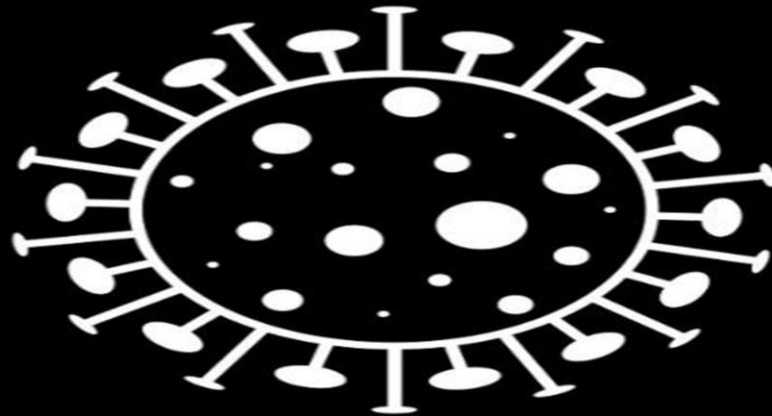




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MINISTRY OF HEALTH - ETHIOPIA

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HEALTHIER CITIZENS FOR PROSPEROUS NATION!



Coronavirus **COVID-19**



National Comprehensive COVID 19 Clinical Management Handbook for Ethiopia

**Second Edition
September 2020**

FOREWORD

Over the past eight months, COVID-19 pandemic has caused huge stress on the health care system of all countries in the world. Hospitals were overcrowded and many lives were lost all over the world. The damage it has caused on the economy is estimated to take years to recover, especially to low and middle income countries of Africa. It is observed that early interventions with optimal political commitment and community mobilization help to flatten the curve averting occurrence of many cases and deaths.

Ethiopia, being one of the developing countries trying to address the diverse needs of its people is currently in state of community transmission. The government is currently showing high commitment to contain the epidemic before it causes significant damage to the community. Case identification, contact tracing, isolation and quarantine are the actions being taken to contain the spread of the disease with case management to mitigate the damage by the pandemic in addition to the preventive measures put in place mainly promoting social distancing, sanitary measures and mandatory use of face mask by the public.

Cognizant of the need for standardization of the response for COVID 19, the Federal Ministry of Health prepared first edition national guideline in an effort to contain the epidemic before it overwhelms the health care facilities. COVID 19 is a novel with disease pathogenesis and treatment options changing periodically. Hence, it has become mandatory to revise the first edition and incorporate updated and new recommendations. The handbook has been categorized in to main volumes, Volume 1 (National Comprehensive COVID 19 Clinical Management Handbook) and Volume 2 (National Comprehensive COVID 19 Clinical Management Handbook).The national clinical advisory team in collaboration with others stakeholders has collected all available new evidences on COVID 19 and revised the National Comprehensive COVID 19 Clinical Management Handbook (Volume 1). This second edition will be a guiding resource for all facilities involved in diagnosis and treatment of COVID 19 in Ethiopia. A standardized approach has proven to be effective and efficient for proper utilization of the limited resource of the country.

There are many encouraging vaccine trials in many part of the world. Ethiopia is trying to be part of theses vaccine development efforts. The next edition hopefully will deal with vaccine related new developments.

The national EOC, national clinical advisory team, and scientific advisory council role during the past six months COVID 19 epidemic period was crucial. The MOH would like to acknowledge the members of the national EOC team, national clinical advisory team, scientific advisory council role and other experts for their commitment and unstinting effort.



Lia Tadesse (MD, MHA)

Minister, Minister of health

Editors note

This second edition of National Comprehensive COVID 19 Clinical management handbook contains updated case definition and the following protocols discharge and recovery, radiology and imaging, nutrition, psychosocial, dialysis, stakeholder analysis and home based care.

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CHAPTER 1 : BACKGROUND

Pneumonia of unusual clinical presentation was first recognized in Wuhan, China in late December. The etiology was later identified to be an RNA virus that belongs to the family of CORONA (Latin Crown, from the structure of the virus under electron microscope) viruses. This new CORONA virus causing acute respiratory disease in humans since the end of December 2019(2019-nCoV), later labeled as SARS-CoV2 by World Health Organization is a different strain of CORONA virus from SARS and MERS CORONA viruses. The virus is single stranded pleomorphic, RNA virus, and is 30 000 nucleotides long. The virus has 80 × 160 nm diameter, with 12–24 nm surface projections (spikes) that gives the corona appearance. The major proteins are S (spike), E (envelope), M (membrane), N (nucleocapsid). The virus do not replicate outside the body or cell but can still remain infectious for some time in the outside environment.

The virus can be easily killed by commonly used disinfectant like 70% alcohol, 1% hypochlorite, etc. The virus loses viability at a higher temperature and remains stable at lower temperature, e.g. easily killed at 56 degrees Celsius for 15 minutes. The disease caused by this virus is known as COVID-19.

The disease has been recognized as global public health emergency by World Health Organization after cases had started to be seen outside china in less than two-month period. Failure to recognize the magnitude of the problem, reluctance to use available information timely and take the necessary actions together with lack of political commitment in nations across the world contributed to the rapid spread of the disease out of China and unacceptably high mortality in countries most affected by the pandemic. Physical contact and respiratory routs are still the two most important well established routs of transmission of the virus. Poor hand hygiene practice, overcrowding, and close physical contacts like hand shaking contributed for the fast spread of the virus with in very short period of time. Experience from China where the disease was first recognized shows educating the public about the nature of the disease and the rout of transmission, restricting mobility of individuals within the border and across borders is proven to be key in preventing transmission. Implementation of strict non pharmacologic preventive methods like universal use of face mask, frequent hand washing and social distancing are still the available effective preventive methods. WHO and other international institutions have recommended universal face mask use by the public.

Depending on the risk of exposure, health care workers and others likely to get exposed use different types of Personal Protective Equipment (PPE).

Ethiopia, being one of the countries with limited resources, is expected to be affected most by the global COVID-19 pandemic. Experience from different part of the world shows that allocating the limited resources for the prevention of transmission of the disease and implementation of a uniform and evidence based preventive and treatment protocol at all levels of health care system throughout the country under central command, is believed to be wise decision for optimal utilization of the resources. Areas affected most will be given priority so that the infection will be contained in that locality. In order to make all preventive and treatment endeavors uniform in Ethiopia, the need for national COVID-19 prevention and treatment guideline is given priority by FMOH and EPHI and the first edition of National Comprehensive COVID 19 Management Handbook was published in early April.

Current evidences indicate that the pathogenesis of COVID 19 is not limited to damage to the respiratory system. Postmortem examinations conducted on bodies of COVID 19 victims revealed that vascular endothelial injury, thrombosis in the pulmonary vessels and neo vascularization are the findings consistently observed in most bodies of patients who died in the ICU while being on respiratory support. A number of treatment options are also revised and recommendations are changed based on the findings of the limited research conducted in different countries. Currently WHO has registered six COVID 19 vaccine trials and the results are encouraging. We hope theses vaccines under trial to change the whole course of COVID 19 in the world. Until effective vaccine is found, it is recommended to update the treatment guideline with the available treatment modalities. Therefore, it has become mandatory to revise and update the first edition handbook in order to accommodate current recommendations recommended by international institutions like WHO and the CDC. Future revision of this edition is expected as new evidences unfold.

CHAPTER 2 : CASE DEFINITION, TRIAGE FOR COVID 19 AND PATIENT FLOW

2.1 Case definitions for COVID 19

2.1.1 Suspect cases for COVID infection

Clinical features

A person with at least the following symptoms:

Fever

OR

At least one of the respiratory symptoms: Cough, respiratory distress, difficulty of breathing

OR

At least of two of the following symptoms: Fatigue, myalgia, headache, sore throat, loss of smell or taste

OR

Severe respiratory distress with radiological evidence of pneumonia or ARDS

N.B: A person needing hospitalization for severe illness and no other alternative diagnosis explaining the illness has be considered as suspect

High index of suspicion is advised for **children and elderly** who might present with atypical symptoms and signs such as fatigue, reduced alertness, reduced mobility, diarrhoea, loss of appetite, delirium, and in the absence of fever.

2.1.2 Epidemiological case definition

One or more of the following exposures in the last 14 days

- Contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset;

Close contact with a person with:

- Clinically compatible illness AND
- Linkage to a confirmed case of COVID-19 disease

Probable case

- Meets clinical criteria and /or epidemiologic evidence with no confirmatory or indeterminate laboratory testing for COVID-19
- Risk factors for severe disease (influenza)

Comorbidities

- Cardiovascular disease (cardiac failure) (COVID-2019)
- Pulmonary disease (asthma and COPD)
- Metabolic disease (diabetes)
- Kidney disease
- Hepatic disease
- Haemoglobinopathies
- Chronic neurologic conditions (neuromuscular, neurocognitive and seizure disorders).

Extremes of age

- Infants and young children (< 2 years)
- Elderly (≥ 65)

Immunosuppressive conditions

- Immunosuppressive medication and malignancy

Special situations

- Children receiving chronic aspirin therapy
- Pregnancy (up to 2 weeks' postpartum).

N.B: High risks groups should be considered for hospitalization even with mild disease, for close monitoring to detect deterioration and treatment

2.2 Pre- health facility service

2.2.1 Transport of Patient with Confirmed/suspected COVID-19

If a patient with an exposure history and signs and symptoms suggestive of COVID-19 requires transport to a healthcare facility for further evaluation and management the following actions should be taken during transport:

- Put on appropriate PPE before any contact with the patient
- Ensure the patient has a surgical mask on
- Exercise appropriate precautions during initial assessment of the patient
- Initial assessment should be done at a distance of at least 2m from the patient
- EMS clinicians should notify the receiving healthcare facility that the patient has an exposure history and signs and symptoms suggestive of COVID-19 so that appropriate infection control precautions may be taken prior to patient arrival.
- Keep the patient separated from other people as much as possible.
- Family members and other contacts of patients with possible COVID-19 should not ride in the transport vehicle, if possible. If riding in the transport vehicle, they should wear a facemask.
- Isolate the ambulance driver from the patient compartment and keep pass-through doors and windows tightly shut.
- When possible, use vehicles that have isolated driver and patient compartments that can provide separate ventilation to each area.
- During transport, vehicle ventilation in both compartments should be on non-recirculated mode to maximize air changes that reduce potentially infectious particles in the vehicle.
- If the vehicle has a rear exhaust fan, use it to draw air away from the cab, toward the patient- care area, and out the back end of the vehicle.
- If a vehicle without an isolated driver compartment and ventilation must be used, open the outside air vents in the driver area and turn on the rear exhaust ventilation fans to the highest setting. This will create a negative pressure gradient in the patient area.
- Follow routine procedures for a transfer of the patient to the receiving healthcare facility (e.g., wheel the patient directly into an examination room).

2.2.2 Documentation of Patient Care

- Documentation of patient care should be done after ECS clinicians have completed transport, removed their PPE, and performed hand hygiene.
- Any written documentation should match the verbal communication given to the emergency department providers at the time patient care was transferred.
- Emergency Care Summary documentation should include a listing of EMS clinicians and public safety providers involved in the response and level of contact with the patient (for example, no contact with patient, provided direct patient care).

2.2.3 Health Care Worker PPE measures during ambulance transportation

- The transport team must be wearing case appropriate PPE like a footed suit, gloves,
 - i. Apply Droplet Precautions**
 - Use a medical mask if working within 1 m of the patient.
 - When providing care in close contact with a patient with respiratory symptoms (e.g. coughing or sneezing), use eye protection (face shield or goggles), because sprays of secretions may occur.
 - ii. Apply Contact Precautions**

Use PPE (medical mask, eye protection, gloves and gown) when entering room and remove PPE when leaving and practice hand hygiene after PPE removal. Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles and light switches). Avoid medically unnecessary movement of patients or transport. Perform hand hygiene.

iii. Precautions for Aerosol-Generating Procedures

- Appropriate PPE must be worn when performing aerosol generating procedure e.g. bag valve mask (BVM) ventilation, oropharyngeal suctioning, endotracheal intubation, nebulizer treatment, continuous positive airway pressure (CPAP), bi-phasic positive airway pressure (biPAP), or resuscitation involving emergency intubation or cardiopulmonary resuscitation (CPR))

2.2.4 Cleaning EMS Transport Vehicles after Transporting Patient with Confirmed or suspected COVID-19

After transporting the patient, leave the rear doors of the transport vehicle open to allow for sufficient air changes to remove potentially infectious particles. When cleaning the vehicle, EMS clinicians should wear a disposable gown and gloves. A face shield or facemask and goggles should also be worn if splashes or sprays during cleaning are anticipated. Ensure that environmental cleaning and disinfection procedures are followed consistently and correctly, to include the provision of adequate ventilation when chemicals are in use. Doors should remain open when cleaning the vehicle.

Routine cleaning and disinfection procedures should be wiped with “1 in 49 diluted household bleach” (mixing 1 part of 5.25% bleach with 49 parts of water), leave it for 15-30 minutes, and then rinse with water. Metal surfaces could be wiped with 70% alcohol.

Clean and disinfect reusable patient-care equipment before use on another patient, according to manufacturer’s instructions.

Follow infection prevention and control protocol for the containment and disposal of used PPE and regulated medical waste.

Follow standard operating procedures for containing and laundering used linen. Avoid shaking the linen.

2.2.5 Additional role of ambulance Worker

- ECS should have infection control policies and procedures in place, including describing a recommended sequence for safely donning and doffing PPE.
- Provide all ECS clinicians with job- or task-specific education and training on preventing transmission of infectious agents, including refresher training.
- Ensure that ECS clinicians are educated, trained, and have practiced the appropriate use of PPE prior to caring for a patient, including attention to correct use of PPE and prevention of contamination of clothing, skin, and environment during the process of removing such equipment.
- Ensure ECS clinicians are medically cleared, trained, and fit tested for respiratory protection device use (e.g., N95 filtering face piece respirators), or medically cleared and

trained in the use of an alternative respiratory protection device (e.g., Powered Air-Purifying Respirator, PAPR) whenever respirators are required.

- ECS units should have an adequate supply of PPE.
- Ensure an adequate supply of or access to hospital grade disinfectants for adequate decontamination of ECS transport vehicles and their contents.

2.3 Pre-triage

Pre-triage is an area for sorting out clients into COVID 19 suspect from non-suspect based on simple criteria. All the facility entrance should have pre-triage system, and all the client and facility staff should be pre-triaged in addition hand sanitizer or water and soap at exit and entrance should be provided. If the client is non-suspect to pre-triage, client will be direct to regular service areas however client should be direct to COVID 19 designated isolation area or fever clinic if COVID 19 is suspected.

2.3.1 Pre-triage layout

Facility should delegate a separate entrance for emergency patient and has to have restricted area mapped for entrance and exit in clearly understandable and visible manner by local language and options for disabled individuals. Pre-triage should be separated from other service areas by at least 2 meters.

Designated area can be tent or room, with good ventilation and 4x4 meter squares. Facility should avoid crowd, and reusable medical equipment should be disinfected in standard IPC protocol.

2.3.2 Pre-triage format for COVID 19 infection

A customized pre-triage format is used for COVID 19 infection, which is mandatory to use for all clients served.

Table 2-1: Pre-triage format for COVID 19 infection

Name of the patient:			
Date: __/__/____	Time:__:__	Age:	Sex <input type="checkbox"/> Male <input type="checkbox"/> Female
COVID 19 specific			
Does the client have COVID 19 defining illness?	Put ✓ if Yes and ✗ if No on the checkbox		
	<input type="checkbox"/> Fever <input type="checkbox"/> Cough <input type="checkbox"/> SOB <input type="checkbox"/> Generalized fatigue <input type="checkbox"/> Loss of smell or taste		
Close contact with a confirmed or individual with	Put ✓ if Yes and ✗ if No on the checkbox		
	<input type="checkbox"/> Cough <input type="checkbox"/> SOB <input type="checkbox"/> Fever with in the 14 days prior to illness onset		
Close contact with a confirmed or individual with cough, SOB, fever in the 14 days prior to illness onset	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Pre-triage result			
An individual having with any acute respiratory illness (runny nose sore thought) AND at least one of the above (fever, cough, SOB),that individual should	<input type="checkbox"/> Suspect		<input type="checkbox"/> Non-suspect
	<input type="checkbox"/> Suspect		<input type="checkbox"/> Non-suspect

<p>be consider as pre-triage COVID 19 suspect and should be direct to facility isolation area .</p>		
<p>Suspect COVID 19 with any acute respiratory illness (runny nose sore thought) AND at least one of the above mentioned symptoms, that individual should be consider as pre-triage COVID 19 suspect and should be direct to facility isolation area or if the institution is not health facility isolate individual and link to EOC.</p>		

N.B For community call via hot line, EOC will direct based on hotline protocols

2.3.3 Equipment need for pre-triage & triage

- Pre-triage format
- Thermometer,(thermo scanner , infrared)
- Surgical glove
- Hand antiseptic
- Medical mask Face shield
- Disposable glove
- Hand sanitizer /water source easily accessible
- Trained health professional
- Waste disposal plastic /waste bin
- Phone access

2.4 Triage

2.4.1 IPC precautions in triage

In order to avoid risk of exposure to health professional, health care workers should follow following IPC recommendations in triage.

- Apply droplet precautions
 - Give the suspect patient with acute respiratory tract infection a medical mask
 - Instruct the patient to practice respiratory hygiene and hand hygiene and to avoid movements within the facility
 - Locate the suspect patient in separate area
 - Keep at least 2 meters distance between patients
- Apply contact to droplet precaution measures
 - Health care worker have to wears gown, gloves, medical mask and eye protection when examining patient.
 - Use dedicated patient equipment when possible, (such as stethoscopes) or wash and disinfect between patients.
- Apply airborne precautions
 - If there is an emergent need for intubation or cardiopulmonary resuscitation or any aerosol generating procedure

2.4.2 Patient triaging

General principles:

- Prioritize and sort patients based on their severity of illness and need for immediate care
- Use standardized triage tools to ensure reliability and valid sorting of patients
- Avoid “under-triage” and “over-triage”
- Identify high priority patients that need immediate care

While triage a patient triage officer can use the following diagram (diagram 1) or alternatively can use institution’s own triage format and categorize patient in, high acuity,

moderate acuity and low acuity. Those patients with high acuity treatment should start immediately.

Figure 2-1: Patient triage format for adult (age >12)

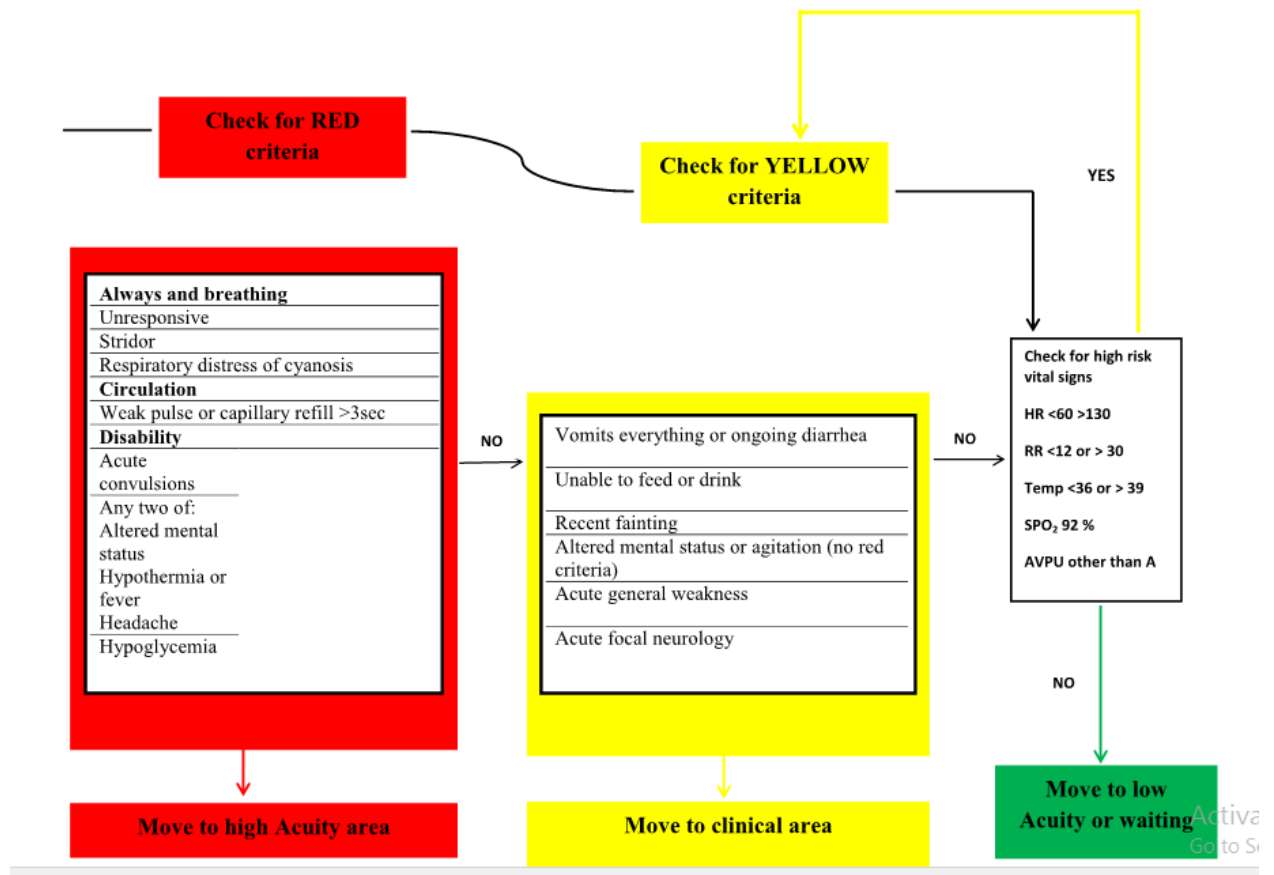
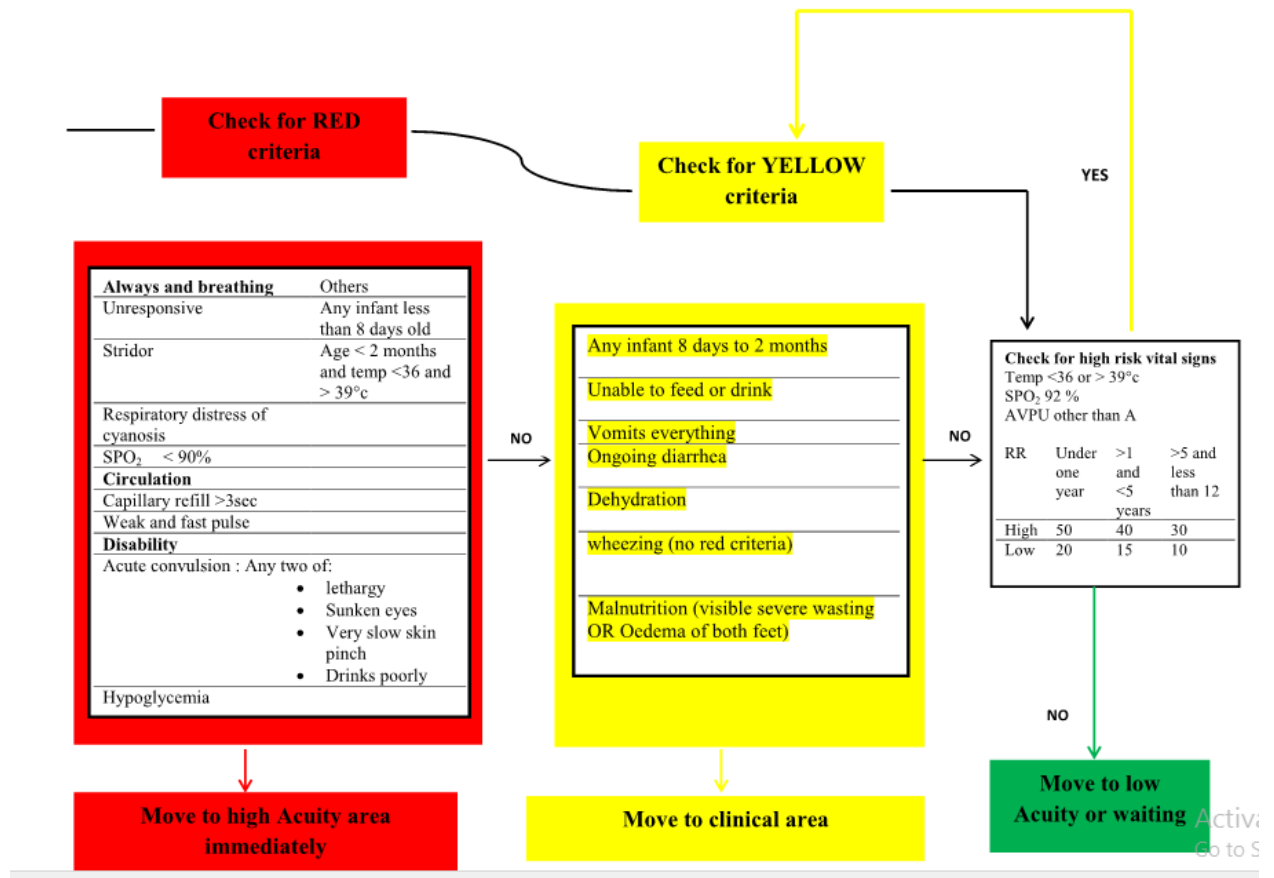


Figure 2-2: Triage tool for pediatric age (<12)



2.5 COVID-19 patient flow

2.5.1 Patient flow protocol

For suspected or probable case

If patient needs medical care (moderate to severe illness): Place in isolation room and provide appropriate medical care with strict adherence to infection prevention and control practice.

If patient is mildly symptomatic, and does not meet criteria for hospitalization: RT PCR sample should be taken and discharge home with counseling. The individual's contact address should be recorded. Education materials should be provided so that the individual continues to exercise the approved preventive measures.

If a suspected/probable case results becomes a confirmed case (positive test result):

The patient flow of *asymptomatic or mild illness* will be determined with home isolation protocol (See

Annex 1: Suspected or confirmed asymptomatic and mild COVID 19 Home and non-health facility isolation for the general public)

If patient had *moderate to severe disease*, should be admitted to health facility.

2.5.2 COVID 19 Facility floor map

The layout or floor map for facility involved COVID 19 management, should fulfill minimum standard for quarantine, isolation and treatment. (See Annex 2: Facility layout)

CHAPTER 3 : COVID 19 CLINICAL CASE MANAGEMENT

Introduction

This protocol is mainly intended for health care workers taking care of COVID-19 patients either at health facilities with isolation centers or dedicated COVID-19 treatment centers. It is not meant to replace clinical judgment or specialist consultation but rather to strengthen clinical management of these patients and provide to up-to-date guidance.

