Clinical Management Guidelines for
COVID-19 Acute Respiratory Disease

Version  -  DoMS/COVID-19/clinical/Version 06-2020
Date     -  14th April 2020
Surveillance case definitions for COVID-19

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

AND

a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset.

OR

2) A patient with any acute respiratory illness

AND

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

OR

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

AND

in the absence of an alternative diagnosis that fully explains the clinical presentation

*Note: “Reporting community transmission of COVID-19 disease” should be checked in WHO updated situation report

Probable case
A. A suspect case for whom testing for the COVID-19 virus is inconclusive.
   a. Inconclusive being the result of the test reported by the laboratory.

OR

B. A suspect case for whom testing could not be performed for any reason.
Confirmed case
A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

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

Criteria for severe acute respiratory infection requiring hospital admission
Anyone of the following parameters:
- Respiratory rate > 30 breaths/min
- Severe respiratory distress
- SpO2 ≤ 93% on room air
- Systolic blood pressure ≤ 100 mmHg
- Altered mental status (GCS < 15)

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;
  (For 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 21 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
I. History taking

Name: -------------------       Age:   -------------------
Sex:   -------------------       R/N:   -------------------
Address: -----------------------------------------------------------------------
Detail of Travel History----------------------------------------------------------
Contact History-----------------------------------------------------------------

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

II. Physical Examination

Vital signs: GCS: ........ Temperature........ Cyanosis........ BP: ........
HR: .......... SpO2: ............ RR: ............ Lungs: ............
Features of Septic shock, Acute kidney injury
### Management Protocol for Covid-19 Acute Respiratory Disease (Version 06)

#### Updated as of 14 April 2020

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

- At triage area

### Person Under Investigation (PUI) for suspected pneumonia

**History of travel to or residence in a location reporting community transmission within past 14 days**
- Facility quarantine (Close contact) for 21 days
- Report to State and Regional Health Department
- Follow CEU guidelines for taking sample

**History of close contact with a confirmed or probable COVID-19 case within past 14 days**
- Isolate the patient in a separate room (e.g., Fever room)
- Take strict IPC measures depending on severity
- Take complete and detail history and physical examination
- Inform immediately to DoMS [09 449621202], CEU [067 3420268], State and Regional Health Department
- Inform Regional/Facility Level Clinical Management Committee

**Presenting fever, symptoms of acute respiratory disease (e.g., cough, shortness of breath)**
- Move the patient to isolation room
- Take specimen and send to NHL (To follow specimen collection guidelines)
- If clinician strongly suspect possibility of COVID-19 infection, second swab should be considered
- Follow “Clinical Management Guidelines for Coronavirus disease (COVID-19)”

**Presenting fever, symptoms of severe acute respiratory disease with no other clear aetiology**
- Supportive treatment including fluid therapy
- Antibiotic
- Antiviral/HCQ should be considered
- Treatment of complications
- Refer to designated hospital with standard precaution and considering risk and benefit
- Isolate patients for 21 days (after last exposure)

**Confirmed case**
- High flow O₂ 5L/min
- Supportive treatment including fluid therapy
- IV antibiotics
- Treatment of complications
- Assess for ventilator & specialist care

**Death**
- Proper disposal of the dead person

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**Mild pneumonia (PUI)**
- Symptomatic treatment

**Result (−)**
- Discharge
- Discharge criteria
- Discharge message

**Result (+)**
- Recover

**Pneumonia (Suspected)**
- Symptomatic treatment
- Oral antibiotics

**Result (−)**
- Discharge

**Result (+)**
- Severe Pneumonia (Suspected)
  - Respiratory rate > 30 breaths/min
  - Severe respiratory distress
  - SpO₂ ≤ 93% on room air
  - Systolic Blood Pressure ≤ 100 mmHg
  - Altered mental status (GCS <15)

**Confirmed case**
- Supportive treatment including fluid therapy
- Antibiotic
- Antiviral/HCQ should be considered
- Treatment of complications
- Refer to designated hospital with standard precaution and considering risk and benefit
- Isolate patients for 21 days (after last exposure)
III. Categorization of Patients

**Mild illness**
Patients uncomplicated upper respiratory tract viral infection may have non-specific symptoms such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, dyspnea, nasal congestion, or headache. Rarely, patients may also present with diarrhoea, nausea, and vomiting. The elderly and immunosuppressed may present with atypical symptoms.

