MANAGEMENT GUIDELINES FOR COVID-19 INFECTION PREVENTION & CONTROL IN THE HEALTHCARE SETTING

Generic LMICs (based on the Philippines vs) of 12/05/20

This operational guideline is based on guidelines of WHO, China, the UK and other countries with experience of COVID-19.

It is a guide, but use local knowledge and judgement, recognising that some points may not be relevant or feasible in your setting.

The aim is to manage people ill with possible COVID while continuing other essential care and prevention.

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Introduction

The COVID-19 epidemic evolves rapidly from the initial few cases and their contacts, with cases doubling every 3 days and rapid spread within the community. Everyone is susceptible to the infection. Everyone needs education on what to do. Symptoms in at least half of the cases are very mild, especially in children and young adults. As such, they continue their activities and spread the infection, unless social distancing – staying at home or keeping 2m apart – are implemented. Patients who are ill, but not severely, can pass on the infection to family and carers, unless they are home isolated for 14 days. Other patients, especially the elderly and/or those with chronic diseases, may get very ill and require oxygen or ventilator support. Within a few weeks of the epidemic, there is a steep climb in cases and deaths. After a few months, the numbers stop rising and then start to decline. But after this first peak of cases, other epidemics with peaks of cases can follow.

This guideline is for managers and health workers in healthcare facilities and meant to supplement the national guidelines stipulated by the Department of Health. Not all hospitals will have the same resources, staffing and context, which is why these guidelines were designed to cover topics broadly. It was developed by a team in China, Toronto Canada and Leeds UK. It will be piloted, revised, and made freely available for adaption and use in any low-middle income country.

Chapter 1 Isolation Area Management

1. Scope of Application

Incoming hospital patients with suspected COVID-19 symptoms should be kept separate from those with non-COVID-19 symptoms at all points of care. All those with suspected COVID-19 symptoms should be directed either to a separate designated isolation area or (initial) tent set up outside the hospital. The entire isolation area should include a reception and waiting area, an emergency room, an observation unit, wards, and an intensive care unit (ICU) separate and disconnected to areas treating patients who are not suspected of having COVID-19. The building layout, staff and workflow should meet the hospital isolation technical regulations and requirements (either national or WHO). Isolation areas should be well ventilated (preferably in negative pressure rooms) and be strictly limited in access to designated and trained hospital personnel. Signs and posters should be clearly posted inside and outside the hospital to distinguish COVID-19 from non-COVID-19 areas.

2. The Reception and Emergency Room

2.1 Scope

Only non-COVID-19 patients are allowed to enter the hospital. Suspected COVID-19 patients are directed to a tent set up outside the hospital where appropriate diagnostics are performed. In the event, that a possible/suspected COVID-19 patient has entered the hospital, they should be kept separate from those with non-COVID-19 symptoms throughout the entrance, reception, emergency room waiting and consultation rooms.

2.2 Layout

Set up an independent tent or room with an exclusive one-way entry passage for patients with suspected COVID-19 symptoms directly from the hospital or emergency department entrance with visible and clear signs, separating them from the no-fever/cough (clean zone) patients.

For the reception area, the following measures should be taken:

1. Clearly indicated signs should direct patients to go to different desks: Desk A if they do not have fever, a cough or difficulty breathing; and Desk B (preferably located entirely in the isolated area and separate from Desk A) if they do have a fever, a cough or difficulty breathing;
    a. Desks A & B could also be separate locations, for example ‘Desk B’ could

be a tent outside of the hospital

2. Instruct the registration staff to ask and confirm the presence of one or more COVID-19 related symptoms
3. Direct patients with non-COVID-19 symptoms to Waiting Area A and direct suspected COVID-19 patients to Waiting Area B.

A. Triage and take vital signs of non-COVID-19 patients. The doctor or clinical officer should consult and manage these patients as per usual care. Outpatients should be instructed on signs of suspected COVID-19, given a telephone number to call for advice, educated on future online consultation/follow up procedures, or return if additional procedures are indicated. Inpatients are admitted to non-COVID-19 wards, which should be located on a different floor or building of the hospital, separate from the designated COVID-19 ward or areas.
B. Patients with suspected COVID-19 symptoms are triaged, vital signs taken, are consulted by the designated COVID-19 doctor/ clinical officer and staff, different from those consulting non-COVID patients. If severely ill, e.g. the patient has great difficulty breathing, signs of acute respiratory distress syndrome and/or sepsis (e.g. CRB65 2+ or NEWS any ‘3’ sign or total score of 5+), the patient should be urgently transferred to the critical care ward or intensive care unit (these are also zoned as either A, normal ’dry’, or B, suspected COVID-19).

3. Designated COVID-19 Isolation Observation Area

3.1 Scope

The designated COVID-19 isolation observation area is an isolated room or series of rooms dedicated to monitoring suspected, probable or confirmed COVID-19 patients and providing interim care for a period of 6 to 24 hours in order to determine the need for inpatient admission following a full assessment of disease severity.

Mildly ill patients without difficulty breathing and no sepsis (CRB65=0 or NEWS 0-1) should be instructed on home isolation procedures, appropriate infection prevention and control measures and signs or symptoms requiring urgent return to the hospital. Layout and workflow should meet hospital isolation requirements.

Moderately ill patients with some but not severe difficulty in breathing, and no sepsis should be transferred to an observation bed for further monitoring, specifically those meeting criteria:

- Dyspnea on exertion (such as when walking upstairs but not while lying flat or in bed)
- Can speak in sentences
- No signs of being severe/sepsis (e.g. CRB65 '1', or NEWS score 2-4) criteria.

Refer to algorithms released for Hospital Care by the Philippine Society for Microbiology and Infection Diseases (PSMID), last updated on April 6, 2020 but subject to change as evidence emerges and guidelines are updated. Below is the algorithm for probable or confirmed COVID-19 Pneumonia.