3.1 General principle of clinical management for COVID-19

- Identify moderate, severe and critical cases in triage screening and initiate supportive therapy including oxygen and fluid management as soon as possible. Please measure oxygen saturation with pulse oximeter in addition to assessment of vital signs.
- Oxygen therapy is effective supportive measure in COVID-19 patients and target saturation is >92-96%. For pregnant women and children with emergency signs (airway obstruction, shock, severe respiratory distress, convulsion and resuscitation) it has to be >94%
- Initiate oxygen therapy when SO_2 is < 90% for stable case and < 92% for unstable cases
- Drug allergies, drug adverse effects, and drug interactions must be considered during managing the patient with COVID-19.
- Underlying /chronic diseases should be identified as early as possible with detailed history from patient, close family members or friends. Underlying /chronic diseases such as hypertension, CVD, diabetes, cancer, Chronic respiratory diseases, HIV/AIDS and smoking history should be identified as early as possible with detailed history from patient, close family members or friends as they affect the outcome of the disease
- Apply strict IPC measures when managing patients (Refer to IPC guideline)Apply contact and droplet precautions for all case management while additional airborne precaution is needed for aerosol generating procedures
- Specimens for detecting COVID-19 can be obtained from nasopharyngeal (NP) preferably or oropharyngeal (OP) swabs. Deep expectorated sputum (if produced) or

bronchoalveolar lavage is not recommended for diagnosis due to high risk of aerosolisation.

- Patient care should be with respect, dignity and psychosocial support which include: medical support, food/water, and information.
- Use conservative fluid management in patients with COVID-19 patients unless there is evidence of shock or hypoperfusion. Aggressive fluid administration may worsen oxygenation and be cautious unless there is justification.
- Initial evaluation includes complete blood count (CBC) with differential, with a focus on the total lymphocyte and platelet count trend, serum creatinine, liver function test, hepatitis B virus serologies, hepatitis C virus antibody, and HIV antigen/antibody testing and CXR. PT and PTT for ICU admitted patients.

3.2 COVID 19 Clinical syndromes and management

3.2.1 Mild COVID 19 illness

- Patients with uncomplicated upper respiratory tract viral infection may have symptoms such as fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain. Nonspecific symptoms like sore throat, dyspnea, nasal congestion, or headache, diarrhea, nausea, and vomiting, loss of smell and taste have also been reported.
- Patients may present with worsening of preexisting health condition
- Atypical symptoms: the elderly and immunosuppressed may present with atypical symptoms like fatigue, myalgia, delirium and significant loss of appetite. Symptoms due to physiologic adaptations of pregnancy or adverse pregnancy events, such as dyspnea, fever, gastrointestinal symptoms or fatigue, may overlap with COVID-19 symptoms.

Management of Mild COVID 19 Illness

- Transfer to COVID-19 non health facility OR discharge home with instructions for self-quarantine for 14 days.
- Counseling about danger sign and close monitoring for signs of clinical deterioration such respiratory failure, sepsis/ septic shock has to be done for early management of such complications
- Advise patients to keep hydrated, but not to take too much fluid as this can worsen oxygenation
- Provide symptomatic therapies with antipyretic/ analgesic, antipyretics / analgesics in adults: Paracetamol 1gm paracetamol PO every 6–8 hours, maximum 4g/ 24hr ,Tramadol 50–100 mg PO/IV every 4–6 hours for analgesics purpose as needed, daily ,maximum400 mg/day can be given alternatively or combined with paracetamol
- Pediatrics: Paracetamol 15 mg /kg PO, Suppository every 6-8 hours: avoid aspirin use in pediatrics cases to avoid, Reye Syndrome

3.2.2 Moderate COVID 19 illness

- Moderate illness is described as patient having mild pneumonia using appropriate criteria in adults (CURB-65) or children. This form of illness comprises of 40% of COVID-19 patients.
- Adult with pneumonia but no signs of severe pneumonia and no need supplemental oxygen.
- Child with non-severe pneumonia who has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): < 2 months: ≥ 60 ; 2–11 months: ≥ 50 ; 1–5 years: ≥ 40 , and no signs of severe pneumonia.

Management of moderate COVID 19 Illness

- Admit patient to the hospital and monitor vital signs at least six hourly.
- Follow closely for clinical deterioration especially in the vulnerable with high risk severe disease.
- Maintain O₂ Sat > 92% with O₂ via non-rebreather mask if available (up to 10-15L O₂; equivalent to 60-80% FiO₂), or can give additional 6-10L O₂ via NC under non-rebreather mask (equivalent to 80% FiO₂) Refer Section on Oxygen therapy
- Avoid IV fluid unless there is a clinical indication
- Add empiric oral antibiotics if you have strong suspicion of bacterial pneumonia
- In adult: Amoxicillin 500mg po TID or Amoxicillin-clavulanate 1gm PO BID or 625 mg po TID for 7days

3.2.3 Severe COVID 19 illness

- Severe illness is described as patient having severe pneumonia, acute respiratory distress Syndrome (ARDS), sepsis or patients responding to non invasive management.
- These patients manifest with dyspnea, RR ≥ 30 /min, blood oxygen saturation (SpO₂) $\leq 90\%$, or when there is ABG PaO₂/FiO₂ ratio < 300 OR when Kigali definition is used SpO₂/FIO₂<350, and/or lung infiltrates in CT imaging > 50% within 24 to 48 hours; this occurs in 14% of cases.

- In patients with fever or suspected respiratory infection, the CURB-65 criteria (Confusion, Urea >7mmol/L or abnormal Creatinine value, Respiratory rate >30, Blood pressure <90/60, Age >65) can be used to determine severity of pneumonia. The CURB-65 score should be interpreted in conjunction with clinical judgment. Patients with a CURB-65 score of >2 patient should be considered as severe and admitted.

Management of Severe COVID 19 illness

- Provide oxygen supplementation for SpO₂ target ≥ 92-96% (for pregnant mother, patients with hemodynamic instability SpO₂ target >92-94%). Refer to Oxygen therapy section
- Prone positioning can be tried for 16 hrs in a day (See Annex 3: Prone Ventilation Guide)
- Short of invasive mechanical ventilators, NIPPV can particularly be useful in patients with chronic respiratory airway obstruction, sleep apnea and pulmonary edema.
- NIPPV should be used with non-vented masks to avoid room aerosilization. NIPPV is best used on the ventilator with a closed loop circuit with a viral filter on the exhaust line.
- Options for NIPPV are Bi-level positive airway pressure ventilation (BiPAP), and Continuous Positive Airway Pressure ventilation (CPAP) with PEEP 10-15 cm H₂ O or as tolerated can be used.
- Experts recommend the use of NIPPV with precautions as it may delay time to intubations and increase risk of transmission of SARS CoV2 virus.
- In a conscious patient whose work of breathing worsens with poor oxygenation a trial of Bi-level positive airway pressure ventilation (BiPAP), and continuous positive airway pressure ventilation(CPAP) with high PEEP 10-15 cm H₂ O as tolerated can be used for respiratory support until intubation
- Manage anxiety and coach the patient to be calm and synchronize his/her breathing with the breath delivered by the machine. If the patient is clinically deteriorating or if no improvement after 30 minutes of trial, immediately proceed for steps to intubation for Mechanical Ventilation. (Refer section on Mechanical Ventilation)
- Close monitoring of vital signs, work of breathing and mental status is advised.
- If after 30 minutes of trial, the patients has no improvement, immediately intubate
- Conservative IV fluid management should be instituted
- Convalescent plasma (CP) 400 ml should be administered intravenously for severer or critical COVID19 cases if available at blood bank.

- Empiric antimicrobials should be started after taking specimen for culture and sensitivity (preferably broader spectrum antibiotics). In adults for possible superimposed pneumonia:
 - In patients with who are with severe ill and critical, hospitalized, immunocompromized or with previous structural lung disorder, give Ceftazidime/Cefepime 2g iv TID +or +/-Vancomycin 1 gm IV BID *Ceftriaxone 1gm IV bid is alternative to ceftazidime/Cefepime but now a days it is not routinely used in severe pneumonia or sepsis because of high rate of resistance.
 - If there is no response with the above antibiotics or culture and sensitivity result suggests it Meropenem (or other available carbapenemes) 1g IV q8hours +/- Vancomycin 1g IV q12 hours can be used.
 - When patients improve and are able to take PO switch to Amoxicillin-clavulanate (look dose at moderate pneumonia section above).

3.2.4 Critical COVID 19 illness

- Respiratory failure, septic shock, and/or multiple organ dysfunctions (MOD) or failure (MOF) and it needs invasive or special management; this occurs in 5% of cases. Severe form of the following diseases requiring advanced management namely: Pulmonary embolism, stroke, and myocardial infarction are recently described in COVID-19 patients

Management of critical COVID 19 illness

- Admit to Intensive Care Unit (ICU)
- Assess the Airway, Breathing, Circulation, Disability, and Exposure (ABCDE) and act accordingly.
- Follow the recommendations of severe cases on the use of antibiotics.
- Follow recommendations of severe cases on oxygen supplementation, non-invasive ventilator support and prone positioning
- Any patient with severe respiratory failure not responding to non-invasive modes of respiratory support require invasive endotracheal intubation for Mechanical Ventilation Refer below on management of COVID 19 ARDS section
- Manage sepsis or septic shock.(Refer to sepsis section)

- Anticoagulation: Start on therapeutic dose anticoagulants (Refer to Anticoagulants section)

3.3 Management of COVID 19 ARDS

- Current data indicate that 5% of the COVID-19 affected patients are critically ill. Hence, supporting the respiratory system with positive pressure is needed expansively.
- As the disease affects mainly the lungs, the most frequently encountered complications of SARS COV₂ is ARDS.
- To diagnose ARDS Berlin criteria or Kigali's modification of Berlin criteria is used. According to Berlin criteria ARDS is described as:

- New onset/worsening respiratory symptom
- Bilateral opacities not explained by effusion, lobar/lung collapse or nodules by chest radiograph or ultrasound
- Respiratory failure not fully explained by cardiac failure or fluid overload (may need objective assessment, such as echocardiography, to exclude hydrostatic edema if no risk factor present)
- Hypoxemia of different severity based on arterial blood gas determination (Pao₂/FiO₂): Mild if the ratio is 200-300, moderate 100-200 and severe if <100.
- In the Kigali modification of Berlin definition use SapO₂ instead of PaO₂ hence, Spo₂/Fio₂ < or =315 – for Mild ARDS
- SpO₂/FiO₂ < 230 – Severe ARDS (correlating to PaO₂/FiO₂ ratio of 150)
- If Spo₂ unavailable: suspect ARDS in any patient with worsening respiratory failure despite receiving supplemental oxygen.

In ARDS If non-invasive support is not successful, intubation and mechanical ventilation is advised. In this portion protocol for intubation, mechanical ventilation, fluid management and proning position are described.

3.3.1 Intubation protocol for COVID-19 patients

- The most experienced professional should intubate the patient
- i. Prepare**
- Apply monitoring – Spo₂, ECG and BP on 3-minute cycle at the very least
 - Prepare for difficult air way, resuscitation equipment, and drugs.

- Prepare suction, ETT different size, paralytic drug (preferably Rocuronium, Suxametonium) and sedative drugs (Preferably Fentanyl, Ketamine, Midazolam)
- Check IV access (ideally x2)
- Put patient in sniffing position or sit them up slightly to minimize further reduction in functional residual capacity (FRC).
- Prepare Glydoscope if possible or Video laryngoscopy.

Pre-oxygenation

- Pre-oxygenation with 100% oxygen for 5min or 5 vital capacity breaths
- Avoid manual ventilation as it aerosolizes infectious droplets to the atmosphere
- Give opioid or IV lidocaine to blunt airway reflex if appropriate

ii. Paralyze and sedate (be care full for difficult air way)

- Rapid sequence induction with larger doses of ketamine 1-2mg/kg and Suxametonium 2mg/kg to avoid coughing during intubation and to rapidly intubate patient with the first attempt
- Ketamine should ideally be first line drug due to its bronchodilator effects as well as hemodynamic stability

iii. Place the tube

- Use Glidescope if available to reduce the risk of transmission by keeping distance from patient's airway

iv. Placement check

- Do not check tube placement through manual ventilation, immediately inflate the cuff and connect patient to machine and look for the chest rise push and twist connections to prevent/ minimize accidental leaks in the circuit

v. Post intubation care

- Keep the laryngoscope, stylet and bougiein plastic bag or specially prepared tray to be disinfected

- If available, use HME (Heat and Moisture Exchanger) filter. The filter needs to be placed after the tube and before the y piece
- Follow the guideline when removing PPE
- Appropriate level of sedation and paralysis

vi. PPE guideline for performing aerosolizing procedures

- Apply PPE with aerosol precaution
- Wash hands with soap and water for at least 20 seconds
- Put on gown, Foot ware, N-95 mask and face shield
- Wear two pairs of surgical glove
- Perform the procedure
- Remove the first pair of glove when you finish the procedure
- Remove gown, foot ware, face shield and mask and dispose to a container according the international doffing protocol
- Remove the 2nd pair of glove and wash hands with soap and water for at least 20 second

3.3.2 Mechanical Ventilator Management of COVID19 Patients

COVID 19 patients with ARDS and severe hypoxemia with poor lung compliance If the patient's condition deteriorates with severe respiratory distress, change in mentation and hypoxemia not improving with non-invasive methods and oxygen therapy, it is recommendable to intubate and support.

i. Setting on Mechanical Ventilator for COVID ARDS patients

Initial ventilator setting upon intubation should target LPV (Lung protective ventilation). Start at TV 6cc/kg and titrate for patients comfort

- Reduce TV to reach target of 6 mL/kg of ideal body weight over couple of hours
- If TV is at 8 mL/kg and Pplat remains > 30 cm H₂O, then reduce TV by 1 mL/kg

Each hour, to a minimum 4 mL/kg:

- At the same time, increase Respiratory Rate(RR) to maintain minute ventilation (MV)
- Set RR to approximate minute ventilation (MV):

- Do not set > 35/min
- Remember $MV = VT \times RR$.
- Set I: E ratio so 1:2
- Set inspiratory flow rate above patient demand (Commonly > 60 L/min)
- Monitor for intrinsic PEEP
- Set FiO_2 at 1.00, titrate down. Titrate the FiO_2 to the lowest value that maintains target SpO_2 88–93%
- Set PEEP 5–10 cm H_2O or higher for severe ARDS. If $P_{plat} > 30$ – increase PEEP to attempt to recruit more alveoli. Increase PEEP as tolerated only if P_{plat} improves or remains the same with higher PEEP
- Set PEEP corresponding to severity of oxygen impairment:
 - Higher PEEP for moderate-severe
 - Reduce of PEEP should be done gradually: 2 cm H_2O , once or twice a day
 - Set PEEP corresponding to severity of oxygen impairment:

Table 3-1: Lower PEEP/higher FiO_2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7
PEEP	5	5	8	8	10	10	10	12

FiO_2	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

Higher PEEP/Lower FiO_2

FiO_2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
PEEP	5	8	10	12	14	14	16	16

FiO_2	0.5	0.5-0.8	0.8	0.9	1.0	1.0
PEEP	18	20	22	22	22	24

ii. Weaning from Mechanical Ventilator

- Conduct spontaneous breathing trial daily when
- $FiO_2 \leq 0.4$ and $PEEP \leq 8$ Or $PEEP \leq 5$ and $FiO_2 \leq 0.5$

- Patients has acceptable spontaneous breathing efforts (may decrease ventilator support by 50% to see the effort)
- Systolic BP \geq 90mmHg without vasopressor support
- No neuromuscular blocking agents or blockade
- NB: For pediatrics, make sure that vital signs are stable and patients are off vasopressors

iii. Spontaneous Breathing trial

- If the above criteria are met perform spontaneous breath trial for 120 minutes with FIO₂ \leq 0.5 and max pressure support of 8cmH₂O
- Assess for tolerance as below for two hours
 - Spo₂ \geq 92
 - Spontaneous TV $>$ 4ml/PBW
 - RR \leq 35
 - No respiratory distress (distress = 2 or more)
 - HR $>$ 120 or 20% increase from baseline
 - Marked accessory muscle use
 - Abdominal paradoxical breathing
 - Diaphoresis
- If tolerated at least for two hours consider extubation, if not tolerated resume pre weaning setting

iv. Prevention of Complication

- Reduce days on mechanical ventilation by assessing readiness for spontaneous breathing (spontaneous breathing trial)
- Reduce Ventilator Associated Pneumonia by (VAP)
- Oral intubation preferred over nasal intubation in adolescents and adults
- Keep the head of patients up in 30-45°
- Use closed suctioning method to prevent contamination
 - Use new clean breathing circuit if possible for each patient, change the circuit only if damaged and soiled
- Reduce incidence of venous thromboembolism

- LMW heparin or unfractionated heparin
- Intermittent pneumatic compression
- Turn patients every 2 hours to prevent pressure ulcer
- Initiate early enteral nutrition within the 24-48 hours of admission
- Start H2 blocker or PPI prophylaxis for GI bleeding

v. Fluid management

- Conservative fluid strategy is recommended, as appropriate for the overall clinical status.
- Diuresis or fluid removal in patients with favorable hemodynamics is recommended.

vi. Sedation and paralysis

- We may use sedation to enhance patient and ventilator synchrony
- Consider neuromuscular blockage in the presence of refractory hypoxemia despite high PEEP. We have to simultaneously give deep sedation to avoid awareness.

vii. Prone Positioning

- Prone Positioning is beneficial in improving ventilation-perfusion mismatch, promoting homogenous aeration and decreasing lung injury as well as infection by facilitating airway secretions drainage. Recent data also indicate mortality benefit when used early in moderate to severe ARDS. Trials also indicate that non intubated patients may benefit with prone positioning in patients with refractory hypoxemia with high flow oxygen.

viii. Indication for Prone Positioning

- It is recommended to use Prone Positioning as we observe poor oxygenation despite maximal ventilator support
- Taking into consideration the availability of resources, especially optimal nursing care we advise to prone the patients for at least 12 hours, preferably 16 hours per day in the absence of contraindications.

ix. Contraindication for proning patients:

- Significant hemodynamic instability
- Increased ICP
- Pregnancy
- DVT treated for <2 days
- Facial surgery or severe facial trauma
- Massive hemoptysis
- Life-threatening cardiac arrhythmias within 24 hours
- Bronchopleural fistula
- Unstable fracture, especially pelvic fractures and Spinal instability
- Serious burns (> 20% body surface area)
- History of difficult or nasotracheal intubation
- Inability to tolerate face-down position
- Recent sternotomy ,tracheostomy or major abdominal surgery or active intraabdominal process

3.3.3 Oxygen therapy for COVID-19

Introduction

Oxygen therapy means the use of oxygen as a medical treatment. It is also included in the WHO essential drug list, recognizing its importance in averting death with respiratory cases worldwide. The surge of SARS Corona 2 Virus pneumonia cases makes it timely to advocate for proper use of oxygen, especially for low middle income country as ours where resources are scarce.

Hypoxemia is recognized as a cause of death in patients with severe respiratory illness. Hence, oxygen therapy is a known intervention to reduce mortality in severe respiratory diseases especially in severe and critically sick COVID 19 patients. Studies indicate that oxygen saturation less than 90 % is associated with increased chance of death and is most commonly seen in elderly and those with at least one comorbidity. In fact, an observational study demonstrates that the oxygen saturation cut off value of 90.5% yielded 84.6% sensitivity and 97.2% specificity for prediction of survival in COVID 19 patients.

i. Objective:

- Improve the detection of hypoxaemia based on pulse oximeter reading and clinical symptoms for COVID 19 patients
- Improve the delivery and monitoring of patients on oxygen therapy.

ii. Indications of oxygen therapy:

In the hospital setting, give oxygen immediately to patients (adults and children) with severe acute respiratory illness (SARI):

- Severe respiratory distress
- Sepsis with hypo-perfusion or shock
- Alteration of mental status
- Hypoxaemia
 - SpO₂ < 90% (if patient is hemodynamically normal)
 - SpO₂ < 94% (if patient with any emergency signs of airway, breathing or circulation)
 - SpO₂ < 92–95% (if pregnant woman).
- Short of pulse oximeter clinical signs that trigger oxygen therapy in:

In Adult:

- Dyspnea or difficult breathing on minimal exertion
- Inability to talk in sentences
- Fast respiratory rate
- Prominent use of accessory muscles to breathe
- Central cyanosis
- Chest crackles
- Tachycardia
- Restlessness
- Drowsiness or confusion

In children:

- Central cyanosis
- Nasal flaring

- Inability to drink or feed (when due to respiratory distress)
- Grunting with every breath
- Depressed mental state (i.e. drowsy, lethargic)
- And in certain conditions (severe lower chest in drawing, RR \geq 70 bpm, head nodding).

iii. Sources of oxygen

- Oxygen cylinders
- Oxygen concentrators
- Central piped oxygen

iv. Method of oxygen delivery system:

- Initiate high flow oxygen therapy in severe acute respiratory infection
 - In adults and older children, start with 10–15 l/min via face mask with reservoir bag.
 - Less ill patients can start with 5 L/min by nasal cannula
 - In children less than five years of age preferably use nasal cannulas as described in table :.....If no improvement , you can use bubble continuous positive pressure device(bCPAP) to support the work of breathing as well as the oxygenation
 - With high flow oxygen delivery system, we can provide $>2l/kg/min$ of flow of oxygen in paediatric patients

NB: Airborne precautions shall be instituted in case of nebulisations and high flow oxygen delivery

Table 3-2: Use appropriate dose and delivery device

Oxygen delivery method	Recommended flow of oxygen	Estimated delivered FiO ₂
Adult		
Nasal prongs	O ₂ dose 1–5 L/min	0.25-0.40
Simple Face	O ₂ dose 6–10 L/min	0.40–0.60
Face mask with reservoir	O ₂ dose 10–15 L/min	0.60–0.95
Paediatric		
Nasal cannula		
<ul style="list-style-type: none"> • New-born 	0.5–1.0 L/min	0.25-0.40
<ul style="list-style-type: none"> • Infant 	1–2 L/min	0.25-0.40
<ul style="list-style-type: none"> • 2-5 years 	1–4 L/min	0.25-0.40
<ul style="list-style-type: none"> • >6 year s 	1–6 L/min	0.25-0.40

v. Monitoring of oxygen therapy:

- Monitor vital signs hourly for critically ill and 3-4 hourly for moderately ill patients
- If low oxygen, check
 - Patient airway
 - Equipment
 - Circulation
 - Consider complications
 - Escalate support with invasive mechanical ventilation

vi. Weaning patients off oxygen

- You can start weaning off oxygen if,
 - if the indication for initiation of oxygen is resolving
 - the patient’s work of breathing is decreasing
 - The patient is able to maintain oxygen saturation >94 %
 - The respiratory rate is normalizing.
- Decrease flow of oxygen 2L /min at a time and observe for at least 5 minutes if oxygen saturation drops and respiratory distress worsens.

- Once weaning is started reassess the patients every 2-4 hourly to determine if the patients' condition is deteriorating.

3.3.4 Non-invasive ventilation

- Bi-level positive airway pressure ventilation (BiPAP), and continuous positive airway pressure ventilation (CPAP) with high PEEP 10-15 cm H₂O as tolerated can be used for respiratory support .
- Short of mechanical ventilators, NIPPV can be tried to support patients as it can especially be useful in patients with chronic respiratory diseases.
- Contraindications for use of NIPPV include: Change in mental status, Shock , ,Pneumothorax, Absence of spontaneous breathing and Unable to handle its secretions

Monitoring

- Closely monitor the vital signs, and respiratory distress signs
- As patients may be anxious, you can low dose sedation while in use
- If after 30 minutes of trial, the patients has no improvement, immediately intubate

3.4 Sepsis and Septic shock management in COVID 19 patients

Introduction

Sepsis is an acute complication of severe COVID 19. The global burden of disease study estimated 48.9 million global sepsis incident cases and 11.0 million sepsis-related mortality in 2017. This number is expected to rise in the advent of COVID 19 pandemic. In fact, mortality due to sepsis in COVID19 patients ranges from 5.4% to 29.8%. Multiple organ dysfunctions expected on hematogenous spread of infectious pathogen guide the identification of sepsis in both adult and pediatric patients. The quick Sequential Organ Failure Assessment (qSOFA) and Systemic inflammatory response syndrome with proven or suspected infections are tools to identify septic patients in adult as well as children respectively.

i. Management of sepsis and septic shock

- Apply the six sepsis management bundles within 1hr: appropriate fluid management, Oxygen delivery, antibiotics, sending specimen for culture and sensitivity, and monitoring of lactate and hourly urine output.
- Immediate aggressive volume expansion with isotonic solution, preferably R/L or R/L alternative with N/S is the main stays of management in septic shock. We have to be precautious in administering high volume of fluid in patients with ARDS.
- Start with at least 30ml/kg in the first 3hrs, then additional fluid boluses depending on hemodynamic response.
- Further fluid administration depend on the response to fluid resuscitation
- Closely monitor for signs of fluid overload (jugular venous distension, crackles on lung auscultation, pulmonary edema on imaging, or hepatomegaly particularly children)
- Stop or decrease fluid administration if signs of fluid overload.
- Watch for signs of target perfusion achievement (Mean Arterial Pressure (MAP)>65 mmHg.
- If target perfusion is not achieved or hemodynamic response is poor with standard fluid administration within one-hour start vasopressor administration.
- The vasopressor of choice in adults is norepinephrine (NE) (2-30 µg/min/ (0.1-1 µg/kg/min) but epinephrine (2-30 µg/min, (0.1-1 µg/kg/min) and dopamine (2-20 µg/kg/min) can be used respectively. Titrate dose based on response.

- Closely monitor the veins for any extravasations of vasopressors as it may cause tissue swelling and necrosis.
- Broad spectrum antibiotics should be administered for possible superimposed infection

Adults:

- In patients with who are critical, hospitalized, immunocompromized
- or previous structural lung disorder: Ceftazidime/Cefepime 2g iv TID +/-Vancomycin 1 gm IV BID
- Meropenem 1g IV q8hours +/- Vancomycin 1g IV q12 hours in critical patients if there is no response with the above alternative or culture and sensitivity result is suggestive
- When patients improve and are able to take PO Amoxicillin-clavulanate (Augumentin) 2 gm PO BID for 7-10 days
 - Other antibiotics can be administered based on the clinical judgment of the clinician
- Blood transfusion if Hgb is ≤ 7 mg/dl in adults, Hgb is < 10 mg/dl in pediatrics to keep adequate O2 saturation.
- Surgical drainage or debridement of an abscess or dead /necrotized tissue.
- Collect culture and sensitivity, organ function tests, electrolytes, and imaging results and manage if there are any complications.
- Stress dose steroid (Hydrocortisone 2 mg/kg IV hydrocortisone (maximum 100 mg), followed by 1 mg/kg (maximum 50mg) of hydrocortisone dosed every six hours for a maximum of seven days or until all vasoactive infusions have been discontinued for at least 12 hours, can be given for refractory septic shock .

3.5 Antiviral and immune modulator management

i. Convalescent plasma (CP) transfusion:

- According to recent data, convalescent plasma(CP) use :
 - (a) May reduce mortality in critically ill patients,
 - (b) Increase in neutralizing antibody titers and disappearance of SARS-CoV-2 RNA, and
 - (c) Improve clinical symptoms after administration
- Based on the limited scientific data, CPT therapy in COVID-19 patients appears safe, clinically effective.
- We therefore recommend it use in severely and critically ill patients.
- 400 ml CP should be administered intravenously for COVID19 cases admitted to hospitals.
- CP is collected from recovered COVID-19 cases three weeks after recovery.
- The transfusion procedure follows standard blood and blood product transfusion protocol.

ii. Steroids

- Dexamethasone 6mg once per day IV or PO for ten days for adult patients. For pediatric dose refer pediatric section

iii. Antiviral treatment: Some studies in different countries showed Remdesivir and Favipiravir are effective against COVID-19.

