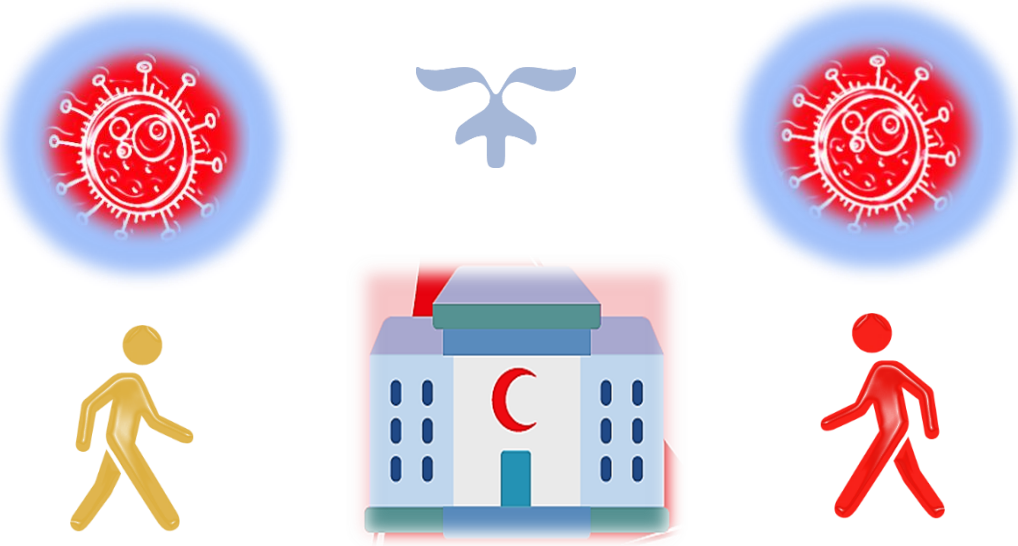
NATIONAL CASE MANAGEMENT PROTOCOL FOR COVID-19

First Version



THE CASE MANAGEMENT FOR COVID-19
SCIENTIFIC COMMITTEE

http://www.lmb.ly/scc-covid-19.htm

MAY 6, 2020

THE SCIENTIFIC CONSULTANCY COMMITTEE AGAINST CORONA VIRUS PANDEMIC

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FOREWORD

The national case management protocol for COVID-19 is intended for clinicians working in different health facilities (primary, secondary and designated centres for COVID-19) both in public and private sectors, managing adult with different forms of acute presentation of COVID-19 infection, including mild, moderate, severe pneumonia, and acute respiratory distress syndrome, and sepsis septic shock, arrest and post mortem care.

Its main objectives are:

- To provide guidance on clinical management of the COVID-19 infection
- To provide a protocol on the practical steps to deal with COVID-19 cases
- To detail the measures necessary to protect hospital staff, patients and visitors.

The manual will provide a framework for users and are to be adapted to health facility context.

ACKNOWLEDGEMENTS

The national case management protocol for COVID-19 is the product of contributions by many individuals and scientific societies/ association under the coordination of the case management for COVID-19 scientific committee of the scientific consultancy committee against corona virus pandemic.

The main scientific societies/ association contributors are:

- *Libyan thoracic society*
- *Libyan general practice society*
- *Libyan emergency medicine association*

The scientific consultancy committee against corona virus pandemic would like to thank all contributors (individuals and scientific societies/ association) to contribute in the first version of national case management protocol for COVID-19 of Libya.

Objectives

The objectives of this document are ：

•To provide guidance on clinical management of the COVID-19 infection

•To provide a protocol on the practical steps to deal with COVID-19 cases

•To detail the measures necessary to protect hospital staff, patients and visitors

Notice:

- **This guideline is not intended to override the clinical decisions that would be made by clinicians providing individualized patient care.**
- **This guideline will be updated as more information becomes available.**

Introduction

Introduction

Coronaviruses (COVID-19)

- Corona virus is a large family of viruses that cause illness in humans and animals
- In people, Corona virus can cause illness ranging in severity from the common cold to Pneumonia and Severe Acute Respiratory Illness
- Corona virus is one of seven types of known human coronaviruses. SARS COV2 like the MERS and SARS coronaviruses, likely evolved from a virus previously found in animals
- The estimated **incubation period** is unknown and currently considered to be 2 to 14 days post exposure.

Case finding instruction for Patient under investigation COVID-19 Cases in health facilities:

1. All healthcare workers shall fully understand the possible situations for screening patients in accordance with PUI criteria;
2. The sample should be taken for PCR testing in the health care facility and should be conducted on those patients who meet the PUI criteria for and /or (positive rapid AB test); by well-trained health care worker to decrease chance of false negative results

Patient under investigation (PUI) criteria:

1. A patient with acute respiratory tract infection (sudden onset of at least one of the following: cough, fever, shortness of breath) and with no other etiology that fully explains the clinical presentation and with a history of travel or residence in a country/area reporting local or community transmission during the 14 days prior to symptom onset;
   OR
2. A patient with any acute respiratory illness and having been in close contact with a confirmed or probable COVID-19 case in the last 14 days prior to onset of symptoms;
   OR
3. A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g., cough, fever, shortness breath)) and requiring hospitalization (SARI) AND with no other etiology that fully explains the clinical presentation.

Patient under investigation should never be behind. All patient under investigation should have PCR test in either health care facilities or by rapid response team of NCDC after discharge at home.

Confirmed COVID-19 is defined as:
A person with confirmed positive PCR test for COVID-19 by an approved national laboratory.

Negative cases for COVID-19 is defined
A person with requested enough number of PCR test to exclude that the patient has the COVID-19. i.e. the patient had twice negative PCR test with interval 48 to 72 hrs.

Institutional isolation:

- All confirmed mild cases need admission in institutional isolation and medical monitoring by health worker personnel.
- All Institutional isolation cases should be notified to NCDC by physician (directly or by using hot line for COVID-19) for further evaluation of contacts and exclusion from getting COVID-19 disease

Home isolation:

- All confirmed cases that need admission in institutional isolation in the health facility but as admission is not feasible can be discharged for home isolation.
- All home isolated cases should be notified to NCDC by direct physician (directly or by using hot line for COVID-19) for further evaluation of contacts and exclusion from getting COVID-19 disease.

Home quarantine:

- All cases that are discharged from the health facility and had PUI category.
- All home quarantine cases should be notified to national center for disease control (NCDC) by direct physician (directly or by using hot line for COVID-19) for further evaluation and exclusion from getting COVID-19 disease.

Health facility designated for COVID- 19:

- **All health facility designated for COVID-19 with different name**
    1. Triage centre for COVID-19
    2. Institutional isolation
    3. Designated hospital for COVID-19 (cohort word admission, critical care admission and /or triage).

Clinical Findings and Complications

Clinical Findings and Complications

Some patients with initially mild symptoms may progress over the course 5-7 days from symptom onset.

Clinical manifestations

- **Fever 43-98%**
  - Often high and sustained for 10 days but may be intermittent
  - Absence of fever does not rule out diagnosis
- **Cough 68-82%**
  - Productive in 14-56% of cases.
- **Breathlessness 3-64%**
  - Onset around day 6 of illness.
  - May be silent hypoxia (No increased work of breathing but severe hypoxia) especially elderly.
- Less common:

1. Gastrointestinal (diarrhea, nausea, may precede fever) – up to 10%
2. Runny nose – 4-24%
3. Sore throat - 14%
4. Myalgia - 11-15%
5. Headache - 6-34%

- **Anosmia** - ENT UK press release:
  - Up to 2/3rd of patients with COVID have anosmia
  - Significant amounts of patients presenting with anosmia with NO other symptoms

Duration of symptoms:

1. Fever, median 4-12 days in survivors
2. Dyspnea, median 13 days
3. Cough, median 19 days in survivors. Still present in 45% of survivors on discharge and 72% of non-survivors on death

High-risk groups

- Age above 60 years old
- Smoker
- Cardiovascular disease
- Diabetes
- Hypertension

- Immune deficiency and or suppression (HIV/AIDS, long-term steroid therapy, post-solid organ transplant cases, chemotherapy, immune modulator therapy)
- Pre-existing pulmonary disease (uncontrolled Asthma, COPD, bronchiectasis)
- Other chronic disease such as chronic kidney disease, Chronic Respiratory disease, Sickle cell…etc.

Complications:

- Severe Pneumonia
- Acute Respiratory Failure and ARDS
- Acute Renal failure
- Disseminated intravascular coagulation
- Sepsis or septic shock
- Arrhythmias

Timing of complications from illness onset:

1. Sepsis, median 9 days (range 7-13 days)
2. ARDS, median 12 days (range 8-15 days)

- Respiratory status can decompensate very rapidly
- Duration between symptom onset and ventilation ranges from 3-12.5 days, median 10 days

3. Acute cardiac injury, median 15 days (range 10-17 days)
4. AKI, median 15 days (range 13-19.5 days)
5. Secondary infection, median 17 days (range 13-19 days)

Time from initiation of invasive ventilation to VAP occurrence, median 8 days

Clinical Classifications of COVID-19 confirmed cases:

- **Mild Cases:** The clinical symptoms are mild and ***no pneumonia manifestations can be found in imaging***.
- **Moderate Cases:** Patients have symptoms such as fever and respiratory tract symptoms, etc. and ***pneumonia manifestations can be seen in imaging***.
- **Severe Cases:** Adults who meet any of the following criteria:
  - Respiratory rate ≥ 30 breaths/min;
  - Oxygen saturation ≤ 93% at a rest state or on room air;
  - Patients with > 50% lesions progression within 24 to 48 hours in lung imaging should be treated as severe cases.

Severity of disease:

1. 81% have mild to moderate symptoms (mild symptoms to mild pneumonia)
2. 14% have severe symptoms (hypoxemia, or >50% lung involvement)
3. 5% have critical symptoms (respiratory failure, shock, multiorgan dysfunction)

Baseline Investigations

Chemistry and Hematology:

1. Complete blood count and differential
2. Renal function and Electrolytes
3. Liver Function test including Liver enzymes
4. Coagulation profile
5. Procalcitonin
6. CRP
7. LDH
8. Ferritin
9. D-dimer
10. Troponin & creatinine kinase (CK)
11. Serum Glucose (HbA1C if diabetic)
12. G6PD (if treatment with chloroquine is being considered)
13. Pregnancy test in women of child-bearing age

Laboratory abnormalities: can be present on patient admission as shown;

- Lymphopenia, 35-83%
- Mild hepatocellular injury pattern (AST / ALT ~200s), 28-38%
- GGT elevated in ~54% of COVID-19 cases in one center.
- Anemia, 51%
- Increased D-dimer, 36%
- Elevated CK 13%
- Elevated LDH 76%
- Low/normal procalcitonin 94%
- Elevated inflammatory markers (IL-6, ESR, CRP, or ferritin) 38-86%

Imaging:

CHEST IMAGING

Ensure infection control measure are taken if patient is transferred to radiology or any other department outside the isolation room and it is preferred to be done at point of care.

Findings:

1. Primary features are of atypical pneumonia or organizing pneumonia.
    - Distribution is typically bilateral, peripheral and basal bilateral findings in about 85% of patients. 33 - 86% predominantly peripheral and 70 - 80% predominantly posterior
2. Parenchymal imaging findings are variable and depend on time course
    - Days 0-5: ~65% pure GGOs, 24% GGOs with intralobular lines
    - Days 6-11: ~40% pure GGOs, 22% pure GGO with intralobular lines, 28% GGO with irregular lines and interfaces
    - Days 12 - 17: more consolidations (38% show “mixed” pattern of consolidation, GGOs, and reticular opacities with architectural distortion)
    - Late findings may include fibrotic changes
3. Small bilateral effusions can be seen in <10% of patients; large effusions are not.
    - Large effusions, cavitation, discrete nodules, lymphadenopathy suggestive of another process (e.g. superimposed bacterial infection)

CXR: is helpful as primary Imaging investigation if US not feasible, and can be used in places where CT not feasible. Sufficient in most cases. Avoid routine daily CXR (unlikely to change management, evaluate case-by-case). May be initially normal in up to ~30% of hospitalized COVID patients, particularly in early disease. Sensitivity is 59% as confirmed in one study, as compared to 86% for CT scan.

CT Chest: Often will not change management and is associated with potentially unnecessary risk (risk to staff of transmission in transit, risk to patient for desaturation

in transit) and may be reserved for cases where lung ultrasonography is not sufficient to answer clinical question. Avoid unless otherwise indicated: e.g. for abscess or empyema, or other causes of hypoxemia like pulmonary embolism. If chest CT obtained, would be better non-contrast scan (or contrast and non-contrast phases if concerned for PE). Approximately 50% of CT scans are normal up to 2 days after symptom onset

Point of Care Ultrasound: Can be used by experienced providers. Ultrasound imaging utility for rapid assessment of severity of COVID-19 at presentation, track the evolution of disease, and help to making decision for weaning of patient from ventilator support. Ultrasound is helpful is decision for admission in the following:

1. If admission being considered; lung ultrasound finding is more sensitive than that in X ray finding. Positive study should prompt lower threshold for admission.
2. If admission is indicated, ICU admission is considered; lung ultrasound is complementary to X ray. If US finding is more severe to X ray, should lower the threshold for ICU admission.

Table 1 lung x ray, CT, ultrasound finding

Lung (CT or X ray)	Lung ultrasound
Thickened pleura	Thickened pleural line (C lines)
Ground glass shadow and effusion (GGO)	B lines (multifocal, discrete, or confluent)
Pulmonary infiltrating shadow	Confluent B lines
Subpleural consolidation	Small centomeric consolidations (C profile)
Translobar consolidation	Both non-translobar and translobar consolidation (C profile)
Pleural effusion is rare.	Pleural effusion is rare
More than two lobes affected	Multilobar distribution of abnormalities
Negative or atypical in lung CT images in the super-early stage, then diffuse scattered or ground glass shadow with the progress of the disease, further lung consolidation	Focal B lines is the main feature in the early stage and in mild infection; alveolar interstitial syndrome is the main feature in the progressive stage and in critically ill patients; A lines can be found in the convalescence; pleural line thickening with uneven B lines can be seen in patients with pulmonary fibrosis

Cardiac investigations:

1. ECG
2. Echocardiogram, pro-BNP, Troponin T and CK-MB if clinically indicated

Microbiology:

Samples for PCR testing from the following:

Nasopharyngeal Aspirate/Swab and oropharyngeal swab (should use non-cotton flocked swab) if upper respiratory tract infection

All specimens should be regarded as potentially infectious, and health care workers (HCWs) who collect, or transport clinical specimens should adhere rigorously to standard precautions to minimize the possibility of exposure to pathogens.

Transport of Respiratory Secretions Samples

- Transport of the respiratory secretions sample to the reference laboratory of your region, using double packing system at 2-8°C temperature.
- Trained personnel following safe handling practices should transport specimen

For PCR testing in all Health Facilities:

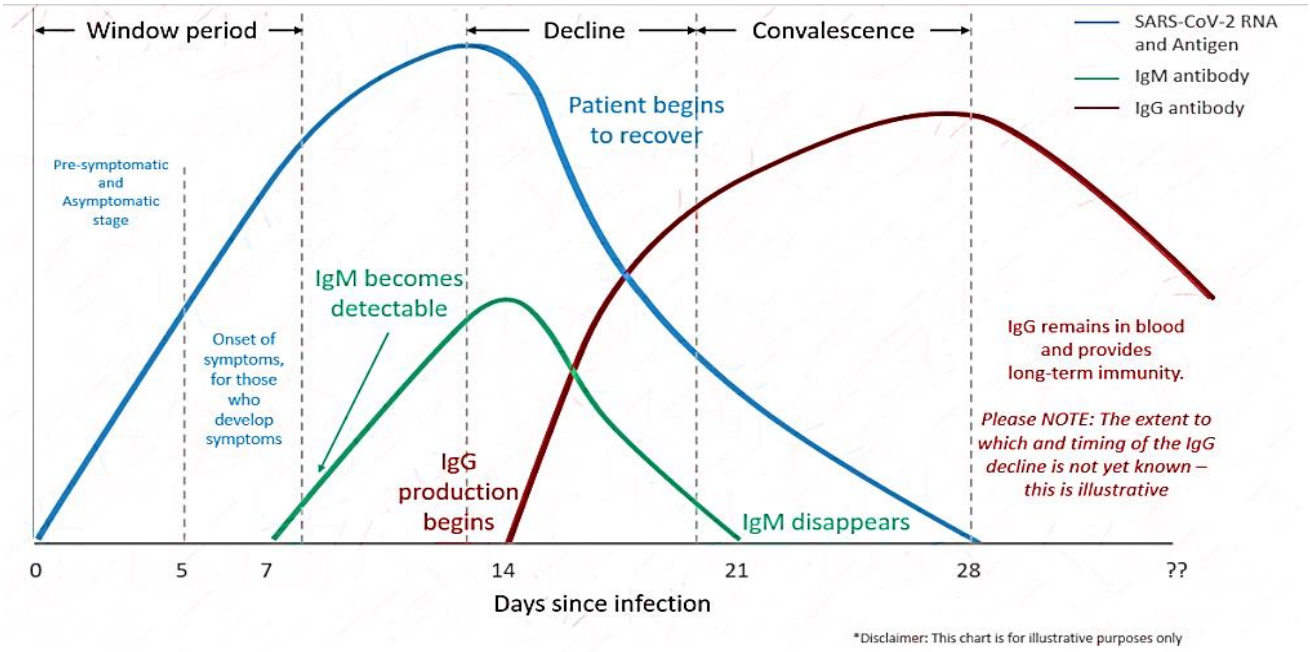
Send the samples to their dedicated national approved laboratory. Either using RT-PCR test or GeneXpert PCR test. According to availability and/or case severity or procedure necessity.

Rapid AB testing:

Serum/plasma/ whole blood sample taken for specific Ig M, IgG antibodies for COVID-19. it is point of care testing takes 10-15 min.

Notice:

- The Rapid AB test is used as point of care test in case finding for COVID-19.
- Patient with positive Rapid AB test cannot be categorized as confirmed cases.
- You do not need to tell the patient the result of rapid AB test before confirmation by PCR test and it is considered as tool assisting your clinical decision.



Test results			Clinical significance
PCR	IgM	IgG	
+	-	-	Patient may be in the window period of infection
+	+	-	Patient may be in the early stage of infection
+	+	+	Patient is in the active phase of infection
+	-	+	Patient may be in the late or recurrent stage of infection
-	+	-	Patient may be in the early stage of infection. PCR result may be false-negative. Antibody test could be false positive
-	-	+	Patient may have had a past infection, and has recovered or antibody test could be false positive
-	+	+	Patient may be in the recovery stage of an infection, or the PCR result may be false-negative. Antibody test could also be false positive.

Source: https://www.medscape.com/viewarticle/928150

Infection Control Measures for PUI or Confirmed COVID19 Cases in Healthcare Facilities

Infection Control Measures for PUI or Confirmed COVID19 Cases in Healthcare Facilities

Early Recognition

Enhance early recognition of suspected cases by:

Visual triage at the entry point of the healthcare facility, for early identification of all patients with acute respiratory illness (ARI).

