

**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 09-2021**

**Date - 13<sup>th</sup> July 2021**

## Content

	Page no.
I. Standard definitions for COVID-19	2
II. History taking	4
III. Physical Examination	5
IV. Risk factor for severe disease	5
Management Protocol for Covid-19 Acute Respiratory Disease (Version 10)	6
V. COVID-19 disease severity	7
VI. Investigations	9
VII. Immediate implementation of IPC measures	10
VIII. Treatment	11
IX. Rehabilitation for patients with COVID-19	15
X. Caring for older people with COVID-19	15
XI. Pregnancy and COVID-19 disease	15
Awake proning position	16
XII. Discharge criteria	17
XIII. References	18
XIV. Annex I	20
Standard Operating Procedure for use of Remdesivir as investigational agent in Patients with Confirmed COVID-19	
XV. Annex II	23
ICU management guideline of acute hypoxemic respiratory failure and ARDS when COVID-19 infection is suspected (Version 4)	

**Department Medical Services**  
**Clinical Management Guidelines for Corona Virus Disease (COVID-19)**  
**Version (9/2020) (updated as of 13<sup>th</sup> July 2021)**

**I. Standard definitions for COVID-19**

**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<sup>1</sup>, headache, myalgia, sore throat, coryza, dyspnoea, anorexia/nausea/vomiting, diarrhoea<sup>1</sup>, 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 the 14 days before symptom onset; *OR*
- Residing or travel to an area with community transmission anytime within the 14 days before symptom onset; *OR*
- Working in any health care setting, including within 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  $\geq 38\text{ C}^\circ$ ; and cough; with onset within the last 10 days; and requires hospitalization)

C. Asymptomatic person not meeting epidemiologic criteria with a **positive SARS-CoV-2 Antigen-RDT<sup>2</sup>**

**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:

### **Probable COVID-19 Case**

- A. A patient who meets clinical criteria above **AND** is a contact of **a probable or confirmed case**, or linked to a **COVID-19 cluster**<sup>3</sup>
- B. **A suspect case with chest imaging** showing findings suggestive of COVID-19 disease<sup>4</sup>
- 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 linked to a **COVID-19 cluster**<sup>3</sup>

### **Confirmed COVID-19 Case**

- A. A person with a positive **Nucleic Acid Amplification Test (NAAT)**
- B. A person with a **positive SARS-CoV-2 Antigen-RDT AND** meeting either the **probable case definition or suspect criteria A OR B**
- C. An **asymptomatic person with a positive SARS-CoV-2 Antigen-RDT** who is a **contact of a probable or confirmed case**

<sup>1</sup> Signs separated with slash (/) are to be counted as one sign.

<sup>2</sup> NAAT is required for confirmation, see Diagnostic testing for SARS-CoV-2

<sup>3</sup> A group of symptomatic individuals linked by time, geographic location and common exposures, containing at least one NAAT-confirmed case or at least two epidemiologically linked, symptomatic (meeting clinical criteria of Suspect case definition A or B) persons with positive AgRDTs (based on  $\geq 97\%$  specificity of test and desired  $>99.9\%$  probability of at least one positive result being a true positive)

<sup>4</sup> 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.

\*see [https://www.who.int/publications/i/item/WHO-2019-nCoV-Surveillance\\_Case\\_Definition-2020.2](https://www.who.int/publications/i/item/WHO-2019-nCoV-Surveillance_Case_Definition-2020.2) for latest case definitions

## Definition of contact

A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:

- Face-to-face contact with a probable or confirmed case within 1 meter and for more than 15 minutes;
- Direct physical contact with a probable or confirmed case;
- Direct care for a patient with probable or confirmed COVID-19 disease without using proper personal protective equipment;
- Other situations as indicated by local risk assessments, as outlined in table 1 in [Contact tracing in the context of COVID-19](#).

(Note: For confirmed asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation)

## Monitoring of contacts of probable and confirmed cases:

- Contacts should be monitored for maximum 14 days from the last unprotected contact.
- All contacts should be kept in facility quarantine ~~arranged by government~~.
- Any contact of confirmed cases should be tested.
- Any newly identified probable or confirmed cases should have their own contacts identified and monitored

## II. History taking

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

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

Address: -----

Detail of Travel History-----

Contact History-----

## Complaints

Fever .....Cough ..... Fatigue..... Anorexia .....Shortness of breath .....Myalgia  
 ..... Sore throat.....Nasal congestion.....Headache.....Diarrhoea.....Nausea &  
 Vomiting ..... Loss of smell.....Loss of taste..... Altered mental status  
 .....Other.....

### III. Physical Examination

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

HR: ..... SpO<sub>2</sub>: ..... RR: ..... Lungs: .....

