How to Run a COVID-19 Hospital in Bangladesh

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Preface

Coronavirus Disease-2019 (COVID-19) has been declared as a pandemic by the World Health Organization (WHO) in March 2020. The COVID-19 outbreak originated in Wuhan, China, in December 2019. Bangladesh Government started the preparation to control and contain the pandemic in the country since January 2020 based on National Preparation and Response Plan. As a part of the preparation process a number of documents related to the response are being developed.COVID-19 is an infectious illness of high possibility of human-to-human transmission. The cases once diagnosed will be managed preferably in dedicated hospitals either purposefully built or transformed from existing ones. Some private hospital may be used as well- as COVID-19 hospital or ICUs. Non-COVID hospital will also need to have facility of Triage and transfer to COVID hospital. Whole range of topics for example, human resources, infection prevention and control, safety of the health care providers, communication need to be addressed in a harmonised manner. Considering the urgency this operation manual is prepared by a core group and finalized by many specialists who deserve special thanks. We are grateful for their contribution. We expect that every hospital, who will treat/screen COVID-19 cases will follow/adapt this operation manual.

This is a dynamic document. We will update this manual from time to time to incorporate latest evidence and recommendations of WHO. We welcome every suggestion and feedback on this document.

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Abbreviation:

CHCP	Community Health Care Provider
CMSD	Central Medical Store Depot
COVID-19	Coronavirus Disease 2019
ER	Emergency room
EU	European Union
FRSM	Fluid-resistant (Type IIR) surgical mask
HDU	High dependency unit
HCWs	Health Care Workers
IPC	Infection Prevention and Control
ICU	Intensive Care Unit
IPD	In Patient Department
NIOSH	National Institute for Occupational Safety and Health
NS	Nursing staffs
OPD	Out Patient Department
PPE	Personal Protective Equipment
RT-PCR	Real time- Polymerase Chain Reaction
SARS	Severe acute Respiratory Syndrome
UHC	Upazilla Health Complex

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How to run COVID-19 Hospital in Bangladesh

Introduction:

Operational manual to run a COVID-19 hospital

This operational manual is applicable for all designated COVID-19 hospitals in Bangladesh. This operational guideline will follow seven (07) core elements mentioned below. If any hospital cannot comply or arrange each element mentioned in this manual, the core committee can customize this based on availability of local resources and with discussion of the office of the Director, Hospital, DGHS.A procedure for the self-auditing of compliance with this checklist should be considered.

Six core elements to be followed have been divided into the following areas:

1. Establishment of a core team and key internal and external contact points
2. Human, material and facility capacity
3. Communication and data protection
4. Hand hygiene, personal protective equipment (PPE), and waste management
5. Triage, first contact and prioritization
6. Patient placement, moving of the patients in the facility, and visitor access
7. Environmental cleaning

1. **Establishment of a core team and key internal and external contact points**

Members of the hospital core team:

Chairperson:

1. A member of the hospital management: Director or Superintendent of the hospital.

Member secretary:

2. An infectious disease expert, if not available than an Internal Medicine specialists or Pulmonologists.

Members:

3. A member of the hospital infection prevention and control team (IPC): Virologists/ microbiologists/laboratory medicine specialists/ Resident physician.
4. An expert representing the intensive care unit (ICU): Anesthetist/ Critical care expert.
5. Representative from Emergency room (ER): Any one of the Emergency medical officers.
6. Resident Physician (RP) or Residential Medical Officer (RMO).
7. Representative from Nursing staffs (NS): Matron/ Nursing supervisor/Senior staff nurse.

Core Committee Members	Core Job Responsibility
Chairman	1. Carry on the overall responsibility to ensure that all necessary preventive and protective measures are taken to minimize occupational safety and health risks 2. Ensure adequate IPC and PPE supplies (masks, gloves, goggles, gowns, hand sanitizer, soap and water, cleaning supplies) in sufficient quantity to healthcare or other staff caring for suspected or confirmed COVID-19 patients, such that workers do not incur expenses for occupational safety and health requirements. 3. Responsible for external communication (higher authority, media etc.) and ensure patients data protection. 4. Continuously assess the human, material and facility capacity, need identification and maintenance of supply chain.
Member secretary	1. Provide information, instruction and training on occupational safety and health, including; • Refresher training on infection prevention and control (IPC); and • Use, putting on, taking off and disposal of personal protective equipment (PPE)for all health care workers (HCWs) working on that hospital. 2. Ensure adequate care and treatment to the patients who get admission to the ward, assess and refer the patients who requires advance respiratory support. 3. Collect all necessary documents related to COVID-19

IPC Rep	1. Support the member secretary to arrange and conduct refresher training on infection prevention and control (IPC); and use, putting on, taking off and disposal of personal protective equipment (PPE). 2. Ensure adequate diagnostic facilities, sample collection and biological waste management.
ICU Rep	1. Ensure adequate care and treatment to the patients who are shifted to High dependency unit (HDU) or ICU.
ER Rep	1. Familiarize the whole emergency department to provide appropriate tools to assess, ensure triage, first contact, prioritization and refer the patients accordingly.
RP/ RMO	1. Will coordinate with the Chairman and EMO for patient placement, moving of the patients in the facility, and visitor access. 2. Ensure environmental cleaning with the support of IPC team and relevant staffs.
NS Rep	1. Ensure refresher training on infection prevention and control (IPC); and use, putting on, taking off and disposal of personal protective equipment (PPE) for all the nurses and supporting staffs. 2. Continuously assess the logistical needs of both indoor and outdoor and report to the Chairman and member secretary.

Please ensure:

- A backup member for each of the roles need to be established.
- Full contact details of the core team and backups need to ensure; update regularly and make it easily accessible.
- Please identify a designated space where the core team will meet every day to discuss issues. Please ensure necessary facilities (e.g. meeting rooms, computers, projectors, boards, phones for teleconference, office supplies).
- A procedure to keep track and control of documentation (e.g. procedures, meeting notes, training materials, etc.) is in place. A mechanism is in place to keep documentation updated and staff informed on where to find information.
- Ensure other auxiliary staffs and facilities such as guards/ security officer, ambulance and ambulance driver, engineering and maintenance, laboratory staffs and reagents, laundry, cleaning and waste management area and facilities.
- Designate an area as hospital morgue to keep the dead bodies.
- Make a list of key external contact points (regional and national level) and their backups for case notification, management of cases, suppliers, etc.).

2. Human, material and facility capacity:

Please concentrate on four (4) key elements and ensure the followings:

2.1. Procurement and stock management:

- Ensure regular communication with central medical store depot (CMSD) and Director, Hospital and Director, CDC to acquire the necessary materials (PPE, gloves, masks, re-breathing masks, oxygen etc) and ensure supplies is in place and can be activated on short notice.
- Review your hospital's procurement policy for purchasing regular items and reduce the load from central store. Identify alternative suppliers if requires.
- Ensure a buffer stock of key supplies (e.g. for hand and respiratory hygiene, PPE, isolation, ICU supplies, mechanical respirators) has been acquired.
- Maintain a stock inventory for regular monitoring and update the inventory.
- Make a plan is in place to keep track and custody of key supplies (e.g. PPE, ventilators, cleaning and disinfection material, alcohol solution, etc.) to avoid misuse, overuse or theft.

2.2. Human capacity:

- Make an estimate and confirm 24×7 roster (with back up) of HCWs for triage, emergency room, ICU, laboratory, and the units where the patients will be placed and treated.
- Make an estimate and confirm 24×7 roster (with back up) of non-HCWs (e.g. administration, cleaning personnel, etc.).
- Make sure a plan for staff absences, in particular due to sick leave or having to care for sick people at home. Regularly assess your institute's human resource capacity.
- A mechanism to monitor staff absences is in place, prepare a sick-leave policy for symptomatic staffs.
- Update you training and quick provision of all necessary administration needs as well as equipment for new staff on short notice is in place, and the budget is available and allocated
- Make sure a plan to utilize auxiliary forces like 5th year medical students, university students, retired HCW if situation get worse.
- Make sure a plan is in place to avoid burnout among healthcare and non-HCWs; a maximum number of working hours will be ensured, workloads will be equally distributed, minimum rest times between shifts have been determined, as have been breaks during regular work shifts; a contact point has been appointed who can be addressed if there are problems.
- Make sure psychological support for HCWs when requires.