3.2 Layout

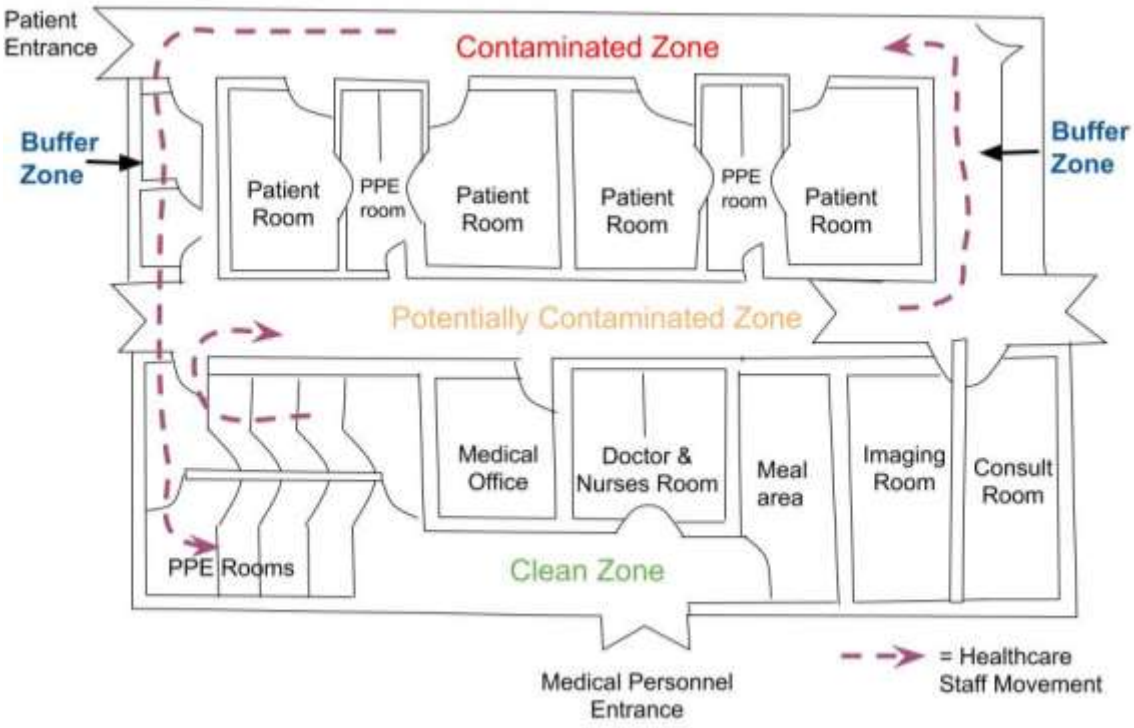
1. Set up an independent tent or room with an exclusive one-way passage for patients with suspected COVID-19 symptoms directly from the suspected COVID-19 patient reception area ("Desk B" patients");
2. Patient and hospital personnel movement should follow the principle of three COVID-19 zones:
    - **A Contaminated Zone** with:
        - Isolation signage
        - PPE donning/doffing rooms before each patient room with signage and PPE supplies (n95, surgical masks, gowns, small/medium/large gloves, face shields)

- Disposable stethoscope and thermometer in patient rooms
- 1 canister of each type of disinfectant wipe in patient rooms: grey top, orange top and purple top wipes

- Red biohazard trash bags only (replace all black trash bags)
- Oxygen source, ventilators etc. as needed

- **A Potentially Contaminated Zone**
  - Isolation signage
  - Ante room entrance logs
  - PPE donning/doffing rooms with signage, PPE supplies (n95, surgical masks, gowns, small/medium/large gloves, face shields) and shower area for gross decontamination
  - Proper use of powered air purifying respirators (PAPR) checklist
  - Red biohazard trash bags
  - 1 canister of each type of disinfectant wipe in patient rooms: grey top, orange top and purple top wipes (see above for illustration)
  - Small biohazard bags for labs
- **A Clean Zone**
  - Staff entrance log
  - Lockers, padlocks and keys for staff personal valuables

The 3 zones should be clearly indicated and demarcated with two buffer zones between the contaminated zone and the potentially contaminated zone. Hand disinfection stations should be present at each transition zones. Entrance to each zone should contain description of appropriate infection prevention and control procedures to be taken at that location.



The graphic above is an example layout of the three COVID-19 zones for observation/in-patient rooms and demonstrates healthcare staff movement. Each hospital will need to create zones adapted to its layout of existing rooms and corridors.

3. Contaminated items should be stored in an independent room in the contaminated area for appropriate disinfection and disposal by staff. Two separate passages should be designated for the one-way delivery of items from office areas to the isolation area: one through either the potentially contaminated or contaminated zone, and another through the clean zone;
4. Flowcharts of different zones and PPE procedures along with full-length mirrors should be provided in all PPE Rooms to ensure appropriate adherence to PPE procedures and strict observation of movement routes;
5. Infection prevention and control (IPC) officers should be designated to supervise medical personnel adherence to PPE donning and doffing procedures so as to prevent contamination;
6. Any item in the contaminated zone should not be removed unless properly disinfected (See Chapter 4.3.2).

3.3 Designated COVID-19 Observation Isolation Area Requirements

1. Suspected and confirmed patients should be further separated in different isolation areas within the unit, each equipped with separate facilities (e.g. comfort

room, sinks, etc.);

2. Confirmed patients can be arranged in the same observation room with bed spacing of no less than 1.2 meters (approximately 4 feet);
3. Monitor all patients in the designated COVID-19 isolation area for vital signs and record the following: respiratory rate, oxygen saturation, pulse, blood pressure and temperature. Additional parameters indicative of clinical deterioration can also be monitored, including changes in sensorium and urine output;
4. Signs of clinical deterioration and decompensation should be addressed immediately and subsequent follow-up plans should be considered, e.g. transfer to inpatient COVID-19 ward, etc.
5. Per shift within the isolation area, there should be at least one doctor or clinical officer on call and one nurse for every five patients, and patient rounds should take place at the beginning of each shift (depending on resource availability);

3.4 Patient Selection & Management

1. Select COVID-19 (suspected, probable or confirmed) patients with symptoms who cannot proceed with outpatient care or home isolation or those who need inpatient admission due to more severe symptoms, such as:
    - Increased difficulty breathing
    - Cannot easily finish complete sentences without taking extra breaths
    - Cannot perform basic self-care activities such as eating and taking a shower
    - Tachypnea and/or abnormalities in other vital signs (e.g. higher CRB65 or NEWS scores);
2. Exclude patients with an unclear diagnosis and/or possible/suspected/confirmed COVID-19 with severe symptoms consistent with requiring an inpatient admission in a COVID-19 ward;
3. Ensure that the patient's condition requires a limited amount of service that is consistent to what is available in the designated COVID-19 observation isolation area;
4. Enforce a strict no visitor policy and confine patient's activity to the isolation ward;
5. Educate patients on standard precautions (e.g. use of use of masks, handwashing, coughing etiquette, etc.)

4. COVID-19 Isolation Ward and Intensive Care Unit

4.1 Scope

The isolation areas include an observation unit, wards, and an intensive care unit (ICU) area (i.e. separate from non COVID-19, non-isolation areas). The building layout, staff and workflow should meet the hospital isolation technical regulation/requirements (national or WHO). Isolation areas should be well ventilated (preferably in negative pressure rooms or rooms equipped with portable air filtration systems if negative pressure room is not available) and with strictly limited staff and visitor access.

4.2 Layout

Please refer to Chapter 1 Section 3.