**Pneumonia**
Adult with pneumonia but no signs of severe pneumonia and no need for supplemental oxygen.

**Severe pneumonia**
Fever or suspected respiratory infection, plus one of the following: respiratory rate > 30 breaths/min; severe respiratory distress; or SpO2 ≤ 93% on room air.

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

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

**Septic shock**
- Patients with persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥65 mmHg and serum lactate level >2 mmol/L.
**The SOFA score** ranges from 0 to 24 and includes points related to 6 organ systems: respiratory (hypoxemia defined by low PaO₂/FiO₂), coagulation (low platelets), liver (high bilirubin), cardiovascular (hypotension), central nervous system (low level of consciousness defined by Glasgow Coma Scale), renal (low urine output or high creatinine).

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

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

<table>
<thead>
<tr>
<th>System or organ and measure</th>
<th>SOFA score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>Respiratory:</strong></td>
<td></td>
</tr>
<tr>
<td>PaO₂/FiO₂, mmHg</td>
<td>≥400</td>
</tr>
<tr>
<td><strong>Coagulation:</strong></td>
<td></td>
</tr>
<tr>
<td>Platelets, ×10^3/µL</td>
<td>≥150</td>
</tr>
<tr>
<td><strong>Liver:</strong></td>
<td></td>
</tr>
<tr>
<td>Bilirubin, µmol/L (mg/dl)</td>
<td>&lt;20 (1.2)</td>
</tr>
<tr>
<td><strong>Circulatory:</strong></td>
<td></td>
</tr>
<tr>
<td>Mean arterial pressure, mmHg</td>
<td>≥70</td>
</tr>
<tr>
<td><strong>Central nervous system:</strong></td>
<td></td>
</tr>
<tr>
<td>Glasgow Coma Scale score</td>
<td>15</td>
</tr>
<tr>
<td><strong>Renal:</strong></td>
<td></td>
</tr>
<tr>
<td>Creatinine, µmol/L (mg/dl)</td>
<td>&lt;110 (1.2)</td>
</tr>
<tr>
<td>Urine output, mL/day</td>
<td>–</td>
</tr>
</tbody>
</table>

*Our recommendation applies to patients with an infection and a SOFA score of ≥2. PaO₂ = partial pressure of oxygen (arterial), FiO₂ = fraction of inspired oxygen.*
IV. 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 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 RT-PCR and bacterial stains/cultures.

- In hospitalized patients with confirmed COVID-19, repeated URT and LRT samples can be collected to demonstrate viral clearance. The frequency of specimen collection will depend on local epidemic characteristics and resources.

- 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, ESR, RBS, U&E, Creatinine, LFT with Enzymes,

- If possible CRP, D-Dimer, LDH, ABG,

- ECG, CXR (PA)

Recommendations for laboratory testing

- Any suspected case should be tested for COVID-19 infection using available molecular tests.

- 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, 2nd swab should be considered in PUI cases (if 1st swab test is negative).
V. Treatment

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

Apply contact precaution

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

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

B. Management of mild COVID-19

- Patients with mild disease should be admitted to hospital.
- Isolation can be done in hospital.
- Symptomatic treatment such as antipyretics (paracetamol) for fever.

C. Management of severe COVID-19

Supplemental oxygen therapy

- For patients with SARI and respiratory distress, hypoxaemia, or shock.
- Target SpO$_2$ ≥ 90% in non-pregnant adults and SpO$_2$ ≥ 92-95% in pregnant patients.

Fluid management

- Use conservative fluid management in patients with SARI when there is no evidence of shock.
* Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation

Empirical antimicrobial treatment

- Give antimicrobials within one hour of identification of sepsis.
- Neuraminidase inhibitor when there is local circulation or other risk factors, including travel history or exposure to animal influenza viruses.
- Mild pneumonia PO Augmentin 625 mg tds + PO Azithromycin 500mg od x 5 days
- Severe pneumonia (community acquired)
  - IV Augmentin 1.2 g 8h (ATD) for 7 days + IV Azithromycin 500 mg OD for 7 days
Followed by extend or change other antibiotics according to clinical and lab results.