If these drugs are available, it is recommended to use either of them for:

Moderate and severe cases:

Remdesivir (adult dose):200mg IV stat and 100mg IV once daily for 9 days

Mild and moderate cases:

Favipiravir/ Avigan (adult dose): Favipiravir 1600mg PO BID the first day then 600mg PO BID 7-10days.

3.6 Anticoagulant for COVID-19 patients

- Hypercoagulable state is currently recognized as one pathophysiologic derangement in COVID patients.
- However, it is not clear whether prophylactic anticoagulation benefits patients with COVID-19
 - a. Mild cases:** No need for anticoagulation unless there is a non-COVID-19 indication for anticoagulation
 - b. Moderate/Severe cases:** Start prophylaxis with UFH 5000 S/C b.i.d until discharge
 - c. Critical cases:** Start on therapeutic UFH 5000 U S/C bolus and then 17500 U S/C BID then shift to oral anticoagulants- Rivaroxaban 15 mg PO BID for 21 days, THEN 20 mg PO daily, or Warfarin (three days overlap) dose adjusted to INR 2-3 after improvement for a total of three months.

NB: Avoid anticoagulation if there is:

- $INR \geq 1.4$
- Low platelet ($<25,000$)
- Uncontrolled blood pressure
- Active bleeding from any site
- Any other potential risk factor for fatal bleeding
- If difficult to assess coagulation profile
 - d. Those on prior anticoagulant treatment:**
 - Continue anticoagulants
 - e. With new diagnosis of VTE requiring anticoagulant:**
 - Start with therapeutic anticoagulation as step “c”.

3.7 Specific clinical case management of COVID 19

3.7.1 Management of Newborns, Children and Adolescent with COVID-19

Pediatrics Co-morbid conditions

Chronic lung disease including asthma, congenital and acquired cardiovascular disease and immunosuppression were commonly recognized Comorbidities in children.

Additionally, children less than 3 months of age and any age of children with severe acute malnutrition (SAM): weight/height WHO $<-3SD$ should be included in this group. These special group of children need particular attention in the severity assessment and management; thus even if they have moderate disease they may need admission for observation and treatment

Lymphopenia is relatively rare in children, with the majority having normal or raised lymphocyte counts; C-Reactive Protein (CRP) and procalcitonin levels are often raised but only very mildly, and slight elevation in transaminases appear to be common.

i. Care of New born with Confirmed and Suspected COVID-19

Generally, that there is no proven mother to child transmission of COVID-19 based on amniotic fluid, Cord blood and placental swabs testing negative for COVID-19.

A. Attending Labor and Delivery

- The delivery of a mother with confirmed or suspected COVID 19 should be attended if possible in a room with negative pressure
- NICU team should wear surgical /N95 mask, eye protection (face shield or safety goggles), isolation gown and gloves. Note that personal eye glass is not protective against COVID-19 while attending delivery
- For obstetric high risk mothers and preterm deliveries with gestational age of less than 34 weeks or estimated fetal weight less than 1500 grams, two health care providers i.e neonatal nurse/ neonatologist/pediatrician or pediatric resident and the attending obstetric staff must attend the delivery

- For low risk mothers with normal fetal monitoring, a nurse or midwife trained on Helping Babies Breathe (HBB) should attend the delivery
- Other providers can wait outside the delivery room and can be called in case of emergency

B. Neonatal resuscitation

- The neonatal resuscitation area/ the newborn corner should be in separate room close to the delivery room. If a separate room is not possible, it should be 2 meters away from the delivery coach and separated by curtain.
- The delivery/operating room, should have adequate equipment including a radiant warmer, airway accessories (suction, preterm and term facemasks, endotracheal tube, laryngeal airway, positive pressure apparatus, oxygen, and blender) and a cart with medications /fluids/ umbilical catheter placement kit for advanced resuscitation as recommended by the Neonatal Resuscitation Program (NRP).
- For preterm delivery, CPAP should be ready

C. Essential Newborn care

- Avoid Delayed cord clamping (DCC), if the mother is sick requiring oxygen, or has been intubated for cesarean section and /or if the baby requires resuscitation
- Allow skin to skin contact only on asymptomatic mothers with the mother wearing mask
- Wrap preterm babies with plastic bag to prevent hypothermia
- Provide Vitamin K and TTC eye ointment must be for every baby in the delivery room.

D. Post-delivery baby care

Testing newborns for COVID-19

- If resources are available test all newborns that have come into contact with COVID-19 positive mother, if resources are limited, test only symptomatic newborns.
- Nasopharyngeal swabs for COVID 19 in newborns should be taken at 48-72 hours of age and the repeat test can be done at least 48 hours apart or at discharge,

- For preterm babies with respiratory distress syndrome (RDS) wait until 72 hours and repeat the test on day 5 (to reduce the false negative rate).

Breast feeding and handling of newborns born to COVID-19 suspected or confirmed mothers

- Mothers should be oriented on the necessary IPC measures: to wear face masks, respiratory and hand hygiene, cleaning and disinfecting the surfaces with which the mother been in contact.
- Mother need to clean her chest and breast if it has been contaminated with sneezes and coughs, otherwise she does not need to wash her breast each time during breast feeding.
- Mother and infant should be enabled to room-in throughout the day and night and practice skin to skin contact, including kangaroo mother care especially immediately after birth and during establishment of breast feeding (first 1 hour), whether they or their infants have suspected or confirmed COVID-19 virus infection; this applies to preterm babies and low birth weight.
- If the mother is unable to care for the newborn, competent family care giver can take care of the baby and if possible the baby can be fed by expressed breast milk; but if mother is too sick to express breast milk baby can be fed with breast milk replacement.
- Mothers who are not able to start breast feeding during the first hour, should be supported to breast feed as soon as they are able to do so (re-lactation).
- Breast feeding should continue exclusively for the first 6 months and afterwards complementary feeds can be started.
- Mothers have to be oriented on danger signs; if neonate is sick and requires special care there should be an arrangement to access the facility as soon as possible.

E. Newborns who need admission

- Being born from COVID 19 suspected or confirmed mother is not an indication to admit the newborn to neonatal intensive critical unit (NICU).
- Preterm babies less than 1800 grams and or less than or equal to 34 weeks of gestation must be admitted to NICU.

- Babies who are sick and fulfill other admission criteria must be admitted to NICU.
- Bathe every baby on admission, if baby is critical wipe the baby with soap, water and cloth with precaution for hypothermia
- Visitors should be limited, communication with family should be via telephone
- Baby's vital sign should be monitored closely every 4 hourly for stable newborn and every hourly for critical newborns; Neonatologist/ pediatrician should make daily round and decide on the management
- If the tests on day 3 and 5 are positive and requires respiratory support beyond 14 days, infants should remain in isolation until the tests become negative.

F. NICU and nursery in COVID centers

- The COVID treatment unit must have NICU and nursery for newborns delivered from COVID 19 suspected or confirmed mother with the necessary resuscitation equipment and emergency drugs
- The nurse to patient ratio should be at least 1:6 in the nursery and 1:3 in the NICU
- Isolette/incubators are better than warmers or basinet
- If there is no NICU in the COVID treatment unit the newborn will be admitted to the existing NICU isolation room with separate staff taking care of such babies.

G. Transporting babies born of mothers with COVID-19

There could be a need to transport babies needing NICU care from COVID or non-COVID center in which the mother is suspected for COVID-19. These are the principles we should follow:

- Try to minimize transportation of babies, if it is mandatory clear your way and make it fast
- Transport incubators/ Isolette are ideal to transport these babies, all ports must be closed.
- Incubators/isolettes need to be cleaned and readily available either inside the delivery/or operation room or right outside; if there is no incubator, the baby basinet could be used with adequate cover to prevent hypothermia; If basinet is not available, baby can be covered with blanket, carried and transported; NICU/resuscitation team will transport the baby wearing appropriate PPE.

- Before transporting inform the receiving team to be prepared, if baby requires CPAP or ventilation preparing bed is mandatory before the transfer

H. NICU care in non COVID hospitals

- Every out born baby must be received in the triage area
- Wear simple face mask, gown, sterile glove and face shield when you receive the baby from care takers
- All out born babies with unknown maternal COVID status needs bathing with warm water and soap on admission, if baby is critical wipe the baby with soap and water using gauze or cloth
- Screen all mothers for sign and symptoms of COVID infection at admission to NICU
- If the test of the newborn result turns to be positive, transfer the newborn to COVID centers NICU after a formal communication with the respective hospitals NICU staffs.

I. Discharge and home care of newborn

- Discharge home with advice on contact and droplet precautions; no further maternal testing unless symptoms/signs do not resolve in 14 days or her condition deteriorates (refer to obstetric care guideline for the management of postpartum mother)
- Care takers of the infant should be counseled on danger signs that would prompt immediate medical attention, have appropriate follow-up in place and correct phone numbers to call
- Infants can be re-infected from other family member or visitor; hence caretakers should take steps to reduce the risk of transmission through avoiding visitors.
- No further testing is needed unless infant is symptomatic

ii. Clinical symptoms and severity assessment in pediatrics COVID-19 patients

Table 3-3: Severity grading of COVID-19 in children 0 month to 19 years of age

Severity		Clinical symptoms and signs
Mild disease	Upper respiratory tract infection	Non-specific symptoms: fever, fatigue, cough (with or without sputum production), anorexia, malaise, muscle pain, sore throat, nasal congestion, or headache. Rarely, patients may also present with diarrhea, nausea and vomiting
Moderate Disease	Pneumonia	<p>Child with cough or difficulty breathing + fast breathing:</p> <p>J. fast breathing (in breaths/min): < 2 months: ≥ 60; 2–11 months: ≥ 50; 1–5 years: ≥ 40, and</p> <p>K. no signs of severe pneumonia and SaO₂ > 90 %</p> <p>L. Chest imaging (radiograph, CT scan Ultrasound may assist in diagnosis and identify complications</p> <p>*Infants < 3months of age with only fast breathing should always be considered as sever disease ↓</p>
Sever Disease	Severe pneumonia	<p>Child with cough or difficulty in breathing, plus at least one of the following:</p> <p>M. Infants blow 3months of age with fast breathing</p> <p>N. Central cyanosis or SpO₂ < 90%;</p> <p>O. SpO₂ < 94% if hemodynamically unstable</p> <p>P. severe respiratory distress (e.g. fast breathing, grunting, very severe chest indrawing);</p> <p>Q. general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions</p> <p>R. Chest imaging (as above)</p>
Critical Disease	Acute respiratory distress syndrome	<p>Onset: within 1 week of a known clinical insult or new or worsening respiratory symptoms.</p> <p>Chest imaging: bilateral opacities, not fully explained by volume</p>

		<p>overload, lobar or lung collapse, or nodules.</p> <p>Origin of pulmonary infiltrates: respiratory failure not fully explained by cardiac failure or fluid overload if no risk factor present.</p> <p>Oxygenation impairment in children: OSI = Oxygenation saturation Index using SpO₂:</p> <p><i>NB. wean FiO₂ to maintain SpO₂ ≥ 97% to calculate OSI or SpO₂/FiO₂ratio:</i></p> <ul style="list-style-type: none"> • Bilevel (NIV or CPAP) ≥ 5 cmH₂O via full face mask: PaO₂/FiO₂ ≤ 300 mmHg or SpO₂/FiO₂ ≤ 264 • Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5 • Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3 <p>Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3.</p>
Critical Disease	<p>Sepsis</p> <p>Suspected or proven infection and ≥2 age based system inflammatory response syndrome (SIRS) criteria of which one must be abnormal temperature or white blood cell count.</p> <p>Newborns: fever, lethargy, rhinorrhea, cough, tachypnea, apnea, increased work of breathing, vomiting, diarrhea, feeding intolerance or decreased intake and change in mentation. (signs of neonatal sepsis)</p> <p>Septic shock</p> <p>Any hypotension (SBP < 5th centile or >2SD below normal for age) or two of three of the following altered status; bradycardia or tachycardia (HR < 90bpm or > 160 in infants and heart rate < 70bpm or > 150bpm in children); Prolonged capillary refill (>2 sec) or weak pulse ; fast breathing ; mottled or cool skin or petechial or purpuric rash; high lactate, reduced urine output; Hyperthermia or hypothermia</p>	

iii. Multisystem inflammatory disorders in pediatric patients with COVID-19

Table 3-4: World Health Organization surveillance definition of multisystem inflammatory disease in COVID 19

<p>WHO has defined this multisystem inflammatory disease as:</p> <p>Children and adolescents 0–19 years of age with fever > 3 days; AND two of the following:</p> <ul style="list-style-type: none">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 (diarrhea, vomiting, or abdominal pain). <p>AND</p> <ul style="list-style-type: none">• Elevated markers of inflammation such as ESR, C-reactive protein, or procalcitonin. <p>AND</p> <ul style="list-style-type: none">• No other obvious microbial cause of inflammation, including bacterial sepsis, staphylococcal or streptococcal shock syndromes. <p>AND</p> <ul style="list-style-type: none">• Evidence of COVID-19 (RT-PCR, antigen test or serology positive), or likely contact with patients with COVID-19.

Kawasaki like disease (KD): present with fever ≥ 5 days + four of the following clinical criteria

- Bilateral non exudative conjunctival injection with limbal sparing,
- Enanthem : red oral and pharyngeal mucosa with strawberry tongue & red cracked lips;
- Edema hands and feet
- Rash: various forms (maculopapular, erythema multiforme, or scarlatiniform)
- Non-suppurative cervical lymphadenopathy, usually unilateral, size>1.5 Cm

Incomplete Kawasaki disease: Children present with fever present with fever ≥ 5 days + <4 of the above clinical criteria

Kawasaki disease shock syndrome (KDSS) present with KD criteria plus hypotension.

Macrophage Activation syndrome (MAS) present with high, non-remitting fever, hepatosplenomegaly, generalized lymphadenopathy, CNS dysfunction, and hemorrhagic manifestations. Typical laboratory abnormalities are : pancytopenia, increased (ferritin, liver enzymes, LDH, triglycerides, D-dimers, and soluble interleukin-2 (IL-2) receptor [sCD25]), and decreased fibrinogen levels.

iv. Laboratory Tests

A. Confirmatory Test

Child friendly rooms with compassionate and respective care easily make children cooperative for sample taking. If resources are available test all newborns and children who have come into contact with COVID-19 positive cases, however if resources are limited, test only symptomatic newborns and children. Nasopharyngeal swabs for COVID 19:

- For newborns should be taken at 48 hours of age and the repeat test can be done at least 48 hours apart or at discharge
- For preterm babies with RDS wait until 72 hours and repeat the test on day 5 (to reduce the false negative rate).
- The sample for RT-PCR for newborns and children can be collected using nasopharynx, oropharynx or nasal swab.

B. Laboratory Investigations

The lists of investigations need to be done based on the disease severity and availability ; Complete Blood Count, CRP, Blood culture (for severe and critical disease preferably before

initiation of antibiotics), Renal Function test , Liver Function test , Random Blood Sugar Serum Electrolyte, Coagulation tests : PT, PTT, INR, D-Dimer, Chest Imaging : radiograph, CT, ultrasound for Moderate, severe and critical disease , echocardiography, serum ferritin, LDH, triglycerides, fibrinogen levels, Troponin.

C. Radiographic features in children; are also somewhat different than adults; Chest x-rays and CT scans are often normal; if abnormalities are present it appears as bilateral pneumonia. CT-changes may be found in asymptomatic children, mild and bilateral ground glass appearance with less peripheral predominance than is reportedly found in adults. In newborns CXR might show thickened lung textures and CT may reveal patchy infiltrates (

D. Additional Lab investigations for malaria, dengue fever, tuberculosis, relapsing fever, typhoid fever etc should be considered depending on the local epidemiology and patient symptoms.

v. Management

A. Home /isolation center management for mild and moderate illness

- Children with suspected or confirmed COVID-19 infection should be kept together with caregiver who has suspected or confirmed COVID-19 infection.
- If caregivers are negative and child test positive, allow one caregiver to stay with the child after assessing or risk of severe disease in the care givers and obtaining consent.. If such option is not available, make sure that the young children have at least one attendant taking care of them at treatment/isolation areas. Proper PPE should be provided for the caregivers
- If possible, use a separate bedroom; all Infection prevention and control (IPC) measures should be practiced as described in the IPC section of the adult guideline.
- Mothers should continue breast feeding their infected infants wearing appropriate face mask.
- Avoid direct contact with respiratory and oral secretions and stool, also keep washing hands with soap and water, if available can use disposable plastic or latex gloves.

B. Management of COVID 19 children with hypoxemia

Hypoxemia is identified one of the major determinant of death in children with severe pneumonia. Hypoxemia is detected via pulse oximeter or clinical symptoms(Refer to section on oxygen therapy).

Table 3-5: Management of hypoxemia in children with COVID 19

CRITERIA (Child)	CLASSIFICATION
<ul style="list-style-type: none"> • Symptom: Cough, fever, shortness of breath • Fast breathing (breath per minutes): <ul style="list-style-type: none"> ○ < 2 months: ≥ 60; ○ 2–11 months: ≥ 50; ○ 1–5 years: ≥ 40 ○ 5-15 years: ≥ 30 ○ 16 years or older: ≥ 22 • Spo₂ $\geq 90\%$ on room air (hemodynamically stable) 	<p style="text-align: center;">PNEUMONIA with NO HYPOXEMIA</p> <ul style="list-style-type: none"> • All infants 0-3 months (fast breathing considered as sever disease) so go to the red box • > 3month (Home / isolation center care) • Give P.O antibiotics and see the child after 2 days/or at any time if comes back with danger sign refer yellow box • Give antipyretics and advice on adequate nutrition and rehydration
<ul style="list-style-type: none"> • Symptoms and fast breathing (as above) • Central cyanosis or SpO₂ < 94% if hemodynamically unstable; • Severe respiratory distress (nasal flaring, head nodding, grunting, chest indrawing) • General danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions 	<p style="text-align: center;">SEVER PNEUMONIA with MILD-MODERATE HYPOXEMIA</p> <ul style="list-style-type: none"> • Admit to COVID-19 ward • Initiate oxygen using nasal prong or cannula until Spo₂ >94%* • Meticulous monitoring of Spo₂ • Check RBS.(for non- malnourished <45mg/dl and malnourished <54mg/dl); give dextrose 5ml/kg 10% dextrose • Convulsing child: give Dextrose (as above) and Diazepam 0.1ml/kg rectal or 0.05ml/kg I.V 10 mg/2 ml preparation (refer the local guideline for further management) • I.V Antibiotics as per the local protocol
<p>The above and/or Persistently altered consciousness and/or Bradypnea; Spo₂ < 90% despite high flow Oxygen administration</p>	<p style="text-align: center;">SEVER PNEUMONIA/DISEASE with SEVER HYPOXEMIA</p> <p>Transfer to ICU (ARDS can be defined while patient is in ICU, look at on the clinical guideline on severity assessment :</p> <ul style="list-style-type: none"> • Non Invasive ventilation or Invasive Ventilation are recommended based on patient condition with all the necessary precautions of minimizing aerosolization

Table 3-6: Positive pressure ventilation in children 0 month to 18 years of age with COVID-19 infection

	Indications	Contraindication	Mode of delivery
Non-invasive ventilation support	<p>Newborns with respiratory distress and unable to maintain Spo₂ of >90% with intranasal or head box oxygen</p> <p>Respiratory distress due to:</p> <ul style="list-style-type: none"> Sever pneumonia Acute lung injury Chronic lung disease Cardiogenic pulmonary edema <p>Patient weaned of invasive mechanical ventilation</p> <p>NB : The child have to be able to maintain the airway open and handle its' secretion</p>	<p>Surgery, trauma or deformity of the face</p> <p>Total obstruction of the upper airways.</p> <p>Failure of airway protective reflex.</p> <p>High risk of aspiration (vomit or upper, GI hemorrhage),</p> <p>Undrained pneumothorax</p> <p>Non respiratory organ failure: change in mental status , digestive hemorrhage, cardiac, arrhythmia and hemodynamic instability</p>	<p>Continuous Positive Air way pressure(CPAP) start at pressure depth of 5cmH₂O and increase up to 8 cm H₂O, if the baby is not improving can go up to 10cm H₂O.</p> <p>Oxygenation targets for newborn = 90-95% spo₂</p> <p>For children above 1months of age the target should be above 94%</p> <p>Bilevel Positive airway Pressure (BiPAP) with maximum of 10 of driving pressure</p> <p>The interface of administration can be nasal, face masks, helmet</p> <p>All precautions should be taken as there is risk of aerosolization.</p>
Invasive mechanical ventilation	<p>Severe Hypoxemia: unable to maintain target oxygen saturation with</p>	<p>A conscious patient who otherwise can be</p>	<p>Use preferably cuffed tubes</p> <p>A lower level of plateau</p>

	<p>high flow of oxygen</p> <p>Change in mental status</p> <p>Increased work of breathing with exhaustion</p> <p>Patients with septic shock unresponsive to fluid and inotropes</p> <p>Newborns with recurrent or prolonged apnea, in shock needing more than 2 inotropes with congenital diaphragmatic hernia</p>	<p>treated with NIV</p>	<p>pressure (< 28 cmH₂O), and lower target of pH is permitted (7.15–7.30).</p> <p>Tidal volumes: 3-6mL/kg Predicted Birth Weight (PBW) in the case of poor respiratory system compliance, and 5–8 mL/kg PBW with better preserved compliance</p> <p>Recommended maximal positive end pressure (PEEP) is 15 cmH₂O. Watch for hemodynamic stability while escalating the PEEP</p> <p>In patients with ventilator dyssynchrony and severe ARDS: consider deep sedation and neuromuscular blockage</p> <p>Institute standard care for patient on mechanical care ventilator: ventilator pneumonia bundle, use of proton pump inhibitor, avoid pressure ulcer</p>
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C. Fluid therapy

General principle

- A child with COVID-19 can lose fluid either due to diarrhea secondary to the COVID-19 itself or can have sepsis with septic shock.
- Secure oxygen for all children in shock
- Before starting any fluid management, the child has to be weighed and quickly assessed for nutritional status as assessment of fluid deficit/ shock differs in well and malnourished child.
- Fluid management depends on fluid deficit level, cardiac and renal status of the patient
- Children with COVID should be treated cautiously with I.V fluids as aggressive resuscitation may worsen oxygenation and cardiac function.
- Record base line and monitor throughout the following important parameters: respiratory rate, pulse rate, capillary refill, blood pressure, liver size, body weight, level of consciousness, urine output
- Secure at least two intravenous/intraosseous lines
- Make a proper selection of fluid type, dose, and decide on further management in well-nourished and malnourished child.
- Do not use hypotonic crystalloids, starches or gelatins
- If there is no central line, vasopressors can be given using peripheral or intraosseous line, checking cautiously for extravasations.
- Unless the child is severely ill with septic shock or on scheduled procedure, enteral feeding is preferable with the aid nasogastric tube
- Calculate fluid balance at least twice daily while on fluid therapy.

D. Management of Septic Shock

i. Management of Septic Shock in Non-Malnourished Child

- Provide oxygen for all patients with septic shock
- Measure Random Blood Sugar (RBS)
- Start with 20ml/kg aliquots for at least 3 times with assessment for fluid overload with each bolus: jugular venous distention, crackles on lungs , pulmonary oedema or hepatomegaly, if there is fluid over load stop fluid

- Administer **Epinephrine** 0.1-0.3mcg/kg /hour if signs of fluid overload are apparent or the following persist after two fluid bolus:
 - Altered mental state;
 - Bradycardia or tachycardia (hr < 90 bpm or > 160 bpm in infants and hr < 70 bpm or > 150 bpm in children);
 - Prolonged capillary refill (> 2 seconds) or feeble pulses;
 - Tachypnoea; mottled or cool skin or petechial or purpuric rash;
 - Increased lactate; oliguria persists after two repeat boluses; or
 - Age-appropriate blood pressure targets are not achieved
- Dopamine can be added if shock persists despite optimal dose of epinephrine
- If sepsis refractory to fluid and inotropes: Hydrocortisone 2 mg/kg IV (maximum 100 mg), followed by 1 mg/kg (maximum 50mg) every six hours for a maximum of seven days or until all vasoactive infusions have been discontinued for at least 12 hours, whichever comes first.
- Consider blood transfusion if hgb <10g/dl
- Take blood culture and initiate appropriate antibiotics within the first hour

ii. Management of septic shock in severely malnourished patients

Table 3-7: Management of septic shock in severely malnourished patients

	A child with Malnutrition
Type of fluid	N/S or R/L with 5% Dextrose/glucose; Half strength Darrows solution
Amount	15ml/kg
How fast?	Over 1 hour
Assess for Improvement: assess the child every 5-10 minutes	<p>Good sign: PR and RR falls, good capillary refill, change in wakefulness</p> <p>Signs of fluid over load: If Pulse increase by 15/min and RR increase by 5/min</p> <p>Signs of persistent shock:</p> <ul style="list-style-type: none"> • altered mental state;

	<ul style="list-style-type: none"> • bradycardia or tachycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children); • prolonged capillary refill (> 2 seconds) or feeble pulses; • tachypnoea; mottled or cool skin or petechial or purpuric rash; increased lactate; oliguria persists after two repeat boluses; Or • age-appropriate blood pressure targets are not achieved <p>Consider giving Epinephrine and Dopamine sequentially as above Or one or the other if one is not available</p> <p>Measure Random Blood Sugar (RBS) meticulously.</p>
If the child is not improving with the first dose of fluid	<p>Give maintenance I.V fluids 4ml/kg while waiting for blood</p> <p>Transfuse with whole blood at 10 ml/kg slowly over 3 hrs (use packed RBC if signs of heart failure)</p> <p>Keep the child warm</p>

E. Special Management of Hyper Inflammatory Disease

Children presenting with hyper inflammatory disease such as Kawasaki like disease (KD), Kawasaki disease shock syndrome (KDSS) and Macrophage Activation syndrome (MAS) should include two modalities of treatment based on **Kobayashi score**.

Kobayashi score is used to predict Intravenous immunoglobulin (IVIG) resistance, hence will help to select patients for additional early corticosteroid treatment:

- White blood cell count > $12 \times 10^3/\text{mm}^3$
- Platelet count < $35 \times 10^4/\text{mm}^3$
- C-reactive protein > 3+
- Hematocrit < 35%
- Albumin < 3.5 g/dL
- Age < 12 months
- Sex Male

- Thus all children with hyperinflammatory conditions (KD, KDSS, and MAS) should be treated with Intravenous Immunoglobulin (IVIG) 2g/kg stat dose and then:
- Children with Kobayashi score of <5: treat with Aspirin 50-80mg/kg/day for 5 days,

- Children with Kobayashi score ≥ 5 (including those with KDSS and MAS): Aspirin 30mg/kg/day+ Methylprednisolone 2mg/kg/day for 5 days followed by tapering over 2wks
- Aspirin will be maintained at 3-5mg/kg/d for 8 weeks (low dose for anti-platelet activity)
- Response to treatment should be guided with resolution symptoms and signs.
- Children should have echocardiographic evaluation at cardiac clinic
 - If initial Echocardiography was normal a repeat one can be done at week 2-3 and 6-8.
 - If initial Echocardiography was abnormal more frequent echocardiographies should be done with cardiologist evaluation.
- Resolution of other laboratory tests such as ESR may take several weeks and can be done while the patient is seen as an outpatient.