4.3 Ward Requirements

1. Suspected and confirmed COVID-19 patients should be separated in different ward areas;
2. Suspected patients preferably are isolated in single rooms (or in beds that are at least 2 metres apart) with private facilities or facilities limited to designated patients e.g. comfort rooms;
3. Confirmed patients can be arranged in the same room with bed spacing of no less than 1.2 meters (appx 4 feet) and with dedicated facilities such as a bathroom.

4.4 Patient Management

1. Enforce a strict no-visitor policy but allow patients to use their phones to facilitate interactions with loved ones;
2. Confine patient's activity and movement within the isolation ward;
3. Educate patients and provide instructions on how to wear surgical masks, proper handwashing, cough hygiene (into mask, tissues or elbow of shirt as available), medical observation and home isolation (quarantine).

Chapter 2 Healthcare Staff Management

1. Workflow Management

1. Staff must undergo strict training or on-the-job briefings at the minimum and pass relevant assessments on the PPE Donning and Doffing techniques. (See Chapter 4.3)
2. The staff should be divided into different teams. Each team should be limited to, as possible, 4 hour shifts in the isolation ward.
3. Treatment, examination and disinfection for each team should be arranged as a group to reduce the frequency of staff moving in and out of the isolation wards.
4. Before going off duty, staff must wash themselves and conduct necessary personal hygiene regimens to prevent possible infection of their respiratory tracts and mucosa.

2. Staff Health

1. Frontline staff – healthcare personnel, medical technicians and property and logistics personnel – should live self-isolated away from family members (ideally in isolated accommodations) and avoid social interaction except with similarly exposed colleagues.
2. A nutritious diet should be provided to improve the immunity of medical personnel. Medical personnel should only eat in designated areas, avoid sharing food and practice social distancing while taking breaks.
3. Monitor and record health statuses of all frontline and non-frontline staff members. Conduct health monitoring for frontline staff, including monitoring body temperature and new respiratory symptoms, and address any arising psychological and physiological problems with relevant experts.
4. If a staff member has any relevant COVID-19 symptoms such as fever, they should be isolated immediately and screened with the 2019 nCoV real-time reverse transcription polymerase chain reaction test (rRT-PCR) or nucleic acid test (NAT).
5. After completion of work in the isolation area, frontline staff (healthcare personnel, medical technicians and property and logistics personnel) should first be CoV PCR tested or NAT tested for SARS-CoV-2. If negative, they should be collectively isolated in a specified area for 14 days of medical observation before being discharged to return back to their community.

Chapter 3 Hospital Work Plan Requirements

1. Preparation in the Early Epidemic Period

1.1 Infection, Prevention Control Procedures

1. Strengthen infection, prevention and control (IPC) procedures of infectious respiratory tract diseases, including increasing acquisition and provision of wash basin soap, soap dispensers, hand washing procedure posters, gowns, and masks as well as ensuring rigorous staff training in appropriate IPC measures.

2. Ensure contingency strategies and crisis capacity strategies to optimize supply of PPE and essential healthcare equipment in anticipation of limited hospital supplies during the COVID-19 pandemic as indicated below:
    - Contingency strategies: maximize use of engineering and administrative controls to minimize patient contact, cancel elective/non-urgent procedures, reserve PPE for HCP, use reusable PPE that can be reprocessed, use PPE beyond designated shelf life for training, allow HCP to extend use of PPE beyond single patient contact
    - Crisis capacity strategies: consider intact PPE beyond designated shelf-life, prioritize PPE for select care activities, consider alternative approaches if no commercial PPE available
3. Strengthen surveillance of the pneumonia cases with an unknown aetiology and initiate a tailored emergency backup plan for highly contagious disease outbreak prevention and control
4. Plan for priority emergency ambulance procedures (as for public health emergencies) equipped with oxygen, and highest emergency response protocols for incoming patients with severe difficulty in breathing (in addition to the usual caseloads e.g. chest pain, etc.)
5. Notify and publish technical specifications for all levels for personnel and logistics. Revisit process of disseminating ad hoc updates to technical specifications in order to ensure immediate implementation and adherence to new and rolling guidance across all levels of hospital personnel.

6. Regularly re-assess, update, strengthen and implement technical specifications
7. Suspend outpatient routine procedures e.g. stop routine endoscopies and other non-surgical procedures.

1.2 Testing

1. Set up designated COVID-19 testing sites and implement appropriate protocols depending on the context (availability of mass testing at community sites or limited to hospitals as the testing site)
2. Regulate collection of throat swab samples, including ensuring accurate collection methods and thorough implementation of appropriate IPC procedures
3. Submit suspected COVID-19 related pneumonia samples
4. Favour laboratory tests of suspected COVID-19 patients over point of care testing, which are completed in front of patients, in order to reduce healthcare worker exposure
5. Refer to the guidelines released by the Department of Health as of April 9, 2020 (subject to updates, click or type in the following address: https://www.doh.gov.ph/sites/default/files/health-update/dc2020-0174.pdf)

1.3 Determining, Training and Implementing New Guidance

1. Organize trainings for medical staff on COVID-19 related pneumonia
2. Post advice for COVID-19 IPC in all wards and outpatient/ emergency departments
3. Provide guidance on transfer procedures for mild COVID-19 positive patients
4. Provide guidelines to all medical personnel and post signs and posters accordingly for the admission of patients needing emergency surgery during the epidemic prevention period.
5. Display rules who can/cannot visit inpatients.

2. During the Epidemic ‘Mitigation’ Period

At this point in time, numbers of suspected/probable/confirmed COVID-19 patients are high and/or increasing. The following actions should be taken in order to mitigate the spread of COVID-19 throughout the general population:

1. Provide guidance on admission procedures
    a. Enforce screening of patients for COVID-19 symptoms including: fever, cough and difficulty breathing
    b. Direct suspected, probable or confirmed patients accordingly to COVID-19 outpatient services, observation rooms or inpatient admission;
2. Provide guidance on disease prevention for radiological examinations in fever-cough outpatient (emergency room) clinics and in observation areas;
3. Adapt non-COVID-19 ‘clean’ outpatient care to an appointment-based system;
4. Standardize the diagnosis and treatment of fever-cough and difficulty breathing in hospitalized patients
5. Provide guidance for the consultation of staff with fever and respiratory symptoms
6. Implement contingency strategies and/or crisis capacity strategies to optimize supply of PPE and essential healthcare equipment

Chapter 4 Infection Prevention and Control (IPC) for COVID-19

1. COVID-19 Patient IPC Management

1.1 Patient Instructions

1. Provide a suspected/possible COVID-19 patient with a medical mask after registration at reception and direct the patient to an isolation area.
2. Keep at least a 2-meter (6.5 feet) distance between suspected patients and other patients. Indications for appropriate social distancing can be marked on the floor and seats in high occupancy rooms and/or queue areas.
3. Instruct all patients to cover their nose and mouth with a tissue during coughing or sneezing (and dispose according to correct disposal procedures immediately) or cough or sneeze into the flexed elbow of shirt as available and to frequently wash hands with soap carefully and for at least 20 seconds each time, particularly after contact with respiratory secretions.