**OR**

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

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

(Attending physician should modify empirical antibiotic on the basis of microbiology result and clinical judgement)

Closely monitor patients with SARI for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately.
Understand the patient’s co-morbid condition(s) to tailor the management of critical illness and appreciate the prognosis. Communicate early with patient and family.

**D. Treatment of complications**

<table>
<thead>
<tr>
<th>Respiratory Failure &amp; ARDS</th>
<th>Mechanical ventilation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic shock</td>
<td>Fluid resuscitation with 250–500 mL crystalloid fluid as rapid bolus in first 15–30 minutes and reassess for signs of fluid overload after each bolus. Administer Noradrenalin if shock persists during or after fluid resuscitation, consider dobutamine if not responded to fluid and noradrenalin, etc.</td>
</tr>
</tbody>
</table>

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

Fluid resuscitation may lead to volume overload, including respiratory failure. If there is no response to fluid loading and signs of volume overload appear (for example, jugular venous distension, crackles on lung auscultation, pulmonary oedema on imaging, or hepatomegaly in children) Administer vasopressors when shock persists during or after fluid resuscitation. Norepinephrine is considered first-line in adult patients
Noradrenaline Infusion

<table>
<thead>
<tr>
<th>Rate</th>
<th>40kg</th>
<th>45kg</th>
<th>50kg</th>
<th>55kg</th>
<th>60kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05ug/kg/min</td>
<td>0.6</td>
<td>0.7</td>
<td>0.8</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>0.1 ug/kg/min</td>
<td>1.2</td>
<td>1.4</td>
<td>1.5</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>0.15 ug/kg/min</td>
<td>1.8</td>
<td>2</td>
<td>2.3</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>0.2 ug/kg/min</td>
<td>2.4</td>
<td>2.7</td>
<td>3</td>
<td>3.3</td>
<td>3.6</td>
</tr>
<tr>
<td>0.25 ug/kg/min</td>
<td>3</td>
<td>3.4</td>
<td>3.8</td>
<td>4.1</td>
<td>4.5</td>
</tr>
</tbody>
</table>

E. Prevention of complications

- For prophylaxis of venous-thromboembolism, consider LMWH (low molecular-weight heparin) OD or unfractionated heparin 5000 units subcutaneously twice daily in adolescents and adults without contraindications. For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices).
- Turn patient every two hours
- Awake proning position may reduce ICU admission (see attached photo)
- Give early enteral nutrition (within 24–48 hours of admission)
- Administer H₂ blockers or PPI in patients with risk factors for GI bleeding.
- Actively mobilize the patient early in the course of illness when safe to do so

F. Therapeutic Option for COVID-19 Disease

*This option is needed to consult with central level clinical management committee before starting it.*

- For patients with confirmed COVID-19 Disease (mild, moderate and severe disease), start hydroxychloroquine (HCQ) if there are no contraindications.
  - 400 mg BD for 1 day followed by
  - 200 mg BD for 4 days

*Contra-indications to HCQ*

- QTc > 500 msec
- drug interaction
• Myasthenia gravis
• Porphyria
• Retinal pathology
• Epilepsy
➢ For patients with confirmed COVID-19 Critical disease (≥ 1 of the following: □ Acute Respiratory Distress Syndrome □ Sepsis □ Altered consciousness □ Multi-organ failure), start hydroxychloroquine, crushed in nasogastric tube at the same dosage and monitor as above.

Important side effects of HCQ
➢ Prolonged QT interval
➢ Haemolysis with G6PD deficiency
➢ Retinopathy with retinal pigmentation changes

Alternative therapy

If HCQ is not available, consider
• Chloroquine base 600mg (4 tabs) stat,
• 300mg (2 tabs) after 12h, followed by
• 300mg (2 tabs) BD for 4 days

Note:
**Pregnancy is not a contraindication as such. Perform basic biochemistry daily and ECG daily if initial QTc > 450 msec. Avoid quinolones if possible, or monitor closely the QT if these antibiotics are needed.
**Attending physician decision should be taken into account for use of HCQ.
**Caution is required in cardiac, liver and renal failure when using HCQ.
**Counseling should be done before administering Hydroxychloroquine or Chloroquine to patients and consent should be taken.
**Patients should be monitored for side effects and to give appropriate prompt action if present.

