons experience fever (83–99%) though may be absent in close to half of patients initially, cough (59–82%), fatigue (44–70%), anorexia (40–84%), shortness of breath (31–40%), myalgias (11–35%). Other **non-specific symptoms,** such as sore throat, nasal congestion, headache, diarrhoea, nausea and vomiting, have also been reported. Loss of smell (anosmia) or loss of taste (ageusia) preceding the onset of respiratory symptoms has also been reported. **Older people** and **immunosuppressed patients** in particular may present with atypical symptoms such as fatigue, reduced alertness, reduced mobility,

	diarrhoea, loss of appetite, delirium, and fever may be absent. Symptoms such as dyspnoea, fever, GI symptoms or fatigue due to physiologic adaptations in **pregnant women**, adverse pregnancy events, or other diseases such as malaria, may overlap with symptoms of COVID-19. Compared with adults, **children** are less likely to present with fever, cough and shortness of breath.
Risk factors for severe disease	Age more than 60 years (increasing with age). Underlying noncommunicable diseases (NCDs): hypertension, cardiac disease, chronic lung disease, cerebrovascular disease, diabetes mellitus (DM), immunocompromising conditions, and cancer have been associated with higher mortality. Smoking.

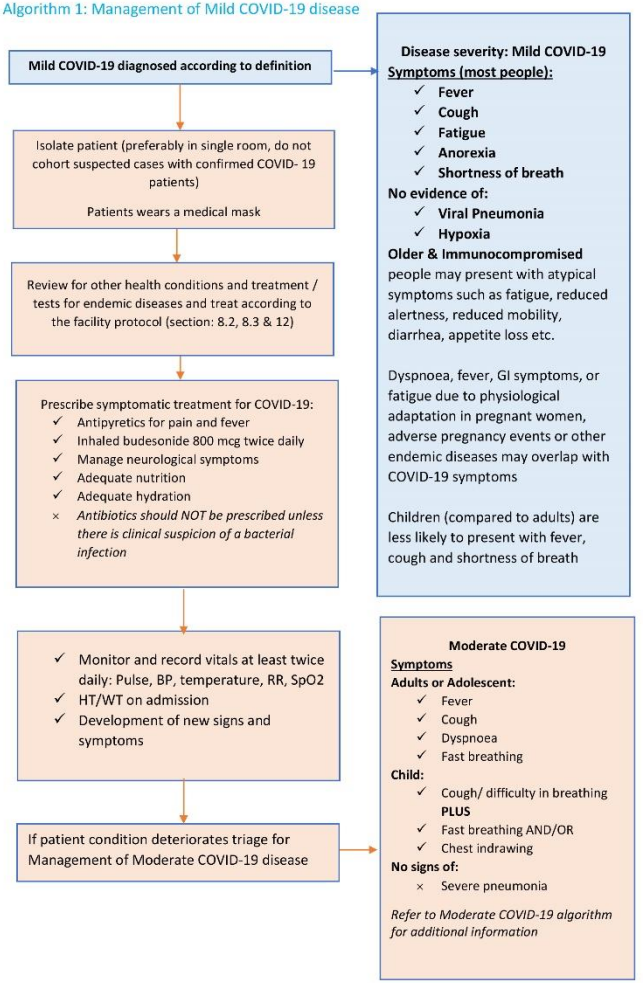
5. MANAGEMENT OF COVID-19 CASES ACCORDING TO DISEASE SEVERITY

First, protect yourself and others by implementing appropriate IPC measures at all times:

- Instruct the patient to wear a medical mask.
- Maintain physical distancing of 2 meters where possible.
- Instruct patients to adopt; good hand hygiene, respiratory hygiene, and cough etiquette (Annex 3)
- Depending on the activity risk:
  - Apply standard precautions,
  - Apply contact and droplet precautions,
  - Apply airborne precautions.

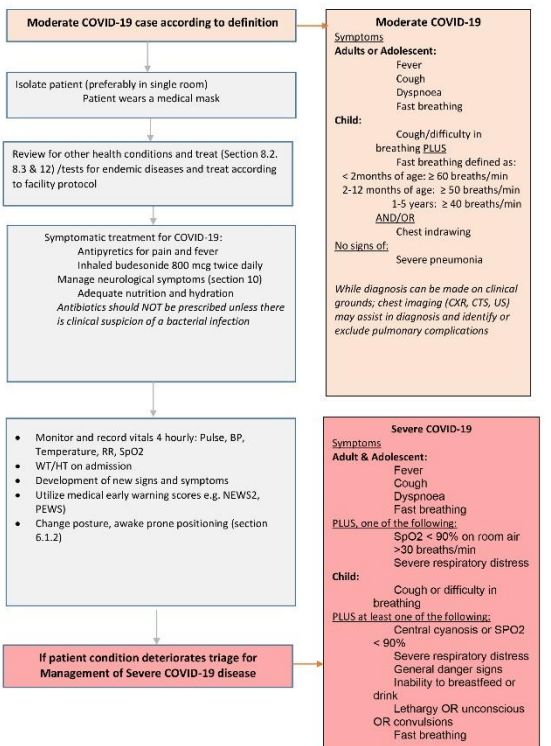
5.1 Case Management of MILD COVID-19 cases