Features of Septic shock, Acute kidney injury

### IV. Risk factor for severe disease

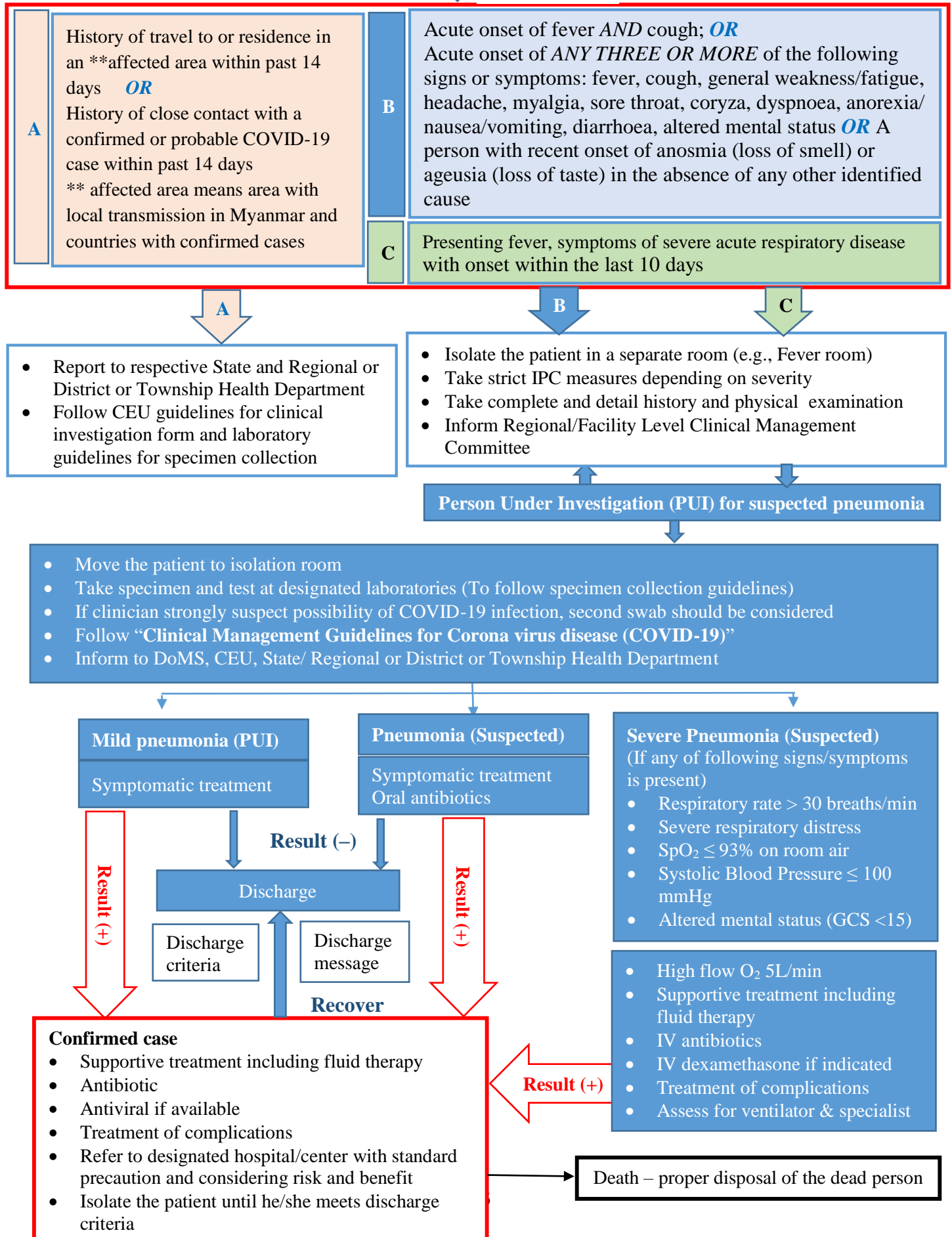
- Age more than 60 years (increasing with age).
- Underlying noncommunicable diseases (NCDs): diabetes, hypertension, cardiac disease, chronic lung disease, cerebrovascular disease, dementia, mental disorders, chronic kidney disease, immunosuppression, obesity and cancer have been associated with higher mortality.
- In pregnancy, increasing maternal age, high BMI, non-white ethnicity, chronic conditions and pregnancy specific conditions such as gestational diabetes and pre-eclampsia .
- Smoking.



## Management Protocol for Covid-19 Acute Respiratory Disease (Version 10) (updated as of 13<sup>th</sup> July 2021)

### Attendance of patients in hospital, OPD and community clinics

At triage area



## **V. COVID-19 disease severity**

### ***Mild disease***

- Symptomatic patients meeting the case definition for COVID-19 without evidence of viral pneumonia or hypoxia

### ***Moderate disease/Pneumonia***

- Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnoea, fast breathing)

### ***Severe disease/Severe pneumonia***

- Adolescent or adult with clinical signs of pneumonia (fever, cough, dyspnea, fast breathing) plus one of the following: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO<sub>2</sub> <93% on room air.

### **Critical disease**

Defined by the criteria for acute respiratory distress syndrome (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.

#### ***1. Acute Respiratory Distress Syndrome (ARDS)***

- Onset: within 1 week of a known clinical insult (i.e. pneumonia) or new or worsening respiratory symptoms.
- Chest Imaging: (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by volume overload, lobar or lung collapse, or nodules.
- Origin of pulmonary infiltrates: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of infiltrates/ oedema if no risk factor present.

*Patients with hypoxaemic respiratory failure and haemodynamic instability, multiorgan failure or abnormal mental status should not receive HFNO or NIV in place of other options such as invasive ventilation.*

**Patients receiving a trial of HFNO or NIV should be in a monitored setting and cared for 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.

**Oxygenation impairment in adults:**

- Mild ARDS:  $200 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$  (with PEEP or CPAP  $\geq 5 \text{ cmH}_2\text{O}$ ).
- Moderate ARDS:  $100 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg}$  (with PEEP  $\geq 5 \text{ cmH}_2\text{O}$ ).
- Severe ARDS:  $\text{PaO}_2/\text{FiO}_2 \leq 100 \text{ mmHg}$  (with PEEP  $\geq 5 \text{ cmH}_2\text{O}$ ).

**2. Sepsis**

- Acute 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.