G. Adjunctive therapies for COVID-19: corticosteroids
• IV Methylprednisolone 40mg 12 hrly for 5 days (1-2mg/kg/day), if indicated e.g. severe pneumonia.

**H. Treatment of pregnant patients**

• Considering asymptomatic transmission of COVID-19 may be possible in pregnant or recently pregnant women, all women with epidemiologic history of contact should be carefully monitored.

• Pregnant women with suspected, probable, or confirmed COVID-19 should have access to woman-centred, respectful skilled care, including obstetric, fetal medicine and neonatal care, as well as mental health and psychosocial support, with readiness to care for maternal and neonatal complications.

• Pregnant and recently pregnant women who have recovered from COVID-19 should be enabled and encouraged to attend routine antenatal, postpartum, or postabortion care as appropriate. counselling on safe infant feeding and appropriate IPC measures to prevent COVID-19 virus transmission should also be done.

• Emergency delivery and pregnancy termination decisions are challenging and based on many factors: gestational age, maternal condition, and fetal stability.

• Consultations with obstetric, neonatal, and intensive care specialists (depending on the condition of the mother) are essential.

**I. Monitoring**

• Signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis and respond immediately with supportive care interventions.

**J. Management of critical COVID-19: acute respiratory distress syndrome (ARDS)**

**ICU Management Guideline**

**Criteria for ICU Admission (If any of one)**

1. Respiratory rate ≥ 30/min
2. SpO2 <90% with standard Oxygen Therapy (face mask with reservoir bag 10-15 L/min)
3. SpO2/FiO2 < 315
4. PaO2/FiO2 < 200 (If ABG available) (Moderate ARDS)
5. Severe pneumonia with sepsis/ septic shock
Closed observation and monitoring, optimization of oxygenation to maintain SpO2 > 90%

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. PaO2/ FiO2 < 200 (If ABG available) or SpO2/FiO2 <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)

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% FiO2 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 [height (inches) - 60]
   b. Females = 45.5 + 2.3 [height (inches) -60]
2. Select any ventilator mode, AC or SIMV mode
3. Initial tidal volume is 6 ml/kg PBW; tidal volume up to 8 ml/kg PBW
4. Set initial rate to approximate baseline minute ventilation (not > 35 bpm).
5. Adjust PEEP (5-15) and FiO2 to achieve SpO2 88-92% (PaO2- 55-80 mmHg) lower inspiratory pressures (plateau pressure <30 cmH2O).
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 (PaO2/FiO2 <150), neuromuscular blockade by continuous infusion should not be routinely used.
Discharge Criteria

For PUI case came out COVID-19 negative result from Swab

1) Move from isolation ward to cohort room (so call room to meet others plan for DC)
2) Need to explore DC parade and counseling in 2 days stay in cohort room.
3) Afebrile and resolving respiratory symptoms for at least 48 hours, and, stable on co-morbid conditions for at least 48 hours (if co-morbid condition is not stable, refer to appropriate specialist for consultation)
4) Follow-up on 2 weeks after discharge (if anything happens, return to hospital anytime)

Discharge Criteria for confirmed COVID-19 patients

Confirmed COVID-19 Cases

1. Afebrile for at least 48 hours
2. Resolving respiratory symptoms
3. Improving radiological signs
4. Improved well-being
5. Having had at least 2 consecutive, 48-hours apart, tests negative results of nasopharyngeal or oropharyngeal swab
6. Testing of nasopharyngeal or oropharyngeal swabs:
   a. Conduct the test on day 11: if negative the next test will be conducted on day 13 and if negative, discharge on day 14. After discharge, transfer the patient to ensure stay of 7 more days in facility isolation, and then 7 more days in home isolation.
   b. If positive on day 11: conduct another test after 6 days, and repeat after 6 more days until the test becomes negative, e.g. day 11, day 17, day 23, day 29, etc. When test becomes negative one more test will be conducted 48 hours later. If negative again, discharge on the next day. Manage as appropriate to have a total of 28 days in isolation.

