Partners In Health Guide | COVID-19

Part II: Clinical Management of COVID-19

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List of Standard Abbreviations

ABG	Arterial Blood Gas
AC/VC	Assist Control/Volume Cycled
ACH	Air Changes per Hour
ANC	Ante-Natal Care
ARDS	Acute Respiratory Distress Syndrome
ARV	Anti-Retroviral
BID	Twice daily
BIPAP	Bilevel Positive Airway Pressure
BMI	Body Mass Index
BP	Blood Pressure
BUN	Blood Urea Nitrogen
CDC	Centers for Disease Control
COPD	Chronic Obstructive Pulmonary Disease
CPAP	Continuous Positive Airway Pressure
CPR	Cardiopulmonary Resuscitation
Cr	Creatinine
CrCl	Creatinine Clearance
CRP	C-Reactive Protein
DBM	Dead Body Management
DBP	Diastolic Blood Pressure
DFID	Department for International Development
DIC	Diffuse Intravascular Coagulation
DVT	Deep Vein Thrombosis
ECG	Electrocardiogram
ED	Emergency Department
EDTA	Ethylenediaminetetraacetic Acid
ESR	Erythrocyte Sedimentation Rate
EU	European Union
FDA	Federal Drug Administration
FiO2	Fraction of Inspired Oxygen
GGO	Ground Glass Opacities
HCW	Healthcare Worker
HFNC	High Flow Nasal Cannula
HR	Heart Rate
IASC	Inter-Agency Standing Committee
IBW	Ideal Body Weight
ICRC	International Committee of the Red Cross
ICU	Intensive Care Unit
INR	International Normalized Ratio
IPC	Infection Prevention and Control
LDH	Lactate Dehydrogenase
LED	Light Emitting Diode
LMWH	Low Molecular Weight Heparin
LPM	Liters per Minute
M&E	Monitoring and Evaluation
MUAC	Mid-Upper Arm Circumference
NCD	Non-Communicable Diseases
NIPPV	Non-Invasive Positive Pressure Ventilation
ORS	Oral Rehydration Solution
PaO2	Partial Pressure of Arterial Oxygen
PCR	Polymerase Chain Reaction
PEEP	Positive End-Expiratory Pressure
PFA	Psychological First Aid
PIH	Partners In Health
PPE	Personal Protective Equipment
PSI	Pounds per Square Inch
PTT	Partial Thromboplastin Time
PUI	Person Under Investigation
RR	Respiratory Rate
SBP	Systolic Blood Pressure
SC	Subcutaneous
SOFA	Sequential Organ Failure Assessment
SpO2	Oxygen Saturation
SUV	Sport Utility Vehicle
TID	Three times a day
UN	United Nations
UPS	Universal Power Supply
USAID	United States Agency for International Development
VL	Viral Load
VTE	Venous Thromboembolism
WHO	World Health Organization

1. Introduction

The novel coronavirus (SARS-CoV-2) that causes the disease known as COVID-19, a respiratory tract infection spread by contact with droplets onto mucous membranes. As a newly emergent disease, the global population has no immunity and it therefore causes high morbidity and mortality. Most people with COVID-19 develop only mild or uncomplicated illness with flu-like symptoms of muscle pain, fever and mild respiratory symptoms. However, unlike seasonal influenza, up to 14% of people infected with the virus develop serious COVID-19 disease (generally pneumonia) that requires hospitalization and oxygen support, and up to 5% require admission to an intensive care unit.[1] These most severe cases may develop what is known as Acute Respiratory Distress Syndrome (ARDS) where the lung becomes stiff and oxygenation only can be maintained by mechanical ventilation. Other severe complications of COVID-19 include septic shock and multi-organ failure. Older people and those with co-morbidities appear to be at significantly higher risk of disease. Part II of the PIH Guide to COVID-19 elaborates guidelines for the management of patients with suspected or confirmed COVID-19 at home, at the clinic and at the hospital.

2. Preparing and Managing the Facility

Because COVID-19 is highly infectious, facility preparedness and management are critical to assure high quality care of patients who are sick with COVID-19 and to protect staff and non-COVID-19 patients from contracting coronavirus. Like the management of Ebola, Lassa, cholera or other infectious diseases, infection control and prevention (IPC) is central to facility management. IPC requires the right staffing, stuff (supplies like PPE), space (for proper distancing and triage) and systems (to assure adherence to IPC protocols). This section describes the preparation and management of a facility for COVID-19 patients.

2.1. Infrastructure Requirements

Hospitals and clinics must be able to continue to see patients and triage patients with symptoms of or contact with COVID-19 through a safe pathway of physical spaces.

2.1.1. **Clinic and hospital outpatient areas**

A. Triage at designated points of entry

See Chapter 4, Figure 1 for Approach to Screening #1

- Points of entry should be limited.
- Screening #1: Triage in open air, e.g. as vehicles pull up or on walkway outside. Health worker in PPE screening of patients for symptoms and contact.
- Patients who are positive for symptoms or contact are persons under investigation (PUI) should be given a mask and told to go to the waiting area for suspects to wash hands and at least **2 meters** from nearest patient. Acuity-based triage and secondary screening should be conducted in this area.
- Patients negative for symptoms or contacts should go to handwashing nearer to the facility and go to inpatient or outpatient triage area.

B. Waiting area for Person Under Investigation (PUI) COVID-19

See Chapter 4, Figure 1 for Approach to Screening #2

- Patients have masks.
- Will have washed hands before entry.
- Will sit at least 2 meters from other patients with physical barriers between.
- Area is preferably open to the air on all three sides.

C. Consultative space contiguous with waiting area and separate from other areas of the facility

- Separate entrance for health care worker.
- Health care worker in PPE.

D. Specimen collection space

- Sputum collection should be done outside in an area designated for sample collection.
- Nasal and pharyngeal swabs, blood finger prick and blood draws can be done in the consultative space.

2.1.2. **Hospitals (or clinic) inpatient areas**

A. Isolation room/ward

Negative pressure rooms should be used whenever possible. COVID-19 patient should be cared for in single self-contained isolation room or on wards with other confirmed COVID-19 patients; all patients' beds should be placed at least 1 meter apart. Where negative pressure is not available, patients should be placed in adequately ventilated rooms, considered to be 60 L/s per patient.

B. For COVID-19, infrastructure (spaces) should include:

- *Screening tent:* at entrance of hospital to screen all patients with temperature and basic symptoms
- *Triage unit:* for patients who meet case definition at triage and require COVID-19 lab testing.
- *Patient Under Investigation (PUI) Ward:* for patients under investigation for COVID-19 to get care for respiratory illness, while awaiting COVID-19 testing. Notably, this ward requires the highest level of IPC, to reduce nosocomial transmission, as patients here are a mix of positive/negative.
- *COVID-19 Inpatient Ward(s):* for care of stable patients with confirmed or highly suspected COVID-19 (known contact, ARDS).
- *COVID-19 ICU:* for care of critically ill patients.
- *Small laboratory space*: for COVID-19 testing.
- *Donning stations*: Separate from areas with PUI COVID-19 or COVID-19 patients where health personnel can put on protective gear.
- *Doffing stations:* for each area where used material will either be sterilized (bucked for goggles), incinerated, or laundered and handled by cleaning personnel in full PPE.
- *Patient exit*
- *Laundry*

See below for specific infrastructure standards for ventilation, water, power, etc.

2.1.3. Table 1. Infrastructure and facility standards

This table addresses the infrastructure and facility standards that should be in place to safely address a COVID-19 outbreak.

Facility Needs	COVID-19 Treatment Center Standards
Water Supply	
1. Supply **2. Potability** **3. Reserve Capacity** **4. Redundancy** **5. Access Points**	Adequate water supply is required for hand washing, drinking water for patients, staff, and family caregivers, cleaning, patient bathing on discharge. This includes water for laundry.
Power Supply	
1. Reliability **2. Capacity** **3. Redundancy** **4. Controls**	Consistent electrical power is needed for safe basic care. For non-ICU level care, we will need two sources of electricity. They can be any combination of diesel generator, solar and batteries, or utility grid connection. In the case of generator only, two redundant generators are recommended. Whatever the energy sources are, we should have an automatic transfer switch between the two primary sources of power. If we have an ICU, we recommend that there be a UPS installed to feed the receptacles for lights and power of at least 20 kVA. Main circuit breaker and electrical panel should be readily accessible but located outside of patient areas so that a technician can service without PPE. Automatic transfer switch and saddle tank for generators should be provided. Saddle tank should be sized to provide fuel for a minimum of seven days continuous generator use.
Power Distribution & Lighting	
1. Ward level **2. Distribution level** **3. Documentation**	Treatment and administrative areas need minimum of 40 foot-candles of illumination at 1 meter above the floor. All lighting should be LED strip lighting securely hung on chain or wire at a minimum of 2.6 meters above the floor. All treatment areas should have a minimum of two duplex receptacles for each bed or patient exam chair. There should be no more than five duplex receptacles on each 20 amp circuit breaker. For ICU, there should be three dedicated 20 amp duplex receptacles for each bed all fed from UPS.
Wastewater Treatment	
1. Treatment Level **2. Capacity** **3. Monitoring and Maintenance**	Wastewater from hand sinks, janitorial sinks, and showers should be discharged by gravity into holding tank for 48-hour retention and chlorination and then discharged into soak pit, built to WHO and MSF guidelines. Toilets in temporary facilities should be dedicated pit latrines which discharge into a lined tight tank of sufficient size that it requires pumping no more than twice per month. The lined pit latrine should have access and inspection hatches and vented to promote breakdown of solids to the WHO guidelines for "Improved Pit Latrines". There should be an overflow pipe for liquid wastewater at least 15 cm below the floor and run to a separate soak pit.
Biohazardous, Pharma, and Chemical Waste	
1. Collection and Sorting **2. Disposal** **3. Staff Safety**	Sharps Containers should be mounted at between 1.3 to 1.4 meters above the floor. The container should be placed in a visible location, within easy horizontal reach, and below eye level. The container should also be placed away from any obstructed areas, such as near doors, under sinks, near light switches, etc. Containers should be clearly visible to the health care worker. There should be one 5-liter sharps container for every 4 beds or patient exam stations, and no less than 1 sharps container per room.

Oxygen	
1. Supply **2. Distribution** **3. Reserve Capacity** **4. Redundancy**	An oxygen quantity of 10 liters per minute (LPM) per bed is recommended for sizing piped oxygen planning. RESERVE Oxygen is required as well as REDUNDANT CAPACITY if supply fails. If a manifold with high pressure oxygen cylinders is used, then there should be an adequate supply for all the beds for 24 hours of use at 6 liters per minute. In a 16-bed ward this would translate to 96 LPM. A 75% diversity factory then can be applied so the 24-hour supply would be 96 LPM x 60 minutes *.75= 4320 liters per hour. An H-cylinder yields approximately 7,000 usable liters; so, for a 24 hour supply you would need 15 full cylinders. A reserve manifold (in addition to the 15 cylinders) should have a minimum of 4 full H-cylinders. The manifold and zone valve must be connected to an audible (and if possible) visual alarm to notify if there is a drop in oxygen pressure below 40 PSI. Ideally, there should be redundancy in O2. Bedside O2 concentrators are a good option. Anticipate that up to 40% of patients with COVID-19 will require O2.
Ventilation	
	Either mechanical ventilation through the use of exterior exhaust fans and opposite wall/end air intake louvers to achieve 12 air changes/hour (ACH) by volume in the space. It may be possible in some locations and climates to achieve 12 ACH by using natural ventilation especially a scheme that utilizes low intake and high exhaust. If this method is employed, it is strongly recommended that a professional engineer be consulted and that the space be tested for CO2 build up and transfer prior to the space being operationalized.
Network/Internet Connectivity	
1. Reliability **2. Speed** **3. Availability**	Ability to connect to the internet whether via wire or wireless connection wherever layout of facility deems necessary. Suggest: Dual Wired RJ45 connections at each convenient and/or required location. Wireless Access Points placed throughout facility positioned for complete and optimum coverage. Consider backup internet source from 4G cellular routers, if available.
Fire Safety	
1. Fire Extinguisher **2. Smoke Detectors** **3. Fire Assembly Points** **4. Fire Evacuation Plan**	Fire safety in temporary facilities in countries with little or no fire safety training and standards is always challenging. We suggest a flexible commonsense approach. Within the temporary wards, try to avoid using sheets or other linens for shading as these are an obvious fire hazard. Fire extinguishers should be employed and hung on the walls in locations that are accessible and highly visible. We recommend a minimum of two per every 1000 square feet, plus one by each exit and entrance. There should be fire extinguishers not more than 50 feet (or 15 meters) apart throughout the facility. The fire extinguishers should be clearly marked with a sign and arrow in the appropriate language.

2.1.4. Table 2. List of items needed for COVID-19 treatment center

Durable Equipment	Secondary Screening Area	Presumptive COVID-19 Area	COVID-19 Ward	Critical Care Area
Scales, adult and pediatric		X	X	X
Thermometer infrared	X	X	X	X
Pulse oximeter	X	X	X	X
Vital signs machines/BP cuff	X	X	X	X
Cardiac monitors				X
Stethoscope	X	X	X	X
Ultrasound			X	X
Infusion pumps				X
Beds with washable mattress		X	X	X
Bedsheets		X	X	X
Pillows (washable)		X	X	X
Plastic chairs	X	X	X	X
Waste bin	X	X	X	X
Nurse station / Provider station table	X	X	X	X
Pharmacy table		X	X	X
Pharmacy cabinet		X	X	X
Shelves		X	X	X
Medication trolley		X	X	X
Fridge		X	X	X
White board with markers for patient tracking		X	X	X
Laryngoscope, various sizes				X
Hemocue		X	X	X
Glucometer	X	X	X	X
Light for clinical exams	X	X	X	X
Clock with second hand	X	X	X	X
Suction machine				X
Oxygen source – O2 tanks vs O2 concentrator		X	X	X
Ventilator				X
CONSUMABLES				
non-sterile glove - small	X	X	X	X
non-sterile glove - medium	X	X	X	X
non-sterile glove – large	X	X	X	X
Bar soap + water source	X	X	X	X
Hand sanitizer	X	X	X	X
Chlorine				
Bleach	X	X	X	X
Biohazard bag	X	X	X	X
Sterile gloves, assorted sizes				X
IV cannulae 18 – 24 gauge		X	X	X
IV tubing, 15-20 drops/mL		X	X	X
IV tubing, 60 drops/mL		X	X	X
Nasal cannula, pediatric and adult		X	X	X
O2 mask, pediatric and adult		X	X	X
O2 mask, non-rebreather, pediatric and adult		X	X	X
Adhesive tape	X	X	X	X
Bag, Urinal drainage, with non-return valve and tap, Sterile, 85cm tube, 2000mL		X	X	X
Nasogastric tubes for adults and children		X	X	X
Foley Catheter 12Fr and 16Fr		X	X	X
Needle, 18G, 21G and 25G		X	X	X

Spacer for inhalers		X	X	X
Syringes, 5ml, 10ml and 20 ml		X	X	X
Cotton wool, 500g roll		X	X	X
Wristband, Patient Identification		X	X	X
Body bag		X	X	X
Sharps container, 3 gallon		X	X	X
Tablet bag, Resealable, with Pictogram, 80mm x 100mm		X	X	X
Underpad, Tissue, 3 ply, 17in x 24in (chux)		X	X	X
Bag, Specimen transport, 6in x 9in		X	X	X
Tube, Blood collection, Heparin (Green) Vacutainer Tubes Case		X	X	X
Tube, Blood collection, K3 EDTA (K3E), 15% solution, Lavender, 6mL		X	X	X
Tube, Blood collection, Serum, Silicone coated, Red, 6mL		X	X	X
HIV rapid tests		X	X	X
Hemocue microcuvettes		X	X	X
Glucometer strips	X	X	X	
Lancets	X	X	X	
CONSUMABLES FOR MECHANICAL VENTILATION* **Only if site capable of mechanical ventilation*				
Viral filter for ventilator circuit				X
Ventilator circuit				X
Ambu bag, adult, pediatric and neonatal				X
Endotracheal tube - 4.0 - 8.0				X

2.2. Water, Sanitation, Hygiene, and Waste Management

2.2.1. **Surface decontamination principles**[2]

It is not certain how long the virus that causes COVID-19 survives on surfaces, but it seems likely to behave like other coronaviruses:

- Can likely survive between 2 hours to 9 days on surfaces.
- The survival time depends on the type of surface, temperature, relative humidity and specific strain of the virus.
- Effective inactivation can be achieved within 1 minute using most disinfectants

2.2.2. Table 3. Offices and non-clinical areas: COVID-19 cleaning and disinfection guidelines

See annex for job aids regarding cleaning and disinfection

OFFICES and NON-CLINICAL AREAS: *Recommended Minimum Cleaning and Disinfecting Frequencies*			
Type of Surface	**Examples**	**Soap and Water**	**Disinfect**
Minimally Touched Surfaces	Floors Ceilings Walls Windows	When dirty (At least 3 times/week)	After human contact When Dirty (At least weekly)
Frequently Touched Surfaces	Door handles Table tops / Desks Light switches Computers Sinks/basins	Daily	Daily

CLINICAL AREAS (Including Isolation Units): *Recommended Minimum Cleaning and Disinfecting Frequencies*			
Type of Surface	**Examples**	**Soap and Water**	**Disinfect**
Minimally Touched Surfaces	Floors Ceilings Walls Blinds	3 times daily + any known COVID-19 exposure	3 times daily + any known COVID-19 exposure
Frequently Touched Surfaces	Door handles Table tops / Desks Light switches Computers Sinks/basins	3 times daily + between each patient	3 times daily + between each patient

2.2.3. Cleaning steps

A. Preparation

- Wear disposable gloves for all tasks in the cleaning process, including handling trash. Wash hands immediately after gloves are removed.
- Close off areas to be cleaned and wait as long as practical before beginning cleaning and disinfection to minimize the potential for exposure to respiratory droplets.
- Open outside doors and windows to increase air circulation in the area.

B. Soap and Water Cleaning

- Always clean surfaces using a detergent or soap and water *before* disinfection.
- Remove visible pollutants (blood, secretions, excreta) completely.
- Damp mopping is preferable to dry mopping.
- Surfaces should be disinfected if they have come into direct human contact or are frequently touched.
- Always sterilize washing cloths, mops and other supplies used during cleaning.

C. Disinfecting Guidelines

- Wear disposable gloves for all tasks in the disinfection process, including handling trash. Wash hands immediately after gloves are removed.

- Use freshly made solutions, or premix and follow manufacturer's instructions or table below for appropriate dilution.
- Wipe the area with the disinfectant solution using a cloth.
- Wipe cleaner regions first, then more contaminated regions.
- Dispose or sterilize cloth immediately after use.
- After cleaning, wash hands well using soap and water. If water is unavailable, clean hands with alcohol-based hand rub.

D. Choosing the Right Disinfectant

- Chlorine Bleach can damage computers, plastic, fabric and metal
- Use chlorine bleach on non-porous surfaces such as floors, sinks, toilets, walls
- Use an Alcohol-based cleaner (if available) on biomedical equipment, electronics, computers, phones, screens, etc.
    - If not available, clean with bleach, if possible
    - DO NOT MIX SOLUTIONS

E. Preparation and use of disinfectant solution

- Gloves should be worn when handling and preparing bleach solutions.
- Protective eye wear should be worn in case of splashing.
- Cleaning solutions (example chlorine bleach) should be made up daily.
- Leave the disinfectant solution on the surface for a sufficient time is required to kill the virus – a minimum of 10 minutes for chlorine/bleach.
- Always rinse chlorine/bleach with water after 10 minutes. Hydrogen peroxide and alcohol-based cleaners do not need to be rinsed.