- Hand wash hygiene at the entry point
- Visual triage station should be placed at the entry point of the AE and entry point of any health facility
- Attended by a trained receptionist. Staff should be trained on appropriate questions to ask as well as actions based on findings.
- Post visual alert signage to enhance self-reporting by symptomatic patients.
- Attended by a trained nurse or nurse assistant. Staff should be trained on appropriate questions to ask as well as actions based on findings and updated case definition
- All identified acute respiratory infection (ARI) patients should be offered to
    - Wear a surgical mask, if they can tolerate it, and should be asked to perform hand hygiene.
- All contacts of PUI should also be offered to wear a surgical mask and should be asked to perform hand hygiene.
- Do not allow PUI to be in None - fever and / or respiratory cases section with other patients.
- Place PUI in a dedicated waiting area with at 1-2 meters distance between them.
- Provide enough supply of surgical masks & hand hygiene sanitizers.
- Screen all patients walking into the ED for symptoms of acute respiratory illness (ARI) as described above.
- Perform Infection Control Risk Assessment in triage.

General recommendations:

i. **Implement Standard Precautions for all patients at all times focusing on**

· Hand hygiene: adherence to WHO steps and moments

· Ensure availability and Proper use of PPE.

· Follow Respiratory Hygiene Practices:

- Offer a medical mask for fever and / or respiratory cases for those who can tolerate it.
- Offer a medical mask for PUI cases of COVID 19 for those who can tolerate it.
- Educate patient and relatives about cough and sneeze etiquette i.e. Cover nose and mouth during coughing or sneezing with tissue or flexed elbow for others.
- Avoid touching your eyes, mouth or nose.
- Post visual aid for cough etiquette, hand hygiene and symptoms to report early.

· Risk assessment is critical for all activities, i.e. assess each health care activity and determine the personal protective equipment (PPE) that is needed for adequate protection. According to national infection prevention and control guideline.

ii. **Practice droplet and contact Precaution when dealing with fever and / or respiratory cases (PUI)**

For fever and / or respiratory cases (PUI):

Patients to be placed in a single room if possible, otherwise you should have barrier between patients. Or distance for at least 2 meters.

Practice droplet and contact precautions for fever and / or respiratory cases or PUI cases:

· Wear a surgical mask, eye protection i.e. goggles or a face shield, gloves and impermeable gown.

· Practice airborne precautions for **aerosol-generating procedures** (bronchoscopy, open suction, nebulization, sputum induction, ambu-bagging intubation and extubation, NIV (Non-invasive Ventilation), CPR, and autopsy) by wearing fit tested N95 mask.

iii. **Practice droplet and contact Precaution when dealing with Confirmed Cases**

For confirmed cases:

· Place patient in airborne infection isolation room if available, otherwise in a room with good ventilation.

· Avoid the presence of unnecessary individuals in the room.

·Practice airborne precautions for aerosol-generating procedures (bronchoscopy, open suction, nebulization, sputum induction, ambu-bagging intubation and extubation, NIV (Non-invasive Ventilation), CPR, and autopsy) by wearing fit tested N95 mask.

Medical Care for Patients with confirmed COVID-19 infection

Medical Care for Patients with confirmed COVID-19 infection

- All confirmed cases should be treated, as per scientific consultancy committee against COVID-19 recommendation.
- All positive cases (PCR TEST or rapid AB test) need to be assessed, if they are **fitting criteria** as described below for institutional isolation, can be isolated at designated isolation building, with full instructions
- If patient's condition deteriorates, they will be transferred to the nearest healthcare facility for further assessment and management.
- Admit patients with stable moderate illness and patients with mild illness with risk factors to designated hospital facilities and follow active treatment pathway according to the clinical data. If patient's condition deteriorates, upgrade level of care.
- Admit all severe patients to hospitals and once their condition stabilizes, they can be transferred to lower levels of care areas.
- Admit all patients with COVID-19 infection to single room or cohort word with good ventilation and toilet services.
- If hospital capacity is full, positive COVID 19 cases can be cohered in the same room, provided there is 2 meters distance between the patients.
- Implement standard, contact and droplet precautions whenever coming in contact with confirmed cases. Unless aerosol generating procedure then, airborne precaution.
- Follow recommended active management plan for patients with moderate to severe illness.

· **Fitting criteria of confirmed cases for dispatch to proper place**

Comorbidities:

- **Hypertension**
- **Diabetes**
- **COPD/Asthma**
- **TB**
- **Current smoker**

Immunocompromised:

- **HIV/AIDS**
- **Severe malnutrition**
- **Chronic steroid use**
- **Oncological cancer therapy**
- **Post solid organ transplantation**
- **Chronic renal failure on dialysis**
- **Immunocompromised medication use**

Score	Imaging	Classification Severity	Oxygen dependency
1 - 4	No imaging finding	Mild	Less likely need oxygen
1 - 4	Imaging finding	Moderate	Probably need oxygen
5 - 7	Imaging finding	Severe	Need oxygen, less likely need mechanical ventilation
>7	Imaging finding	Critical	Need oxygen, Probably need mechanical ventilation

Comorbidity: = score 2 if

- **> 2 comorbidities**
  Or
- **Immunocompromised**
  OR
- **Cardiovascular disease**

Grade

Score

Calculate the total score

Assess

Ask

		Score circle only those that apply
Mobility	**With help** **Stretcher**	**1** **2**
Assessment	**Difficult breathing or unresponsive**	**3**
Temperature	**<35.1** **>38.4**	**2** **3**
Pulse	**<46** **>109**	**2** **3**
Respiratory rate	**<28** **>27**	**2** **4**
Systolic blood pressure	**<91** **>159**	**4** **2**

Clinical Management and Treatment for confirmed COVID 19 cases

· **Treat all positive cases of COVID-19 regardless of clinical presentation.**

· Apply Standard Precautions, Contact Precautions, and Droplet Precautions with eye protection should always be used when caring for the patient

· If mild symptoms can be cared for in single room with good ventilation and droplet precaution. Negative pressure rooms are not required unless aerosol generating procedures.

· Clinical management includes prompt implementation of recommended infection prevention and control measures and supportive management of complications, including advanced organ support if indicated.

· No specific treatment for COVID19 infection is currently approved for improving morbidity and mortality yet:

- Give supplemental oxygen therapy, as needed.
- Use conservative fluid management, if possible.
- Give empiric antimicrobials as indicated.
- DO NOT routinely give systemic corticosteroids for treatment of viral pneumonia or ARDS.
- Closely monitor patients for signs of clinical deterioration.
- Address co-morbid condition(s).
- Critically ill patients can be treated with convalescent plasma (according to national guidelines).

Instruction for home quarantine to PUI / home isolation for confirmed case and admission in institutional isolation is not feasible

1. **Home quarantine/ home isolation for the next 14 days from the date of discharge from the hospital/clinic**
2. Stay at home in a single room with separate washroom and separate yourself from other people in your home.
3. If you share any facility at home, please make sure you disinfect it thoroughly after every use with warm water and detergent then dry your items with a separate towel that only you would use
4. Don't go outside your room, unless its unavoidable and then wear a facemask
5. Cover your mouth and nose when you cough or sneeze with tissue then dispose of it immediately in a sealed plastic bag
6. Wash your hands frequently with soap and water for 30 seconds at least then dry them well and avoid touching your eyes, nose and mouth if you haven't washed your hands
7. Avoid sharing household items
8. Monitor your symptoms **if become worse**. You need to visit a doctor, **call ahead before visiting. By using the hotline for coronavirus 195, 1448.**
9. Do not have visitors in your home
10. Waste management: All waste that has been in contact with the individual, including used tissues, and masks if used, should be put in a plastic rubbish bag and tied when full. The plastic bag should then be placed in a second bin bag and tied.

Laboratory and Radiological Monitoring for admitted confirmed cases

- Baseline tests should be done prior to treatment initiation for all patients.
- Repeat PCR test after 5 days of therapy initiation.
- Repeat blood tests every 72 hours and imaging every week, earlier if clinically indicated, while on treatment.
- Repeat more frequently in critically ill patients if indicated.

Discharge Criteria for COVID19 confirmed cases in the designated health facility after admission

- if COVID19 PCR test from nasopharyngeal sample or lower respiratory sample is positive, repeat samples after 5 days and every 72 hours thereafter.

- Once a sample becomes negative, collect after 48 hours

- Patient can be discharged once they have

i. 2 consecutive Negative PCR tests for COVID 19 that are more than 48 hours apart and

ii. Patient has minimal respiratory symptoms and normal oxygen saturation level and

iii. Patient is afebrile for more than 3 days without antipyretic

- Discharged patients to be seen in the hospital clinic after 2 weeks, unless patient develops respiratory symptoms to attend earlier. If asymptomatic at 2 weeks, no more follow up

- All patients after discharge should be quarantined at home for 14 days from discharge date and instructions and quarantine undertaking to be given to the patient and documented in medical record. Notify home quarantine case to the NCDC.

-Cured healthy patients without contraindication to blood donation are advised to donate plasma for use in critically ill patients after antibody IgG testing.

Patient flow in different health facilities

Patient flow in different health facilities

There are different patient flow diagrams according to the type of health services afforded in the pandemic emergencies for COVID-19.

There will be two major kinds of health facilities:

- Designated COVID-19 health facilities
    - Designated triage centre for COVID-19
    - Institutional isolation centre for COVID-19
    - Designated hospital for COVID-19
- Designated essential health service facilities
    - Primary health cere centre
    - Private clinic
    - Public hospital
    - Specialized centre

Although the designated essential health service facilities still have risk for dealing with COVID-19 patient. But the risk is minimum, and both the health workers and visitors should follow the instruction in patient follow and IPC recommendation from the scientific and consultancy committee against coronavirus pandemic, the risk of transmission will be minimum. the benefit of empowering these facilities for continuing essential health services is important for sustaining the provision of non-COVID-19 health services to the general population.

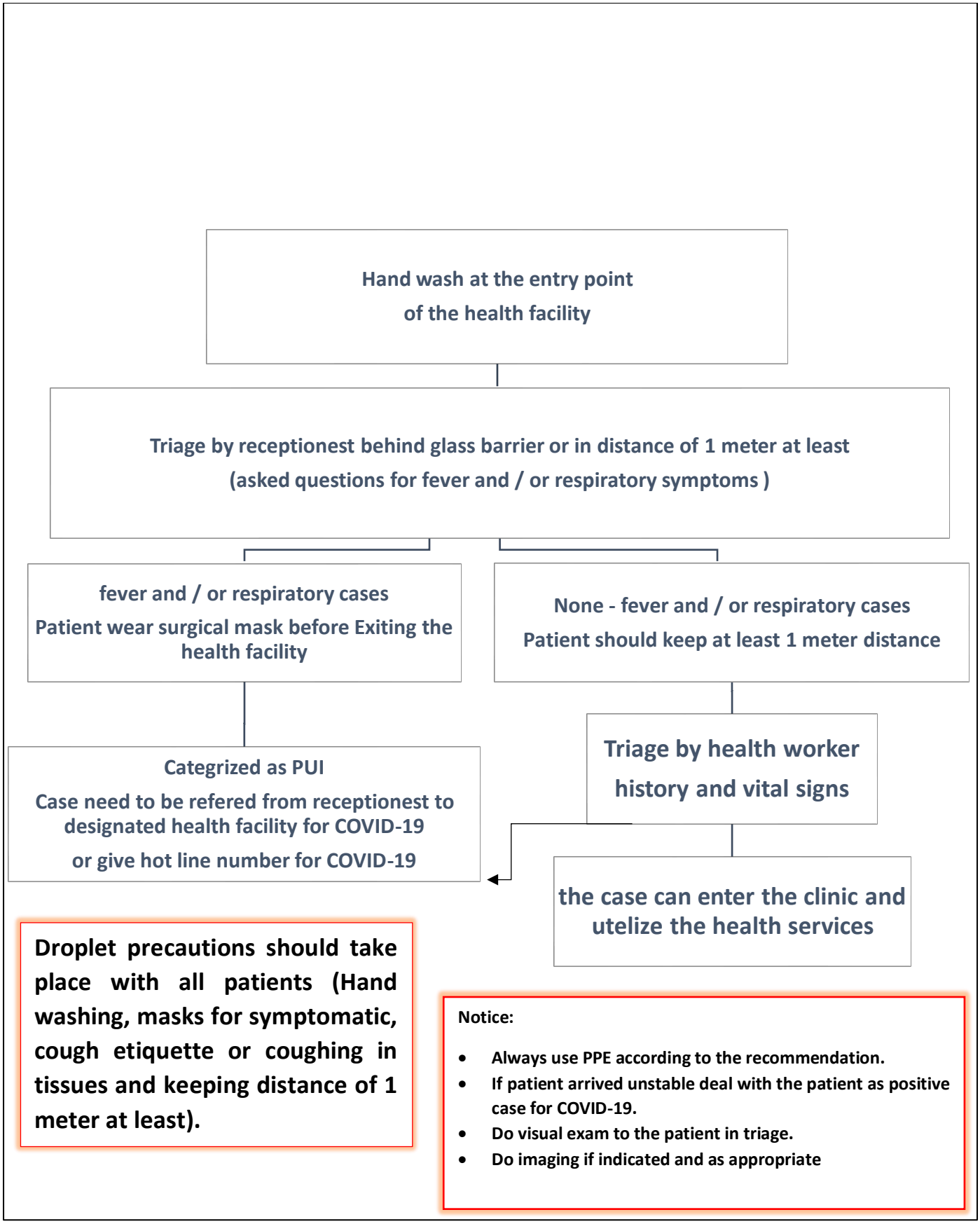


Figure 1 patient flow in the primary health care facility or other health facility working to provide essential health services (level 3 of crisis)

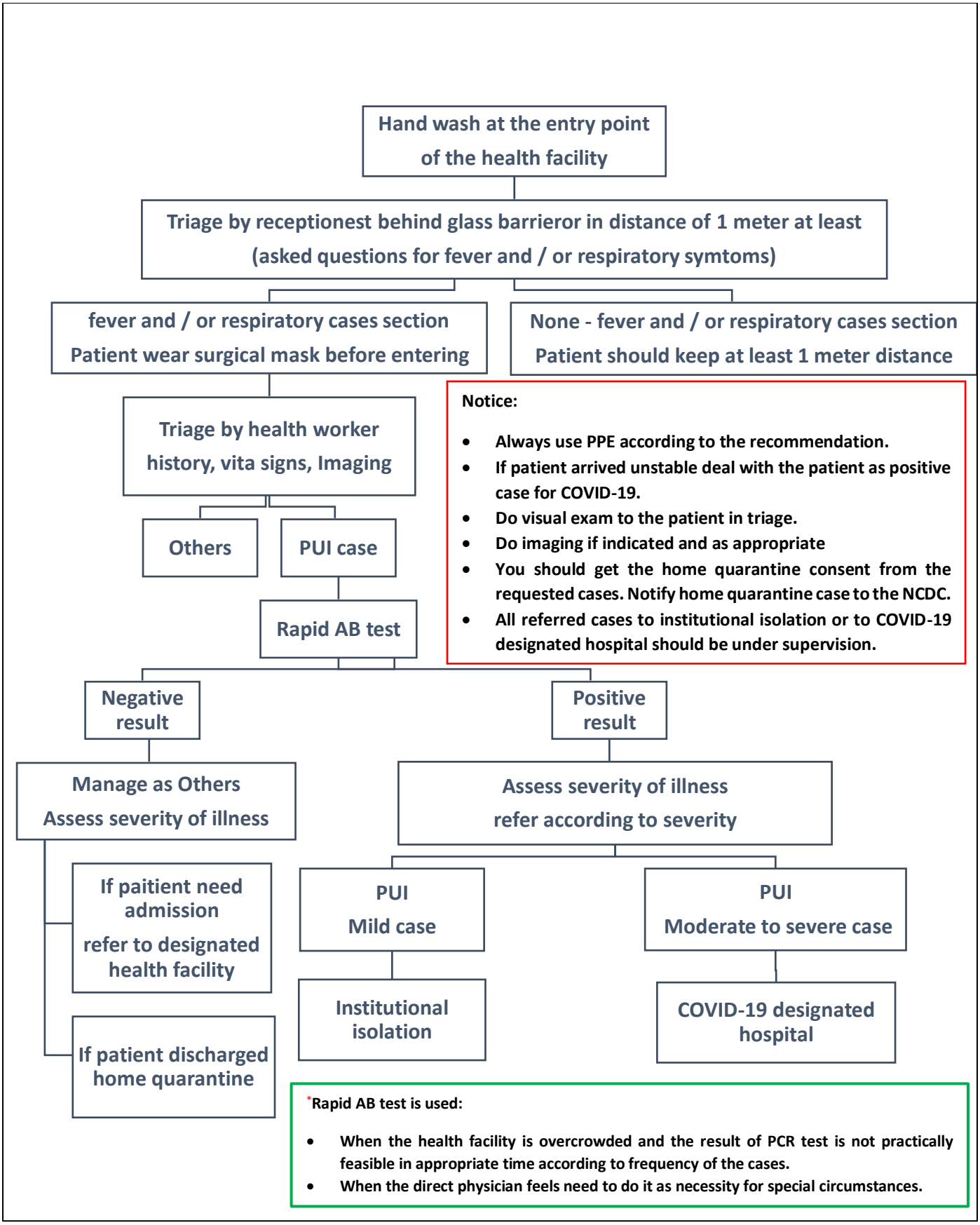


Figure 2 patient flow in the primary health care facility or other health facility working to provide essential health services (level 4 of crisis)

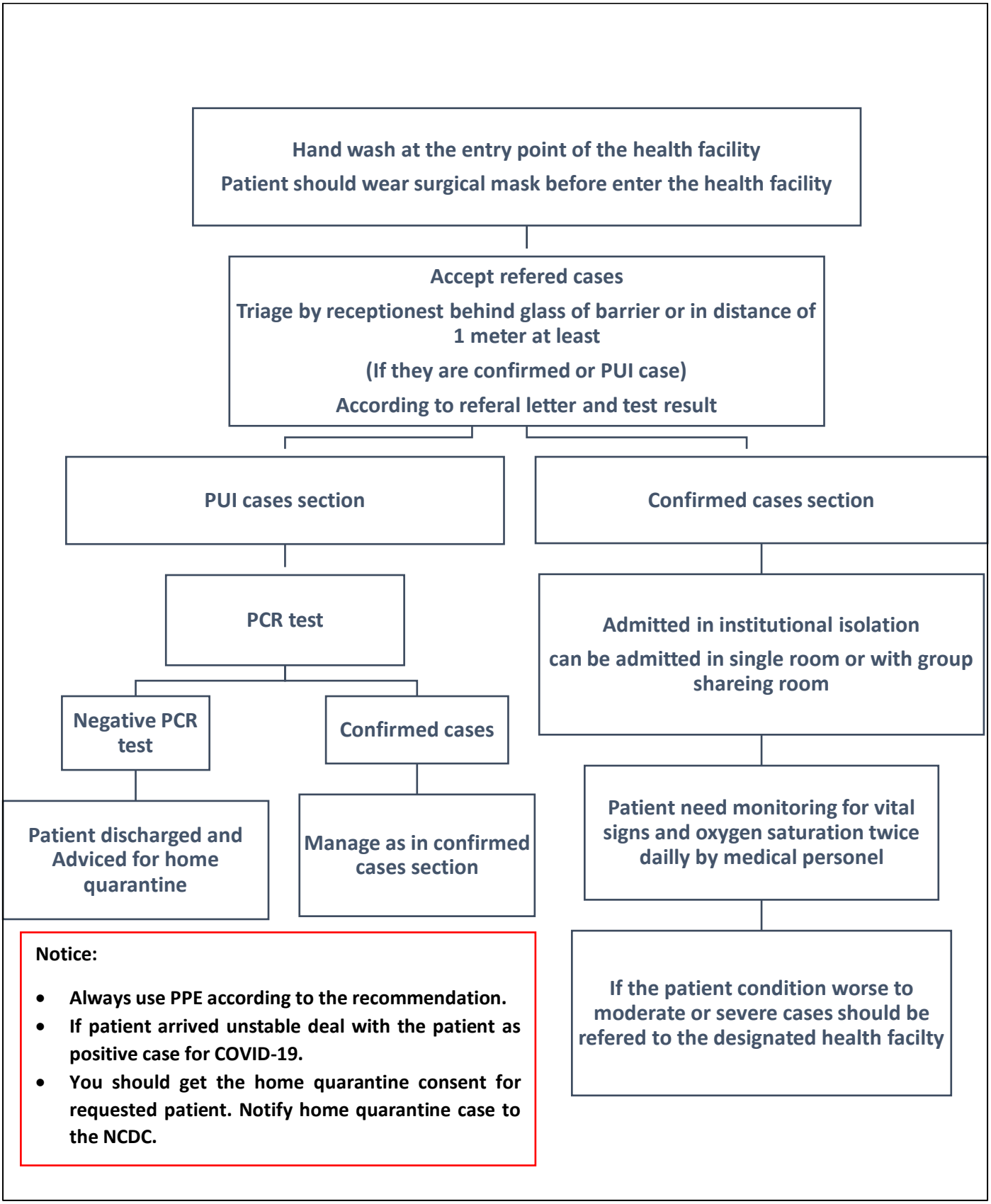


Figure 3 patient flow in the health facility designated for institutional isolation for COVID- 19 (all level of crisis)