**3. Septic shock**

- persistent hypotension despite volume resuscitation,
- septic shock in adults when infection is suspected or confirmed  
AND
- vasopressors are needed to maintain mean arterial pressure (MAP)  $\geq 65 \text{ mmHg}$   
AND
- lactate is  $\geq 2 \text{ mmol/L}$ , in the absence of hypovolaemia .  
or
- **two or more of the following:** altered mental status; bradycardia or tachycardia (HR  $< 90 \text{ bpm}$  or  $> 160 \text{ bpm}$  in infants and HR  $< 70 \text{ bpm}$ , prolonged capillary refill ( $> 2 \text{ sec}$ ) or feeble pulses; tachypnoea; mottled or cold skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia

**4. Other complication**

- Acute pulmonary embolism,
- Acute coronary syndrome,
- Acute Stroke and delirium

## VI. Investigations

- Collection of blood cultures (if possible)– for bacteria that cause pneumonia and sepsis, ideally before antimicrobial therapy. Do not delay antimicrobial therapy to collect blood cultures.
- Collection of specimens – from the upper respiratory tract (nasopharyngeal **and/or** oropharyngeal) **AND**, where clinical suspicion remains and URT specimens are negative, collect specimens from the lower respiratory tract when readily available (expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage in ventilated patient) for COVID-19 virus testing by RDT/Gene Xpert/RT-PCR and bacterial stains/cultures.
- Testing for other respiratory viruses like influenza and bacteria if feasible and clinically indicated.
- Detection of malaria parasites – by RDT or blood film for patients with fever in malarial endemic areas should be considered.
- Detection of dengue/chikungunya - may also be considered in the differential diagnosis of undifferentiated febrile illness, particularly when thrombocytopenia is present.
- CP, CRP/ESR, RBS, U&E, Creatinine, ECG, CXR (PA), Blood grouping
- If possible D-Dimer, LDH, ABG
- SARS-CoV-2 antibody tests – not recommended for diagnosis of current infection with COVID-19

### *Recommendations for laboratory testing*

- Any suspected case should be tested for COVID-19 infection using available molecular tests or rapid antigen test.
- 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.
- If clinicians strongly suspect possibility of covid-19 infection, 2<sup>nd</sup> swab should be considered in PUI cases (if 1<sup>st</sup> swab test is negative).

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

### **At triage**

- Screening should be done at first point of contact at the emergency department or outpatient department.
- Give suspect patient a medical mask and direct patient to separate area, an isolation room if available.
- Keep at least 1 meter 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 indirect and 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)
- Place patients in single rooms, or group together those with the same etiological diagnosis.
- 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.

## **VIII. Treatment**

### **Treatment of mild COVID-19**

- Isolate the patients in hospitals to contain virus transmission
- Symptomatic treatment such as antipyretics (paracetamol) for fever and pain
- Adequate nutrition
- Appropriate nutrition
- Counsel about signs and symptoms of complications that should prompt urgent care
- Antibiotic therapy/prophylaxis is not recommended

#### **➤ Signs and symptoms of complications that should prompt urgent care.**

light headedness, difficulty breathing, chest pain, dehydration, etc

### **Treatment of moderate COVID-19: Pneumonia treatment**

- Isolate the patients in hospitals to contain virus transmission
- Antibiotics if there is clinical suspicion of bacterial infection
- Monitor the patients for signs and symptoms of disease progression

### **Treatment of severe COVID-19: Severe Pneumonia treatment**

- Immediate administration of supplemental oxygen therapy to target  $SpO_2 \geq 94\%$  and to any patient without emergency signs and hypoxaemia (i.e. stable hypoxaemic patient) to target  $SpO_2 > 90\%$  or  $\geq 92-95\%$  in pregnant women.
- Monitor for signs of clinical deterioration, such as rapidly progressive respiratory failure and shock
- Cautious fluid management in patients with COVID-19
- Use of empiric antimicrobials to treat all likely pathogens, based on clinical judgment, patient host factors and local epidemiology, within 1 hour of initial assessment if possible, ideally

with blood cultures obtained first. Antimicrobial therapy should be assessed daily for de-escalation.

- Adults with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma and/or convulsions) should receive emergency airway management and oxygen therapy

**Guideline contains the following recommendations:**

- Strong recommendations **against the use of** hydroxychloroquine and lopinavir/ritonavir in patients with COVID-19, regardless of disease severity.
- A strong recommendation for systemic corticosteroids in patients with severe and critical COVID-19.
- A conditional recommendation against systemic corticosteroids in patients with non-severe COVID-19.

For patients with ARDS	-	Refer to ICU management
For patients with septic shock	-	250-500 ml crystalloid fluid as rapid bolus in first 15-30 minutes
	-	Do not use hypotonic crystalloids, starches or gelatins for resuscitation
	-	Administer vasopressors (Noradrenalin) when shock persists during or after fluid resuscitation to reach MAP 65 mmHg
	-	Consider dobutamine if sings of poor perfusion and cardiac dysfunction persists despite achieving MAP target with fluids and vasopressors

**Prevention of complications in hospitalized and critically ill patients with COVID-19**

- Monitor patients with COVID-19, **for signs or symptoms suggestive of thromboembolism**, such as stroke, deep venous thrombosis, pulmonary embolism or acute coronary syndrome.
- *In hospitalized patients with COVID-19, without an established indication for higher dose anticoagulation*, suggest administering **standard thromboprophylaxis dosing of anticoagulation** rather than therapeutic or intermediate dosing
- For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices).

- **Suggested dosing of standard thromboprophylaxis is as follows:**
  - Enoxaparin 40 mg by subcutaneous injection every 24h:
  - *Prophylactic dosages (non-weight adjusted) in low body weight (women < 45 kg, men < 57 kg) may lead to a higher risk of bleeding.*
- **Careful clinical observation is advised.**
  - *If BMI > 40 kg/m<sup>2</sup> or weight > 120 kg: enoxaparin 40 mg by subcutaneous injection every 12h*
  - Fondaparinux 2.5 mg by subcutaneous injection every 24h.
  - **duration of standard thromboprophylaxis is until hospital discharge.**
- Turn patient every two hours
- Awake proning position may reduce ICU admission (see attached photo)
- Give early enteral nutrition (within 24–48 hours of admission)
- Administer PPI in patients with risk factors for GI bleeding.
- Actively mobilize the patient early in the course of illness when safe to do so

### **Antivirals, immunomodulators and other adjunctive therapies for COVID-19 Disease**

There is no definite treatment for COVID-19 disease. Should be treated with supportive measures as necessary.