2.2.4. **Table 4. Acceptable disinfectants**

Disinfecting Solution	Concentration	Directions	OK to use on	Do NOT use on
Diluted chlorine bleach (5.25% sodium hypochlorite)	0.5% (1:50)	Apply, leave for 10 min, rinse	Floors, desks, non-porous surfaces	Computers, phones, screens, fabric, can discolor plastic, metal
Chlorine (see table below to mix clorine)	0.5%	Apply, leave for 10 min, rinse	Floors, desks, non-porous surfaces	Computers, phones, screens, fabric, can discolor plastic, metal
Hydrogen Peroxide	0.5%	Apply	Floors, desks, non-porous surfaces, metal	Fabric
Ethanol / Ethyl Alcohol	62% minimum	Apply	Computers, Phones, Non-porous surfaces	Can discolor plastic
Isopropyl Alcohol	70% minimum	Apply	Computers, Phones, Non-porous surfaces	Can discolor plastic
Propanol	70% minimum	Apply	Computers, Phones, Non-porous surfaces	Can discolor plastic

Do NOT: use ammonia, vinegar, **Do NOT:** mix multiple disinfectants

Liquid Chlorine Preparation				
	% Solution	**0.05 %**	**0.5 %**	**2 %**
Basic Product	Use for:	Hands, skin, laundry, clothes	Floors, walls, equipment	Disinfection of stool, vomit, blood. Disinfection of corpses.
	Bleach, 5% sodium hypochlorite (5% active chlorine)	10 milliliters in 10 liters of water	1 liter in 10 liters of water	4 liters in 6 liters of water
	Chlorine laundry powder (30% active chlorine)	16 grams (1 tablespoon) in 10 liters of water	16 grams (1 tablespoon) in 1 liter of water	64 grams (4 tablespoons) in 1 liter of water
	Chlore en granules (HTH) (70 % de chlore actif)	8 grams (1/2 tablespoon) in 10 liters of water	8 grams (1/2 tablespoon) in 1 liter of water	32 grams (2 tablespoons) in 1 liter of water

ALWAYS label solutions using a permanent marker
Note: WaterGuard is 1.25% Sodium Hypochlorite --> if this is used, then will need to use different ratios

2.2.5. **Disposal of excreta**

- It is critical to conduct hand hygiene when there is suspected or direct contact with feces (if hands are dirty, then soap and water are preferred to the use of an alcohol-based hand rub).
- If the patient is unable to use a latrine, excreta should be collected in either a diaper or a clean bedpan and immediately and carefully disposed of into a separate toilet or latrine used only by suspected or confirmed cases of COVID-19.
- Feces must be treated as a biohazard and handled as little as possible. Anyone handling feces should follow WHO contact and droplet precautions and use PPE to prevent exposure, including long-sleeved gowns, gloves, boots, surgical masks, and goggles or a face shield. If diapers are used, they should be disposed of as infectious waste as they would be in all situations.
- If a bedpan is used, after disposing of excreta from it, the bedpan should be cleaned with a neutral detergent and water, disinfected with a 1% chlorine or 0.5% sodium hypochlorite solution, and then rinsed with clean water; the rinse water should be disposed of in a drain or a toilet or latrine.

2.2.6. **Laundry**

- All individuals dealing with soiled bedding, towels and clothes from patients with COVID-19 infection should wear appropriate PPE before touching it, including heavy duty gloves, a mask, eye protection (goggles or a face shield), a long-sleeved gown, an apron if the gown is not fluid resistant, and boots or closed shoes.
- Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine.
- Machine washing with warm water at 60–90° C with laundry detergent is recommended. The laundry can then be dried according to routine procedures.
    - If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 1% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

    - If excreta are on surfaces (such as linens or the floor), the excreta should be carefully removed with towels and immediately safely disposed of in a toilet or latrine. If the towels are single use, they should be treated as infectious waste; if they are reusable, they should be treated as soiled linens.
- Water: Persistence of SARS-CoV-2 in drinking-water is possible. There is no evidence to date about survival of the virus that causes COVID-19 in water or sewage, but this virus is likely to become inactivated significantly faster than non-enveloped human enteric viruses with known waterborne transmission (such as adenoviruses, norovirus, rotavirus and hepatitis A).

2.3. Dead Body Management

There is a risk of transmission of COVID-19 post-mortem, and several organizations provide guidance for Dead Body Management (DBM) in order to reduce the risk of transmission of disease to HCWs and family members.[3,4] While taking appropriate precautions during the post-mortem period it is essential that we maintain the dignity of the deceased and respect relevant cultural and religious traditions.

A. Preparation of body for transfer from room or isolation ward

- All staff should perform hand hygiene before and after contact with the body
- Ensure proper use of PPE, including gown, goggles/face shield, surgical mask and gloves.
- Remove all tubes, IVs and other lines from the patient.
- Wrap the body in cloth for transfer to mortuary area
- In the following circumstances a leak-proof or a double plastic bag may be necessary:
    - Excessive fluid leakage
    - Management of a large number of bodies
    - Other situations where use of a body bag is recommended by standard mortuary procedures
- Ensure that all used equipment including the patient's bed are cleaned, as per the protocol above.

B. Mortuary procedures:

- Ensure that mortuary staff wear appropriate PPE, including gown, goggles/face shield, surgical mask and gloves. Then may continue usual mortuary procedures.
- Ensure daily cleaning of the mortuary, as above, with chlorine or bleach, as above

C. Transfer to family

- If culturally appropriate, place the body in a leak-proof or a double plastic bag. Alternatively cover the body with a sheet. Plastic or cloth sheeting can be used. If covering the body is not possible, place a non-medical/fabric mask on the deceased before any movement or manipulation of the body

D. Counseling for the family

- Recommend gloves be worn by person with physical contact with the deceased
- Recommend eye and mouth protection (i.e. face shield/goggles and medical mask) for any ceremonial or burial activity that may involve the splashing of bodily fluids or the production of aerosols.
    - If activities have the potential to generate aerosols, particulate respirators (N95 or FFP2 or its equivalent) should be worn.
- Clothing worn during contact with the body should be immediately removed and washed after the procedure, or an apron or long-sleeved fluid resistant gown should be worn.
- Those preparing the body should instruct family and friends not to kiss or touch the deceased.
- Anyone who has assisted in preparing the body should wash their hands thoroughly with soap and water when finished.

3. Operational Support, Supply Chain, Procurement, and Logistics

Logistics and supply chain are a critical part of any emergency response. Below are some key lessons from PIH's coordination of other emergency responses. It is also important to ensure operations staff, including logisticians, couriers, drivers, and warehouse workers, receive basic education about COVID-19, including modes of transmission, proper hand-hygiene and any enhanced precautions required (wiping down equipment, wearing gloves to handle boxes, and wearing masks to pick up medications at pharmacy vendors).

A. Clarify PIH supply chain governance

- Clearly identify a specific individual to lead emergency supply chain efforts.
- Develop protocols for how the emergency and routine supply chains should interact, including storage, information systems, and purchasing.
    - Commonly, they are not separated at the outset of the response out of necessity and are later separated as dedicated funding becomes available. More restrictive funders, such as bilateral agencies (USAID, DFID, etc.), will require this.
- Clearly identify and authorize specific funds for emergency procurement in the earliest stages of the response and identify ongoing funding approval process.
- Clearly identify a specific individual to lead clinical decisions for emergency supply chain efforts (ie product specifications, substitutions, forecasting, etc.).

B. Clarify country level governance of emergency supply chain in partnership with Ministry of Health

- Determine whether the UN Logistics Cluster System has been established and identify how PIH will engage.
    - Among other things, this global mechanism coordinates requests of supplies across local, regional, and global implementers of all sizes, including donors (USAID, DFID) and local governments. At minimum, review LogCluster reports.
- If Log Cluster is not active, identify mechanism to coordinate efforts with other partners involved in emergency response.
    - Often this happens through the Ministry of Health and/or the implementing partner for USAID-funded supply chain projects.

C. Map PIH's current systems and available resources

- Conduct review of stock levels of all items on PIH COVID-19 Response Formulary/Clinical Protocols.
- Conduct rapid assessment of essential clinical and non-clinical equipment/systems and spare parts (oxygen, generators, incinerators, patient monitoring equipment, etc.).
- Conduct rapid assessment of vehicle fleet and stocks of spare parts (SUVs, ambulances, motos, etc.).
- Review PIH's in-country supply chain management system (importation and customs, strategic stockpiling, storage, security, transportation, distribution, information systems, and requisitions) for clinical and other essential supplies and equipment.
- Assess storage and warehousing infrastructure and capacity.

D. Map current supply systems and available resources, in health and other sectors

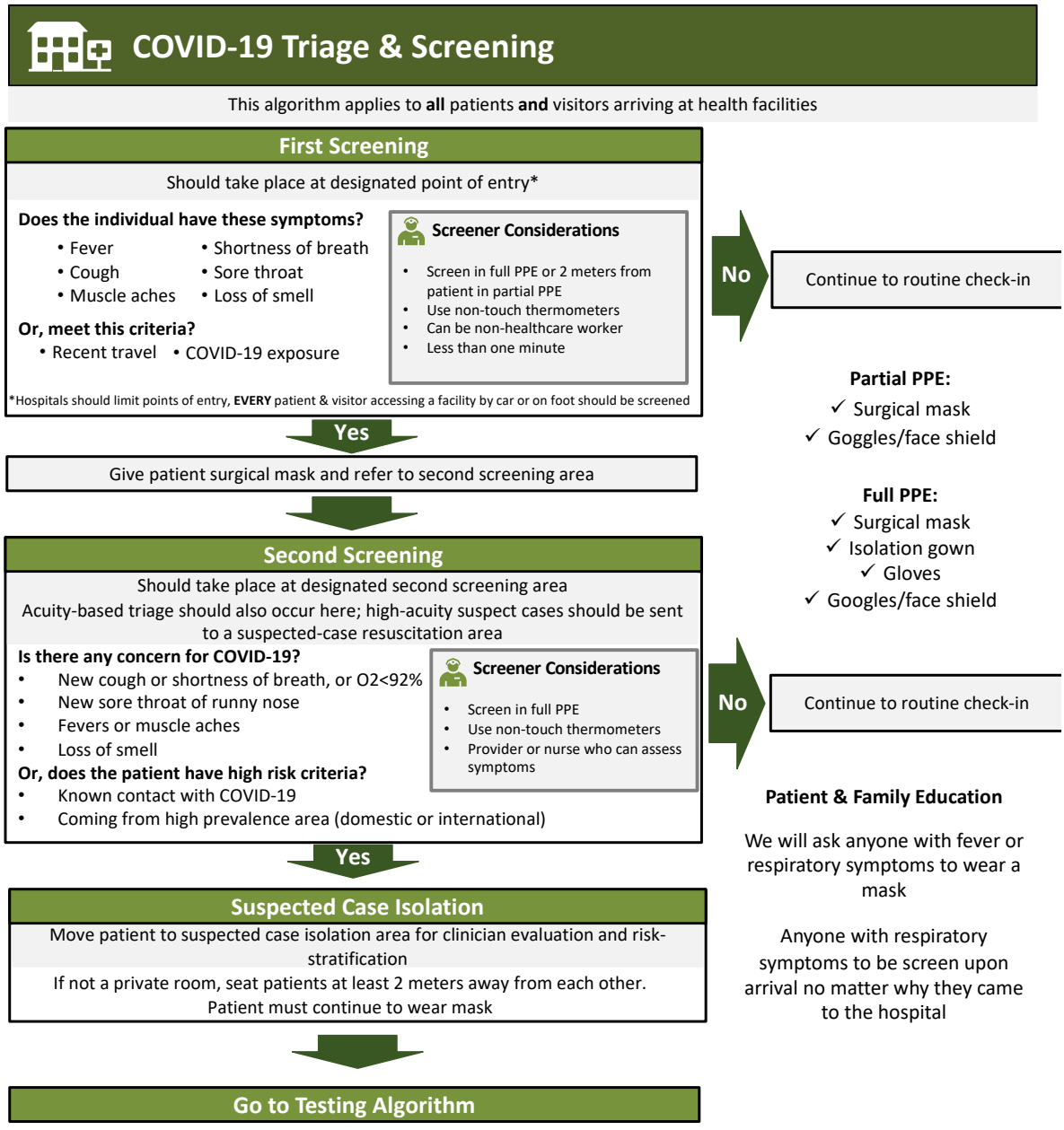
- If UN LogCluster has been activated, utilize their mapping, which will include local & global partners, including military, private, and public agencies.
- Asses basic in-country logistics and identify any major (or potential) infrastructure breakdowns (port closures, road or bridge disruptions, etc.).
- Coordinate closely with district and national Ministry of Health Colleagues to understand public supply chain processes, even if they are seemingly sparse.

- Assess the capacity of the local market to meet increased demand for clinical & other essential supplies. Encourage preference for qualified local sources when possible.
- Assess the capacity of the international market to meet increased demand for clinical & other essential supplies; prioritize order placement based on knowledge of at-risk and essential items.
- Work with donors to ensure in-kind donations align with identified need.
- Assess likely funders of medium and long-term response efforts to anticipate allowable commodities and other restrictions.

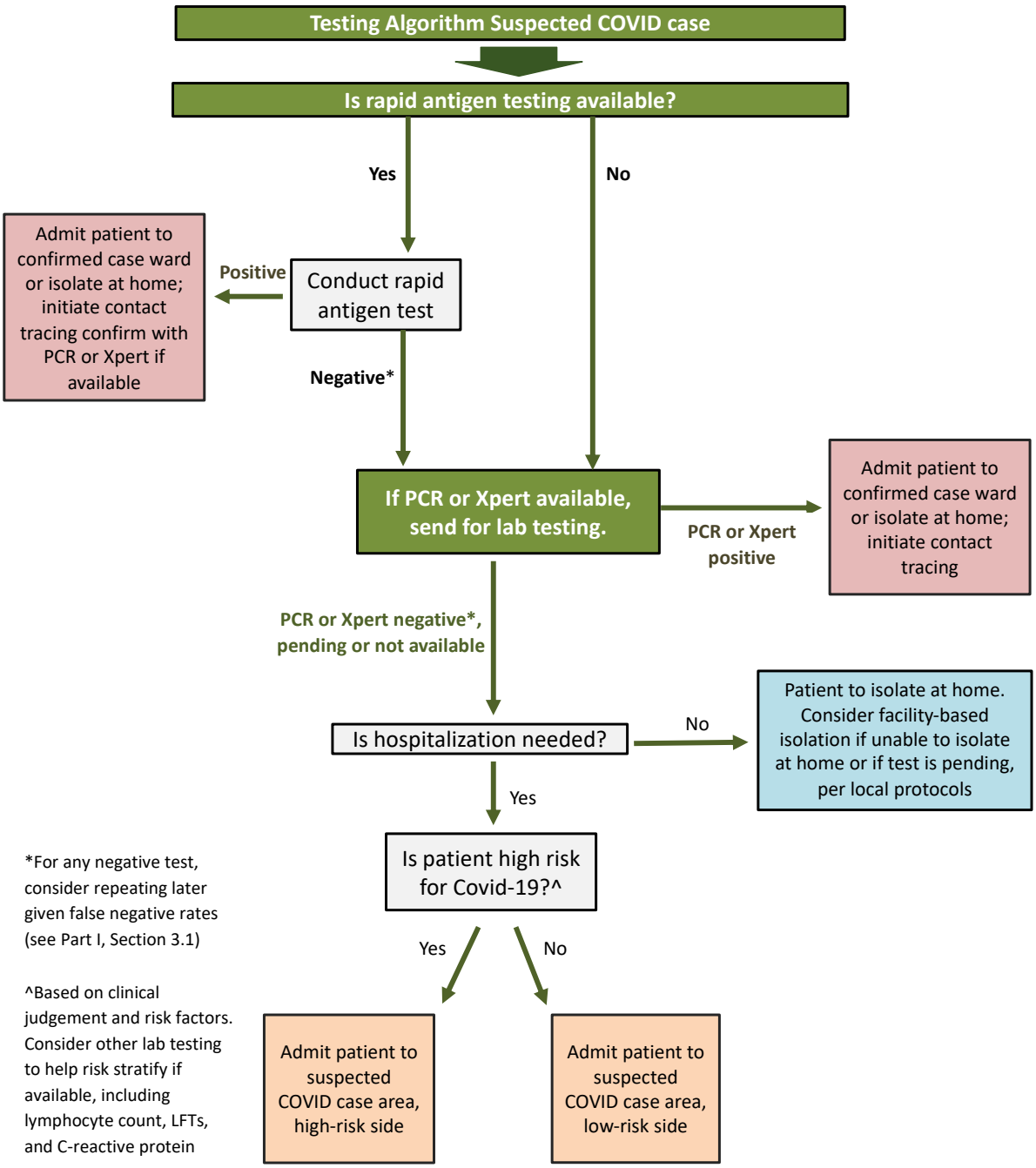
4. Screening, Triage and Infection Control and Isolation

COVID-19 is highly infectious. Infection control and prevention are critical to protect patients and staff. Administrative controls, environmental controls and personal protection are all key elements of a safe environment. All of these controls rely on vigilance for suspected cases and safe screening, testing and isolating confirmed cases.

4.1.1. **Figure 1. Screening, testing and isolation of suspects and confirmed cases with COVID-19**



COVID-19 Triage & Screening



*For any negative test, consider repeating later given false negative rates (see Part I, Section 3.1)

^Based on clinical judgement and risk factors. Consider other lab testing to help risk stratify if available, including lymphocyte count, LFTs, and C-reactive protein

4.2. Screening, Triage & Testing, Isolation

A. 1st Screening

- Separate screening area outside of health care facility or at hospital entrance
- All patients entering healthcare facility are screened for fever, cough, SOB, known contact of COVID-19 patient, or recent travel that may place them at risk.
- Screener should wear full PPE.
- If initial screen is positive:
    - Immediately place facemask on patient and provide patient with alcohol-based hand sanitizer.
    - Direct patient to Triage & Testing area.

B. Triage & Testing

- Secondary screening space should be separated from other patients.
- Providers should don full PPE and observe contact and droplet precautions.
- Acuity based triage should be conducted in this area; patients in need of resuscitation should be sent to a dedicated resuscitation area of suspected COVID-19 cases
- Follow protocols for specimen collection for laboratory testing.
- Asymptomatic patients may be directed home with follow up and to self-quarantine pending test results.
- Symptomatic patients will be admitted to isolation area per protocol.

C. Persons Under Investigation (PUI) for COVID-19

- There should be separate isolation areas for PUI for COVID-19 who have not been confirmed to have COVID-19.
- When a patient comes to a facility with symptoms consistent with COVID-19 or known contact with COVID-19, it is important that IPC is adhered to—there are three levels of isolation:
- Asymptomatic PUI: known contact, but not displaying symptoms. Once tested asymptomatic suspect patients may return home with close follow up and instructed to self-quarantine pending test results.
- Symptomatic PUI: should be evaluated clinically for admission and separated from asymptomatic suspects pending the test result.
    - Presumptive case areas for PUIs should be separated into low- and high-risk sides depending on clinical suspicion

D. Isolation for confirmed positive patients OR highly symptomatic PUI (especially with a close family contact with a symptomatic or confirmed case)

- Patient should be separated from suspect patients and **should be moved immediately to the isolation unit.**

E. General Practices Procedures:

- Providers should move from asymptomatic to symptomatic and then to confirmed patients.
- Limit transport and movement of patients. When transport is necessary don clean PPE, place face mask on patient, and follow respiratory/hygiene etiquette.
- The isolation areas must be a separate enclosed space removed from other patients.
- Equipment (stethoscope, blood pressure cuff, pulse oximeter) must remain in the room and must be cleaned and disinfected between each patient (e.g., by using ethyl alcohol 70%).
- No visitors for suspected or confirmed patients (see exceptions below) as a strategy to help conserve PPE. All parents must wear PPE and can remain with the child as a caregiver.
- Once patient is in the isolation area they cannot leave unless to dedicated bathroom for isolated patients, movement within the hospital per health care provider, or discharge.

- Maintain a record of all persons entering a patient's room or isolation space, including all staff and visitors.

4.3. Social Distancing in the Hospital Setting

When an epidemic shifts into the community transmission phase, it is important to maintain appropriate measures to reduce transmission within the hospital.