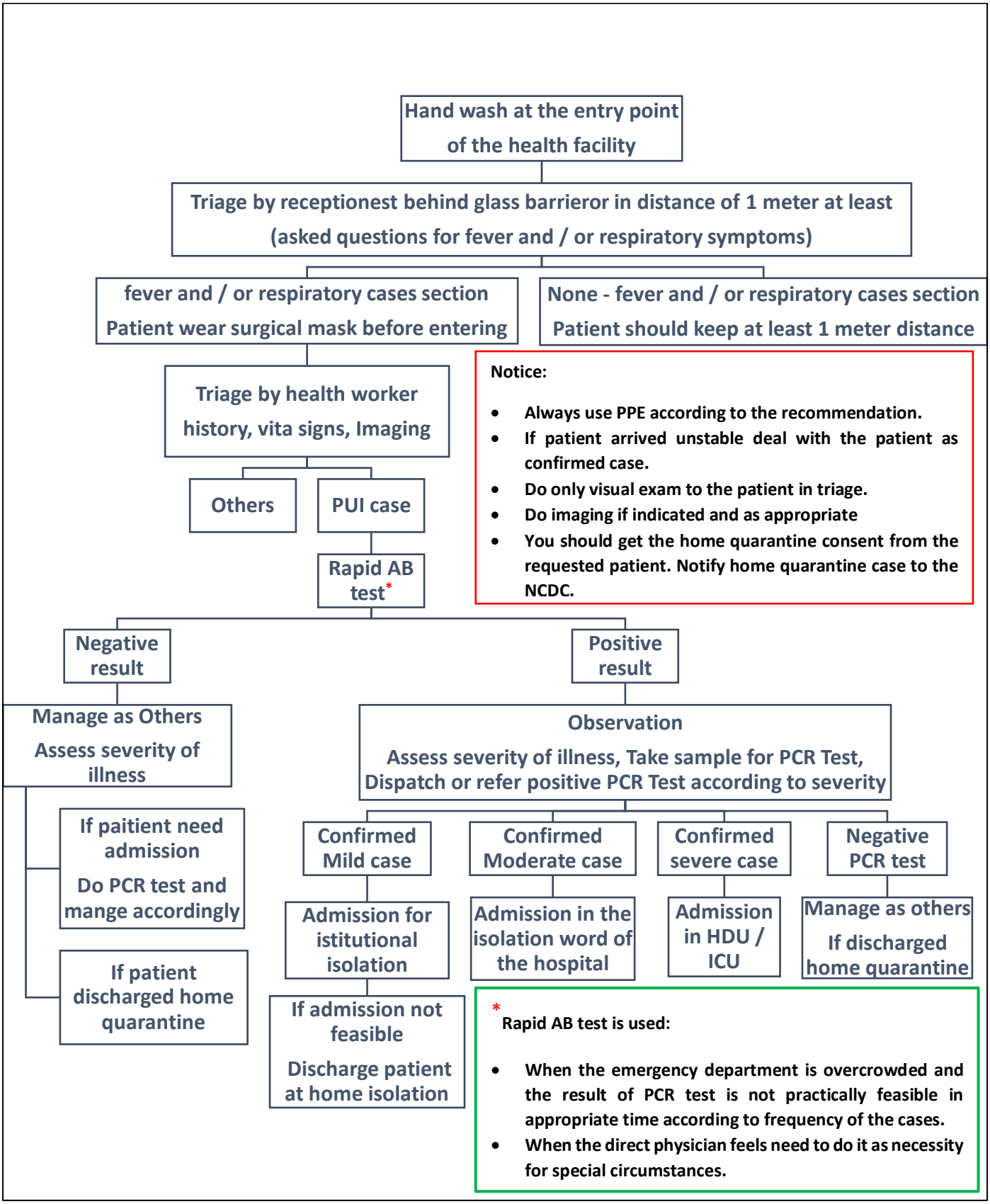


Figure 4 patient flow in the health facility designated for full health services of COVID- 19 in special circumstances (all level of crisis)

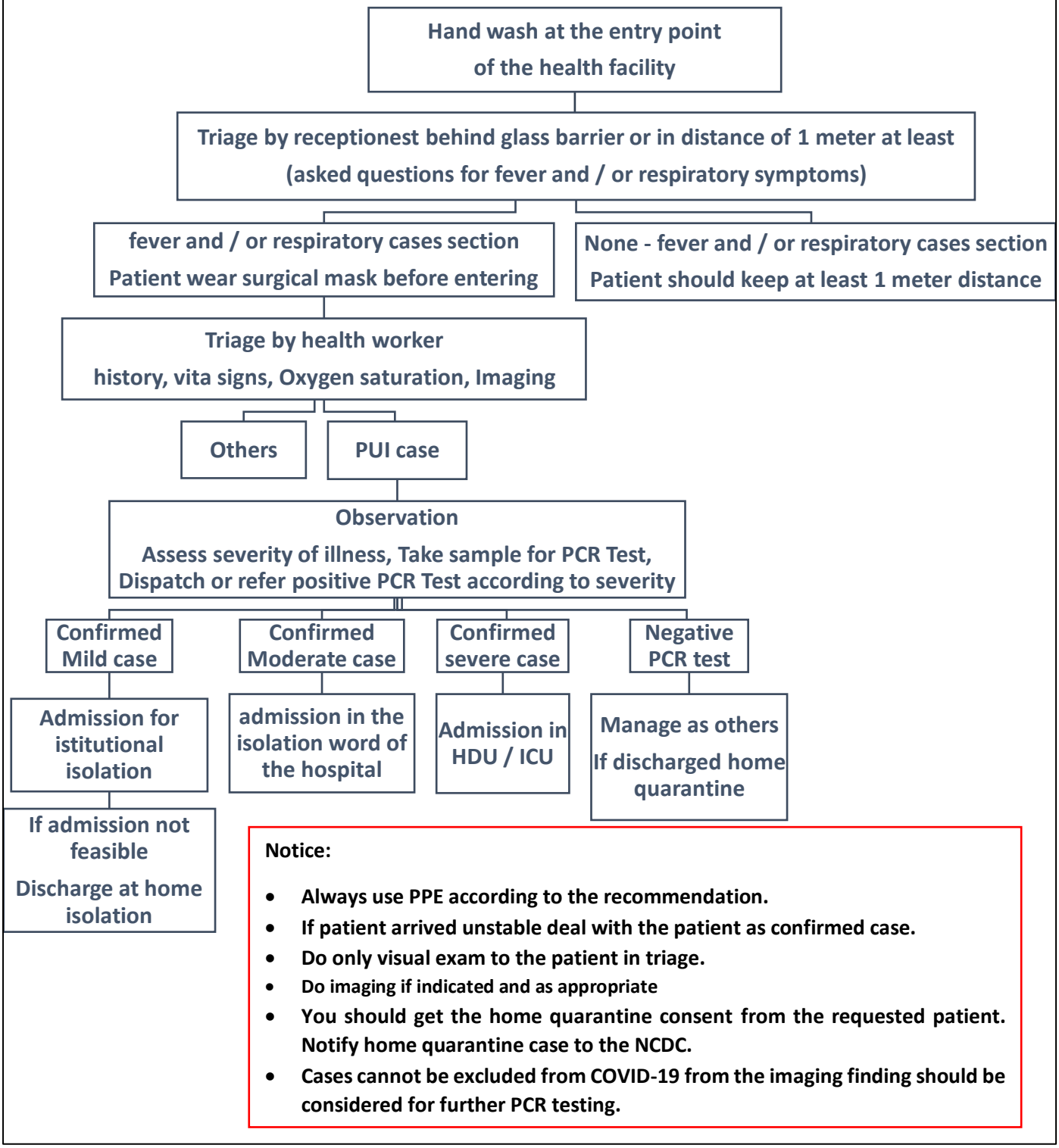


Figure 5 Standard patient flow in the health facility designated for COVID- 19 (all level of crisis)

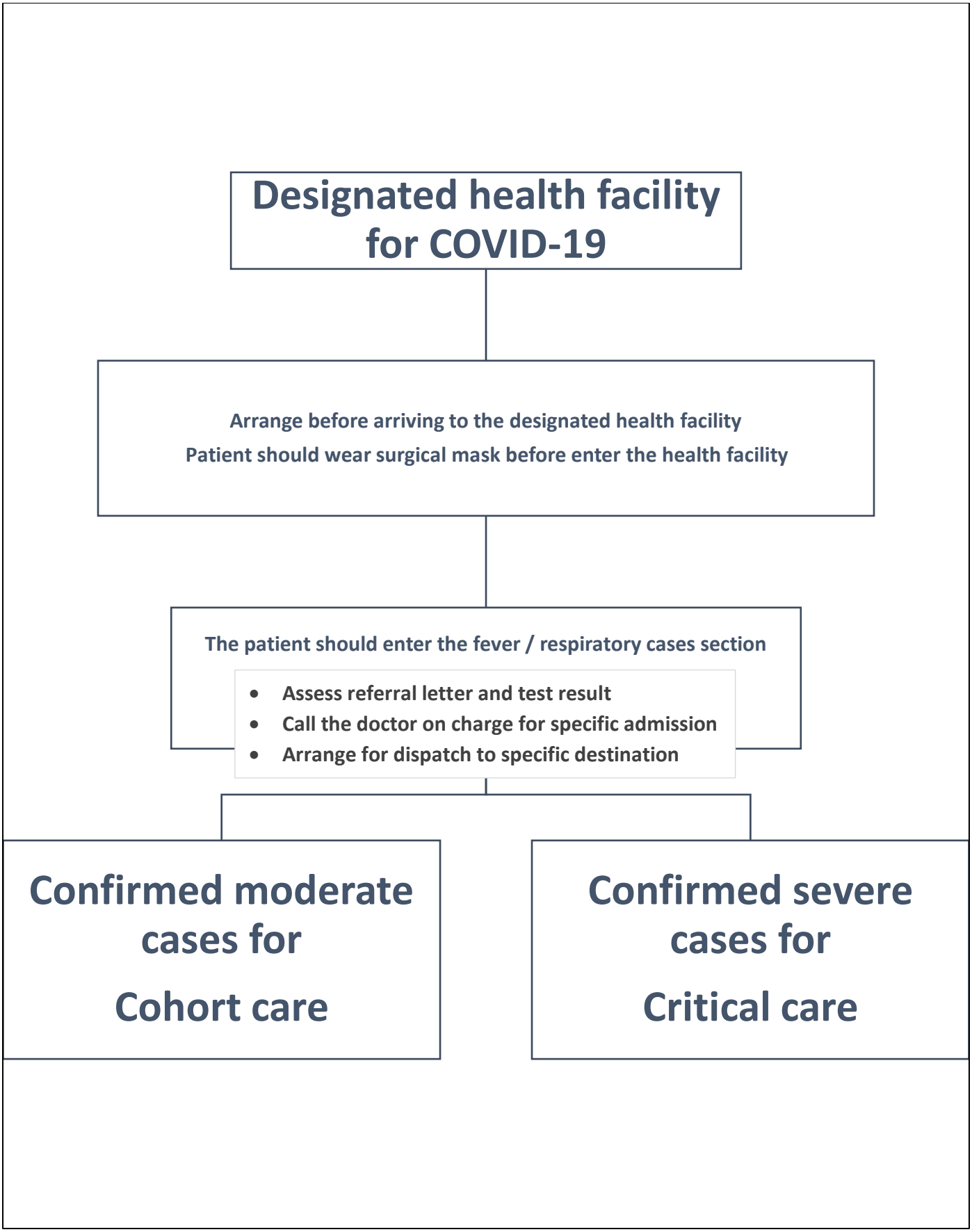


Figure 6 patient flow in the health facility designated for COVID- 19 when referred for admission (all level of crisis)

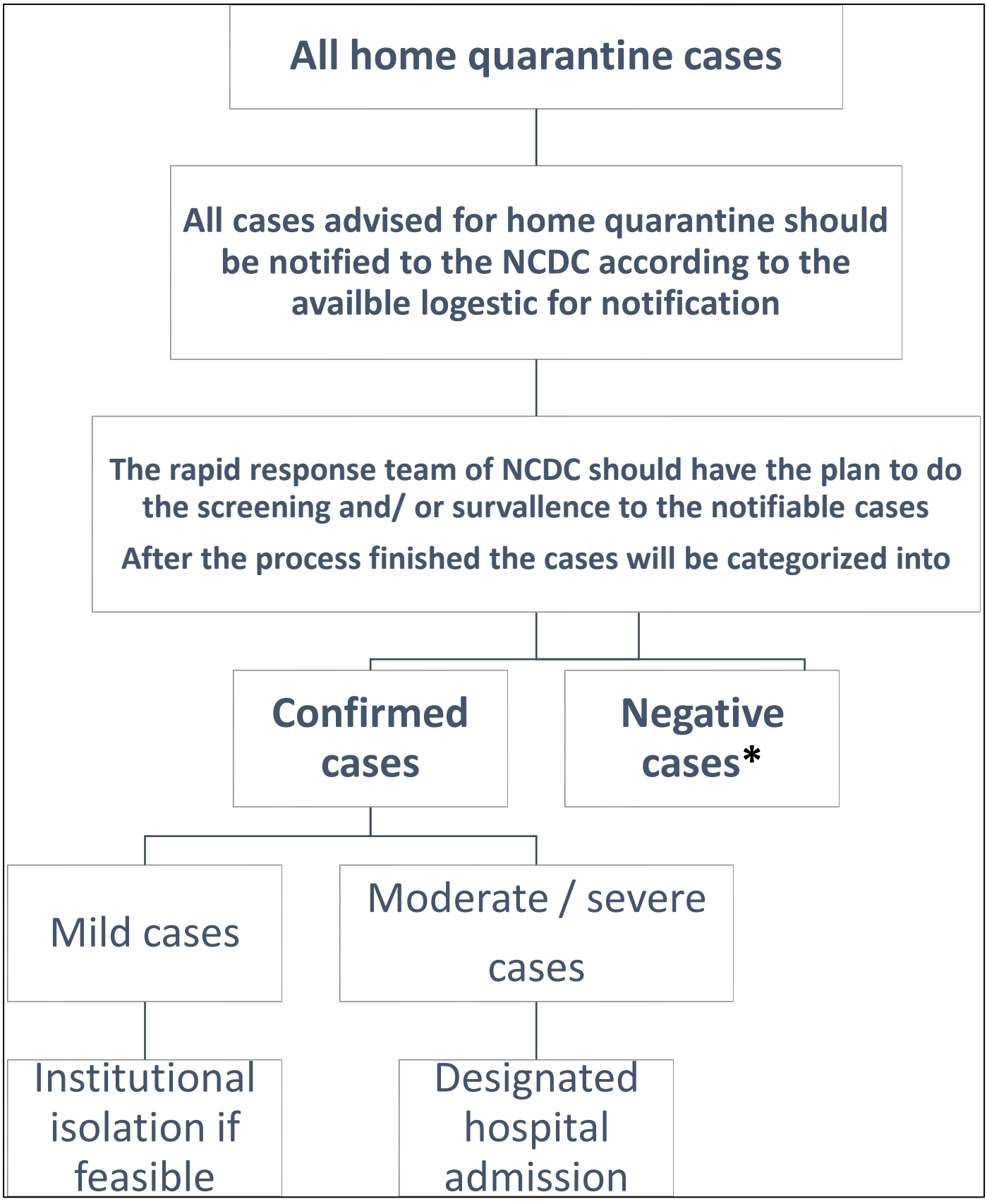


Figure 7 the notifiable home quarantine cases process after discharged from the health facility (all level of crisis)

(*) Negative cases for COVID-19 is define; A person with requested enough number of PCR test to exclude the patient have the COVID-19. i.e. the patient had twice negative PCR test with interval 48 to 72 hrs.

ICU and critical illness care

ICU AND CRITICAL ILLNESS CARE

Onset:

1. Median time from symptom onset to ICU transfer, 12 days.

Indication for ICU admission:

1. Hypoxemic respiratory failure is the most common indication for ICU.

   Mechanical ventilation initiated in 71% of critically-ill patients. 53% of vented critically-ill patients developed ARDS within 72 hours of initiation of mechanical ventilation. 100% of ventilated patients had or developed ARDS
2. Presentation with shock is rare

   Vasopressors are eventually used in 67% of critically-ill patients
3. Cardiomyopathy noted in 33% of critically-ill patients

   Some progress to cardiogenic shock late in course (anecdotal reports).

TRIAGE TO ICU

Consult the ICU triage team EARLY for:

1. Provider concern
2. Respiratory distress
   - Need O2 > 6 LPM to maintain SpO2 > 92% or PaO2 > 65.
   - Rapid escalation of oxygen requirement.
   - Significant work of breathing.
3. Hemodynamic instability after initial conservative fluid resuscitation
   - SBP < 90, Mean arterial pressure < 65, or Heart rate > 120.
4. Acidosis
   - ABG with pH < 7.3 or PCO2 > 50 or above patient's baseline.
   - Lactate > 2.
5. Need for intensive nursing care or frequent laboratory draws requiring arterial line.
6. Severe comorbid illness / high risk for deterioration.

TRANSFER PROCESS

Floor / ED to ICU:

1. ICU nurse brings ICU bed to the floor for transfer the patient (to avoid bed transfer in COVID precautions room and subsequent bed cleaning).
2. Patient wears surgical mask, with an extra clean gown and sheet on top.
3. Providers wear standard PPE during transport.
4. Security facilitates the shortest and fastest transfer route, walks 2 meters away from patient and providers, not required to wear PPE
5. Necessary tests (*e.g.* CT) should be obtained during transfer if possible.