F. Pharmacotherapy of children with COVID-19

1. Systemic Corticosteroid

- Routine use of systemic corticosteroid as a treatment for viral pneumonia is not recommended.
- Recent study showed that Dexamethasone has reduced the death rate of severe and critically sick patients with COVID 19
- Decisions to initiate glucocorticoids should be made case by case basis; dosing regimens described on table 3.8

Table 3-8: Dosing of Steroid for moderate to severe COVID 19 disease

Mild	Moderate	Severe critical
No role of steroid in mild cases, it can harm during viremia phase	NB: Do not delay in giving the first dose of steroid if indicated, if delay is expected for admission oral steroids should be given.	
	Dexamethasone 0.1-0.2mg/kg(max6mg)I.V/day for 3-5 days	Dexamethasone 0.2-0.4mg/mg/day(max6mg)I.V for 5-7 days
	Injection: methyl-prednisolone 0-5-1mg/kg(Max 40 to 60mg)for 3-5 days	Injection: methyl prednisolone 1-2mg/kg/day(max 80mg) for 5-7 days
		Increase the dos if already given
		In patients with worsening clinical conditions increase the dose 80mg q 12 hourly, then titrate down as appropriate
	Avoid dexamethasone if Remdesevir is planned	
<p>NB: Endocrine experts recommend that if steroids are given for <2 weeks there may not be a need to plan tapering dose but if there is need for tapering dose should it be as follows: next five days after the usual treatment dose: give half dose, then next 2 days give quarter dose, then next 3 days give one eightieth (1/8th), then you can stop.</p>		

2. Empiric Antibiotics

Only children with moderate disease in whom we consider bacterial infection and those with sever and critical disease should receive empiric antibiotics based on the clinical diagnosis and should be modified depending on the culture and sensitivity result (Refer to Table 3.9 for choice of antibiotics).

Table 3-9: Antibiotics treatment for children with moderate to critical illness of COVID

19

Severity		Patient' age	Action
Mild disease	Upper respiratory tract infection	0-19 years	Transfer to COVID-19 surge facility <i>OR</i> discharge home with instructions for self-quarantine x 14 days <i>AND</i> Acetaminophen 10-15 mg/kg/dose PO or suppository q4-6h PRN, max dose of 90mg/kg/day
Moderate Disease	Pneumonia	Age : >3- 59 months Vaccinated	Home/ facility isolation and treatment Amoxicillin 90 mg/kg/day divided q12h PO/5 days
		Unvaccinated	Amoxicillin – clavulinate P.O
		Malnourished	Amoxacillin + Gentamycin 5mg/kg/day I.M
		Age : >5 -19 years	Azythromycin 10mg /kg/day for day 1 and 5mg/kg/day for the rest of 4 days
Severe disease	Pneumonia with co morbidity <i>OR</i> Severe pneumonia in all children	Newborns sepsis*: Early onset Late onset (No meningitis)	Ampicillin 100mg/kg/day divided q8h IV Gentamicin 5mg/kg/day
		Late onset with meningitis	Ampicillin 300 mg /kg/day divided q6h <i>AND</i> Cefotaxime 200 mg/kg/ day divided q12h
		Age: 1-3 months	Ampicillin 200 mg divided q 6h <i>AND</i> Gentamicin 7.5 mg /kg/day
		Age: > 3-59 months	Cefotaxime 150mg /kg/day divided q8h <i>OR</i> Ceftriaxone 75mg /kg/day q 24h for five days <i>AND</i> Azythromycin 10mg /kg/day for day 1 and 5mg/kg/day for the rest of 4 days
		Age : >5 -19 years	Ceftriaxone /Cefotaxime + Azythromycin (dose as above)
		Malnourished	Ceftriaxone /Cefotaxime + Gentamicin (dose as above)
		Critical Disease	ARDS Sepsis Septic shock
<p>*Duration of management of newborns depend on the type of organ involved. **Discontinue antibiotics within 48 hours if clinically not deteriorating <i>AND</i> cultures (sputum, blood, sterile specimen) do not reveal a bacterial pathogen; clinical judgment should prevail over any single lab values (such as WBC or CRP). Consider adding vancomycin <i>ONLY</i> for patients known to be MRSA infected; reassess daily. †Risk factors (look at on the Co-morbid conditions)</p>			

G. Other supportive therapy for newborns

Indications for caffeine/ aminophylline use

- Preterm infants < 34 weeks if recurrent apnea (> 2 apneas/ h or > 3 in 2 consecutive hours).
- As prophylaxis for those with BW <1250gram or < 32 weeks of gestation age

- Prior to extubation in preterm infants >1250gm

Dosing

- Loading dose 20mg/kg caffeine citrate(10mg/kg of caffeine base) P.O or I.V followed by maintenance doses of 5-8mg/kg of caffeine citrate (2.5-5 mg/kg of base) once daily dose beginning 24hrs after loading dose

Caffeine is discontinued:

- 48 hours after extubation
- Apnea free for 7 days
- If started as prophylaxis for those with BW <1250gram or GA <32 weeks it is generally discontinued at 34-36 week of corrected age and if no apneic spells have occurred in last 7 days
- Effect of caffeine likely remains for approximately 1 week after discontinuation. If caffeine is stopped, the baby should be monitored for apnea for 5-7 days
- Aminophylline can also be used with loading dose of 5 mg/kg, followed by 2 mg/kg /dose TID. However, the therapeutic index of aminophylline is narrower

H. Anticoagulant use

Generally younger pediatrics patients have a tendency to have bleeding rather than coagulation disorder in sever disease conditions, however, there might need a need to have anticoagulant therapy for older children and adolescents admitted with COVID-19.

Table 3-10: Use of anticoagulant in older and adolescent children

Anticoagulants	Moderate disease	Severe /critical disease
<p>Contradicted if HAS-BLED score more than 3 indicates high risk of bleeding</p> <p>HAS BLED SCORE: hypertension -1 point</p> <p>Abnormal liver function -1 point</p> <p>Abnormal Liver function -1point</p> <p>Stroke -1point ;Labile INR-1 point</p> <p>Alcohol-1 point</p> <ul style="list-style-type: none"> • ALSO contraindicated an active bleeding , if emergency surgery is planned ,platelets <20,000/mm:BP>200/120mmg/Hg, fibrinogen level <0.5 gm/It • Use D-Dimer and sepsis induced coagulopathy (SIC)score (sofa score ,INR ,platelet counts)of more than or equal to 4 portends high thrombotic risk • Monitor anti-Xa activity in underweight and obese patients ,those with chronic renal failure and in those patients with an increasing D-Dimer aiming for anti Xa activity of 0.6 - 1.1Uml • LMWH is given even if coagulation tests are abnormal i.e prolonged PT or 	<p>Enoxaparin 40mg SC/day</p> <p>Dalteparin 2500 IU SC /day</p> <p>In End stage renal disease</p> <p>Unfractionated Heparin(UFH)5000u SC BID</p>	<p>Enoxaparin 40 mg SC BID or</p> <p>0.5mg/kg in two divided doses</p> <p>Titrate the dose as per the value of D-dinner</p>

<p>aPTT is not a contraindication for LMWH</p> <ul style="list-style-type: none">• Patient on anti-platelet agents follow ASA/ESC and ISTH guidelines		
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3.7.2 Surgical and anesthesia care during covid-19 pandemic

Introduction

The current outbreak of COVID-19 has resulted in significant change in surgical practices in the hospitals. As part of the response to this challenge, many hospitals are canceling or reducing out-patient visits as part of their COVID-19 containment strategy. It is most regrettable that a large number of surgical patients are inconvenienced, and some may be at risk of missed or delayed OPD visits. The duration of disruption to services is difficult to predict. Patients with time-sensitive surgical conditions or tumors have to be prioritized while patients with surgical conditions that require less urgent management such as asymptomatic hernias or obesity have been postponed indefinitely. The challenge now is how do hospitals transition from the current pandemic mode of operation back to business as usual, and ensure that all patients receive equitable, timely and high-quality surgical care during all phases of the public health crisis.

i. Principle of management of Emergency surgery

Patients requiring surgery during the COVID-19 crisis have been classified in the following groups:

- Priority level 1a Emergency - operation needed within 24 hours
- Priority level 1b Urgent - operation needed with 72 hours
- Priority level 2 Surgery- that can be deferred for up to 4 weeks
- Priority level 3 Surgery- that can be delayed for up to 3 months
- Priority level 4 Surgery- that can be delayed for more than 3 months

Principle: Facilities should establish a prioritization policy committee consisting of surgery, anesthesia and nursing leadership to develop a prioritization strategy appropriate to the immediate patient needs.

Considerations: Prioritization policy committee strategy decisions should address case scheduling and prioritization and should account for the following:

- List of previously cancelled and postponed cases
- Specialties' prioritization (cancer, organ transplants, cardiac, trauma).
- Strategy for phased opening of operating rooms
- Outpatient/ambulatory cases start surgery (minor surgeries) first followed by inpatient surgeries
- All operating rooms simultaneously – will require more personnel and material

- Strategy for increasing “OR/procedural time” availability (e.g., extended hours, weekends).
- Issues associated with increased OR/procedural volume.
- Ensure primary personnel availability commensurate with increased volume and hours (e.g., surgery, anesthesia, nursing, housekeeping, engineering, sterile processing, etc.).
- Ensure adjunct personnel availability (e.g., pathology, radiology, etc.).
- Ensure supply availability for planned procedures (e.g., anesthesia drugs, procedure-related medications, sutures, disposable and non -disposable surgical instruments).
- Ensure adequacy and availability of inpatient hospital beds and intensive care beds and ventilators for the expected postoperative care

a. Emergency surgical Procedure

Emergency surgeries in COVID 19 patients have become a concern. These patients deserve to get emergency surgical care. However, there must be maximum care so that other surgical patients should not expose to the infection due to the material and environmental contamination during the care. There should be maximal protection of the medical professionals while handling these patients. Therefore, it is a must to have a separate operation theatre and patient isolation room. In addition, COVID 19 surgical center should be opened per demand but not in all COVID treatment centers.

b. Infrastructure

The operation theatre will be easy access able and close to ICU.

Five rooms are required:

- Changing room
- Ante room/ preparation room/ supply room
- Induction room/ main operation room
- Recovery room
- Utility room

The operation room should be cleaned after 1-hour completion of surgery; this is to minimize risk of infection transmission to the cleaners.

c. Preparation before bringing the patient to OR

- Planning ahead of time is important to allow sufficient time for staff to apply personal protective equipment (PPE) and barrier precautions.
- Use check list to make sure all PPE are in place before bringing patient to OR and start anesthesia
- Remove all jewelry and watches, leave your cell phone behind
- Prepare all the necessary Anesthesia equipment and Drugs using the designated checklist
- PPE for aerosol precaution is necessary including long sleeve gown, Face shield, N95 mask, double glove, Foot wear, locally prepared plastic coat.
- Hydro-alcoholic washing of the hands should occur before PPE dressing.
- Dressing should occur in the following order: isolation gown, mask, glasses, hood to protect the glasses temples and the mask laces, gloves.
- Undressing should occur in the following order: gloves, hydro-alcoholic hand washing, hood, hydroalcoholic hand washing, glasses, isolation gown, hydro-alcoholic hand washing, mask (without touching the outside surface of it), and hydro-alcoholic hand washing.
- Contact between the hands and the face or hair should be avoided before the last hydro-alcoholic hand washing. Undressing should ideally occur outside the room where the patient was managed, to avoid contamination by eventual residual air droplets, but in a secure environment where only involved care givers are present.
- The use of specific shoes, reserved for moving inside the dedicated COVID-19 environment, should be considered. If such shoes exist, they should be carefully cleaned between each managed case

d. Transport of COVID 19 Suspected or confirmed cases

- The transfer of the patient to and from the OR should be organized and planned in advance.
- Hospital security is responsible for clearing the route from the ward or intensive care unit (ICU) to the OR, including the elevators.
- Stretcher-bearers and welcoming personal should wear an personal protection equipment (PPE),
- The transfer from the isolation ward to the OR will be done by the ward nurses in full personal protective equipment (PPE) including a well-fitting N95 mask, goggles or face shield, splash-resistant gown, and boot covers.

- When moving, the patient should always hold a correctly adjusted surgical mask, and should ideally be placed in an impermeable cover. The sides of the bed should be cleaned before transfer.
- For patients coming from the ICU, a dedicated transport ventilator is used. To avoid aerosolisation, the gas flow is turned off and the endotracheal tube clamped with forceps during switching of ventilators.
- Circulating nurse and runner will send back patient to Isolation ward
- Circulating nurse and Anesthetist will send back patient to ICU-
- Training for PPE dressing and undressing should occur in advance (see below) to avoid errors and contamination. Maximum risk of contamination occurs during undressing, which should be done under the supervision of a colleague
- Strict hands hygiene should occur before PPE dressing and after undressing.
- The OR that will receive the patient should be put in negative pressure.
- During transfer of the patient, the PACU and any bed-hold waiting area should be bypassed.

e. Human resource

Minimize number of people in the OR for surgery have:

- Senior surgeon
- Resident/ Assistant
- Scrub nurse
- Circulating nurse
- Runner (should not enter the induction/main OR)

To provide anesthesia care, avail

- One senior airway operator (Anesthesiologist/ senior Anesthetist)
- Second airway operator (Anesthesiologist/Anesthetist/Anesthesia resident)

Allocate roles

- Team leader
- Most experienced person for intubation
- Second supporter on intubation
- Medication
- Monitor patient

- Runner outside room
- Who do call for help?

f. Anesthetic management

- Ideally, the management of COVID-19 patients should occur in a specifically dedicated OR.
- The number of people involved in the procedure should be limited to a minimum. Entering or exiting the OR, as well as exchange of persons should be avoided during the entire procedure.
- Reference staff members should be appointed to take care of those procedures, or at least to guide them.
- Hydrophobic filters, with a high filtration capacity, should be used between the facial mask or the tube and the Y piece of the ventilation circuit tubes, as well as between the expiratory tube and the expiratory valve. All filters should be replaced after the procedure.
- The gas sampling line should be connected upstream of the filter connected to the Y piece.
- Soda lime should be changed before the procedure to avoid unnecessary disconnections.
- Closed-circuit suction systems should be used, equipped with disposable filters, to avoid contaminating the usual aspiration system.
- All drugs and material should be prepared in advance. A series of clean gloves should be ready, to allow stakeholders changing gloves whenever manipulating new drugs or material extracted from the anesthesia chart.
- Because of the risk of aerosolisation during the management of the airway (tracheal intubation and extubation), all present personals that are close to the patient at that time should be equipped with adequate PPE and FFP2 masks.
- A meticulous evaluation of the airway for the detection of possible difficult intubation should occur before starting the procedure.
- Airway management should be handled by the most experienced anesthesiologist.
- Rapid sequence induction without mask ventilation should be preferred, with a 100% pre oxygenation.

Pre oxygenation can be performed after covering the patient's mouth and nose with two pieces of wet gauze. If mask ventilation occurs, the mask should be adjusted with two hands to avoid leaks.

- The lowest fresh gas flows should be used throughout the procedure.
- Awake fiber optic intubation should be avoided because of the risk of cough and aerosolisation.
- The use of a video-laryngoscope, which keeps the operator away from the patient's mouth, should be considered when available.
- Tracheal intubation is preferable to the placement of a laryngeal mask. Mask bagging and noninvasive ventilation should be avoided.
- The tube should be clamped before insertion into the trachea. Once in place, the cuff should be inflated and the tube still clamped before connection to the ventilator.
- The positive pressure ventilation should be started only when the tube cuff is adequately inflated, after removing the tube clamp.
- Disconnection of the ventilation circuit should be avoided. In case of disconnection, the hydrophobic filter should be left in place on the tube, and the tube clamped until reconnected. Any aspiration manoeuvre in mouth or tube should be performed with maximal caution, in a paralyzed patient to avoid cough.
- Adequate muscle relaxation is recommended, to avoid cough and aerosolisation.
- After the procedure, if the respiratory status of the patient permits, emergence occurs in the OR with the same protecting measures as during induction of anesthesia. Once extubated and autonomous regarding ventilation, the patient is reequipped with a surgical mask as fast as possible. Thereafter, the patient is directly transferred to his/her initial room on the COVID-19 ward, or to a designated COVID-19 ward if coming initially from the emergency unit, without transiting through the PACU. The same precautions as those applied during admission of the patient to the OR are also of application during this transfer.
- After the procedure, all disposable material is eliminated in sealed containers that are present in the room beforehand. Any other non-disposable material is cleaned with standard disinfectant soap. All non-disposable material present in the room should not be used in another room, including easily movable material such as a stethoscope, syringe pumps, etc. Manipulation of all materials should be done by trained personal, adequately equipped with PPE and surgical mask.

- In case of loco-regional anesthesia, the patient should always wear a surgical mask, and the medical team should be equipped with adequate PPE and surgical mask. The anesthetic procedure should be performed by the most experienced anesthesiologist.
- Unnecessary transfers of COVID-19 patients should be avoided. For example, the insertion of a central venous line should preferably be performed in the room of the patient, on the COVID-19 ward.

Table 3-11: Check list to be used before giving anesthesia for suspected or confirmed COVID19 patient

Prepare to enter room	Prepare equipment	Prepare patient	Prepare team	Prepare for difficulty
<ul style="list-style-type: none"> • Minimize number of OR team • Eye protection • N95 mask • Double glove • Check RSI drug box • Thiopental 3-5mg/kg • Ketamin 1-2mg/kg • Fentanyl 1-2mcg/kg • Sux 1-2mg/kg • Emergency drugs • Atropine • Adrenalin 	<ul style="list-style-type: none"> • Checked equipment • Self-inflating bag • Working suction • Two endotracheal tubes • Two laryngoscope • Bougie/stylet • Guedel airway • Supraglottic airway device • Video laryngoscope • Tube clamp • HME • Do you have the drugs required? 	<ul style="list-style-type: none"> • Apply monitor • ETCO2 • SPO2 • BP • ECG • Reliable and secured IV access • Optimize position • Pre-oxygenation • With 100% oxygen for 5 mins • Avoid CPAP/bagging • Optimize patient state • Fluid/pressor 	<ul style="list-style-type: none"> • Allocate roles • Team leader • Most senior intubator • Second intubator • Cricoid pressure • Drugs • Monitor patient • Runner outside room • Who do we call for 	<ul style="list-style-type: none"> • Verbalize airway plan • Plan • Plan A • Drugs and laryngoscope • Intubate with HMEF attached to endotracheal tube • Inflate endotracheal tube • No hand ventilation , pre-intubation • Connect circuit and ventilator immediately after intubation • Plan B/C • Supraglottic airway

	<ul style="list-style-type: none"> • Long acting relaxant • Pressor/inotrope • Verbalize quantity and volume of drugs • Plan of Maintenance of anaesthesia 	<ul style="list-style-type: none"> • Aspirate NG tube if it's in place 	<p>help?</p>	<ul style="list-style-type: none"> • Plan D • Surgical Airway <p>pre RSI briefing</p> <ul style="list-style-type: none"> • No chest auscultation • Minimize circuit disconnection and if needed clamp endotracheal tube • No open suction
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Table 3-12: Check list to be used in the Operation room for suspected or confirmed COVID19 patient

Sign in	Intubation	scrubbing	Intra op	Post op
<p>Staff Anaesthesit, surgeon, circulating nurse</p>	<p>Stuff Anaesthetics medical and Nursing staff only</p>	<p>Staff Most senior surgical staff available</p>	<p>Staff Anaesthetic surgical and nursing staff</p>	<p>All staff</p>
<ul style="list-style-type: none"> • Site marking, consent and appropriately informing family members should be completed usual. • Sign in at reception should be modified should ensure minimal unnecessary staff exposure. • Hospital departments should agree this locally and advice staff. • Suspending this process allows for retention of PPE equipment and less staff risk <p>Managing COVID-19 in surgical systems-</p>	<ul style="list-style-type: none"> • This is considered an aerosol Generating Procedure(A GGP).i.e. • Requires standard contact and airborne procedure protocols. • Surgeons should not be in the operating theatre for intubation unless concurrent management of bleeding etc. Requires their presence. • Under no circumstances should staff enter the operating room without properly applied PPE <p>Consensus statement; safe airway society</p>	<p>Work in teams of two (buddy) to ensure correct application of equipment,</p> <p>Equipment advice</p> <p>Masks; FFP3 or higher. (FFP3Mask should fit face securely and if not surgeon should be fitted for an N95 or PAPR.</p> <p>Eye Wear: Full coverage Eye protection.</p> <p>Foot wear: Though not part of COVID-19 PPE, consider the use of shoe covers as with any operation.</p> <p>Gloves: double Glove .Alcohol-based hand prep of PPE gloves may be appropriate.</p> <p>Gown: waterproof</p>	<p>All surgery should be performed in quick and efficient manner, the following principle apply to all surgeries but particularly laparoscopic:</p> <ul style="list-style-type: none"> • Strict Haemostasis. • Electro cautery at low settings • Liberal use of suction • Reduce Trendelenburg • Low pneumo peritoneum pressure levels ;consider open surgery as an an alternative, • Avoid long dissection in one area • Avoid Harmonic or ultrasound Dissection if possible. <p>Minimally invasive surgery and the novel</p>	<ul style="list-style-type: none"> • All PPE should be removed inside the operating room. • Exposed skin, outside of gown, mask, goggles, and gloves, are presumed to be infected and should not be touched directly. • Follow PPE removal and disposal guidelines on CDC website. • Order is important: First gloves then gown<then wash or alcohol rub hands>then eyewear and mask, then Wash

	principles of airway management and tracheal intubation specific to the COVID-19 adult patient group	Gown .If not available water proof apron, underneath standard gown.	coronavirus outbreak	or alcohol
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Precautions for infection control during the preoperative evaluation of patients

- Preoperative and pre anesthetic evaluation should be limited to those patients whose surgery cannot reasonably be delayed.
- Medical staff involved in the preoperative evaluation of patients should ideally wear a disposable isolation gown, a surgical mask, a skull cap and gloves.
- Local organization should insure social distance between patients themselves, and between patients and medical staff. Patients are seen one by one to avoid congestion in the medical office and in the clinic.
- Tympanic temperature (electronic ear thermometer) is routinely checked for each patient stepping into the clinic (electronic ear thermometer), for the detection of suspect patients and correct orientation thereafter, eventually towards a COVID dedicated ward.
- Ear thermometers, blood pressure monitors, pulse oximeters, and stethoscopes should be cleaned with ethanol each time for every use.
- Hydro-alcoholic hand washing should occur after each contact with patients.
- Disinfectant wipes should be used to wipe and disinfect the surfaces of table tops and chairs.

ii. Elective Surgical Procedures

Guided by the trajectory of cases in other countries, it is very likely that health care infrastructure and resources, particularly as it relates to care of the most critically ill patients, are likely to be strained over the coming weeks. Social distancing, crowd avoidance, and other techniques do help to flatten the curve of the dissemination of Coronavirus Disease

2019 (COVID-19), but beyond that, it is appropriate to be forward thinking regarding those patients who will, nevertheless, become infected.

Key considerations before resuming elective services

Timing: There should be a sustained reduction in the rate of new COVID-19 cases for a period of time past the peak to ensure necessary staff and associated facilities (eg ICU) are available.

Testing: Hospitals should know their diagnostic testing availability and develop clear policies for addressing testing requirements and frequency for staff and patients. Make sure that all patients should be tested negative before admission and separate isolation is dedicated for patient whose results are pending. The result has to be ready before 72 hours of subjected to surgical intervention.

PPE: Hospitals should have adequate PPE and surgical supplies appropriate to the number and type of procedures performed, and clear policies on how and when to use them.

Capacity: Recognize and improve internal capacity of the facility (surgical ward, ICU HR shortage, and power interruption) If there is no enough internal capacity, it might be useful to consider engaging with external partners for temporary support.

Data: Improve data capturing and usage to improve surgical efficiency.

Communication: Share all necessary information within surgical patients who want to understand what's different about having surgery during the pandemic.

Efficiency: Design a new approach to scheduling to minimize cancellations, design backlog clearance mechanism based on the local capacity, and consider day care surgery for selected procedures, Promote essential services in catchment areas

Leadership: A local governance team should be put together to coordinate the recovery and provide transparent and flexible oversight. There must be hospital level service integration plan including how to organize surgical service during COVID-19 pandemic season.

Training: A robust plan should be in place to support the next generation of surgeons. Where possible, additional opportunities for training and for more surgical and clinical exposure should be identified. Delivery of surgical training needs to be matched to the need for increased surgical activity and should be undertaken at all sites involving patients.

Workforce: Temporary expansion of the workforce will be necessary. It will also be important to be prepared for an unstable workforce related to fatigue, illness or social issues.

iii. Surgical Outpatient clinics

- Develop a system, prior to attendance (e.g. phone call, SMS), to ask patients whether they've been overseas or have had close contact with a person with confirmed COVID-19 while infectious, in the 14 days before the scheduled outpatient appointment.
- If the patient meets the above criteria:
 - Reschedule their appointment unless it is medically necessary
 - Reschedule the appointment as soon as possible after the 14-day exclusion
 - Remind them they have to self-isolate at home for 14 days Remind them if they develop respiratory symptoms or fever report to incident manager of the facility
- Note, facilities will need to develop a system to implement the above steps, including an appropriate appointing person to assess whether safe or notan to defer the outpatient appointment.

During outpatient attendance consider:

- An options to identify patients in the outpatient clinic waiting room
- Asking patients at reception whether they have been overseas in the last 14 days or have had close contact with a person with confirmed COVID-19 while infectious, in the previous 14 days

For patients who meet the above criteria:

- Ask the patient to wear a surgical mask.
- Ask the patient if they have any respiratory symptoms or fever.

For patients who meet the above criteria within 14 days of their appointment and who do not report any respiratory symptoms or fever:

- The attending doctor should make a clinical assessment about the presence of respiratory symptoms
- If no symptoms/signs continue the outpatient consultation as normal, while the patient is wearing a surgical mask.
- Remind the patient that they should self-isolate themselves at home for 14 days after they returned or have had contact with a person with confirmed COVID-19 infectious.

iv. Inpatient Facilities

- Reschedule elective surgeries as necessary.
- Shift elective urgent inpatient diagnostic and surgical procedures to outpatient settings, when feasible.
- Avoid visitors to COVID-19 patients.
- Plan for a surge of critically ill patients and identify additional space to care for these patients. Include options for:
 - Using alternate and separate spaces in the ER, ICUs, and other patient care areas to manage known or suspected COVID-19 patients.
 - Separating known or suspected COVID-19 patients from other patients ("cohorting").
 - Identifying dedicated staff to care for COVID-19 patients.

Please be vigilant and take a leadership role in your practice setting so that these recommendations begin to take hold immediately.

3.7.3 Management of Pain and sedation

Introduction

Patient COMFORT should be the goal, and includes adequate pain control, anxiolytics and prevention and treatment of delirium. Achieving the appropriate balance of analgesia, and sedation is challenging. Light/no sedation is the current standard of care for most patients: deep sedation may cause respiratory, CVS, neurological, psychological and immunological complications and contribute to risk of death. PAD protocol should be implemented

i. Assessment of pain

Non-specific signs of pain include diaphoresis, hypertension and tachycardia. These signs are less reliable.