- Ensure isolation wards and hospital operations for COVID-19 suspects and confirmed cases are maintained separately from routine hospital operations.
- Visitors to the hospital for non-COVID-19 patients:
    - All visitors should be screened at entry point according to guidelines.
    - The health facilities should adopt restricted visitation policies in ALL wards.
    - Restrict visitation to one person for patients who require visitation for food or assistance with activities of daily living.
- Visitors should not be permitted in COVID-19 isolation wards.
- Additional staff may be needed to help care for basic patient needs (see visitor guidelines below).
- Minimize staff gatherings:
    - Avoid large gatherings of staff in confined spaces, including staff meetings, meal times, or congregating at nurses' stations.
    - Consider holding staff meetings outdoors where there can be ample space between people.
    - Consider rotating meal times to avoid crowds in dining areas.

4.4. Visitor Guidelines

Visitors will be allowed in based on the exception list outlined below. The exception list applies provided there is absence of symptoms on screening:

- Obstetric patients may have one partner and one birth support person accompany them.
- No children under the age of 16.
- Patients who are under the age of 18 may have one visitor, or parents or guardians.
- Must stay in the room for the duration of the visit.
- For the Nursery/Neonatal Care Unit:
    - Birth parent plus one significant other.
    - Must stay in the room for the duration of the visit.
- Patients who are at the end-of-life may have only 2 visitors.
    - Must stay in the room for the duration of the visit.
- Patients with disruptive behavior, where a family member is key to their care, may have only 1 visitor.
    - Must stay in the room for the duration of the visit.
- Patients who have altered mental status or developmental delays (where caregiver provides safety) may have only 1 visitor.
        - Must stay in the room for the duration of the visit
- Patients who require a home caregiver to be trained.
- Must stay in the room for the duration of the visit.
- Patients undergoing surgery or procedures may have 1 visitor.
    - Visitor to leave medical center as soon as possible after the procedure/surgery.

4.5. Infection Prevention and Control

A. <u>IPC in healthcare centers:</u>

- Early triage.
- Establish early identification of suspected COVID-19 infection.

- Establish triage station to entrance of health care facility, supported by trained staff.
- Screen patients for fever >38 degrees Celsius, cough, shortness of breath, or known COVID-19 contact.

B. Ensure the correct IPC precautions are used based on guidelines outlined below *(standard precautions, droplet precautions, contact precautions, airborne precautions)*

C. Environmental precautions.

- Adhere to environmental services disinfecting procedures.
- Limit movement of patients in the health facility.
- If a patient must be moved, all staff who come into contact with the patient must wear PPE (gown, gloves, mask, goggles).
- Maintain good ventilation, open doors and windows when possible.
- Medical equipment including stethoscopes, BP machines, pulse oximeters to remain in isolation areas and decontaminated per protocol.
- Implement administrative controls.
    - Prompt lab testing for early identification.
    - Prevent overcrowding, especially in the ED.
    - Provide dedicated waiting areas for symptomatic or suspected patients.
    - Isolate confirmed patients.
    - Provide dedicated bathroom for suspected and confirmed patients.
    - Limit visitors per visitation policy.

4.6. Standard, Droplet and Airborne Precautions

Standard, droplet, and airborne precautions should be practiced for all patients under investigation for COVID-19 or confirmed to have COVID-19. These include hand and respiratory hygiene, the use of appropriate PPE, safe injection practices, safe waste management, proper linens, environmental cleaning, and sterilization of patient care equipment.

A. Standard Precautions[5]

Hand washing is always a critical protection for staff and patients. Gloves should be used for all blood and body fluids.

WHO's 5 Moments for Hand Hygiene	
1	Before touching a patient.
2	Before clean/aseptic procedures.
3	After touching a patient.
4	After body fluid exposure/risk.
5	After touching the patient's surroundings.

B. Droplet Precautions for PUI and Confirmed COVID-19 patients

In addition, because of the infectiousness of the SARS-CoV-2 virus, PPE is required for personnel in contact with infected persons or infectious material. The virus is spread through droplets that contact mucous membranes (it may also have an airborne component). Therefore, respirators, gowns, gloves and eye protection are recommended.

- Don appropriate PPE (gloves, gown, surgical mask, goggles/face mask).
- If possible, place patients in single rooms.
- When single rooms not available, patients suspected of being infected with COVID-19 may be grouped together. Space should be separated and removed from other patients.
- Maintain at least 1 meter distance between all patients. All patients should don surgical masks.
- Limit transport and movement of patients. When transport is necessary don clean PPE, place face mask on patient, and follow respiratory/hygiene etiquette.

- Equipment (stethoscope, blood pressure cuff, pulse oximeter) must be cleaned and disinfected between each patient (e.g., by using ethyl alcohol 70%).
    - Equipment should not be moved between rooms.
- No visitors for suspected or confirmed patients (with the exception of parents for children) as a strategy to help conserve PPE.
- Maintain a record of all persons entering a patient's room or isolation space, including all staff and visitors.

C. Airborne precautions for aerosol-generating procedures

Indication: tracheal intubation, non-invasive ventilation, tracheotomy, CPR, manual ventilation before intubation, bronchoscopy, nebulizer treatment, use of oxygen masks (i.e. venturi masks).

- Perform procedure in adequately ventilated space.
- Don N95 mask in addition to PPE above (gloves, gown, face shield/goggles).
- Limit the number of people in the room to those necessary.
    - There should be no other patients present.

4.6.1. **Table 5. Recommended PPE for those in contact with COVID-19 patients or infectious material**

Item	Description	Technical Specifications
Gown	Single-use, long sleeve, ties in back, length to mid-calf.	• EU PPE Regulation 2016/425 and EU MDD Directive 93/42/EEC • FDA Class I or II medical device, or equivalent • EN 13795 any performance level, or • AAMI PB70 all levels acceptable, or equivalent
Particulate respirator *(Type N95 or greater)*	Reserved for HCW in contact with highly aerosolizing procedures (intubation, ventilation, nebulization, deep suctioning, oxygen supplementation with venturi masks)	• Minimum "N95" respirator according to FDA Class II, under 21 CFR 878.4040, and CDC NIOSH, • Minimum "FFP2 according to EN 149, EU PPE • Regulation 2016/425 Category III, or equivalent
Surgical mask	Used by all HCWs in normal care settings for COVID-19 cases, and for patients who may expose others	• EU MDD Directive 93/42/EEC Category III or equivalent • EN 14683 Type II, IR, IIIR • ASTM F2100 minimum level 1 or equivalent
Face Shield **OR** Goggles	**Face Shield:** Made of clear plastic and providing good visibility to both the wearer and the patient. Adjustable band to attach firmly around the head and fit snuggly against the forehead. Completely cover the sides and length of the face. May be re-usable (made of robust material which can be cleaned and disinfected) or disposable.	**Face Shield :** • EU PPE Regulation 2016/425 • EN 166 • ANSI/ISEA Z87.1
	Goggles: Good seal with the skin of the face, flexible PVC frame to easily fit with all face contours with even pressure, enclose eyes and the surrounding areas, accommodate wearers with prescription glasses, adjustable band to secure firmly so as not to become loose during clinical activity, indirect venting to avoid fogging. May be re-useable or disposable.	**Goggles :** • EU PPE Regulation 2016/425 • EN 166 • ANSI/ISEA Z87.1 or equivalent
Gloves, non-sterile	Gloves, examination, nitrile, powder-free, non-sterile, single-use gloves should have longer cuffs, reaching above the wrist. Sizes: small, medium, large.	• EU MDD Directive 93/42/EEC Category III • EU PPE Regulation 2016/425 Category III • EN 455 • EN 374 • ANSI/ISEA 105, • ASTM D6319 or equivalent

4.6.2. Table 6. Donning and doffing of PPE

Putting on (donning) and taking off (doffing) PPE is an important part of infection control as improper placement of protective gear places staff at risk. Similarly, contamination of mucous membranes while removing gear can expose staff to the virus.

Donning	Doffing
1. Perform hand hygiene* 2. Don gown 3. Don N95 respirator mask/surgical mask 4. Don face shield 5. Don gloves, ensuring wrist covered	1. Remove gloves 2. Perform hand hygiene 3. Remove gown 4. Perform hand hygiene 5. Remove face shield 6. Perform hand hygiene 7. Leave the treatment area 8. Remove N95 (outside the treatment area) 9. Perform hand hygiene 10. Thoroughly wash hands with soap & water

*When using alcohol-based hand gel, allow gel to dry before continuing.

4.6.3. Table 7. Strategies for conserving PPE

Conservation of PPE can begin prior to any cases of COVID-19 detection. It is CRITICAL that as triage and isolation systems are rapidly planned and implemented, early efforts are made to **conserve PPE** as stock is limited globally. Conserving PPE now will ensure enough supplies to keep providers safe throughout the epidemic.

Strategies for conserving PPE[6]
1. When evaluating patients with concern for coronavirus, providers should wear a surgical mask, gown, gloves, and eye protection. N95 masks should be prioritized for aerosolizing procedures for coronavirus patients (such as nebulization, non-invasive positive pressure ventilation (NIPPV), and intubation) or with patients that require Venturi masks for oxygen supplementation. This is a WHO and CDC recommendation. Some procedures (nebulization, NIPPV) should be avoided unless absolutely necessary. 2. When possible, concentrate patient care activities to minimize sets of PPE needed. For example, take vital signs and give medications at the same time to use one set of PPE instead of returning a second time and using a second set of PPE. 3. Minimizing people in an isolation area or for a patient needing PPE to the caregivers involved in direct care of those patients. For example: • For patient rounds, consider only having the direct caregivers interact with the patient rather than members of the team responsible for the care of other patients. • On any single day, try to have a dedicated set of caregivers for an isolation area, and another set for a non-isolation area, instead of a larger number of caregivers that work in both. 4. Limit the number of observers and non-essential personnel in operating rooms to reduce the use of masks and gowns. 5. As needed, consider the extended use of masks between patients (meaning that the mask is not removed between patients but stays on a provider's face continuously). These strategies are being used at many hospitals, including many in the United States. CDC guidelines for extended use (including when the mask should be changed) can be found at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/contingency-capacity-strategies.html 6. Eye protection can be cleaned with a bleach solution and reused between patients. 7. To ensure that global PPE shortages do not negatively impact care of any kind of patient (including TB patients and surgical patients), it is important to conserve the use of PPE in all clinical areas. **Please note none of these suggestions should detract from patient care. The safety of staff and patients is always the top priority!**

4.6.4. **Table 8. N95 equivalencies**

While the purchase of N95 masks will be prioritized, it is likely that due to global PPE shortages, procurement of substitutes for N95 masks will be needed. The CDC and the National Institute for Occupational Safety and Health provide extensive guidance on selection and use of N95 equivalents, including an updated list of approved respirators as well as counterfeit respirators which can be found at: https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource.html .html.

Note all N95 masks rely on a close seal to the face to ensure that all air is filtered through the mask. Ideally, qualitative fit testing should be performed to ensure a correct fit for each individual. In addition, each time an N95 is used, the provider should perform a seal check, then adjust the position of the mask on their face if there is not a good seal. A video describing how to perofrm a seal check is available at: https://www.youtube.com/watch?v=CoSb-HJJ5tk

Respirators Approved Under Standards Used in Other Countries That Are Similar to NIOSH-Approved N95 Filtering Facepiece Respirators

Country	Performance Standard	Acceptable Product Classification	May Be Used in Lieu of NIOSH-Certified Products Classified as
Australia	AS/NZS 1716:2012	P2	N95
		P3	N99 or lower
Brazil	ABNT/NBR 13698:2011	PFF2	N95
		PFF3	N99 or lower
People's Republic of China	GB 2626-2006 GB 2626-2019	KN/KP95	N95
	GB19083-2010	KN/KP100	N95
Europe	EN 149-2001	P2	N95
		P3	N99 or lower
Japan	JMHLW-2000	DS/DL2	N95
		DS/DL3	N99 or lower
Korea	KMOEL-2017-64	Special 1st	N95
Mexico	NOM-116-2009	N95	N95
		R95	R95 or lower
		P95	P95 or lower
		N99	N99 or lower
		R99	R99 or lower
		P99	P99 or lower
		N100	N100 or lower
		R100	R100 or lower
		P100	P100 or lower

Source: https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fhcp%2Frespirator-supply-strategies.html

4.7. Options for When Recommended PPE is Not Available

- Maintain at least 1 meter distance to avoid inhalation of droplets or droplets making contact with mucous membranes.

- Frequent hand washing for more than 20 seconds each time
- Avoid touching face, mucous membranes
- Avoid touching surfaces without gloves
- If performing aerosolizing procedure that would normally need an N95, consider double surgical mask, and remaining out of direct line from patient's nose, mouth.
- Any additional eye protection can be used to cover the eyes.

4.8. Decontamination of PPE Equipment

- Hydrogen peroxide vapor and UV light may be used to decontaminate N95 masks but require specific protocols and equipment. Information is available at www.n95decon.org. Alcohol and sodium hypochlorite should not be used on N95 masks as they degrade filtration efficacy.
- For other equipment, 70% ethyl alcohol can be used to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers).
- Sodium hypochlorite at 0.5% (equivalent to 5000ppm) can be used for disinfecting surfaces.
- Reusable face shields can be soaked in sodium hypochlorite 0.5% for 1 hour and left in a clean, open space to dry for at least 1 hour.
- If reusable gowns are used, they should be machine washed with warm water at 60-90°C with laundry detergent is recommended. The laundry can then be dried according to routine procedures.
    - If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight.

4.9. Discharge of Patients from Facility

Once a patient is breathing without oxygen and able to perform basic functions, the patient may be discharged. In some settings, two negative PCRs are performed. As Ab and Ag tests are widely available and have increased data associated with them, they may be able to be used for discharge. Patients who recover from COVID-19 may shed the virus as long as 37 days with a median of 20 days. Therefore, if the patient is not cleared by successive negative PCR tests, it is reasonable to keep the patient isolated for 21 days from the onset of symptoms.

Consider discharging patient from hospital when they are clinically stable (clinician judgement) and meet the following criteria:

- Oxygen saturation ≥ 94%.
- Respiratory rate < 22.
- Blood pressure > 90/60.
- No signs of increased work of breathing, respiratory distress.
- Asymptomatic for > 72 hours.

At time of discharge also refer patient to psychosocial support program.

4.10. Surge Situations

Growing patient numbers can outpace hospital capacity, requiring adjustments to operations. Ideally, hospitals should have an incident command structure set up before this happens. If not, an ad hoc structure can be created:

4.10.1. **Table 9. Incident management committee**

Recommended membership for hospital incident command center	
Administration	Security
Communication	Pharmacy
Medical personnel and nursing administration	Laboratory
Infection control	Maintenance and engineering
Respiratory therapy	Dietary services
Human Resources	Laundry, cleaning, and waste management

4.10.2. **Managing surge capacity:**

- Estimate both your maximum total demand and your maximum total capacity (including space, supplies, and staff).
- Plan for staffing interruptions. Staffing needs will surge, and risk of staff exposures or illness can increase.
- Identify what services must be preserved and maintained at all times. Consider prioritizing in order to temporarily stop some services.
- Plan in advance for changes in where patients are admitted as patient numbers increase.

4.10.3. **Strategies for managing surge and increasing hospital capacity**

- Converting wards typically used for other reasons into COVID-19-treatment wards.
- Cancelling elective procedures and surgeries (at least 1 week prior to patient surge).
- Shifting outpatient appointments to other times or settings. This may be particularly useful for chronic disease, for example.
- CHWs distribute medication refills.
- Phone or text messaging for virtual appointments instead of in-person consultation.
- Consider increasing the time duration between follow up visits for stable patients, so they are given sufficient quantities of medications until their next visit.
- Shift non-coronavirus inpatients to alternate treatment sites. For example:
    - Malnutrition treatment to health centers or local community settings or CHW supported.
    - Transition patients on long courses of antibiotics to oral antibiotics and home.
    - Move all routine hospital outpatient visits (e.g. ANC, children under 5) to primary care centers to repurpose outpatient space for inpatient or isolation beds.
    - Identify alternate treatment sites for mild cases (churches, hotels, schools, etc.) with local authorities.
- If several beds can be freed from each ward, wards can be combined to create an empty space for COVID-19 treatment.
- These approaches require a multidisciplinary team, including physicians, nurses, CHWs, facilities managers, and hospital administration.
- Allocation of advanced care services may become necessary for treatment such as oxygen therapy or ventilation. There are two key recommendations to consider:
- Plan in advance: this is critical to ensure equity and to protect staff from making very difficult decisions without support.
- Potential considerations for guiding allocation include:
    - Saving the most amount of lives
    - likelihood of survival from COVID-19
- Allocation systems which incorporate factors such as age, gender, social or economic characteristics, or other pre-existing or co-existing illnesses may lead to inequity. In addition, some of these (e.g. age) will already impact likelihood of survival and therefore are inherently included.

4.10.4. **Strategies for rationing protocols and allocation systems**[7]

A. Principles to consider in rationing protocols

- Non-abandonment: Health care providers have a duty to provide care. No person in need of medical care ever should be neglected or abandoned. Palliative care must be accessible for all patients with respiratory failure for whom life sustaining treatment such as mechanical ventilation will be withheld or withdrawn.
- Health systems have a duty to responsibly and equitably manage resources.
- Health systems have a duty to plan for these scenarios to avoid placing the burden on frontline health care workers.
- Rationing systems should ensure just and equitable allocation of resources.
- Protocols and decisions must be transparent.

B. Procedures to consider for allocation systems

- Utilize an officer or committee not involved in caring for the patient to guide decisions. This can help avoid individual health care workers from making tough decisions alone.

C. A simple system might include:

- *Assessing eligibility*: Exclusion criteria for advanced care resources may include factors that will lead to near-term death regardless of intervention (e.g. cardiac arrest, irreversible septic shock and/or organ damage, severe traumatic brain injury).
- *Standardized risk assessment:* A replicable way for an officer or committee to use clinical data to assess mortality risk can help determine patients most likely to survive coronavirus infection. One example is the Sequential Organ Failure Assessment (SOFA) calculator.
- *Reassess at routine intervals*: Decisions should be ongoing as clinical parameters change.
- *Transparency:* The procedures should be easily accessible and understandable at an elementary school level and in all major languages in the institution's catchment area.
- *Reciprocity and social usefulness during the pandemic*: Providers of critical services, especially those who face disproportionate risk in helping others, should have a proportional return for their contributions such as priority in access to personal protective equipment, testing, treatment, and psycho-social support. These might include doctors, nurses, housekeepers, sanitation workers, morgue workers, and emergency medical workers.
- *Special vulnerability*
    - Patients who are particularly vulnerable due to poverty, homelessness, social isolation, or discrimination may require more or more intense psycho-social services than others.
    - Patients who are particularly vulnerable to infection due to chronic illness or disability, or to their living situation, may require enhanced protective measures

5. Clinical Management of Patients with COVID-19

As of September 24, 2020, there is no approved vaccine for COVID-19. In terms of treatments, a number of medications that initially generated enthusiasm, such as lopinavir/ritonavir[8] and hydroxychlorquine,[9,10] have been studied and found to have no significant positive impact on COVID-19 outcomes. More recently, data from randomized controlled trials evaluating corticosteroids[11] and remdesivir[12,13] have shown benefit. In the United States, remdesivir and convalescent plasma have received Emergency Use Authorization for treatment of COVID-19. Based on all the available information, we recommend administration corticosteroids for patients with COVID-19 who require supplemental oxygen or critical care.

The overall strategy to managing patients with COVID-19 is to first assess severity. Patients who are mildly symptomatic should remain at home with social support that allows for safe isolation. These patients represent a majority of COVID-19 cases. However, over 15% of COVID-19 patients become severely ill.[1] This percentage may be even higher in countries with increased rates of immune suppression from HIV, TB or malnutrition. Delivering high quality supportive care will be lifesaving. Supportive care ranges from oxygen and IV fluids to mechanical ventilation. There are some medications discussed in this chapter that may have anti-viral activity against COVID-19 and can be used in serious cases. This guide will be regularly updated as new therapies become known.