Algorithm 1: Management of Mild COVID-19 disease

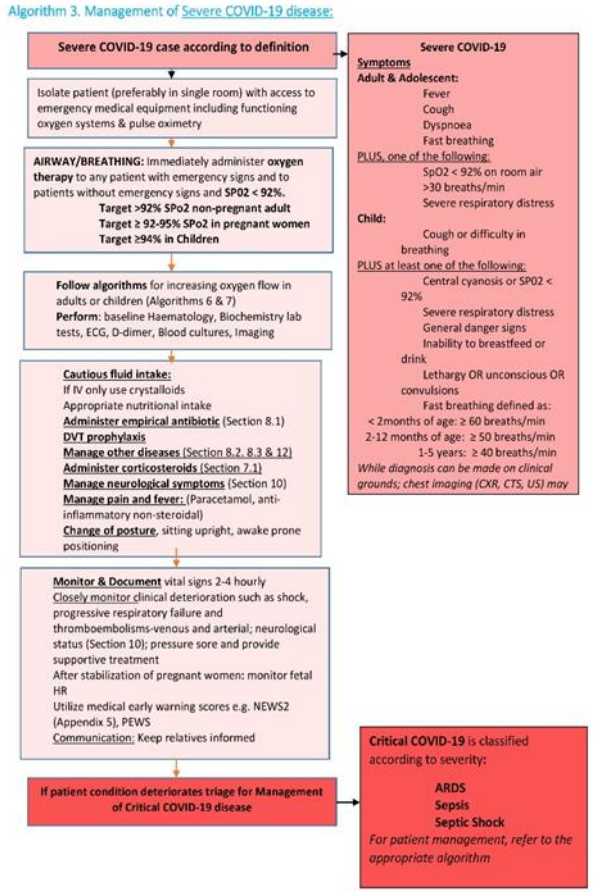


5.1.1 Case Management of MODERATE COVID-19 cases

Algorithm 2. Management of Moderate COVID-19 disease

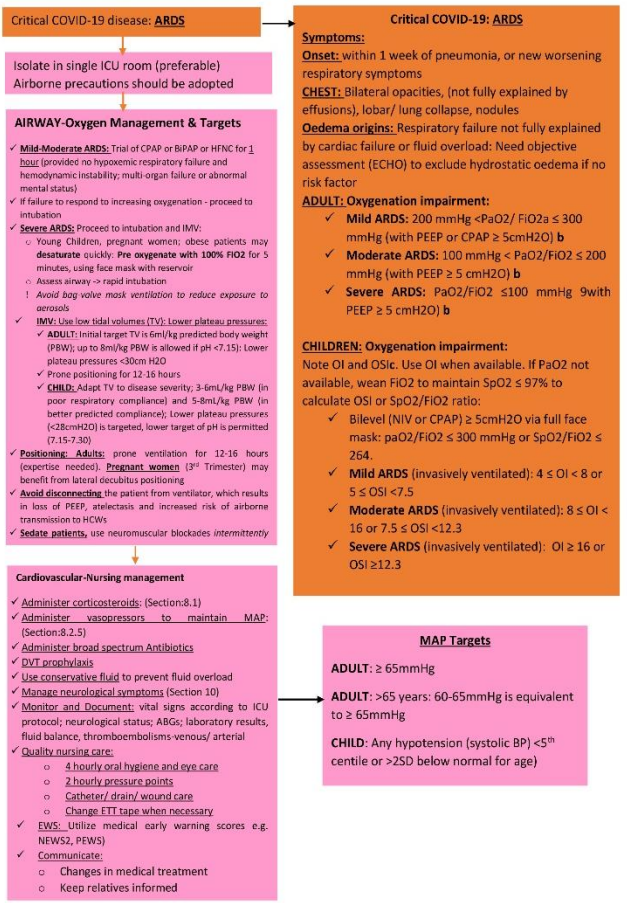


5.1.2 Case Management of SEVERE COVID-19 cases



5.1.3 Case Management of CRITICAL COVID-19

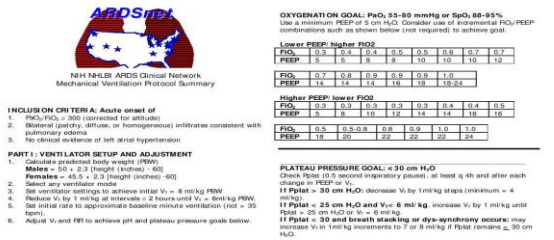
Algorithm 4. Acute Respiratory Distress Syndrome (ARDS)



5.1.4 ARDS protocol including PEEP titration

WHO recommend implementation of mechanical ventilation using lower tidal volumes (4–8 mL/kg predicted body weight [PBW]) and lower inspiratory pressures (plateau pressure < 30 cmH2O).

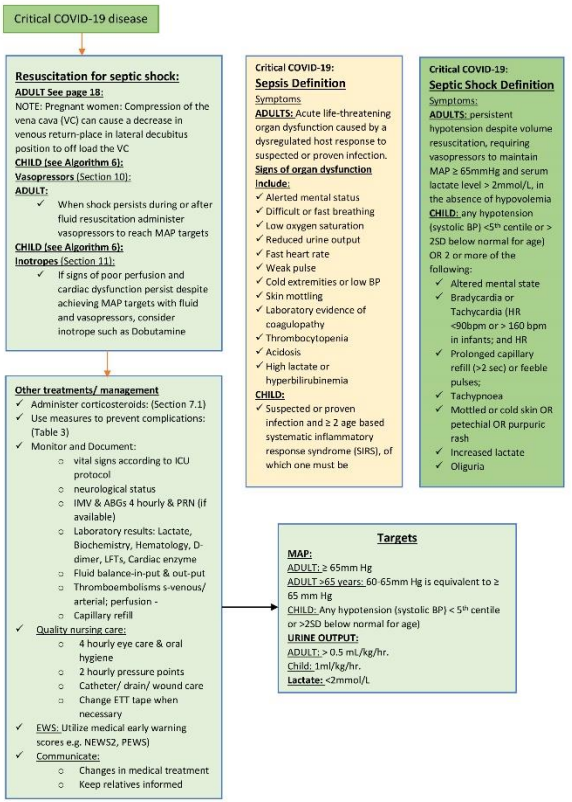
The implementation of mechanical ventilation using lower tidal volumes and lower plateau pressures (< 30 cmH2O) is a strong recommendation from a clinical guideline for patients with ARDS, and is also suggested for patients with sepsis-induced respiratory failure who do not meet ARDS criteria. The initial target 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). Permissive hypercapnia is permitted. Ventilator protocols are available. The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets.
Remarks for children: In children, a lower level of plateau pressure (< 28 cmH2O) is targeted, and a lower target of pH is permitted (7.15–7.30). Tidal volumes should be adapted to disease severity: 3–6 mL/kg PBW in the case of poor respiratory system compliance, and 5–8 mL/kg PBW with better preserved compliance.



Source: ards.net

Algorithm 5: Management of Critical COVID-19 Sepsis and Septic Shock

Management of Critical COVID-19 Sepsis and Septic Shock



Recommended resuscitation strategies for adult and pediatric patients with septic shock[1]

- In resuscitation for septic shock in adults, give 250–500 mL crystalloid fluid (Normal saline or Ringer lactate) as rapid bolus in first 15–30 minutes and for septic shock in children, give 10–20 mL/kg crystalloid fluid as a bolus in the first 30–60 minutes. Fluid resuscitation may lead to volume overload, including respiratory failure, particularly with ARDS.

- If there is no response to fluid loading or signs of volume overload appear (e.g. jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly), then reduce or discontinue fluid administration.

- Determine the need for additional fluid boluses (250–500 mL in adults; 10–20 mL/kg in children) based on clinical response and improvement of perfusion targets and reassess for signs of fluid overload after each bolus.

- Perfusion targets include MAP (> 65 mmHg or age-appropriate targets in children), urine output (> 0.5 mL/kg/hr. in adults; 1 mL/kg/hr. in children), and improvement of skin mottling and extremity perfusion, capillary refill, heart rate, level of consciousness, and lactate.

- Consider dynamic indices of volume responsiveness: passive leg raises, fluid challenges with serial stroke volume measurements, or variations in systolic pressure, pulse pressure etc. to guide volume administration beyond initial resuscitation based on local resources and experience.

6. PRONE POSITIONING

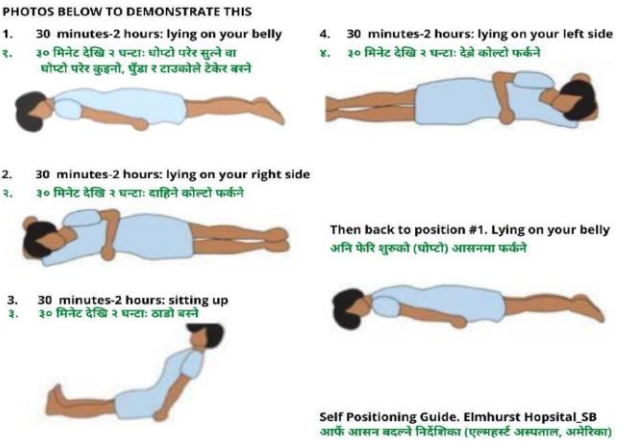
6.1.1 Prone positioning in intubated severe COVID-19 patients[5-7]

In adult patients with severe ARDS (PaO2/FiO2 < 150) prone ventilation for 12–16 hours per day is recommended.
Application of prone ventilation is recommended for adult patients, preferably for 16 hours per day, and may be considered for paediatric patients with severe ARDS but requires sufficient human resources and expertise to be performed safely; protocols (including videos) are available.
There is little evidence on prone positioning in pregnant women with ARDS; this could be considered in early pregnancy. Pregnant women in the third trimester may benefit from being placed in the lateral decubitus position. It helps to reduce ventilation perfusion mismatching, hypoxemia and shunting. The patient needs to be monitored closely for possible complications- accidental extubation, tube dislodgement, worsening of hemodynamics and hypoxemia. Spinal injury, open chest wound, etc. are contraindications of prone positioning.