DIAGNOSTIC TESTING

COVID testing: - mentioned before

Laboratory studies and ECGs

On admission ***If not obtained in ED, draw following morning***	**CBC with differential BMP, Magnesium** **LFTs, Troponin & CPK, NT-proBNP** **LDH, CRP, D-dimer, Procalcitonin, PTT/INR, Ferritin** **Baseline ECG**
Daily ***Can change to every other day in stable floor patients***	CBC with differential BMP, Magnesium *If ICU:* Troponin & CPK, NT-proBNP, VBG / ABG PRN
Every other day .	LFTs, Troponin & CPK, NT-proBNP LDH, CRP, D-dimer, Ferritin *If on propofol:* Triglycerides
If clinical worsening .	CBC with differential BMP, Magnesium, LFTs Troponin & CPK, LDH, CRP, D-dimer, Procalcitonin PTT/INR, Fibrinogen, Ferritin ABG preferred over VBG Repeat ECG

ACUTE LUNG INJURY (ALI) AND ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS)

Definition of Acute Respiratory Distress Syndrome (ARDS)

1-Most patients with COVID-19 who require ICU level of care will develop ARDS.

- Among all hospitalized patients, a range of 26% to 32% of patients were admitted to the ICU.
- ARDS developed in 3%-17% of all patients,
- ARDS developed in hospitalized patients 20% to 42%
- ARDS developed in 67% to 85% for patients admitted to the ICU

2-The Berlin definition of ARDS requires the following four criteria:

- Acute (onset over 1 week or less)
- Bilateral opacities detected on CT or chest radiograph
- PF ratio <300mmHg with a minimum of 5 cmH20 PEEP (or CPAP)
- Must not be fully explained by cardiac failure or fluid overload

Severity	**PaO2/FiO2 (on PEEP/CPAP >5)**	**Mortality (all cause, cohort)**
Mild	200-300	27%
Moderate	100-200	32%
Severe	<100	45%

Time course

1. Anecdotally, many reports that progression of hypoxemic respiratory failure occurs rapidly (within ~12-24 hours).
2. From onset of symptoms, the median time to:
    1. Development of ARDS: 8-12 days
    2. Mechanical ventilation: 10.5-14.5 days.

MANAGEMENT OF HYPOXEMIA FOR COVID PUI/ CONFIRMED CASES

Supplemental Oxygen Escalation

1. **Nasal cannula:** Initial oxygen delivery should be humidified nasal cannula (NC) 1 to 8 LPM for target SpO2 92-96%.
    2. **Venturi mask:** If a patient requires > 8 LPM NC, initiate dry Venturi mask (non-humidified to reduce aerosolization risk)

- Start at 9 LPM and FiO2 28%, and notify the ICU coordinator.
- Up-titrate FiO2 to goal SpO2 of 92-96% (not exceeding FiO2 35%)
    - If FiO2 > 35% then increase flow to 12 LPM

Early intubation

1. ***For patients maintained on a Venturi mask;*** Once FiO2 = 60% and SpO2 < 92%, recommend intubation by expert (Consider other indications for intubation (tachypnea, work of breathing).
2. ***Avoid NIPPV or HFNC to stave off intubation;*** For patients already on NIPPV/HFNC, transition to Venturi mask or non-rebreather mask if possible, ideally 45 minutes prior to intubation
3. ***Rapid Sequence Induction (RSI)*;** should be performed by the most experienced airway provider without bag-valve masking and using a video laryngoscope if it is available,

NON-INVASIVE POSITIVE PRESSURE VENTILATION (NIPPV) AND HIGH FLOW NASAL CANNULA (HFNC)

1. **The recommendation is to avoid high-flow nasal cannula (HFNC) and non-invasive positive pressure ventilation (NIPPV; i.e. CPAP/BiPAP) in most circumstances**
    - There is a paucity of data on the increased aerosol risk of these interventions, and their role in increasing transmission.
    - Do not anticipate many patients would avoid intubation using NIPPV/HFNC.

2. **Exceptions to this include:**

- ***As a short-term bridge to ventilator availability;*** If a patient would otherwise be a candidate for intubation but no ventilator is immediately available, then NIPPV/HFNC can be considered as a bridge
- ***For rapidly reversible causes of hypoxemia;*** e.g. flash pulmonary edema, mucus plug, or witnessed small aspiration.

3. **For Obstructive Sleep Apnea or Tracheo bronchomalacia:**

- Where possible, patients with mild or moderate OSA should be transitioned to nocturnal nasal cannula.
- Patients on home nocturnal NIPPV for severe sleep apnea may continue NIPPV, but must use a BWH device with the specifications below. Patients may not use home NIPPV mask or nasal pillow or single-limb machine due to increased aerosol risk.
- HFNC or NIPPV are used:
    1. For HFNC, patient wears surgical mask and limit flow rate to < 30 L/min
    2. For BiPAP, use BWH NIPPV machine with dual limb with a HEPA filter and BWH mask without anti-asphyxia valve
    3. Use under strict airborne precautions, including N95s, strict isolation, and a negative pressure room.
    4. Ensure masks/devices fit well and there is minimal air leak
- Measured exhaled air distances are minimally increased with CPAP pressures up to 20 cm H2O and HFNC up to 60 LPM; importantly device/interface leaks cause significant lateral air travel.

INITIAL MECHANICAL VENTILATION

Checklist following intubation

1. Set the initial ventilator settings:
    1. Initiate ARDS ventilation as described below
    2. Determine PEEP and mechanics as described below
    3. Assure adequate sedation as described below

2. Obtain STAT portable CXR to confirm endotracheal tube location

   Prioritize CXR and vent settings over procedures (such as central venous catheter placement) if possible.

3. Complete the "Mechanical Ventilation with Sedation.
4. Obtain an ABG (preferred) or a VBG within 30 minutes
    1. Calculate P/F ratio from initial post-intubation ABG. Adjust oxygenation as described below
    2. Goal pH 7.25 to 7.45 by adjusting ventilation as described below.

       Please do not Use of Single Ventilator Multiple Patients

INITIAL ARDS VENTILATION SETTINGS

1. **Set mode to volume control (AC/VC)**
2. **Set Initial tidal volume (Vt):**

- Vt = 6 ml/kg (based on ideal body weight [IBW]
  - IBW men (kg) = 50 + 0.91X [(height in centimeters – 152.4)]
    IBW men (kg) = 50 + 2.3 (height in inches – 60)
  - IBW women (kg) = 45.5 + 0.91X [(height in centimeters – 152.4)]
    IBW women (kg) = 45.5 + 2.3 (height in inches – 60)

NIH PREDICTED BODY WEIGHT (PBW) / TIDAL VOLUME CHART

MALES								FEMALES							
HEIGHT		PBW	4	5	6	7	8	HEIGHT		PBW	4	5	6	7	8
Feet	Inches	Male	ml/kg	ml/kg	ml/kg	ml/kg	ml/kg	Feet	Inches	Female	ml/kg	ml/kg	ml/kg	ml/kg	ml/kg
4' 10"	58	45.4	180	230	270	320	360	4' 7"	55	34	140	170	200	240	270
4' 11"	59	47.7	190	240	290	330	380	4' 8"	56	36.3	150	180	220	250	290
5' 0"	60	50	200	250	300	350	400	4' 9"	57	38.6	150	190	230	270	310
5' 1"	61	52.3	210	260	310	370	420	4' 10"	58	40.9	160	200	250	290	330
5' 2"	62	54.6	220	270	330	380	440	4' 11"	59	43.2	170	220	260	300	350
5' 3"	63	56.9	230	280	340	400	460	5' 0"	60	45.5	180	230	270	320	360
5' 4"	64	59.2	240	300	360	410	470	5' 1"	61	47.8	190	240	290	330	380
5' 5"	65	61.5	250	310	370	430	490	5' 2"	62	50.1	200	250	300	350	400
5' 6"	66	63.8	260	320	380	450	510	5' 3"	63	52.4	210	260	310	370	420
5' 7"	67	66.1	260	330	400	460	530	5' 4"	64	54.7	220	270	330	380	440
5' 8"	68	68.4	270	340	410	480	550	5' 5"	65	57	230	290	340	400	460
5' 9"	69	70.7	280	350	420	490	570	5' 6"	66	59.3	240	300	360	420	470
5' 10"	70	73	290	370	440	510	580	5' 7"	67	61.6	250	310	370	430	490
5' 11"	71	75.3	300	380	450	530	600	5' 8"	68	63.9	260	320	380	450	510
6' 0"	72	77.6	310	390	470	540	620	5' 9"	69	66.2	260	330	400	460	530
6' 1"	73	79.9	320	400	480	560	640	5' 10"	70	68.5	270	340	410	480	550
6' 2"	74	82.2	330	410	490	580	660	5' 11"	71	70.8	280	350	420	500	570
6' 3"	75	84.5	340	420	510	590	680	6' 0"	72	73.1	290	370	440	510	580
6' 4"	76	86.8	350	430	520	610	690	6' 1"	73	75.4	300	380	450	530	600
6' 5"	77	89.1	360	450	530	620	710	6' 2"	74	77.7	310	390	470	540	620
6' 6"	78	91.4	370	460	550	640	730	6' 3"	75	80	320	400	480	560	640

3. **Set Initial respiratory rate**
    1. Typical starting rates will be 16-24 titrated to goal minute ventilation of 5-8 L/min
    2. Consider starting rates of 24-28 titrated to goal minute ventilation of 8-12 L/min in setting of acidosis (pH < 7.25) pre-intubation
4. **Set an Initial PEEP based on BMI (empirically chosen targets):**
    1. BMI < 35: PEEP 5
    2. BMI ≥ 35: PEEP 10
5. **Initial FiO2:** 100% on intubation then rapidly wean to SpO2 92-96%.

DETERMINING PEEP AND MECHANICS

1. **Titrate FiO2 and PEEP for oxygenation**
    1. Initiate PEEP based on BMI, per above, and then titrate PEEP and FiO2 to target oxygenation SpO2 92-96% as per the following guidelines:
        1. **BMI < 35**: titrate PEEP and FiO2 as per the ARDS net low PEEP table

Lower PEEP/higher FiO2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	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

        2. **BMI ≥ 35**: titrate PEEP and FiO2 as per the ARDS net HIGH PEEP table

Higher PEEP/lower FiO2

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

    2. If SpO2 < 92% or > 96% then titrate PEEP and FiO2 according to the ARDS net table as per BMI

3. Special consideration: anecdotal reports of COVID-19 patients describe a compliant, highly PEEP dependent phenotype in which PEEP management may not strictly adhere to specified ARDS net tables (*e.g.,* FiO2 0.4 - 0.5 but does not tolerate PEEP <10)
4. Avoid elevated plateau pressures (with goal ≤ 30), particularly if using the higher PEEP table. Special cases (*e.g.*, morbid obesity, burns) may need special considerations.

2. **Obtain respiratory mechanics**:
    1. Plateau pressure (with goal ≤ 30, management below)
    2. Static compliance

SEDATION AND VENTILATOR SYNCHRONY

1. **If un paralyzed, target sedation to ventilator synchrony or RASS -2 to -3 (see table below):**

After paralytics have worn off, assess patient synchrony with the ventilator (*e.g.*, signs of breath-stacking, double triggering, other ventilator alarms).

1. Titrate sedatives/analgesics to ventilator synchrony allowing for deeper RASS.
2. If patient remains dyssynchronous despite deep sedation (RASS -5), initiate continuous paralytics.

2. **If paralyzed, target deep sedation and titrate level of neuromuscular blockade to ventilator synchrony:**

1. Maintain deep sedation immediately post-intubation while paralyzed (assume 60 minutes for Rocuronium, 10 minutes for succinylcholine)

- Preferred initial sedation regimen:
    - Fentanyl (boluses +/- infusion) + Propofol: optimize analgesia first while decreasing sedative requirements
        - Recommend to obtain baseline triglycerides, lipase and CK if the patient is on propofol. While the patient continues on propofol would recommend checking triglyceride levels daily (if triglycerides are elevated may check lipase and CK q24 or q48h depending on trends).
        - Patients with severe respiratory failure secondary to COVID may have elevated triglyceride levels, however if lipase and CK remain normal to slightly elevated would continue propofol before switching to an alternative form of sedation if

needed for ventilator synchrony (i.e. midazolam) until triglycerides reach > 1000 or elevated CK, lipase and/or concern for pancreatitis

- Fentanyl 10 micg/ml +Midazolam1 mg /ml in separate syringes.

"Check the Sedation Protocol"

INTUBATION IN EMERGENCY DEPARTMENT, ICU, OR FLOOR

Preparation: they strongly encourage the providers to prepare and perform the intubation electively, do not wait until you get to the point when you rush to intubate.

1. Rapid Sequence Induction (RSI) should be performed by the most experienced airway provider using a video laryngoscope (if available).
2. Limit providers in room to **3**

- Assign roles and airway plan: The intubation Should be performed by the most experienced one in the team.

3. Checklist prior to starting:
3. Suction available
4. Monitor
5. Ventilator setup and ready
6. Free-flowing IV access
7. Post-intubation sedation ready
8. HEPA filter in-line
9. Medications ready
10. Non-rebreather, flow "OFF" until ready to pre-oxygenate
11. If no ventilator is available, ambu bag post intubation with HEPA filter. Flows turned down during circuit changes.
12. Ensure patients are in negative pressure rooms for all intubations/extubations if possible or get air-purification unit close to the head side of the bed.

Procedure

1. Don appropriate PPE via "read/do" checklist, gather supplies and review airway plan
2. Preoxygenate the patient: maintain preoxygenation technique until neuromuscular blockade has set in
    1. Option 1: 3-5 minutes of tidal breathing 1.0 FiO_2 on non-rebreather at 15L/min flow

2. Option 2: facemask attached to AMBU bag with HEPA filter (2 hand technique to maintain seal)
3. Option 3: if patient already on BiPAP then maintain BiPAP with tight seal until ready to intubate (turn “OFF” BiPAP flow prior to removing mask)

3. Intubate the patient with an RSI technique/video laryngoscopy (if available)
4. If mask ventilation becomes necessary:
    1. use 2-hand technique with oral airway to create tight seal
    2. use AMBU bag with HEPA filter in-line with high frequency/low tidal volume
    3. do not remove mask for 2nd attempt intubation until end exhalation
5. After successful intubation:
    1. Inflate cuff
    2. Connect patient directly to ventilator with HEPA filter with $EtCO_2$ gas sampling line post-filter or use an infrared CO_2 analyzer with no gas sampling
    3. Avoid listening bilaterally for risk of contamination (touching ears with stethoscope/hands)
    4. Secure ETT.
6. Clean the laryngoscope:
    1. Remove soiled gloves and replace with clean gloves
    2. Clean the video laryngoscope and allow it to dry (fellow the infection control committee recommendation in this regard)
    3. Push video laryngoscope out of room with clean gloves on
7. Follow “read/do” instructions for doffing of PPE per hospital protocol

ICU EXTUBATION

1. Don appropriate PPE via “read/do” checklist
2. Only ICU a nurse and airway provider(anesthesiologist/intensivist) should be in the room
3. Confirm patient will tolerate extubation.
4. Place patient on 1.0 FiO_2 and ensure non-rebreather mask ready with flow “OFF”
5. Place towel on patient chest and ensure yankauer suction on ready readily available

6. Ask the nurse to cut tape holding ETT, turn vent flows to “OFF” and extubate patient
7. Immediately discard of ETT and chuck or towel and immediately place non-rebreather, then turn oxygen flow to 10-15L/min
8. Ensure patient is oxygenating and ventilating
9. All providers will sanitize/change gloves while maintaining base layer PPE.

Do not allow anyone into the room for at least 60 minutes after extubation to facilitate 99% of aerosolized virus removal by the air-purification unit (should be kept close the head side of the bed) or negative pressure (when it is available).

MEDICATIONS

No pharmaceutical products have yet been shown to be safe and effective for the treatment of covid-19. However, a number of medicines have been suggested as potential investigational therapies, many of which are now being or will soon be studied in clinical trials, including the solidarity trial co-sponsored by WHO and participating countries.

In many countries, doctors are giving covid-19 patients medicines that have not been approved for this disease. The use of licensed medicines for indications that have not been approved by a national medicines regulatory authority is considered “off-label” use. The prescription of medicines for off-label use by doctors may be subject to national laws and regulations. All health care workers should be aware of and comply with the laws and regulations governing their practice. Further, such prescribing should be done on a case-by-case basis. Unnecessary stockpiling and the creation of shortages of approved medicines that are required to treat other diseases should be avoided.

It can be ethically appropriate to offer individual patients experimental interventions on an emergency basis outside clinical trials, provided that no proven effective treatment exists; it is not possible to initiate clinical studies immediately; the patient or his or her legal representative has given informed consent; and 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.

The decision to offer a patient an unproven or experimental treatment is between the doctor and the patient but must comply with national law. Where it is possible and feasible for the treatment to be given as part of a clinical trial, this should be done unless the patient declines to participate in the trial.

If it is not possible to give the treatment as part of a clinical trial, appropriate records of the use of the medicine must be kept, in compliance with national law, and outcomes for patients should be monitored and recorded.

If early results from an unproven or experimental treatment are promising, the treatment should be studied in the context of a formal clinical trial to establish its safety, efficacy, risks, and benefits.

Antibiotics

Antibiotics should be considered as following.

1. For empiric coverage for a presumed pulmonary source of infection:

- In patients **without** risk factors for MRSA or *Pseudomonas* (*i.e.*, living in community, no prior MDROs), start with ceftriaxone + azithromycin.
- In patients **with** risk factors for MRSA or *Pseudomonas* (*i.e.*, chronic hospitalization, prior MDR infections), start with vancomycin + Tazocin (piperacillin/Tazobactam) and consider ciprofloxacin.

3. For coverage of potential co-infections**:**

- If concurrent influenza, treat with oseltamivir.

4. Special consideration for oncology patients

Note

- Give oral antibiotics when possible
- Unnecessary antibiotics should be discontinued as soon as possible (ideally, within 48 hours). We suggest discontinuing when the following criteria are:
  - Clinical status is not deteriorating
  - Cultures do not reveal pathogens at 48 hours and/or procalcitonin and WBC are relatively stable from 0 to 48 hours

BRONCHODILATORS

Non-intubated patients

If COVID-19 is confirmed or PUI:

- Use metered dose inhalers (MDIs), NOT nebulizers, due to increased aerosol risk associated with nebulization.
- In patients not categorized as PUI for COVID-19 use nebulizers.

Intubated patients

- We recommend, an in-line nebulizer container is part of a closed ventilator circuit.

AIRWAY CLEARANCE

Management principles

- Airway clearance should be used only in **selected ventilated patients (closed-circuit)** with extremely thick secretions, to avoid mucus plugging.

Secretion thinning

- Nebulized treatments

1. **Only use in ventilated patients on strict airborne precautions in a negative-pressure room.**
2. Options include:
    1. Normal (0.9%) saline nebulizer BID.
    2. Avoid N-acetylcysteine due to bronchospasm and frequent dosing requirements.