5.1. Symptoms of COVID-19

Patients with COVID-19 can experience a variety of symptoms, including fever, shortness of breath, cough, sore throat, loss of smell or taste, muscle aches, nausea and diarrhea. Patients may experience only some of these (or none of these – up to 20% of confirmed cases may be asymptomatic), and symptoms may change over the course of the disease.[14]

5.1.1. Table 10. Common symptoms of COVID-19 and their frequency

Common symptoms of COVID-19, and the frequencies with which patients experience the symptom over the course of their disease. Since symptoms can change over time, patients may not have all symptoms at the same time. Note there is a wide range of reported symptoms and symptom prevalence in the literature.[15–21]

Symptom	% of patients experiencing[15–21]
Fever	44 - 89%
Cough	68%
Loss of smell (anosmia) and/or loss of taste (ageusia)	53 - 64%
Sore throat	14%
Nasal or sinus congestion	5%
Shortness of Breath	19%
Fatigue	38%
Muscle aches (myalgia)	15%
Headache	14%
Gastrointestinal symptoms (nausea, vomiting, or diarrhea)	2 - 40%

5.1.2. **Table 11. COVID-19 danger signs**

COVID-19 Danger Signs
Difficulty breathing/Shortness of breath
Gasping for air when speaking
Coughing up blood
Pain/pressure in chest (NOT associated with coughing)
Altered mental status or severe sleepiness
Inability to eat/drink or walk

5.2. Differential Diagnosis for COVID-19 Symptoms

As above, patients with COVID-19 can experience a variety of symptoms, which can change over the course of the disease. It is important to remember that a number of other diseases cause similar symptoms, including tuberculosis, malaria, bacterial pneumonia, congestive heart failure, urinary tract infections, and gastrointestinal illnesses. Patients should be evaluated for secondary infections and other conditions depending on the local burden of disease, patient risk factors, and patient clinical presentation. Over the course of their treatment, if a patient's condition changes, providers should consider if the cause is due to COVID-19 or if another process is contributing.

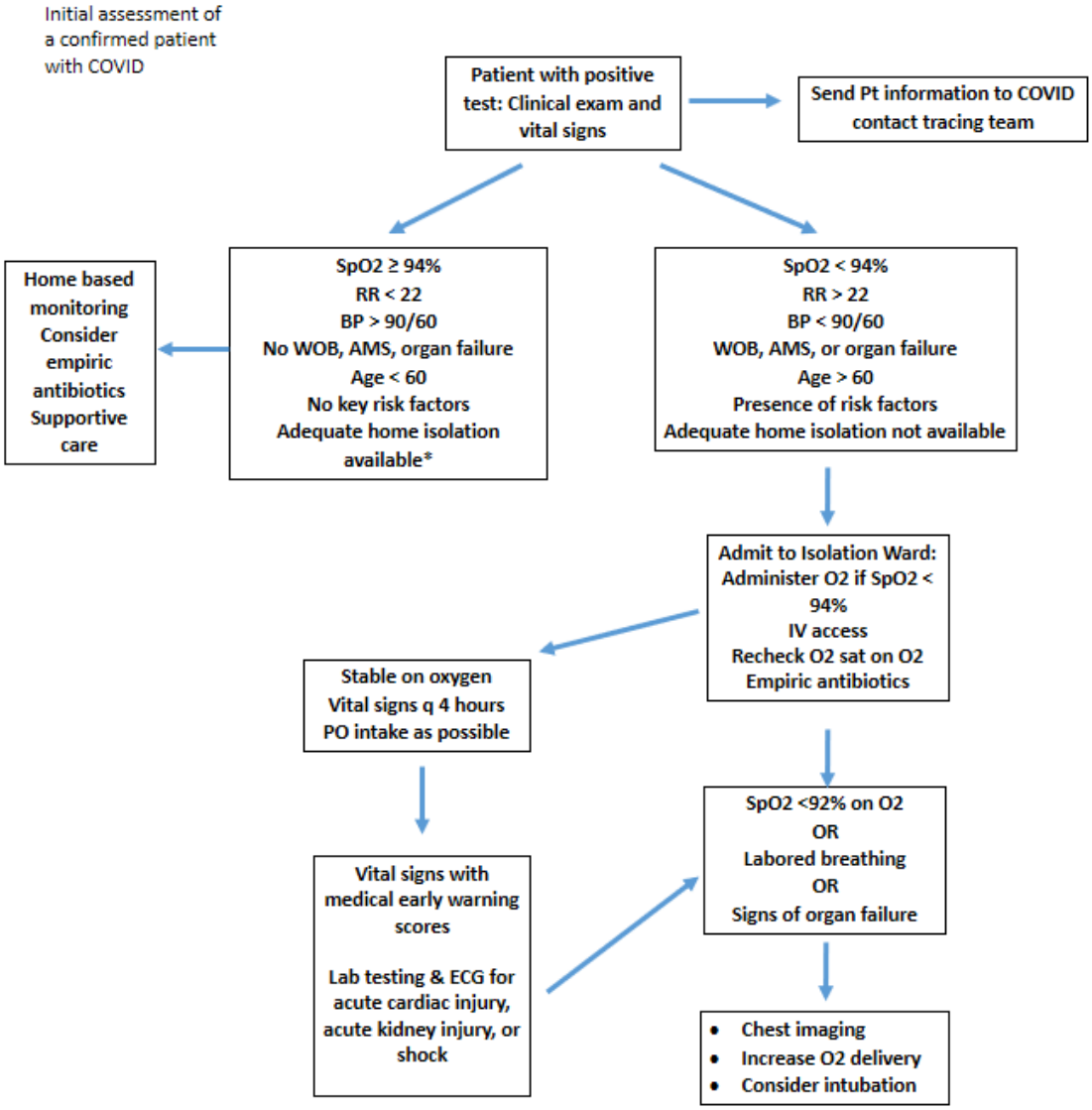
5.3. Diagnosis of COVID-19

See PIH COVID-19 Guide Part 1: Testing, Contact Tracing, and Community Management of COVID-19 for additional information on testing and diagnosis.

5.4. Initial Evaluation of a Confirmed COVID-19 Patient

The most common serious illness among patients with COVID-19 is pneumonia. In addition to history and physical exam, the initial evaluation of the patient with confirmed COVID-19 disease is to assess the blood pressure, pulse, respiratory rate and oxygenation of the patient. Assessment should only be done by personnel in proper PPE.

5.4.1. **Figure 2. Initial assessment of a confirmed patient with COVID-19**



**As epidemic progresses and hospital capacity is limited, these become relative consideration; patients with risk factors for complications may need to be sent home with close follow -up (CHW or phone calls)*

Please see ARDS and proning protocols below.

5.5. Mild COVID-19 and Home-Based Management

Providing care at home should be considered for patients with mild illness where there is no concern for rapid deterioration, and for those who are symptomatic but no longer require hospitalization. In environments where home-based care and quarantine is not possible other options could be considered such as rented houses, hotels, or schools. The following guidelines should then be applied with minimum stay being 14 days from symptom onset or exposure and until full recovery. For full recovery patients need to have been symptom free for at least 72 hours before they are released from isolation. In some cases, a PCR (or other tests as they become available) will be used to confirm that the patient is no longer shedding virus.

- Home Assessment: If possible, a healthcare or community health worker should assess the home to assist with isolation procedures and ensure a safe environment.
- Communication: The patient and family should be provided with clear instructions of what to do and who to call if the condition worsens. These are good strategies to disseminate widely through community education initiatives so good understanding of home-based care is widely present in the community.
- Education: The patient and family should be educated about home isolation procedures and infection prevention

5.5.1. Table 12. Considerations for home-based care for patients with mild COVID-19

Considerations for Home-Based Care	
Isolation	• Quarantine should last 14 days from symptom onset or COVID-19 exposure. No visitors during this time. • Social/economic support, including food supplementation is critical and should be delivered in way that is in line with infection prevention control • Patient should stay in a well-ventilated single room; maintain distance of >1 meter from other household members. • Minimize use of shared spaces and eating utensils; ensure that spaces are well ventilated. If a fan is available, point it out of one window and keep another window open to facilitate increased air exchange in the room. • Assign one person to be the caregiver to the patient. • If patient is a primary caregiver to another household member, assign someone else to take over those responsibilities • No visitors should come to the home during the 14 days.
Hygiene	• Wash hands after any type of contact with the patient, before and after preparing food, and before eating. • Cover mouth with cloth or paper when coughing or sneezing. • Clean eating utensils with soap and water after using. Clean linens with detergent and surfaces with soap.
Materials	• Patients and caregivers should wear masks when not isolated from others in the home. Ideally, surgical masks would be used, but cloth masks are an alternative if they are not available. • Use dedicated sheets and eating utensils for the patient. • Bleach solutions can be diluted 1 part bleach to 9 parts water to make 0.5% solution from 5% pure bleach.
Care	• Assess for and provide home care kits including food support. Please see social support section in Chapter 8. • Monitor daily for worsening symptoms. Call healthcare provider or report to facility if patient develops shortness of breath, altered mental status or severe sleepiness, inability to eat/drink or walk, or has any other significant change in condition. • Community Health Workers should visit on a frequent basis, checking in with family members and patients *outside* the home rather than entering, maintaining a distance of at least 1 meter away. • If the patient worsens and needs to be transported to a facility, appropriate PPE should be used when possible. • If possible, the CHW can offer families a small bag of Paracetamol and Oral Rehydration Solution to help generate trust. This trust could help with coordination efforts if the patient's condition worsens. • See Chapter 8 for considerations about mental health and psychological support

5.6. Considerations for Patients with Chronic Disease

Patients with chronic conditions have specific risks and needs related to COVID-19 diagnosis and treatment. As health systems are overburdened by illness due to COVID-19, it is crucial that access to essential services be maintained for all, including those with chronic disease. Important strategies for protecting patients with chronic diseases during this period will include infection control (limiting exposure at health facilities), minimizing disruptions in treatment (by shifting to community-based delivery of medications and services), addressing disease-specific considerations regarding COVID-19 management, and social support (to allow for safe isolation/quarantine as needed).

5.6.1. **Table 13. Considerations for all patients with chronic conditions: HIV, TB, NCDs, mental health**

Considerations for all patients with chronic conditions: HIV, TB, NCDs, mental health	
Risk considerations	All patients with chronic disease are at increased risk of poor health due to disruptions in access to essential health care services.
Strategies to limit COVID-19 transmission	**Minimize time spent by stable patients at facilities** by increasing the time duration between follow-up clinic visits. o Provide multiple months of medications o Capacitate CHWs to deliver medications to patients' homes (with appropriate infection control measures including PPE) • Establish district sites outside health facilities for medication distribution and essential clinical services (e.g. viral load testing, blood pressure measurement) o Consider phone-based encounters in place of in-person consultation (some routine clinical decisions can be made without physical exam or testing) **Minimize transmission amongst patients** at outpatient facilities: o Provide patients with specific appointment times or windows to minimize overcrowding o Screen patients for symptoms of COVID-19 at point of entry to facility, send for prioritized testing if positive o Set up handwashing stations for all staff and patients at entrance to clinic o **I**ncrease physical space between patients in waiting areas • **Replace group activities** (e.g. patient support groups, peer education sessions) with individual outreach, telephone contact, printed materials, radio contact
Considerations for patients with HIV & TB	
Risk considerations	• Immunocompromised patients may be at increased risk of acquisition as well as severe illness, bacterial superinfection. • Patients with pulmonary TB may be at increased risk of severe respiratory disease. • Patients with malnutrition and food insecurity are more vulnerable to disruptions in food access.

Disease-specific diagnostic / treatment considerations	Clinical presentations of COVID-19 may be atypical in patients with HIV and TB (e.g. fever may be less frequent). • Patients with HIV who present with respiratory symptoms should be evaluated for TB in addition to COVID-19 as clinically indicated. A lower threshold for testing, monitoring, and isolation or quarantine of patients with HIV and TB (to prevent contact with people with confirmed or suspected COVID-19 infection) may be considered. • Person-centered education and support strategies to encourage ARV / TB medication continuation is important to minimize interruptions in treatment. • Given the high prevalence of malnutrition among patients with TB/HIV, ensuring continued social support including food packages is important for disease control.
Considerations for patients with NCDs	
Risk considerations	• Patients with diabetes, hypertension, heart disease, and obesity have been shown to have higher rates of hospitalization and severe illness due to COVID-19. • Chronic diseases including type I diabetes and epilepsy may complicate disease course.
Disease-specific diagnostic / treatment considerations	**<u>Type 1 Diabetes:</u>** • More frequent blood glucose and ketone (blood or urine) monitoring may be indicated, with goal blood glucose level between 4 and 10 mmol/L (70-180 mg/dL) and blood ketones below 0.6 mmol/L during illness. • Patient education may include: -DO NOT STOP INSULIN: If there is FEVER, insulin needs are usually higher -Monitor and maintain hydration with adequate salt and water balance -Treat underlying illness and symptoms (fever) **<u>Cardiovascular disease:</u>** • There is no clear association between ACE Inhibitor use and adverse outcomes among people infected with COVD-19. Patients on ACE inhibitor should be continued. • For patients on anticoagulation therapy, fever may increase response to warfarin/Coumadin. INR should be monitored close and the warfarin/Coumadin dose may be reduced if the patients develops fever. **<u>Chronic respiratory disease</u>** • For patients with asthma and COPD, inhaled steroids should not be discontinued due to COVID-19. Cleaning of the mouth after each dose should be reinforced.
Considerations for patients with Mental illness	
Risk considerations	• Persons with poor health and disease literacy may be less likely to seek care if they have symptoms. • Patients who are less able to safely isolate / quarantine could accidently spread COVID-19.
Disease-specific diagnostic / treatment considerations	• Social isolation may exacerbate underlying mental health problems and increase risk for those living in unsafe environments (intimate partner violence, etc.) **<u>Depression</u>** • Persons with depression may be at risk for worsening symptoms and suicidality with significant social isolation. • CHW outreach for patients with depression and suicidality may be needed in order to provide psychosocial support.

6. Inpatient Management of COVID-19

6.1. General Considerations

While most patients with COVID-19 do not develop severe disease, some become sick enough to require hospital admission. These patients typically have developed pneumonia which leads to difficulty breathing, hypoxemia, and in some cases respiratory failure.

A. Respiratory complications:

- Hypoxemia
- Acute Respiratory Distress Syndrome (ARDS)
- Respiratory failure

B. Non-Respiratory Complications

- Deep vein thrombosis/venous thromboembolism (DVT/VTE)
- Arterial thrombosis (including myocardial infarction)
- Myocarditis/pericarditis
- Coagulopathy/diffuse intravascular coagulation (DIC)
- Heart failure/cardiogenic shock
- Liver injury
- Renal failure
- Stroke
- Seizures
- Encephalitis
- Septic shock as well as an inflammatory response known as Cytokine Release Syndrome that clinically resembles septic shock

6.1.1. **Clinical course**

Although the clinical course of patients with COVID-19 is variable and not well understood, there is evidence that the sickest patients do not develop severe disease until 7-14 days after their symptoms start. Because of this, clinicians should monitor inpatients closely for signs of worsening respiratory status (e.g. increased oxygen requirement or increased work of breathing) even if a patient has been stable for several days.

6.1.2. **Prevention of deep vein thrombosis/venous thromboembolism (DVT/VTE)**

There are multiple reports that patients with COVID-19 have a high incidence of DVT/VTE. For prevention and monitoring thrombotic complications we recommend that for all inpatients

- Use pharmacological prophylaxis with low molecular-weight heparin (LMWH) preferred if available. Alternatively, unfractionated heparin (5000 units subcutaneously three times daily) can be used in adolescents and adults without contraindications.
    - For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices)
- Dosing Guidance:
    - If CrCl > 30: Enoxaparin 40 mg SC daily or heparin 5000 units SC TID
    - If CrCl < 30 or AKI: Heparin 5000 units SC TID
    - Hold if platelets <50,000, INR>2.0, or bleeding, start mechanical prophylaxis
    - If the patient is on direct oral anticoagulants (DOACs) or Warfarin for atrial fibrillation or VTE, switch to full dose anticoagulation (LMWH or heparin, as indicated based on renal function or clinical scenario).
- Monitor closely for signs of DVT/VTE
    - Asymmetrical extremity swelling and/or pain
    - Occlusion or inability to withdraw from venous catheters

- Clinical signs of pulmonary embolism (acute onset of tachycardia with or without hypoxemia and hypotension).

6.2. Laboratory Studies

A. Common laboratory findings in patients with COVID-19 include:

- Lymphopenia (more severe lymphopenia correlates with more severe disease)
- Elevated liver function tests
- Anemia
- Coagulopathy
  - Elevations in PTT and/or INR can be a sign of coagulopathy (i.e. dysfunction in the body's clotting system which leads to an increased risk of bleeding).
  - Suspect DIC when platelets drop, and D-dimer, PTT, and INR increase
- Elevated inflammatory markers (D-dimer, LDH, CRP, ESR)
  - These labs are often elevated in patients with severe COVID-19
  - If a previously stable patient deteriorates, checking D-dimer, LDH, CRP, and ESR. If they are elevated this suggests worsening COVID-19 infection may be the cause.
  - Note: an elevated D-dimer in patients with COVID-19 is **not** always a sign of deep vein thrombosis/venous thromboembolism. Consider other clinical signs and symptoms and use available diagnostic methods such as bedside ultrasound to further evaluate these cases.

6.2.1. Table 14. Recommended laboratory monitoring of COVID-19 patients

Recommended laboratory monitoring of COVID-19 patients. Note: Not all tests will be available at any given time or in a given clinical context. However, the full list is provided here for clinical reference. Clinical judgment should be applied to any given case.	
Upon admission	• Full blood count with differential • Electrolytes (Na, Cl, bicarbonate, K, Mg) • BUN/Cr • Liver function test • LDH, CRP, D-dimer (for signs of inflammation and COVID-19 severity) • PTT/INR (for monitoring COVID-19-related coagulopathy) • Baseline ECG
Every other day Or twice a week	• Full blood count with differential • Electrolytes (Na, Cl, bicarbonate, K) • BUN/Cr
If clinical worsening	• Full blood count with differential • Electrolytes (Na, Cl, bicarbonate, K, Mg) • BUN/Cr • Liver function test • LDH, CRP, D-dimer • PTT/INR • ECG

6.3. Imaging Studies

Chest X-ray, ultrasound, and CT-scan are being used to image patients with COVID-19. (While CT-scan is often not readily available, it is included for those facilities with access). COVID-19

often produces bilateral findings on imaging studies; specific findings on each modality are discussed below.

A. Triage

Imaging may be useful as an additional data point in triage. Ultrasound and chest X-rays can be used. Chest X-rays are normal in 30% of patients requiring hospitalization. Although ultrasound findings in COVID-19 have been shown to correlate with CT scan results, the false negative rate of ultrasound is not currently known.[22]

B. Management

Imaging can assist in evaluation of disease severity and progression as well as the detection of acute respiratory distress syndrome, bacterial co-infection, pleural effusion and pneumothorax. Serial ultrasound is showing promise as a low-cost method to assess disease progression but chest X-ray is required for more severely ill patients who require assessment of support tube, such as endotracheal tubes.

C. Infection prevention and control

It is crucial that any imaging device (x-ray, ultrasound or CT) used for a confirmed or suspected COVID-19 patient is fully disinfected in between patients. Disinfection protocols need to be verified with manufacturer instructions for each piece of equipment but, in general, dilute bleach solutions (*see Section 2.2*) can be wiped over the equipment to clean them between patients. Note that some ultrasound probes can be damaged by alcohol-based cleaning solutions. Unless safety with a given ultrasound machine can be confirmed, alcohol-based solutions for cleaning ultrasound probes should be avoided if alternate options are available.

6.3.1. **Chest x-ray**

When possible, portable X-ray equipment avoids the needs to fully decontaminate a radiography room (the portable x-ray machine will need to be decontaminated between patients) and to transport a COVID-19 patient to another section of the hospital. X-ray appearance is not specific for COVID-19 but may be helpful to guide management decisions in patients with moderate or severe disease, to assess support tube positioning, and to detect complications, including pleural effusion and pneumothorax.

A. Findings

Initial focal or multifocal consolidation and/or ground glass opacities (GGO) in a peripheral, lower lobe and bilateral distribution. Pleural effusion at presentation is unusual.