6.1.2 Awake prone positioning in moderate to severe disease

UK Intensive care society advocates awake prone positioning to become standard of care for suspected or confirmed COVID-19 in patients requiring oxygen supplementation $\geq$28%. This will lead to better ventilation perfusion matching believed due to more homogenous lung aeration and strain distribution with recruitment of dorsal lung. Awake prone positioning appears to be safe and may

slow or avoid the respiratory deterioration in COVID-19 patients requiring oxygen supplementation. The optimal frequency and duration of awake prone positioning in non-intubated patient is not known. Patients are required to adopt the prone position for 1 hour each, five sessions per day during waking hours.



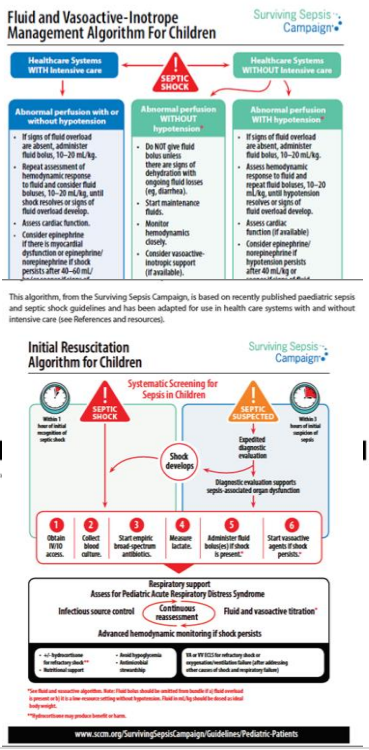
The awake prone positioning is advised in patients who are alert, able to communicate and has stable hemodynamics. Close monitoring of mental status, oxygen saturation and blood pressure is essential to find out deterioration[8]

[5] Koeckerling D, Barker J, Mudalige NL, *et al*. Awake prone positioning in COVID-19. *Thorax* 2020;**75**:833–834

[6]McNicholas, Bairbre et al. “Prone positioning in COVID-19 acute respiratory failure: just do it?.” *British journal of anaesthesia* vol. 125,4

(2020): 440-443. doi:10.1016/j.bja.2020.06.003
[7]Ng Z, Tay WC, Ho CHB. Awake prone positioning for non-intubated oxygen dependent COVID-19 pneumonia patients. Eur Respir J 2020;56:2001198
[8]Interim Clinical Guidance for Care of Patients with COVID-19 in Healthcare Settings. Nepal Medical Council, October 20202

Algorithm 6. Treatment for Children with septic shock



Algorithm 7. Delivering increasing oxygen in ADULT

How to deliver increasing oxygen

Place prongs inside the nostril. Hook tubing behind ears. Flow rates higher than 5 L will dry mucous membranes.

→ **Start oxygen at 5 L/min**
→ Use nasal prongs
→ Assess response

If increasing respiratory distress or $SpO_2 < 90\%$*

Secure mask firmly on face over nose and mouth. Pull strap over head.

→ Use face mask
→ **Increase oxygen to 6–10 L/min**
→ Assess response

If increasing respiratory distress or $SpO_2 < 90\%$*

Make sure bag is full to deliver highest oxygen concentration. An empty bag is dangerous.

→ Use face mask with reservoir
→ **Increase oxygen to 10–15 L/min**
→ Make sure bag inflates
→ Call for help from district clinician
→ Assess response

If increasing respiratory distress or $SpO_2 < 90\%$*, transfer to a hospital with available invasive mechanical ventilator possible

→ Call for help from district clinician for possible tracheal intubation
→ **Start manual ventilation (bagging) with high-oxygen flow**

Estimating FiO_2 when delivering oxygen

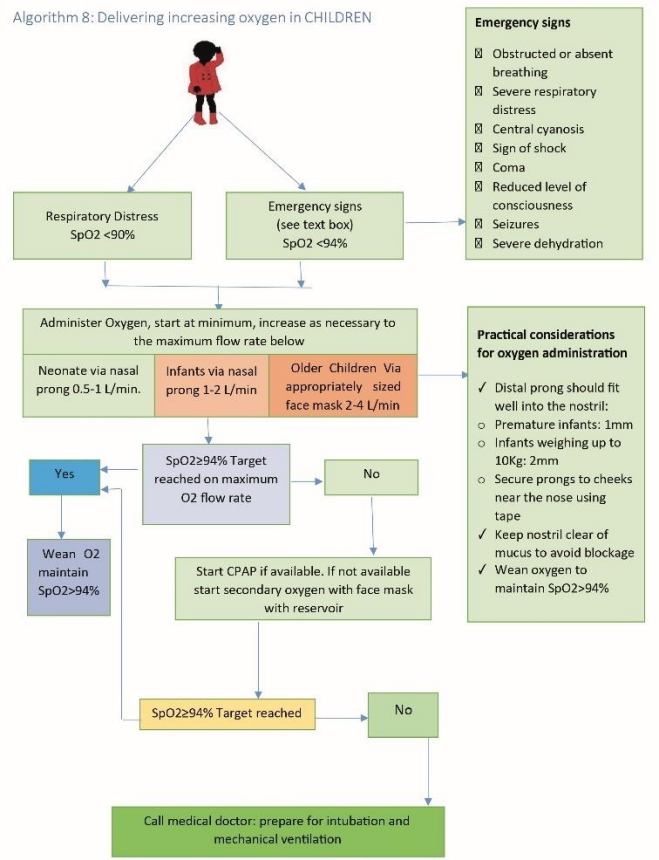
Adults

- 2–4 L/min ~ FiO_2 0.28–0.36
- 5 L/min ~ FiO_2 0.40
- 6–10 L/min ~ FiO_2 0.44–0.60
- 10–15 L/min ~ FiO_2 0.60–0.95

Note:

* Patients presenting with emergency signs should receive oxygen therapy if SpO_2 is < 94%.
  Emergency signs:
  - Obstructed or absent breathing
  - Severe respiratory distress
  - Central cyanosis
  - Signs of shock, defined as cold extremities with capillary refill time > 3 sec and weak and fast pulse
  - Coma (or seriously reduced level of consciousness)
  - Seizures
  - Signs of severe dehydration: lethargy or unconscious, sunken eyes, very slow return after pinching the skin.

Algorithm 8: Delivering increasing oxygen in CHILDREN



Footnotes for algorithm boxes 1-6

a If altitude is higher than 1000 m, then the correction factor should be calculated as follows: PaO2/FiO2 x barometric pressure/760.

b When PaO2 is not available, SpO2/FiO2 ≤ 315 suggests ARDS (including in non-ventilated patients).

c Oxygenation Index (OI) is an invasive measurement of the severity of hypoxaemic respiratory failure and may be used to predict outcomes in paediatric patients. It is calculated as follows: percentage of fraction of inhaled oxygen multiplied by the mean airway pressure (in mmHg), divided by the partial pressure of arterial oxygen (in mmHg). Oxygen saturation index (OSI) is a non-invasive measurement and has been shown to be a reliable surrogate marker of OI in children and adults with respiratory failure. OSI replaces PaO2 with oxygen saturation as measured by pulse oximetry (SpO2) in the OI equation.

d The SOFA score ranges from 0 to 24 and includes points related to six organ systems: respiratory (hypoxaemia defined by low PaO2/FiO2); coagulation (low platelets); liver (high bilirubin); cardiovascular (hypotension); central nervous system (low level of consciousness defined by Glasgow Coma Scale); and renal (low urine output or high creatinine). Sepsis is defined by an increase in the sepsis-related SOFA score of ≥ 2 points. Assume the baseline score is 0 if data are not available (62).

e SIRS criteria: abnormal temperature (> 38.5 °C or < 36 °C); tachycardia for age or bradycardia for age if < 1 year; tachypnoea for age or need for mechanical ventilation; abnormal white blood cell count for age or > 10% bands.