Mechanical airway clearance not routinely recommended

SYSTEMIC CORTICOSTEROIDS

RECOMMENDATIONS

1. At this time, we do not recommend steroids for COVID-19 except for treating another indication.
2. If treating another indication, use corticosteroids at a low dose for a short duration:
    - **For asthma or COPD exacerbation**, treat with 40mg prednisone PO or 30mg methylprednisolone IV, once daily x 3-5 days. Or equivalent dose of hydrocortisone.
    - **For *any* shock with a history of chronic steroid use in excess of 10mg prednisone daily**, treat with 50mg hydrocortisone IV Q6H until improvement in shock.
    - **For multiprocessor (>2 pressors) shock without history of chronic steroid use**, treat with 50mg hydrocortisone IV Q6H until improvement in shock.

PULMONARY VASODILATORS

We do not have them now. And there is no special recommendation for time been.

CONVALESCENT PLASMA

RECOMMENDATIONS

- If it becomes available, it **should only be used under approved protocol** from national authority.
- We cannot make any recommendations until we have contact with Tripoli Central Blood Bank where they already have started working on this project.

HYDROXYCHLOROQUINE AND CHLOROQUINE

1. Hydroxychloroquine (HCQ) is an anti-malarial 4-aminoquinoline shown to have *in vitro* (but not yet *in vivo*) activity against diverse RNA viruses, including SARS-CoV-2
2. Hydroxychloroquine was found to be more potent than chloroquine in inhibiting SARS-CoV-2 in vitro
3. HCQ is thought to act through multiple mechanisms
    1. Inhibition of viral entry.
    2. Inhibition of viral release into the host cell.
    3. Reduction of viral infectivity.
    4. Immune modulation.

Recommendations: We **do not recommend** the use of hydroxychloroquine until we get more data with or against the use.

Dosing regimens

- **Hydroxychloroquine:** 400 mg PO BID on the first day, followed by 200 mg q12h (q8h if concerns for absorption) for 5 days. May extend up to 10 days depending on clinical response.

  Hydroxychloroquine is contraindicated in epilepsy and porphyria, and it is known adverse effects including; Bone marrow suppression, Cardiomyopathy and retinopathy, QT-segment prolongation and therefore torsades de pointes, especially if administered in combination with azithromycin or other QTc-prolonging agents

- The following monitoring is required for patients being treated with hydroxychloroquine:
  1. Obtain baseline ECG, ECG 4 hours after first dose, and daily ECG
  2. Discontinue all other QT-prolonging agents
  3. Do not start if QTc > 500 msec (or 550 msec with pacing or BBB)
  4. Discontinue if there is an increase in PVCs or non-sustained polymorphic VT.

AZITHROMYCIN

Pathophysiology

1. Azithromycin is a macrolide anti**biotic** that inhibits RNA-dependent protein synthesis by binding to the 50S ribosomal subunit of bacteria, resulting in blockage of transpeptidation.
2. There is no evidence of azithromycin's direct effects on SARS-CoV-2.
3. Theoretical benefit could come in azithromycin's anti-inflammatory effects seen in other infectious diseases.

Evidence

The studies are all limited and until more studies are done, we believe that the risks of QTc prolongation and torsades de pointes outweigh the potential benefits of combination treatment of Azithromycin and HCQ.

Recommendations

- There **is not sufficient supporting evidence** to use azithromycin in combination with hydroxychloroquine for COVID-19, unless concomitant community-acquired pneumonia is suspected and atypical coverage is desired

Dosing Regimens

- Normal azithromycin dosing for community-acquired pneumonia (for atypical coverage) is 500 mg daily for 5 days inpatient, or 500 mg x1, then 250 mg for a total of 5 days

Monitoring and Toxicity

1. While we **do not recommend** it for treatment of COVID-19, if azithromycin is used in combination with hydroxychloroquine, QTc should be monitored.

LOPINAVIR/RITONAVIR

RECOMMENDATIONS

Lopinavir/ritonavir **should not be used** as overall evidence is lacking

NITAZOXANIDE

RECOMMENDATIONS

Nitazoxanide **should not be used** as overall clinical evidence is lacking and optimal dosing is not yet known

ANTI-IL6 AGENTS (TOCILIZUMAB, SILTUXIMAB, SARILUMAB)

RECOMMENDATIONS

For severe cases of COVID-19 with suspicion of cytokine activation syndrome consider use in **conjunction with Infectious Diseases consultation.**

Retrospective reviews in patients with rheumatological disease suggest a possible increase in serious bacterial infection, so use with precaution if secondary infection is clinically suspected. In addition, the Tocilizumab has confirmed as having less associated bacterial infection.

Dosing regimens

Tocilizumab (anti-IL6R mAb)**:** 4-8mg/kg (suggested dose 400 mg) IV x1. Dose may be repeated 12 hours later if inadequate response to the first dose. The total dose should be no more than 800 mg. Tocilizumab should not be administered more than twice.

Common adverse effects of tocilizumab include:

1. Transaminitis (AST, ALT), >22%
2. Infusion reaction, 4-20%
3. Hypercholesterolemia, 20%
4. Upper respiratory tract infection, 7%
5. Neutropenia, 2-7%

Siltuximab (anti-IL6 mAb)**:** 11mg/kg IV x1

Common adverse effects of siltuximab include:

1. Edema, >26%
2. Upper respiratory infection, >26%
3. Pruritus / skin rash, 28%

4. Hyperuricemia, 11%
5. Lower respiratory tract infection, 8%
6. Thrombocytopenia, 8%
7. Hypotension, 4%

ANGIOTENSIN CONVERTING ENZYME INHIBITORS (ACE-I) AND ANGIOTENSIN II RECEPTOR BLOCKERS (ARB)

RECOMMENDATIONS

- We **do not recommend stop outpatient** ACEi /ARBs.
- For inpatients, we recommend **against routine discontinuation** of ACEi/ARBs, unless otherwise indicated (*e.g.,* acute kidney injury, hypotension, shock, etc.).

NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS)

RECOMMENDATIONS

We **cannot make a recommendation for or against their use** at this time.

VITAMIN C

There is currently **no evidence to support** low- or high-dose vitamin C in COVID-19 patients.

SHOCK

WORKUP

1. Assess for severity of **end organ damage**:

   UOP, mental status, lactate, BUN/creatinine, electrolytes, LFTs

2. Obtain a **FULL infectious/ septic workup**, which includes all of the following:

   i. Labs: CBC with differential. Note that most COVID patients are lymphogenic (83%). However, new leukocytosis can occur and left-shift can be used as a part of clinical picture. Two sets of blood cultures, LFTs (for cholangitis/acalculous cholecystitis), urinalysis (with reflex to culture), sputum culture (if safely obtained via inline suctioning), procalcitonin at 0 and 48h (do not withhold early antibiotics on the basis of procalcitonin alone*).*
   ii. Portable CXR (avoid CT unless absolutely necessary)
   iii. Full skin exam

3. Assess for **cardiogenic shock**

   i. Assess extremities: warm or cool on exam
   ii. Assess patient volume status: JVP, CVP, edema, CXR
   iii. Assess pulse pressure: If < 25% of the SBP, correlates highly with a reduction in cardiac index to less than 2.2 with a sensitivity of 91% and a specificity of 83%
   iv. Perform POCUS, if able, to assess for gross LV/RV dysfunction (upload to PACS/Centricity)
   v. Labs: Obtain an SCV02 or MV02 if the patient has central access, troponin x2, A1c, lipid profile, TSH
   vi. ECG
   vii. Obtain cardiology consultation if any suspicion of cardiogenic shock

4. Assess for other causes of shock:

   i. Run medication list for recent cardio suppressive medications, vasodilatory agents, antihypertensives
   ii. Adrenal insufficiency: make the patient history leading the work up guidance.

iii. Obstruction:

a. PE (given the elevated risk of thrombosis)

b. Tamponade (given elevated risk of pericarditis)

c. Obstruction from PEEP

iv. Cytokine storm

v. Allergic reactions to recent medications

vi. Neurogenic shock is uncommon in this context

vii. Hypovolemia:

a. Bleeding

b. Insensible losses from fever

c. Diarrhea/vomiting

DIFFERENTIATING SHOCK

Type of Shock	***Cardiac Output***	***SVR***	***C ↑ VP/Wedge***	***ScvO2, MvO2***	***Other features***
Cardiogenic	↓	↑		↓	
Distributive (sepsis, cytokine, anaphylaxis)	↑	↓	↓	↑	
Obstructive	↓	↑	↑	↓	
Hypovolemic	↓	↑	↓	↓	
Neurogenic	↓	↓	↓ ***/normal***	↓	***Decreased HR***

SEPTIC SHOCK AND SECONDARY INFECTIONS

Incidence

1. Secondary bacterial infections are reported:
    1. 20% of non-survivors Zhou et al, *Lancet*, 2020
    2. 16% of non-survivors (Ruan et al, *Intensive Care Med*, 2020)

Management

1. **Antibiotics:**

   Early empiric antibiotics should be initiated within 1 hour
2. **Pressors and Fluid Management:**
    1. **Goal MAP > 65mmHg**
    2. **Pressors**
        - Start Nor-adrenaline while determining the etiology of undifferentiated shock
    3. Unless new evidence emerges, standard choices for distributive shock (*i.e.*, nor-adrenaline then adrenaline unless the vasopressin is available) are recommended, with high vigilance for the development of cardiogenic shock.

Conservative fluid management:

1. **Do not give conventional 30cc/kg resuscitation**

Instead, give 250-500cc IVF and assess in 15-30 minutes for:

1. Increase > 2 in CVP
2. Increase in MAP or decrease in pressor requirement
    - Use isotonic crystalloids; Lactated Ringer's solution is preferred where possible. Avoid hypotonic fluids, starches, or colloids

2. **Repeat 250-500cc IVF boluses; Use dynamic measures of fluid responsiveness**

1. Pulse Pressure Variation: can be calculated in mechanically ventilated patients without arrhythmia; PPV >12% is sensitive and specific for volume responsiveness
2. Straight Leg Raise: raise legs to 45° w/ supine torso for at least one minute. A change in pulse pressure of > 12% has sensitivity of 60% & specificity of 85% for fluid responsiveness in mechanically ventilated patients; less accurate if spontaneously breathing
3. Ultrasound evaluation of IVC collapsibility should only be undertaken by trained personnel to avoid contamination of ultrasound

Corticosteroids

Stress dose hydrocortisone should still be considered in patients on > 2 pressors.

Cardiogenic Shock

Workup

1. All cardiogenic shock cases require **cardiovascular medicine consult**
2. Significant concern for cardiogenic shock if any of the following are present with evidence of hypoperfusion (*e.g.*, elevated lactate):
    1. Elevated NT-pro BNP, or
    2. CvO2 < 60% (PvO2 < 35 mm Hg), or
    3. echocardiogram with depressed LV and/or RV function
3. Rule out ACS
4. Ongoing monitoring:
    - Labs: Trend troponins to peak, SCvO2 (obtained by upper body CVC) or MvO2 q8-12h or with clinical change, Lactate q4-6h, LFTs daily (for hepatic congestion)
    - Daily ECGs or prn with clinical deterioration
    - Trend troponin to peak

Management

Close collaboration with the **cardiovascular medicine consultation service** is recommended.

1. Goals: MAPs 65-75, CVP 6-14, PCWP 12-18, PAD 20-25, SVR 800-1000, SCvO2 > 60%, CI > 2.2
2. How to achieve goals:
    1. Continue titration of norepinephrine for goal MAP 65-75
    2. Initiate diuretic therapy for CVP > 14, PCWP >18, PAD > 25
    3. Initiate inotropic support:

       Dobutamine for SCvO2 < 60%, and MAP > 65. Start at 2mcg/kg/min. Up-titrate by 1-2mcg/kg/min every 30-60 minutes for goal parameters. Alternative strategies should be considered once dose exceeds 5mcg/kg/min. Maximum dose is 10mcg/kg/min.
    4. Ensure negative inotropes such as beta blockers, calcium channel blockers and antihypertensives are discontinued.

Cytokine Activation Syndrome

Pathophysiology

A subgroup of patients with severe COVID-19 may have cytokine activation syndrome and secondary HLH. Patients who had cytokine activation developed rapid progression to ARDS, shock, and multiorgan failure.

Workup

- Suspect if clinical deterioration with shock and multiorgan failure.
- CBC with diff, PT/INR, PTT, fibrinogen, D-dimer, ferritin, liver function test, triglycerides, C-reactive protein (CRP), CRP seems to correlate with disease severity and prognosis of COVID-19

Management

If high suspicion, discuss with ID about the use of IVIG, steroids, cytokine blockade, particularly IL-6 pathway and perhaps IL-1. While steroids have been implicated with

worse lung injury and outcomes, they may be beneficial in the hyperinflammatory state.

THROMBOTIC DISEASE

Incidence:

1. Unclear incidence, though case reports suggest there may be increased venous thromboembolism (VTE) in COVID-19 patients
2. risk for thrombosis and bleeding

Management:

1. Preliminary data from Wuhan suggest that prophylactic LMWH or UFH may be of benefit in those patients with severe COVID-19 and D-dimer levels > 6 times the upper limit of normal
2. Initiate prophylactic anticoagulation therapy for all COVID-19 patients unless otherwise contraindicated
    1. If CrCl > 30: weight <100kg Enoxaparin 40 mg SC daily
    2. If CrCl < 30 or AKI: Heparin 5000 units SC TID
    3. Hold if Platelets <30,000 or bleeding, start TEDs and SCDs

D-Dimer	**Weight**	**LMWH**
<1000	**<100kg**	**Enoxaparin 40mg OD**
	100-150kg	**Enoxaparin 40mg BD**
	>150kg	**Enoxaparin 60mg BD**
1000-3000	**<100kg**	**Enoxaparin 40mg BD**
	100-150kg	**Enoxaparin 80mg BD**
	>150kg	**Enoxaparin 120mg BD**
>3000		**Tinzaprin 175 units/kg OD**

3. If the patient is on direct oral anticoagulants (DOACs) or Warfarin for Afib or VTE, switch to full dose anticoagulation (LMWH or UFH, as indicated based on renal function or clinical scenario).

Prognosis:

1. Higher D-dimer and FDP levels track with multi-organ dysfunction syndrome and poorer prognosis.

Disseminated Intravascular Coagulation (DIC)

Workup:

1. Identify and treat underlying condition
2. Elevated PT/PTT and D-dimer correlate with worse prognosis: trend PT/INR, PTT, D-dimer, fibrinogen every 3 days until discharge or death

Management:

1. If not bleeding, supportive care:

   If fibrinogen < 150: FFP or fibrinogen concentrate
2. Transfuse platelets if < 30K

   Consider holding anticoagulation if the patient requires blood products for supportive care, though clinician should weigh risks and benefits.

1. If bleeding, give blood products:
    1. For elevated PT/PTT and bleeding, use FFP or 4F-PCC
    2. Hold anticoagulation for active bleeding.

1. Start systemic anticoagulation only if:
    1. Overt thromboembolism or organ failure due to clot
    2. There has been no mortality benefit of therapeutic anticoagulation in DIC

Prognosis:

DIC is associated with worse survival in COVID-19 patients.

Cardiac Arrest

Preparation

Minimizing Healthcare Worker Risk of Exposure

Cardiac arrest resuscitation for COVID-19 patients are high-risk event for healthcare worker exposure due to the aerosolization that occurs with chest compressions and intubation

- Use PPE: guidelines recommend N95 respirator, face shield, gown and gloves be used by all code responders during code events as well as Face Shield, Gown and Gloves).
- Minimize personnel.
- Prepare the equipment; Consider creating Code Bags inside the Code Cart pre-packed with necessary code meds (Epinephrine, Bicarbonate, Calcium etc.) and IV/lab supplies.

Early goals of care conversations

To avoid unnecessary codes in patients with an irreversible underlying condition, patients who are at high-risk for acute decompensation should be identified early and appropriate steps should be taken to confirm code status and initiate early goals of care conversations with the patient and family.

1. **Code Management**

Efforts should be made to minimize the total number of Code responders in the room to 7-8. Code responders outside the patient's room should not don PPE unless called upon in the room:

2. **Circulation**

Until a definitive airway is obtained, compression-only CPR should be performed. Multiple studies have shown that compression-only CPR is non-inferior to standard CPR. If the patient has shockable rhythm (VF/VT), defibrillate as soon as possible.

3. **Airway**

1. **Initial Airway Management, Prior to Intubation:**

    1. Prior to securing a definitive airway, oxygen should be applied via a non-rebreather mask at 15L/min without humidification
    2. Avoid BVM ventilation, high-flow nasal cannula, and non-invasive ventilation (CPAP, BiPAP) to minimize aerosolized virus.
    3. If passive oxygen is not available, place a surgical face-mask and a blanket over the patient's face prior to chest compressions.
    4. If the patient does not have a shockable rhythm, proceed with Rapid Sequence Intubation as early as possible to limit aerosolization

2. **Endotracheal Intubation**

    1. Endotracheal intubation is the procedure that subjects the rescuer to the highest risk of infection during resuscitation. To maximize the success rate for intubation, airway interventions should be carried out by experienced individuals and chest compressions should be stopped. This may deviate from usual cardiac arrest care leading to a pause in chest compressions.
    2. Chest compressions should resume once the endotracheal tube (ETT) cuff is inflated and the ETT is connected to the ventilator.
    3. If the pause in chest compressions is excessive and endotracheal intubation does not seem likely, consider LMA or other extraglottic airway device.

4. Code responders should distance themselves from the head of the bed during the intubation procedure (2 m distance).
5. Continuous capnography device if it is available.

4. Etiologies to Consider

1. Data from a retrospective study in Wuhan revealed cause of death to be:
    1. Respiratory failure (53%)
    2. Heart failure with respiratory failure (33%)
    3. Myocardial damage (7%)
    4. Unknown cause (7%)
2. It is important to attempt to identify and treat reversible causes (5H's, 5T's) before stopping the code.

5. Terminating Resuscitative Efforts

1. Avoid prolonged resuscitation if there is no easily reversible etiology identified.
2. No one factor alone, or in combination, is predictive of outcome during cardiac arrest.
3. In intubated patients, failure to achieve an ETCO2 of greater than 10 mm Hg by waveform capnography after 20 minutes of CPR should be considered as one component of a multimodal approach to decide when to end resuscitative efforts.