In patients who can self-report, a 10-point pain scale is reliable and accurate (gold standard): other method includes

- Visual Analog Scale (VAS)
- Wong Baker Faces

In patients that are non-communicative or sedated, use a behavioral pain scale which is score based on facial expression, limb movement, muscle tension and ventilator compliance other method includes

- Behavioral Pain Scale (BPS) and Critical-Care Pain Observation Tool (CPOT)
- Comfort-B scale.

ii. Management of pain

Use of analgesia-based approach may be adequate for most critically ill patients and minimize the need for additional sedatives: give pre-emptive analgesia to alleviate pain prior to invasive or potentially painful procedures. Use opioids to treat non-neuropathic pain:

- Common agents: Fentanyl, morphine, hydromorphone.
- Dosing: Start with intermittent dosing

Consider continuous infusions based on intermittent dose requirements or if patient is known to have chronic pain avoid. Special consideration for patients with ARDS.

In patients with early, severe ARDS, target deep sedation (RASS -4, -3) to optimize Lung protective ventilation (LPV) strategy: patients with severe ARDS may easily deteriorate with little movement or minor ventilator asynchrony. They are not good candidates for sedation interruption.

iii. Addition of early NMB for the short term (up to 48 hours):

- NMB is used to reduced mortality and more organ-failure free days
- NMB must be used in conjunction with continuous sedatives that provide amnesia and analgesics for pain.
- NMB **does not** provide sedation, amnesia or analgesia.

3.7.4 Acute kidney injury and renal replacement therapy in COVID-19 patients

i. Acute Kidney Injury (AKI) in COVID-19 patients

Critically ill patients who require ICU admissions from any cause are known to be at a very high risk of developing AKI and requiring renal replacement therapy (RRT), and mortality. The rate is reported to even higher in critically ill COVID-19 patients. It is estimated that as high as 20-30% COVID -19 patients in ICU will develop severe AKI requiring RRT. The experience from countries which experienced a large surge of COVID-19 patients indicates that centers providing care for severely or critically ill COVID-19 patients should develop a capacity to diagnose, follow, and provide appropriate supportive care including RRT.

ii. Causes AKI in COVID -19 patients

The most important causes of AKI in COVID-19 patients are similar to other critically ill patients i.e. hypotension/shock, sepsis, drugs or a combination. However, there are reports which indicate:

- Direct cytopathic effects of the virus
- Thrombotic microangiopathies
- Capillary leak syndrome
- Might contribute to the causation of AKI in COVID-19 patients.

iii. Diagnosis of AKI in COVID-19 patients

The diagnosis and staging of AKI in COVID-19 patients similar to other patients. The KDIGO criteria which is summarized below

AKI: If any one of the following criteria are full filled

- I. Increase in serum creatinine by $\geq 0.3\text{mg/dl}$, which is known to have occurred occur in ≤ 48 hours
- II. Increase in serum creatinine by 50% (1.5 fold) form baseline, which is known or presumed to have occurred within the prior 7 days
- III. Urine output $< 0.5\text{ml/kg/hr}$ for 6 hours (for an average adult $< 200\text{ml/ 6 hours}$)

Staging AKI

Stage 1: Creatinine based: Increase by 1.5–1.9 times (>50% but < 100%) from baseline

Urine output based: Urine output < 0.5 ml/kg/h for 6–12 hours

Stage 2: Creatinine based: Increase by 2.0 -2.9 times (>100% but < 300%) from baseline

- Urine output based: Urine output < 0.5 ml/kg/h for >12 hours

Stage 3: Creatinine based:

- Increase >3.0 times (>300%) from baseline or an increase to a level >4.0 mg/dl or Initiation of renal replacement therapy
- Urine output based: <0.3 ml/kg/h for X24 hours OR Anuria for X12 hours

iv. Which patients with COVID-19 require screening for AKI?

- All symptomatic patients requiring hospital admission regular wards or ICU need initial (baseline) serum creatinine.
- All patients who have severe disease or critical need to have the following screening/follow up

Serum creatinine:

- Every 24 hours if there is AKI or CKD at admission or patients develops AKI after admission
- Every 48 hours for all other severe or critically ill patients

Urine output and fluid balance

- Every 06-12 hours for all severe or critically patients

v. Investigations needed in addition to serum creatinine and follow up of urine output?

- Serum electrolytes and urinalysis: At baseline for all hospitalized patients, subsequently depending on the baseline finding and the development of AKI or not.
- Abdominal ultrasound: Should only be done if there is a strong suspicion of CKD or obstructive uropathy by the treating team based on clinical evaluation.

- Other investigations: Serum LDH, coagulation profile (PT/INR, aPTT) serum albumin and liver enzymes are essential, need to be done at baseline for all critical patients and subsequently depending on the clinical status of the patient.
 - Arterial blood gas (ABG): If resources are available all critical patients with AKI need to have ABG monitoring.

vi. How to establish the cause/s of AKI in COVID-19 patients?

- AKI in COVID-19 patients might be the direct consequence of the illness, its complications or medications used for the treatment of its complications or a combination. In addition the AKI could be caused by totally unrelated etiology (e.g. glomerulonephritis due to other causes, drugs taken for other purposes)
- The following causes should be actively searched for through history and physical examination
- Hypotension: BP, Signs of dehydration, fluid balance
- Evidence of sepsis/septic shock: altered mental status, other organ dysfunction
- Drugs that alter renal hemodynamics: NSAIDS, ACE inhibitor/ ARBs
- Nephrotoxic drugs: Intravenous iodinated contrast, aminoglycosides, Amphotericin-b
- Evidence of glomerulonephritis: proteinuria, hematuria, raised BP, potential etiologies
- Evidence of allergic interstitial nephritis: exposure to potential drugs, pyuria

vii. How to prevent and manage AKI in COVID-19 patients?

- Optimization of volume status: Detect and correct Hypovolemia
- Avoiding nephrotoxic medications.
- Renal dose adjustment for drugs that need adjustment.
- Management of the underlying cause e.g. sepsis/septic shock, holding nephrotoxic drug
- Non-dialytic management of complications of AKI
- Fluid overload: IV furosemide
- Hyperkalemia. Regular insulin with 40% dextrose
- Metabolic acidosis: IV bicarbonate infusion **Initiation of dialysis:** when indications arise

When to consult a nephrologist?

- A nephrologist should be consulted if a patient has stage 2 AKI at baseline or after admission. If a nephrologist is not available, an internist/critical care physician who is in charge of making dialysis related decisions in the center or hospital should be consulted.

viii. Indications for dialysis

- The indication for dialysis are in COVID-19 patients are similar to non-COVID patients
- **Complications refractory to medical management:** Fluid overload/pulmonary edema hyperkalemia, or acidemia
- **Uremic complications:** pericarditis, encephalopathy, bleeding

Which modality of dialysis?

- Hemodialysis: For all adults
- Intermittent hemodialysis (IHD) for hemodynamically stable patients
- modified sustained low efficacy dialysis (SLED) for hemodynamically unstable patients
- Peritoneal dialysis: For small children and infants

Where should dialysis be done?

- For patients in ICU: dialysis should be done in the ICU while they are continuing to get the critical care support
- For patients in regular wards: In the unlikely situation where patients with COVID-19 and AKI are stable enough not to require ICU admission or the ICU is full, an isolated room where dialysis can be performed needs to be prepared.

Personal protective equipment (PPE) required for dialysis staffs

- Acute dialysis is provided for a prolonged period of time in the ICU where patients are ventilated and suctioning is done or in isolation areas, hence all

precautions needed for the ICU staffs are needed for the dialysis staffs i.e. respiratory, droplet, contact and eye protection.

Minimum preparations needed for provision of dialysis

- Hospitals or centers treating critically ill COVID-19 patients should be prepared to provide dialysis in their ICU, hence they would need to prepare the following
- Dedicated hemodialysis machines
 - a. Portable water treatment machines or reverse osmosis machines
 - b. Dialysis consumables enough for a potential surge of patients
 - c. Dialysis nurses

When to stop dialysis?

- When there is renal recovery good enough to maintain fluid, electrolyte and acid-base status as assessed by the nephrologist.

OR

- When the care is defined to be futile by the treating team.

ix. The care of patients with end stage renal disease on maintenance dialysis

Where dialysis should maintenance dialysis be provided?

- If the patients have severe or critical COVID-19 disease, the dialysis would be similar to patients with AKI.
- If the patients are asymptomatic or have mild symptoms

Option 1 (Preferred option):

- In the same dialysis unit where they were dialyzed before the diagnosis of COVID-19.
- The unit should prepare isolation rooms for the patients, institute good infection prevention practice to prevent transmission to other patients and the staffs, provide appropriate PPE to the dialysis unit staffs, and get approval from the appropriate body.

Options 2 (Alternative)

- If the unit has not get approval to provide dialysis for COVID-19 patients, refer the patient/s to public hospitals which are dedicated to provide COVID-19 care and have dialysis facility.
- If there is shortage of consumables, the referring dialysis unit might be requested to provide consumables required for the duration of dialysis
- When recovery is defined (based on test, time or symptom based criteria) the patient would be returned to the dialysis unit which referred the patient. The unit has the obligation to accept the patient.

x. The care of renal transplant recipients

- If a transplant recipient has been confirmed to have COVID-19, he/she should be referred to a St. Paul's Hospital Millennium Medical College.

3.7.5 Mental Health Considerations for Patients and Healthcare Professionals during COVID-19 Pandemic

Introduction

COVID 19 has got a huge social, economic, political and psychological impact on the society. This has become visible even with in short duration of the pandemic. Hence, it is a crucial time to address COVID 19 pandemic related mental health issues. Moreover, mental health issues needs to be addressed among people with new onset mental health conditions, who are either in quarantine or in treatment for COVID 19.

i. Guiding principles

1. There need to be a discussion with patients/clients about coping skills to prevent mental health issues related with the stress of COVID-19 pandemic
2. Discuss options for alternative service provision in case treatment with their current treatment provider is interrupted (e.g: due to road closure or other laws enforced by the government/hospital administration).
3. Patients who have been screened with COVID-19 may have anxiety attacks that resemble worsening of underlying infection. Sleep disturbances, depression, as well as post-traumatic stress disorder could be problems in patients or people who have been quarantined due to past personal experience or what is witnessed. Exploring these issues and managing them is important.
4. Treatment of all psychiatry illness should follow the recommended guidelines
5. Be watchful for substance withdrawal in patients and people who are quarantined, as admission may lead to sudden cessation of the substances they were using. Screening for history of substance use for all will be important in this process. History of substance use can contribute to decrease in immunity and medical complications making these individuals susceptible for severe illness in relation to COVID 19.
6. There is no specific medication used for COVID-19 infection currently. However, based on the patients' needs, certain medications may be used. It's important to check drug-drug interaction with psychotropic medications.
7. It should be noted that new evidence may emerge during the course of this pandemic, therefore; management of certain mental illness in relation to COVID-19 infection and treatment may change in line with new developments.

ii. Psychological First Aid Protocol in COVID-19 for Health Care Providers

Psychological First Aid (PFA)

Is a human, supportive and practical help provided in ways that respect their dignity, culture and abilities

In addition to ensuring safety and strengthening connectedness PFA aims to fulfill 3 psychological needs which are: To Talk, to be listened to and to feel someone cares

Psychological First Aid Components:

LOOK. LISTEN, LINK

Look:

- Check for Safety
- Check for people with obvious urgent basic needs.
- Check for people with serious distress reactions.

Listen

- Always start by introducing yourself and your role
- Use a calm tone of voice
- Start with open ended question /Ask if they need help
- Maintain culturally appropriate eye contact
- Use non-verbal communication that show that you are listening
- Repeat what they said and clarify if there is anything that you didn't understand
- Give time for answers, tolerate silence
- If they are very anxious, teach them to take deep breaths slowly
- If they seem numb or have a freeze response: remind them of where they are, who they are speaking to, why they are there and ask them to look around them, feel the floor/chair/bed

You are not Listening if you:

- Interrupt them frequently, or pressure them to talk

- Make Judgment, or use Why/ why not questions often
- If you say things like ‘You’ll feel better soon’, ‘It’s good that you are alive’, ‘You need to relax’, ‘Let’s talk about something else’

If you have to break bad news (infection with COVID-19):

A– Advance Preparation – prepare what you say, in what setting, with who

B – Build trusting Relationship

C– Communicate Well - clear language and inform reality, ask if they understood the information

D – Deal with family’s & patient’s reactions – let them express it , don’t be defensive or walk away

E – Encourage and validate emotions – say ‘It is understandable that this makes you feel...)

Link:

- Help people address basic needs and access services such as food, water, social services, information
- Help people Cope with their problems
 - Identify what helped them most in previous difficult times and encourage them to use those strategies
 - Identify supports in their lives and find a way they can maintain connection with them while physically distancing
- Give adequate and appropriate information about:
 - Safety
 - Roles and responsibilities
 - How to access services to Measures institution / government is taking to keep them safe
- Connect with loved ones and their social support systems including religious services
 - Use phone calls or other means in accordance with safety measures
- Find a positive way to end help after services have ended

Special considerations:

- Age – children or very old people –
 - find interactive ways to communicate like drawing, writing, playing
 - need regular safe communication with their individual support system
- Pre-existing Physical or Mental Health conditions:
 - Give similar services as you would do others, treat with respect to their dignity
 - Remove barriers of communication, and ask what they need
 - If they are already on medications, make sure they continue except when you fear drug interactions where you consult a Psychiatry professional
 - Higher attention to infection prevention protocol

iii. Self-care for Health care providers

Needed because of high risk of developing mental health issues when working in crisis

- Remember that you are not responsible for solving all people's problems
- Consider dividing the workload among helpers
- Minimize caffeine, alcohol or nicotine, avoid nonprescription drugs
- Take time to eat, relax and exercise, rest even for short periods
- Check in with fellow helpers to see how they are doing, and have them check in with you
- Talk with friends, loved ones or other people you trust for support
- Take Deep breaths when you feel overwhelmed
- Seek medical or mental health support when needed.

iv. Psychiatric Considerations in COVID-19

Supporting people with Psychiatric illness

- People with pre-existing mental illness should have uninterrupted treatment plan
- To prevent relapse: Find alternative service provision options if treatment with their current treatment provider is interrupted due to lockdown measures
- If new onset mental health conditions occur, while in quarantine or isolation, make sure their mental health needs are addressed by respective professionals

Issues that need special consideration:

- Anxiety or panic attacks may resemble worsening of underlying infection in COVID-19. Keep this part of your differential diagnosis
- Sleep disturbances, depression, and post-traumatic stress disorder could occur due to past personal experience or what is witnessed. Specialized care is needed
- Treatment of delirium should be followed as per the recommended guidelines. Be careful with use of long acting benzodiazepines that can impair alertness
- Screen for history of substance use for all who are quarantined/ isolated.
- Admission can lead to sudden cessation of the substances they were using (Substance withdrawal) which can provoke severe withdrawal reactions including seizures, delirium, coma or death.
- If there is substance withdrawal, detoxification may be required to prevent adverse reactions depending on the type of substance
- History of substance use can contribute to decrease in immunity and medical complications making these individuals susceptible for severe illness in relation to COVID-19.
- Check drug-drug interaction with psychotropic medications.

Specific issues in pharmacological management of acute behavioral disturbance in patients who are infected with COVID-19

- Risk of rapid tranquilization medications in COVID-19 infection/ in physically unwell patients
 - *Benzodiazepines*
 - Benzodiazepines do not cause respiratory depression at therapeutic doses
 - High risk of respiratory depression if co-ingested with alcohol and other drugs.
 - Higher risk with pre-existing respiratory problems.
 - Patients who are exhibiting respiratory symptoms should be offered non-benzodiazepine sedating drugs first, where possible.
 - *Antipsychotics*
 - No specific contraindications but

- If possible, avoid the concomitant use of two or more antipsychotics due to the risk of QT prolongation. The risk is further heightened where patients are in a distressed state. Ensure to obtain an ECG to check for QTc.
- *Promethazine*
 - Antihistamines can thicken lung secretions, impairing expectoration
 - Caution should be used in those with underlying lung disease
 - Short-term use is unlikely to be a problem

Recommendations

- Offer non-benzodiazepine sedative drugs first.
- Use short-acting drugs where possible. Patients with COVID-19 may rapidly physically deteriorate.
- Avoid long-term prescription of benzodiazepines or promethazine. Review prescriptions frequently.
- Ensure the use of effective doses to avoid multiple ineffective restraints.
- Review regular medication; aim to avoid the need for rapid tranquilization by using effective baseline treatments and doses.

Be aware of the overlap of symptoms of COVID-19 and Neuroleptic Malignant Syndrome (specifically a raised temperature). Checking the level of Creatinine kinase when possible in these circumstances is recommended.

- Consult Mental health specialist or expert when needed

v. Breaking Bad News Protocol

Evidence and Ethos

Patient communication skills may lead to psychological distress including increased anxiety and depression and poorer psychological adjustment to the diseases. Presenting 'bad' news in an unhurried, honest, balanced and empathic fashion has been shown to produce greater satisfaction with communication of the news.

Important aspects include exploring the patient's expectations, warning him/her that the news is bad, giving the news at the patient's own pace, allowing time for the patient to react and eliciting the patient's concerns. Health workers-patient communication skills for COVID 19 countered bad news consultations to enhance patient recall of information and increase patient satisfaction with communication. On the other hand, the psychological impact of the news itself, breaking bad news insensitively can cause patients additional distress.

SPIKES protocol works on the assumption that breaking bad news is a clinical task, similar to other medical procedures, which can be broken down into a series of steps. The aim of this dissection of the encounter in addition to increasing their confidence is to prompt the clinician involve the patient in each step, helping them feel to feel supported, well-informed and able to participate in decision-making.

The SPIKES protocol provides a step-wise framework for difficult discussions. Key components of the SPIKES strategy include demonstrating empathy, acknowledging and validating the patient's feelings, exploring the patient's understanding and acceptance of the bad news, and providing information about possible interventions. Having a plan of action provides structure for this difficult discussion and helps support all involved professionals.

When breaking bad news for coronavirus, we need to follow the SPIKES protocol

SPIKES Protocol

S - Setting

- First, Proper donning personal protective equipment (PPE) (if in person)
- Ensure your calling time is appropriate/ comfortable for your client (for call news)
- Ensure you are in a comfortable and helping mood
- Ensure you are in a comfortable confidential room where you will not be interrupted

P - Perception

- Remember events that have led up to now
- Ask them what they already know/expect
- Spend some time trying to get them to say what the diagnosis is

“Could you tell me what’s happened so far?”

“Do you have any ideas as to what the problem might be?”

“Is there anything you have been worried about?”

I - Invitation

- Check if the patient wants to know the result now
- you need permission to move on from each step

“I do have the result here today; would you like me to explain it to you now?”

K - Knowledge

- As you know, we took a sample for coronavirus test and, unfortunately, “the result”

PAUSE & WAIT:

- Shape up to the result – give a warning shot
- Portion the diagnosis (stepped approach) you need permission to move on from each step
- “Unfortunately the Corona is a problem” pause & wait for patient to ask
- After every statement you say, pause & wait for the patient to ask the next question (silence is the best thing at this point – there are a million thoughts going around in their head)
- “Yes, I’m so sorry to have to tell you”
- “I’m afraid / unfortunately the result is not as we hoped.” / I’m sorry to tell you it is a coronavirus positive result”
- If the silence is very awkward, you can ask a question about how they are feeling
- Chunk & check any requested explanations

Next: Don’t say anything. It’s difficult but the most effective way to communicate from now onwards is not to say anything until asked. If it really gets awkward, reflect the fact that they are quiet/shocked, pause, then ask what’s going through their mind.

E – Emotions and Empathy

- Acknowledge and reflect their emotions back (including body language)
- Don't try to solve their problems or reassure them, just listen and summarize/ bounce their concerns back to them and expand on them (it shows you are listening and conveys empathy)
- If there is a lot of silence, Patients have concerns in their head and therefore won't listen to anything else you say. You need to get the concerns out first you can ask about their emotions

“I can see this news was a huge shock” PAUSE & WAIT

“You appear very anxious” PAUSE & WAIT

“How are you feeling about hearing the news?”

“You're very quiet; can I ask what's going through your mind?”

“What's upsetting you the most?”

- First, observe for any emotion on the part of the patient. This may be tearfulness, a look of sadness, silence, or shock.
- Second, identify the emotion experienced by the patient by naming it to oneself. If a patient appears sad but is silent, use open questions to query the patient as to what they are thinking or feeling.
- Third, identify the reason for the emotion. This is usually connected to the bad news. However, if you are not sure, again, ask the patient.
- Fourth, after you have given the patient a brief period of time to express his or her feelings, let the patient know that you have connected the emotion with the reason for the emotion by making a connecting state-men

S – Strategy and Summary

- Discuss and Agree on next plan
- Summaries concerns
- Ask how they are left feeling

vi. Self-care TIPS in Maintaining Mental health and Psycho-social wellbeing during COVID-19 Pandemic

Tips to help with self-care

1. It is good to maintain a healthy routine (regular sleeping hours, regular healthy diet)
2. Exercising regularly, possibly with indoor physical activities, would have positive impact on mental and physical health.
3. Taking regular breaks during working hours is important: make sure you take few minutes regularly for yourself to do things that you like or have previously helped you in decreasing stress (e.g., listening to music, religious activities, relaxation exercise, other culturally practiced activities).
4. Although the workload and the stress at this time can increase, try limiting the time spent in high intensity settings when possible (eg, staying in hospital after finishing shift, working double shift, etc).
5. Communicating with people outside your field (people outside of your profession) through regular phone calls, video-calls, as well as contact with family while taking precautions is important. Conversations unrelated to the outbreak will help remind you about other positive things you have in your life.
6. Map out a plan for fair distribution of rotation at work
7. You may have feelings of anxiety, anger, and fear during a crisis of this sort. Be aware of your feelings and plan to meet with your coworkers regularly to talk about your experience in a small group.
8. Mental health practitioners who are giving psychotherapy should schedule a time to take a break after each session to collect their thoughts and reflect on the session.
9. Videos of relaxation exercises for beginners, such as deep breathing exercise, mindfulness exercise, and progressive muscle relaxation, are available on YouTube; you can pick the videos based on the duration and your preference.
10. Prepare yourself for heightened anxiety in patients/clients and care givers during this situation, and have a plan on how to respond, or who to link them with if the need arises. Knowing how to manage other's anxiety helps reduce your own.
11. Do not use alcohol or other substances to cope with stressful situations as these will affect your mental and physical health in the future
12. Limit too much information: as health care professionals, you will need to keep yourself updated about the virus itself and what the government puts out.

13. As this is like no other time in your life, you will find yourself having to make decisions that are extremely hard, and that will require you to compromise your personal needs/life more ways than you are used to previously.
14. Health care professionals should contact a mental health worker for additional support.

3.7.6 Nutritional guidance for COVID 19 patients

A. Nutrition management for non-critical illnesses illness

- Insure adequate amount of water to replace insensible loss related with fever (at list two litters)
- Insure adequate calories
- Consider supplementation with Vitamin C, zinc, Vitamin A, B6, D, E, iron, Folate and fiber if not getting enough from the diet.
- Ensure enough sleep, reduced stress, exercise, completely avoid intake of alcohol and tobacco products.
- All pregnant women with COVID-19 should be provided with information and counseling on safe infant feeding, appropriate infection prevention, and control (IPC) measures to prevent COVID-19 virus transmission.

NB:

- If the child have malnutrition in admission to COVID 19, the nutritional management should follow the national sever acute malnutrition management protocol.
- Infants born to mothers with suspected, probable, or confirmed COVID-19 should be fed according to standard infant feeding guidelines, while applying necessary precautions for IPC;

B. Nutrition management in critically ill patients

- Early Enteral Nutrition initiate within 48 hours is recommends.
- If available, Parenteral Nutrition is recommended for patient whom we are not achieving targeted enteral feeding within seven days.
- Enteral Nutrition should be delayed if there is uncontrolled shock, hypoxemia, hypercapnia or acidosis upper GI bleeding, high-output intestinal fistula or gastric residual volume is above 500 ml.
- Balance fluid and electrolyte intake to output. Ideally, fluid and electrolyte intake should balance the net output.
- Fluid monitoring to facilitate feeding: last 24 hr fluid output + 500ml if no edema or 300mls if there is edema.

- Critically ill adult patients should receive feedings at rates of 25 to 30 kcal/kg.
- The amount of glucose (PN) or carbohydrates (EN) administered to ICU patients should not exceed 5 mg/kg/min.
- For intravenous lipids the upper recommendation is 1 g/kg body weight/day with a tolerance up to 1.5 g/kg/day.
- For the unstressed adult patient with adequate organ function requiring nutrition support, 1.3 g/kg/day-1.5g/kg/day may be adequate.

3.8 Recovery protocol for RT-PCR test positive COVID-19 cases

Current evidence suggests that there is lower risk of transmission after 14 days of first diagnosis in asymptomatic cases and 14 days after last symptom for symptomatic cases. Performing repeated test to confirm recovery will incur constraint on PPE, test kit, prolong time of discharge, and limit the need for continuity of COVID care in other facility when treatment is not possible/ available in one center and non-COVID care after recovery.

There are three ways of declaring recovery:

- 1. Time based recovery:* Declaring recovery considering days after the day of lab confirmed diagnosis of COVID-19.
- 2. Symptom based recovery:* Declaring recovery considering days after being asymptomatic (fever and/or cough) in a patient with lab confirmed diagnosis of COVID-19 with moderate, severe or critical illness. If cough is the only symptom judgment should be left for clinician decision.
- 3. Test based recovery:* Declaring recovery considering two negative lab tests done 24 hour apart in a patient with lab confirmed diagnosis of COVID-19.

Based on these:

- Asymptomatic or mild cases will be declared recovered based on time based recovery criteria; 14 days after the date of first positive lab test.
- Moderate, severe or critical cases will be declared recovered based on symptom based recovery criteria; 14 days after being asymptomatic (fever and/or cough) in patients who had lab test confirmed COVID-19.
- All lab confirmed COVID-19 cases that will join public service without practicing physical distancing because of their profession or service duty will be declared recovered based on test based criteria with two negative lab tests done 24 hour apart.

Those cases declared recovered by any of the above criteria will be released from home or facility isolation and further follow up.

Patients can be discharged from the healthcare facility whenever clinically indicated without qualifying recovery criteria in the following conditions:

Discharge to home:

- After clinical improvement before qualifying for the time or symptom based recovery criteria patient with no identified risk factor for severity or comorbidity can be discharged early to home or non-health facility care center considering the suitability for and patient's ability to adhere to home isolation recommendations.

Transfer to other facility:

- A patient can be transferred to nursing home or other long-term care facility (e.g., assisted living facility) or to other health facility for continuation of care/treatment.

If patient does not *qualify any of the above recovery criteria*, the patient should go to a facility with an ability to adhere to infection prevention and control recommendations for the care of people with SARS-CoV-2 infection. The transfer should be made after communication with the receiving facility and confirmation of transfer. Until transfer is successful care and treatment should continue in the center where patient is primarily admitted.

If patient *does qualify any of the above recovery criteria*, the patient does not require further restrictions, based upon history of SARS-CoV-2 infection and can get any care or treatment designed for non-COVID service. If there is suspicion of SARS-CoV-2 re-infection or 'reactivation', which is less likely event, they will be managed as suspect case till new test result is ready.