- Make sure round the clock security team in place to ensure the safety of patients, staff and visitors and key supplies.
- HCW motivation & dissatisfactions be assessed periodically to avert any possible crisis.

2.3. **Facility and material:**

- Regular monitor and calculate the bed occupancy (including the number of patients in isolation), the number of rooms used for isolation, and the number of rooms that can be potentially used for isolation, ICU beds and mechanical ventilators if available (along with the required human resource capacities and supply capacity).
- Make sure a plan to convert other back up rooms if existing facilities are exhausted. Once the number reaches a certain threshold, trigger the progressive conversion of normal rooms to isolation rooms; the capacity for cohorting patients of the same disease need to be calculated.
- Establish a plan to re-allocate the non-isolated patients to other rooms when requires. All staff members should be immediately aware of such changes.
- Regularly calculate the current stocks and the expected additional needs for different scenarios (e.g. hand and respiratory hygiene, PPE, isolation, ventilators, pharmacy, other key supplies) and ensure storage facilities with respect to temperature, humidity, cold-chain, logistics, etc.
- If possible, try to manage access to separate toilets and drinking water facility for patients in the waiting and emergency rooms.
- Please make sure adequate material for isolation units and ICUs, and ensure disinfection procedures are in place, ensure adequate amount of PPE of all sizes are available for HCWs and cleaning personnel.
- Make sure a proper amount of cleaning and disinfection products and adequate number and types of bins for infectious waste are available.
- Make sure a procedure for the management of deceased patients is in place. Establish a separate place as morgue and ensure the custody of the body following available procedures.
- Establish a mechanism in place to ensure that equipment is in perfect working order and can be quickly replaced whenever necessary.

2.4. Laboratory capacity:

- If the hospital has no laboratory capacity, a plan for the sampling and safe shipment of specimens need to establish.
- For hospitals with in-house laboratory capacity, please ensure an appropriate amount of reagents and supplies for diagnostic testing. Ensure an uninterrupted supply.
- A plan should be in place to outsource services if capacities are exceeded.

3. Communication and data protection

Communication, both internal and external is the integral part of hospital management system. Please follow the following steps to ensure smooth and credible communication.

- Established a clear communication lines to your immediate higher authority or to the designated control room to allow rapid communication. Form a core communication team if requires.
- Establish a clear procedure in place to communicate transparently to hospital staff, healthcare and non-healthcare workers; this procedure governs all information on the outbreak, the situation in the hospital, procedures, rules for using PPE, preventive and protection measures, changes in the procedures, and any other information related to the event.
- Try to draft key messages for different groups: HCWs, other staff, patients, visitors, etc. Always try to receive feedback or questions from workers and inform about incidents.
- Appoint a key communication person with a backup member. This shall be the Chair of the core committee or his/her representative. No other hospital staffs or administrative members should make any external communication to avoid any inconsistencies of information.
- The member secretary of the core committee or his/her designated person will daily brief the patients or their relatives/visitors regarding patients health status.
- The appointed key spokesperson will ensure the communication with the media and the public. He/she will check the consistency of the information and seek approval from his higher authority.
- Draft key messages for different groups (journalists, general public, healthcare specialists, etc.).
- Strictly comply with the existing ‘Digital Security Act-2018’ for data protection in accordance with the legislation. All staff should be reminded of data protection rules and ensure strict compliance.

4. Hand hygiene, PPE, and waste management Element/Process Items

4.1. Hand hygiene:

- Soap and paper hand towels should be available in sufficient quantities next to all sinks (both in toilets and next to all hand wash sinks)
- Supplies of alcohol-based hand sanitizers should be available for staff and patients, especially in waiting rooms, triage rooms, examination rooms, and areas for the removal of PPE.
- A procedure to check and refill the supplies should be established and working
- Instructions for the correct hand hygiene procedures have been developed and are ready to be distributed to patients, visitors, healthcare workers and cleaning personnel

4.2. Personal Protective Equipment (PPE):

- The need for PPE needs to be estimated.
- An adequate amount of PPE for protection against contact, droplet, and airborne transmission should be available in different sizes where required.
- A list of available sizes and expiry dates of the stockpiled PPE should be compiled and is up to date.
- Healthcare workers and cleaning personnel must be trained in putting on ('donning') and taking off ('doffing') PPE

The suggested minimal composition of PPE to be used in healthcare settings (COVID-19 Hospital)

The prescribed set of PPE prevents contact, droplet and airborne transmission.

Minimal composition for PPE set to manage suspected or confirmed cases of COVID- 19 Protection Suggested PPE

- Respiratory protection: N95 respirator or N99 respirator/ FFP2 or FFP3 respirator
- Eye protection : Goggles or face shield
- Body protection: Long-sleeved water-resistant gown/Coverall with hair cover
- Hand protection: Gloves

Respiratory protection:

The respirator protects from the inhalation of droplets and particles. Given that the fitting of different types of respirator will vary for each user, the respirator will require a fitting test in order to find the best match of PPE to user. An filtering face piece [N95(FFP2) /N99(FFP3) respirator] should always be used when performing aerosol-generating procedures.

N95/FFP2: Filters at least 95% of airborne particles < 8% inward N/99FFP3: Filters at least 99% of airborne particles < 2% inward leakage

N99/FFP3 provides best protection from aerosols and airborne transmission of COVID- 19.

- N95/FFP2 or N99/FFP3 protection should be decided depending on the pathogen and on the type of exposure.
- N95/FFP2 is considered sufficient for first-contact precautions, transport, visits, and supervision tasks.
- The seal fit is crucial to ensure the specified level of protection.
- Breathing resistance increases with the class of particle filtration.
- N95/FFP2 are more comfortable as they offer less inhalation resistance.
- Valved N99/FFP3 respirators offer less exhalation resistance than un-valved N99/FF3 respirators.
- An exhalation valve makes breathing more comfortable and helps to prevent goggles from fogging.
- Different models and sizes are needed to ensure seal fit in different face physiognomies.

Eye protection:

To prevent exposure of the eye mucosa to the virus, goggles or a face shield should be considered. It is important that the goggles fit the contours of the user's face and are compatible with the respirator.

Body protection:

Coveralls: The coveralls of the PPE ensemble have to be particle-tight and fluid-proof. The zipper of the coveralls needs to be covered by a particle-tight and splash-proof flap with an adhesive strip. A coverall needs to fit the height and posture of the user. The PPE user must be able to move around freely without the coverall being displaced and giving room for fluids to enter the coveralls.

Gown: Long-sleeved water-resistant gowns should be used. This PPE does not need to be sterile, unless used in a sterile environment (e.g. operating room). If water-resistant gowns are not available, single-use plastic aprons can be used on top of the non-water-resistant gowns to prevent body contamination.

Hair covers: Hair covers (surgical hoods) should be worn under the hood of the coveralls to prevent hair from hanging out, where it can get easily contaminated with bodily fluids from the patient. This also prevents the hair from sticking to the flaps and the tape. Ponytails or tying back hair with elastic straps under the hair cover can be uncomfortable while working in the PPE, as the goggles and the respirator's strap can apply point pressure on it.

Separate hood: Using a separate splash-proof hood with an integrated surgical mask offers advantages in the splash protection for the face area. If a separate hood is used, the integrated hood of the coverall needs to folded into the inside of the coverall first.

Hand protection: Gloves should be used when managing suspected or confirmed COVID-19 patients.

PPE users should always use a minimum of two pairs of gloves.

- inner pair of gloves: covering the skin ('like a second skin')
- outer pair of gloves: gloves on top of gloves ('working gloves')

Gloves are available in different thickness, textures, materials, colours and qualities. PPE users should consider the use of different gloves depending on the exposure risk associated with the planned intervention. Glove combinations adapted to specific tasks improve safety and provide the desired tactility or the needed robustness.

Check that the gloves have not expired as this will compromise their integrity. If possible, provide different colours to differentiate inner and outer gloves.

N.B:

- Poor fit of PPE components is an often underestimated risk factor for PPE users.
- Coveralls, respirators, goggles, gloves and boots need to be provided in a variety of sizes.
- Gloves need to fit the PPE user, too big or to small gloves complicate patient care and increase the risk.
- There is no such thing as 'one size fits all' when it comes to PPE components.
- Testing the fit of all PPE components before entering the red zone is mandatory.