Abbreviations: BP blood pressure; bpm beats per minute; CPAP continuous positive airway pressure; FiO2 fraction of inspired oxygen; MAP mean arterial pressure; NIV non-invasive ventilation; OI Oxygenation Index; OSI Oxygenation Index using SpO2; PaO2 partial pressure of oxygen; PEEP positive end-expiratory pressure; SBP systolic blood pressure; SD standard deviation; SIRS systemic inflammatory response syndrome; qSOFA quick sequential organ failure assessment; SpO2 oxygen saturation.

Indications of intubation

1. Worsening respiratory distress with SpO2 < 90% despite oxygen supplementation with non-rebreathing face mask and or failure of HFNO/NIV
2. PaO_2/FiO_2 <150 mmHg

NOTE: Full airborne precautions need to be taken during bag and mask ventilation and intubation.

High flow Nasal Oxygen (HFNO) and Non-invasive ventilation (NIV)[9,10]

For adult patients with acute hypoxic respiratory failure despite supplementation of oxygen by non-rebreather mask, and no urgent indication for intubation, high flow nasal oxygen is feasible. Almost half of those who receive it (HFNO), can be successfully weaned without the need for mechanical ventilation. It appears to be safe for health care workers and could well liberate critical ICU resources. If HFNO is not available, non-invasive ventilation can be tried. Awake prone positioning can be considered in alert and hemodynamic patient on NIV or HFNO.

Precautions:

1. HFNO should not be used in patients who needs urgent intubation such as hypoxaemic respiratory failure and haemodynamic instability, multiorgan failure or abnormal mental status.

2. Patients receiving a trial of HFNO or NIV should be in a monitored by personnel experienced with HFNO and/or NIV and capable of performing endotracheal intubation in case the patient acutely deteriorates or does not improve

after a short trial (about 1 hour). Intubation should not be delayed if the patient acutely deteriorates or does not improve after a short trial. Adult HFNO systems can deliver 60 L/min of gas flow and FiO2 up to 1.0. Paediatric circuits generally only handle up to 25 L/min, and many children will require an adult circuit to deliver adequate flow.

3. Viral filters or high efficiency particulate air (HEPA) filter should be used in NIV.

[9] G.L. Calligaro et al., The utility of high-flow nasal oxygen for severe COVID-19 pneumonia in a resource-constrained setting: A multi-centre prospective observational study, EClinicalMedicine (2020), https://doi.org/10.1016/j.eclinm.2020.100570

[10] Guy, Tiphaine et al. "High-flow nasal oxygen: a safe, efficient treatment for COVID-19 patients not in an ICU." *The European respiratory journal*, 2001154. 9 Sep. 2020, doi:10.1183/13993003.01154-2020

7. THERAPEUTICS FOR COVID-19[11-13]

7.1 Corticosteroid Therapy and COVID-19

In patients with *severe or critical COVID-19* disease and requiring oxygen supplementation, dexamethasone is strongly recommended[4]. Hydrocortisone or prednisolone can be used when dexamethasone is not available. Continue corticosteroids for up to 10 days unless there is a clear indication to stop early which includes discharge from hospital or a hospital supervised virtual COVID ward.

Systemic corticosteroid therapy of:

- ✔ 6 mg Dexamethasone orally or intravenously daily for 10 days (or until hospital discharge whichever comes earlier) for adult and 150 micrograms/kg (as a base) orally, nasogastrically or intravenously once a day for 10 days (max 6 mg) in children

OR

- ✔ 50 mg of Hydrocortisone intravenously every 8 hours for 10 days for adults and for neonates (<1 month of age): 0.5 mg/kg IV every 12 hours for 7 days followed by 0.5 mg/kg IV once daily for 3 days; for children ≥1 month: 1.3 mg/kg IV every 8 hours (maximum dose 50 mg; maximum total daily dose 150 mg).

OR

- ✔ Prednisolone 40 mg once daily for 10 days for adults and 1 mg/kg orally, nasogastrically or intravenously once a day for 10 days (max 40 mg) for children. Doses can be rounded as per routine clinical practice)

OR

- ✔ Methylprednisolone 32 mg given in 1-4 divided doses per day for adults and 0.8 mg/kg IV once daily (maximum dose 32 mg) for children

Do not routinely use corticosteroids to treat COVID-19 in people who do not need supplemental oxygen, unless there is another medical indication to do so.

***Pregnant Women*:** WHO recommends antenatal corticosteroid therapy for women at risk of preterm birth from 24 to 34 weeks of gestation when there is no clinical evidence of maternal infection, and adequate childbirth and newborn care is available. However, in cases where the woman presents with mild COVID-19, the clinical benefits of antenatal corticosteroid might outweigh the risks of potential harm to the mother. In this situation, the balance of benefits and harms for the woman and the preterm newborn should be discussed with the woman to ensure an informed decision. This assessment may vary depending on the woman's clinical condition, her wishes and that of her family, and available health care resources[5].

7.2 Remdesivir

The conditional recommendation against the use of REMDESIVIR for patients with COVID-19 in Therapeutics and COVID-19: living guideline - World Health Organization is based on the evidence of possibly no effect on mortality, need for mechanical ventilation, recovery from symptoms

[11]Corticosteroids for COVID-19: Living guidance: 2 September 2020: WHO
[12]Therapeutics and COVID-19: living guideline - World Health Organization (WHO), 31 March 2021
[13]COVID-19 rapid guideline: managing COVID-19 NICE guideline Published: 23 March 2021 www.nice.org.uk/guidance/ng191

and other patient-important outcomes, though of albeit of low certainty.
NICE guidelines put conditional recommendation for COVID-19 pneumonia in adults, and young people 12 years and over weighing 40 kg or more, who are in hospital and on supplemental oxygen but not on invasive mechanical ventilation for 5 days with a dose of 200 mg on day 1 followed by 100 mg daily for 4 days.

7.3 Tocilizumab[6]

IL-6 receptor blockers (tocilizumab, sarilumab) reduce mortality and need for mechanical ventilation in patients with severe or critical COVID-19 infection. (high certainty evidence) They may also reduce duration of mechanical ventilation and hospitalization (low certainty evidence). As IL-6 receptor blockers require intravenous administration, this treatment would be primarily indicated for patients with severe and critical COVID-19 who require hospitalization. IL-6 receptor blockers are relatively easy to administer, and only require one, or at most, two doses.
Tocilizumab is recommended (strong recommendation) to adults in hospital with COVID-19 if all the following apply:

- The patient is having or have completed a course of corticosteroids such as dexamethasone, unless they cannot have corticosteroids
- The patient has not had another interleukin-6 inhibitor during this admission

[6] Therapeutics and COVID-19: living guideline - World Health Organization (WHO), 24 September 2021

- there is no evidence of a bacterial or viral infection (other than SARS-CoV-2) that might be worsened by tocilizumab.
- And the patient either:
  - needs supplemental oxygen and have a CRP level of 75 mg/L or more, or
  - are within 48 hours of starting high-flow nasal oxygen, continuous positive airway pressure, non-invasive ventilation or invasive mechanical ventilation.