#### *Dexamethasone therapy*

- It is recommended for patients with **severe disease whose SpO<sub>2</sub> <94% on room air.**
- Dose - 6 mg IV/PO daily for 7-10 days.
- It should not be used for **either prevention or treatment of mild to moderate COVID-19 (not on oxygen supplementation).**

### **Investigational treatments**

#### **(1) Remdesivir**

- It can be used in hospitalized patients with severe COVID-19 (SOP attached in Annex 1)

#### **(2) Convalescent plasma therapy**

- Should consider in selected patients according to convalescent plasma protocol in Myanmar

### **Treatment of neurological and mental manifestations associated with COVID-19**

- Implement measures to prevent delirium
- Evaluate using standardized protocol 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.
- Provide basic mental health and psychological support for all patients
- Prompt identification and assessment of anxiety and depressive symptoms
- Management of sleep problem in the context of acute stress

### **Patients presenting with rapidly developing neurological symptoms suggestive of stroke**

- should be evaluated as soon as possible
- standard stroke protocols should be followed including systemic thrombolysis and/or intra-arterial thrombectomy, if indicated.
- Signs and symptoms of stroke can include weakness of limbs or face, sensory loss,
- speech difficulties, impairment of vision, ataxia, confusion, or decreased consciousness.
- Standard IPC measures must be followed during the clinical evaluation, neuroimaging Or procedures for patients with stroke.
- *Strokes can be missed in severely sick or unresponsive ICU patients and a low threshold for further evaluation (including neuroimaging) is recommended for acute neurological worsening.*

### **Treatment of Non communicable disease and COVID-19**

- Continue or modify previous medical therapy according to the patient's clinical condition to prevent drug interactions and adverse events
- Antihypertensive drugs should not routinely be stopped in patients with COVID-19
- Therapy may need to be adjusted based on general considerations for patients with acute illness, with particular reference to maintaining normal blood pressure and renal function.
- Attending physician should adjust therapy to maintaining normal blood pressure and renal function

### **Palliative care and COVID-19**

- Palliative care interventions should be made accessible at each institution that provides care for persons with COVID-19.

### **Care of COVID-19 patients after acute illness**

- Patients who have had suspected or confirmed COVID-19 (of any disease severity) who have persistent, new, or changing symptoms should have access to follow-up care.

## **IX. Rehabilitation for patients with COVID-19**

- Routinely assess for mobility, functional, swallow, cognitive impairments and mental health concerns
- Interventions that relieve respiratory distress, prevent complications and support communication.
- Determine discharge readiness, and rehabilitation and follow-up requirements
- Groups of patients who need above measures:
  - patients that are in or have been discharged from intensive care;
  - older patients that have experienced severe cases;
  - patients that exhibit signs of any of these impairments.

## **X. Caring for older people with COVID-19**

- Identify if there is an advance care plan for patients with COVID-19 (such as desires for intensive care support) and respect their priorities and preferences.
- Tailor the care plan to be in line with patients' expressed wishes and provide the best care irrespective of treatment choice.
- Review medication prescriptions to reduce polypharmacy and prevent medicine interactions and adverse events for those being treated with COVID-19.

## **XI. Pregnancy and COVID-19 disease**

- Symptoms such as dyspnea, fever, gastrointestinal (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.
  - Isolate the patients to contain virus transmission
  - Carefully monitor for maternal and fetal complications
  - Mode of delivery should be individualized
  - COVID-19 positive status alone is not an indication for caesarean section
- **Ethical principles for optimum care during the COVID-19 Pandemic**
- Ethics are central to the clinical care of COVID-19 patients in the same way that ethics pertain to all patients.



## Awake proning guide

### Aims

Awake proning **may reduce** ICU admissions. Intubation in COVID19 has a high mortality. Patient **must** be **awake** and willing to **comply**.

### Duration

Aim to remain prone for **4 hours periods**. Allow **1 hour comfort breaks** between periods of proning for eating, drinking, toilet and general comfort.

### Placement for patient positioning

- 1 soft pillow for the **head**
- 2 substantial pillows for under the **chest**
- 2 substantial pillows for under the **pelvis**
- 1 pillow for under the **shins**

NB: The abdomen should hang free and not be compressed. This is even more important in obese patients.



### Bed position

Steep head up (at least **30 degrees**).



### Head position

**Leave oxygen mask in place** – do not try and wean down immediately. Improvement of oxygenation with proning may take many hours to manifest.

Head turned to left or right – **whatever is comfortable** for the patient.



## **XII. Discharge criteria (Version 6) as of 10-10-2020**

### **I. For symptomatic COVID-19 confirmed patients:**

#### **(a) Patients with mild or moderate Illness who are not severely immunocompromised**

- 10 days after onset of symptoms, plus at least 1 additional day without symptoms (including without fever with no antipyretics and without respiratory symptoms and other COVID-19 symptoms) provided that history of onset of symptoms is reliable
- If the history of onset of symptoms is not reliable, at least 11 days is recommended to stay in hospital.

#### **(b) Patients with severe to critical illness or who are severely immunocompromised**

- 10 days after onset of symptoms, plus at least 4 additional days without symptoms (including without fever with no antipyretics and without respiratory symptoms and other COVID-19 symptoms)
- At least 20 days is recommended to stay in hospital.

### **II. For asymptomatic COVID-19 confirmed patients:**

- 10 days after taking swab with positive test for SARS-CoV-2

### **XIII. References**

- Global Surveillance for human infection with coronavirus disease (COVID-19), WHO Interim guidance, 20 March 2020.
- Clinical management of COVID-19, WHO Interim guidance, 27 May 2020.
- Therapeutics and COVID-19, WHO, 17 Dec 2020.
- Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed, WHO Interim guidance, 29 June 2020.
- Clinical management guidelines for COVID-19 Acute respiratory disease, Version 8 MOHS.
- Discharge criteria for confirmed COVID-19 cases – When is it safe to discharge COVID-19 cases from the hospital or end home isolation?, ECDC Technical Report.
- Coronavirus Disease 2019 (COVID-19) Treatment Guidelines, NIH.
- Coronavirus disease 2019 (COVID-19): Management in hospitalized adults, Uptodate.
- WHO COVID-19 Case definition updated in Public health surveillance for COVID-19, published 7 August 2020
- WHO COVID-19: Case Definitions Updated in Public health surveillance for COVID-19, published 16 December 2020.
- Discharge Criteria for COVID-19 confirmed patients (as of 10-10-2020) (Version-6), MOHS.