Precautions during first assessments:

First contacts between HCWs and COVDI-19 cases can occur in various settings, ranging from airports, public transport, waiting areas in doctor's offices or hospitals, ambulances, emergency rooms up to hospital wards if a patient shows COVID-19 symptoms while being treated for another kind of disease.

At the time of first contact, the staff should immediately assess the transmission risk and take appropriate precautions to avoid secondary infections. A combination of awareness, distancing measures, and the use of appropriate PPE effectively reduces the infection risk.

- By using distancing measures (more than 1.5 metres) and common materials, the infection risk can be significantly reduced.

- PPE components: double gloves, hair cover, impermeable gown, surgical Type IIR face mask (or FFP2 respirator/N95 if available), face shield or goggles, and shoe covers.
- Limit the number of staff that comes into contact with the patient.

Practical hints

- Contact the relevant authorities or reference hospital. If necessary, transfer the patient.
- PPE used for first assessments is not sufficient to perform invasive diagnostic or treatment activities.
- Minimize additional moving of the patient to keep the potentially contaminated zone as small as possible.

Assessment of required PPE level:

Assessing the necessary level of PPE protection is the key to allocating staff in the most effective and appropriate way for the identified risk level. One approach for assigning the appropriate type of PPE lies in analyzing the level of specialization for COVID- 19 cases in different healthcare setting.

PPE estimated needs:

COVID-19: The needs assessments of PPE supplies per patient per day in this short guide are based on the following assumptions:

- Depending on the clinical severity of their condition, patients require different levels of care, with increased care contact necessary for patients with more severe clinical presentation;
- There are three shifts per 24 hours for nursing staff, nursing assistants and cleaners;
- For critically ill patients there are dedicated nursing staff available on a one-to-one basis for each shift;
- Contacts with patients should be limited to that which is strictly necessary for the care of the patient;
- When possible and if well-tolerated, the patient should wear a surgical mask (which mainly protects from exhaled droplets) in order to mitigate the risk of droplet spreading;
- Patient transportation inside and outside the treatment facility should be kept to a minimum (e.g. laboratory and radiology testing, etc.);
- Health professionals should inform/educate the patient about cough etiquette and respiratory hygiene;
- Contact, droplet and airborne transmission precautions should be applied for all care of COVID-19 infection cases.

The amount of PPE used will ultimately depend on the total number of suspected and confirmed cases, the severity of the cases and the duration of hospitalization. The number of sets considered in the following scenarios represents the minimum amount required. In particular, for cases showing severe/critical symptoms, additional procedures may be required (e.g. intubation, central lines, haemodialysis, radiological procedures, etc.). In this case, an additional two to three sets per procedure should be considered.

PPE needs in healthcare settings for the care of patients with suspected or confirmed COVID-19

- For the assessment of a suspected case, a minimum of **three to six sets per case**, distributed as follows:
  - 1-2 sets per patient for nursing staff;
  - One set per patient for medical staff;
  - One set per patient for cleaning staff;
  - 0-2 sets per patient for assistant nursing staff.
- For the care of a confirmed case with mild symptoms in a plain isolation room, minimum **14–15 sets per patient per day**, distributed as follows:
  - Six sets per patient per day for nursing staff, assuming two entries per shift for dedicated staff;
  - 2–3 sets per patient per day for medical staff, assuming one entry per shift and dedicated staff only;
  - Three sets per patient per day for cleaning staff, assuming one entry per shift for cleaning;
  - 1–2 sets per patient per day for assistant nursing staff, assuming one entry per shift. Assistant nursing staff may not be required, depending on needs.
- For the care of a confirmed case with severe (and/or critical) symptoms a minimum of **15–24 sets per patient per day**, distributed as follows:
  - 6–12 sets per patient per day for nursing staff, assuming 2–4 entries per shift for dedicated staff, maximum stay four hours;
  - 3–6 sets per patient per day for medical staff, assuming 1–2 entries per shift for examination and procedures;
  - Three sets per patient per day for cleaning staff, assuming three entries per day for cleaning;
  - Three sets per patient per day for assistant nursing staff, assuming one entry per shift. This could also be a respiratory therapist or other service staff.

4.3. Waste management:

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

WASH in health care settings:

Existing recommendations for water, sanitation and hygiene measures in health care settings are important for providing adequate care for patients and protecting patients, staff, and caregivers from infection risks. The following actions are particularly important:

i. Managing excreta (faces and urine) safely, including ensuring that no one comes into contact with it and that it is treated and disposed of correctly;
ii. Engaging in frequent hand hygiene using appropriate techniques;
iii. Implementing regular cleaning and disinfection practices; and
iv. Safely managing health care waste.

Other important measures include providing sufficient safe drinking-water to staff, caregivers, and patients; ensuring that personal hygiene can be maintained, including hand hygiene, for patients, staff and caregivers; regularly laundering bedsheets and patients' clothing; providing adequate and accessible toilets (including separate facilities for confirmed and suspected cases of COVID-19 infection); and segregating and safely disposing of health care waste.

Hand hygiene practices:

- Hand hygiene is extremely important. Cleaning hands with soap and water or an alcohol-based hand rub should be performed according to the instructions known as "My 5 moments for hand hygiene".
- If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20−30 seconds using the appropriate technique.
- When hands are visibly dirty, they should be washed with soap and water for at least 20 seconds using the appropriate technique.
- Hand hygiene should be performed at all five moments, including before putting on PPE and after removing it, when changing gloves, after any contact with a patient with suspected or confirmed COVID-19 infection or their waste, after contact with any respiratory secretions, before eating, and after using the toilet.

- If an alcohol-based hand rub and soap are not available, then using chlorinated water (0.05%) for handwashing is an option, but it is not ideal because frequent use may lead to dermatitis, which could increase the risk of infection and asthma and because prepared dilutions might be inaccurate.
- However, if other options are not available or feasible, using chlorinated water for handwashing is an option.
- Functional hand hygiene facilities should be present for all health care workers at all points of care and in areas where PPE is put on or taken off. In addition, functional hand hygiene facilities should be available for all patients, family members, and visitors, and should be available within 5 m of toilets, as well as in waiting and dining rooms and other public areas.
- Every hand was station should/may have a "my 5 moments of hand hygiene" poster stuck on the wall, just above the wash-basin.

Sanitation and plumbing:

- People with suspected or confirmed COVID-19 disease should be provided with their own flush toilet or latrine that has a door that closes to separate it from the patient's room.
- Flush toilets should operate properly and have functioning drain traps. When possible, the toilet should be flushed with the lid down to prevent droplet splatter and aerosol clouds.
- If it is not possible to provide separate toilets, the toilet should be cleaned and disinfected at least twice daily by a trained cleaner wearing PPE (gown, gloves, boots, mask, and a face shield or goggles).
- Further, and consistent with existing guidance, staff and health care workers should have toilet facilities that are separate from those used by all patients.
- WHO recommends the use of standard, well-maintained plumbing, such as sealed bathroom drains, and backflow valves on sprayers and faucets to prevent aerosolized faecal matter from entering the plumbing or ventilation system, together with standard wastewater treatment.
- Faulty plumbing and a poorly designed air ventilation system were implicated as contributing factors to the spread of the aerosolized SARS coronavirus in a high-rise apartment building in Hong Kong in 2003. Similar concerns have been raised about the spread of the COVID-19 virus from faulty toilets in high-rise apartment buildings.

- If health care facilities are connected to sewers, a risk assessment should be conducted to confirm that wastewater is contained within the system (that is, the system does not leak) before its arrival at a functioning treatment or disposal site, or both.
- Risks pertaining to the adequacy of the collection system or to treatment and disposal methods should be assessed following a safety planning approach, with critical control points prioritized for mitigation. For smaller health care facilities in low-resource settings, if space and local conditions allow, pit latrines may be the preferred option.
- Standard precautions should be taken to prevent contamination of the environment by excreta. These precautions include ensuring that at least 1.5 m exists between the bottom of the pit and the groundwater table (more space should be allowed in coarse sands, gravels, and fissured formations) and that the latrines are located at least 30 m horizontally from any groundwater source (including both shallow wells and boreholes).
- If there is a high groundwater table or a lack of space to dig pits, excreta should be retained in impermeable storage containers and left for as long as feasible to allow for a reduction in virus levels before moving it off-site for additional treatment or safe disposal, or both.
- A two-tank system with parallel tanks would help facilitate inactivation by maximizing retention times, as one tank could be used until full, then allowed to sit while the next tank is being filled. Particular care should be taken to avoid splashing and the release of droplets while cleaning or emptying tanks.