Common side effects are URT infections, nasopharyngitis, headache, hypertension, increased alanine aminotransferase (adverse effects are ALT), injection site reactions).
Dosage: A single dose of 8 mg/Kg by intravenous infusion (total dose not exceeding 800 mg) diluted in 100 ml of normal saline and infusion over 60 minutes.
Cautions:

- ✓ Use separate IV line
- ✓ Do not use if opaque particles or discoloration is visible
- ✓ Do not administer IV push or bolus.

WHO recommend the use of neutralizing monoclonal antibodies (casirivimab and imdevimab) conditionally to those at highest risk of hospitalization. In non-severe patients, casirivimab and imdevimab probably reduces the risk of hospitalization and duration of symptoms.
Casirivimab and Imdevimab is unlikely to have serious adverse effects, including allergic reactions. In the overall population of patients with severe and critical COVID-19, casirivimab and imdevimab may not have an impact on mortality and the impact on mechanical ventilation and duration of hospitalization is very uncertain.

7.4 Convalescent plasma therapy

Only a few clinical trials of convalescent plasma have produced results, and the evidence, at least so far, has not been convincing enough to endorse it beyond use as an experimental therapy. WHO: There are several side effects ranging from mild fevers to severe lung injuries or circulatory overload.

7.5 Not recommended agents

WHO recommends AGAINST administering of any of the following for treatment of COVID-19 patients with any disease severity and any duration of symtoms:

- HYDROXYCHLOROQUINE or
- CHLOROQUINE or
- IVERMECTIN or
- LOPINAVIR/RITONAVIR or
- INTERFERON

8. TREATMENT OF OTHER ACUTE AND CHRONIC INFECTIONS IN PATIENTS WITH COVID-19

8.1 Use of antimicrobials: The prevalence of acute co-infections or secondary infections coinciding with COVID-19 has been not adequately described but appears to be low and will be based on local factors and endemic or other emerging infections.

In suspected or confirmed mild or moderate cases of COVID:

- Routine use of antimicrobials is not recommended unless there is clinical suspicion of a bacterial infection.

Suspected or confirmed severe COVID-19

- ✔ Administer empiric antimicrobials to treat all likely pathogens, based on clinical judgment, patient host factors and local epidemiology, and this should be done as soon as possible (within 1 hour of initial assessment if possible), ideally with blood cultures obtained first. Antimicrobial therapy should be assessed daily for de-escalation and reviewed to treat based on microbiology results.
- ✔ **ADULT**: Ceftriaxone 1-2g, once daily PLUS Azithromycin 500mg, once daily OR Ampicillin 2g IV, 4 times day PLUS Azithromycin 500mg, once daily
- ✔ **CHILD**: Ceftriaxone 50-75 mg/Kg (maximum 1 gm) per day or cefotaxime 150-180 mg/Kg/day in three divided doses (maximum doses 8 gm/day) for 5 days If bacterial pneumonia or sepsis is suspected use Ceftriaxone or Amoxicillin-Clavulanic Acid,
    - Add Azithromycin for atypical coverage of pneumonia substitute with Doxycycline if allergic to macrolides

8.2 Chronic infections: It is currently unknown whether immunosuppression caused by chronic co-infections such as HIV put persons at greater risk for severe COVID-19 disease. However, people living with HIV with advanced disease have an increased risk of opportunistic infections (notably TB) and related complications in general. Facility-based HIV testing

services should be continued and those newly diagnosed should start antiretroviral therapy as soon as possible. For people living with HIV already on treatment, continuity of antiretroviral therapy and prophylaxis for co-infections is essential, with multi-month prescribing.Tuberculosis (TB) and COVID-19 are both infectious diseases with e similar symptoms such as cough, fever and difficulty breathing. TB, however, has a longer incubation period with a slower onset of disease. While experience on COVID-19 infection in TB patients remains limited, it is anticipated that people ill with both TB and COVID-19 may have poorer treatment outcomes, especially if TB treatment is interrupted. TB patients should take precautions as advised by health authorities to be protected from COVID-19 and continue their TB treatment as prescribed.

8.3 Endemic diseases (co-morbidities) e.g. malaria, dengue, typhoid etc. should be treated in accordance with the appropriate treatment protocols at the facility level. Many of the endemic diseases have similar clinical presentation as COVID-19 disease, use the differential diagnostic matrix (Annex 4) to facilitate diagnosis.

8.4 Fungal diseases and COVID 19

People with severe COVID-19, such as those in an intensive care unit (ICU), are particularly vulnerable to bacterial and fungal infections. The most common fungal infections in patients with COVID-19 include aspergillosis and mucormycosis. Fungal infection can be difficult to diagnose clinically because symptoms are non-specific like fever, cough, and

shortness of breath. These fungal co-infections are reported with increasing frequency and can be associated with severe illness and death. Awareness of the possibility of fungal co-infection is essential to reduce delays in diagnosis and treatment in order to help prevent severe illness and death from these infections.

8.4.1 COVID-19-associated Aspergillosis

Clinicians should consider the possibility of aspergillosis in patients with severe COVID-19 who have worsening respiratory function or sepsis, even if they do not have classical risk factors for aspergillosis. Testing for aspergillosis usually involves obtaining specimens from patients' lower respiratory tract, which are tested for Aspergillus galactomannan antigen and fungal culture. Voriconazole is effective therapy. Voriconazole 6 mg/Kg twice daily for 2 doses followed by 4 mg/Kg twice daily. Once the patient can tolerate oral administration, consider transition to oral formulation. Oral dose is 200 mg twice daily for 6-12 weeks.

8.4.2 COVID-19-associated mucormycosis

COVID-19–associated mucormycosis is less common than other COVID-19–associated fungal infections however, emerging reports from India highlight the importance of considering this infection7,. Use of high-dose corticosteroids and tocilizumab, diabetes mellitus etc. might predispose patients with COVID-19 to mucormycosis. Early diagnosis and treatment are key to improving

[7] https://www.cdc.gov/fungal/covid-fungal.html

outcomes for patients with COVID-19–associated mucormycosis. Biomarkers for diagnosing invasive aspergillosis, such as beta-d-glucan and galactomannan, are typically negative in patients with mucormycosis.
The treatment for mucormycosis frequently involves aggressive surgical intervention and treatment with antifungals, including liposomal Amphotericin B (LAB). Voriconazole is not recommended for treating mucormycosis.
Liposomal Amphotericin B (L-AmB) dose:

- Rhino-orbital -5 mg/kg/ day given as infusion in 5% Dextrose over 2 hours
- Intracranial - 10 mg/kg/ day
- Max. cumulative dose 5-7gm; 50 kg, 50x5=250 mg i.e. 3 vials. For 5 gm100 vials
- Step down to oral Posaconazole 300mg BD on day 1 and then OD for at least 3 months or Isavuconazole (200 mg 1 tab 3 times daily for 2 days followed by 200 mg daily).