NB: In any case, confirmed COVID-19 patients should be kept in a hospital isolation for at least 14 days.
COVID-19 Airway management principles according to WFSA guideline

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

- Limit staff present at tracheal intubation: one intubator, one assistant and one to administer drugs/monitor patient.
- Preferably, the most experienced anaesthesiologist should perform the intubation.
- Create a COVID-19 tracheal intubation trolley that can be used in ICU or elsewhere.
- PPE is effective and must be worn. 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.
- Everyone should know the plan before entering the room – use a checklist to achieve this.
- Plan how to communicate before entering the room.
- All preparations of airway equipment and drugs that can take place outside the room should do.
- Before the procedure begins, ensure all equipment is ready: standard monitoring equipment, iv access, drugs. Ensure ventilator and suction equipment is functional.
- 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.
- Place an HME with viral filter between the catheter mount and the circuit at all times. Keep it dry to avoid blocking.
- Avoid aerosol-generating procedure, including high-flow nasal oxygen, non-invasive ventilation, bronchoscopy and tracheal suction unless an in-line suction system is in place.
- 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.
- To avoid cardiovascular collapse, use ketamine 1–2 mg.kg\(^{-1}\), suxamethonium 1.5 mg.kg\(^{-1}\).
- Have a vasopressor for bolus or infusion (noradrenalin 0.05-1 μg/kg/min) immediately available for managing hypotension.
- Communicate clearly: simple instructions, closed loop communication (repeat instructions back), adequate volume without shouting.
- Place a nasogastric tube after tracheal intubation is completed and ventilation established safely.
- Discard disposable equipment safely after use. Decontaminate reusable equipment fully and according to manufacturer’s instructions.
- After leaving the room ensure doffing of PPE is meticulous.
Emergency tracheal intubation checklist
COVID-19

OUTSIDE ROOM

- PPE - be thorough, don't rush
  - Wash hands
  - Put on PPE

- Long sleeved gown
- FFP3 mask
- Gloves
- Eyewear
- Wipeable shoes
- Headwear

- Check fully by buddy with checklist
- Names on visors

- Allocaic relax.:
  - Team leader and intubator
  - Cricoid force and intubator's assistant
  - Drugs, monitor, timer
  - Ringer ( Feelinig)
  - iFONA

- How do we contact further help if required?

INSIDE ROOM

- Check kit:
  - BMV or Mapleson C with HME attached
  - Guidewire
  - Working suction
  - Laryngoscope
  - Bougie/styli
  - Two tracheal tubes, ties and syringe
  - 2 nd generation SGA

- sFONA set

- Do you have all the drugs required?
  - Ketamine
  - Relaxant
  - Vasopressor
  - Maintenance sedation

- Weight?

- Allergies?

- If the airway is difficult, could we wake the patient up?

- What is the plan for a difficult intubation?
  - Plan A: RSI
  - Plan B: 2-handed 2-person BMV & 2 nd generation SGA
  - 2 nd generation SGA

- Plan D, e.g. Front of neck airway: scalpel bougie tube

- Confirm agreed plan

- Does anyone have any concerns?

- Airway assessment
  - Identify: CVM
  - UMACOCHA

- Apply monitors
  - ECG waveform capnography
  - USpO2 probe
  - UECG
  - UBlood pressure

- Check IV access (i2)

- Optimise position
  - Consider ramping or reverse Trendelenburg

- Optimise pre-oxygenation
  - O2 inhalation
  - O2 > 85%
  - Use Flow nasal O2

- Optimise patient condition be optimised any further before intubation?
  - Fluid/pressor/ Isope
  - Aspirate NGT
  - Delayed sequence induction?