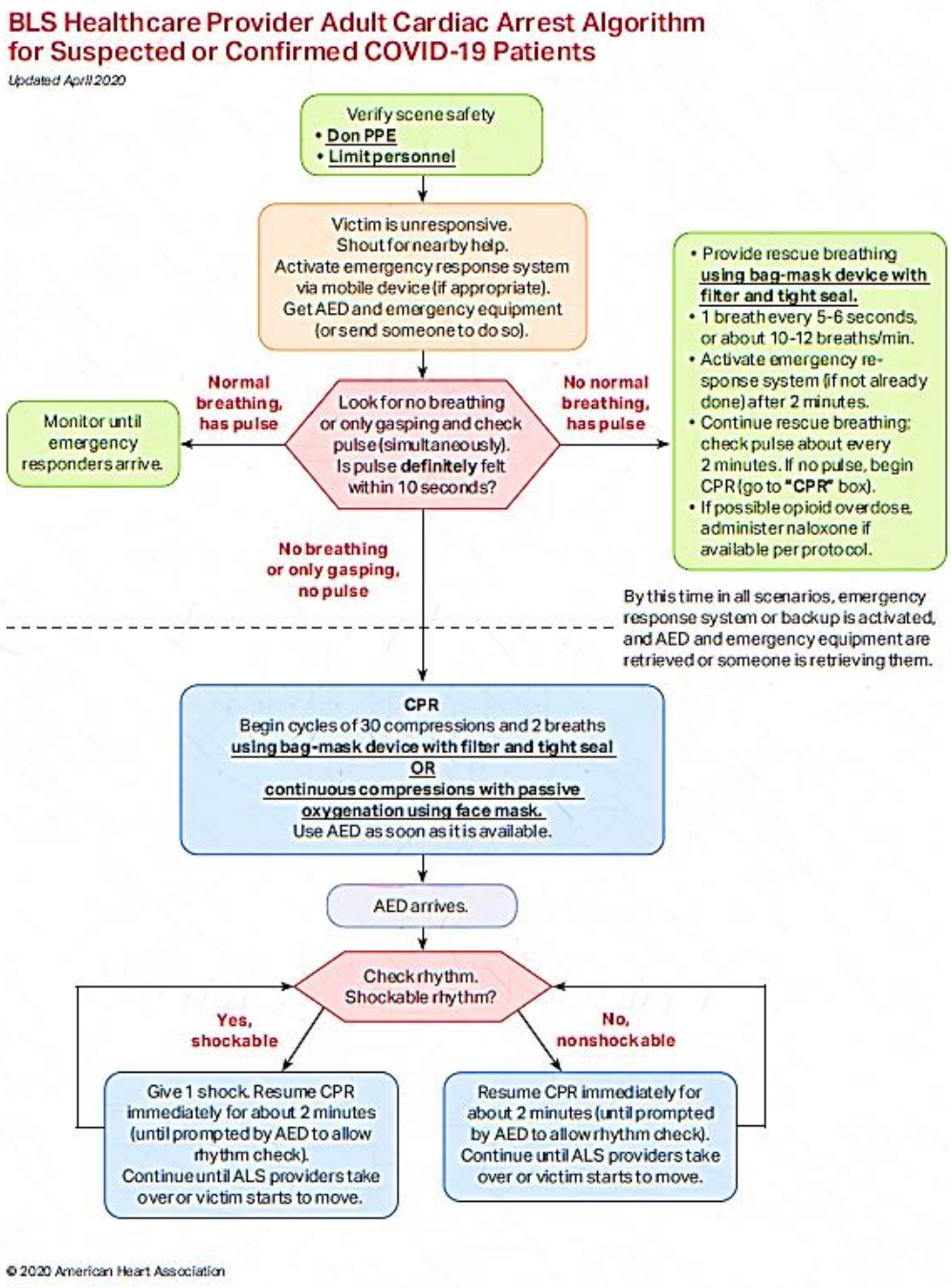
6. Post-Resuscitation Care

1. Dispose of, or clean, all equipment used during CPR. Any work surfaces used for airway/resuscitation equipment will also need to be cleaned.
2. After the resuscitation has ended adhere to strict doffing procedure to limit exposure.

3. If ROSC is achieved, provide usual post-resuscitation care consistent with current recommended guidelines including targeted temperature management.

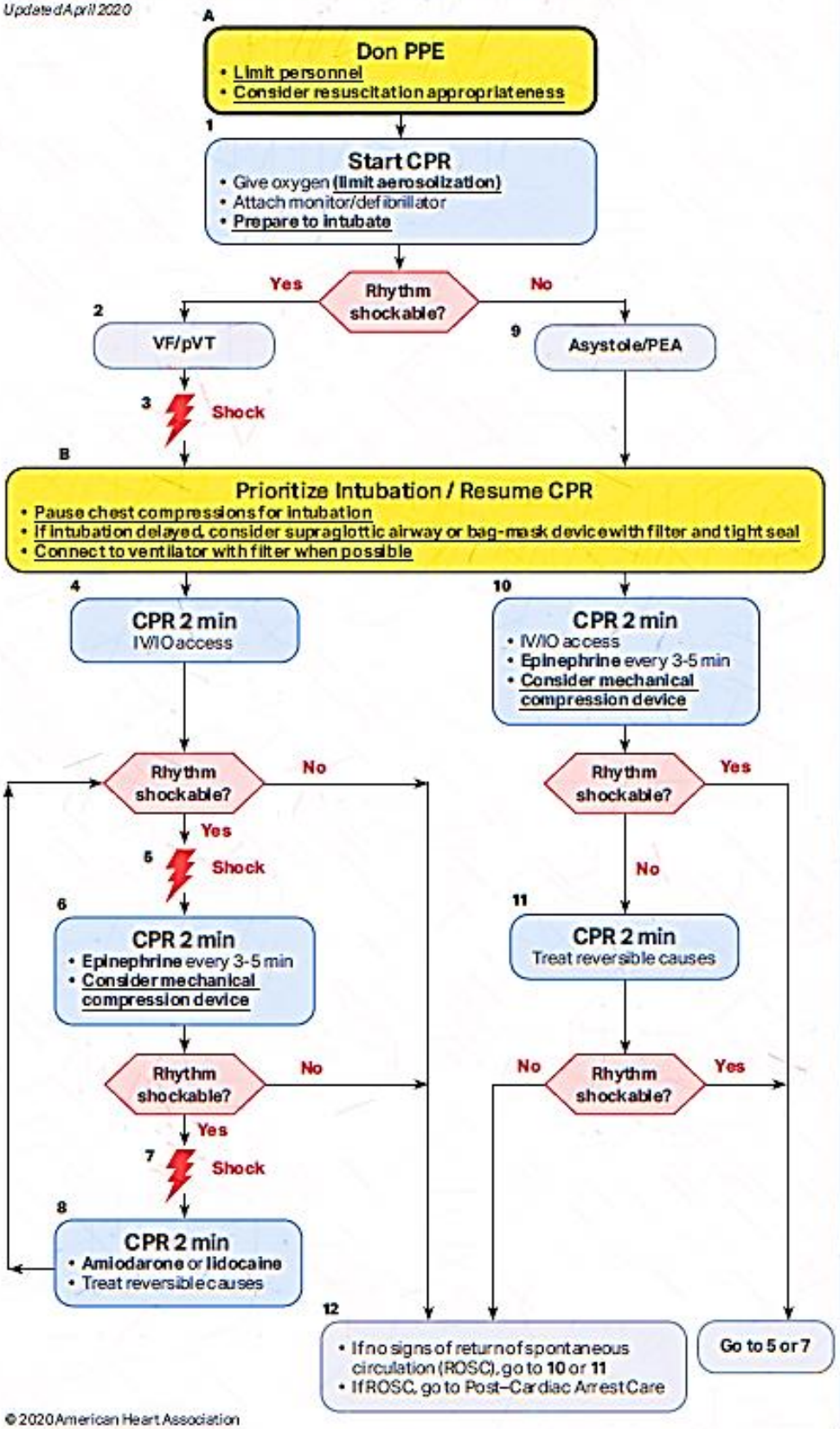
Resuscitation for arrived unknown, PUI or confirmed arrested cases

- The HCW should help the arrested patient after wearing the PPE as recommended from national infection prevention and control policies before starting any procedures.
- No clear recommendation to not do CPR to the confirmed or suspected COVID-19 arrested case in any location in the health facility.
- If the patient arrived unknown, PUI or confirmed arrested cases in the triage, emergency, cohort and critical care. The HCW should follow the instruction as shown:



ACLS Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



CPR Quality

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If P_{ETCO_2} < 10 mm Hg, attempt to improve CPR quality.
- Intra-arterial pressure
  - If relaxation phase (diastolic) pressure < 20 mm Hg, attempt to improve CPR quality.

Shock Energy for Defibrillation

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Advanced Airway

- **Minimize closed-circuit disconnection**
- **Use intubator with highest likelihood of first pass success**
- **Consider video laryngoscopy**
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Drug Therapy

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg.
  or
  Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

Return of Spontaneous Circulation (ROSC)

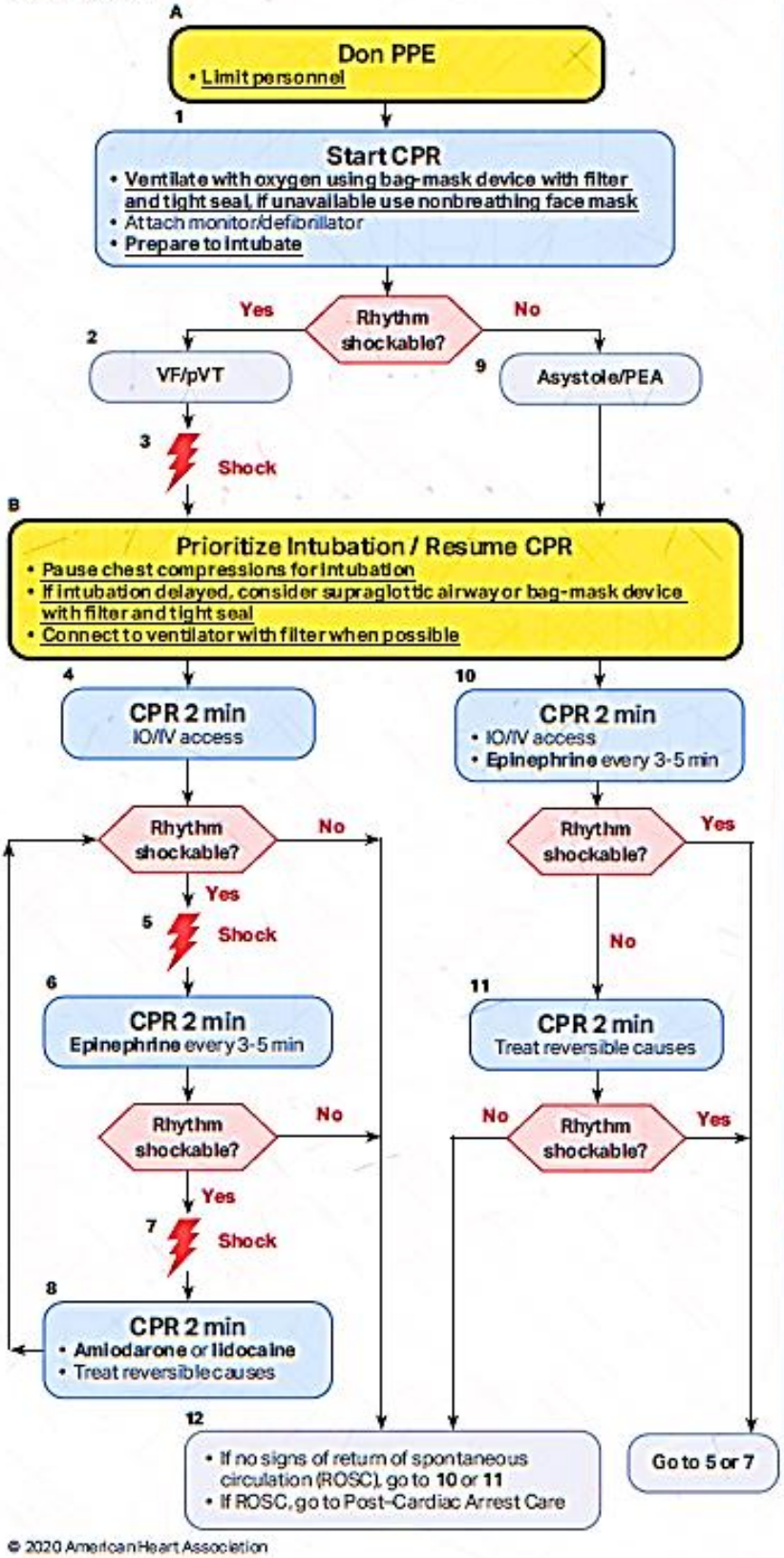
- Pulse and blood pressure
- Abrupt sustained increase in P_{ETCO_2} (typically ≥ 40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Pediatric Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100–120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 15:2 compression–ventilation ratio.

Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Advanced Airway

- Minimize closed-circuit disconnection
- Use intubator with highest likelihood of first pass success
- Consider video laryngoscopy
- Prefer cuffed endotracheal tube if available
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Drug Therapy

- **Epinephrine IO/IV dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Repeat every 3–5 minutes.
- **Amiodarone IO/IV dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.
  or
  Lidocaine IO/IV dose: Initial: 1 mg/kg loading dose. Maintenance: 20–50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated >15 minutes after initial bolus therapy).

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

Managing PUI /Confirmed case in special circumstance

Managing PUI /Confirmed case in special circumstance

Managing PUI /Confirmed case in Operation Theater

Postpone elective operations immediately.

- No routine, elective surgery should be done
- Only emergency or medically necessary surgery should be performed
- Designate a specific operating theater for all COVID-19 cases. This room should be out of high-traffic areas and be completely emptied of all non-essential materials. When an anteroom is available, this should be used as an area for donning and doffing of personal protective equipment and exchange of equipment, medications and materials for the case.
- Use of personal protective equipment is recommended for every operative procedure performed on a patient with confirmed COVID-19 infection or a patient where there is suspicion for infection.
- N95 respirators or respirators that offer a higher level of protection should be used when
- Performing, or present for, an aerosol-generating procedure (e.g. OR patient intubation) in COVID-19 or suspected infected patient.
- All traffic in and out of the operating theater should be minimized. A runner or support staff should be dedicated to the Operating theater to provide all materials needed throughout the case with exchanges performed using a material exchange cart placed immediately outside of the room or in the anteroom.
- Procedures should be performed by senior and experienced staff to minimize procedure time.
- No laparoscopy (SAGES consider it low risk)
    - If used; need to filter CO2 (which is difficult to apply)
- Full PPE for laparotomy unless patient is convincingly negative

- Minimize use of energy devices for dissection and hemostasis especially
- diathermy, smoke evacuation if diathermy is used
- Risk reducing surgery e.g. use of stomas instead of anastomosis
- For superficial infections, collection of pus, perianal abscess which is pointing
    - incision and drainage under local anesthesia
- Use of local anesthesia when feasible
- Conservative treatment for conditions like acute cholangitis, diverticulitis etc.

Performing intubation and/or extubation in Operating Room (OR):

- Ideally intubate patients in an Airborne Infection Isolation Room (AII) room and then transfer them to the positive pressure OR (once intubated they are considered low risk because it is a closed system). Also consider transferring the patient to an (AII) room for extubation.
- If not possible, a portable high-efficiency particulate air (HEPA) filtration unit may be used by positioning the unit near the patient's breathing zone.
- Switching the portable unit off during the surgical procedure.
- Only essential personnel wearing respiratory protection, such as an N95 respirator, should be in the OR when intubation and extubation occur
- A bacterial filter that filters particles 0.3 µm in size and has a filter efficiency of >95 percent should be placed on the patient's anesthesia breathing circuit at the endotracheal tube or expiratory side of the circuit. The entire circuit should be changed after the surgery is completed

After the procedure:

- The patient should be recovered in the operating theatre with dedicated staff until they can be transferred to an isolation room on the ward or in the intensive care unit.

- Adequate air exchanges should occur before environmental services enters the room for cleaning. With 15-20 air exchanges it will be around 30 minutes.

Managing PUI /Confirmed case need endoscopic procedure

No routine, elective procedure should be done

- Should only do emergency cases
- Follow sages' guidelines
- Upper GI endoscopy require wearing PPE as recommended from national guideline for infection control and prevention.

Advice for services caring for pregnancy and childbirth with PUI or confirmed COVID-19

1-Clinical manifestations (symptoms)

- Currently no difference between the clinical manifestations of COVID-19 pregnant and non-pregnant women or adults of reproductive age.
- No evidence that pregnant women are at higher risk of severe illness.
- Considering asymptomatic transmission of COVID-19 may be possible in pregnant women. Carefully assess the exposure history.
- Changes in pregnant women's bodies and immune systems, expose pregnant women to be badly affected by some respiratory infections
- Pregnant women with history of COVID contact require close monitoring

2- How COVID-19 affects fetus and infant:

- No evidence of vertical transmission, however IPC standards must be adhered to.
- No evidence that pregnant women with COVID-19 present the increased risk of fetal compromise.
- Relatively few cases have been reported of newborns confirmed with COVID-19 and they experienced mild illness.
- No evidence on mother-to-child transmission shown when infection manifests in the third trimester, based on negative samples from
    - amniotic fluid,
    - cord blood,
    - vaginal discharge,

- neonatal throat swabs or breastmilk

- Infection in the third trimester showed some cases of premature rupture of membranes, fetal distress, and preterm birth reported

3- Care for pregnant women with COVID 19

1st trimester: Care of women should follow infection prevention/investigation/ diagnostic guidance, as for non-pregnant adults.

2nd and 3rd trimesters of pregnancy

PUI: If suspect on the basis of h/o contact and appearance of symptoms, get tested. If test is in process, wait for test.

Confirmed Cases

a- General Advice and patient flow:

- Women should be advised to attend via private transport where possible or call help line if exist ++
- If an ambulance is required, the call handler should be informed that the woman is currently in self-isolation for possible COVID-19 and pregnant
- Women should be asked to alert a member of maternity staff to their attendance when on the hospital premises, but prior to entering the hospital
- Staff providing care should take personal protective equipment (PPE) precautions
- Woman should be asked to remove all ornaments etc. by herself and put in a bag to be disinfectant before place in safe or safe place by staff
- Women should be met at the maternity unit entrance by staff wearing appropriate PPE and provided with a surgical face mask
- The face mask should not be removed until the woman is isolated in a suitable room.

- Women should immediately be escorted to an isolation room, suitable for the majority of care during their hospital visit or stay
- Only essential staff should enter the room and visitors should be kept to a minimum
- Remove non-essential items from the clinic/scan room prior to consultation
- All clinical areas used will need to be cleaned after use as per local guidance
- Women should immediately be escorted to an isolation room, suitable for the majority of care during their hospital visit or stay
- In the isolation room, follow the same routine of pregnancy and labor care.

Attendance of scheduled Routine antenatal care in women with PUI or confirmed COVID-19

Prioritize pregnant women among other patients for COVID-19 testing

- Routine appointments for women with suspected or confirmed COVID-19 (growth scans, antenatal care appointments) should be delayed until after the recommended period of isolation
- Advice to attend more urgent pre-arranged appointments (fetal medicine surveillance, high risk maternal secondary care) will require a senior decision on urgency and potential risks/benefits
- If it is deemed that obstetric or midwifery care cannot be delayed until after the recommended period of isolation, infection prevention and control measures should be arranged locally to facilitate care.
- Pregnant women in isolation who need to attend should be contacted by a local care coordinator to re-book urgent appointments / scans, preferably at the end of the working day
- Provide mental health and psychosocial support

- Disinfection of rooms and equipment must be done immediately after examination/procedure as per IPC protocols of COVID 19

Attendance for unscheduled/urgent antenatal care in women with PUI or confirmed COVID-19:

- Where possible, early pregnancy (1st trimester) or maternity triage units should provide advice over the phone.
- If this requires discussion with a senior member of staff who is not immediately available, a return telephone call should be arranged.
- In case, any intervention or facility-based care deemed necessary, proceed as per instruction given in "General advice"

Infant feeding

For women wishing to breastfeed, precautions should be taken to limit viral spread to the baby:

- Hand washing before touching the baby, breast pump or bottles;
- Try and avoid coughing or sneezing on your baby while feeding at the breast
- Consider wearing a face mask while breastfeeding, available
- Wash/clean breast with soap/detergent or sanitizer before expressing
- Consider asking someone who is well to feed expressed milk to the baby
- Follow the recommended cleaning of breast pump after each use
- Wash hands before expressing milk, while wearing face mask
- Where mothers are expressing breastmilk in hospital, a dedicated breast pump should be used.