CHAPTER 4 : LABORATORY AND IMAGING OF COVID 19 PATIENTS IN HEALTH FACILITIES

4.1 Laboratory

Background

- This document provides guidance to laboratories and stakeholders involved in COVID-19 virus laboratory testing and radiologic imaging of COVID 19 patients in health facility
- Currently the approved and available testing method is RT-PCR.
- Antibody tests are being introduced for surveillance purpose for community level circulation of the virus.
- Antibody tests help determine whether the individual being tested was previously infected—even if that person never showed symptoms.

4.1.1 Categories for SARS-CoV₂ Testing

- Individuals with signs or symptoms consistent with COVID-19
- Asymptomatic individuals with recent known or suspected exposure to SARS-CoV-2 to control transmission
- Asymptomatic individuals without known or suspected exposure to SARS-CoV-2 for early identification in special settings
- Individuals being tested to determine resolution of infection (i.e., test-based strategy for Discontinuation of Transmission-based Precautions, HCP Return to Work, and Discontinuation of Home Isolation)
- Individuals being tested for purposes of public health surveillance for SARS-CoV-2
- PCR testing should have to be done for all suspect cases.
- Rapid collection and testing of appropriate specimens from patients meeting the suspected case definition for COVID-19 is a priority for clinical management and outbreak control
- Healthcare personnel [HCP]), even mild signs and symptoms (e.g: sore throat) of a possible SARS-CoV-2 infection should prompt consideration for testing.

Testing the same individual more than once in a 24-hour period is not recommended.

Safety procedures during specimen collection:

- Ensure that adequate standard operating procedures (SOPs) are in use and that staff are trained for appropriate specimen collection, storage, packaging, and transport under appropriate IPC caution. Specimens that can be delivered promptly to the laboratory can be stored and transported at 2-8°C. All specimens collected for laboratory investigations should be regarded as potentially infectious.

4.1.2 Collection Instructions Respiratory Specimens

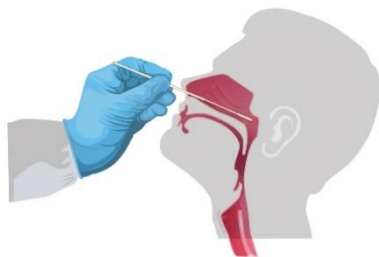
- Sample should be collected by trained health professional working at the facility level
- Proper collection of specimens is the most important step in the laboratory diagnosis of infectious diseases.
- A specimen that is not collected correctly may lead to false negative test results.

A. Upper respiratory tract:

1. Nasopharyngeal Swab

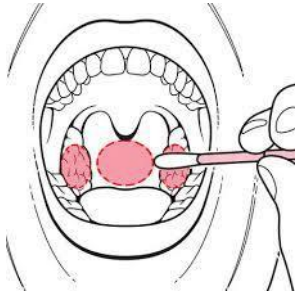
- Use the flexible shaft nasopharyngeal swab: tilt the patient's head back 70 degrees and insert the swab into nostril parallel to the palate until resistance is encountered or the distance is equivalent to that from nostrils to outer opening of patient's ear indicating contact with nasopharynx.
- Leave swab in place for several seconds to absorb secretions, slowly remove the swab while rotating it then insert the swab into the tube and tip is covered by the liquid in the tube
- Store specimens at 2-8°C for up to 72 hours after collection.
- If a delay in testing or shipping is expected, store specimens at -70°C or below.

Figure 4-1: Nasopharyngeal swab



2. **Throat swab:** Insert swab into the posterior pharynx and tonsillar areas. Rub swab over both tonsillar pillars and posterior oropharynx and avoid touching the tongue, teeth, and gums.

Figure 4-2: Oropharyngeal swab



B. Lower respiratory tract:

- Broncho alveolar lavage, tracheal aspirate, pleural fluid, lung biopsy
- Collect 2-3 mL into a sterile, leak-proof, screw-cap sputum collection cup or sterile dry container.
- Sputum specimens should be correctly labeled and accompanied by a diagnostic request form
- Forced cough is not recommended

4.1.3 Laboratory testing for COVID-19 virus

- Laboratories undertaking testing for COVID-19 virus should adhere strictly to appropriate bio-safety practices.
- Routine confirmation of cases of COVID-19 is based on detection of the virus RNA by real-time reverse-transcription polymerase chain reaction (RRT-PCR)
- A number of factors could lead to a negative result in an infected individual, including:
 - Poor quality of the specimen, containing little patient material
 - The specimen was collected late or very early in the infection.
 - The specimen was not handled and transported appropriately
 - Technical reasons inherent in the test, e.g. virus mutation or PCR inhibition.

- If a negative result is obtained from a patient with a high index of suspicion for COVID-19 virus infection, the lower respiratory tract if possible, should be collected and tested.

4.1.4 Reporting of cases and test results:

- Laboratories should follow national reporting requirements.
- In general, all test results, positive or negative, should be immediately reported to national authorities

4.2 Guideline for use of imaging services during COVID-19 pandemic

The purpose of this guideline is to provide guidance and information regarding the safe conduct of imaging and image-guided intervention with particular emphasis on:

- When and for what clinical scenarios is imaging services is recommended for suspected/probable/confirmed COVID-19 patients
- Protection of the staffs at the imaging department
- Prevention of the spread of the virus in the imaging facility

4.2.1 General imaging services

The strategy is to minimize any possibility of in-hospital transmission and to achieve zero health care worker transmission to ensure a safe environment for both patients and staff.

Recommendations:

- All referring physicians should use the national or WHO surveillance criteria to screen patients before they send patients to the imaging department.
- Imaging facilities recommended to have enough screening space and waiting area which adequate to maintain the recommended social distance from patients
- Personal protective devices for the screening staff like surgical masks and gloves should be provided.
- It is highly recommended to implement capabilities for remote interpretation diagnostic imaging and working from home;
- It is also recommended to decrease the patient load of the department by prioritizing urgent cases and subsequent cancelling non emergent examination.
- Imaging facilities should prepare a checklist for screening of all patients coming to the department for any symptoms/ signs suggestive of COVID19 infection
- All chest CT examinations should be communicated to the reporting radiologist as soon as possible

Recommendations:

- CT is not, currently, recommended for initial diagnosis of COVID-19. Viral testing remains the only specific method of diagnosis even if radiologic findings on CXR or CT are suggestive of COVID-19.
- Those patients who are suspected based on WHO surveillance criteria or confirmed cases and have mild disease are not recommended to have chest CT for patient safety and logistic reasons.
- For those patients with confirmed COVID-19 using RT-PCR, evaluation with chest CT does not affect the management of the patient hence it is not generally recommended.
- If there is suspicion of additional or alternative diagnosis by the treating physician and believed that imaging changes the patient's management, imaging and intervention can be performed.
- Chest CT may be required to rule out alternative emergency diagnosis and can be done for COVID-19 probable or suspected patients with moderate and severe acute respiratory illness requiring inpatient treatment and whose test status is not known, cannot be done, inconclusive or negative.
- Imaging is performed in the imaging unit nearest to the patient and, if possible, portable imaging is performed (portable radiography and ultrasound).
- And in case of CT imaging, the dedicated CT scanner should be located in the COVID19 treatment/isolation center.
- And it's not recommended to transfer COVID-19 suspected or confirmed cases from Institution to institution for imaging.
- This approach limits the transit of contagious patients, potential exposure of others and to limit equipment, room, and hallway decontamination requirements.
- After imaging of each COVID19 probable, suspected or confirmed patient, the imaging equipment should get optimal disinfection;
- Standard hospital or national protocols for decontaminating equipment and rooms should be followed.
- It's recommended that patients are masked during imaging procedures. Air exchange processes are not employed due to patient masking.
- After imaging, the CT room downtime is typically between 30 minutes to 1 hour for room decontamination and passive air exchange.

- All staffs working on the dedicated imaging equipment should follow the infection prevention guideline of the staffs of the COVID19 isolation or treatment center.
- It's recommended that radiology outposts and isolated reading rooms should be prepared in the treatment/isolation center, or in the outpatient imaging area.
- Staffs that do not need to be on-site and who can work remotely are directed to work from home. Mechanisms for remote reporting shall be availed as much as possible.

CHAPTER 5 : INFECTION PREVENTION AND CONTROL AND DEAD BODY MANAGEMENT IN THE HEALTH FACILITY

5.1 Rational use of Personal Protective Equipment (PPE) at clinical setting for COVID 19

Since COVID 19 was declared a global pandemic by World Health Organization in March/2020, much emphasis was given on PPE and IPC. Lack of uniform protocol and shortage of the required PPE in many centers led to anxiety among health workers. Ethiopian National Comprehensive COVID 19 management guideline has tried to address PPE in the first edition. But the practice we have observed at the COVID treatment center in Addis Ababa and our assessment on some health care providers about PPE for COVID 19 revealed that there is inconsistency and ambiguity regarding types, use, and indications of PPE. This update will help to have uniform understanding of rational use of PPE among health care providers throughout the country and avoids anxiety and ambiguity among all levels of providers.

This update requires that all health workers, social workers and others who may have direct contact with suspected or confirmed COVID 19 case should get training on donning and doffing PPE.

5.1.1 Health care providers in the COVID treatment setting are expected to:

1. Change their regular cloths and wear scrubs and shoes suitable for health care facility, example doctors shoes (Or dedicated personal cloth and shoes dedicated only for COVID treatment center) in their office before they go to donning.
2. Then they go to donning and they put on PPE at donning on top of their scrub and shoe(or dedicated cloth and shoe) and directly go to area of assignment in the center.
3. After completing their session, they leave the center with the scrub and shoes(or dedicated cloth and shoe) after removing the apron, gowns, shoe cover, face mask, face shield or eye cover and hand washed at doffing. before they leave the compound, the professional changes the clothes they used while in the center and wear their regular clothes before they leave the compound.

Single session means the period of time health care provider stays in the facility after donning

until doffing. Most PPE are used for single session while disposable glove and disposable apron should be changed after each patient in a single session depending on the extent of contamination. Hand hygiene should be routine if there is a need to change any of the PPE during a session.

5.1.2 The following procedures are currently considered to be potentially infectious Aerosol Generating Procedures (AGP) for COVID-19:

1. Intubation, extubation and related procedures, for example, manual ventilation and open suctioning of the respiratory tract (including the upper respiratory tract), Mechanical ventilation
2. Tracheotomy or tracheostomy procedures (insertion or open suctioning or removal) bronchoscopy and upper ENT airway procedures that involve suctioning
3. Upper gastro-intestinal endoscopy where there is open suctioning of the upper respiratory tract surgery and post mortem procedures involving high-speed devices
4. Surgical procedures under GA including Laparoscopic surgery
5. Some dental procedures (for example, high-speed drilling)
6. Non-invasive ventilation (NIV); Bi-level Positive Airway Pressure Ventilation (BiPAP) and Continuous Positive Airway Pressure Ventilation (CPAP)
7. High Frequency Oscillatory Ventilation (HFOV) induction of sputum high flow nasal oxygen (HFNO)
8. Use of nebulizer
9. CPR

5.1.3 AGP environment: the following are designated as AGP areas

1. ICU
2. Emergency room including triage area and resuscitation area
3. Operating theater
4. Delivery room
5. Wards with NIV and/or airway suctioning
6. Outpatient endoscopic procedure areas

5.1.4 Optimum recommended PPE for health professionals

A. For professionals doing or assisting AGP in any health facility during COVID outbreak at any site in the facility

1. A long-sleeved disposable fluid repellent gown (covering the arms and body) or disposable fluid repellent coveralls if available. If both are not available, long sleeved cloth gown, with plastic apron underneath.
2. N95 face mask,
3. A full-face shield or goggle
4. Gloves
5. Shoe cover or plastic boots

PPE like gloves and contaminated protection equipments are subject to single use and are changed after each patient contact or procedure as appropriate while using the remaining for the whole session.

B. Any person in higher risk acute areas for confirmed or suspected COVID 19(are generally AGP areas) other than the person performing or assisting the AGP

1. Scrubs or equivalent if there is no direct contact with the patient for example providing bed care. If there is direct contact, use additional long sleeved cloth gown with plastic apron.
2. N95 face mask,
3. Eye protection,
4. Gloves
5. Shoe cover or plastic boots

NB: Ambulance staff conveying a patient into a high risk area is not required to change or upgrade their PPE for the purposes of patient handover.

C. In patient areas with confirmed COVID 19 cases but not AGA

1. Fluid resistant Surgical mask
2. Disposable gloves
3. Eye protection
4. Aprons
5. Shoe cover/boots

D. Inpatient areas with suspected cases and/or regular patients ward and but is not AGP area

1. A fluid resistant surgical face mask
2. Disposable gloves,
3. Eye protection
4. Shoe cover

For operating theatre and operative procedures, labor ward and ambulance and ambulance staffs: Where AGPs are performed use PPE guidance set out for AGPs and when there is no AGP, use recommendation for non AGP setting.

For healthcare and non-health care workers working in emergency department and acute admission areas, those transferring patients and involved in other duties requiring close contact but not actually doing AGP or are not assisting AGP: Use of aprons, surgical masks, eye protection and gloves is recommended

For primary care, ambulatory care and other non-emergency outpatient clinical settings: surgical mask, eye protection and gloves should be used for any direct care of possible and confirmed cases.

For health and social care workers working in reception and communal areas but not involved in direct patient care: distancing of 2 meters and surgical face mask.

For health care professionals working in individual's home or quarantine sites: surgical face mask, eye protection and gloves are recommended.

Professionals working in pharmacy: Social distancing of 2 meters from customers and colleagues and three layered cloth mask is recommended. If not able to maintain distancing or if the pharmacy is in the middle of patient area, surgical mask is recommended.

For collection of nasopharyngeal swab for COVID 19: plastic aprons, N95 face mask, eye protection and gloves should be used. Change gloves after each procedure.

For collection of other lab samples: surgical face mask, gloves and eye protection when collection is at non AGP area

Nursing homes: for care givers, surgical face mask, gloves. For those living in the nursing homes, surgical face mask.

Prison: For inmates, cloth mask and social distancing. Wardens cloth mask. Those treating inmates and in the clinic environment surgical face mask.

Patient use of PPE: in clinical areas, communal waiting areas and during transportation, it is recommended that possible or confirmed COVID-19 cases, vulnerable groups and those with respiratory symptoms wear a surgical face mask if tolerated, for example, if not using oxygen. Attendant and visitors can use three layered cloth mask like the general population.

Gathering areas: gathering is prohibited during the outbreak but if mandatory social distancing and three layered cloth mask.

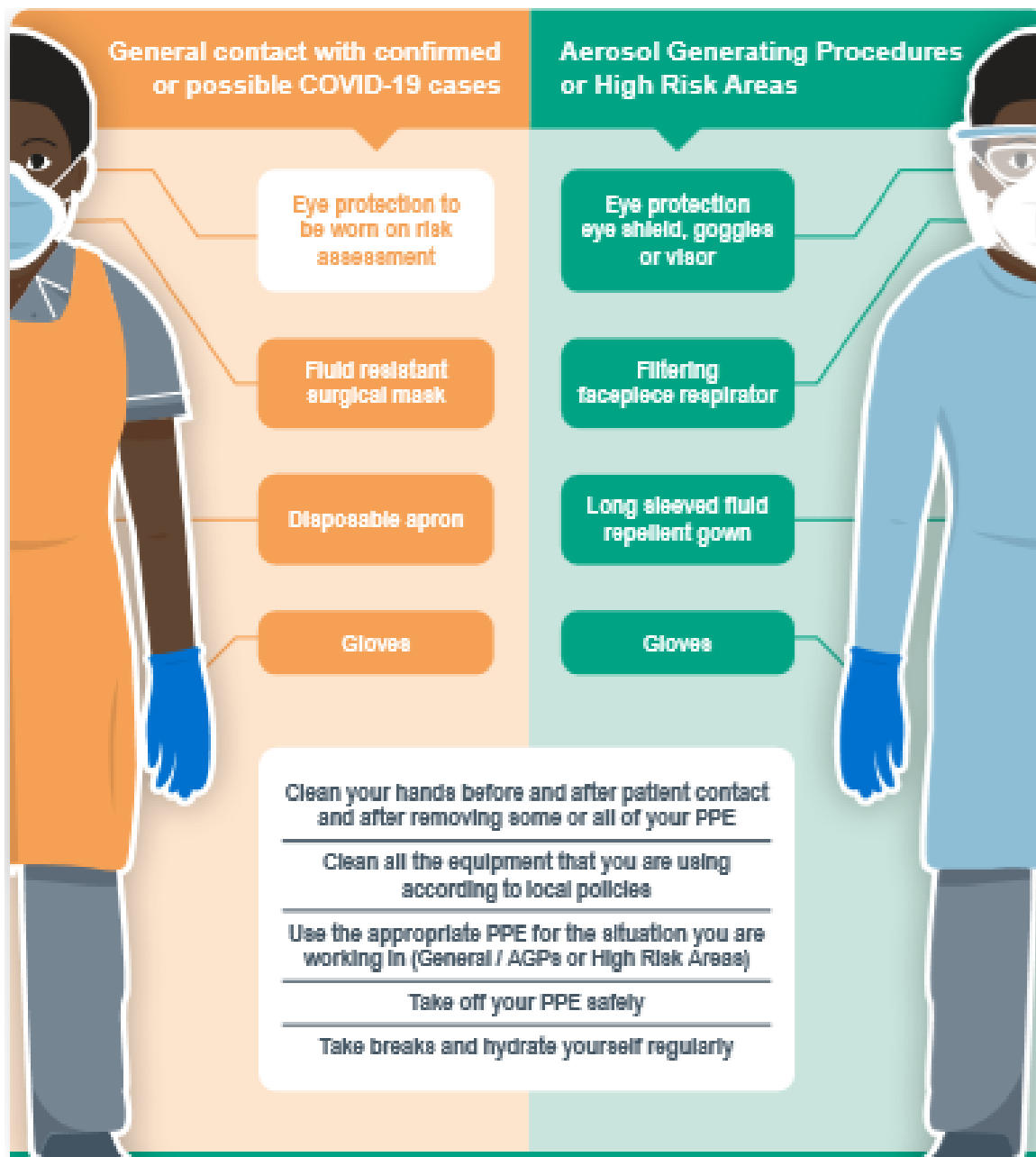
Security staffs: Three layered cloth mask.

The above recommendations should be implemented together with social distancing of two meters and hand washing (or use of 70% alcohol).

Extended or re use of face mask is possible in a setting with shortage of PPE supplies. Always avoid touching the outer and inner surface of face mask. Face mask is removed after each session by holding the ties(or ear loops or bands). For reuse or extended use, put the face mask on dry area exposed to sun, the outer surface exposed.

Disposable fluid repellent coveralls or long-sleeved gowns must be worn when a disposable plastic apron provides inadequate cover of staff uniform or clothes for the procedure or task being performed, and when there is a risk of splashing of body fluids such as during AGPs in higher risk areas or in operative procedures. If non-fluid-resistant gowns are used, a disposable plastic apron should be worn. If extensive splashing is anticipated, then use of additional fluid repellent items may be appropriate.

Figure 5-1: Rapid Visual Guide for PPE in Ethiopia



5.2 Dead body handling

All health facilities will have morgue and burial personnel trained on IP and PPE techniques dedicated to manage dead bodies due. The personnel will be involved in preparing body in the morgue. These personnel will be from non-health professional. Both federal ministry of health and regional health bureau will introduce similar dead body handling mechanisms by involving health extension workers in case of out of health facility death both in rural and urban areas. The health extension workers role will be educating the public on IP procedures during dead body handling and facilitating testing if accessible in that community.

All deaths in health facilities and out of health facilities including home during the COVID 19 outbreak should be considered due to COVID 19 for the sake of preventing the transmission of the disease to those who are handling the dead body.

If possible sample has to be taken for RT PCR for SARS CoV 2 for all deaths of unknown COVID status. Burial should not be delayed until the result is ready. Rather all the precautions for COVID dead body handling is observed during handling of all deaths and body is buried as soon as possible.

Families are responsible for transportation, facilitating the burial process of both facility and out of facility deaths. Both regional and federal government will coordinate safe transportation of dead body until burial site.

Burial site is decided by families according to their religion. Unclaimed bodies are buried by the municipality. Religious rituals and burial for all deaths (Unknown and known COVID status) will be attended by limited number of attendants according to the state of emergency legislation.

Local “Edir” will make sure that those handling the dead body at home use face mask and gloves while preparing the body.

While deceased is in bed

1. Adhere to standard precautions and use appropriate personal protective equipment (PPE) at all times. At least face mask and gloves should be routinely used

2. Notifying the family and grief counseling according to the ethical standard in case of facility deaths.
3. After the physician declares death, perform the following tasks to prevent exposure to blood and body fluid during transportation to protecting morgue personnel:
 - a. Remove all disposable tubes and lines appropriately.
 - b. Dress all wounds with impervious material to prevent oozing of body fluids or bleeding from wounds or previous catheter sites.
 - c. Follow the proper identification of the body, transportation, and documentation in the morgue.
4. Patients with COVID 19 should have body tags labeled with the appropriate category.
5. The nurse in charge or dedicated personnel will inform the morgue supervisor if the deceased was known to harbor COVID 19(This information will also be confirmed in writing on the identification tag.)

In the Morgue

1. All morgue staffs must be oriented and provided training on COVID 19 regarding the proper infection control practices (i.e., hand hygiene, modes of disease transmission, and the importance of PPE) and how to apply these practices.
2. Always use standard precautions and use appropriate personal protective equipment (PPE) at all times. Avoid direct contact with blood and body fluids.
3. Use PPE (mask, goggles, latex/vinyl gloves, boots, and water proof full-length apron) to prevent splashing and contamination with body fluids. Remove disposable PPE and discard immediately after the task is completed.
4. Better to avoid Autopsy examination unless required by court. If it is done it has to be carried out under strict IP procedure.
5. Close families should be allowed to see the body after tubes removed and wound sites dressed under strict IP precautions and standard PPE used. But no family member should be allowed to touch, kiss or hug the body even under PPE.
6. Do standard body preparation and put the body in plastic bag, zipped or tied water tight so that there is no leakage of body fluids
7. Put the body in coffin, seal the coffin and disinfect the coffin with disinfectant. Body should be directly transported to burial site(mortuary) the same day and burial process completed the same day and should not be allowed to be transported to home.

N.B: Staffs handling dead bodies of unknown category at the time of COVID-19 outbreak:

Staff may need to handle dead bodies of unknown categories. For example, dead bodies found on the street or abandoned in a house with unclear history or suspected COVID-19 should strictly observe all the recommendation put in this guideline for confirmed COVID-19 cases.

Burial

Regular burial sites of the families choice is used to bury bodies of patients died during the COVID outbreak including deaths due to confirmed COVID-19.

Burial process

1. It is recommended that bodies shall be disposed off (burial or cremation) as soon as practicable.
2. Religious rituals are to be conducted at the mortuary but coffin should not be opened
3. Embalming (preserving body by drying) must be avoided.
4. Relatives are prohibited from opening the sealed coffin.
5. Vehicle used to transport the body should be disinfected

5.3 Post Mortem (Autopsy) procedure recommendation during COVID 19

The national Dead body handling during COVID 19 clearly indicates that autopsy examination is done on COVID 19 confirmed or suspected cases when there are indications like request from the court. And the autopsy should be performed under strict IPC measures. The following recommendation is developed based on international institutions guidelines like the CDC, American College of Pathologists and WHO and customized to the local scenario.

The ROOM:

1. The area where autopsy is performed should have negative pressure as required in all AGPs area for COVID 19 if available. If not available, a separate wide and well illuminated and ventilated room is required.
2. The doors and windows should not open in to the main building but to the outside open air, not used by other people nor populated.
3. Frequently cleaned and disinfected
4. Separate donning and doffing area

The Procedure

1. AGPs such as use of an oscillating bone saw should be avoided for known or suspected COVID-19 cases. Consider using hand shears as an alternative cutting tool. If an oscillating saw is used, attach a vacuum shroud to contain aerosols.
2. Allow only one person to cut at a given time.
3. Limit the number of personnel working in the autopsy suite at any time to the minimum number of people necessary to safely conduct the autopsy.
4. Limit the number of personnel working on the human body at any given time.
5. Use a biosafety cabinet for the handling and examination of smaller specimens.
6. Use caution when handling needles or other sharps, and dispose of contaminated sharps in puncture-proof, labeled, closable sharps containers.
7. A logbook including names, dates, and activities of all workers participating in the postmortem and cleaning of the autopsy suite should be kept to assist in future follow up, if necessary.
8. Dead body should not stay for more than 24 hours

9. Autopsy result should be given only to authorized person

PPE during Autopsy

1. All PPE recommendations for health care workers doing or assisting AGPs apply for those doing or assisting autopsy
2. Better to limit the number of people to the minimum only those who do or assist be in the room at the time of procedure
3. Students should not directly attend the procedure but can follow virtually or use recorded video.

CHAPTER 6 : ETHICAL ISSUES, RESPONSIBILITIES OF HEALTH PROFESSIONALS AND INCIDENT MANAGEMENT IN COVID-19 MANAGEMENT

6.1 Ethical issues in COVID 19 management

As COVID-19 is an unanticipated outbreak, there will be a number of ethical dilemmas in prevention and case management. There are a number of issues that may arise during the period of the epidemics not covered by the existing ethical standards and laws of the country. In order to address this and related challenges, WHO issued a document on how to manage ethical issues during infectious disease outbreaks (*Guideline in Managing Ethical issues in Infectious disease outbreaks, WHO 2019*). Relevant ethical principles included in the guide line are justice (fairness), beneficence (acts that are done for the benefit of others), utility (actions are right insofar as they promote the well-being of individuals or communities), respect for persons (treating individuals with humanity, dignity and inherent rights), liberty (social, religious and political freedom), reciprocity (making a fitting and proportional return).

Other ethical issues that may arise include prioritization of limited resources, withdrawal of treatment and termination of care/life support. The Ethiopian Federal constitution also restricts certain rights during emergency situations. Relevant provisions on Civil and Penal code also apply in line with Public Health emergency. This section of the Ethiopian COVID-19 case management and facility preparedness guideline aims to address anticipated ethical issues in the case management of COVID-19 and the roles and responsibilities of involved parties.

6.1.1 Obligations of governments and the international community

Governments can play a critical role in preventing and responding to infectious disease outbreaks by improving social and environmental conditions, ensuring well-functioning and accessible health systems, and engaging in public health surveillance and prevention activities. Health professionals and institutions cannot handle identification of COVID-19 cases in the community, tracing of contacts and isolation of the exposed as these require involvement of different security and law enforcement bodies of the government. Ensuring the sufficiency of national public health laws, participating in global surveillance and preparedness efforts, providing financial, technical and scientific assistance are key government and international community obligation during this COVID-19 outbreak

6.1.2 Obligations of the local community

All aspects of infectious disease outbreak response efforts, including COVID-19, should be supported by early and ongoing engagement with the affected communities. In addition to being ethically important in its own right, community engagement is essential to establishing and maintaining trust and preserving social order. Involvement of the media and artists in educating the community, youth in community services, companies and private investors in fundraising will assist the control process. The community is expected to obey orders to be given by the government and the health institutions. Individuals are treated with respect and dignity. Suspected and confirmed cases should not be stigmatized by the community; rather they should be actively involved in the control effort after recovery.