9. USE OF OSELTAMIVIR

Oseltamivir is currently not proven to be an effective treatment for COVID-19. Oseltamivir can be used when influenza is suspected or known to be circulating. If testing for influenza is not possible, empirical treatment is indicated. Oseltamivir has not been evaluated in severely ill patients, pregnancy, or pediatric populations. Oseltamivir should be used with caution.

10. USE OF VASOPRESSORS

In adults, administer vasopressors when shock persists during or after fluid resuscitation. The initial blood pressure target is MAP ≥ 65 mmHg in adults and improvement of markers of perfusion. Norepinephrine is considered the first-line treatment in adult patients; Epinephrine or Vasopressin can be added to achieve the MAP target. Because of the risk of tachyarrhythmia, reserve dopamine for selected patients with low risk of tachyarrhythmia or those with bradycardia. For children, refer to algorithm 6. Vasopressors (i.e. Norepinephrine, Epinephrine, Vasopressin and Dopamine) are most safely given through a central venous catheter at a strictly controlled rate, but it is also possible to safely administer them via peripheral vein and intraosseous.

11. USE OF INOTROPES

Side-effects of inotropes, such as Dobutamine, include tachyarrhythmias and hypotension due to peripheral vasodilation. Thus, in septic shock, inotropes should be used in combination with vasopressors to maintain MAP at goal in adults, and children with low systemic vascular resistance.

12. NON-COMMUNICABLE DISEASES (NCD) and COVID-19

When caring for patients with suspected and confirmed COVID-19 with underlying NCDs, we may need to continue or modify previous medical therapy according to the patient's clinical condition.

12.1 Antihypertensive patients: antihypertensive drugs should not routinely be stopped in patients with COVID-19, but therapy may need to be adjusted based on general considerations of patients with acute illness, with reference to maintaining normal blood pressure and renal function.

12.2 Asthmatic patients: Respiratory viral infections, such as COVID-19, can trigger and worsen asthma symptoms. However, at present, there is no evidence suggesting that people with asthma are any more likely to contract COVID-19 than anyone else. Continue to administer regular treatment for asthmatic patients, monitor peak flow and respiratory function tests according to facility protocol.

12.3 Diabetic patients: are at a higher risk of severe COVID -19 disease and associated mortality due to COVID-19. However, controlled diabetic patients have more favorable outcomes than non-controlled[8]. Monitor blood sugar levels regularly and manage according to facility protocol.

12.4 Patients with myocarditis: consult cardiologist consultant for appropriate management.

13. PREVENTION OF COMPLICATIONS IN HOSPITALIZED AND CRITICALLY ILL PATIENTS WITH COVID-19

12.5 Thromboembolism

Adults and adolescents:

Use low molecular weight heparin, if contraindicated use mechanical prophylaxis including intermittent pneumatic devices. Prophylactic and therapeutic doses of different types of heparin is shown in the table[9].

Anticoagulation for adults with COVID 19 hypercoagulopathy				
Anticoagulation agent (AC)	**VTE prophylaxis**		**VTE treatment**	
	Cr Cl >30 ml/min	Cr Cl <30 ml/min	Cr Cl >30 ml/min	Cr Cl <30 ml/min
Enoxaparin†	40 mg/day	30 mg/day OD SC	1mg/kg BD SC	1mg/kg OD SC

[9] Interim Cinical Guidance for Care of Patients with COVID-19 in Healthcare Settings. Jul 11, 2021

	OD SC			
Dalteparin	5000 units OD SC	Use alternative AC	200 U/kg OD SC, or 100 U/kg BD SC	Use alternative AC
Fondaparinux	2.5 mg OD SC	Use alternative AC	<50kg: 5mg OD 50-100kg: 7.5mg OD >100kg: 10mg OD SC	Use alternative AC
Unfractionated Heparin (UFH)	5000 units 8-12 hourly SC		†80 units/kg bolus (maximum dose: 10,000 units), then 18 units/kg/hour IV (maximum initial infusion: 2,000 units/hour) APTT needs to be monitored within 6 hours of starting infusion and then regularly for dose adjustment. DO NOT USE treatment dose of UFH if there is no facility to measure APTT.	
†Enoxaparin is the preferred anticoagulant for prophylaxis and treatment of hypercoagulopathy. Avoid use of unfractionated heparin especially for VTE treatment if other options are available.				

∗In case of previous heparin-induced thrombocytopenia (HIT) or suspected HIT, use Fondaparinux.
∗VTE- venous thromboembolism, SC- subcutaneous, IV- intravenous, Cr Cl- creatinine clearance

- ✔ Monitor patients for signs and symptoms suggestive of thromboembolism.
- ✔ If thromboembolism is suspected proceed immediately to the area/center with diagnostic and management facility.

12.6 Other complications

These interventions are based on surviving sepsis or other guidelines and are based on limited feasible recommendations based on high-quality evidence.

Table 3. Anticipated outcome*	Interventions
Reduce days if invasive mechanical ventilation	● Use weaning protocols that include daily assessment for readiness to breathe spontaneously, ● Minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions, ● Early mobilization, ● Implementation of the above as a bundle of care (may also reduce delirium); such as the Awakening and Breathing Coordination, Delirium assessment.

	/management, and Early mobility (ABCDE)
Reduce incidence of ventilator-associated pneumonia	● Oral intubation is preferable to nasal intubation in adolescents and adults. ● Keep patient in semi-recumbent position (head of bed elevation 30–45º). ● Use a closed suctioning system; periodically drain and discard condensate in tubing. ● Use a new ventilator circuit for each patient; once patient is ventilated, change circuit if it is soiled or damaged, but not routinely. ● Change heat moisture exchanger when it malfunctions, when soiled, or every 5–7 days.
Reduce incidence of catheter-related bloodstream infection	● Use a checklist with completion verified by a real-time observer as reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed.
Reduce incidence of pressure ulcers	● Turn patient every 2 hours.

Reduce incidence of stress ulcers and gastrointestinal (GI) bleeding	● Give early enteral nutrition (within 24–48 hours of admission). ● Administer histamine-2 receptor blockers or proton-pump inhibitors in patients with risk factors for GI bleeding. Risk factors for GI bleeding include mechanical ventilation for ≥ 48 hours, coagulopathy, renal replacement therapy, liver disease, multiple comorbidities, and higher organ failure score.
Reduce the development of antimicrobial resistance Reduce the development of adverse drug effects. Promote appropriate antimicrobial prescribing and use during the COVID19 pandemic.	● Utilize de-escalation protocols as soon as patient is clinically stable and there is no evidence of bacterial infection. ● Expose patient to empiric antimicrobial therapy for the shortest time possible, to prevent nephrotoxicity, cardiac and other side-effects from unnecessary antimicrobial use. ● **Do not prescribe antibiotics to suspected or confirmed COVID-19 patients with low suspicion of a bacterial infection,** to avoid more short-term side effects of antibiotics in patients and negative long-term consequences of increased antimicrobial resistance.

*Refer to: Clinical Management of COVID-19 Interim Guidance; May 2020; Page 27: WHO

12.7 Nutrition

- ✔ Start enteral feeding early.
- ✔ Nasogastric or orogastric tube feeding in intubated patients.
- ✔ Consider parenteral nutrition if enteral feeding is not tolerated despite prokinetics use or if enteral feeding is contraindicated.

14. MANAGEMENT OF PREGNANT AND LACTATING WOMEN AND COVID-19[14-15]

There is limited data on the clinical presentation and maternal and perinatal outcomes of COVID-19 disease during or after pregnancy. Existing evidence has not identified major risks or complications in babies born to mothers with COVID-19. However, COVID-19 Pregnant and post-partum women: with pre-existing or pregnancy related co-morbidities (e.g. pregnancy induced hypertension, gestational diabetes), should also be considered for close monitoring.