AFTER AND LEAVING

- Airway management
  - Establish ventilation after cuff inflation
  - Check waveform capnography
  - Clamp tracheal tube before each disconnection
  - Avoid unnecessary disconnections

- Other
  - UNP test NBT
  - Consider deep tracheal viral sample

- Careful equipment disposal

- Decontamination of reusable

- Remove PPE
  - Observe by buddy
  - Use checklist
  - Miscellaneous disposal
  - Wash hands
Tracheal intubation of critically ill adults
Adapted for COVID-19

**Personnel and PPE**
- Staff must don full checked PPE and share plan for failure
- Most appropriate airway manager to manage airway

**Pre-oxygenate and Checklist**
- Position: head up if possible
- Assess airway and identify cricothyroid membrane
- Waveform capnograph
- Pre-oxygenate: Mapleson C / Anaesthetic circuit - with HME
- Optimise cardiovascular system
- Share plan for failure

**Plan A: Tracheal Intubation**

**Laryngoscopy**
- Maximum 3 attempts
  - Maintain oxygenation
    - May use low flow, low pressure 2-person mask ventilation
  - Full neuromuscular block
  - Video laryngoscopy +/- bougie or stylet
  - External laryngeal manipulation
  - Remove cricoid

**Succeed**
- Confirm with capnography

**First failure**
- Call HELP
  - Before entering room staff must don full checked PPE
  - Get Front Of Neck Airway (FONA) set

**Fail**
- Declare "failed intubation"

**Plan B/C: Rescue Oxygenation**

**2nd generation supraglottic airway**
- Facemask
  - 2 person
  - Adjuncts

- Maximum 3 attempts each
  - Change device / size / operator
  - Open Front Of Neck Airway set

**Succeed**
- Stop, think, communicate
  - Options
    - Wake patient if planned
    - Intubate via supraglottic airway x1
    - Front Of Neck Airway

**Fail**
- Declare "can't intubate, can't oxygenate"

**Plan D: Front Of Neck Airway: FONA**

**Use FONA set**
- Scalpel cricothyroidotomy
  - Extend neck
  - Neuromuscular blockade
**Rational use of PPE**

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Medical Mask</th>
<th>N95 mask</th>
<th>Gown</th>
<th>Gloves</th>
<th>Eyes protection</th>
<th>Boots/closed shoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>(+)</td>
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<td>(-)</td>
<td>(-)</td>
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<tr>
<td>Fever room/Temporary isolation room</td>
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<td>Person under investigation/suspected</td>
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<tr>
<td>Sample collection/Processing/Aerosol-generating procedures</td>
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<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+)</td>
<td>(-)</td>
</tr>
</tbody>
</table>

Note: Rational use of PPE depends on the risk level and infection control measures. Always follow local guidelines and protocols.
<table>
<thead>
<tr>
<th>Activity / Task</th>
<th>Medical Mask</th>
<th>N95 mask</th>
<th>Gown</th>
<th>Gloves</th>
<th>Eyes protection (Goggles or face shield)</th>
<th>Boots/closed shoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact with COVID-19 patients</td>
<td>(+)</td>
<td>(-)</td>
<td>(+)</td>
<td>(+)</td>
<td>(+) (Heavy duty gloves)</td>
<td>(+)</td>
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<tr>
<td>Personal care of COVID-19 patients</td>
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<td>(+)</td>
<td>(+)</td>
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<td>(-)</td>
<td>(-)</td>
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<tr>
<td>Reference: Rational Use of Personal Protective Equipment for Coronavirus Disease 2019 (WHO)</td>
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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.
VII. References:

- Clinical management of severe acute respiratory infection (SARI) when COVID-19 disease is suspected Interim guidance 13 March 2020, WHO.
- Specialist hospital Waibargi SOP for Wuhan Pneumonia
- In Vitro Antiviral Activity and Projection of Optimized Dosing Design of Hydroxychloroquine for the Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), Yao et al., 2020.
- Informations for clinicians on therapeutic options for COVID-19 patients, CDC. March 21, 2020.

• Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected (Interim guidance January 2020)WHO/2019-nCoV/IPC/v2020.1

• COVID-19 Airway management principles (ICMANAESTHEAIACOVID-19.ORG)

• World Federation of Societies of Anaesthesiologists- Coronavirus- guidance for anaesthesia and perioperative care providers


• 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

• Management Protocol for COVID-19 Acute Respiratory Disease in Yangon Children Hospital (Revised on 20-03-2020) *(Version 04)*

• Awake proning guide, MARY SEACOLE, Sandwell and West, Birmingham Hospitals, NHS Trust.