Managing bodies in the Mortuary

Managing bodies in the Mortuary

· Although no post-mortem transmission of COVID 19 has been documented, deceased bodies theoretically may pose a risk when handled by untrained personnel.

Preparing and packing the body for transfer from a patient room to mortuary

- The health worker attending to the dead body should follow standard precaution such as perform hand hygiene, ensure proper use of PPE (water resistant apron, goggles, N95 mask, gloves).
- All tubes, drains, and catheters on the dead body should be removed. Any puncture holes or wounds (resulting from removal of catheter, drains, tubes, or otherwise) should be contained with dressing.
- Keep both the movement and handling of the body to a minimum.
- There is no need to disinfect the body before transfer to the mortuary area
- Place patient in leak-proof plastic body bag (Cadaver bags) and those handling the body at this point should use PPE (surgical mask, clean gloves, and isolation gown).
- Morgue's staff should be informed about infectious status of the deceased, risk of infection and appropriate precautions required before transferring the patient to mortuary and should be well trained on standard precaution and infection control measure.
- Limit the number of Mortuary staff handling COVID dead body to limit the exposure
- No special transport equipment or vehicle is required. The trolley carrying the body must be disinfected after transmission with approved disinfectant (with 1% Hypochlorite solution, quarterly ammonium chloride ...etc.)
- Dead bodies should be stored in cold chambers maintained at approximately **4°C.**
- The mortuary must be kept clean. Environmental surfaces, instruments and transport trolleys should be properly disinfected

Preparing and transferring the body from mortuary to Graveyard

- The body is prepared for burial in mortuary department of the healthcare facility as its forbidden to transport it to the home and it is only allowed to move it to public washing places with trained and competent people with appropriate equipment to deal with the dead bodies of infectious diseases.
- Limit the number of people washing the body
- All personal performing the body wash should be competent and should wear appropriate PPE (gloves, mask, gown and face shield) and should thoroughly wash their hands with soap and water when finished
- Instruct the family to avoid large gathering at the burial ground it should limited to close family contacts
- The belongings of the deceased person do not need to be burned or otherwise disposed of. However, they should be handled with gloves and cleaned with a detergent followed by disinfection with a solution of at least 70% ethanol or 0.1% (1000 ppm) bleach, Clothing and other fabric belonging to the deceased should be machine washed with warm water at 60-90°C (140-194°F) and laundry detergent
- After removing the body, the mortuary fridge, door, handles and floor should be cleaned with approved disinfectant such as 1% Hypochlorite solution
- The vehicle, after the transfer of the body must be decontaminated

Occupational Health for Healthcare workers

Occupational Health for Healthcare workers

This Guidance is for Screening, Risk Assessment, Active Management and Return to Work Policy on Occupational Exposure to Patients with Coronavirus Disease

- This guidance is based on currently available data about COVID-19. Recommendations will be updated as more information becomes available
- The guidelines cover Screening, Risk Assessment post exposure, Active management and Return to Work policy for Health Care workers (HCW).
- Recommendations regarding which HCW are restricted from work may not anticipate every potential exposure scenario and will be updated according to new information emerging.
- Healthcare facilities should have a low threshold for evaluating symptoms and testing symptomatic HCW, particularly those who fall into the *high*- and *medium-risk* categories described in this guidance.
- Healthcare facilities, in consultation with public health authorities, should use clinical judgement as well as the principles outlined in this guidance to assign risk and determine need for work restrictions.
- Currently, this guidance applies to HCW with potential exposure in a healthcare setting to patients with confirmed COVID-19. However, HCW exposures could involve a PUI who is awaiting testing. Implementation of monitoring and work restrictions described in this guidance could be applied to HCW exposed to a PUI if test results for the PUI are not expected to return within 48 to 72 hours. A record of HCW exposed to a PUI should be maintained and HCP should be encouraged to perform self-monitoring while awaiting test results. If the results will be delayed more than 72 hours or the patient is positive for COVID-19, then the monitoring and work restrictions described in this document should be followed.

- Healthcare facilities should have a low threshold for screening staff in high-risk areas like Emergency rooms, Primary Healthcare Centers and Isolation facilities. In addition, immediate triage pathway (clinical examination and testing) should be implemented for HCW falling under High and Medium risk exposure as will be detailed below in this guidance.
- Healthcare facilities should use clinical judgement as well as the principles outlined in this guidance to assign risk and determine need for work restrictions.
- Asymptomatic HCW who have had an exposure to COVID19 patients will be allowed to continue to work in case of severe staff shortage that is affecting smooth daily workflow and after consultation and approval from direct line manager and Occupational Health Clinics or other designated clinics in each Health Authority or Facility.
- This guidance does not cover Community Exposure or Travel-related Exposure in HCW. Please refer to related Public Health Policies and procedures in this regard.
- At the time of preparing this document, decision will be made can be made using a test-based strategy. Testing guidance is based upon limited information and is subject to change as more information becomes available.

Definitions related to Occupational Health for Healthcare workers

Self-monitoring: HCW should monitor themselves for fever by taking their temperature twice a day and remain alert for respiratory symptoms (e.g., cough, shortness of breath, sore throat, and headache). Anyone on self-monitoring should be provided a plan for whom to contact if they develop fever or respiratory symptoms during the self-monitoring period to determine whether medical evaluation is needed.

Active monitoring: The facility or the local public health authority assumes responsibility for establishing regular daily follow up of potentially exposed HCW in High or Medium risk category to assess for the presence of fever and/or active respiratory symptoms. Mode of communication may include telephone calls, mobile Apps or any electronic-based means of communication. This can be delegated to facility occupational health clinics, infection control offices or other designated teams/clinics at the discretion of hospitals and local Health Care Authorities.

Self-Monitoring with delegated supervision: in a healthcare setting means HCW perform self-monitoring with oversight by their healthcare facility's occupational health or infection control office. On days HCW are scheduled to work, healthcare facilities could consider measuring temperature and assessing symptoms prior to starting work. Alternatively, a facility may consider having HCW report temperature and absence of symptoms to occupational health prior to starting work. Mode of communication may include telephone calls, mobile Apps or any electronic-based means of communication.

Close contact: for healthcare exposures is defined as follows: a) being within approximately 2 meters, of a person with COVID-19 for a prolonged period of time (such as caring for or visiting the patient; or sitting within 2 meters of the patient in a healthcare waiting area or room); or b) having unprotected direct contact with infectious secretions or excretions of the patient (e.g., being coughed on, touching used tissues with a bare hands.

- Data are limited for definitions of close contact.

  Factors for consideration include

  - the duration of exposure (e.g., longer exposure time likely increases exposure risk)
  - clinical symptoms of the patient (e.g., coughing likely increases exposure risk)

- whether the patient was wearing a facemask (which can efficiently block respiratory secretions from contaminating others and the environment)
- PPE used by personnel
- Whether aerosol-generating procedures were performed.

Defining Exposure Risk Category

High-risk exposures: refer to HCW who have had prolonged close contact with patients with COVID-19 who were not wearing a facemask while HCW nose and mouth were exposed to material potentially infectious with the virus causing COVID-19.

Medium-risk exposures: include HCW who had prolonged close contact with patients with COVID-19 who were wearing a facemask while HCW nose and mouth were exposed to material potentially infectious with the virus causing COVID-19.
HCW who were wearing a gown, gloves, eye protection and a facemask (instead of N95) during an aerosol-generating procedure would be considered to have a medium-risk exposure. If an aerosol-generating procedure had not been performed, they would have been considered low-risk.

Low-risk exposures: refer to brief interactions with patients with COVID-19 or prolonged close contact with patients who were wearing a facemask for source control while HCW were wearing a facemask or respirator. Use of eye protection, in addition to a facemask or respirator would further lower the risk of exposure. HCW not using all recommended PPE who have only brief interactions with a patient regardless of whether patient was wearing a facemask are considered low risk. Examples of brief interactions include: brief conversation at a triage desk; briefly entering a patient room

but not having direct contact with the patient or the patient's secretions/excretions; entering the patient room immediately after the patient was discharged.

No identifiable risk exposure: HCW who walk by a patient or who have no direct contact with the patient or their secretions/excretions and no entry into the patient room are considered to have no identifiable risk. HCW falling in this category do not require monitoring or restriction from work.

A- Screening Recommendations:

- In view of increasing risk of COVID19 acquisition in healthcare settings and in the community, it is recommended to perform regular screening (every 2-4 weeks) for HCW working in front lines who come into frequent and incidentally un-protected exposure to CVOID19 positive cases.
- This includes staff in Emergency Rooms, Isolation units/facilities, Institutional Quarantine facilities, Intensive care Units and Primary Healthcare Centers and virology labs processing COVID19 samples.

B- Risk Assessment

- While body fluids other than respiratory secretions have not been clearly implicated in transmission of COVID-19, unprotected contact with other body fluids, including blood, stool, vomit, and urine, might put HCW at risk of COVID-19.Proper adherence to currently recommended infection control practices, including all recommended PPE, should protect HCW having prolonged close contact with patients infected with COVID-19.
- HCW with no direct patient contact and no entry into active patient management areas who adhere to routine safety precautions do not have a risk of exposure to COVID-19 (i.e., they have no identifiable risk and should not be tested routinely).

- HCW in any of the risk exposure categories who develop signs or symptoms compatible with COVID-19 must contact their established point of contact (public health authorities or their facility's occupational health clinic) for medical evaluation prior to returning to work.

C- Active Management

- **HCW in the high- or medium-risk category** should undergo
    - Restriction from work in any healthcare setting preferably until 14 days, (may be reduced to 7 days in case of staff shortage) after their last exposure and quarantine at home for the same period
    - Test for covid-19 by SARS COV2 PCR
    - Active monitoring for fever and symptoms related to covid-19
    - If they develop any fever (measured temperature > 38 degrees or respiratory symptoms consistent with covid-19, they should immediately self-isolate and notify their line manager and healthcare facility promptly to be retested

- **HCW in the low-risk category** should
    - Perform self-monitoring with delegated supervision until 14 days after the last potential exposure.
    - Asymptomatic HCW in this category are not restricted from work.
    - They should check their temperature twice daily and remain alert for respiratory symptoms consistent with COVID-19.

- They should ensure they are afebrile and asymptomatic before leaving home and reporting for work. If they do not have fever or respiratory symptoms, they may report to work.
- If they develop fever (measured temperature > 38 degrees or subjective fever) OR respiratory symptoms they should immediately self-isolate and notify their line manager and their healthcare facility promptly.
- On days HCW are scheduled to work, healthcare facilities could consider measuring temperature and assessing symptoms prior to starting work.
- Should wear mask all the time and ensure contact and droplet precautions while dealing with others

D- Return to Work Criteria for HCW with Confirmed or Suspected COVID-19

- Decisions about return to work for HCW with confirmed or suspected COVID-19 should be made in the context of local circumstances, risk stratification of degree of potential exposure and work load/nature in that particular care area in healthcare facility.
- Un-justified restriction of HCW from work can lead to increased workload on remaining team members, increased risk of medical errors and delayed patient care and discharge process. It can also lead to breaches in Infection Control measures by exposing reduced numbers of HCW to increasing number of patients.
- The HCW should still report temperature and absence of symptoms each day prior to starting work.
- The HCW should wear a facemask and practice frequent and adequate Hand Hygiene during working hours.
- If HCW develop even mild symptoms consistent with COVID-19, they must cease patient care activities, notify their line manager/Infection Control office immediately

- If signs/symptoms are reported during working hours: HCW should attend Occupational Health clinic (or equivalent) during working hours and ED after working hours.
- HCW will be Patient Under Investigation (PUI) and appropriate work up as per pathway will be initiated.

Personal Protective Equipment (PPE) for confirmed cases of COVID 19

PPE should be available where and when it is indicated in the correct size and sufficient quantity

- Ensure all staff wear a fit-tested N95 mask, eye protection i.e. goggles or a face shield, gloves, head cover and impermeable gown
- Designate staff who will be responsible for caring for suspected or known COVID-19 patients. Ensure they are trained on the infection prevention and control recommendations for COVID-19 and proper use of personal protective equipment.
- All health care provider should wear and remove the PPE safely**.**
- If there is concern and/or breach of PPE during patient care, leave the patient care area when safe to do so and properly remove and change the PPE and report it to your direct senior and infection control personnel.
- Minimize the time spent and entry to the patient room by cohering the task together
- All PPE should be used for certain task with certain patient and should be removed and discarded before leaving the patient room except N95 will be removed immediately outside patient room
- In case of shortage of PPE, refer to WHO and CDC guidelines for extended use/reuse of PPE

Patient Care Equipment

· When possible use disposable devices or equipment.

· If disposables devices and equipment not an option, dedicate devices or equipment to a single patient

· If dedicated devices or equipment is not available, clean and disinfect the shared equipment before using it for other patients with approved disinfectant maintaining product contact time

· Approved disinfectant for COVID 19: quaternary ammonium compounds, sodium hypochlorite and 70% alcohol wipes

Patient Transport in the hospital

· Avoid the movement and transport of patients out of the isolation room or area unless medically necessary.

· The use of designated portable X-ray, ultrasound, echocardiogram and other important diagnostic machines is recommended when possible.

· If transport is unavoidable, the following should be observed:

- Patients should wear a surgical mask during movement to contain secretions.
- Use routes of transport that minimize exposures of staff, other patients, and visitors.
- Notify the receiving area of the patient's diagnosis and necessary precautions before the patient's arrival.
- Ensure that healthcare workers (HCWs) who are transporting patients wear appropriate PPE if they will participate in direct patient care and perform hand hygiene afterward.

- Area used by the patient/wheelchair to be cleaned appropriately after patient's transfer.

Patient Transport to another facility:

- Inform the other facility about referring a suspected/confirmed case
- Call ambulance and inform about the case being suspected/confirmed COVID 19, which will be transferred in designated ambulance
- If hospital ambulance used ensure that ambulance will be cleaned and disinfected based on hospital guide
- If ambulance personnel will come in contact with the patient, they should wear appropriate PPE.

Additional Measures

· Dedicate HCWs and limit the number of persons present in the room to the absolute minimum required for the patient's care and support

· Limit visitors entering the room to the minimum necessary.

· Keep log sheet of all persons coming in contact with the suspected/confirmed COVID 19 patients

· Exclude immunocompromised, pregnant, non-competent staff from the care of suspected/confirmed COVID 19 patients

Environmental cleaning in isolation rooms/areas

· Ensure that environmental cleaning and disinfection procedures are followed consistently and correctly

· Increase frequency of cleaning by housekeeping in patient care areas especially high touch surfaces (door handle, call bell, patient side rails ...etc.)

· Isolation areas should have their own cleaning supplies that are separate from clean patient care areas and are kept in or near isolation area

· Responsible housekeeping staff should be trained and educated with regard to cleaning method and technique, donning and doffing of PPE, spill management, dealing with occupational exposure ...etc.)

· Cleaners/housekeeping should wear appropriate PPE when cleaning an isolation room or area as described in the national IPC guideline for the health facility.

· All waste from the isolation area is considered contaminated and should be disposed of following your facilities methods for contaminated waste use sodium hypochlorite for regular cleaning while patient is in the isolation room.

· After patient is discharged, use terminal cleaning with fumigation with accelerated hydrogen peroxide 6%, time and cycles adjusted per room size and shape.

Linen and laundry management, food service utensils and waste management, related to COVID19 case

Refer to the facility guideline/ protocol for waste management, to be dealt with as infectious material

Surveillance

- Develop a database containing information for all suspected/confirmed case and all cases advised for home quarantine who were/are assessed at the health care facility.
- Develop a database containing information for all healthcare workers and visitors that were in contact /caring for the confirmed cases of COVID-19.
- All cases advised for home quarantine should have PCR test from the response team of NCDC according to the endorsed plan.
- All health care workers were in contact /caring for the confirmed cases of COVID-19 should have regular screening (every 2-4 weeks) by testing with PCR testing from response team of NCDC or rapid AB test in the health facility if PCR testing not feasible.
- All HCW who had incident report of high risk of exposure for CIVID-19 need immediate notification to NCDC. They should be screened for COVID-19.
- Visitors or contacts to the confirmed cases for COVID-19 should have PCR testing according to the policy of NCDC.

Appendix

Appendix

1. Quick guide for management of patients with covid19: hospitalist guide + initial work-up.
2. Quick guide for management of critically ill patients with covid19: respiratory failure.
3. Caring for COVID-19: quick guide for the intensivist.
4. Guidance for prone positioning of the conscious COVID patient 2020.
5. Richmond Agitation Sedation Scale (RASS)

6. نموذج التبليغ للإشتباه بحالة التاجية المستجد
7. اقرار و تعهد بتنفيذ اجراءات الحجر الصحي

QUICK GUIDE FOR MANAGEMENT OF PATIENTS WITH COVID19: HOSPITALIST GUIDE + INITIAL WORK-UP

FIRST STEPS: *
- At admission: HCP form +/- MOLST filled out and updated
- Attending to discuss realistic goals re. intubation and CPR
- Check baseline EKG

LAB WORK-UP:
- Covid19 PCR testing + Rapid viral panel

At admission →	CBC with differential, BMP, Magnesium, CRP, LFT, CPK, LDH, PTT, INR procalcitonin, troponin, NT-proBNP, d-dimer, soluble IL2 receptor
Daily →	CBC with differential, BMP, Magnesium If patient is in ICU add: troponin, CPK
Every other day →	LFT, CPK, troponin, CRP, LDH, d-dimer, fibrinogen, PTT, INR, (If on propofol also: triglyceride)
→	
If clinically worse →	LFT, CPK, troponin, CRP, procalcitonin, LDH, ferritin, d-dimer, fibrinogen, PTT, INR

LAB RESULTS TO EXPECT: *potential marker of disease severity

Normal WBC	Elevated AST*/ALT*
Lymphopenia*	Elevated CRP*
Mild thrombocytopenia	Elevated LDH*
BMP with elevated Cr	Elevated d-dimer*
Normal procalcitonin	Elevated troponin*

RESPIRATORY CARE: See Respiratory Failure Quick Guide for details
Titrate 1-6L/min NC for goal SpO2 92 - 96% or PaO2 >75
if requiring >6L/min: trial venturi or oximyzer COVID ICU Triage) @ oximyzer 10L/min or venturi FiO2 50%

ISOLATION: Remember these basics for covid + or rule-out patients
- Contact (gown + gloves) +Droplet (mask + eye protection)
- If aerosolizing procedure or ICU patient use N95 mask
- Aerosolizing procedures in negative pressure room only
- Avoid unnecessary aerosolizing procedures e.g. nebulization (switch to inhalers), high flow nasal canula, non-invasive ventilation (CPAP, BiPAP)
- OK to continue chronic night-time non-invasive ventilation, switch to BWH mask + machine because less aerosol risk

CONSULTS to CALL: Upfront consults or when to call
- INFECTIOUS DISEASE → on ALL patients (discuss therapies)
- ANESTHESIOLOGY → @difficult intubation
- Pulmonologist →
- ICU TRIAGE → @6L/min NC or if concern for clinical worsening
- CARDIOLOGY → if concern for new heart failure, ACS, VT/VF, or cardiogenic shock
- ONCOLOGY →

INITIAL MANAGEMENT CONSIDERATIONS:

CT chest:	NOT necessary for diagnosis, recommend minimizing use of CT given challenges with isolation and transport
Daily CXR:	NOT necessary unless it will change management plan
IV fluids:	Conservative fluid management is important to mitigate risk of progression of respiratory failure
Steroids:	Avoid using empirically, only use if other indication
Antibiotics:	Follow the guidelines for empiric antibiosis based on patient risk factors, talk to consult about concerns

.