Toilets and the handling of faces:

- It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (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.
- In all health care settings, including those with suspected or confirmed COVID-19 cases, faces must be treated as a biohazard and handled as little as possible. Anyone handling faces should follow WHO contact and droplet precautions and use PPE to prevent exposure, including long-sleeved gowns, gloves, boots, 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. Workers should be properly trained in how to put on, use, and remove PPE so that these protective barriers are not breached.

- If PPE is not available or the supply is limited, hand hygiene should be regularly practiced, and workers should keep at least 1 m distance from any suspected or confirmed cases.
- 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 0.5% chlorine solution, and then rinsed with clean water; the rinse water should be disposed of in a drain or a toilet or latrine.
- Other effective disinfectants include commercially available quaternary ammonium compounds, such as cetylpyridinium chloride, used according to manufacturer's instructions, and peracetic or peroxyacetic acid at concentrations of 500−2000 mg/L.26 Chlorine is ineffective for disinfecting media containing large amounts of solid and dissolved organic matter. Therefore, there is limited benefit to adding chlorine solution to fresh excreta and it is possible that this may introduce risks associated with splashing.
- Emptying latrines and holding tanks, and transporting excreta off-site. There is no reason to empty latrines and holding tanks of excreta from suspected or confirmed COVID-19 cases unless they are at capacity.
- In general, the best practices for safely managing excreta should be followed.
- Latrines or holding tanks should be designed to meet patient demand, considering potential sudden increases in cases, and there should be a regular schedule for emptying them based on the wastewater volumes generated. PPE (long-sleeved gown, gloves, boots, masks, and goggles or a face shield) should be worn at all times when handling or transporting excreta offsite, and great care should be taken to avoid splashing. For crews, this includes pumping out tanks or unloading pumper trucks.
- After handling the waste and once there is no risk of further exposure, individuals should safely remove their PPE and perform hand hygiene before entering the transport vehicle. Soiled PPE should be put in a sealed bag for later safe laundering (see cleaning practices).
- Where there is no off-site treatment, in-situ treatment can be done using lime. Such treatment involves using a 10% lime slurry added at 1-part lime slurry per 10 parts of waste.

Cleaning practices recommended cleaning and disinfection procedures for health care facilities should be followed consistently and correctly.

- Laundry should be done and surfaces in all environments in which COVID-19 patients receive care (treatment units, community care centres) should be cleaned at least once a day and when a patient is discharged.
- Many disinfectants are active against enveloped viruses, such as the COVID-19 virus, including commonly used hospital disinfectants. Currently, WHO recommends using:

- 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (for example, thermometers); sodium hypochlorite at 0.5% (equivalent to 5000 ppm) for disinfecting surfaces.
- All individuals dealing with soiled bedding, towels, and clothes from patients with COVID-19 infection should wear appropriate PPE before touching soiled items, 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.
- They should perform hand hygiene after exposure to blood or body fluids and after removing PPE.
- Soiled linen should be placed in clearly labeled, 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 (140−194°F) 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. 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. The area should then be cleaned and disinfected (with, for example, 0.5% free chlorine solution), following published guidance on cleaning and disinfection procedures for spilled body fluids.

Safely disposing of greywater or water from washing PPE, surfaces and floors.

- Current WHO recommendations are to clean utility gloves or heavy duty, reusable plastic aprons with soap and water and then decontaminate them with 0.5% sodium hypochlorite solution after each use. Single-use gloves (nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed.
- If greywater includes disinfectant used in prior cleaning, it does not need to be chlorinated or treated again. However, it is important that such water is disposed of in drains connected to a septic system or sewer or in a soakaway pit. If greywater is disposed of in a soakaway pit, the

pit should be fenced off within the health facility grounds to prevent tampering and to avoid possible exposure in the case of overflow. Safe management of health care waste Best practices for safely managing health care waste should be followed, including assigning responsibility and sufficient human and material resources to dispose of such waste safely.

- There is no evidence that direct, unprotected human contact during the handling of health care waste has resulted in the transmission of the COVID-19 virus. All health care waste produced during the care of COVID-19 patients should be collected safely in designated containers and bags, treated, and then safely disposed of or treated, or both, preferably onsite.
- If waste is moved off-site, it is critical to understand where and how it will be treated and destroyed.
- All who handle health care waste should wear appropriate PPE (boots, apron, long-sleeved gown, thick gloves, mask, and goggles or a face shield) and perform hand hygiene after removing it. For more information refer to the WHO guidance, Safe management of wastes from health-care activities.

5. Triage, first contact and prioritization

5.1. General:

Procedures to separate suspected cases* from the other patients and isolation procedures need to be established, e.g.

- Placement in different waiting rooms, use of different toilets; this also covers areas that need to be reached for water/food supplies.
- Procedures for patient prioritisation (e.g. triage, discharge criteria, triggers to postpone elective hospitalisations or interventions) are in place and have been communicated to all staff involved.
- Procedures are in place for the cleaning of common areas and equipment that cannot only be used by non-suspected or confirmed cases.

5.2. Tele-triage:

A tele-triage system to triage patients before they arrive at the hospital is in place:

- Phone/email/telemedicine services are in place for possible cases; these services can also be used to coordinate the arrival of patients at the hospital if required
- The population has been informed about the tele-triage services of the hospital because they were informed about these services through several channels

5.3. First contact at the hospital:

- Signs and information displays at the entrance and in waiting rooms provide Q&As about COVID-19.
- Hand hygiene supplies (e.g. alcohol-based hand sanitizers; access to water, soap and disposable paper tissues to dry hands) and respiratory hygiene supplies (e.g. disposable paper tissues) are available for staff and patients
- Quick checks at entry points to the emergency room, triaging of suspected cases, and severity assessment procedures are in place
- The hospital could provide an option for patients to wait in their cars/vehicles/ambulance instead of the waiting room (provided they are well enough to do so); this also requires a system to call them in
- All emergency room staff are aware of alternative areas to be converted into waiting rooms when a certain threshold of patients has been reached
- A protocol is established to inform the patients with suspected COVID-19 about certain procedures, for example that they will be separated from other patients and why; information will be provided on hand and respiratory hygiene, the use of PPE, toilet use, and how to obtain water and food
- The capacity for patient transportation should be assessed

6. Patient placement, moving of the patients in the facility, and visitor access:

6.1. Patient placement:

- The capacity of isolation beds and ICU beds in the hospital has been assessed.
- If the hospital has rooms with negative pressure, the maximal number of patients that can be hosted in each room according to the manufacturer has been determined.
- Aerosol generated invasive procedures should be performed in an adequately ventilated room – that is, natural ventilation with air flow of at least 160 L/s per patient or in negative-pressure rooms with at least 12 air changes per hour and controlled direction of air flow when using mechanical ventilation.
- The maximal capacity for the isolation of patients has been estimated:
  - Maximum number of rooms that can be converted into isolation rooms (if there is increased need) has been calculated.
  - Maximum number of patients that can be cohorted in isolation rooms and number of potential isolation rooms has been calculated. Separation of at least 1 meter should be maintained between all patients.

- A plan is in place that indicates the criteria that would trigger the transformation of normal rooms into isolation rooms and also the order in which this process would be carried out; this includes a plan to re-allocate patients, facilitate their rapid discharge as soon as their clinical status allows for it, or treat patients at home.

- The staff know the plan and have been trained accordingly, e.g. the know how to use PPE, are familiar with protocols and new tasks that they may be assigned to them, etc.
- PPE for aerosol-generating procedures are available in sufficient numbers and sizes so they can be used in the isolation rooms when appropriate. Use a particulate respirator at least as protective as a US National Institute for Occupational Safety and Health (NIOSH)-certified N95, European Union (EU) standard FFP2, or equivalent. When HCWs put on a disposable particulate respirator, they must always perform the seal check. Use eye protection (i.e. goggles or a face shield); wear a clean, non-sterile, long-sleeved gown and gloves. If gowns are not fluid-resistant, HCWs should use a waterproof apron(Macintosh) for procedures expected to create high volumes of fluid that might penetrate the gown.
- Only a limited number of staff members is authorized to access the isolation rooms; they have been trained accordingly. Staff members who have access to isolation rooms are tracked and records are kept. A record of all staff members who have access to isolation rooms is kept so that all staff movements can be tracked.
- Staff members with access to isolation rooms should be limited to reduce the possibility of transmission among other patients.