### **Summary of revised facts**

- Case definitions have been updated
- Laboratory testing has been updated by adding RDT and Gene Xpert
- Treatment has been updated by update Dexamethasone therapy and adding Remdesivir and Convalescent plasma therapy as investigational treatments
- Palliative care and caring for older people with COVID-19 have been added

### **Update plan**

- Guidelines will be updated upon the new information and situation of the disease

## Annex I

# Standard Operating Procedure for use of Remdesivir as investigational agent in Patients with Confirmed COVID-19

- It is a novel nucleotide analogue that has activity against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in vitro.
- Optimal role of remdesivir remains uncertain, and some guidelines panels (including the WHO) suggest not using it in hospitalized patients because there is no clear evidence that it improves patient-important outcomes for hospitalized patients (eg, mortality, need for mechanical ventilation). Other guidelines panels, including the IDSA and the NIH, suggest using remdesivir in hospitalized patients who require supplemental oxygen

### Eligible persons

Hospitalized patients with confirmed COVID-19 disease who should meet the following criteria:

- Adult patients with age  $\geq 18$  year who has signed the informed consent form *and*
- Those with symptom **onset of within 10 days** *and*
- Presence of **pulmonary infiltrates or pneumonia** as determined by radiographic imaging *or*
- Those who required supplemental oxygen therapy with **oxygen saturation of  $\leq 94\%$  on room air**

**(NOTE: Prioritize for those requiring low flow supplemental oxygen therapy in limited supplies of remdesivir)**

### Contraindications

- Hypersensitivity to remdesivir or any component of the formulation
- Patients with eGFR  $<30$  mL/minute, unless the potential benefit outweighs the potential risk
- Patients with ALT  $\geq 5$  times the upper limit of normal (and should be discontinued if it rises above this level during treatment or if there are other signs of liver injury such as increasing conjugated bilirubin/ALP/INR)

### Adverse reactions

- Endocrine & metabolic: Hyperglycemia
- Hepatic: increased serum ALT/AST
- Renal: Acute renal failure
- Miscellaneous: fever, infusion related reactions (nausea, vomiting, diaphoresis, shivering)

**Drug Interactions**

- Chloroquine: May diminish the therapeutic effect of Remdesivir
- CYP3A4 Inducers (Strong): May decrease the serum concentration of Remdesivir
- Hydroxychloroquine: May diminish the therapeutic effect of Remdesivir

**Dosing:**

*Intravenous injection:* 200 mg on day 1, followed by 100 mg once daily

*Administration:* IV infusion over 30 to 120 minutes. Flush line with at least 30 mL of NS after remdesivir infusion is complete

*Duration:* 5 days

Infusion Bag Volume	Infusion Time	Rate of infusion
250 ml	30 min	8.33ml/min
	60 min	4.17 ml/min
	120 min	2.08 ml/min

**Dosing: Renal Impairment**

- eGFR  $\geq 30$  mL/minute: No dosage adjustment necessary
- eGFR  $< 30$  mL/minute: Use not recommended unless potential benefit outweighs potential risk

**Dosing: Hepatic Impairment**

*Baseline hepatic impairment:*

- There are no dosage adjustments provided; not recommended to be used in patients with baseline ALT  $\geq 5$  times the ULN

*Hepatotoxicity during therapy:*

- ALT  $\geq 5$  times the ULN: Discontinue remdesivir; may resume when ALT is  $< 5$  times the ULN
- ALT elevation AND signs or symptoms of liver inflammation or increasing conjugated bilirubin, alkaline phosphatase, or INR: Discontinue remdesivir

## **Pregnancy Considerations**

- A limited number of pregnant women have received remdesivir through the compassionate use program. Use should not be withheld if otherwise needed.

## **Breast-Feeding Considerations**

- It is not known if remdesivir is present in breast milk.

## **References**

- National Institutes of Health. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. <https://covid19treatmentguidelines.nih.gov/> (Accessed on October 26, 2020).
- Infectious Diseases Society of America Guidelines on the Treatment and Management of Patients with COVID-19 <https://www.idsociety.org/practice-guideline/covid-19-guideline-treatment-and-management/> (Accessed on September 22, 2020).
- World Health Organization. Therapeutics and COVID-19: living guideline. <https://www.who.int/publications/i/item/therapeutics-and-covid-19-living-guideline> (Accessed on December 17, 2020).
- Coronavirus disease 2019 (COVID-19): Management in hospitalized adults, Kim AY and Gandhi RT, 2020.

## Annex II

### ICU MANAGEMENT GUIDELINE OF ACUTE HYPOXEMIC RESPIRATORY FAILURE AND ARDS WHEN COVID-19 INFECTION IS SUSPECTED (*Version 4 as of 14-7-2021*)

#### ICU admission criteria for COVID 19 patients

1. Patient requiring Invasive Mechanical Ventilation.
2. Patient requiring more than 2 hours on Non-Invasive Ventilation (NIV) or High Flow Nasal Cannula (HFNC).
3. Respiratory Distress ☐
  - Need O<sub>2</sub> > 10 LPM to maintain SpO<sub>2</sub> > 92
  - Rapid escalation of oxygen requirement.
  - Significant work of breathing i.e. Tachypnea (RR > 30/ min)
4. Patient with hemodynamic instability despite initial conservative fluid resuscitation.
5. Patient requires vasopressor support. (Noradrenaline > 0.1µ/kg/min)
6. Patient with a decreased level of consciousness (GCS <12/15)
7. Acidosis ( If ABG is available) - ☐ABG with pH < 7.3 or PCO<sub>2</sub> > 50 or above patient's baseline. Lactate > 2mmol/l.
8. Patient with unstable vital signs not yet on vasopressors.
9. Patient with new ECG findings, including ischemia, arrhythmias, heart block .