6.1.3 Allocating scarce resources

Most of the resources in the health care system need to be diverted to control the outbreak while giving attention to continuing care to emergency non COVID-19 cases and chronic conditions that need continuous follow up. Saving the resources for the outbreak helps to mitigate scarcity of important supplies at the time and places where it is highly needed to stop the spread of the outbreak and save more lives. Unless planned in advance, COVID-19 can quickly overwhelm the capacities of government and health-care systems, requiring them to make difficult decisions about the allocation of limited resources such as hospital beds, medications, and medical equipment to control the epidemic.

In case of limited supply of life saving interventions like mechanical ventilators, the decision of health care provider should be guided by the principle of first come first served and chances of survival based on the severity and reversibility of organ damage. This decision to discontinue life support in terminal cases depends on the existing practice in the country (i.e. brain death confirmed).

6.1.4 Restrictions on freedom of movement

Restrictions on freedom of movement within the border and across the border are ethical decisions in case of COVID-19 outbreak in order to prevent the spread of this contagious disease. This is also in accordance to the provisions in our constitutions in cases of disaster and emergency situations. Isolation, quarantine, restriction of movement in suspected and confirmed cases should be in accordance with the principles mentioned in the WHO guideline mentioned above. Quarantine Regulations of Ethiopia: Council of Ministers Regulations No. 4/1992, Ensures the legal ground for quarantine and isolation of ill patients to prevent the spread of infection, control of hazardous exposure to the community in case of emergencies and disasters reduction also applies in this situation.

6.1.5 Obligations related to medical interventions for the diagnosis, treatment, and prevention of COVID-19

Individuals offered medical interventions for the diagnosis, treatment, or prevention of COVID -19 should be informed about the risks, benefits, and alternatives, just as they would be for other significant medical interventions. The presumption should be that the final decision about which medical interventions to accept, if any, belongs to the patient.

In COVID-19 outbreak, owing to its high contagious nature and threat to the public safety at large, there may be legitimate reasons to override an individual's refusal of a new or existing diagnostic, therapeutic, or preventive measure that has proven to be safe and effective and is part of the accepted medical standard of care unless there is medical contraindication in that particular patient. Similarly, it is ethically sound to conduct research including randomized controlled trial that will have an impact in disease control and improving survival.

6.1.6 Emergency use of unproven interventions outside of research

Considering the high mortality of the COVID-19 outbreak in certain group of the population it is ethical to offer patients experimental intervention provided that:

- No proven effective treatment exists;
- It is not possible to initiate clinical studies immediately;
- Data providing preliminary support of the intervention's efficacy and safety are available, at least from laboratory or animal studies.
- The national ethics authorities, as well as an appropriately qualified ethics committee, have approved such use;
- Adequate resources are available to ensure that risks can be minimized;
- The patient's informed consent is obtained;
- The emergency use of the intervention is monitored and the results are documented and shared in a timely manner with the wider medical and scientific community.

6.1.7 Frontline response workers' rights and obligations

As the risks of occupational exposure, physical and mental health stress on HCWs run high during public health emergencies like COVID-19 many ethical issues arise. Clients at the care in health facilities during

these emergencies are also at increased risk of stigma and may suffer in accessing safe, timely and equitable care. The below section provides guidance to common ethical issues in this setting.

- HCWs should not be expected to take on risky work assignments during an infectious disease outbreak unless they are provided with the training, tools, and resources necessary to minimize the risks to the extent reasonably possible.
- HCWs are also ethically and legally entitled to health insurance coverage especially for occupational related adverse events.
- As professionals with high civil societal capital HCWs should be availed priority access to highest health care even for family members who become ill through contact, as the nation's capacity allows.
- In case of adverse events incurred by HCWs in an occupational setting appropriate compensation should be provided to them. This can be devised and implemented by Ministry of Health and relevant sectors according to need.
- HCWs should be availed appropriate support for reintegration into the community including advocacy to reduce impact of stigma as well as providing job placement and relocation by government as situations dictate.
- HCWs are obliged to follow the standard IP precautions on their return to community and family.
- HCWs are also ethically obliged to uphold the ethos of their profession, abide by their oath and professional code of conduct in caring for patients at all times.

6.2 Ethical issues related to access of essential and emergency care, disclosure and facility responsiveness

During the care of patients with COVID-19 at facilities many ethical issues are expected to arise in the clinical care process, equitable distribution of scarce resources (such as access to life support equipment, staff time, and termination or withdrawal of care).

- Facilities are obliged to prepare contingency plans to provide screening, isolation and emergency care for patients with COVID-19.
- Facilities are also expected to develop and implement a COVID-19 facility preparedness and readiness plan including setting up a pre-triage screening for COVID-19, isolation areas with access to essential and emergency care.

N.B. Resource allocation of a particular facility will be governed by facility COVID-19 protocol.

- Facilities should put in place processes and structures to ensure care provided for patients with COVID-19 is as safe, effective, proven, equitable and dignified as possible. Patients should also be allowed to access family members and significant others through phone.
- For public health measures disclosure of pertinent information on patients with COVID-19 (or SARS Cov-2 infection) and their contacts is allowed. Disclosing the infection to contacts does not require obtaining consent.
- Facility should provide adequate and of good quality food/drink/cloth to patients.
- Information on patient's condition should be communicated to their family regularly and upon request by the treating physician.
- Facilities should establish a clinical Ethical Committee (CEC) and put in place protocol that address difficult clinical decision making in caring for patients with COVID-19 as well as to ensure safety, equity and quality of care and use of scarce resources.
- Facilities should put in place necessary resources to ensure safety of patients and staff alike in dead body handling, disinfection of equipment for reuse and other ethical issues at the hospital.
- Any COVID-19 patient who requires emergency surgical or other interventions should not be denied these emergency services at any health facility, denying the service amounts to stigmatization.

6.3 Rights and responsibilities of health professional

Health care workers are at the front line of any outbreak response and as such are exposed to hazards that put them at risk of infection with an outbreak pathogen (in this case COVID-19). Many countries have experienced many challenges in responding to COVID-19 in clinical settings. Experience has proven that health care workforce (HCW) is one of the most vulnerable groups for COVID-19 infection, particularly of nosocomial nature. It is therefore essential to clearly delineate the roles, rights, responsibilities and occupational risks involved in health care workforce providing clinical care for patients in the face of SARS Cov-2 infection. This section of the national protocol will also serve to facilitate the proper human resource management in the response to SARS Cov-2 infection across the nation.

Hazards include:

- Pathogen exposure
- Long working hours
- Psychological distress
- Fatigue
- Occupational burnout
- Stigma
- Physical and psychological violence

Hence, specific measures should be taken to prevent /minimize risk. The following sections serve as a guidance to delineate the rights, roles and responsibilities of health professionals managing patients in the face of widespread community transmission of COVID-19.

6.3.1 Health care workers (Health Work Force) Rights

Employers and managers in health facilities should:

1. Assume overall responsibility to ensure that all necessary preventive and protective measures are taken to minimize occupational safety and health risks
2. Provide information, instruction and training on occupational safety and health, including
3. Refresher training on infection prevention and control (IPC) as per protocol

4. Provide adequate IPC and PPE supplies (masks, gloves, goggles/face shield gowns, hand sanitizer, soap and water, cleaning supplies) in sufficient quantity per standard to healthcare or other staff caring for suspected or confirmed COVID-19 patients, such that workers do not incur expenses for occupational safety and health requirements
5. Familiarize personnel with technical updates on COVID-19 and provide appropriate tools to assess, triage, test and treat patients and to share infection prevention and control information with patients and the public
6. Provide with appropriate (federal/regional law enforcement) security measures for personal safety
7. Provide a blame-free environment for workers to report on incidents, such as exposures to blood or bodily fluids from the respiratory system or to cases of violence, and to adopt measures for immediate follow up, including support to victims
8. Advise workers on self-assessment, symptom reporting and staying home when ill after appropriate triage and decided to do so.
N.B Based on the burden COVID-19 in the nation and at facilities health workforce who have mild SARS Cov-19 infection could be called on to care for patients with COVID-19
9. Maintain appropriate working hours with breaks as per the capacity and burden of the facility.
10. Consult with health workers on occupational safety and health aspects of their work and notify of facility incident commander of cases of occupational diseases
11. Not be required to return to a work situation where there is continuing or serious danger to life or health, until the employer has taken any necessary remedial action
12. Honor the right to compensation, rehabilitation and curative services if infected with COVID-19 following exposure in the workplace. This would be considered occupational exposure and resulting illness would be considered an occupational disease and HCW should be given priority in treatment.
N.B In case of death of a HCW with COVID-19 special considerations should be given.
13. Provide access to mental health and counseling resources

14. Enable co-operation between management and workers and/or their representatives
15. Leaders and health facilities should give special considerations for HCW with higher risk of infection and subsequent illness outcomes (e.g. HCW belonging in older age groups, those with chronic illness and comorbid conditions, as well as pregnant women and postpartum and lactating mothers).

6.3.2 Health care workers (Health Work Force) Responsibilities:

1. Follow established occupational safety and health procedures, avoid exposing others to health and safety risks and participate in employer-provided occupational safety and health training
2. Use provided protocols to assess, triage and treat patients
3. Treat patients with respect, compassion and dignity
4. Maintain patient confidentiality
5. Swiftly follow established public health reporting procedures of suspect and confirmed cases
6. Provide or reinforce accurate infection prevention and control and public health information, including to concerned people who have neither symptoms nor risk.
7. Put on, use, take off and dispose of personal protective equipment properly
8. Self-monitor for signs of illness and self-isolate or report illness to managers, if it occurs advise management if they are experiencing signs of undue stress or mental health challenges that require support interventions
9. Report to their immediate supervisor any situation which they have reasonable justification to believe presents an imminent and serious danger to life or health
10. Take any responsibility given by the employer
11. Try and use helpful coping strategies such as ensuring sufficient rest and respite during work or between shifts, eat sufficient and healthy food, engage in physical activity, and stay in contact with family and friends.
12. Avoid using unhelpful coping strategies such as tobacco, alcohol or other drugs.
13. Staying connected with your loved ones including through digital methods is one way to maintain contact.

6.3.3 Recommendation for different stakeholders

Federal authorities such as Ministry of Health, Civil Service Authority, Ministry of labor, Federal prosecutor, Regional government authorities, professional societies as well as front line staff should be engaged to ensure proper working environment, take measures to minimize and address risk to HCWs caring for patients in the face of COVID-19 as well as respond to necessary compensation and work environment standards. Facilities should also strive to provide a safe work environment and address existing and emerging concerns. As outlines in the document health professionals are also expected to respond to the national public health emergency in a professional and ethical manner.

6.4 Incidence management for COVID 19 at the health facility

6.4.1 Introduction

Transmission of SARS-CoV2 occurs through respiratory droplets from infected individuals, but transmission through aerosols and via environmental (fomites) may occur particularly in the setting of health care. Hence, health care workers (HCWs) are at particularly high risk of exposure and of infection. Adopting appropriate infection control precautions (use of PPE and frequent Hand washing) are critical for healthcare worker safety and to prevent transmission of virus from healthcare worker to patient. This document aims to provide an exposure risk assessment scheme and provide institutions guidance on managing exposures (furlough vs. return to work)

6.4.2 Objective of the Incidence management team/committee

- Exposure risk assessment of HCWs after possible contact with a COVID-19 case
- To determine the risk categorization of each HCW after exposure to a COVID-19 patient
- To coordinate the management of the exposed and confirmed HCWs based on risk categorization

i. Committee members for incident management team

This committee consisting of the following members will develop TOR at each facility

- IPC
- CCD/MD or any senior delegate by official letter – Chair person
- Diagnostic delegate
- Nursing and midwifery director – Secretary
- OR representative
- Legal affairs delegate
- HR head

ii. Roles and responsibility of the team

- Assess exposure of health facility staff members to COVID 19
- Identify and stratify risk areas in the health facility and ensure strict IPC measures
- Coordinate administrative related issues for the exposed and confirmed health facility staff

- Report to the CED/CEO/PROVOST daily
- Identify health facility staffs with risk factors like comorbidity and ensure they are assigned in less risky areas of the health facility

Risk Classification for COVID 19 exposed health facility staffs

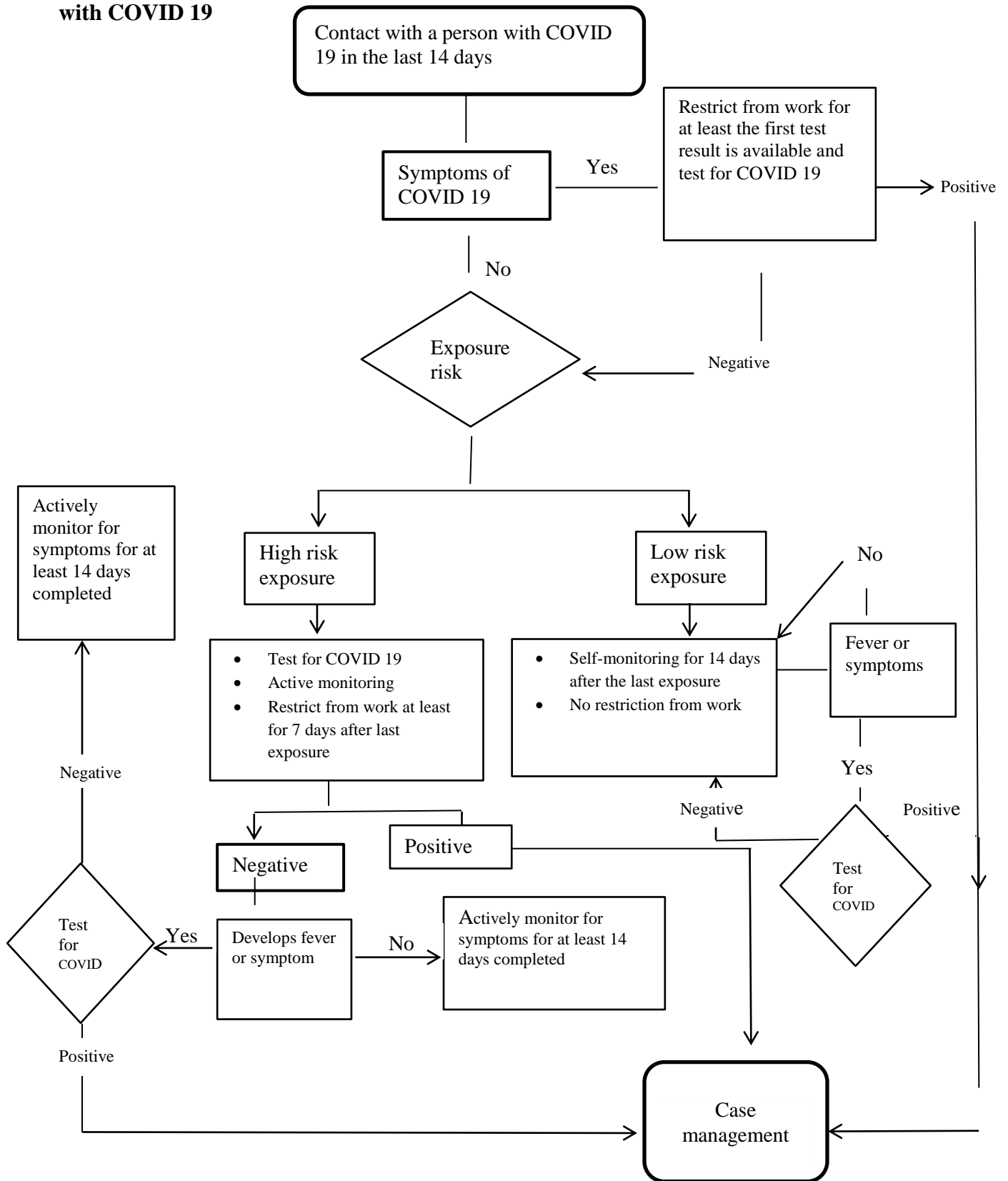
i. High risk

- a. Prolonged close contact with COVID-19 patients not wearing a facemask while HCWs eyes, nose or mouth were not protected and exposed to potentially infectious secretions.
- b. Present for aerosol-generating procedures or when respiratory secretions are likely to be poorly controlled (e.g., cardiopulmonary resuscitation, intubation, extubation, bronchoscopy, endoscopy, nebulizer therapy, sputum induction) on patients with COVID-19 if HCWs's eyes, nose, or mouth were not protected (without mask and face shield)
- c. Prolonged close contact with COVID-19 patients who were wearing a facemask while HCWs eyes, nose or mouth were exposed to respiratory droplet and body fluids potentially infectious with the virus causing COVID-19.

ii. Low risk

- a. Use of facemask (rather than respirator or PAPR) by HCWs who were wearing a gown, gloves, AND eye protection during routine care of COVID-19 patient
- b. Brief interactions with COVID-19 patients
- c. Prolonged close contact with COVID-19 patients when both patient and HCWs wearing a facemask.

Figure 6-1: Flow chart for management of health workers with exposure to a person with COVID 19



CHAPTER 7 : HEALTH CARE FACILITY PREPAREDNESS PROTOCOL FOR COVID 19

As it is known COVID 19 is a highly contagious disease with high attack and case fatality rate. During such pandemic situation most burden goes to health care system and facilities hence health care facilities should prepare for this pandemic in the following regards

7.1 General preparation activities

- A. A multidisciplinary planning committee or teams has to be created to specifically address COVID-19 preparedness planning. Selected facilities should dedicate an area for COVID 19 case management and isolation.
- B. All facilities should be careful not to compromise essential patient care.
- C. Non COVID managing centers should prepare patient isolation center and dedicate and train staffs for deployment to COVID 19 treatment center.
- D. Collaborate with immediate political leadership for decisions and potential resource allocation for COVID 19 response.
- E. Determine methods for patient/family information provision including alternate languages/interpretive services.
- F. Determine strategies to maintain services for at-risk patients during outbreak period (e.g., pregnant, dialysis) but unrelated to COVID
- G. Develop service restriction plans in case of staff shortages or increased demand (e.g., respiratory care, nutritional support, pharmacy, laboratory, radiology, elective surgeries/procedures).
- H. Modify staff responsibilities and shifts as required (supervisory staff work clinically, train less-trained staff can safely provide support and the extent of family member support).
- I. COVID-19 planning has to be incorporated into disaster planning and exercises for the hospital
- J. Responsibilities of key personnel and departments within the facility related to executing the plan have to be described.
- K. A written protocol has to be developed for identifying, monitoring and reporting COVID-19 among hospitalized patients, volunteers, and staff.

- L. A system has to be in place to monitor for and internally review healthcare-associated transmission of COVID-19 among patients and staff in the facility.
- M. There should be a mechanism in place to ensure data protection, quality, display and all staffs should be aware of it.

i. Facility communication

- A. A person has been assigned responsibility for communications with staff, patients, and their families regarding the status and impact of COVID-19 in the facility.
- B. Informational materials (e.g., brochures, posters) on COVID-19 and relevant policies have to be developed or identified for patients and their families.
- C. A person has to be assigned responsibility for communications with public health authorities (i.e., case reporting, status updates)

ii. Consumables and durable medical equipment and supplies

- A. Estimates have to be made of the quantities of essential patient care materials and equipment, that would be needed (Daily weekly, monthly).
- B. A plan has to be developed to address likely supply shortages (e.g., PPE), including strategies for using normal and alternative channels for procuring needed resources and strategies for conserving PPE.

iii. Infection prevention and control activities

- A. Facilities should assign one IPC person dedicated for this pandemic response.
- B. Provide staff education about COVID-19 infection control and update policies as required.
- C. Facilities should plan the amount of IPC needed with contingency plan
- D. Facilities should avail adequate amount of PPE including medical masks, N95 masks, and goggles, adequate amount of water, soap, and alcohol based sanitizer.
- E. Develop guide line on appropriate use of PPE
- F. Develop monitoring guide for staff illness and work leave
- G. Develop a plan to reduce patient and attendants over crowded less than one meter distance depending on the hospital condition. There may be a focus in emergency rooms, waiting areas, triage, and attendants' area.
- H. Plan to postpone none emergency services and high risk elective procedures.
- I. Samples taken from suspected cases for diagnosis should be handled by trained staff and processed in suitably equipped laboratories.

iv. Emergency area preparedness

- A. Specifically-trained healthcare personnel has to be assigned responsibility for overseeing the triage process
- B. Prepare pre triage area per protocol
- C. Prepare isolation area for suspected cases near to pre triage area until patient get transferred.
- D. A designated location, separate from other clinical triage and evaluation areas, (utilizing the principles of social distancing) for the admission of patients with possible COVID-19 has to be determined.
- E. Determine how suspect cases will be isolated from other waiting patients and during ED care.
- F. Emphasize hand and respiratory hygiene and other infection prevention techniques through education, policies, signage, and easy availability of supplies.
- G. Develop referral plans for patients that do not need emergency care.
- H. Develop care plans that reduce the number of staff caring for suspect/confirmed cases until transferred.
- I. Create 'fast-track' or other methods for rapid evaluation and prescribing for minor illness.
- J. Develop risk communication and transportation plane for suspected cases

v. Outpatient services

- A. Develop staffing plan to allow for expanded service hours when needed.
- B. Determine if outpatient locations and services should remain open if the threat is too great to staff and patients.
- C. Determine pre triage in central triage area.
- D. Develop a plan to expedite medication refills, obstetrician visits
- E. Develop a process for screening and triage of phone and email requests for care to limit office visits to those that require an in-person provider evaluation.
- F. Develop a process to limit/cancel non-essential visits which can interfere with the demands of the COVID-19 outbreak.
- G. Emphasize hand and respiratory hygiene and other infection prevention techniques through education, policies, signage, and easy availability of supplies.
- H. Develop referral/deferral plans for patients that do not need acute care

vi. Occupational Health and training

- A. The facility instructs all staff including contractors, volunteers and students to regularly monitor themselves for fever and symptoms of COVID-19, as a part of routine practice
- B. The facility has a process to conduct symptom and temperature checks prior to the start of any shift of asymptomatic, exposed HCP that are not work restricted.
- C. The hospital has to have a plans to provide education and training to HCP, patients, and family members of patients to help them understand the implications of, and basic prevention and control measures for, COVID-19. All staff should be included in education and training activities.
- D. Facility has to developed plans and materials for education and job-specific training of HCP which includes information on recommended infection control measures to prevent the spread of COVID-19.

vii. Healthcare Services/Surge Capacity:

- A. There should be a plan including strategies for maintaining the hospital’s core missions, identify surge capacity and continuing to care for patients with chronic diseases (e.g., hemodialysis and infusion services), women giving birth, emergency services, and other types of required non-COVID-19 care.
- B. A plane for laboratory service including an appropriate amount of reagents and supplies for diagnostic testing is available.

viii. Facility layout and miscellaneous

Design/ layout and flow

A. Gates

There should be Signs for, entry and exit, check point, delegated surveillance system, ambulance entry and exit signs, separation screens path way. Mask and glove should be worn by guard at all time and hand washing point at every gate (minimum 1).

B. Pre-triage

Should be equipped with all the necessary documents, stock of PPE (N-95, Surgical mask, glove), table, infra-red thermometer, chairs, assigned care giver (look for rotation chart), PPE practice of care giver.

C. Triage

A triage area should be designated and equipped with monitors, crash carts, triage documents, gurney (stretchers), are available, waste bin, posters about COVID 19 , triage algorithms are posted, adequate PPE for staff, toilet (male & female) for staff, separate Hand washing point ,infra-red thermometer, alcohol base hand rub, suction machine, PPE practice of care giver, patient monitor or pulse oximeter and thermometer (min 2).

D. Short stay patient isolation room

Space available in the emergency area, with isolation measures for suspected and confirmed cases, the area should be well ventilated, low-transit, and secure, complete set of bed (minimum 2), oxygen concentrator or cylinder (minimum 1), patient monitor or pulse oximeter and thermometer (minimum 2), waste bin for reusable PPE and other wastes separately, alcohol base hand rub.

E. Liaison

There should be designated liaison area with phones, walkie-talkies, registry book, internal and external data recorder, labeling chairs and waste bins are available, admission, referral in and out protocols are posted (available), referral feedback mechanism is in place, data protection rules and regulation, and referral linkage and service directory.

F. Kitchen and restaurant area

Kitchen should be designated and separated from risky areas, clean well-spaced, responsibility assigned for food transfer, responsible person assigned for traffic control(flow), hand hygiene basins are available with standard precaution measures, waste bins are available and PPE for staff.

G. Waste management, laundry and CSD

There should be adequate number of bins for infectious waste sufficient to cover larger volumes, no-touch bins to dispose of tissues used by patients in waiting and triage areas The facility is able to manage an increased amount of infectious waste by itself or outsources its waste management, adequate temporary waste storage areas for infectious and non-infectious waste.

Laundry service with machine, waste bins and trollies should be ready. There should be ready CSD with back up.

H. Utility

There should be power source back up system, sufficient supply of water with storage house water

I. Morgue

Hospitals should prepare morgues are is designated, Morgue area is well screened and separated from other areas, Procedures are in place for claiming and transfer of bodies, A contingency plan has been developed for managing an increased need for postmortem care and disposition of deceased patients.

7.2 Stakeholders engagement in COVID-19 efforts: develop, maintain, sustain and scale up good relationship

Background

Stakeholder engagement and relations are the practice of building mutually beneficial connections with various groups and individuals that have a common interest and goal.

Communication and trust is the main source for creating a solid relationship between stakeholders or any task force. Through effective communications and building trusting relationships stakeholders are committed and involved in shaping the decisions of organizations towards its goal.

These relationships build a credible solution to a unique problem or devise long lasting solutions to organizations questions. The collective strength from different departments or networks with diverse background is the source for the solution. If stakeholders are not managed well it will be source of risk and dispute, resulting in compromised outcome.

COVID-19 is a pandemic with numerous consequences on health, economy, society, politics and etc. To tackle all these problems the health sector can't be the only player. Even in health sector, the success of COVID-19 control and response, depends on coordination of clinical, public health and other related units. These needs high level understanding, cooperation and team spirit. Besides, multiple partners and stakeholders in different levels as task force members or groups should engage. In this section it is assumed that various task forces working in COVID-19 response are derived from different stakeholders and also working with different institutions and departments that needs better coordination to maximize outcomes and minimize risks. Therefore, the steps of stakeholder engagement and development are described below.

Steps in building and maintaining stakeholder relationship:

1. Set objectives and goals

In organization the process owners should make clear why a task force or stakeholders team will be formed and what the tasks will be. In fact draft terms of reference may be prepared that will be enriched and developed by stakeholders.

2. Identify stakeholders

It is important to gather information about and relevant stakeholders should be prioritized to work with. Before the engagement it's important to understand that who will be dependable and can be relied on throughout the phases of the project or activity. When there are large group of institutions to be represented it is important limit the list to most important ones while the others can be engaged in other forums.

3. Establish the group and communicate effectively.

When the team is met for the first time it is to make clear the objectives, goal and scope of the activity. A task may be unclear to stakeholders, particularly in the early stages, in terms of purpose, scope, risks and approach. Then regular early consultation is essential to ensure these requirements are agreed and a delivery solution is negotiated that is acceptable to all.

4. Finalize a governance system and prepare an action plan

- **Clear TOR**

A more conscientious and measured approach is essential and encouraged for stakeholder engagement. Investment in clear terms of reference (TOR) and careful planning before engaging stakeholders can bring significant benefits. The terms of reference should clearly state the task and administrative details including meeting times. Roles and responsibility should be clear and overlaps of roles from other teams should be avoided.