6.2. Moving patients in the facility

- The movement of patients within the healthcare facility is limited to performing essential procedures
- A surgical mask is worn by the isolated patient when he/she is moved inside the healthcare facility
- The best routes for moving patients within the healthcare facility have been established; staff members have been informed
- If transport/movement is necessary, consider offering the patient a fluid-resistant (Type IIR) surgical mask (FRSM) to be worn during transportation, to minimize the dispersal of respiratory droplets when this can be tolerated.
- Patients must be taken straight to and returned from clinical departments and must not wait in communal areas. If possible, patients should be placed at the end of clinical lists.

- All healthcare workers preparing, moving, and receiving patients are aware of the conditions of these patients and have been trained in all relevant procedures, e.g. where to find PPE and how to use it.

6.3. Visitor access

- Signs outside the ward inform all visitors about symptoms of acute respiratory infections; if possible, visitors are checked for symptoms before entering the facility .Only essential visitors are allowed.
- Rules are in place for the access of visitors to the facility and to the isolation rooms (e.g. one visitor a time) with probable or confirmed patients.
- Hand hygiene procedures are explained to the visitors before entering and after leaving the isolation room.
- PPE are available for visitors; procedures for donning and doffing are in place and accessible.
- A trained healthcare worker is available to check the correct donning and doffing of PPE
- All visitors are informed about self-monitoring for acute respiratory symptoms as described in the guidelines.
- A record of all visitors that entered an isolation room is kept.

7. Environmental cleaning

7.1. **Room cleaning**

- A procedure has been established for the cleaning of the rooms on a regular basis and when required; cleaning after a patient's discharge is also covered by this procedure.
- Disposable material should dispose of after use into the correct waste stream.
- Appropriate products for the cleaning and disinfection of the surfaces, equipment and medical apparatuses are available.
- Ensure that cleaning and disinfection procedures are followed consistently and correctly. Cleaning environmental surfaces with water and detergent and applying commonly used hospital disinfectants (such as sodium hypochlorite) is effective and sufficient.
- Manage laundry, food service utensils and medical waste in accordance with safe routine procedures**.**
- PPE for the cleaning personnel are available in different sizes

- Cleaning personnel have been trained on all relevant procedures, e.g. contact times for the different products, the correct use of PPE (included donning and doffing), and self monitoring of symptoms. They are aware of the procedure to follow if they develop symptoms.
- A record of cleaning staff that have cleaned isolation rooms is maintained.

Crisis Management: There should be a provision for crisis management - immediate security concerns like mob violence, major contamination of work-place, etc.

Counselling: Counselling & communication with patients be made by counsellor or a designated person rather than by the doctors.

Further Reading:

1. WHO (March 2020). Severe Acute Respiratory Infections Treatment Centre: Practical manual to set up and manage a SARI treatment centre and a SARI screening facility in health care facilities.
2. European Centre for Disease Prevention and Control (2020). ECDC Technical Report. Checklist for hospitals preparing for the reception and care of Coronavirus 2019 (COVID-19) patients. ECDC: Stockholm; 2020.
3. DGHS (2020). Rational use of Personal Protective Equipment for COVID-19: করোনা ভাইরাস ২০১৯ (কোভিড-১৯) নিয়ন্ত্রণের লক্ষ্যে Personal Protective Equipment (PPE) এ যুক্তিসংগত ব্যবহার। দ্বিতীয় সংস্কার, Bangladesh.
4. Coronavirus disease (COVID-19) technical guidance: Infection prevention and control/ WASH. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/infection-prevention-and-control

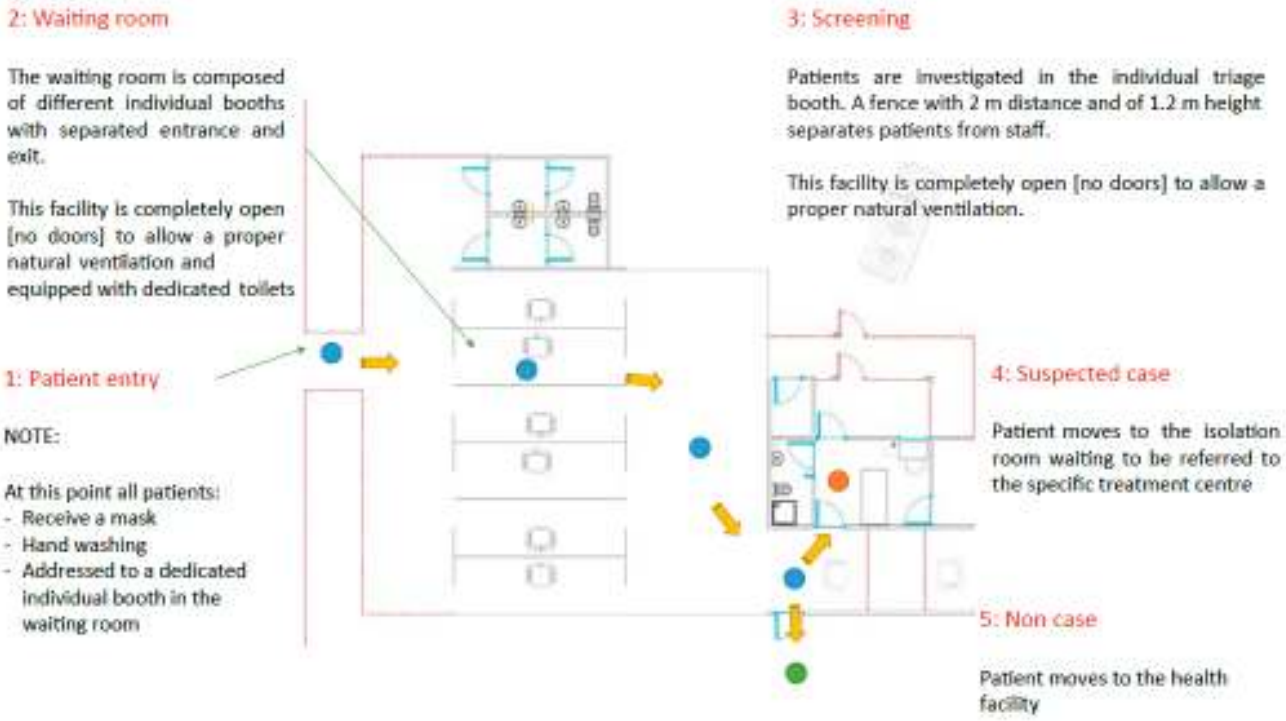
COVID-19 ব্যবস্থাপনার জন্য How to Run a COVID-19 Hospital in Bangladesh প্রস্তুত বিষয়ক গঠিত কমিটি

স্মারক নং-স্বাঃঅধিঃ/হাসঃ/জরুরী চিকিৎসা/২০২০/৩৩১ তারিখঃ ১৫-০৩-২০২০খ্রি.