Closed observation and monitoring, optimization of oxygenation to maintain SpO<sub>2</sub> > 90%

#### Exclusion criteria for ICU admission

1. Patient's wishes
2. Unwitnessed cardiac arrest, recurrent cardiac arrest, cardiac arrest with no ROSC
3. Malignant disease with a life expectancy of less than 12 months
4. Severe irreversible neurological event
5. NYHA class IV heart failure
6. COPD (cor pulmonale who needs home oxygen therapy)
7. Liver cirrhosis (Child-Pugh score >8 or) with refractory ascites or encephalopathy > stage 1
8. Severe circulatory failure, treatment resistant despite increased vasoactive dose (hypotension and/or persistent inadequate organ perfusion).

If one of the exclusion criteria is fulfilled, the patient is not to be admitted to ICU.



**Criteria for endotracheal intubation should be based on individual situation. The followings are red signs;**

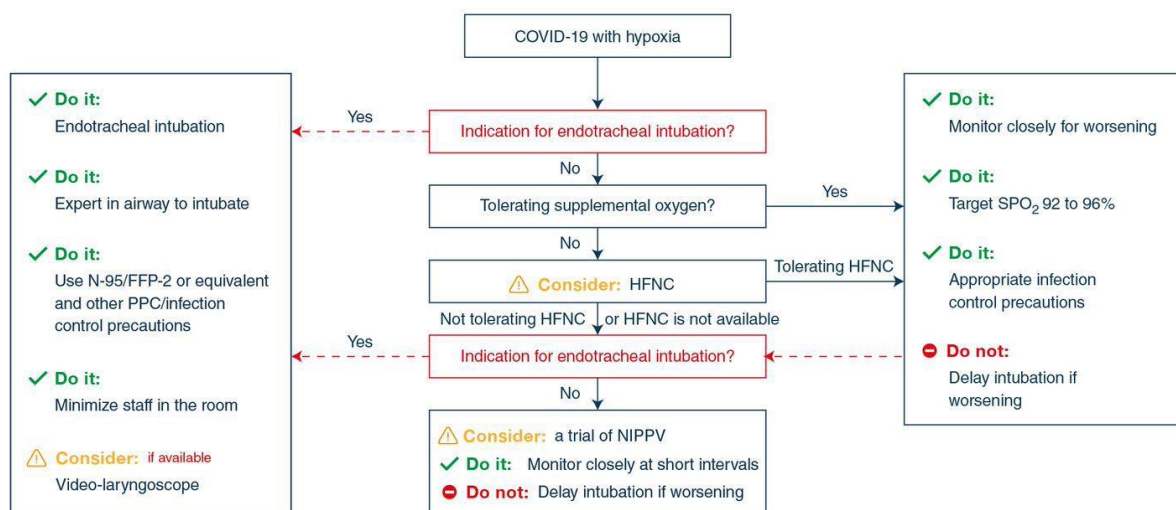
1. Respiratory rate > 35/min, severe respiratory distress with increased work of breathing
2. PaO<sub>2</sub>/ FiO<sub>2</sub> < 200 (If ABG available) or SpO<sub>2</sub>/FiO<sub>2</sub> <150
3. Severe acidosis pH <7.25 (If ABG available)
4. Altered mental status
5. Haemodynamic instability (MAP ≤ 65 mmHg) after fluid resuscitation and vasopressor/inotrope support) (according to updated SSC guideline Hour 1 bundle)

### Ventilatory Support

For acute hypoxemic respiratory failure despite conventional oxygen therapy, use of high-flow nasal cannula (HFNC) is suggested relative to conventional oxygen therapy and non-invasive positive pressure ventilation (NIPPV) (weak recommendation, LQE). If HFNC is not available, a trial of NIPPV is suggested (weak recommendation, very LQE).

Close monitoring and short interval assessment for worsening of respiratory status and early intubation if worsening occurs is recommended.

For patients with persistent hypoxemia despite increasing supplemental oxygen requirements in whom endotracheal intubation is not otherwise indicated, consider a trial of awake prone positioning to improve oxygenation.



**Endotracheal intubation must be followed the COVID-19 Airway management principles, WFSA guideline.**

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% FiO<sub>2</sub> for 5 minutes. Rapid sequence intubation is appropriate after an airway assessment.

## VENTILATOR SETUP AND ADJUSTMENT

1. Calculate predicted body weight (PBW)
  - a. Males =  $50 + 2.3 [\text{height (inches)} - 60]$
  - b. Females =  $45.5 + 2.3 [\text{height (inches)} - 60]$
2. Select any ventilator mode, AC or SIMV mode
3. Initial tidal volume is 6 ml/kg PBW; recommends using low tidal volume (VT) ventilation (VT 4–8 mL/kg of PBW) over higher tidal volumes (VT >8 mL/kg)
4. Set initial rate to approximate baseline minute ventilation (not > 35 bpm).
5. Adjust PEEP (5-15) and FiO<sub>2</sub> to achieve SpO<sub>2</sub> 88-92% (PaO<sub>2</sub>- 55-80 mmHg) lower inspiratory pressures (plateau pressure <30 cmH<sub>2</sub>O).
6. The use of deep sedation may be required to control respiratory drive and to reduce the patient-ventilator dys-synchrony.
7. Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
8. In patients with moderate-severe ARDS (PaO<sub>2</sub>/FiO<sub>2</sub> <150), neuromuscular blockade by continuous infusion should not be routinely used.
9. For mechanically ventilated adults and refractory hypoxemia despite optimized ventilation, recommend prone ventilation for 12 to 16 hours per day over no prone ventilation