1.2 Apply Droplet Precautions

1. Use a medical mask if working within 2 m (6.5 ft) of a patient
2. Limit patient movement and ensure patients wear masks when outside their rooms.
3. Place patients in single rooms as possible, or group patients in respective rooms with the same suspected, probable or confirmed COVID-19 diagnosis. If a lab test confirmed diagnosis is not possible, group patients with similar suspected or probable clinical symptoms. Patients are considered to be probable if they have travel or contact history.
4. Use eye protection (face shield, powered air purifying respirators (PAPR) or goggles) if in close contact with a patient with respiratory symptoms (i.e. coughing or sneezing).

1.3 Apply Contact Precautions

1. Use PPE (medical mask, eye protection, gloves and gown) when entering any room within the designated "potentially contaminated" or "contaminated" zones. Remove PPE and practice hand hygiene following PPE off procedure when leaving.

2. If possible, use equipment (e.g. stethoscopes, blood pressure cuffs, pulse oximeters and thermometers) dedicated to that area. Clean and disinfect shared equipment between each patient use.
3. Ensure that health care workers refrain from touching their eyes, nose and mouth with potentially contaminated gloved or ungloved hands as well as environmental surfaces not directly related to patient care (e.g. door handles and light switches).
4. Avoid medically unnecessary transport of patients

1.4 Apply Airborne Precautions During an Aerosol-Generating Procedure

1. Ensure that health care workers performing aerosol-generating procedures (e.g. swab/suction of the nose or throat, intubation, bronchoscopy, cardiopulmonary resuscitation) use the appropriate PPE, including gloves, long-sleeved gowns, eye protection, and fit-tested particulate respirators (N95 / FL3 or equivalent, or higher level of protection);
2. Check user's mask seal before each use;
3. Use adequately ventilated single rooms or, if available, negative pressure rooms (with a minimum of 12 air changes per hour or at least 160 L/second/patient in facilities with natural ventilation) when performing aerosol-generating procedures;
4. Avoid unnecessary people in the room;
5. Continue airborne precautions on patients commencing mechanical ventilation.

2. Healthcare Staff IPC Management

1. All staff in the healthcare facilities must wear medical surgical masks;
2. All staff working in the emergency department and outpatient departments of infectious diseases, respiratory, gastrointestinal (stomatology, endoscopic) must upgrade from 'surgical' masks to N95 masks/ Level I protection
3. Staff must wear a protective face screen based on Level 2 protection while collecting respiratory specimens from suspected, probable or confirmed patients.

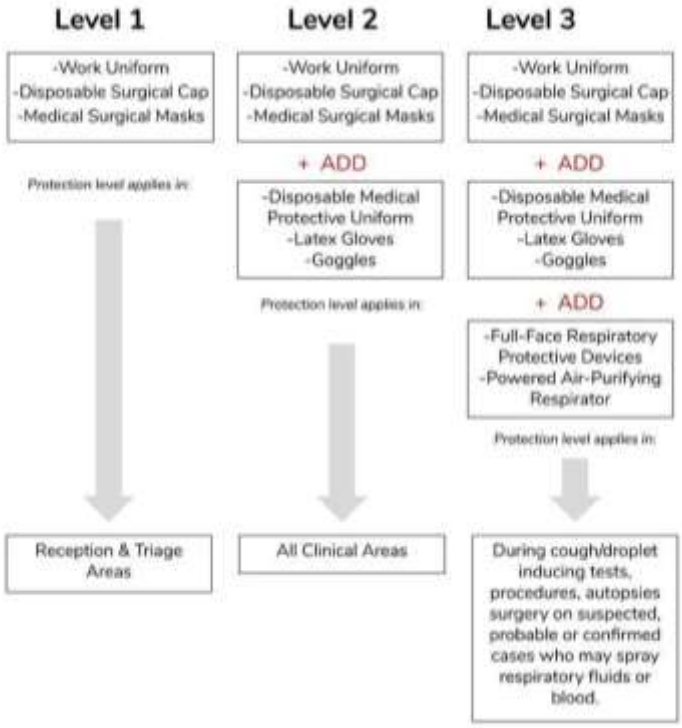
The Levels of Protection – add protective equipment according to the level of risk:

- Level 1: Work uniform, disposable surgical cap and medical surgical masks
- Level 2: Add disposable medical protective uniform, latex gloves, goggles
- Level 3: Add full-face respiratory protective devices or powered air-purifying respirator.

Scope of Protective Equipment Application:

- Level 1: apply in the reception/ triage area

- Level 2: apply in all clinical areas
- Level 3: apply when doing cough/droplet inducing tests, procedures, autopsies surgery on suspected, probable or confirmed cases who may spray respiratory fluids or blood.



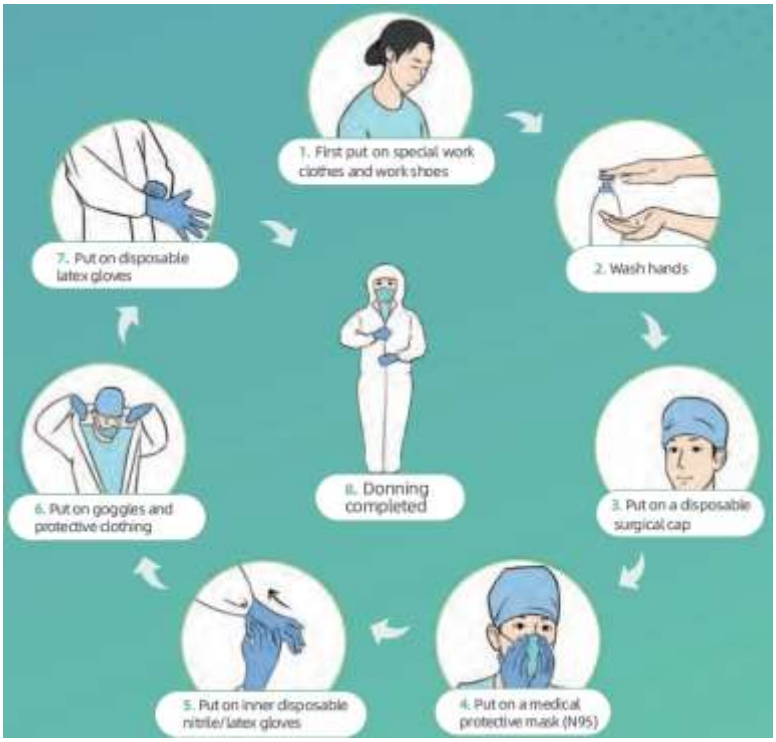
3. IPC Protocols

3.1 PPE Donning and Doffing Procedures

3.1.1 Protocol for Donning full PPE:

1. Put on special work clothes and work shoes
2. Wash hands
3. Put on disposable surgical cap
4. Put on medical protective mask (N95)
5. Put on inner disposable nitrile/latex gloves
6. Put on goggles and protective clothing (note: if wearing protective clothing without foot covers, please also put on separate waterproof boot covers). Put on a disposable isolation gown (if required in work zone) and face shield/powered air-purifying respirator (if required in work zone)
7. Put on outer disposable latex gloves