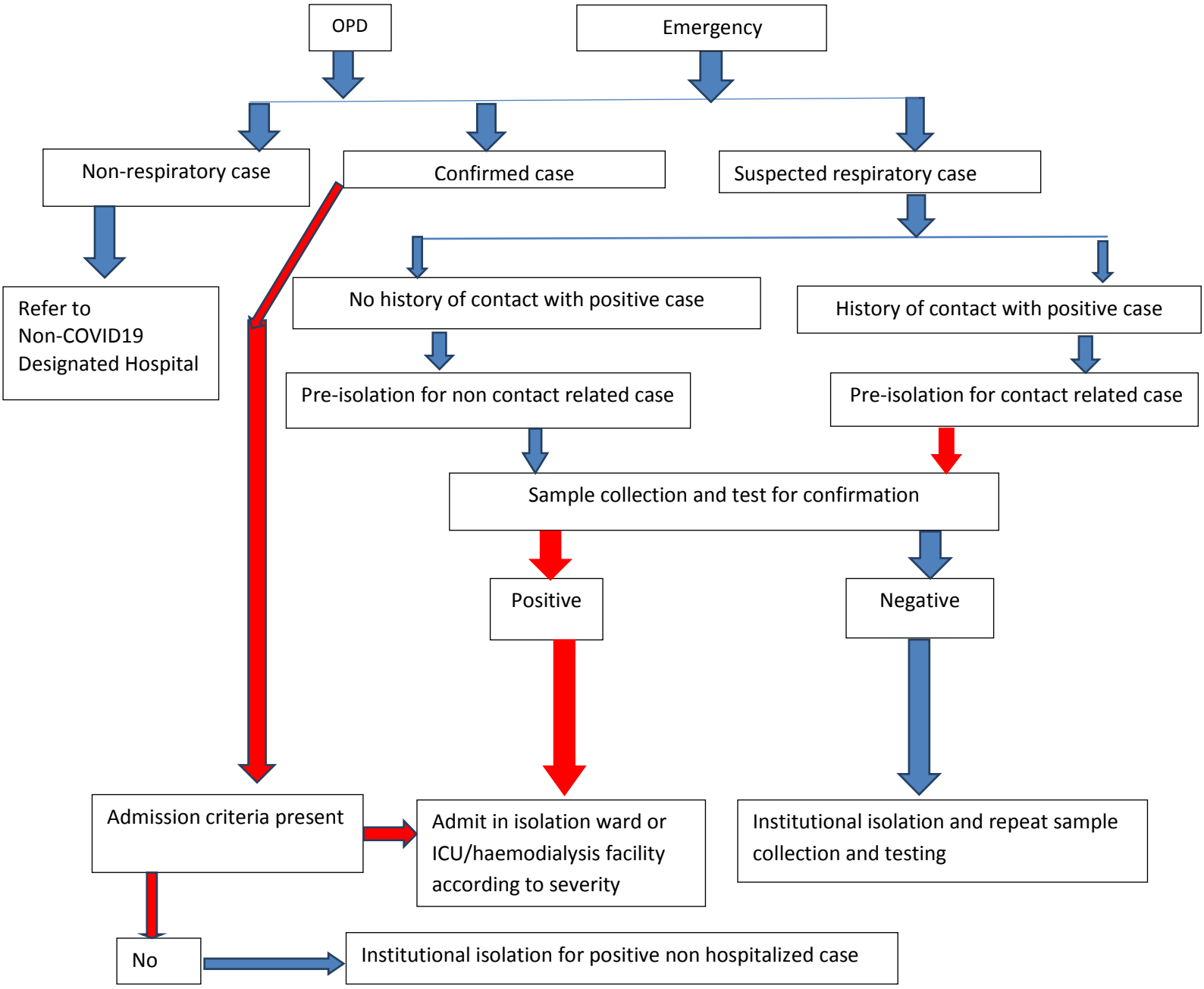
১. অধ্যাপক ডাঃ এম এ ফয়েজ প্রাক্তন মহাপরিচালক, স্বাস্থ্য অধিদপ্তর	সভাপতি
২. অধ্যাপক ডাঃ খান আবুল কালাম আজাদ অধ্যক্ষ, ঢাকা মেডিকেল কলেজ, ঢাকা	সদস্য
৩. অধ্যাপক ডাঃ মোঃ টিটু মিঞা অধ্যাপক (মেডিসিন), ঢাকা মেডিকেল কলেজ হাসপাতাল	সদস্য
৪. অধ্যাপক ডাঃ এম.এ.কাশেম অধ্যাপক (মেডিসিন), ঢাকা মেডিকেল কলেজ হাসপাতাল	সদস্য
৫. অধ্যাপক ডাঃ রোবেদ আমিন অধ্যাপক মেডিসিন বিভাগ, ঢাকা মেডিকেল কলেজ হাসপাতাল	সদস্য
৬. ডাঃ সুদীপ রঞ্জন দেব সহযোগী অধ্যাপক (মেডিসিন) মুগদা মেডিকেল কলেজ হাসপাতাল	সদস্য
৭. ডাঃ অসীম চক্রবর্তী আবাসিক চিকিৎসক, মিটফোর্ড হাসপাতাল	সদস্য
৮. ডাঃ গোলাম মগনি মণ্ডলা সহযোগী অধ্যাপক, ঢাকা মেডিকেল কলেজ হাসপাতাল	সদস্য
৯. ডাঃ মোহাম্মদ আসাদুজ্জামান সহকারী অধ্যাপক (ক্রিটিক্যাল কেয়ার) কুয়েত মৈত্রী হাসপাতাল	সদস্য
১০. ডাঃ মানুন জুনিয়র কনসালটেন্ট (মেডিসিন), কুয়েত মৈত্রী হাসপাতাল	সদস্য
১১. ডাঃ মতলেবুর রহমান সহযোগী অধ্যাপক (মেডিসিন), ডিএমসি	সদস্য
১২. ডাঃ মোঃ আবদুস সাত্তার সরকার সহযোগী অধ্যাপক (মেডিসিন), মিটফোর্ড হাসপাতাল	সদস্য
১৩. ডাঃ আমিরুজ্জামান সহযোগী অধ্যাপক (মেডিসিন), মিটফোর্ড হাসপাতাল	সদস্য
১৪. ডাঃ মোঃ মুরাদ হোসেন সহযোগী অধ্যাপক (মেডিসিন), ঢাকা মেডিকেল কলেজ হাসপাতাল	সদস্য
১৫. ডাঃ ফজলে রাব্বি চৌধুরী সহকারী অধ্যাপক মেডিসিন, বিএসএমএমইউ	সদস্য
১৬. ডাঃ আরিফুল বাসার আইডি বিশেষজ্ঞ, বিএসএমএমইউ	সদস্য
১৭. ডাঃ আবদুর রহিম কনসালটেন্ট (মেডিসিন), কুয়েত মৈত্রি হাসপাতাল	সদস্য
১৮. ডাঃ গোবিন্দ চন্দ্র বণিক সহযোগী অধ্যাপক (মেডিসিন), ঢাকা মেডিকেল কলেজ	সদস্য
১৯. ডাঃ মুরাদ সুলতান, NPO, বিশ্ব স্বাস্থ্য সংস্থার	সদস্য
২০. অধ্যাপক ডাঃ মোঃ শাহেদুর রহমান খান পরিচালক (এনআইডিসিএইচ)	সদস্য
২১. অধ্যাপক ডাঃ বিল্লাল আলম সভাপতি বাংলাদেশ সোসাইটি অব মেডিসিন	সদস্য
২২. অধ্যাপক ডাঃ আহমেদুল কবীর সেক্রেটারী জেনারেল, বাংলাদেশ সোসাইটি অব মেডিসিন	সদস্য
২৩. ডাঃ মোঃ শফিউর রহমান সহকারী পরিচালক (হাসপাতাল-১), স্বাস্থ্য অধিদপ্তর	সদস্য সচিব

Annex: 1. SARI treatment centre/COVID-19 Hospital

Figure: 1. Flow of patients in the screening area of a severe acute respiratory infection treatment centre



Annex: 2. Patient flow pathway for designated COVID-19 Hospital



Annex: 3. SOP: Hand Hygiene for COVID-19

Healthcare associated infections (HCAIs) in COVID-19 is very high that are acquired following contact with the patient. Hand hygiene is one of the most effective means of preventing HCAIs.

1.1 For staff to be competent in appropriate hand hygiene there is a requirement to receive mandatory hand hygiene education and training on induction. An audit is to be followed and retraining will be done every two years

Hand Hygiene for HCW Clinical and non-clinical Staff:

1.2 Facilities should have the following in place to support effective hand hygiene:

- Dedicated hand wash basins with soap dispenser, paper towel and a foot operated non healthcare risk waste bin
- Access to approved alcohol based hand rubs (ABHRs) at the point of care
- Hand wash/alcohol hand rub signage displaying the approved hand hygiene technique
- Access to approved hand creams/moisturisers.

Staff should regularly use hand moisturising agents to reduce irritation and maintain the integrity of the skin.

1.3 HCW are required to be in compliance with the WHO Hand Hygiene Guidelines which include:

- Bare below the elbow (e.g. short sleeved top or rolled up sleeves at least 10cm above the wrist)
- Remove all wrist jewellery, including wristwatch/electronic devices
- Remove all hand jewellery (a single plain band (no stones) may be worn)
- Keep fingernails short (e.g. tips less than 0.5cm)
- Do not wear false nails or nail enhancements (e.g. gel nails, acrylic nails, nail hardener)
- Do not wear nail varnish of any kind (including nail hardener)
- Cover cuts and abrasions with a waterproof dressing

Perform Hand Hygiene using an ABHR or soap and water using an appropriate technique (e.g. WHO) in line with the WHO 5 Moments for Hand Hygiene.