## COVID-19 Airway management principles according to WFSA guideline

### High Risk Procedures – Tracheal Intubation and other Aerosol-generating medical procedures

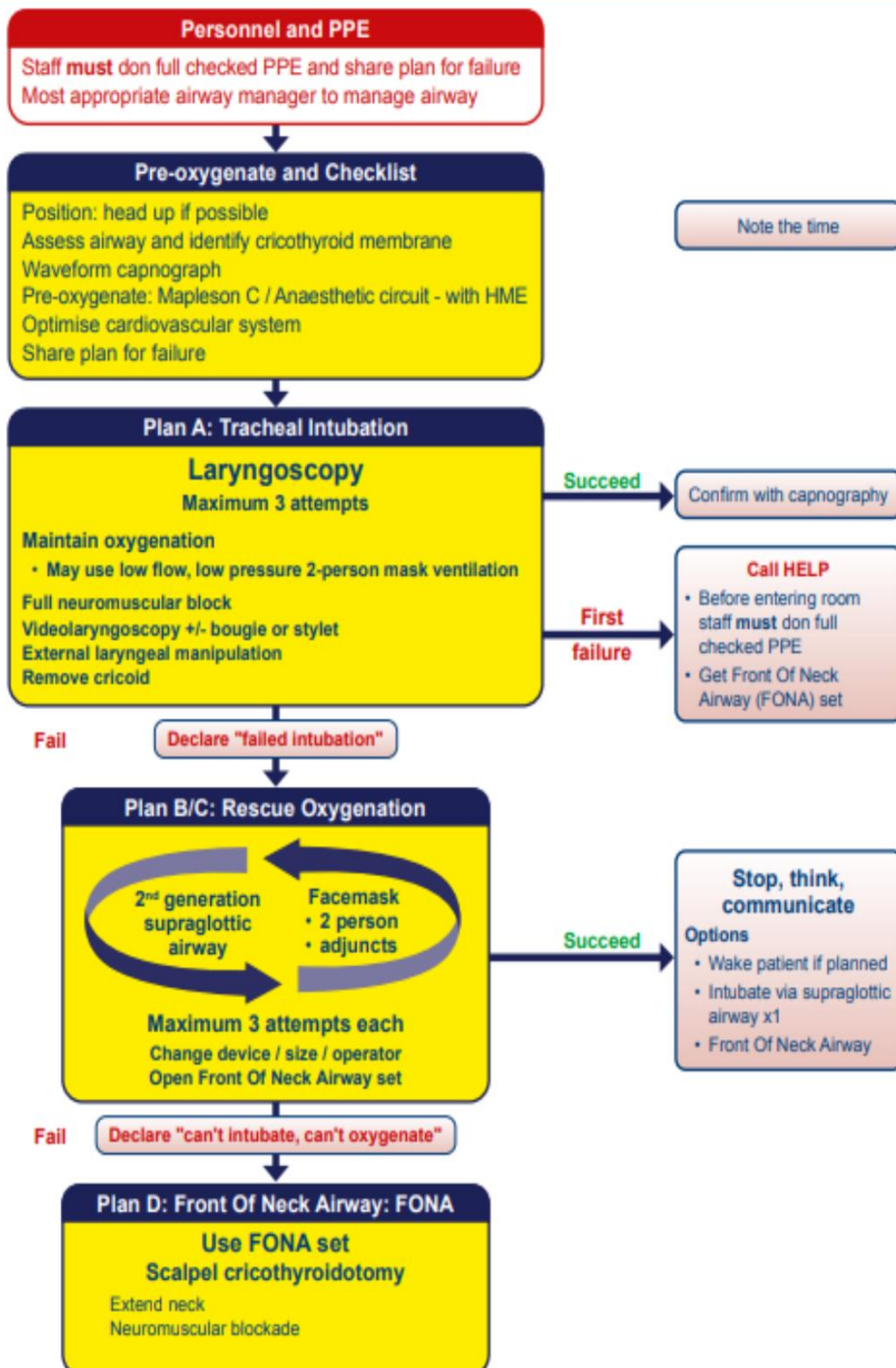
1. Limit staff present at tracheal intubation: one intubator, one assistant and one to administer drugs/monitor patient.
2. Preferably, the most experienced anaesthesiologist should perform the intubation.
3. Create a COVID-19 tracheal intubation trolley that can be used in ICU or elsewhere.
4. PPE is effective and must be worn, using fit-tested respirators (N95 respirators) or powered air-purifying respirators. Wear full PPE at all times. Consider double gloving. Defog goggles and/or eye wear if possible. Touch as little as possible in the room to avoid fomites.
1. Everyone should know the plan before entering the room – use a checklist to achieve this.
2. Plan how to communicate before entering the room.
3. All preparations of airway equipment and drugs that can take place outside the room should do.
4. Before the procedure begins, ensure all equipment is ready: standard monitoring equipment, iv access, drugs. Ensure ventilator and suction equipment is functional.
5. Focus on safety, promptness and reliability. Aim to succeed at the first attempt because multiple attempts increase risk to sick patients and staff. Do not rush but make each attempt the best it can be.

6. Place an HME with viral filter between the catheter mount and the circuit at all times. Keep it dry to avoid blocking.
7. For tracheal suction, closed suction system should be used to prevent aerosol spread.
8. Use RSI with cricoid force where a trained assistant can apply it. Take it off if it causes difficulty. Five minutes of preoxygenation with oxygen 100% and RSI in order to avoid manual ventilation and potential aerosolization of infectious respiratory droplets. If manual ventilation is required, apply small tidal volumes only.
9. Endotracheal intubation perform using video-guided laryngoscopy, over direct laryngoscopy, if available.
10. To avoid cardiovascular collapse, use ketamine 1–2 mg.kg<sup>-1</sup>, suxamethonium 1.5 mg.kg<sup>-1</sup>.
11. Have a vasopressor for bolus or infusion (noradrenalin 0.05-1 µg/kg/min) immediately available for managing hypotension.
12. Communicate clearly: simple instructions, closed loop communication (repeat instructions back), adequate volume without shouting.
13. Place a nasogastric tube after tracheal intubation is completed and ventilation established safely.
14. Discard disposable equipment safely after use. Decontaminate reusable equipment fully and according to manufacturer's instructions.
15. After leaving the room ensure doffing of PPE is meticulous.