All pregnant women with history of contact with a person with confirmed COVID-19 be carefully monitored considering asymptomatic transmission of COVID-19. Pregnant or recently pregnant women with suspected or confirmed mild COVID-19 may not require acute care in hospital, unless there is concern for rapid deterioration or an inability to promptly return to hospital; but isolation to contain virus

transmission is recommended, and can be done at a health facility, community facility or at home, according to established COVID-19 care pathways but women with moderate or severe COVID-19 require acute care in the hospital, as there is concern for rapid deterioration.

WHO recommends that induction of labour and caesarian section should only be undertaken when medically justified and based on maternal and fetal conditions. COVID-19 status alone is not an indication for caesarian section[10].

- ✔ Delayed umbilical cord clamping (not earlier than 1 minute) is recommended for improved maternal and infant health and nutritional outcomes. The risk of transmission of COVID-19 through blood is likely to be minimal
- ✔ Mothers with suspected or confirmed COVID-19 should be encouraged to initiate or continue to breastfeed. Mothers should be counselled that the benefits of breastfeeding substantially outweigh the potential risk for transmission[11]
- ✔ Symptomatic mothers who are breastfeeding or practicing skin-to-skin contact or kangaroo mother care should practice respiratory hygiene (wear a cloth mask[12]), including during feeding perform hand hygiene before and after contact with the child, and routinely

[14] WHO recommendations for induction of labour. Geneva: World Health Organization; 2011 (https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/9789241501156/en/, accessed 14 May 2020).

[15] https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/maternal-or-infant-illnesses/covid-19-and-breastfeeding.html

clean and disinfect surfaces which the symptomatic mother has been in contact with.

- ✔ See algorithms 1, 2, 3, 4, 5, 7 for management of pregnant women according to disease severity.

15. MANAGEMENT OF NEUROLOGICAL AND MENTAL MANIFESTATIONS ASSOCIATED WITH COVID-19[1]

In patients with COVID-19, measures to prevent delirium, an acute neuropsychiatric emergency, should be implemented; and patients be evaluated using standardized protocols, for the development of delirium. If detected, then immediate evaluation by a clinician is recommended to address any underlying cause of delirium and treat appropriately.

- ✔ Manage any underlying cause of delirium by monitoring oxygenation and fluid status, correcting metabolic or endocrine abnormalities, addressing co-infections, minimizing the use of medications that may cause or worsen delirium, treating withdrawal from substances, understanding and minimizing the effects of any harmful drug-drug interactions and maintaining normal sleep cycle as much as possible.

- ✔ In patients receiving invasive ventilation, minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions, to reduce delirium.

- ✔ In patients experiencing agitation (defined as marked restlessness or excessive motor activity, often accompanied by anxiety), use calming communication strategies and attempt to reorient the person. Acute pain due to physical illness or air hunger should be considered as triggers for agitation and need to be addressed immediately. If the person continues to be agitated despite the strategies described above and is experiencing severe distress, it may be necessary to use psychotropic medications.

- ✔ Provide basic mental health and psychosocial support (MHPSS) for all persons with suspected or confirmed COVID-19.

- ✔ Prompt identification and assessment for anxiety and depressive symptoms in the context of COVID-19 is important, for the management of new anxiety and depressive symptoms.

- ✔ If a person's anxiety or depressive symptoms persist beyond recovery from COVID19 and/or discharge from the hospital, then an underlying anxiety or depressive disorder may be suspected, and a mental health professional should be consulted, and these conditions should be managed appropriately.

16. REHABILITATION FOR PATIENTS WITH COVID-19[1]

Patients with COVID-19, regardless of the disease severity, might present with persistent symptoms and a functional decline which may not be obviously apparent. Few common symptoms are new illness-related fatigue, breathlessness, PTSD symptoms, pain, voice change, cough, dysphagia, anxiety, depression, and problems with concentration, memory and continence are increasingly reported in patients who have recovered from acute COVID-19 even up to months. Prior to hospital discharge, COVID-19 patients should be screened for rehabilitation needs in order to facilitate onward referral. A multidisciplinary approach is recommended for better outcome. Nevertheless, the following interventions are useful:

- Patients with COVID-19, should be provided with education and support for the self-management of breathlessness and resumption of activities.
- All rehabilitating patients should be educated about resuming everyday activities conservatively at an appropriate pace that is safe and manageable for energy levels within the limits of current symptoms and should not be pushed for post-exertional fatigue. A gradual increase in exercise should be based on symptoms.
- For patients having difficulties with memory, concentration and problem solving, education should be provided, and advice on strategies to help establish expectations (including from family members) and to alleviate stress and anxiety.

- For patients with anxiety, depression and PTSD, basic mental health and psychosocial support by appropriately trained health or non-health workers should be provided.

ANNEX 1: APPROPRIATE USE OF PPE ACCORDING TO TASK

Guidelines for use of personal protective equipment
(Developed by the Expert Team of NMC
and Government of Nepal with reference from WHO, published on March 26, 2020)
A. For Aerosol Generating procedures: Dental procedures, bronchoscopy, Upper GI Endoscopy, ENT
procedures, Nebulization, Intubation of a patient, CPR, Non-invasive ventilation, endotracheal
suctioning, when obtaining nasopharyngeal or oropharyngeal swab, etc. **in Covid-19 suspected or**
confirmed cases health personnel need to use the following protective equipment: Category I PPE:
a. N-95 mask
b. Goggles or visor
c. Gloves (loose gloves acceptable)
d. Water resistant OR standard disposable gowns
e. Cap: Regular disposable
B. **For Non aerosol generating covid-19 suspected or confirmed patients: Health personnel need to**
use the following protective equipment: Category II PPE:
a. Surgical mask (seal the top edge with tape)*
b. Goggles or visor
c. Gloves (loose gloves acceptable)
d. Water resistant or standard disposable gowns
e. Cap: Regular disposable
C. For Physician/Staff running the fever/screening clinics the following PPE is recommended: Category
II PPE
a. Surgical mask, (seal the top edge with a tape)*
b. Goggles or visor

c. Water resistant or standard disposable gowns
d. Regular disposable Cap
e. Gloves (loose gloves acceptable)

D. For escorts or drivers, the following PPE is recommended: Category III PPE:

a. Surgical masks
b. Gloves
c. If physical contact is expected, depending on circumstances, a gown PLUS goggles or face shield are also recommended, otherwise need to maintain minimum 2-meter distance from the patient.
d. The patient should be given surgical mask and instructed to perform hand-hygiene.

E. For Laboratory staff: category II or III PPE; depending upon the chance of splash:

a. surgical mask
b. Gown
c. Loose Gloves
d. Eye protection (if risk of splash)

F. **For all staff, including health care workers** involved in any activity that does not involve contact with COVID-19 patients and working in other areas of patient transit (e.g. wards, corridors). **No PPE required**.

For Everyone:

o ***Maintain 3-6 feet distance while visiting patients, if no need to touch the patient.***
o ***Mandatory hand-hygiene after each use of PPE and between patients.***
Mandatory surface cleaning of bed or furniture with 0.5% Chlorine disinfectant (Virex* or similar) between each patient in OPD or in an inpatient setting.