6.3.2. **Ultrasound**

Advantages include that it is portable, easy to disinfect, and involves no radiation. Its disadvantage is operator dependence and the inability to image central portions of the lung. Reports suggest that having the same person perform serial ultrasounds improves reproducibility. While the ultrasound findings are not specific for COVID-19 infection, in the appropriate clinical setting, findings may be helpful in confirming lung involvement and may play a role in treatment decisions. Ultrasound is also useful to detect associated pulmonary findings such as effusion and pneumothorax

A. Findings

A standardized approach to scanning, using 14 designated landmarks, has been proposed and is strongly recommended to allow for serial comparison. Scoring of abnormalities can be performed using a 3 point scale: Score 0 – normal pleural line, Score 1 – indented pleural line, Score 2 – Broken pleural line with associated consolidation (darker areas) and areas of white lung, Score 3 – dense, extended white lung

When possible, a dedicated ultrasound machine for a COVID-19 ward can reduce the risk of transmission to other patients. Even if a dedicated machine is used, appropriate disinfection should be done between patients (see infection prevention and control above)

6.3.3. **CT scan**

Selective use of CT imaging can be considered in patients with typical COVID-19 symptoms with a negative PCR test.

- CT-Scan plays no role as a screening test for patients for COVID-19.
- Offers relatively high specificity and the ability to image the entire thorax unlike ultrasound. Use should be limited, if available, to patients in whom critical management decisions require detailed pulmonary evaluation.
- CT scanning involves a higher level of radiation than chest X-ray, more personnel, and is the most difficult imaging equipment to decontaminate.

A. Findings

- Ground-glass opacities (GGO) with or without septal thickening, typically bilateral, lower lobe, subpleural, and peripheral, consolidation, and vascular thickening.
- Bilateral pneumonia on X-ray or a CT-scan that has ground-glass opacities in the lung parenchyma can also help support the diagnosis of COVID-19.

6.4. Drug Therapy

As of September 24, 2020, remdesivir and convalescent plasma have received Emergency Use Authorization for treatment of COVID-19 in the United States. Availability of remdesivir and convalescent plasma is generally limited but this may change over time. Based on several recent studies, ***we recommend administration corticosteroids for patients with COVID-19 who require supplemental oxygen or critical care.***[11]

6.4.1. **Corticosteroids:**

Recent data from the RECOVERY trial[11] reported improved survival in patients with severe COVID-19 who were treated with dexamethasone. Patients in the study received dexamethasone 6 mg once per day (either by mouth or by intravenous injection) for ten days. Treatment with dexamethasone reduced deaths by one-third in ventilated patients (rate ratio 0.65 [95% confidence interval 0.48 to 0.88]; p=0.0003) and by one fifth in other patients receiving oxygen only (0.80 [0.67 to 0.96]; p=0.0021). There was no benefit among those patients who did not require respiratory support (1.22 [0.86 to 1.75; p=0.14). Practitioners should be aware of potential adverse effects of dexamethasone therapy, such as hyperglycemia.

Corticosteroids may also be administered to COVID-19 patients for a non-COVID-19-related indication such as treatment of asthma/COPD exacerbation or adrenal insufficiency

6.4.2. **Table 15. Recommended steroid regimens for COVID-19 patients with hypoxemia or critical illness**[20]

Corticosteroid	Dose and Duration
Dexamethasone	6mg IV or PO daily x 10 days
Hydrocortisone	50mg IV Q8h x 10 days
Methylprednisolone	15mg IV BID x 10 days
Prednisone	40mg PO daily x 10 days

6.4.3. **Table 16. Partners In Health treatment guideline for SARS-CoV-2 infection**

Clinical Severity	Treatment
COVID-19 diagnosis without hypoxia ***AND*** NO radiographic evidence of disease (if x-ray is available) ***AND*** Without risk factors below	1. Symptomatic treatment
COVID-19 without hypoxia or radiographic evidence of disease ***BUT*** With risk factors: Age >60, cardiovascular disease, hypertension, diabetes, chronic lung disease, cancer, immunosuppressive medications, detectable HIV VL or CD4 <200 *Additional risk factors to consider include all HIV, TB patients, pregnancy, malnutrition (BMI <18 in adults, yellow MUAC for children < 5 years old)*	1. Symptomatic treatment 2. Close monitoring, particularly days 5-14 of symptoms 3. Advance to other therapies if clinical condition worsens
COVID-19 diagnosis with hypoxia ***OR*** Radiographic evidence of disease	1. Corticosteroids 2. Consider remdesivir if available
COVID-19 with critical illness or ARDS	1. Empiric antibiotics: doxycycline and ceftriaxone for adults and ceftriaxone for children 2. Corticosteroids 3. Consider remdesivir if available 4. Consider availability of other clinical trials

6.5. Treatments Not Currently Recommended for COVID-19

A. Hydroxychloroquine and Chloroquine

Though initially advocated as potential treatment, recent retrospective data suggests no benefit and potential harm with hydroxychloroquine and chloroquine for hospitalized patients. As a result, routine use is not recommended outside of a clinical trial setting

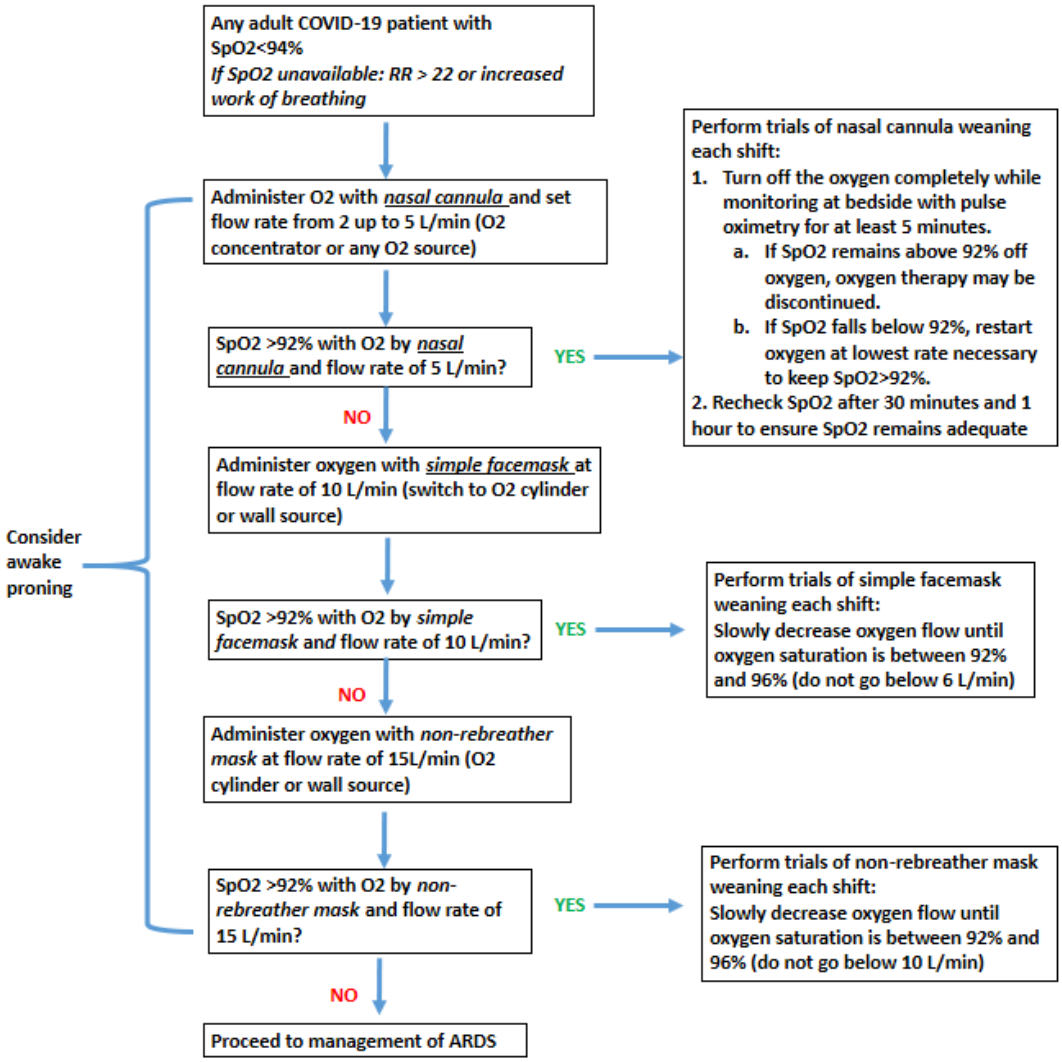
B. Lopinavir/ritonavir

6.6. Management of Patients with COVID-19 Pneumonia Requiring Oxygen

If the initial assessment shows that the patient has hypoxia, or a rapid respiratory rate, supplemental oxygen should be given with a goal is to maintain the oxygen saturation (SpO_2) 92% to 96%.

- Oxygen delivered by *nasal cannula* (at 2 to 5 L/min) FiO2 0.25 to 0.49 (25% to 49% oxygen)
- If oxygen saturation remains <90% with O_2 by nasal cannula at 5 L/min then administer oxygen with *simple facemask* (at 6-10 L/min) FiO2 0.4 to 0.6 (40% to 60% oxygen)
- If oxygen saturation remains <90% with simple face mask, administer oxygen with *non-rebreather facemask* (at 10-15L/min) FiO2 0.6 to 0.95 (60% to 95% oxygen)

6.6.1. **Figure 3. Management of oxygen in patients with COVID-19 pneumonia**



6.6.2. **Figure 4. Oxygen delivery systems for different levels of flow**[23]

Oxygen Delivery	Oxygen Flow	Acceptable Oxygen Sources		
Nasal cannula/prongs	1 to 5 L/min	Oxygen concentrator	Oxygen cylinder	Piped oxygen from central source
Simple facemask	6 to 10 L/min	Oxygen concentrator	Oxygen cylinder	Piped oxygen from central source
Non-rebreather	10 to 15 L/min	Oxygen concentrator	Oxygen cylinder	Piped oxygen from central source

Note that nebulizer treatments should be used very sparingly as they pose a significant risk to staff exposure due to aerosolized virus. An inhaler with a spacer will provide similar benefit in most patients. Limit nebulizers to patients with severe wheezing who do not respond to inhalers and spacers. Any nebulizers should be done on airborne precautions (e.g. N95 mask use for all staff and private room for the patient, with negative pressure if possible). As virus may stay suspended in the air after the nebulizer finishes, airborne precautions should be continued for at least 1-3 hours after the treatment finishes (depending on airflow in the room). For simple instructions on how to make a spacer with a water bottle, see page 158 of the WHO-ICRC basic emergency care course (available at: https://www.who.int/publications-detail/basic-emergency-care-approach-to-the-acutely-ill-and-injured)

6.7. Oxygen Weaning Protocol

As the patient improves, they may be weaned off oxygen: For patients who are and receiving oxygen by nasal cannula, trials of oxygen weaning should be done each shift. This process is also outlined in Figure 4.

- Turn off the oxygen completely while monitoring at bedside with pulse oximetry for at least 5 minutes.
- If oxygen saturation falls below clinical target (92% if no target specified), restart the oxygen at the lowest flow rate necessary to meet the patient's clinical goal.
- If patient maintains saturations above clinical target without oxygen, oxygen therapy may be discontinued.

- Monitor oxygen saturation 30 minutes later and then again at 1 hour to ensure saturation remains adequate without oxygen therapy.

For patients who are stable and on simple face mask or non-rebreather, trials of oxygen weaning should be done each shift by slowly decreasing oxygen flow until oxygen saturation is between 92% to 96%.

6.8. High Flow Oxygen and Non-Invasive Positive Pressure Ventilation

6.8.1. **Non-invasive positive pressure ventilation (CPAP or BiPAP)**

Non-invasive positive pressure ventilation is not recommended for coronavirus due to lack of demonstrated efficacy as well as the potential for pathogen transmission (there is a higher risk of aerosolization of particles that can leak into the air around the mask).

6.8.2. **High flow oxygen via nasal cannula**

High flow nasal cannula (HFNC) can be considered in the situation of respiratory failure and no availability of invasive mechanical ventilation. Due to concerns about the risk of aerosolization with high flow oxygen, airborne precautions should be instituted when it is used. Patients should wear a facemask over a high flow nasal canula to reduce risk of droplet spread

In some situations, HFNC can serve as an effective alternative to mechanical ventilation. Standard HFNC systems typically consist of a high capacity flow meter, an air-oxygen blender (typically connected to wall air and oxygen sources), tubing, cannula, and a heated-humidifier.[24] While standard oxygen systems can provide up 100% oxygen at rates of up to 15 liters per minute, an HFNC system delivers oxygen flow rates as high as 80 L/min with variable concentrates of oxygen up to 100.[24] HFNC has been demonstrated as an effective intervention for management of acute hypoxemic respiratory failure, improving survival[25] and reducing the need for mechanical ventilation.[26]

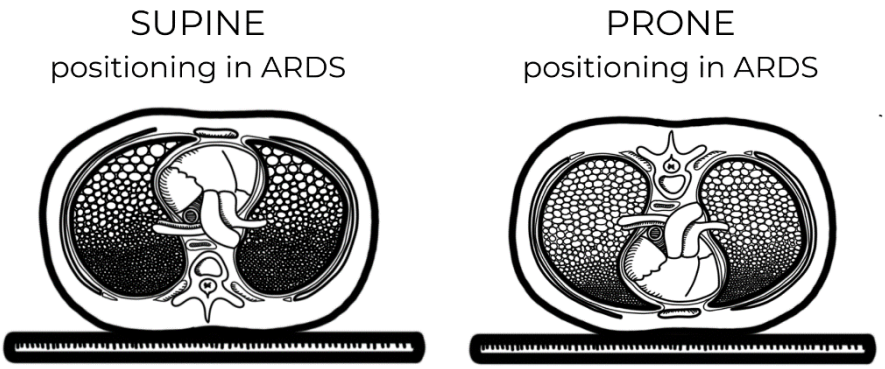
In the context of the COVID-19 pandemic, HFNC has been used in a number of settings. Preliminary studies have demonstrated that HFNC, often in conjunction with prone positioning (see below), can be an effective treatment for severe COVID-19 and may help avoid the use of mechanical ventilation.[27–29]

A. Infectious risk with HFNC[30–37]

Due to concerns about the risk of aerosolization with high flow oxygen, airborne precautions should be instituted when it is used. Patients should wear a facemask over a high flow nasal canula to reduce risk of droplet spread and appropriate airborne precautions should be taken.

6.9. Prone Positioning to Maximize Oxygenation

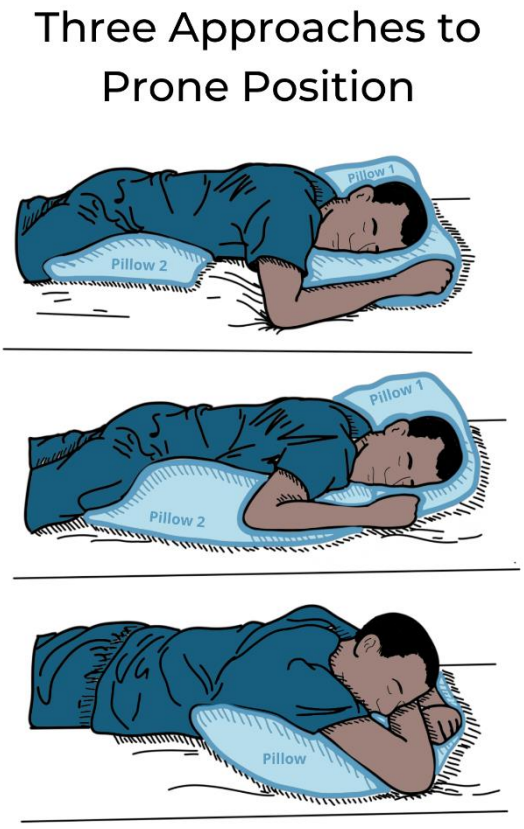
Normally, patients in hospital are lying on their backs. This is easier from a medical and nursing prospective. Yet, studies have shown that putting a patient on their stomach potentially allows for better oxygenation from the lungs into their blood stream, particularly in patients with ARDS. Prone positioning (that is the patient lying on their stomach) increases oxygenation and survival in intubated mechanically ventilated patients with ARDS. It is thought that prone positioning improves oxygenation through alveolar recruitment, improvement of ventilation/perfusion matching, and drainage of secretions. Recently, there have been a number of reports suggesting that hypoxemia may improve when awake COVID-19 patients move to a prone position[38–43] and may even improve outcomes.[44]



In the prone position, more lung tissue is open and filled with air (larger circles) instead of collapsed and filled with fluid (smaller/ darker circles), improving oxygenation.

It is important to note that there are risks associated with prone positioning, including:

- Airway obstruction (particularly if a patient is unconscious but not intubated)
- Dislodged oxygen delivery device
- Facial edema
- Pressure ulcerations (especially the forehead and anterior chest)
- Pressure neuropathies
- Patient intolerance
- Intracranial hypertension



A. <u>Absolute contraindications</u>

- Unstable spinal injury
- Unstable airway (patient with oral swelling, mass, tumor or other object obstructing the airway)
- Unresponsive patient (may be more likely to obstruct their airway)
- Open chest
- Intracranial pressure monitoring or intracranial hypertension
- Hemodynamic instability (blood pressure less than 80/40 or active up-titration of vasopressors)

B. <u>Relative contraindications</u>

- Copious secretions
- Signs of severe respiratory distress (tripod position or obvious severe accessory respiratory muscle use)
- Agitation
- Pregnancy

C. <u>Additional considerations</u>

- Monitoring with continuous pulse oximetry (SpO2) is highly preferable in assisted awake proning

6.9.1. **Protocol 1: Awake self-proning**

In awake, self-proning, the patient changes positions on their own (similar to someone rolling over in bed to sleep on their stomach). Although there are some promising initial data, it is too early to know with certainty if early awake self-proning affects outcomes. There are currently trials ongoing on this. However, it is a low-cost intervention, and when done in the subset of patients listed below, should be low risk. wake self-proning should only be used if:

- Patients can change positions, including rolling over in their bed, without assistance
- Patient is awake and alert and able to follow instructions
- Patient does not have signs of respiratory distress (tripod position or severe accessory muscle use)
- SpO2 is at least 93% on 1-3 L/min via nasal cannula (if patient requires 4 L/min via nasal cannula or higher, they can still self-prone, but should be monitored according to the instructions in the assisted awake proning protocol)
- Patient is hemodynamically stable (HR < 130 and BP > 100/60).
    - Note: providers can still consider prone position in some cases with higher heart rates, but the assisted awake proning protocol should be used
- Patient does not have supporting tubes at high risk for displacement (for example, a chest tube)

A. Protocol

- All staff should be in appropriate PPE when next to patients
- Instruct patient on how changing positions may help them breathe easier
- Point out to patient any IV tubing or oxygen tubing they are connected to. Remind them this tubing should not be under them at any time.
- Ask patient to roll onto their stomach, showing them how to choose which side to roll to so that they avoid any IV tubing
- Show patients how to adjust their nasal cannula if needed
- Show positions different ways to adjust pillows for comfort (see section images for suggestions)
- Instruct the patient to remain on their stomach for 30 minutes to 2 hours.
    - After this, advise them to turn to each side for between 30 minutes to 2 hours, then sit up for between 30 minutes to 2 hours, then repeat laying on their stomach.
- If possible, check SpO2 15 minutes after proning
- Instruct patient to roll back over and call for help if they feel worse
- A patient instruction sheet in English and Spanish with pictures can be found at: https://rebelem.com/wp-content/uploads/2020/04/Self-Proning-Positioning_Eng-n-Spanish.pdf

6.9.2. Protocol 2: Assisted Awake Proning

Assisted prone positioning for awake, non-intubated COVID-19 patients with hypoxemic respiratory failure can be considered if:

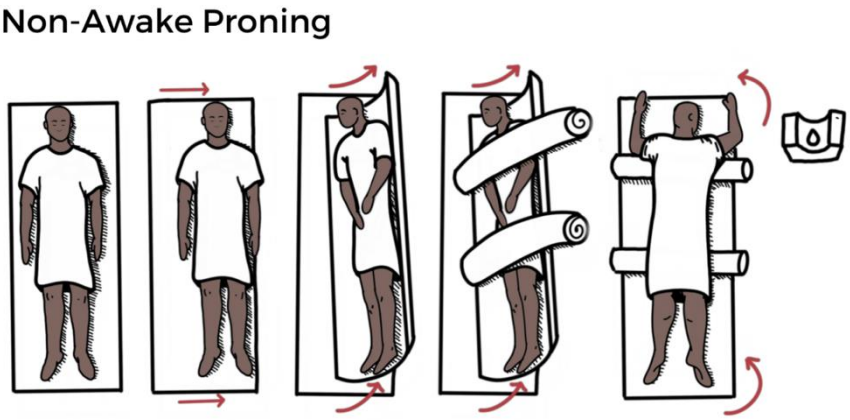
- Patient requires at least 4 L/min of O2 via nasal cannula to maintain oxygen saturation at goal
- Adequate availability of staff to provide close monitoring and support during awake proning

We recommend repeating at least two sessions of proning each day (minimum 30 minutes each) until patient is on nasal cannula (<4 L/min) with SpO2>90%. Do not administer sedation to facilitate proning

A. Steps for Assisted Awake Proning

- Explain procedure and indications to patient
- Evaluate the amount of assistance the patient will require for positioning
- If the patient will require assistance, assess the patient's size and weight to determine adequacy of the bed frame and the mattress in addition to the number of staff required to safely turn the patient.
- Perform physical assessment of the patient's tubes, IV's, oxygen delivery device, and general skin condition.
- Secure tubes and catheters and ensure tubing is of sufficient length

- Stop any tube feeding one hour prior to proning
- If a wound dressing on the patient's anterior surface is due to be changed during the prone position sequence, perform the dressing change prior to the turn.
- Ensure all staff have PPE
- Initiate continuous pulse oximetry (SpO2) if available
- Optimize oxygen delivery
    - If nasal cannula: 5L/min
    - If non-rebreather mask: 15L/min
    - If high flow nasal cannula: FiO2 1.0 (100% oxygen) and flow at least 40L/min
- Decide if the turn will be rightward or leftward. Position drainage bags, if present, on the opposite side of the bed, reposition intravenous tubing toward the patient's head or on the opposite side of the bed and chest tube drains, if present, between patient's legs.
- Have patient roll onto their abdomen, positioning their head to the side initially
- Insert head supports (e.g. rolled sheets) to ensure that the head is high enough off the bed to allow for proper spinal alignment in either face down or side lying position. Position arms slightly above the head bent at the elbow. Place pillows or rolled sheets under the shins to flex the knees and allow the feet to be at a 90-degree angle. Utilize rolls to support shoulders, abdomen and pelvis where necessary. Pillows may be required to support the chest



B. Monitoring for All Patients During Assisted Awake Pronation

- Monitor patient for 10 minutes after turning to prone position to ensure stability
- HR, BP, SpO2 should return to close to baseline within 10 minutes
- Adjust oxygen delivery to minimal required amount to maintain SpO2 > 90%
- Continue to monitor every 15 minutes (or as frequently as possible). If after 30 minutes, there is no improvement and continued close monitoring is not possible, consider supination to avoid complications. If the patient has improved but frequent monitoring is not possible the team should discuss risks/benefits of maintaining prone position.
- Maintain prone position for at least 30 minutes and no more than 5 hours.
- Re-position the patient's arms, which are placed above the patient's head, bent at the elbows every 2 hours
- Perform range of motion to arms and legs every 2 hours
- Assess the skin frequently for areas of non-blanchable redness or breakdown

C. Indications for Supination

- Completion of 5 consecutive hours of supination
- Inability to maintain SpO2 >87%
- Development of hemodynamic instability (BP < 90/50 or HR > 140 in an adult)
- Patient intolerance

D. Supinating

- Reverse the process of proning

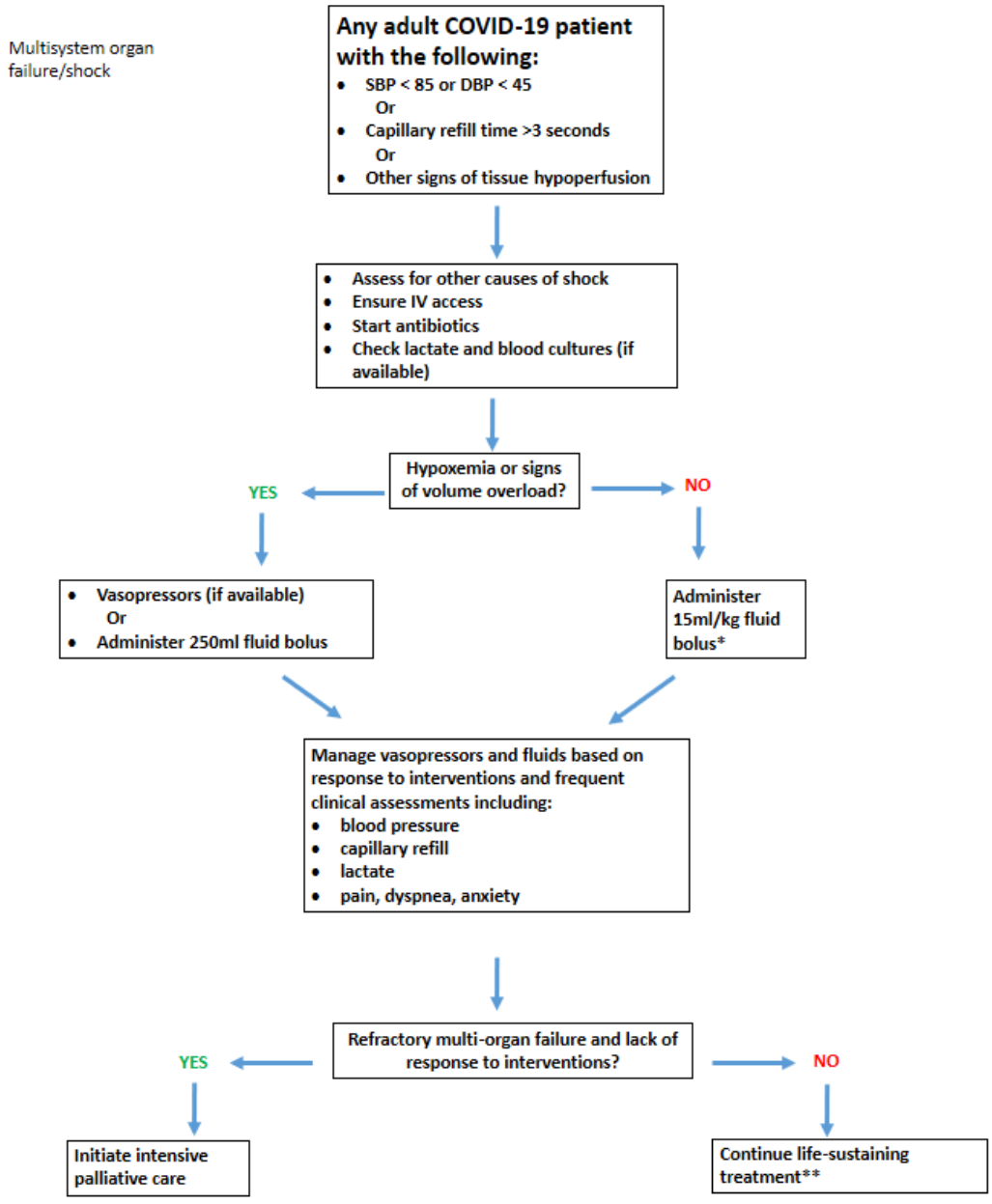
A video demonstration of non-awake proning technique is available here:
https://www.nejm.org/doi/full/10.1056/NEJMoa1214103

Images in this section by Morgan Sehdev for Partners In Health

6.10. Multisystem Organ Failure/Shock

The diagram below is meant to illustrate the overall management of organ failure/shock and does not replace more detailed intensive care guidelines.

6.10.1. **Figure 5. Multisystem organ failure/shock**



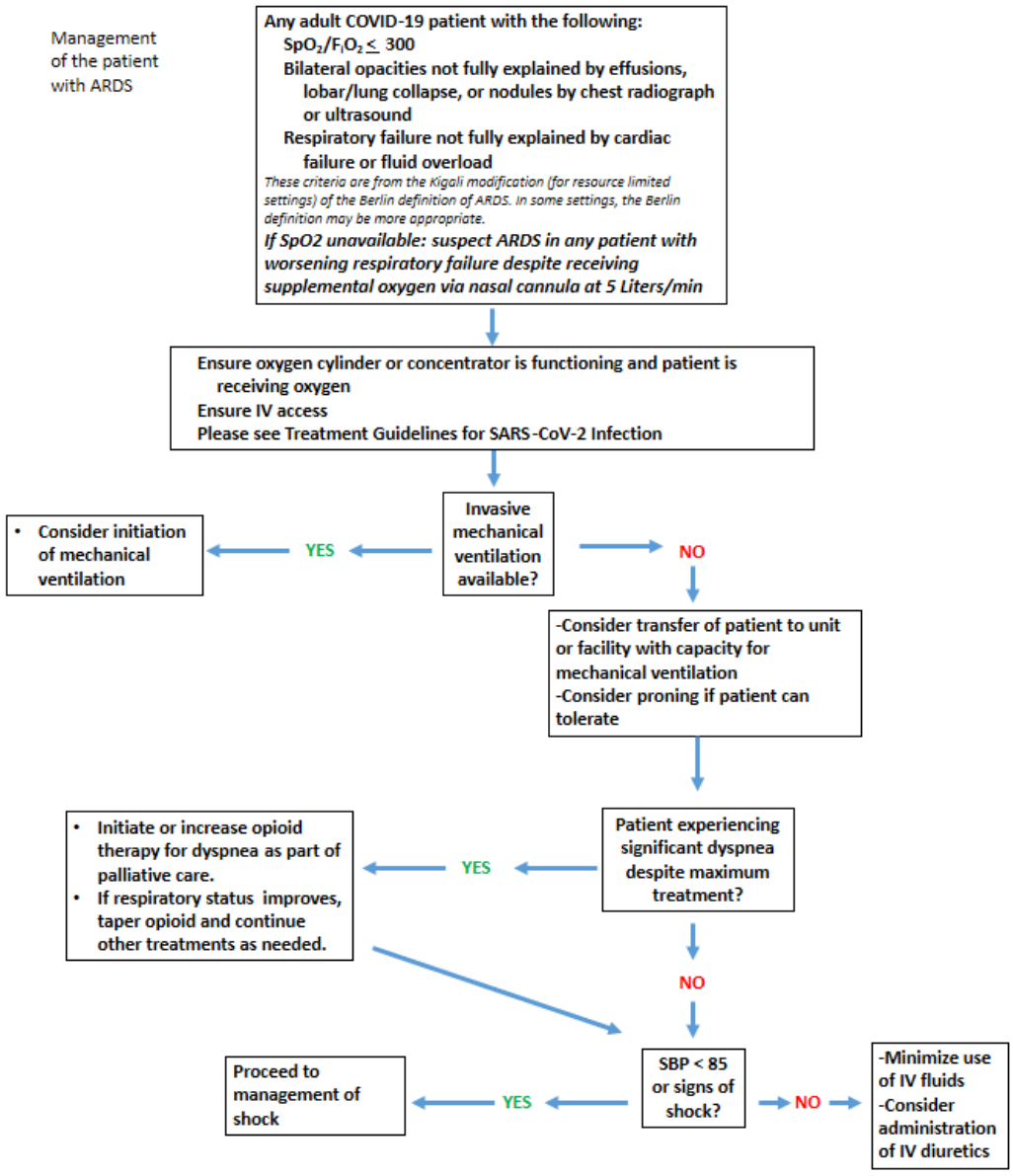
**Manage vasopressors and fluids based on a conservative fluid strategy: give patients smaller volume fluid boluses (15ml/kg instead of 30ml/kg) and, when available, initiate vasoactive medications (e.g. norepinephrine, dopamine) earlier in the course of shock.*

***Life sustaining treatment should always be integrated with physical psychological social and spiritual factors*

6.11. Acute Respiratory Distress Syndrome (ARDS)

One of the most severe complications of COVID-19 is ARDS. This is a condition which leads to extremely labored breathing, the lungs become stiff, and the patient's ability to oxygenate is severely impaired. ARDS often is seen on x-ray or CT scan as bilateral opacities in the lungs. Patients with ARDS often require mechanical ventilation.

6.11.1. **Figure 6. Management of the patient with Acute Respiratory Distress Syndrome**



Definitions from Figure 6:

- SpO2: Oxygen saturation measured from a pulse oximeter
- FiO2 is defined as the fraction of oxygen that a person inhales (the fraction of inspired oxygen). The atmospheric air that we inhale on a day to day basis is made up of 21% oxygen (FiO2: 0.21). *See table 17*
- Effective oxygen therapy is about finding a balance between delivering the lowest FiO2 in order to achieve normal oxygen saturations for the patient. Hypoxia is not a good thing, but neither is too much oxygen. In intubated patients, prolonged exposure to higher FiO2 (>0.6) can cause damage to the lungs.

6.11.2. **Table 17. Determining fraction of inspired oxygen (FiO2)**

Oxygen Device	O_2 Flow (L/min)	FiO_2
Nasal Cannula	1	0.24
	2	0.28
	3	0.32
	4	0.36
	5	0.40
Simple Facemask	6	0.44
	7	0.48
	8	0.52
	9	0.56
	10	0.60
Non-Rebreather Mask*	10 to 15	~0.80
*Non-rebreather reservoir bag must be fully inflated to be effective		

6.12. Management of Mechanically Ventilated Patients

Only facilities with already an established ICU with Mechanical Ventilation procedures available should consider this option. Each individual patient clinical circumstance and personal/family values should be considered and procedures should always be performed by experience staff.

6.12.1. **Considerations for intubation**

- Intubation is an *aerosol generating procedure* with increased risk for health worker exposure. Airborne precautions should be established and staff should don appropriate PPE (gown, gloves, N95 mask, eye mask/goggles). Intubation should be done in a private room away from other patients, ideally one with negative pressure if available.
- Only most experienced available staff should perform to minimize risk of multiple attempts and spreading virus particles.
- Pre-oxygenation and rapid sequence induction should be used to avoid manual ventilation of the patient.

6.12.2. **Initial ventilator settings**

Note: These settings are general recommendations and decisions on approach to mechanical ventilation should be made on an individual basis by experienced clinicians

- Mode: Assist control volume cycled (AC/VC)
- PEEP: 5 to 8 cmH2o
- Respiratory Rate: 16 (consider setting higher RR if patient has acidemia or respiratory distress/tachypnea)
- FiO2: 1.0 (100% oxygen) then reduce to PaO2 goal of >55 (or SpO2>90%)
- Tidal Volumes: start at 8ml/Ideal Body Weight (IBW) then reduce to 4 to 6ml/IBW as tolerated (see Table 18 below)

A. Additional considerations

- If available, check arterial blood gas (ABG) 15 minutes after connecting patient to ventilator (I-STAT)
- If available, check portable x-ray to confirm endotracheal tube placement
- Titrate ventilator using a high-PEEP, lung protective strategy
- Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion.
- If patient's condition continues to worsen despite aggressive treatment and/or if mechanical ventilation will be discontinued, initiate or increase opioid therapy to prevent and relieve dyspnea and assure comfort

6.12.3. **Table 18. Determining tidal volumes based on ideal body weight**

IDEAL BODY WEIGHT (IBW) / TIDAL VOLUME CHART													
MALES							FEMALES						
HEIGHT			IBW Male	6 ml/kg	7 ml/kg	8 ml/kg	HEIGHT			IBW Female	6 ml/kg	7 ml/kg	8 ml/kg
Feet	Inches	cm					Feet	Inches	cm				
4' 0"	48	121.92	22.4	300	350	400	4' 0"	48	121.92	17.9	270	320	360
4' 1"	49	124.46	24.7	300	350	400	4' 1"	49	124.46	20.2	270	320	360
4' 2"	50	127	27	300	350	400	4' 2"	50	127	22.5	270	320	360
4' 3"	51	129.54	29.3	300	350	400	4' 3"	51	129.54	24.8	270	320	360
4' 4"	52	132.08	31.6	300	350	400	4' 4"	52	132.08	27.1	270	320	360
4' 5"	53	134.62	33.9	300	350	400	4' 5"	53	134.62	29.4	270	320	360
4' 6"	54	137.16	36.2	300	350	400	4' 6"	54	137.16	31.7	270	320	360
4' 7"	55	139.7	38.5	300	350	400	4' 7"	55	139.7	34	270	320	360
4' 8"	56	142.24	40.8	300	350	400	4' 8"	56	142.24	36.3	270	320	360
4' 9"	57	144.78	43.1	300	350	400	4' 9"	57	144.78	38.6	270	320	360
4' 10"	58	147.32	45.4	300	350	400	4' 10"	58	147.32	40.9	270	320	360
4' 11"	59	149.86	47.7	300	350	400	4' 11"	59	149.86	43.2	270	320	360
5' 0"	60	152.4	50	300	350	400	5' 0"	60	152.4	45.5	270	320	360
5' 1"	61	154.94	52.3	310	370	420	5' 1"	61	154.94	47.8	290	330	380
5' 2"	62	157.48	54.6	330	380	440	5' 2"	62	157.48	50.1	300	350	400
5' 3"	63	160.02	56.9	340	400	450	5' 3"	63	160.02	52.4	310	370	420
5' 4"	64	162.56	59.2	350	410	470	5' 4"	64	162.56	54.7	330	380	440
5' 5"	65	165.1	61.5	370	430	490	5' 5"	65	165.1	57	340	400	460
5' 6"	66	167.64	63.8	380	450	510	5' 6"	66	167.64	59.3	360	410	470
5' 7"	67	170.18	66.1	400	460	530	5' 7"	67	170.18	61.6	370	430	490
5' 8"	68	172.72	68.4	410	480	550	5' 8"	68	172.72	63.9	380	450	510
5' 9"	69	175.26	70.7	420	500	570	5' 9"	69	175.26	66.2	400	460	530
5' 10"	70	177.8	73	440	510	580	5' 10"	70	177.8	68.5	410	480	550
5' 11"	71	180.34	75.3	450	530	600	5' 11"	71	180.34	70.8	420	500	570
6' 0"	72	182.88	77.6	470	540	620	6' 0"	72	182.88	73.1	440	510	580
6' 1"	73	185.42	79.9	480	560	640	6' 1"	73	185.42	75.4	450	530	600
6' 2"	74	187.96	82.2	490	570	660	6' 2"	74	187.96	77.7	470	540	620
6' 3"	75	190.5	84.5	510	590	680	6' 3"	75	190.5	80	480	560	640
6' 4"	76	193.04	86.8	520	610	690	6' 4"	76	193.04	82.3	490	580	660
6' 5"	77	195.58	89.1	530	620	710	6' 5"	77	195.58	84.6	510	590	680
6' 6"	78	198.12	91.4	550	640	730	6' 6"	78	198.12	86.9	520	610	700
6' 7"	79	200.66	93.7	560	660	750	6' 7"	79	200.66	89.2	530	620	710
6' 8"	80	203.2	96	580	670	770	6' 8"	80	203.2	91.5	550	640	730
6' 9"	81	205.74	98.3	590	690	790	6' 9"	81	205.74	93.8	560	660	750
6' 10"	82	208.28	100.6	600	700	800	6' 10"	82	208.28	96.1	580	670	770
6' 11"	83	210.52	102.9	620	720	820	6' 11"	83	210.82	98.4	590	690	780
7' 0"	84	213.36	105.2	630	740	840	7' 0"	84	213.36	100.7	600	710	810

** Revert to 5 feet when assigning Tidal Volume for all patients < 5 feet tall.*

Modified from ARDSNet & National NIH
Males IBW Calculation: 50kg + 0.91kg * (height in cm –152.4)
Females IBW Calculation: 45.5kg + 0.91kg * (height in cm –152.4)

Table available at: https://mpog.org/files/quality/toolkit/ibw_tv_chart1.pdf

6.12.4. **Table 19. Prevention of complications in critically ill patients**[1]

Prevention of Complications	
Anticipated Outcome	***Interventions***
Reduce days of invasive mechanical ventilation	Use wearing protocols that include daily assessment for readiness to breathe spontaneously Minimize continuous or intermittent sedation, targeting specific titration endpoints (light sedation unless contraindicated) or with daily interruption of continuous sedative infusions
Reduced incidence of ventilator associated pneumonia	Oral intubation is preferable to nasal intubation in adolescents and adults Keep patient in semi-recumbent position (head of bed elevation 30-45 degrees) Use a closed suctioning system, periodically drain and discard condensate in tubing Use a new ventilator circuit for each patient, once patient is ventilated, change circuit if it is soiled or damaged but not routinely Change heat moisture exchanger when it malfunctions, when soiled, or every 5-7 days
Reduce incidence of venous thromboembolism	Use pharmacological prophylaxis (low molecular-weight heparin (preferred if available) or heparin 5000 units subcutaneously twice daily) in adolescents and adults without contraindications. For those with contraindications, use mechanical prophylaxis (intermittent pneumatic compression devices)
Reduce incidence of catheter-related bloodstream infection	Use checklist with completion verified by a real time observer as reminder of each step needed for sterile insertion and as a daily reminder to remove catheter if no longer needed
Reduce incidence of pressure ulcers	Turn patient every 2 hours
Reduce incidence of stress ulcers and gastrointestinal (GI) bleeding	Give early enteral nutrition (within 24-48 hours of admission) Administer histamine-2 receptor blockers or proton pump inhibitors in patients with risk factors for GI bleeding. Risk factors for GI bleeding include mechanical ventilation for greater than or equal to 48 hours, coagulopathy, renal replacement therapy, liver disease, multiple comorbidities and high organ failure score
Reduce incidence of ICU - related weakness	Actively mobilize patient early in the course of illness when safe to do so

7. Palliative Care and Symptom Control

7.1. Palliative Care

Palliative care is ethically imperative care focused on prevention and relief of suffering of adult and pediatric patients and their families facing the problems associated with life-threatening illness, including COVD-19. Palliative care, including relief of dyspnea pain, anxiety, agitation or other symptoms and psycho-social support, should be available to all patients with COVID-19 at all stages of illness.