QUICK GUIDE FOR MANAGEMENT OF CRITICALLY ILL PATIENTS WITH COVID19: RESPIRATORY FAILURE

OXYGEN THERAPY: **Goal SpO2 92-96% PaO2 >75**

- Notify anesthesiology in advance if anticipate difficult airway: eg prior difficult intubation, prior head/neck surgery or XRT
- AVOID CPAP or BiPAP for ARDS, but can consider in reversible cases (e.g. flash pulmonary edema, mild COPD exacerbation)

RESPIRATORY FAILURE ALGORITHM: See full guidelines for details

NC 1-6L/min to maintain SpO2 goal

↓

If NC 6L/min persistently does not achieve SpO2 goal
venturi mask→ titration

↓

Venturi: start at 12L/min + FiO2 40%, titrate to max FiO2 60%

↓

If need mask 10L/min or Venturi FiO2 50% for SpO2 goal call → COVID ICU triage

↓

If SpO2 <92% on mask 12L/min or Venturi mask FiO2 60% OR if dyspnea, tachypnea (RR>24), or increased work of breathing (accessory muscle use, nasal flaring) regardless of FiO2

CALL for intubation (most expert in team to always try to have it → elective

↓

Intubation per COVID intubation guidelines

UPFRONT VENTILATOR SETTINGS: Immediately upon intubation

- Volume control with Vt 6cc/kg IBW + RR 16-24 + FiO2 1.0 + PEEP based on BMI as below
- If BMI<35 PEEP 5; if BMI 35 PEEP 10

INITIAL VENT ADJUSTMENTS:

1) **TITRATE PEEP** use ARDSNET LOW PEEP table for BMI <35; for BMI 35 use ARDSNET HIGH PEEP table
2) **TITRATE DOWN FiO2** goal SpO2 92-96% or PaO2 >75
3) **MEASURE RESISTANCE + COMPLIANCE** (ask RT for help to do this)
4) **MEASURE PLATEAU PRESSURE**: if >30, decrease Vt to 4cc/kg IBW (tolerate incr pCo2 as a result)

WHAT TO DO FOR DIFFICULTY WITH OXYGENATION

1) PEEP titration (as above for initial settings)
2) Increase sedation to goal RAAS -5
3) Initiate continuous paralysis
4) PRONE POSITIONING **if P:F <150 or FiO2 >0.75**
   See the protocol for proning
   1 hr post-prone check mechanics + adjust PEEP as above
   DC proning if P:F>200 or if O2 @ goal w FiO2 <0.5

VENT TITRATION for ACID/BASE ISSUES:

target pH 7.25-7.45

- if pH <7.25 increase RR towards 35
- if pH <7.15 and RR is 35 then increase Vt to 8cc/kg IBW (as long as plateau pressure <30) AND do steps 1-4 above (sedation to RASS -5 + paralysis + prone)

ARDSNET LOW PEEP table (BMI < 35)

FiO2	PEEP
0.3	5
0.4	5
0.4	8
0.5	8
0.5	10
0.6	10
0.7	10
0.7	12
0.7	14
0.8	14
0.9	14
0.9	16
0.9	18
1.0	18-24

ARDSNET HIGH PEEP table BMI 35)

FiO2	PEEP
0.3	5
0.3	8
0.3	10
0.3	12
0.3	14
0.4	14
0.4	16
0.5	16
0.5	18
0.5 – 0.8	20
0.8	22
0.9	22
1.0	22
1.0	24

CARING FOR COVID19: QUICK GUIDE FOR THE INTENSITIVIST

ISOLATION CONSIDERATIONS

- Strict isolation = Contact (gown+ gloves) + Droplet (surgical mask or N95 if in ICU or if w/ aerosolizing procedure)
- AVOID aerosolizing procedures when possible (Non-invasive, high flow, nebs, bronchoscopy)

TRANSFER TO THE ICU

- address goals of care BEFORE admission to ICU
- Patient to travel in ICU bed (if possible) wearing surgical mask + clean gown and sheet
- Travel w 2 ICU Ns (full PPE) + 2 security (N95)

BEDSIDE PROCEDURES

- See "ICU isolation guidelines" for how to do sterile procedures in strict isolation
- A-line: on admission unless contraindicated
- Central line: Left IJ preferred (save R for RRT)
- Bronch: minimize; for pulmonary toilet try albuterol neb then hypertonic saline

CONSULTS

- **ID**- for ALL patients, for therapies/trials + abx
- **Cardiology**- for new Heart failure, ACS, VT/VF, cardiogenic shock
- **Oncology**- call primary oncologist at arrival
- **Anesthesiology**- CALL EARLY for intubation
- **Nephrologist**

IMAGING

- CT chest NOT necessary for diagnosis (if done, looks like viral PNA: bilateral, multifocal GGOs +/- consolidation +/- septal thickening)
- daily CXR NOT necessary- only if changes plan

LABS in the ICU

- **admission** → CBC w diff, CMP, CRP, procal, CPK, trop, d-dimer, PTT, INR, ferritin,
- **daily** → CBC w diff, BMP, Mag, troponin, CPK PTT, INR, fibrinogen
- **every other day** → LFTs, LDH, CRP, d-dimer, ferritin (if on propofol: triglyceride)
- **if clinical worsening** → LFT, CPK, troponin, CRP, procal, LDH, ferritin, d-dimer, fibrinogen, PTT, INR

RESPIRATORY FAILURE

- **goal SpO2 92-96& PaO2>75**
- See Respiratory Failure COVID Quick Guide or full ICU COVID Guidelines for details
- Expect rapidly evolving hypoxemia + ARDS
- Avoid CPAP or BiPAP for ARDS, can consider in reversible cases (e.g. flash pulmonary edema)
- if rapid deterioration **consider** intubation

****Lung Protective Ventilation: Vt 6cc/kg ideal Body weight, initial PEEP 5 for BMI<35 (or initial PEEP 10 if BMI 35)**

- Titrate PEEP: ARDSET LOW PEEP table if BMI<35 or ARDSNET HIGH PEEP table if BMI 35
- **for refractory hypoxemia** try <u>in this order</u>: 1)PEEP titration 2)increased sedation 3)continuous paralysis 4)PRONING (for P:F<150 of FiO2 >0.75)
- Sedation for ARDS: fentanyl /morphine + propofol +/- midazolam (adjunct)

FLUIDS

- Conservative fluids, "dry lungs = happy lungs"
- Assess fluid responsiveness, +/- bedside ultrasound, only small boluses (250-500cc)
- Target CVP 4-8mmHg and EVEN fluid balance

SHOCK

- Distributive (DS) vs. Cardiogenic Shock (CS)
- DS: work-up per Libyan national sepsis guidelines
- CS suggested by CVO2 <60% +/-bedside Echo w decreased LV function
- CS management:
  - Noradrenaline upfront for MAP 65-75
  - Diuretics if CVP>14 for goal CVP 6-14
  - Dobutamine (inotropy) if MAP>65 for goal CVO2 >60 (start at 2mcg/kg/min, up by 1-2 q30-60 min, to max dose 10)
  - Lactate and CVO2 q4-6hrs; LFTs daily

THERAPEUTICS

- Do NOT give steroids (unless for other indication, then use lowest dose possible)
- Discuss therapy options with Consultants for up to date recommendations.

PROGNOSIS

- evolving data, worse outcomes if >65 yrs
- lab markers of severe disease: lymphopenia, increased troponin, LDH, d-dimer, CRP

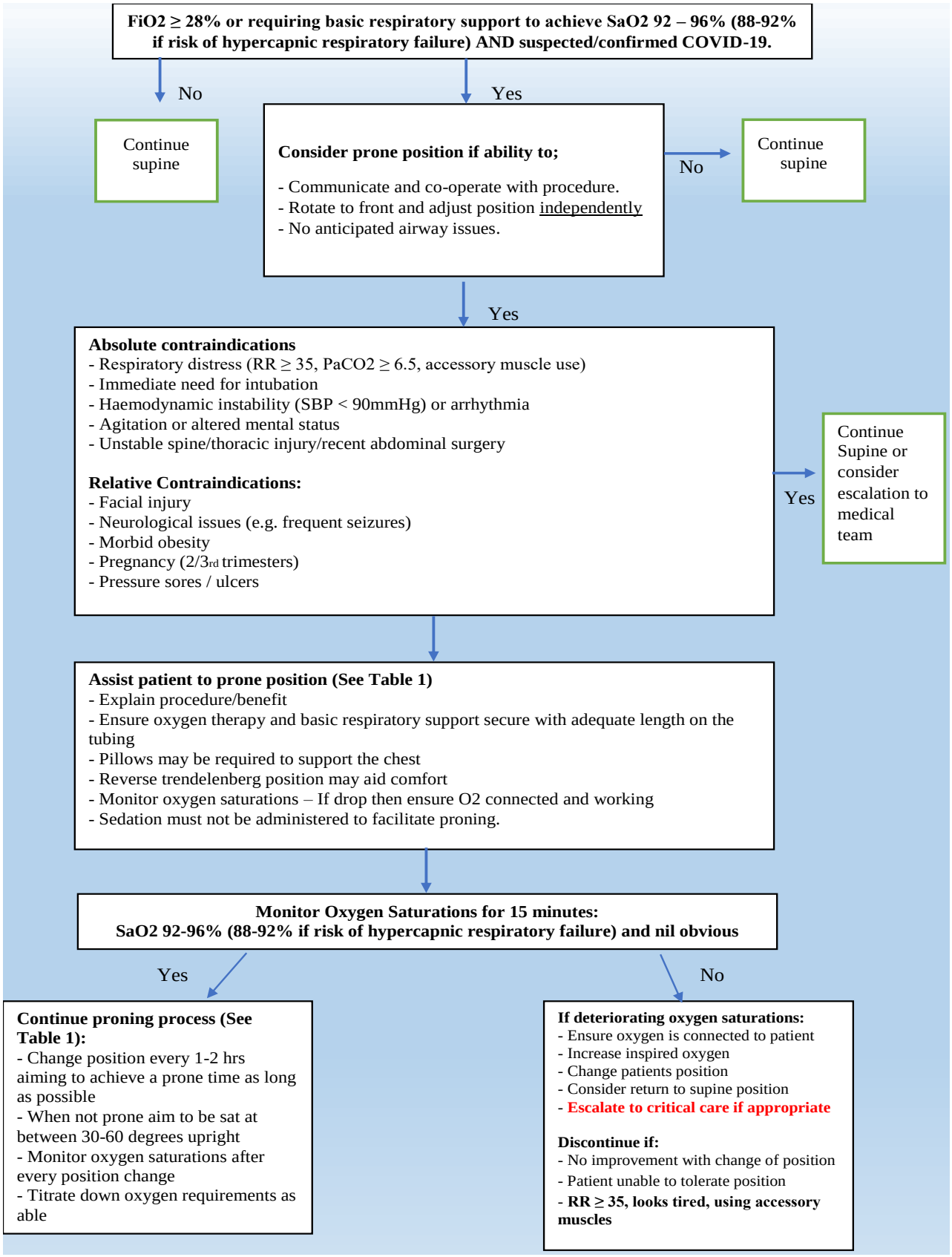
Guidance for prone positioning of the conscious COVID patient 2020

Table 1 – Timed position changes for patients undergoing conscious proning process

Timed Position Changes:

If patient fulfils criteria for proning ask the patient to switch positions as follows. Monitor oxygen saturations 15 minutes after each position change to ensure oxygen saturation has not decreased. Continue to monitor oxygen saturations as per the National Early Warning Score (NEWS)

- 30 minutes to 2 hours lying fully prone (bed flat)
- 30 minutes to 2 hours lying on right side (bed flat)
- 30 minutes to 2 hours sitting up (30-60 degrees) by adjusting head of the bed
- 30 minutes to 2 hours lying on left side (bed flat)
- 30 minutes to 2 hours lying prone again
- Continue to repeat the cycle…….


FiO2 ≥ 28% or requiring basic respiratory support to achieve SaO2 92 – 96% (88-92% if risk of hypercapnic respiratory failure) AND suspected/confirmed COVID-19.
No
Yes
Continue supine
Consider prone position if ability to;
- Communicate and co-operate with procedure.
- Rotate to front and adjust position independently
- No anticipated airway issues.
No
Continue supine
Yes
Absolute contraindications
- Respiratory distress (RR ≥ 35, PaCO2 ≥ 6.5, accessory muscle use)
- Immediate need for intubation
- Haemodynamic instability (SBP < 90mmHg) or arrhythmia
- Agitation or altered mental status
- Unstable spine/thoracic injury/recent abdominal surgery
Relative Contraindications:
- Facial injury
- Neurological issues (e.g. frequent seizures)
- Morbid obesity
- Pregnancy (2/3rd trimesters)
- Pressure sores / ulcers
Yes
Continue Supine or consider escalation to medical team
Assist patient to prone position (See Table 1)
- Explain procedure/benefit
- Ensure oxygen therapy and basic respiratory support secure with adequate length on the tubing
- Pillows may be required to support the chest
- Reverse trendelenberg position may aid comfort
- Monitor oxygen saturations – If drop then ensure O2 connected and working
- Sedation must not be administered to facilitate proning.
Monitor Oxygen Saturations for 15 minutes:
SaO2 92-96% (88-92% if risk of hypercapnic respiratory failure) and nil obvious
Yes
No
Continue proning process (See Table 1):
- Change position every 1-2 hrs aiming to achieve a prone time as long as possible
- When not prone aim to be sat at between 30-60 degrees upright
- Monitor oxygen saturations after every position change
- Titrate down oxygen requirements as able
If deteriorating oxygen saturations:
- Ensure oxygen is connected to patient
- Increase inspired oxygen
- Change patients position
- Consider return to supine position
- Escalate to critical care if appropriate
Discontinue if:
- No improvement with change of position
- Patient unable to tolerate position
- RR ≥ 35, looks tired, using accessory muscles

Richmond Agitation-Sedation Scale (RASS)

Score	Term	Description	
+4	Combative	Overtly combative, violent, immediate danger to staff	
+3	Very agitated	Pulls or removes tube(s) or catheter(s), aggressive	
+2	Agitated	Frequent nonpurposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressively vigorous	
0	Alert and calm		
-1	Drowsy	Not fully alert but has sustained awakening (eye opening/eye contact) to *voice* (≥10 seconds)	Verbal Stimulation
-2	Light sedation	Briefly awakens to *voice* with eye contact (<10 seconds)	
-3	Moderate sedation	Movement or eye opening to *voice* (but no eye contact)	
-4	Deep sedation	No response to voice but movement or eye opening to *physical* stimulation	Physical Stimulation
-5	Unarousable	No response to *voice* or *physical* stimulation	

دولة ليبيا
وزارة الصحة
المرفق الصحى .....

نموذج التبليغ للإشتباه بحالة الإصابة بفيروس التاجية المستجد

التاريخ / / رقم التسلسل اليومي:.....

الأسم الثلاثي	الرقم الوطنى / البطاقة الشخصية الليبي رقم جواز السفر لغير الليبي مع جنسيتة
...../...../...../.....	

البلدية ..... أقرب نقطة دالة .....

الهاتف/.....

البيانات الصحية للفرد

التاريخ الطبي:	*الفرد*	ملاحظات:
1.مرض السكـــــــري	☐نعم/☐لا	.....
2.ارتفاع ضغط الـــــدم	☐نعم/☐لا	.....
3.أمراض الكلـــــــــى	☐نعم/☐لا	.....
4.أمراض الجهازاالتنفسى	☐نعم/☐لا	.....
5.أمراض القلـــــــب	☐نعم/☐لا	.....
6.أمراض الدم الوراثية	☐نعم/☐لا	.....
7.التهاب الكبد لمزمـــن	☐نعم/☐لا	.....
8.متلازمة العوز المناعي	☐نعم/☐لا	.....
9.أمراض نفسيـــــــــة	☐نعم/☐لا	.....
10.الصـــــــــــــرع	☐نعم/☐لا	.....
11.اضطرابات جينيـــــة	☐نعم/☐لا	.....
12.أمراض أخرى تحتاج إلى عناية خاصة	☐نعم/☐لا	.....

هل المريض مقيم أو سافر الى أي مدينة سجلت بها حالات فيروي التاجي المستجد؟.....

هل المريض إختلط مع أي حالة مؤكدة أو مخالطة لفيروس التاجي المستجد؟ .....

في حالى الوفاة //

السن عند الوفاة	
تاريخ الوفاة	
سبب الوفاة	
رمز الوفاة (ICD10)	

دولة ليبيا
وزارة الصحة
المرفق الصحى .....

الجهة المحال إليه:..... الطوارئ ☐ الفرز ☐ العزل ☐

نوع الاحالة : طارىء (آني) ☐ مستعجل (خلال ساعات) ☐ روتيني ☐

ملخص الحالة المرضية:.....

.....

.....

نتيجة التحليل (Rapid AB):.....

سبب الإحالة:.....

.....

وسيلة النقل عند الإحالة:

سيارة إسعاف مركز الإستجابة السريع ☐ سيارة إسعاف جهاز الإسعاف ☐ سيارته خاصة ☐ غير محدد ☐

تقرير الطبيب المعالج بالجهة المحال إليها: .....

:.....

.....

نتيجة التحليل (PCR):.....

.....

نتيجة صورة الإشعاعية: .....

.....

القرار النهائي: الحجر المنزلي ☐ العزل المنزلي ☐ الإيواء بالمستشفى ☐ العزل بالمؤسسة ☐

إسم الطبيب بالمركز : ..... اسم الطبيب بالمستشفى:.....

التوقيع :..... التوقيع :.....

دولة ليبيا
وزارة الصحة
المرفق الصحى .....

اقرار و تعهد بتنفيذ اجراءات الحجر الصحي

الاسم : .....

رقم الجواز/ الرقم الوطني / البطاقة الشخصية: .....

البلدية: .....

أقرب نقطة دالة: .....

رقم الهاتف النقال: .....

رقم أحد الأقارب أو الكفيل: .....

انا الموقع ادناه اتعهد بانه تم إبلاغي بالإجراءات الصحية والنصائح الطبية الواجب اتباعها، و أنني أدرك المخاطر التي من الممكن ان تلحق بالمجتمع في حال عدم التزامي، لذا حرصا على الصحة العامة وتجنب المسائلة القانونية. اتعهد بعدم مغادرة المنزل مع مراعاة تجنب مخالطة الاخرين قدر الامكان حتى نهاية الاجراءات الصحية المطلوبة وفترة الحجر الصحي لمدة 14 يوما اعتبارا من تاريخ ...../...../.....20

وذلك اقرارا منى بانه تم إخطاري بما ذكر اعلاه.

التاريخ..... /..... /.....

التوقيع

إن هذا النموذج من نسختين أحداهما للمواطن و الأخر لجهة العمل

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