***Use N-95 masks if close contact with COVID-19 suspect or confirmed case expected.**

ANNEX 2 : SCREENING QUESTIONNAIRE

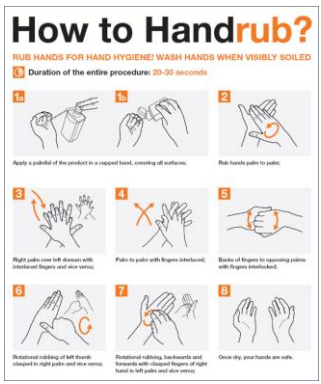
SCREENING QUESTIONNAIRE :
All individuals presenting to the OPD or ER entrance should be screened with the following questions:
a. **Symptoms:** Do you have any of the following symptoms?

- Cough? Fever? Shortness of breath? (common)
- Sore throat, headache or body ache, new loss of smell, or taste? (less common)

b. Travel history or contact with traveler:
Have you
· Recently returned from travel in, or been living in, an affected area in the past 2 weeks?
· Been in close contact in the past 2 weeks with someone returning from travel in an affected area?

c. Exposures:
Did you have any exposures to any of the following?
· Close contact with anyone with fever or respiratory illness of unknown cause
· Known or suspected COVID-positive contact

ANNEX 3: EDUCATION FOR PATIENTS; HOW TO PERFORM HAND HYGIENE, COUGH ETTIQUETTE, WEAR A MASK PROPERLY



ANNEX 4: NATIONAL EARLY WARNING SCORE 2

The National Early Warning Score (NEWS) 2 is based on a simple aggregate scoring system allocated to following physiological measurements which are routinely recorded in hospitalized patients.

1. Respiration rate
2. Oxygen saturation
3. Systolic blood pressure
4. Pulse rate
5. Level of consciousness or new confusion*
6. Temperature

*The patient may respond to questions coherently, but there may be some new-onset confusion, disorientation and/or agitation which score 3 on NEWS system (3 or 4 in GCS).

The use of NEWS 2 will ensure that patients who are deteriorating, or at risk of deteriorating, will have a timely initial assessment by a competent clinical decision maker. NEWS2 should supplement clinical judgement in assessing the patient's condition.

A score is allocated to each parameter as they are measured. The score is then aggregated and frequency of observations and review by appropriate team is decided. If patient is receiving oxygen supplementation, 2 points will be added to score.

In the context of **COVID-19 infection,** oxygen requirement of a patient might increase rapidly but this may not result in additional

significant increase (≥3) in NEWS 2 score. It is recommended that in patients with COVID-19, all staffs should be aware that any increase in oxygen requirement should trigger an escalation call to a competent clinical decision maker along with increase in observations to at least hourly until a clinical review.

Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO_2 Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO_2 Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

Chart 2: NEWS thresholds and triggers

NEW score	Clinical risk	Response
Aggregate score 0–4	Low	Ward-based response
Red score Score of 3 in any individual parameter	Low–medium	Urgent ward-based response*
Aggregate score 5–6	Medium	Key threshold for urgent response*
Aggregate score 7 or more	High	Urgent or emergency response**

* Response by a clinician or team with competence in the assessment and treatment of acutely ill patients and in recognising when the escalation of care to a critical care team is appropriate.

**The response team must also include staff with critical care skills, including airway management.

Chart 3: NEWS observation chart

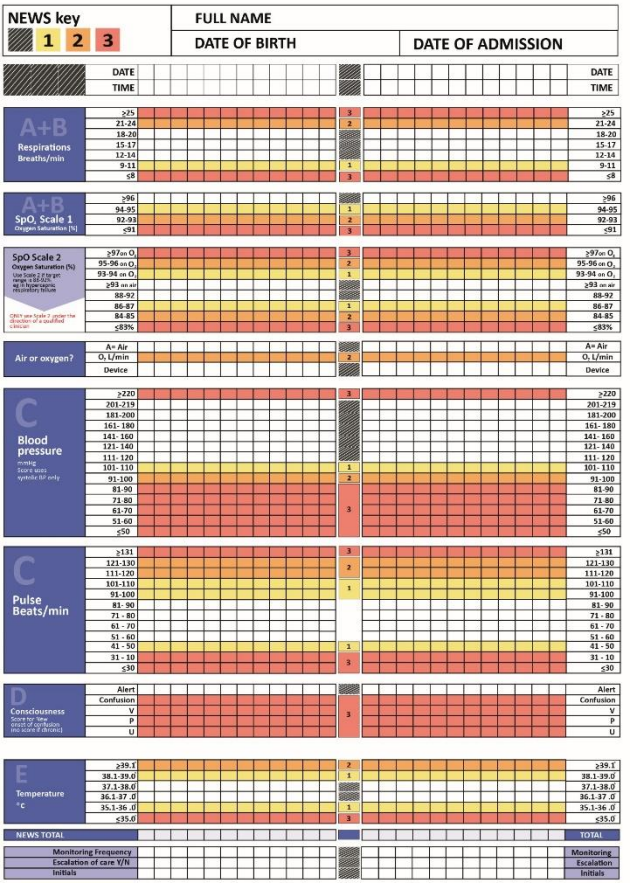


Chart 4: Clinical response to the NEWS trigger thresholds

NEW score	Frequency of monitoring	Clinical response
0	Minimum 12 hourly	• Continue routine NEWS monitoring
Total 1–4	Minimum 4–6 hourly	• Inform registered nurse, who must assess the patient • Registered nurse decides whether increased frequency of monitoring and/or escalation of care is required
3 in single parameter	Minimum 1 hourly	• Registered nurse to inform medical team caring for the patient, who will review and decide whether escalation of care is necessary
Total 5 or more Urgent response threshold	Minimum 1 hourly	• Registered nurse to immediately inform the medical team caring for the patient • Registered nurse to request urgent assessment by a clinician or team with core competencies in the care of acutely ill patients • Provide clinical care in an environment with monitoring facilities
Total 7 or more Emergency response threshold	Continuous monitoring of vital signs	• Registered nurse to immediately inform the medical team caring for the patient – this should be at least at specialist registrar level • Emergency assessment by a team with critical care competencies, including practitioner(s) with advanced airway management skills • Consider transfer of care to a level 2 or 3 clinical care facility, ie higher-dependency unit or ICU • Clinical care in an environment with monitoring facilities

ANNEX 5: MULTISYSTEM INFLAMMATORY SYNDROME IN CHILDREN AND ADOLESCENTS

WITH COVID-19[16,17]

Multisystem Inflammatory syndrome in children (MIS-C) is a new potentially lethal disease temporally associated with COVID-19 disease. WHO has developed a preliminary case definition.

Children and adolescents 0–19 years of age with fever ≥ 3 days **AND** two of the following:

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

AND

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

AND

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

AND

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

The common clinical symptoms at presentation are fever (100%), abdominal pain or diarrhea (73%), and vomiting (68%). Signs and symptoms of MIS-C typically appears after three to four weeks after COVID-19 infection and may progress rapidly to shock and cardiorespiratory failure in many cases. Various immunomodulatory treatments (intravenous immunoglobulin, steroids) have been used. Patients may need mechanical ventilation apart from supportive therapy. Early recognition and referral to a tertiary care center is the key for improving survival.

---

[16]Ahmed M, Advani S, Moreira A et al. Multisystem inflammatory syndrome in children: A systematic review. E Clinical Medicine 26 (2020) 100527. https://doi.org/10.1016/j.eclinm.2020.100527

[17] Multisystem inflammatory syndrome in children and adolescents with COVID-19. Scientific brief. 15 May 2020


COVID-19
RESPONSE