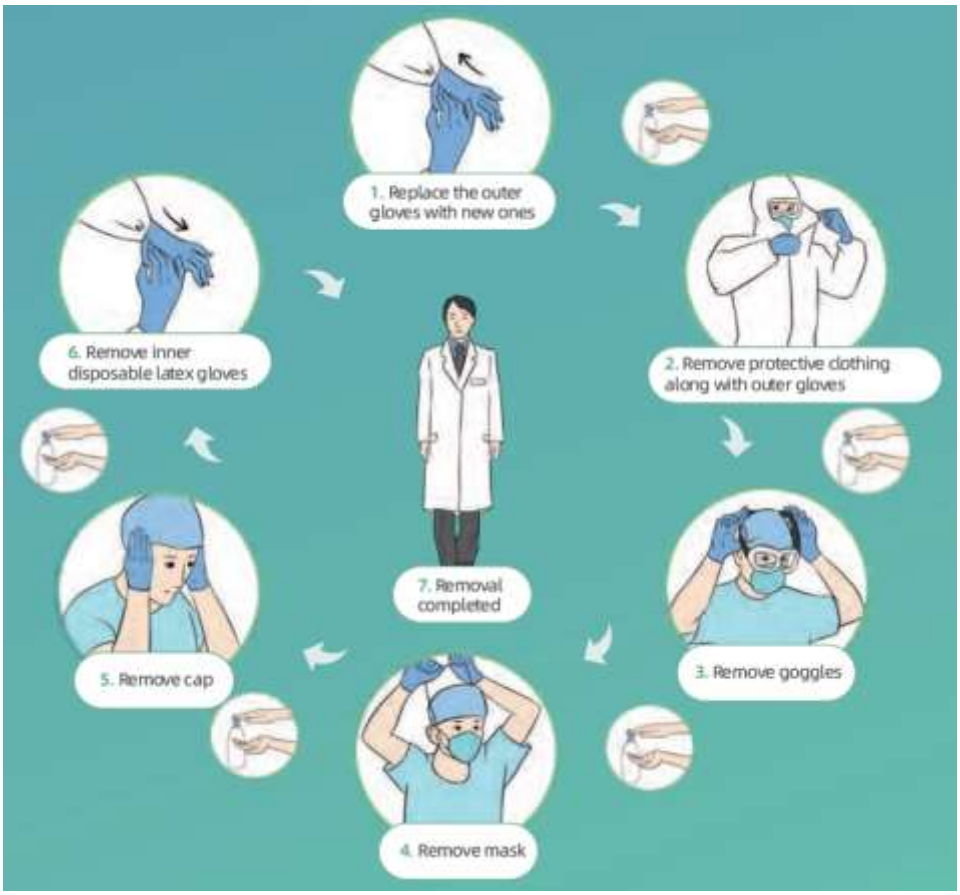
Include country/ regional example



3.1.2 Protocol for Doffing Full PPE:

1. Wash hands to remove visible bodily fluids/blood contaminants on the outer surfaces of both hands
2. Replace outer gloves with new gloves (always turn gloves inside out while rolling them down) → Remove mask (eg powered air-purifying respirator or self-priming filter-type full-face mask, if used) → Wash hands → Remove disposable gowns along with outer gloves (if used) → Wash hands and put on outer gloves → Enter Removal Area No. ①
3. Wash hands and remove protective clothing along with outer gloves (for gloves and protective clothing, turn inside out while rolling them down) (note: if used, remove the waterproof boot covers with clothing) → Wash hands → Enter Removal Area No. ② → Wash hands and remove goggles → Wash hands and remove mask → Wash hands and remove cap → Wash hands and remove inner disposable latex gloves → Wash hands and leave Removal Area No. ② → Wash hands, take a shower, put on clean clothes and enter the clean area.

Include country/ regional example



3.2 Disinfection Procedures for COVID-19 Isolation Wards/Areas

3.2.1 Disinfection for Floor and Walls

1. Visible pollutants should be completely removed before disinfection and handled in accordance with disposal procedures of blood and bodily fluid spills before disinfection;
2. Disinfect the floor and walls with 1000 mg/L chlorine-containing disinfectant through floor mopping, spraying or wiping;
3. Make sure that disinfection is conducted for at least 30 minutes;
4. Disinfect three times a day and repeat the procedure at any time when contamination is suspected.

3.2.2 Disinfection of Object Surfaces

1. Visible pollutants should be completely removed before disinfection and handled in accordance with disposal procedures of blood and bodily fluid spills;
2. Wipe the surfaces of objects with 1000 mg/L chlorine-containing disinfectant or wipes; wait for 30 minutes and then rinse with clean water. Perform disinfection procedure three times a day (repeat at any time when contamination is suspected)

3. Wipe cleaner regions first, then more contaminated regions: first wipe not frequently touched object surfaces, and then wipe frequently touched object surfaces. (Once an object surface is wiped clean, replace the used wipe with a new one).

3.2.3 Air Disinfection

1. Turn off the fan filter unit (FFU);
2. Plasma air sterilizers can be used and continuously run for air disinfection in an environment with human activity;
3. If there are no plasma air sterilizers, disinfect the air by irradiation by ultraviolet lamps for at least 1 hour each time.
4. Turn on the FFU to purity the air automatically for at least 2 hours.
5. Perform this operation three times a day.

3.2.4 Disposal of Faecal Matter and Sewage

1. Before discharge into the municipal drainage system, faecal matter and sewage must be disinfected by treating with chlorine-containing disinfectant (for the initial treatment, the active chlorine must be more than 40 mg/L) for at least 1.5 hours;
2. The concentration of total residual chlorine in disinfected sewage should be 10 mg/L.

3.3. Disposal Procedures for Spills of COVID-19 Patient Blood/Fluids

3.3.1 For Spills of a Small Volume (< 10 mL) of Blood/Bodily Fluids:

1. Option 1: Cover and carefully remove spills with chlorine-containing disinfecting wipes (containing 5000 mg/L effective chlorine), then wipe object surface twice with chlorine-containing disinfecting wipes (with 500 mg/L effective chlorine);
2. Option 2: Carefully remove spills with disposable absorbent materials such as gauze, wipes, etc., which have been soaked in 5000 mg/L chlorine-containing disinfecting solution.