- **Action plan**

In addition, the group should prepare an action plan where every individual or representative from any institute would have a role. Activities to be performed as well as the timeline and resources needed should be described. The plan is a pathway for implementation and a bed rock for monitoring and evaluation.

5. Good relationship building is the key in stakeholders engagement

- **Trust and relationship**

Developing relationships results in increased trust. Where there is trust, people work together more easily and effectively. Larger effort in identifying and building stakeholder relationships increases confidence, minimize uncertainty, and speed problem solving and decision making. Encouraging stakeholder participation in the decision-making process is important element for trust building and makes relationship smooth.

- **Better communication for improving relationship**

Better communication skills should be developed for better engagement. It is said that better communication should be planned, not random. Better communicators provide timely information; are open, and honest for communication; listen to stakeholder concerns emphatically; respect diverse opinions and seek mutually beneficial solutions.

- **A leader as better communicator**

A team leader should be a better communicator and act as a negotiator, even ready for a compromise. It helps to create a good relationship with ultimate goal of trust, win-win and harmonized task and eventually will bring to better outcome.

- **managing risk with good relationship**

Stakeholders are important resources. They should be treated as potential sources of risk and opportunity within the project. Therefore weighing this balance and reducing the risk is important.

6. Empathy and understanding of human behavior:

- **Preventing and handling conflicts**

Accept that humans do not always behave in a rational, reasonable, consistent or predictable way and operate with an awareness of human feelings and potential personal agendas. By understanding the root cause of stakeholder behavior, conflicts can be prevented or handled in a reasonable way that will not affect the main goals. Stakeholders should focus on the goal, results and success and should compromise and come to consensus when there is dispute.

7. Take responsibility

- **Having roles for everyone**

Stakeholder engagement is not the job of one member of the project team. It's the responsibility of everyone to understand their role and to follow the right approach to communication and engagement.

- **Alignment**

The task performed should be aligned and complimentary to other related groups are doing. Overlaps should be prevented

8. Carrying out the task:

- Based on the plan, newly emerging developments and unforeseen realities, actively moving the agenda is needed.
 - While the work is being done monitoring and evaluation has to be performed.
 - Periodic meetings in the expected time table with communication of any progress stimulate the group well. Joint sessions with different groups with common interest should also be conducted. If the chairs are busy they have to delegate others to conduct meetings so that it will not be interrupted.
9. **Evaluation:** interim or final evaluation should be performed to learn strengths, weakness and lessons learned. It should be asked if the team is satisfying different stakeholders or institutions it is serving. Then the result and feedback obtained determine areas of improvement, and points to celebrate as well as to scale up.

ANNEXS

Annex 1: Suspected or confirmed asymptomatic and mild COVID 19 Home and non-health facility isolation for the general public

Background

As facilities are getting overwhelmed by COVID patients, in resource limited set ups home or non-health facility based care for those patient with mild symptom or asymptomatic condition are an option. This section is guidance for home and non-health facility isolation.

Definition

None health facility – Is a set up where suspected or confirmed mild and asymptomatic COVID 19, which includes household, hotel, school or any other set up other than health set

Home – it is a private property, rental house or any house owned by the family member of the suspected or confirmed mild and asymptomatic COVID 19

Mild COVID 19 – Those with fever and/or cough, Upper respiratory tract infection symptoms and with no evidence of pneumonia

Asymptomatic COVID - suspected or confirmed COVID 19 with no symptoms

Precaution to be taken by suspected or confirmed individuals;

1. Keep isolated in separate a room with well ventilation
2. If isolated separate room is not available, keep at a distance of 2 meter from other members of the household/ any individual and mandatory use of medical mask.
3. Self-isolation is at least 14 days and fulfilling discharge criteria
4. If symptoms get worsened report to contact facility immediately
5. Proper respiratory hygiene by covering mouth and nose while coughing and sneezing
6. Proper Hand hygiene
7. Avoid intimate contact/ keep social/physical distancing all the time even with close family members
8. If possible use different or separate utilities like kitchen and toilet. If not wash utility as per standard with soap and water appropriately

9. Design psychosocial support for respective age group
10. Prepare and disseminate information on COVID tailored to pediatric age group
11. Patients with co morbidities and special need, family members should report to the contact health facility if there is any need for medical care. In addition, there could be active follow up of patient with the co morbidity by the health professionals from the contact health facility
12. Those who fulfill the above criteria, should have a working Mobile phone 24/7 and should report to the RRT/HCW if they cannot be accessible through the phone or arrange an alternative mobile number

Criteria for home and non-health isolation

Isolation for people who are suspected or confirmed to have COVID-19 is appropriate in the following circumstances,

1. Those who don't fulfill health facility admission criteria
2. They have appropriate caregivers
3. They have access to food and other basic necessities;
4. They (and anyone who lives in the same home) have access to the recommended personal protective equipment (at a minimum mask)
5. They do not live with household members who may be at increased risk of complications from SARS CoV2 virus infection (e.g. people over the age of 60, people who are immune-compromised or who have cardiovascular diseases, DM, Asthma/COPD, Malignancy) Wherever possible, if you need to travel to your location for isolation (for example, traveling from health facility) , you are advised to use a personal mode of transport, such as a car, to minimize exposure to others. If you need to use public transport (e.g. taxis, ride, use mask and take care of driver)
6. A person in isolation cannot leave to attend public places, including work, school, childcare , university and religious institutions . Only people who usually live in the household should be in the home. Do not see visitors.
7. Home should be assessed by follow up team (health professionals dedicated from EOC for this purposes),

8. Those who need especial support due to disability or other medical condition can be home isolated if they have a proper caregiver. If they don't have proper care giver, they should stay in the health facility

Patient should be counseled on the following points

1. Time to wear a mask inside isolated home

You should wear a mask

- While you are outside your room
- When other people are present.

If you cannot wear a surgical mask,

- The people who live with you should not stay in the same room with you
 - They should wear a mask if they enter your room.
2. What to do for other people in his/her home.
 - A. Only household members who are essential for caring for you should stay in the home.
 - B. Elderly people and those with compromised immune systems or chronic health conditions should stay away.
 - C. If you are sharing the room with others, you should stay in a 2 meter or 6 feet separated as much as possible.
 - D. You should use a separate bath room if available or clean appropriately if it is shared.
 - E. Avoid sharing utensils for feeding if shared wash with water based detergent.
 - F. Avoid shared or communal areas and wear a surgical mask when moving through these areas.
 - G. Wash your hands frequently with soap and water or use hand sanitizer.
 - H. Cover your mouth and nose while coughing and sneezing, dispose of tissues in closed containers.
 - I. If others in the home want to clean your room, ask them to put on a mask before entering the room and wear gloves while cleaning, and use alcohol hand rub before and after wearing gloves.

- J. Surfaces which are touched regularly, such as door handles, kitchen and bathroom areas and phones should be cleaned frequently using detergent and water or a detergent-based cleaner

You will be contacted and told by public health expert whether your household members and close contacts need to be isolated. If they do not require isolation and become unwell, they should contact your local public health unit who will assess and advise on what to do next. If they have difficulty breathing or are seriously unwell and it is an emergency, they should call 8335 or 952 or other hot line immediately.

Psychosocial support for home isolation

Being in isolation can be stressful. Suggestions include:

- Keep in touch with family members and friends via telephone, email or social media;
- Learn more about corona virus and talk with others. Understanding corona virus will reduce anxiety;
- Reassure young children using age-appropriate language;
- Where possible, keep up normal daily routines, such as eating and exercise. Exercise is a proven treatment for stress and depression; Reflect on your resilience and on how you have coped with difficult situations in the past. Remember that isolation won't be for long.

N.B For the latest advice, information and resources, call 8335

Considerations for vulnerable group

Pediatrics

- The decision to isolate pediatric patients at home depends mainly on the clinical severity, underlying comorbidity, ability of the care givers to provide care for the child.
- Preferably pediatrics patient should stay with their parents at any time.
- All pediatrics patients should be cared in a separate room from other siblings.

- Care givers should practice both respiratory and contact precautions especially while changing diapers.
- All mothers should wear face masks while breastfeeding.
- Children should get access for age specific information on SARS Corona 2 virus.
- Ask your child's school to supply assignments or homework by post or email

Elderly

- All elderly > 65 years of age with no co morbidities and mild symptoms can be home isolated
- Presence of capable care givers and ability to self-care should be assessed.
- As elderly may present with atypical symptoms, meticulous and close follow up is needed

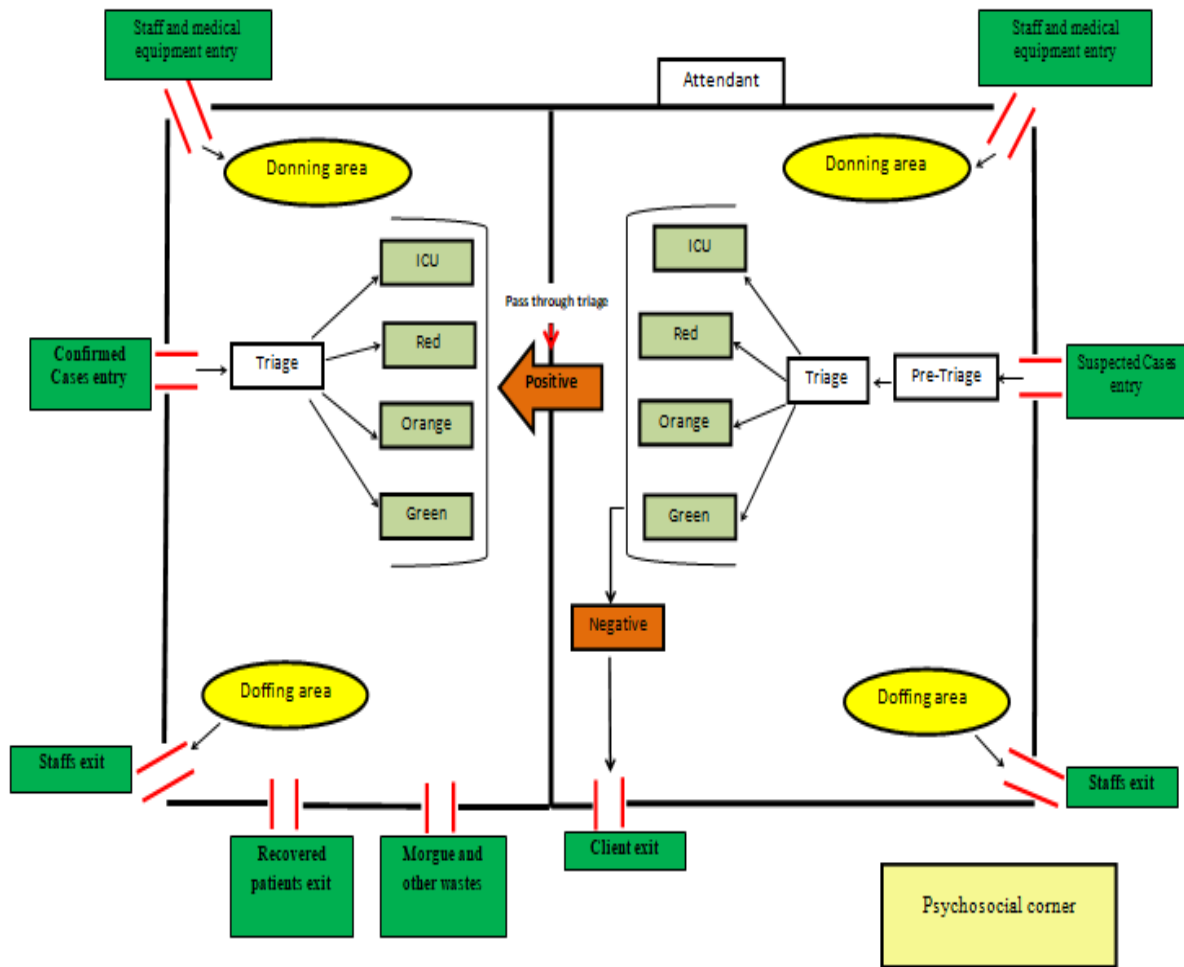
Mentally ill patients

Treat quarantine as an opportunity to do activities that help you relax. Where can I get more information? For the latest advice, information and resources, call 8335 or hotline

Those who will be isolated in non-health facility other than home

- Those who cannot keep at least two meters distance at home or have separate room
- Homeless
- Patient will
- those who does not have care taker

Annex 2: Facility layout



Annex 3: Prone Ventilation Guide

Human resource and equipment required

- At least 3 providers, 1 of which with airway proficiency (in droplet/contact COVID PPE; ETT will be clamped during procedure so no aerosolization is anticipated)
- 3-4 pillows
- 2 flat draw sheets
- ETT holder
- Clamp for ETT
- Pack of new EKG leads
- Thin ear-protective foam pillow (white top from blue/white prone tube holder pillow)
- liquid skin protectant
- 1 supervising provider
- Extra ventilator circuit and ETT suction catheter
- Airway cart with appropriate sized ETT

Preparation before any turn

- Verify absence of contraindications
 - Tracheal surgery or sternotomy in previous 15 days
 - Unstable spine, pelvic, or femur fractures
 - Massive hemoptysis
- Confirm ETT tip in good position (auscultation +/- U/S to rule out main stem intubation)
- Determine whether turn will be rightward or leftward (typically towards ventilator)
- Secure ETT, central lines, arterial line, and peripheral IVs
- Secure NG and/or feeding tube and Foley catheter
- Hold tube feeding, fully evacuate the stomach, and cap/clamp NG and/or feeding tubes
- Suction ETT and oral cavity
- Perform anterior surface skin care and any required wound care or dressing changes
- Empty all ostomy bags; secure all peritoneal catheters and drains
- Evaluate adequacy of sedation and/or paralytic; consider single-dose paralytic if patient not on paralytic infusion; consider viral filter at ETT if no paralytic to be used
- Prepare all lines and tubes:
 - Assure sufficient IV line length; add extensions as needed

- Relocate all drainage bags to the ventilator side of the bed
- Place all chest tube drains and Foley catheter drainage bags between the legs
- Reposition all IV tubing running towards the head and off the ventilator side of the bed

Supine-to-prone turning procedure

- Supervising provider performs brief time-out
- Identify turn leader (usually the patient's primary nurse)
- One provider on each side of the bed to manage turn
- Dedicated provider at the head of bed to manage ETT
- Increase vent FiO₂ to 100% and note the pre-turn vent settings and airway pressures
- Remove patient gown and any orthotic boots or devices
- Place new EKG leads on the patient's back and connect to monitor
- Remove chest EKG leads and any other non-critical skin-adherent material
 - Forehead/Cheek – cut Mepilex lite 4” x 4” into x” x 4” strips; place on cheekbones and forehead
 - Anterior Shoulders - 4” x 4” bordered foam on prominent area of shoulder
 - Chest – 6” x 6” bordered foam over each breast/chest wall
 - Medial Elbows - 4” x 4” bordered foam over medial olecranon
 - Iliac crests – 4” x 4” bordered foam on anterior superior iliac spine
 - Knees – Small sacral Mepilex over patella
 - Eyes with lacrilube gently taped closed prior to turn
- Flatten the bed
- Place amber gel pad under patient's torso with gel pad in direct contact with mattress
- Place a new, clean draw sheet under the patient
- Place 2 absorbent Dri-Flo pads directly on patient's skin - chest and pelvis
- Place three pillows:
 - Across chest
 - Across pelvis at level of iliac crest
 - Across shins
- Position arms at side with hands behind buttocks
- Place draw sheet overlying pillows
- Roll top and bottom sheets together at the patient's sides

- Lift draw sheet and move the patient to the non-ventilator side of the bed until arm is hanging off, but the patient remains securely in bed; avoid sliding
- Prepare to unhook ETT from ventilator
 - Perform inspiratory hold and clamp ETT with hemostat
 - Turn ventilator on standby
 - Unhook ventilator from ETT
- Log-roll into the lateral decubitus position, with the dependent arm tucked under the chest; one side provider pulls straight up on the patient while the other side provider pushes under to keep patient at edge of bed
- Check all lines and tubes
- Complete the log-roll towards the ventilator and into the prone position
- Simultaneously turn the patient's head towards the ventilator
- Prepare to hook ETT back to ventilator
 - Hook ventilator to ETT
 - Turn ventilator back on
 - Unclamp ETT
- Remove the flat sheet and expose the patient's back
- Reassess ETT and all lines/tubes
- Place white offloading foam under head with ear in opening; slide Dri-Flow sheet under to catch secretions
- Raise the patient's arm on the same side as the patient is facing
 - Be sure the raised arm shoulder is dropped, and elbow is below the level of the axilla
 - Place the opposite arm at the patient's side, with palm facing up
 - Lift draw sheet and roll amber gel pad up under same side as patient is facing to micro wedge that side up
- Adjust pillows to keep toes, knees, and abdomen floating
- Position penis, testicles and breasts to avoid inappropriate pressure
- Tilt the bed into slight reverse Trendelenburg (head up) - 15 degrees
- Use fluidized positioner as needed to offload any areas needing extra support because of patient body habitus
- Complete post-turn evaluation (see below)

Head repositioning

- Identify turn leader (usually the patient's primary nurse)
- At least one provider on each side of the bed
- Dedicated provider (usually RT/CRNA) at the head of bed to manage ETT
- Flatten bed
- Lift patient and unroll amber gel pad on side of raised arm
- Place raised arm down by patient side, palm facing up
- Remove white offloading foam ear protector
- Using bottom flat sheet, lift patient and move upward so that head is off bed; avoid sliding
- Carefully turn the patient's head to the opposite side
- Resecure ventilator tubing suspended above the patient's head
- Using bottom flat sheet, slide patient back down onto bed
- Reassess ETT and all lines/tubes
- Place white offloading foam under head with ear in opening
- Reposition ETT in holder towards up-facing side and check for lip and tongue pressure
- Reposition arms in modified swimmer's crawl position
 - Raise the patient's arm on the same side as the patient is facing
 - Be sure the raised arm shoulder is dropped, and elbow is below the level of the axilla
 - Place the opposite side arm at the patient's side, with palm facing up
 - Lift draw sheet and roll amber gel pad up under same side as patient is facing to microwedge that side up
- Adjust pillows to keep toes, knees and abdomen floating
- Position penis, testicles and breasts to avoid inappropriate pressure
- Tilt the bed into slight reverse Trendelenburg (head up) - 15 degrees
- Complete post-turn evaluation (see above)

Prone-to-supine repositioning (planned)

- Identify turn leader (usually the patient's primary nurse)
- At least one provider on each side of the bed
- Dedicated provider (usually RT/CRNA) at the head of bed to manage ETT
- Flatten the bed
- Increase vent FiO₂ to 100% and note the pre-turn vent settings and airway pressures

- Remove patient gown if in place
- Place new EKG leads on the patient's chest and connect to monitor
- Remove back EKG leads and any other non-critical skin-adherent material
- Place sacral Mepilex foam adhesive pad to prevent pressure ulcers (if not already place)
- Unroll amber gel pad to lay flat on the bed
- Place both arms at the patient's side with palms up
- Place 2 absorbent Dri-Flo pads directly on patient's skin - across back and pelvis
- Place clean draw sheet on top of patient
- Using the flat sheet under the patient, slide patient towards the side of the bed that they are facing, keeping the amber gel pad in place on the bed
- Prepare to unhook ETT from ventilator
 - Perform inspiratory hold and clamp ETT with hemostat
 - Turn ventilator on standby
 - Unhook ventilator from ETT
- Log-roll the patient into the lateral decubitus position facing the ventilator, and center the patient's head
- Place a clean flat sheet on the bed
- Complete the log-roll towards the ventilator and into the supine position
- Prepare to hook ETT back to ventilator
 - Hook ventilator to ETT
 - Turn ventilator back on
 - Unclamp ETT
- Reassess ETT and all lines/tubes
- Reposition ETT in holder to avoid sustained lip and tongue pressure in one location
- Complete post-turn evaluation (see below)

Prone-to-supine repositioning (emergent)

- Identify turn leader (usually the patient's primary nurse)
- At least one provider on each side of the bed
- Dedicated provider (usually RT) at the head of bed to manage ETT
- In an emergency, clamp and disconnect the ventilator circuit for the turn
- Place a draw sheet over patient's back and roll it to join the draw sheet below
- Complete a one-step log-roll towards the ventilator and into the supine position

- Reconnect the ventilator circuit or Ambu bag and unclamp the ETT
- Reassess ETT and all lines/tubes
- Complete post-turn evaluation

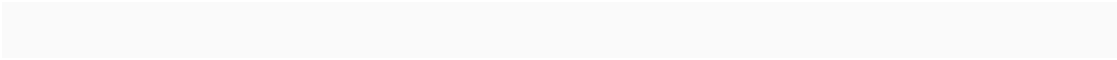
Post-turn evaluation

- Consider potential for accidental right main stemming or dislodging of the ETT and auscultate or U/S if needed
- Reassess ventilator settings, O2 saturation, heart rate, and blood pressure
- Check and adjust all tube and line connections and function
- Check lips and tongue, and reposition ETT holder as needed to avoid recurrent pressure
- Check that all leads and other devices have been removed from the dependent surface of patient
- Check all aspects of the patient's skin in contact with the bed for adequate Mepilex padding
- Check that toes/heels are floating
- Pad any fixed IV, arterial line, or connector sites at the skin with pink foam
- Document a thorough skin assessment, including any non-blanchable erythema in areas of pressure

Annex 4: Pediatric drug list used in COVID 19

0-19 years with mild disease	Acetaminophen 10-15 mg/kg/dose PO or suppository q4-6h PRN, max dose of 90mg/kg/day
Moderate Disease Age : >3- 59 months Vaccinated	Amoxicillin 90 mg/kg/day divided q12h PO/5 days
Unvaccinated	Amoxicillin – clavulinate P.O
Malnourished	Amoxacillin + Gentamycin 5mg/kg/day I.M
Age : >5 -19 years	Azythromycin 10mg /kg/day for day 1 and 5mg/kg/day for the rest of 4 days
Newborns: Early onset Late onset (No meningitis)	Ampicillin 100mg/kg/day divided q8h IV Gentamicin 5mg/kg/day
Late onset with meningitis	Ampicillin 300 mg /kg/day divided q6h AND Cefotaxime 200 mg/kg/ day divided q12h
Age: 1-3 months	Ampicillin 200 mg divided q 6h AND Gentamicin 7.5 mg /kg/day
Age: > 3-59 months	Cefotaxime 150mg /kg/day divided q8h OR Ceftriaxone 75mg /kg/day q 24h for five days AND Azythromycin 10mg /kg/day for day 1 and 5mg/kg/day for the rest of 4 days
Age : >5 -19 years	Ceftriaxone /Cefotaxime + Azythromycin (dose as above)
Malnourished	Ceftriaxone /Cefotaxime + Gentamicin (dose as above)
All age group of children(0-19 years)	Meropenem 20mg/kg/24 IV q8h,max 5 days; <i>AND</i> Azithromycin 10mg/kg/day, then 5mg/kg/day for days 2-5;
For Newborns caffeine (look at on the indication)	Loading dose 20mg/kg caffeine citrate(10mg/kg of caffeine base) P.O or I.V followed by maintenance doses of 5-8mg/kg of caffeine citrate (2.5-5 mg/kg of base) once daily dose beginning 24hrs after loading dose
For moderate disease	Dexamethasone 0.1-0.2mg/kg (max6mg) I.V /day for 3-5 days
For severe disease	Dexamethasone 0.2-0.4mg/kg/day (max6mg) I.V for 5-7 days
For hyper inflammatory syndrome Children with Kobayashi score ≥ 5 (including those with KDSS and MAS):	Aspirin 30mg/kg/day+ Methylpredinsolone 2mg/kg/day for 5 days followed by tapering over 2wks
Anticoagulants (look for specific indications and contraindications)	Enoxaparin 40mg SC/ day Dalteparin 2500 IU SC/ day

For Moderate	In End stage renal disease Unfractionated Heparin (UFH) 5000U SC BID
For sever disease	Enoxaparin 40mg SC BID or 0.5mg/kg in two divided doses Titrate the dose as per the value of D-dimer



Annex 5: PPE equipment for ambulance

Item	Purpose	How to use
N 95 mask	Droplet infection prevention	1for every case
Safety Goggle	Droplet infection prevention	1for every case
Plastic Face shield	Droplet infection prevention	1for every case
Isolation gown	Prevention from body fluids	1for every case
Surgical head cover	Prevention from secretion of body fluids	1for every case
Boots	Prevention from body fluids	Disinfect
Surgical glove	Prevention from body fluids	1for every case
Hand sanitizer	Prevention of cross infection	
Safety box		
Waste disposal plastic		

Annex 6: Supportive & Resuscitation equipment &supplies

Item	Quantity	How to handle &dispose
O1 cylinder	1for each ambulance	-
O1 gage	for each ambulance	-
O1 flow meter	2for each ambulance	-
O1 delivery face mask	1000	-
O2 delivery nasal cannula	1000	-
Ambu bag (BVM) different size, with different face masks	2 for each ambulance	Some Ambu bags can be sterilized in an autoclave at 134° C or 272° F. Otherwise, it must be sterilized through the use of the recommended disinfectant solution. Glutaraldehyde 2% is an appropriately high-level disinfectant ; the bag must be immersed in the solution for at least 20 minutes.
Adhesive plaster	2for each ambulance	
Bandage	2 packs for each ambulance	
Gauze	2 packs for each ambulance	
Syringe different size	20 for each ambulance	
IV canola	20 for each ambulance	
Antipyretic drugs		

Annex 7: Recommendation for Ethiopian CPR guidelines to address patients with COVID-19

CPR remains a critical component of care for many of our patients, particularly during this pandemic, but it does place rescuers at increased exposure

Minimizing provider exposure

The updated guidance emphasized the need to reduce provider, as unnecessary exposure may further decrease the already strained health care workforce. These new tenets include:

- All rescuers should don personal protective equipment (PPE) before entering a scene
- Personnel on the scene should be limited only to those essential for patient care.
- COVID-19 status should be communicated to any new providers before arrival on the scene or when transferring the patient to a second setting.

Oxygenation/ventilation strategies

“The administration of CPR involves performing numerous aerosol-generating procedures, including chest compressions, positive pressure ventilation and establishment of an advanced airway,”

The guidance recommended that:

- If available, attach a high-efficiency particulate air (HEPA) filter in the path of any exhaled gas for manual or mechanical ventilation devices before administering any breaths.
- Before intubation, use a bag-mask device (or T-piece in neonates) with a HEPA filter and tight seal.
- For adults, consider passive oxygenation with non-rebreathing face mask covered by a surgical mask.
- Consider manual ventilation, if intubation is delayed, with a supraglottic airway or bag-mask device with a HEPA filter.

Starting or continuing CPR

- Make sure the CPR corner has high ventilation, if possible with negative pressure

An Ethical Issue of CPR in the Covid-19

- Core ethical principles must be maintained: “fairness, the duty to care, the duty to steward resources, transparency in decision-making, consistency, proportionality, and accountability.”
- Finally, harm to hospital personnel should be minimized, particularly in situations where there is a substantial risk of transmission.

These general principles can be translated into three specific recommendations for crisis standards for CPR:

- Ensuring the safety of personnel justifies selective constraints on resuscitation.
- “CPR remains a critical component of care for many of our patients, particularly during this pandemic, but it does place rescuers at increased exposure,”