Before touching a patient	**When:** Clean your hands before touching a patient **Why:** To protect the patient against harmful germs carried on your hands
2. Before clean/aseptic procedure	**When:** Clean your hands immediately before performing a clean/aseptic procedure **Why:** To protect the patient from harmful germs (including the patient's own) from entering his/her body.
3. After body fluid exposure risk	**When:** Clean your hands immediately after a procedure involving exposure risk to body fluids (after glove removal) **Why:** To protect yourself and the environment from harmful patient germs
4. After touching a patient	**When:** Clean your hands after touching a patient at the end of the encounter or when the encounter is interrupted **Why:** To protect yourself and the environment from harmful patient germs
5. After touching patient surroundings	**When:** Clean your hands after touching any object or furniture in the patient's surroundings when a specific zone is temporarily and exclusively dedicated to a patient – even if the patient has not been touched. **Why:** To protect yourself and the environment from harmful patient germs

Additional situations when hand hygiene should be performed:

- **At the start and end of the working day**
- **After using the toilet**
- **Before preparing medication**
- **Before preparing or eating food**
- **When visibly dirty or soiled with blood or body fluids e.g. coughing**

Hand Hygiene Technique

Hand hygiene can be carried out in three ways:

- Wash with plain liquid soap and water followed by patting dry with single use towels
- Use of alcohol based hand rubs (ABHR) foam/gel
- Wash with antiseptic hand wash and water followed by patting dry with single use towels

Best practice is for HCW during COVID-19 pandemic is wash with plain liquid soap and water followed by patting dry with single use towels before observing /examining/care of patient and after completion of the task. ABHR can be used as frequently as necessary during examining/care of patient one after another. Alcohol based hand rub gel/foams are the preferred method for hand hygiene when the hands are not soiled and are physically clean. A moisturiser (compatible with glove wearing) should be applied up to four times a day.

There are 2 situations where alcohol hand rub is not sufficient:

- After contact with a patient known/suspected to be Severe/Critical COVID-19 in ICU setting
- Where hands are visibly soiled. In these instances, wash hands with antiseptic soap or plain soap and water
- Donning and doffing of PPE

Use Hand Rub/Gels/Foam:

Hand rubs are very effective antimicrobial agents. They should be applied to hands for a minimum of 15 seconds (20-30 seconds WHO), using an adequate volume to completely wet the hands.

ABHR Alcohol based products containing 70% (60-75%) alcohol and an emollient are kinder to the skin than soaps or antimicrobial antiseptics. Repeated use of an alcohol hand rub can lead to an excessive build up emollient on the hands; this should be removed by periodic washing with soap and water.

Use of emollient hand cream/moisturiser: An approved emollient hand cream/moisturiser should be applied regularly, such as after performing hand hygiene before a break or finishing work, but not

applied before donning gloves. Hand hygiene technique may need to be reviewed if skin irritation occurs. If irritation persists, occupational health should be consulted for advice.

Hand Washing Technique

Effective hand washing technique involves a sequence of events and should take at least 20 seconds: WHO recommends at least 20 seconds for entire procedure

- Wet hands and wrists under running water.
- Dispense liquid soap (enough to form lather) into a cupped hand.
- The hand wash solution must come into contact with all surfaces of the hands using the WHO 6 step technique – listed below.
- Each step includes 5 repeats of the movement.

Steps to be followed or procedure or sequence to be followed when carrying out handwashing;

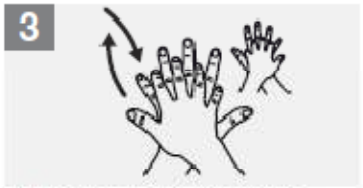
1. Wet hand with water
2. Apply enough soap to cover all hand surfaces.
3. Rub hands palm to palm.
4. Right palm over left dorsum with interlaced fingers and vice versa.
5. Palm to palm with fingers interlaced.
6. Backs of fingers to opposing palms with fingers interlocked.
7. Rotational rubbing of left thumb clasped in right palm and vice versa.
8. Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa.
9. Rinse hands with water.
10. Dry hand thoroughly with single use towel.
11. Use towel to turn off tap.
12. Your hands are now safe.

HOW TO HANDWASH

Wet hands with water;

Apply enough soap to cover all hand surfaces;

Rub hands palm to palm;



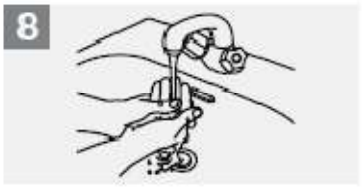
Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Rinse hands with water;

Dry hands thoroughly with a single use towel;

Use towel to turn off faucet;

Your hands are now safe.

Alcohol Based Hand Rub Technique (ABHR)

- Effective decontamination of the hands using alcohol hand rub involves a series of steps and should take at least 15 seconds. WHO recommends 20-30 seconds for entire procedure.
- Hands should be free of dirt and organic material (alcohol is ineffective in the presence of dirt).
- Dispense, as per manufacturer's instructions, the required volume of alcohol-based rub/gel into the palm of the hands to adequately cover hands.
- Use the WHO technique – listed below.
- Each step is repeated to ensure the alcohol-based rub/gel will come into contact with all surfaces of the hands and wrist without the product drying out.

Steps to be followed or procedure or sequence to be followed when applying ABHR;

1. Apply a palmful of the product in a cupped hand covering all surfaces
2. Rub hands palm to palm.
3. Right palm over left dorsum with interlaced fingers and vice versa.
4. Palm to palm with fingers interlaced.
5. Back of fingers to opposing palm with fingers interlocked.
6. Rotational rubbing of left thumb clasped in right palm and vice versa.
7. Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa.
8. Once dry your hands are safe.

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds

1a

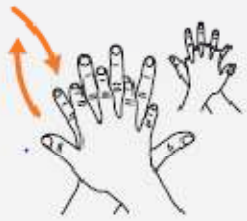
1b

Apply a palmful of the product in a cupped hand, covering all surfaces;

2

Rub hands palm to palm;

3



Right palm over left dorsum with interlaced fingers and vice versa;

4

Palm to palm with fingers interlaced;

5

Backs of fingers to opposing palms with fingers interlocked;

6

Rotational rubbing of left thumb clasped in right palm and vice versa;