3.3.2 For spills of a Large Volume (>10 mL) of Blood and Bodily Fluids:

1. Place signs to indicate the presence of a spill;
2. Perform disposal procedures according to Option 1 or 2:
    a. Option 1: Absorb the spilled fluids for 30 minutes with a clean absorbent towel (containing peroxyacetic acid absorbing up to 1 L of liquid per towel) and then clean the contaminated area after removing the pollutants.

b. Option 2: Completely cover the spill with disinfectant/bleach powder containing water-absorbing ingredients or with disposable water-absorbing materials and then pour a sufficient amount of 10,000 mg/L chlorine-containing disinfectant onto the water-absorbing material (or cover with a dry towel, which will be subjected to high-level disinfection). Leave for at least 30 minutes before removal.

3. Collect patient bodily fluids into special containers and disinfect for 2 hours with a 20,000 mg/L chlorine-containing disinfectant at a spill-to-disinfectant ratio of 1:2.
4. After removing the spill, disinfect the surfaces of the polluted environment or surrounding objects.
5. Soak and disinfect containers holding the contaminants with 5,000 mg/L active chlorine-containing disinfectant for 30 minutes and then clean.
6. The collected pollutants should be disposed of as medical waste.
7. Place used items into double-layer medical waste bags and dispose as medical waste.

3.4. Surgical Operations for Suspected/Probable/Confirmed Patients

3.4.1 Requirements for Operation Rooms and Staff PPE

1. Arrange the patient in a negative pressure operating room. Verify the temperature, humidity and air pressure in the operation room;
2. Prepare all required items for the operation and use disposable surgical items if possible;
3. All surgical personnel (including surgeons, anaesthetists, nurses) should put on their PPE in the buffer room before entering the operating room: Put on double caps, medical protective masks (N95), medical goggles, medical protective clothing, boot covers, latex gloves, and powered air-purifying respirators;
4. The surgeons and the hand-washing nurses should wear disposable sterile operating clothes and sterile gloves in addition to the PPE as mentioned above;
5. Patients should wear disposable caps and disposable surgical masks;
6. The charge nurses in the buffer room are responsible for delivering items from the buffer area to the negative pressure operating room;
7. During the operation, the buffer room and the operating room should be tightly closed, and the operation must be carried out only if the operation room is under negative pressure;
8. Irrelevant personnel should be excluded from entering the operating room.

3.4.2 Procedures for Final Disinfection

1. Medical waste should be disposed of as COVID-19 related medical waste (see Section 3.6);
2. Reusable medical devices should be disinfected according to the disinfection procedures of COVID-19-related reusable medical devices (See Section 3.8);
3. Medical fabrics should be disinfected and disposed of according to the disinfection procedures for COVID-19 related infectious fabrics (see Section 3.5);
4. For surfaces of objects (instruments and devices including device table, operating table, operating bed, etc.) see Section 3.2.2 Disinfection of Object Surfaces
5. For floors and walls see Section 3.2.1 Disinfection for Floors and Walls
6. For indoor air see Section 3.2.3 Air Disinfection

3.5. Infectious Fabric Disinfection Procedures for Suspected/Probable/Confirmed Patients

3.5.1 Examples of Infectious Fabrics

1. Clothes, bed sheets, bed covers and pillowcases used by patients;
2. Ward area bed curtains;
3. Floor towels used for environmental cleaning.

3.5.2 Collection Methods

1. Pack the fabrics into a disposable water-soluble plastic bag and seal the bag with matching cable ties;
2. Pack this bag into another plastic bag and seal the bag with cable ties in a gooseneck fashion;
3. Pack the plastic bag into a yellow fabric bag and seal the bag with cable ties;
4. Attach a special infection label and the department name
5. Send the bag to the laundry room.

3.5.3 Storage and Washing

1. Infectious fabrics should be separated from other infectious fabrics (non-COVID-19) and washed in a dedicated washing machine;
2. Wash and disinfect these fabrics with chlorine-containing disinfectant at 90 degrees Celsius for at least 30 minutes.

3.5.4 Disinfection of Transport Tools

1. Use specific special transport tools for transporting infectious fabrics;
2. Disinfect tools immediately each time after use for transporting infectious fabrics;
3. Wipe transport tools with chlorine-containing disinfectant (with 1000 mg/L active

chlorine). Leave disinfectant on for 30 minutes before wiping the tools with clean water.

3.6. Disposal Procedures for COVID-19 Related Medical Waste

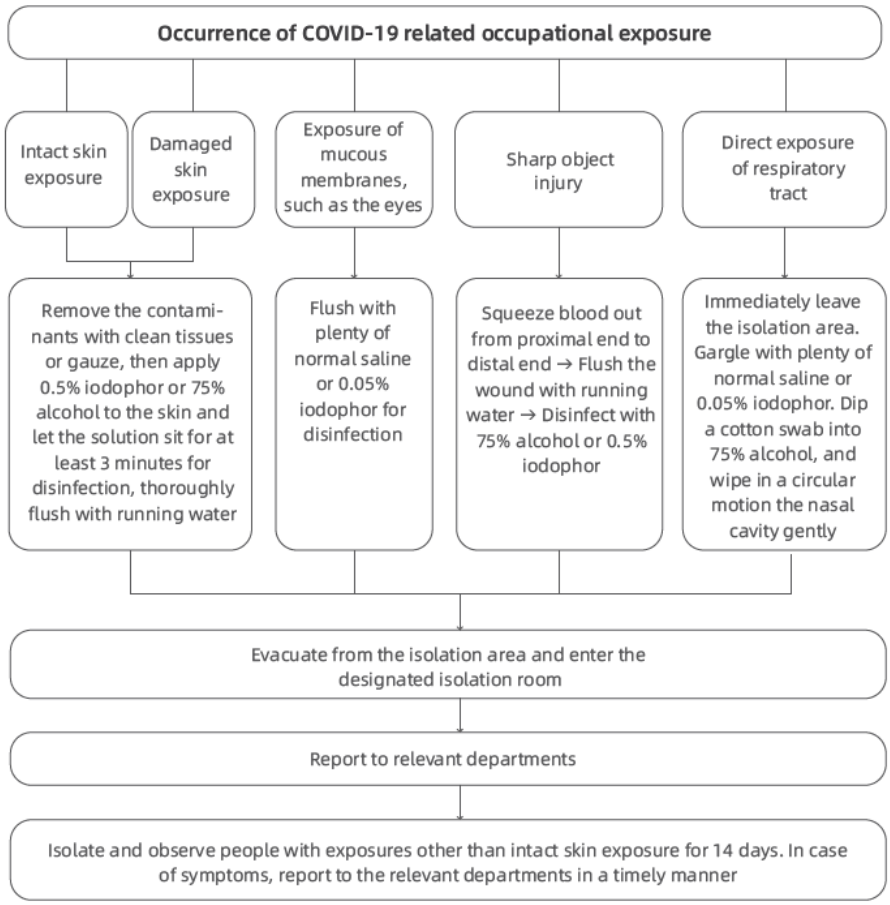
1. Dispose all waste generated from suspected, probable or confirmed patients as medical waste;
2. Put the medical waste into a double-layer medical waste bag, seal with cable ties in a gooseneck fashion and spray the bag with 1000 mg/L chlorine- containing disinfectant;
3. Put sharp objects into a special plastic box, seal and spray it with 1000 mg/L chlorine-containing disinfectant;
4. Put the bagged waste into a medical waste transfer box, attach a special infection label, fully enclose the box
5. Transfer the waste to a temporary storage point for medical waste along a specified route at a fixed time point and store the waste separately at a fixed location;
6. Collect medical waste and dispose using an approved medical waste disposal provider.