7.2. Dyspnea Due to COVID-19

Dyspnea is a common physical symptom of severe COVID-19. Dyspnea may be severe. Dyspnea from COVID-19 should first be treated with oxygen and/or mediations as per the protocols in this chapter. Other underlying causes (such as severe anemia, pleural effusions, pneumothoraxes, or acidosis) should be ruled out and treated.

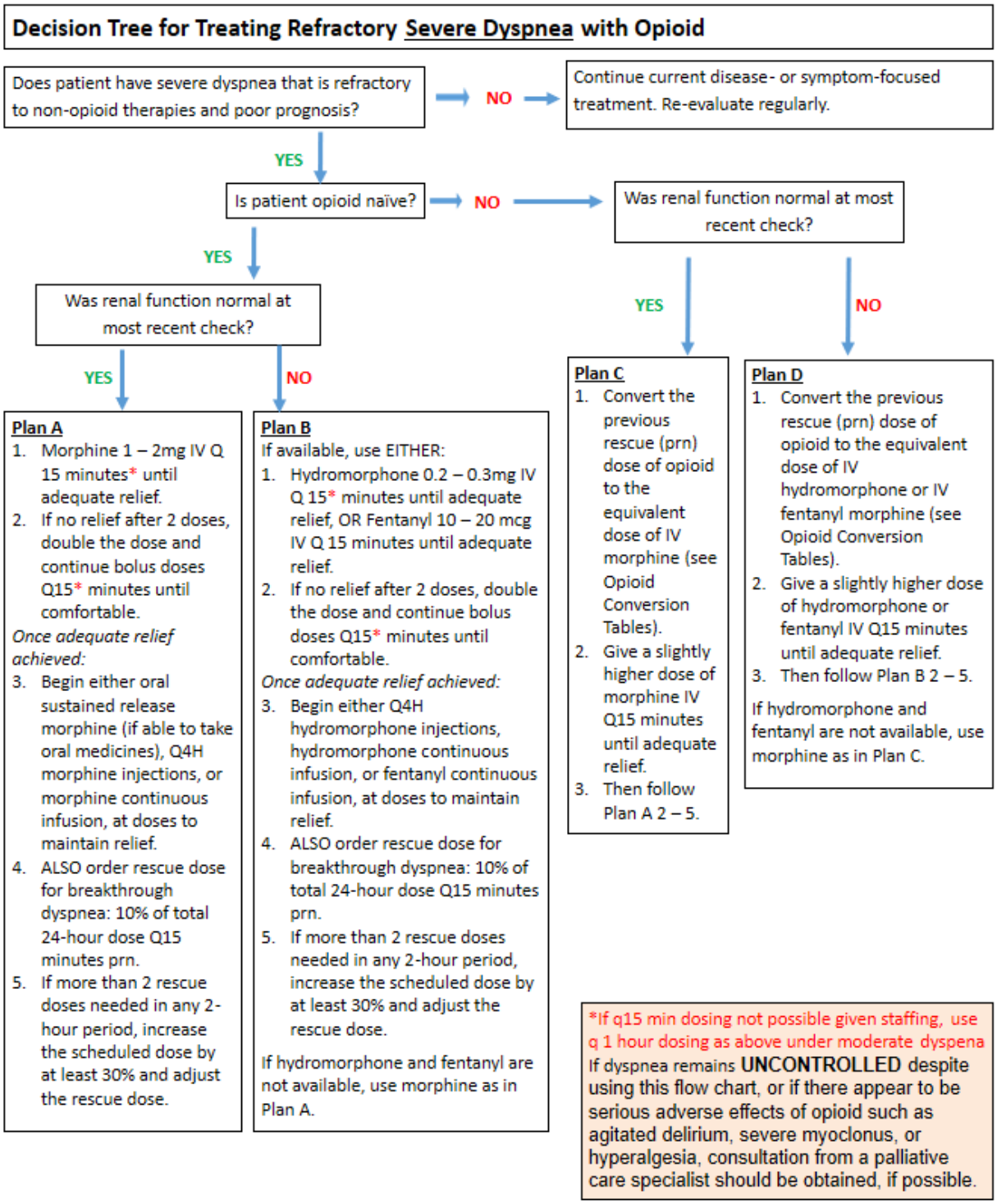
A. Opioids

- Opioids are effective for relief of dyspnea that does not respond to treatment of the underlying cause.
    - Opioids should be used to treat dyspnea in patients for whom survival is unlikely and treatment is focused solely on comfort and control of symptoms.
    - Other patients with significant refractory dyspnea despite maximal treatment but expected to survive can receive opioids to treat dyspnea, although this should be done cautiously in order to minimize the side effect of respiratory suppression.
- Opioid treatment dosing for refractory dyspnea
    - For moderate dyspnea at rest that disrupts sleep and is refractory to treatment of underlying cause, consider morphine. Starting dose for opioid-naïve patient: 2 - 3mg orally (or 1 – 2 mg IV) Q1H as needed.
        - If frequent doses needed, scheduled an effective morphine dose Q4H and add a rescue dose as needed at 10% of the total daily dose.
    - For severe dyspnea where frequent bolus dosing is possible

7.2.1. **Table 20. Opioid equi-analgesic conversion tables (how to change from one opioid to another)**

	Approximate Equianalgesic Dose	
	Oral	*Parenteral (IV)*
Morphine	30 mg every 4 hours	10 mg every 3-4 hours
Oxycodone	20 mg every 4 hours	
Fentanyl		100 mcg every 1-2 hours
Hydromorphone	7.5 mg every 4 hours	1.5 mg every 3-4 hours

7.2.2. **Figure 7. Decision tree for refractory severe dyspnea with opioid**



7.3. Psychosocial Support

Patients with critical illness may also suffer from psychological symptoms (including anxiety and depression), social problems (including social isolation, lack of food), or spiritual distress (including loss of faith). A multi-sectoral approach can be taken to address these.

See Chapter 8 for more details

7.4. Essential Package of Palliative Care

This essential package should be constantly accessible at each institution that provides care for persons with COVID-19, and efforts should be made to be assure accessibility by patients at home. See Table 21 for details on use recommendations.

7.4.1. **Components of essential package**

A. Essential palliative medicines:

- Oral immediate-release morphine and injectable morphine to treat refractory and terminal dyspnea.
    - Stimulant laxative such as oral Bisacodyl should be given to prevent opioid-related constipation
- Dexamethasone, oral and injectable
- Diazepam, oral and injectable
- Fluoxetine, oral
- Furosemide, oral and injectable
- Haloperidol, oral and injectable
- Hyoscine butylbromide, oral and injectable
- Lactulose (or sorbitol or polyethylene glycol), oral
- Metoclopramide, oral and injectable
- Naloxone, injectable
- Omeprazole, oral
- Oxygen
- Paracetamol, oral

B. Essential equipment for palliative care:

- Appropriate personal protective equipment (PPE) for healthcare workers and patients
- Pressure-reducing mattresses
- Nasogastric drainage and feeding tubes
- Urinary catheters
- Opioid lock boxes
- Adult diapers or cotton and plastic

C. Essential social supports for patients living in poverty:

- Cash transfers to cover housing, children's school tuition, transportation to health care facilities or funeral costs
- Food packages
- Other in-kind support (blankets, sleeping mats, shoes, soap, toothbrushes, toothpaste)

D. Essential human resources in addition to doctors and nurses:

- Social workers or psychologists
- Access to local spiritual counsellors
- Palliative home care providers (such as doctors, nurses, social workers, supervised community health workers)

E. Essential locations of palliative care for COVID-19 patients:

- Hospitals: Palliative care does not require a separate ward or department and can be provided in any ward.
- Inpatient hospices
- Patient's homes

7.4.2. **Table 21. Palliative treatments**

Symptom	Treatment
Dyspnea	– Oxygen – If pulmonary edema also may be present, consider furosemide – If the patient also may have COPD or asthma, use bronchodilators and consider steroid. – See recommendations in this chapter on opiate use to reduce dyspnea. – For respiratory secretions that are troubling for the patient: hyoscine butylbromide 10-20 mg orally or 10mg IV/SC 3-4 times/day as needed or scheduled
Pain	– For mild pain: paracetamol – For moderate or severe pain in opioid-naïve patient, morphine 5mg orally (2mg IV) Q1H as needed. – If frequent doses needed, scheduled an effective morphine dose Q4H and add a rescue dose as needed at 10% of the total daily dose.
Nausea / vomiting	– metoclopramide 10mg orally or IV q 6 hours – ondansetron 4 mg orally or IV q 6 hours – Haldol 2.5 mg IV or orally can be used if other drugs are not available or ineffective – Consider other causes such as gastritis, constipation or anxiety
Constipation	– Can be caused by slow transit due to opioid, anticholinergic medicines, immobility, volume depletion: bisacodyl 5 – 10mg orally QD – BID – Lactulose 15 – 30ml orally QD - BID
Anxiety	– Most common cause in patients with COVID-19 is dyspnea. Anxiety usually resolves when dyspnea resolves or is adequately relieved with morphine as above. – In young patients, diazepam can be used, but avoid benzodiazepines in older patients. – Haloperidol 1-2.5 mg orally or IV Q4H as needed. Can also be scheduled Q6 – 8 H. – For moderate or severe anxiety in a patient expected to survive, start fluoxetine 20mg orally daily. Increase dose as needed every 7 days to achieve good effect, maximum 80mg per day. Other selective serotonin uptake inhibitors (SSRIs) that can be used instead of fluoxetine include sertraline and citalopram.
Depression	– SSRI as above
Delirium & agitation	– Non-pharmacologic interventions include placing patient in a quiet location, frequent re-orientation, promoting normal sleep-wake cycles, avoiding benzodiazepines. – Haloperidol 1–5 mg orally or IV Q4H can be used as needed. It also can be scheduled Q6 – 8H

7.5. Caregiver Needs

Family caregivers are at risk for the same types of psychological, social, and spiritual distress as patients and for becoming infected.

Family caregivers for patients unable to care for themselves at home:

- Should be given access to adequate training in caregiving and infection control and to appropriate personal protective equipment.

Should have access to the same psychological, social and spiritual care as patients, and also bereavement support

8. Mental Health and Psychosocial Support

The greatest cause of disability globally is poor mental health, compounded by poverty, conflict, the effects of climate change, and most recently, the COVID-19 pandemic. This unprecedented global pandemic has significantly affected many people's mental health and restricted access to care for those with existing mental health conditions. The mental health impacts of COVID-19 can include increased anxiety and fear about the spread of the virus, loss of social networks, stressful experiences of healthcare workers on the frontlines, higher risk of substance misuse, or other mental health effects. Partners In Health mental health teams around the globe developed, adapted, and implemented the following recommendations to their local COVID-19 MHPSS response. Click here to learn more.

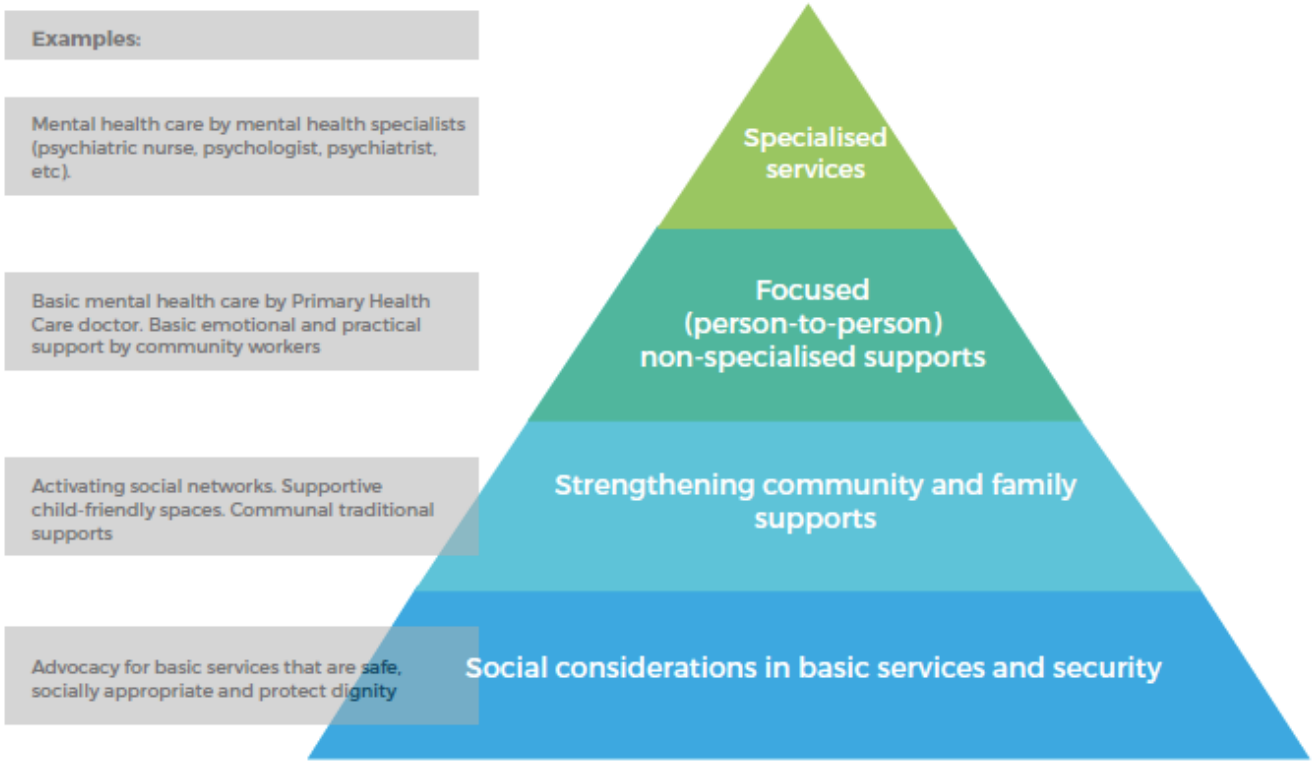
The following guidelines have been articulated to help teams to mount a mental health and psychosocial response to the COVID-19 pandemic. These guidelines are in part adapted from the Inter-Agency Standing Committee (IASC) Guidelines on Mental Health and Psychosocial Support in Emergency Settings, the latest WHO updates for COVID-19 response, and previously articulated PIH guidelines. Partners In Health was a member of the Inter-agency Standing Committee Reference Group formed in March 2020 along with 57 other humanitarian organizations around the globe. The Group developed an Interim Briefing Note Addressing Mental Health and Psychosocial Aspects of COVID-19 Outbreak.[45] Subsequently, a more comprehensive guide has been released, entitled IASC Guidance on Operational considerations for Multisectoral Mental Health and Psychosocial Support Programmes during the COVID-19 Pandemic.[46] Additional documents and tools are accessible on the IASC website and are available in several languages.

The PIH Cross-Site Mental Health team have compiled guidelines, training materials, tools, and forms utilized in the COVID-19 MHPSS response across contexts. All materials are available upon request and along with an adaptation guide to tailor the materials to your context. Please click here to complete the material request form.

8.1. Initial Response

The Guidelines recommend that multiple levels of interventions be integrated within outbreak response activities.[45–50] These levels align with a spectrum of mental health and psychosocial needs and are represented in a pyramid of interventions ranging from embedding social and cultural considerations in basic services, to providing specialized services for individuals with more severe conditions (Figure 8).

8.1.1. **Figure 8. Intervention pyramid for mental health and psychosocial support**[51]



During the first acute emergency stage, the focus of mental health and psychosocial support response should be to work closely with the broader health and public health system to strengthen efforts of Ministries of Health on infection risk management and treatment, including: 1) prevention of COVID-19 transmission; 2) support of surveillance, case triage and contact tracing; 3) support of persons testing positive and those in quarantine/isolation, as well as their family members; and 4) support for health care workers.

8.2. Recommended Initial Actions in the Acute Phase of the Response

- Facilitate collaboration across teams and stakeholders, both within PIH (such as community health and social support programs) and with Ministries of Health, to ensure a coordinated response.
- Develop a plan to continue supporting the ongoing mental health and psychosocial support services (MHPSS) at sites.
- Assess what human, financial and other resources are available for the COVID-19 response.
- Establish a strategy for supporting specific groups affected by the pandemic, including individuals testing positive for COVID-19, those in quarantine/isolation, and their families, as well as the elderly, those with disabilities, and children.
- Work closely with community health workers (CHWs) to ensure that front-line workers have accurate information on COVID-19.
- Train all front-line workers on essential psychosocial care principles, including communication techniques, psychosocial care principles, psychological support, and referral pathways.
- Develop an M&E system for MHPSS activities

8.3. Considerations for Maintaining and Adapting Ongoing Services

A. Community level

- Ensure community health workers and traditional healers have adequate PPE for home visits.
- Create a list of the most vulnerable patients in care and determine an essential social support package.
- Create a list of high-risk patients to ensure remote care, safety plans, and/or sufficient medication supply is provided.
- Maintain at least a 2 meter distance between the patient and caregivers, except when medically necessary. Explain to patients and caregivers the need for this prevention measure.

B. Health facility level

- Limit the need for patients to come to the health facility by shifting to remote services, particularly for those at high risk for contracting COVID-19 and home visits to the most vulnerable patients. See additional guidance below on remote services.
- Ensure seating areas in the waiting room are adequately spread out.
- Limit the number of people accompanying a patient to the health facility.
- Work with the pharmacy team to obtain extended medication supply for stable patients.

C. Remote services and supervision

- Determine the best, most accessible platform for calls with patients considering costs and network reliability.
- Ensure a private and safe space is available for both the provider and the patient.
- Utilize safe, secure, and appropriate channels of communication.
- Establish referral pathways with supervisors for those with severe psychological distress.
- Allocate resources for talk time to ensure staff and patients connect via phone and video call remotely.
- Define clear times when providers will be available for sessions.
- Schedule times for regular clinical supervision with staff.