Emergency tracheal intubation checklist COVID-19				
Personal Protective Equipment	Prepare Equipment	Prepare for Difficulty	In the Room	Post-procedure and Safety
OUTSIDE ROOM			INSIDE ROOM	AFTER AND LEAVING
<p><b>PPE – be thorough, don't rush</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Wash hands</li> <li><input type="checkbox"/> Put on PPE               <ul style="list-style-type: none"> <li><input type="checkbox"/> Long sleeved gown</li> <li><input type="checkbox"/> FFP3 mask</li> <li><input type="checkbox"/> Gloves</li> <li><input type="checkbox"/> Eyewear</li> <li><input type="checkbox"/> Wipeable shoes</li> <li><input type="checkbox"/> + Headwear</li> </ul> </li> <li><input type="checkbox"/> Check fully by buddy with checklist</li> <li><input type="checkbox"/> Names on visors</li> </ul> <p><b>Allocate roles:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Team leader and intubator</li> <li><input type="checkbox"/> Cricoid force and intubator's assistant</li> <li><input type="checkbox"/> Drugs, monitor, timer</li> <li><input type="checkbox"/> Runner (outside)</li> <li><input type="checkbox"/> JbFONA</li> </ul> <p><input type="checkbox"/> How do we contact further help if required?</p>	<p><b>Check kit</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> BMV or Mapleson C with HME attached</li> <li><input type="checkbox"/> Guedel</li> <li><input type="checkbox"/> Working suction</li> <li><input type="checkbox"/> Videolaryngoscope</li> <li><input type="checkbox"/> Bougie/stylet</li> <li><input type="checkbox"/> Two tracheal tubes, ties and syringe</li> <li><input type="checkbox"/> 2<sup>nd</sup> generation SGA</li> <li><input type="checkbox"/> eFONA set</li> </ul> <p><b>Do you have all the drugs required?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Ketamine</li> <li><input type="checkbox"/> Reloxant</li> <li><input type="checkbox"/> Vasopressor</li> <li><input type="checkbox"/> Maintenance sedation</li> </ul> <p><b>Weight?</b></p> <p><b>Allergies?</b></p>	<p><b>If the airway is difficult, could we wake the patient up?</b></p> <p><b>What is the plan for a difficult intubation?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Plan A: RSI</li> <li><input type="checkbox"/> Plan B/C: 2-handed 2-person BMV &amp; 2<sup>nd</sup> generation SGA</li> </ul> <div style="text-align: center;"> </div> <p><input type="checkbox"/> Plan D: e.g. Front of neck airway; scalpel bougie tube</p> <p><input type="checkbox"/> Confirm agreed plan</p> <p><input type="checkbox"/> Does anyone have any concerns?</p>	<p><b>Airway assessment</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Identify CTM</li> <li><input type="checkbox"/> IMAC/COCHA</li> </ul> <p><b>Apply monitors</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Waveform capnography</li> <li><input type="checkbox"/> SpO<sub>2</sub> probe</li> <li><input type="checkbox"/> ECG</li> <li><input type="checkbox"/> Blood pressure</li> </ul> <p><b>Checked IV access (x2)</b></p> <p><b>Optimise position</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Consider ramping or reverse Trendelenburg</li> </ul> <p><b>Optimal preoxygenation</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 3 mins</li> <li><input type="checkbox"/> FiO<sub>2</sub> &gt; 85%</li> <li><input type="checkbox"/> Low flow nasal O<sub>2</sub></li> </ul> <p><b>Optimise patient condition be optimised any further before intubation?</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Fluid/pressor/ inotrope</li> <li><input type="checkbox"/> Aspirate NGT</li> <li><input type="checkbox"/> Delayed sequence induction?</li> </ul>	<p><b>Airway management</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Establish ventilation after cuff inflation</li> <li><input type="checkbox"/> Check waveform capnography</li> <li><input type="checkbox"/> Clamp tracheal tube before each disconnection</li> <li><input type="checkbox"/> Avoid unnecessary disconnections</li> </ul> <p><b>Other</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Insert NGT</li> <li><input type="checkbox"/> Consider deep tracheal viral sample</li> </ul> <p><b>Careful equipment disposal</b></p> <p><b>Decontamination of reusable</b></p> <p><b>Remove PPE</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Observed by buddy</li> <li><input type="checkbox"/> Use checklist</li> <li><input type="checkbox"/> Meticulous disposal</li> <li><input type="checkbox"/> Wash hands</li> </ul>

# Tracheal intubation of critically ill adults

## Adapted for COVID-19



## References;

- (1) Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected (Interim guidance 28 January 2020) WHO/nCoV/Clinical/2020.2
- (2) Papazian L, Aubron C, Brochard L, et al. (2019) Formal guidelines: management of acute respiratory distress syndrome, *Annals of Intensive Care* , 9:69.
- (3) Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected (Interim guidance January 2020)WHO/2019-nCoV/IPC/v2020.1
- (4) COVID-19 Airway management principles (ICMANAESTHEAIACOV-19.ORG)
- (5) World Federation of Societies of Anaesthesiologists- Coronavirus- guidance for anaesthesia and perioperative care providers
- (6) COVID-19 Treatment Guidelines Panel. Coronavirus Disease 2019 (COVID-19) Treatment Guidelines. National Institutes of Health. Available at <https://www.covid19treatmentguidelines.nih.gov/>.