3.7. Procedures for Taking Remedial Actions against Occupational Exposure to COVID

3.7.1 Examples of Occupational Exposure

1. Skin exposure: The skin is directly contaminated by a large amount of visible bodily fluids, blood, secretions or faecal matter of a patient.
2. Mucous membrane exposure: Mucous membranes, such as the eyes and respiratory tract are directly contaminated by a patient’s bodily fluids, blood, secretions or faecal matter.
3. Sharp object injury: Piercing of the body by sharp objects that were directly exposed to a patient's bodily fluids, blood, secretions or faecal matter.
4. Direct exposure of respiratory tract: Falling off of a mask, exposing the mouth or nose to a confirmed patient (1 m or 3.3 ft. away) who is not wearing a mask.

3.7.2 Exposure in Hospital and Actions Required



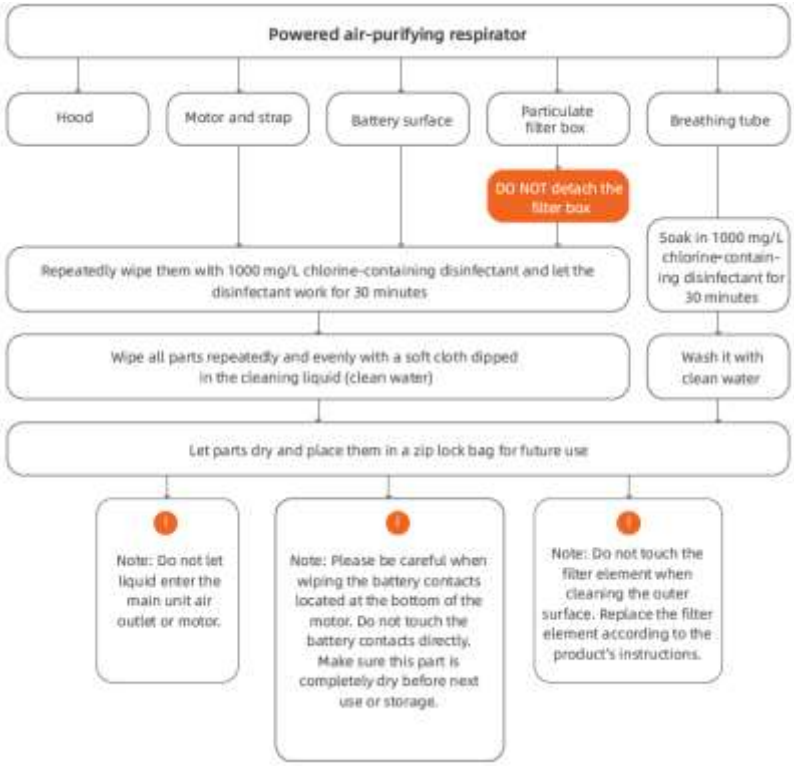
1. Take the following immediate steps if there is an occurrence of COVID-19 occupational exposure, such as:
    a. Intact skin exposure or damaged skin exposure:
        i. Remove the contaminants with clean tissues or gauze,
        ii. Then apply 0.5% iodophor or 75% alcohol to the skin and let the solution sit for at least 3 minutes for disinfection
        iii. Thoroughly flush with running water
    b. Exposure of mucous membranes, such as the eyes:
        i. Flush with plenty of normal saline or 0.05% iodophor for disinfection
    c. Sharp object injury:
        i. Squeeze blood out from proximal end to distal end,
        ii. Flush the wound with running water
        iii. Disinfect with 75% alcohol or 0.05% iodophor
    d. Direct exposure of respiratory tract
        i. Immediately leave the isolation area,
        ii. Gargle with plenty of normal saline or 0.05% iodophor,
        iii. Dip a cotton swab into 75% alcohol, and wipe in a circular motion

the nasal cavity gently

2. Evacuate the isolation area and enter the designated isolation room;
3. Report to relevant departments
4. Isolate and observe peoples with exposures other than intact skin exposure for 14 days. In case of symptoms, report to relevant departments in a timely manner.

3.8. Disinfection of COVID-19 Related Reusable Medical Devices

3.8.1 Disinfection of Powered Air-Purifying Respirator



Note: The disinfection procedures for protective hood described above are only for reusable protective hoods and excludes disposable protective hoods.

3.8.2 Cleaning & Disinfection Procedures for Endoscopy & Bronchofibroscopy

edit out this (and other details) if not relevant in your context

1. Soak the endoscope and reusable valves in 0.23% peroxyacetic acid (confirm the concentration of the disinfectant before use to make sure it will be effective);
2. Connect the perfusion line of each endoscope channel, inject 0.23% peroxyacetic acid liquid into the line with a 50-mL syringe until fully filled, and wait for 5 minutes;
3. Detach the perfusion line and wash each cavity and valve of the endoscope with a disposable special cleaning brush;
4. Put the valves into an ultrasonic oscillator containing enzyme to oscillate it.

Connect the perfusion line of each channel with the endoscope. Inject 0.23% peroxyacetic acid into the line with a 50 mL syringe and flush the line continuously for 5 minutes. Inject air into the line for 1 minute to dry it;

5. Inject clean water into the line with a 50-mL syringe and flush the line continuously for 3 minutes. Inject air into the line for 1 minute to dry it;
6. Perform a leakage test on the endoscope;
7. Put in an automatic endoscopic washing and disinfection machine. Set a high level of disinfection for treatment;
8. Send devices to the disinfection supply center for sterilization with ethylene oxide.

3.8.3 Pre-treatment of Other Reusable Medical Devices

1. If there are no visible pollutants, soak the device in 1000 mg/L chlorine-containing disinfectant for at least 30 minutes;
   If there are any visible pollutants, soak the device in 5000 mg/L chlorine-containing disinfectant for at least 30 minutes;
2. After drying, pack and fully enclose the devices and send them to the disinfection supply center.