8.4. Considerations for Psychological First Aid Training and Implementation

A. Psychological First Aid (PFA) overview[52]

- Psychological first aid describes a humane, supportive response to a fellow human being who is suffering and who may need support. PFA involves helping people to feel safe, connected to others, calm, and hopeful; have access to social, physical, and emotional support; and feel able to help themselves, as individuals and communities.
- Click here to access the WHO PFA manual (available in multiple languages).
- PFA and MHPSS training materials developed by Partners In Health are available upon request. Please click here to complete the material request form.

B. Psychological First Aid training

- The recommended length for a PFA training is 3 hours and topics include: principles of PFA, special considerations for vulnerable populations, and referral pathways for additional psychological care (as required).
- The PFA training materials and activities should be adapted to the context.
- Anyone, mental health care providers, community health workers, general healthcare workers, support staff, etc., can be trained in and provide PFA.
- PFA training can be standalone or adapted to be a part of existing COVID-19 related trainings. Additional trainings can be conducted as needed.

8.4.1. **Figure 9. Psychological First Aid (PFA) quick reference sheet developed by Partners In Health.**

PFA Action Principle		Guidance on Providing PFA Action Principles	Key Psychological Phrases to convey connection, interest and empathy
Prepare		• Ensure your personal physical and emotional safety before offering care and support to others • Learn about up-to-date safety and security concerns, Learn about availability of social services • Prepare simple relaxation strategies or information on practicing and reinforcing coping skills	*Questions the PFA Provider can assess to ensure personal safety: • *Where are the COVID-19 hot spots in my area?* • *Which areas should be avoided?* • *What are current safety guidelines in place that I need to adhere to face masks, social distancing, curfews, etc.?*
Look		• Look for ways to check for safety and check for urgent basic needs • Look for ways to calm and orient emotionally overwhelmed clients • Look for people with serious distress reactions • Attempt to make contact (call, SMS, video conference) with people who may need support	• *"Are you able to safely get water and food for you and your family?"* • *"Do you have someone in your household who you can trust and talk with about this confidentially?"* • *"Do you have a safe living situation right now?"*
Listen		• Ask about people's immediate needs and concerns • Demonstrate active listening, interest and empathy • Create a sense of calm by emphasizing the present and the practical • Create a sense of safety by supporting a person and helping them feel calm	• *"I understand your concerns and most do think a lot about the situation ..."* • *"It is very natural to be sad, angry, upset ..."* • *"I hear what you are saying, about having to ..."* • *"In this situation, your reaction is quite natural ..."*
Link		• Help establish brief or on-going contacts with support persons or other sources of support, including family members, friends and community helping resources • Help people address basic needs and access services • Help provide information or tools about stress reactions and coping to reduce distress and promote adaptive functioning.	• *"Maybe we can discuss possible solutions ..."* • *"What we can offer is ... "* • *"I am concerned about you and would like to refer you to someone who can further help you...."*

8.5. Strategies for Supporting Vulnerable Groups

A. <u>Supporting older adults</u>

- Older adults with cognitive deficits/decline/dementia may become more anxious, angry, stressed, agitated, and withdrawn during the outbreak/while in quarantine. Provide practical and emotional support through informal networks (families) and health professionals.
- Share simple facts about what is going on and give clear information about how to reduce the risk of infection in words older people with/without cognitive impairment can understand. Engage their family and other support networks in providing information and helping them practice prevention measures (e.g. handwashing etc.)
- Encourage older adults with expertise, experiences and strengths to volunteer in community efforts to respond to the COVID-19 outbreak (for example the well/healthy retired older population can provide peer support, neighbor checking, and childcare for medical personnel restricted in hospitals fighting against COVID-19.)

B. <u>Supporting people with disabilities</u>

- Assist people with physical, intellectual, cognitive, or psychosocial disabilities access information related to key information about the COVID-19 outbreak. Messages should be shared in understandable ways to people with intellectual, cognitive, and psychosocial disabilities. Forms of communication that do not rely solely on written information should be designed and utilized.
- If caregivers need to be moved into quarantine, plans should be made to ensure continued support for people with disabilities who need care and support.

- Community-based organizations and leaders in the community can be useful partners in communicating and providing MHPSS support for people with disabilities who have been separated from their families and caregivers.
- People with disabilities and their caregivers should be included in all stages of the outbreak response.

C. Supporting people in isolation

- Recommend staying connected and maintain social networks while self-isolating through phone and/or social media (in moderation).
- Try as much as possible to keep personal daily routines.
- Assist individuals with paying attention to their own needs and feelings. Help to identify healthy activities they enjoy and find relaxing.

D. Messaging strategies for special populations

- This document from the WHO[49] contains messages for various audiences including the general population, healthcare workers, managers in health facilities, caregivers of children, older adults, people with underlying health conditions, and people in isolation.

8.6. Strategies for Supporting Health Care Workers

Frontline workers (including nurses, doctors, ambulance drivers, case identifiers, community health workers, and others) may experience additional stressors during the COVID-19 outbreak.

A. Self-help strategies to manage stress

- Look after your physical health
- Take care of your basic needs and use helpful coping strategies
- Have rest times during work or between shifts
- Make healthy food choices
- Engage in physical activity and stay in contact with family and friends
- Turn to your colleagues, your manager, or other trusted persons for social support (your colleagues may be having similar experiences to you).

B. Support needed from institutions

- Show empathy and be available: Understand that everyone is likely feeling overwhelmed and anxious about circumstances related to the virus.
- Help keep staff, managers, and team leads protected from chronic stress and poor mental health during this response, so they will have a better capacity to fulfill their roles.
- Ensure good quality communication and accurate information updates are provided to all staff.
- Rotate workers from high-stress to lower-stress functions.
- Partner inexperienced workers with their more experienced colleagues.
- The buddy system helps to provide support, monitor stress, and reinforce safety procedures. Ensure that outreach personnel enter the community in pairs.
- Initiate, encourage, and monitor work breaks.
- Implement a flexible work schedule/time for workers. Staff may need additional time to attend to extra personal matters.
- If you are a team leader or manager in a health facility, facilitate access to, and ensure staff is aware of where they can access mental health and psychosocial support services.
- Managers must be able to role-model self-care strategies to mitigate stress.
- Orient responders, including nurses, ambulance drivers, volunteers, case identifiers, teachers and community leaders, and workers in quarantine sites, on how to provide basic emotional and practical support to affected people using (e.g. psychological first aid).

8.7. Self-Care and Coping Strategies

Sharing of helpful information and coping strategies to help all community members adapt to social distancing, and a situation of "acute on chronic uncertainty"

- It is normal to feel sad, distressed, worried, confused, scared, or angry during this crisis. Anxiety-related directly to fear of contracting COVID-19 or related to the short- or long-term consequences of the crisis related to COVID-19, is normal. Talk to people you trust. Contact your friends and family.
- Social distancing does not mean emotional distancing; use technology to connect widely. Keep in touch with family and friends through email, phone calls, video chat, and use of social media platforms.
- While staying at home maintain a consistent routine and a healthy lifestyle (including a proper diet, sleep, exercise, and social contact with loved ones at home and through the use of technology). Exercise and physical activity daily. Try to maintain clear routines and schedule, 7 days a week—don't go overboard, particularly with children. Don't let your own anxiety dictate an overly rigid schedule for children.
- Maintain a tone of positive family time in the household. It is essential to work together as a household to manage tensions and provide positive support to children, elderly and vulnerable family, and community members. All need to feel safe and have a sense of power and responsibility until there is greater clarity. Work together to counter the negativity. In crises such as these child abuse can increase in some households.
- Model positive behaviors for children. Be conscious of the use of language, or the expression on strong emotions. Don't use tobacco, alcohol, or other drugs to cope with your emotions. These promote depression, erratic behavior, and poor sleep.
- Limit exposure to television and internet news; choose small windows and then find ways to cleanse yourself of it. Search information from reliable sources, reduce time looking for information (1-2 times per day, rather than every hour) and reduce time paying attention to rumors.
- Remember the things that you enjoy doing, that you can do in this situation, and find a way to do them. Draw on skills that you have used in the past during difficult times to manage your emotions during this crisis.
- Engage in relaxation or spiritual exercises (e.g. breathing, meditation, mindfulness, religious practice), as well as physical movement (stretching, yoga)
- Bathe daily, if possible, to reinforce the feeling of cleanliness.
- If you feel overwhelmed, talk to a health worker, social worker, similar professional, or another trusted person in your community (e.g., religious leader or community elder), or by phone or video.
- Have a plan where to go and seek help for physical and mental health and psychosocial needs, if required.

8.8. Supporting Reintegration

Individuals affected by COVID-19 and their families may need support integrating into the community. Some strategies include:

- Educating community members about COVID-19 signs, symptoms, and addressing misconceptions.
- Encourage community members to provide support to individual and family members.
- Be aware of different emotional reactions related to COVID-19 that a person may experience.

8.9. Social Support and COVID-19

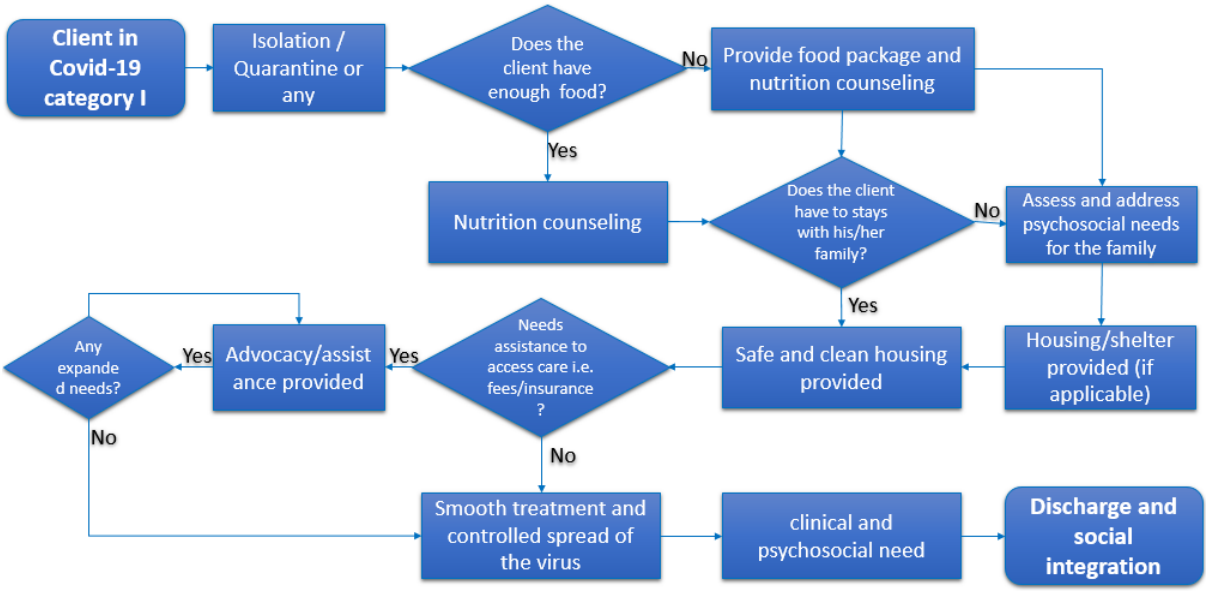
Social support is integral to PIH's mental health and psychosocial response approach to COVID-19 and encompasses nutritional, housing, hygiene supplies, cash

transfers, insurance, and transportation support. People with existing mental health conditions and emerging challenges due to the COVID-19 pandemic require access to social support to enhance treatment success and/or stops the spread of the virus and provides essential components to maximize prevention among the most vulnerable groups. Social support criteria, processes, and packages may vary depending on context and resources. Restrictions in movement and disruptions in supply chains can cause many vulnerable patients unable to access food or inhibit their ability to work and cause economic strain. It is important to forecast and plan for an increased need for social support during the COVID-19.

8.9.1. **Table 22. Vulnerable populations for social support**

Category I	Patient diagnosed with coronavirus Individuals in isolation/quarantine Patient with severe co-morbidity Homeless populations
Category II	Health care workers, including CHWs Older adults (sick or not) People with pre-existing chronic conditions (e.g. lung disease, HIV, TB, heart disease, diabetes)
Category III	Non-exposed family members (children, pregnant women, disabled Poor families (living in slums)

8.9.2. **Figure 10. COVID-19 Social support algorithm**



8.9.3. **Table 23. Social support package**

Home-based care*	Hygiene kit: soap, water bucket, towel, sanitary pads, detergent, bleach, Plate/cup/fork for patient to use exclusively Food packages
Inpatient care	Food packages Cash transfers for prolonged stay where possible
Homeless Populations	Housing Food package Hygiene supplies

*Please note that masks should not be given for home-based care as they should be conserved to protect health care workers and social distancing >1 meter should be used at home instead.

8.10. Monitoring and Evaluation Recommendations

It is important to establish monitoring, evaluation, accountability, and learning mechanisms to measure effective MHPSS activities. Tools such as logframes or theory of change frameworks can be useful in integrating MHPSS indicators into the broader COVID-19 response strategy and establishing goals of your MHPSS activities. Additional guidance on COVID-19 data collection can be found in Section 10 of this guide and the PIH COVID-19 Guide Part 1: Testing, Contact Tracing, and Community Management of COVID-19.

A. Additional M&E suggestions include:

- Establishing clear care pathways MHPSS response activities and articulating patient flow and interventions provided at different care levels. This can aid in defining what types of data collection and analysis is needed at different points in the care pathway.
- Develop data collection tools and job aids, such as a PFA tracker sheet or social support checklist, that can aid providers in documenting and delivering care.
- Build-in time to review data regularly (reviewing targets and data trends) to make informed decisions about MHPSS activities.
- When collecting information to measure results against a goal and/or outcome, data must be inclusive of groups that have special needs or that are likely to respond to interventions differently. Therefore, any indicators being measured must collect data that are disaggregated, including but not limited to gender and different age ranges, including age ranges for children and adults. Depending on the context or the program being implemented, it may also be necessary to disaggregate data by ethnicity, identity status (for example, refugee versus host), disability, education, etc.
- Consider access to and ability to use specific mobile technologies for rapid data collection/monitoring of activities.

9. Community Health Worker Roles in COVID-19 Response

Community Health Workers (CHWs) are in a unique position to help with the response. Programs should address with existing CHWs about how this will impact their work and their individual risk tolerance, as the response may significantly shift these factors. This is particularly true in places where CHWs are doing routine home visits or other patient contact and likely do not have access to PPE. Routine workflows may need to be changed in order to adequately protect CHWs. This could include measures such as conducting routine home visits outside and at a distance greater than 1 meter, rather than entering households and doing any activities that require physical contact.

CHWs can help in two ways, detailed in Table 24 below. The decision about this should be guided based on local availability, context, previous training, availability of sufficient hours, funding and compensation, and PPE. All CHWs can do Strategy 1; Strategy 2 is ideal but only if sufficiently equipped to avoid putting CHWs at risk.

9.1.1. Table 24. Roles of CHW in COVID-19 epidemic

Strategy 1: Information and advising *Maintain safe distance (>2 meter); do not enter homes; do not meet groups; do not touch patients*	
Community education	Disseminate information, answer questions, encourage social distancing, inform when to seek care. Possible mechanisms: Fliers to leave at houses; bullhorn for village communication; consider possible cases at a distance; distribute paracetamol and ORS generously (treatment and trust)
Strategy 2: Active accompaniment *Requires sufficient funding, staffing hours, PPE, and data systems. Consider working in teams. Preparation includes mapping catchment areas and dividing up which teams visit where and how to relay back information. Known cases should be mapped and communicated with the coordinating hospital.*	
Case finding	Symptom based screening. Community rapid tests can be administered by CHWs. Some tests will be similar to rapid malaria tests (which may require little additional training for CHWs who do integrated community care management), and some may be nasal swabs (which may require some additional training).
Contact tracing	Contact and household tracing of known contacts. Follow up and assess for symptoms. Facilitate referral to a facility when necessary.
Home testing	If training possible, perform rapid test in the community for contacts and other community members meeting testing requirements.
Home based care	Ensure understanding of quarantine, hygiene, and distancing protocols. Routine check-ins as possible (at least twice a week) to monitor for worsening symptoms and possible need for referral to a facility. Facilitate transport if severe cases are identified: where possible, call health facility to inform them and ask for ambulance transport.

10. Data Collection

10.1. Data Flow

Data collection tools have been designed in a modular fashion, to allow for flexible adoption across disparate care delivery contexts. While most forms have been designed for settings where paper and Excel-based data entry are the primary solution, this content has also been integrated into various digital health platforms, including CommCare (for screening, testing, and contact tracing) and OpenMRS (for laboratory services and inpatient care).

The goal for all the data collection solutions profiled below is to facilitate data-driven service provision while also minimizing data entry burdens on busy staff.

10.2. Forms

Based on WHO standard forms and input from PIH's clinical leads, individual-level forms have been developed to cover the following topics:

- Symptom screening for COVID-19 cases and contacts
- Lab testing registers & lab request & result forms
- Patient intake and exposure history for COVID-19 cases and contacts
- Facility admission, daily progress, and discharge forms
- Final outcomes for COVID-19 cases and contacts

Additionally, several registers have been developed to facilitate efficient tracking of large numbers of cases and contacts who may need to be followed over time in community and facility settings:

- Contact tracing and isolation monitoring register for COVID-19 contacts
- Suspected case testing follow-up register
- Case monitoring in community register
- COVID-19 Patient treatment register

The data collection annex provides PDF copies of each form along with more detailed information on how and where they may be useful. Editable versions of all forms and French translations can be accessed here (requires PIH log in). If you have questions about these forms or difficulty accessing the editable versions, please contact Annie Michaelis (amichaelis@pih.org).

10.3. Practical Concerns

In times like these where PPE is in short supply and we are fighting a disease with high transmissibility, data collection practices must adapt[53]—for example, paper forms should not exit isolation areas and data collection staff should not enter these areas unless they are equipped with appropriate PPE. In order to continue collecting data under these circumstances, some creative tactics may be employed.

For example, clinicians with appropriate PPE use paper forms to record vital information. For information that needs to leave the isolation unit for programmatic or research purposes, a cell phone or tablet can be used to photograph the data forms. Data clerks outside the isolation unit can then enter the data from the photographs into Excel. If the isolation unit is internet connected, the photos can be securely transmitted electronically, using Microsoft 365 shared folders or other encrypted file sharing solution (email Dave Mayo dmayo@pih.org for advice on specific secure data transfer options). If the isolation units are not internet connected, the cell phone or tablet can be sterilized and brought out of the isolation unit to share the photos with

data clerks through wired upload from phone to laptop. Alternatively, some sites with reliable local area networks and/or wifi connection are using OpenMRS and/or CommCare on tablets and laptops to facilitate point of care electronic data entry and easy access to the same patient information both within and outside isolation units.

For community health workers or other outreach staff collecting data at households or other community settings, IDinsight has created a helpful guide with resources for maximizing staff safety even as they engage in this important work (https://www.idinsight.org/data-collection-practices-and-recommendations-for-COVID-19)

10.4. Digital Data Collection Tools

For sites with sufficient human resources and other required infrastructure, digital data solutions may allow health workers to avoid lengthy paper forms and benefit from real-time decision support and other features available through phone or tablet-based applications. Currently, there are a variety of COVID-19 modules built in software platforms that are commonly used at PIH sites, specifically:[54]

- **CommCare**: A variety of CommCare applications have been developed to support COVID-19 contact tracing, screening, and testing. Information on applications developed for US contexts can be found here. Live demonstrations of the app developed by PIH and Zanmi Lasante for use in Haiti and other global contexts are available upon request (please email Natalie Price, nprice@pih.org for more info) or see here (requires PIH log in) for recorded demos and user manuals.
- **OpenMRS**: COVID-19 related laboratory functionality and inpatient care forms are now available on the OpenMRS platform, available in English and French. Please see here (requires PIH log in) for overview materials or contact David Desimone (ddesimone@pih.org) for more information.

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https://partnersinhealth.sharepoint.com/sites/COVID-1919

Part I: PIH Guide to Testing, Contact Tracing, and Community Management of COVID-19 can be found at: https://www.pih.org/covid-response