3.9. Procedures for Handling Bodies of Deceased Suspected/Probable/Confirmed Patients

3.9.1 General Procedures

1. Staff PPE: The staff must make sure they are fully protected by wearing work clothes, disposable surgical caps, disposable gloves and thick rubber gloves with long sleeves, medical disposable protective clothing, medical protective masks (N95) or powered air purifying respirators (PAPRs), protective face shields, work shoes or rubber boots, waterproof boot covers, waterproof aprons or waterproof isolation gowns, etc.
2. Corpse care: Fill all openings or wounds the patient may have, such as mouth, nose, ears, anus and tracheotomy openings, by using cotton balls or gauze dipped in 3000-5000 mg/L chlorine-containing disinfectant or 0.5% peroxyacetic acid.
3. Wrapping: Wrap the corpse with a double-layer cloth sheet soaked with disinfectant, and pack it into a double-layer, sealed, leak-proof corpse wrapping sheet soaked with chlorine containing disinfectant.
4. The body should be transferred by the staff in the isolation ward of the hospital via the contaminated area to the special elevator, out of the ward and then directly transported to a specified location for cremation by a special vehicle as soon as possible.
5. Final disinfection: Perform final disinfection of the ward and the elevator.

3.9.2 Autopsy Practice and Disposal of Dead Body

COVID-19 related deaths can be grouped arbitrarily into 4 categories:

1. Category I - Death Following Confirmed COVID-19 Infection:
    - Method of disposal
        - Minimum handling
        - No external examination
        - Viewing of the body only by close relatives is allowed in a pre-designated area in hospital
        - No embalming/No autopsy
        - Place the body in a body bag and seal
        - Body should not be viewed after sealing
        - Funeral undertaker should place sealed body bag in a coffin for transportation (coffin should be preferably sealed)
        - Cremate within 24 hours without taking home
    - In case of death occurring in the ward /ICU /ETU:
        - Only use designated body bags or a suitable alternative
        - The dead body should be handled by the attending staff and put in the body bag and kept in a pre-designated place.
        - If the death occurred in ICU, the body should be removed from the machines and placed in a pre-designated area.
    - Need for an Inquest: NOT ESSENTIAL
    - Cremation under the supervision of MOH/ PHI.
2. Category II - Death Following Suspected COVID-19 Infection (awaiting laboratory confirmation) disposal, as above:Minimum handling, External examination only ALSO do **Nasal swab, throat swabs**, (or tracheal aspirate) and perhaps femoral blood sample (centrifuged) to be collected to be sent for analysis.

    Then as above for Viewing of the body only by close relatives, body bag and seal.
    Funeral undertaker should place sealed body bag in a coffin for transportation
    Cremate within 24 hours without taking home
    In case of death occurring in the ward /ICU /ETU, as above.
    An inquest: only if required in country context
    Cremation should be under the supervision of MOH/ PHI along with area police.
3. Category III - Death Following Possible COVID-19 Infection with Suggestive History and Clinical Findings, as above.

4. Category IV - Death Due to *Pneumonia Unlikely* to be Due to COVID-19 Infection
    - Method of disposal
        - External examination -- better to not open body cavities
        - Nasal swab, throat swabs, tracheal aspirate and femoral blood sample (centrifuge) to be collected to be sent for analysis
        - If necessary, perform a true cut lung biopsy
        - Routine disposal
    - Need for an Inquest: if required in country context

Chapter 5: Management of Hospital Supplies

Supply procurement and management is critically important during the COVID-19 pandemic and other healthcare emergencies. The COVID-19 epidemic evolves rapidly from the initial few cases, doubles every 3 days into a steep climb in cases and deaths, and peaks in the number of cases into an eventual decline. Even in developed countries, hospitals are struggling with diminishing equipment and supplies, and compromises have had to be made. Getting supplies takes time, and needs advance planning and procurement.

1. WHO COVID-19 Critical Items List (30 March 2020)

1.1 Personal Protective Equipment (PPE)

- Gloves (examination, surgical)
- Goggles, protective
- Gown, protective
- Face shield
- Mask, surgical, N95, particulate respirator

1.2 Diagnostic Equipment

- Lab screening test kit
- Lab confirmation test kit
- RT-PCR kit
- Extraction kit
- Cartridges for RT-PCR automatic systems
- Swab and Viral transport medium

1.3 Clinical Care Equipment:

- Pulse oximeter
- Concentrator O2, 10L, 230V, 50 Hz + acc.
- Nasal oxygen cannula, with prongs,
- Ventilator patient, for adult, paediatric w/acc.
- CPAP, with tubing and patient interfaces for adult and paediatric, w/acc.
- Suction pump, mechanical
- High-flow nasal cannula (HFNC) w/acc

2. WHO Disease Commodity Package

- Click on link to access the **Disease Commodity Package**

3. WHO COVID-19 Essential Supplies Forecasting Tool

The WHO COVID-19 Essential Supplies Forecasting Tool (ESFT) is designed to help governments, partners, and other stakeholders estimate potential requirements for essential supplies to respond to the current pandemic of COVID-19. Although it provides users with a case number estimation, this calculator is not an epidemiological calculator.

The focus of this tool is to forecast essential supplies: it includes estimation of personal protective equipment, diagnostic equipment, biomedical equipment for case management, essential drugs for supportive care, and consumable medical supplies.

The COVID-19 ESFT tool is intended to be complementary to the Health Workforce tools (Adapt and the Workforce Estimator). Both tools use the same base clinical attack rate ranges and classify health workforce using ILO ISCO codes, but their outputs are intentionally different due to their primary focus.

Access the WHO COVID-19 Essential Supplies Forecasting Tool by clicking on or typing in the following link:

https://www.who.int/docs/default-source/coronaviruse/covid-efst-v1-2.xlsx?sfvrsn=ef11cc11_2

4. Maintaining Other Essential Services During COVID-19

Identify essential services that will be prioritized in their efforts to maintain continuity of service delivery. High-priority categories include:

- Essential prevention for communicable diseases, particularly vaccination;
- Services related to reproductive health, including family planning and care during pregnancy and childbirth;
- Care of vulnerable populations, such as young infants and older adults;
- Provision of medications and supplies for the ongoing management of chronic diseases, including mental health conditions;
- Continuity of critical inpatient therapies;
- Management of emergency health conditions and common acute presentations that require time-sensitive intervention;
- Auxiliary. etc.

Access WHO Operational Guide on Maintaining Essential Services by clicking on or typing in the following link: https://www.who.int/publications-detail/covid-19-operational-guidance-for-maintaining-essential-health-services-during-an-outbreak

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