7

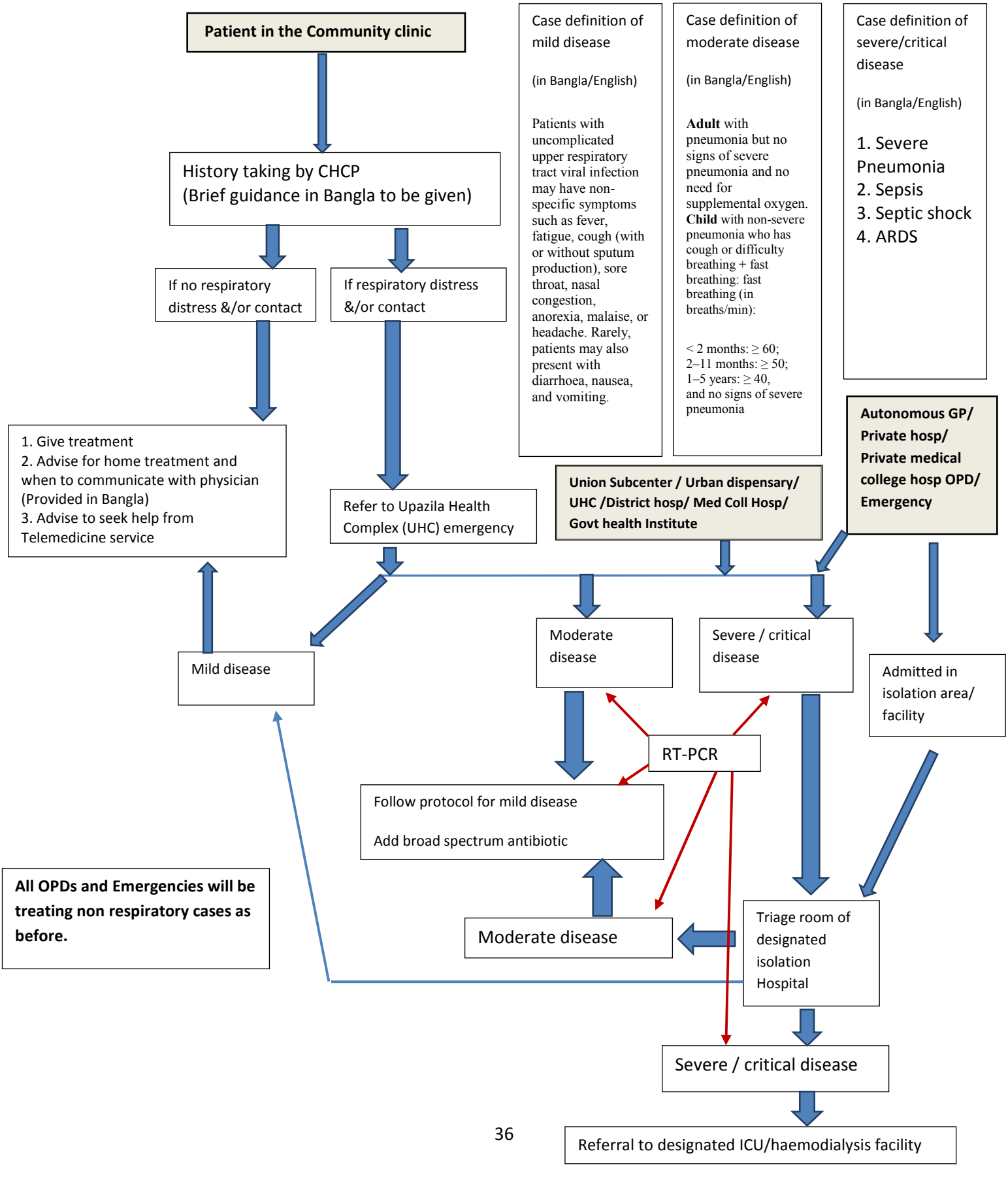
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

8

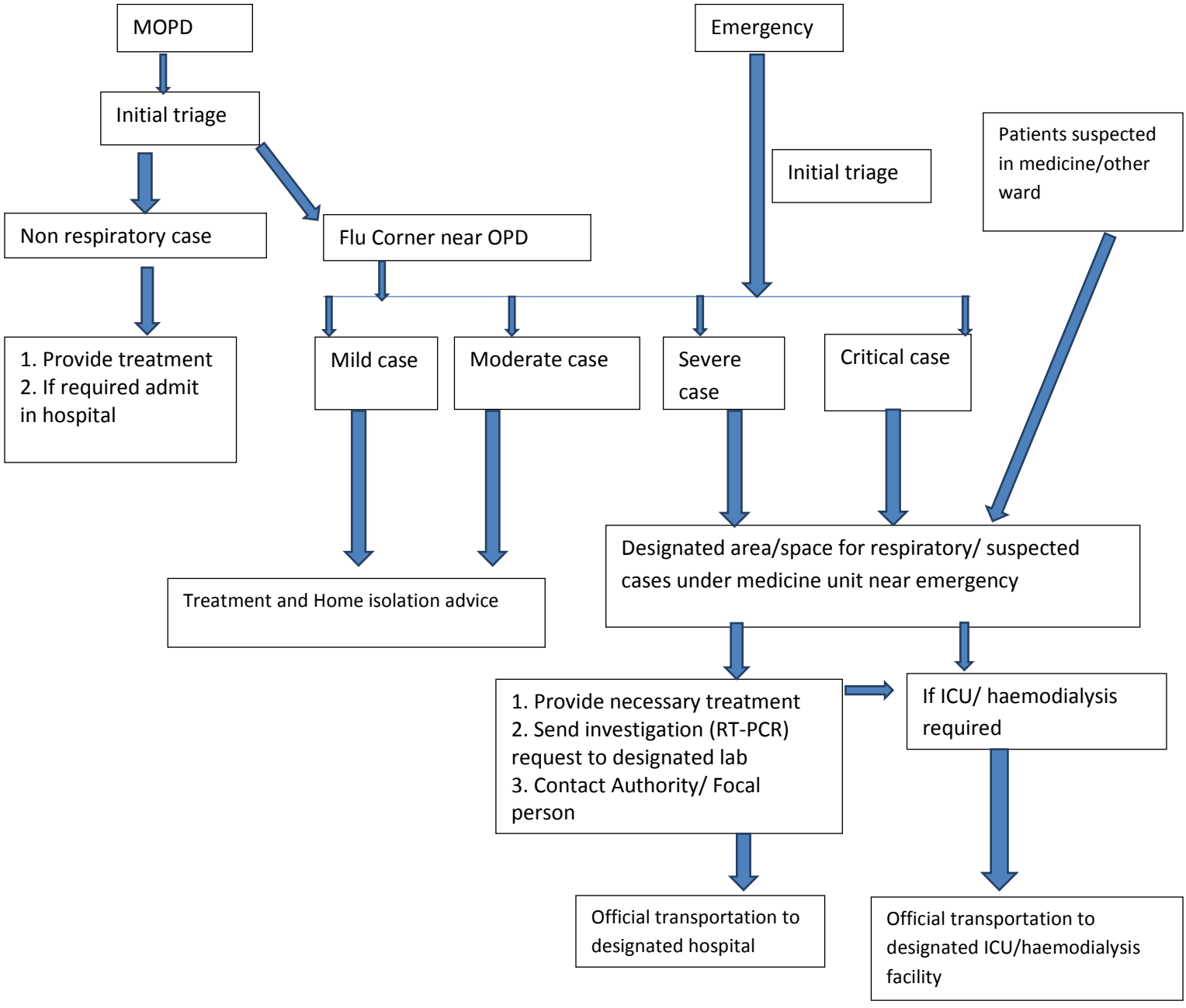
Once dry, your hands are safe.

World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

Annex: 4. SOP- Patient flow chart



Annex: 5. Patient flow chart for non COVID-19 Hospital



Annex: 6. SOP on Roster for healthcare professionals, illness and sick leave management

A. The use of complete PPE (donning and doffing) should be strictly followed before entering and leave the workplace. Effective and appropriate use of PPE could almost prevent getting an infection.

B. There has to be separate rooms for HCWs for changing their dress. They will wear scrub (dress surgeons wear before OT) and keep their outdoor dress on that room. After finishing their duty (with donning and doffing), scrubs will be return into a separate box for autoclaving. At the end of the duty, they will come out of the hospital with their usual outdoor dress.

C. All HCWs will work on a daily rota basis with a single day off. The working duration will be eight (8) hours for all except ICU staff. For ICU staff including doctors, the duration of rota will be 12 hours.

D. All HCWs are allowed to change their PPE for at least once to provide a break between the working hours. It could be more than one if necessary; however, we should keep in mind about the global shortage of PPE.

E. After appropriate doffing and return of scrub, HCWs can return to their home or their family. HCWs working in a COVID-19 hospital are strictly requested to avoid any social or family gathering or program (even in-house) until the pandemic has over.

F. The hospital authority will try their best to provide flexibility on choosing the duty rota only for those HCWs who have mandatory (sole carer) caring responsibility (child, parents). However, they have to provide convincing evidence to the authority for flexible hours (morning or evening duty).

G. The hospital authority has all rights to change the workplace (department, unit, OPD, IPD) of an HCW within the hospital whenever required.

Illness and sick leave management:

A. While working in a COVID-19 hospital, if any HCWs fell sick and developed symptoms related to COVID-19 disease, they would be isolated immediately and testing will be done. His/her family members (members residing in the same house) will keep into quarantine and observed.

B. If two successive test (72 hours apart and first test between 5^{th} to 7^{th} day), comes negative, they can be considered to resume their duty, depending on the availability of the work force and hospital need.

C. If any HCWs fell into sickness due to other reason, the immediate authority will assess the situation and allow the minimum days of sick leave.

D. All other regular leave (such as casual leave, earned leave, rest and recreation leave, etc.) will be withheld during this crisis period. However, they will be able to enjoy these leaves later when the crisis is over.

Annex: 7. SOP on Personal Protective Equipment (PPE):

This document is English version of PPE guideline for COVID-19 patients that is already published and available in DGHS website.

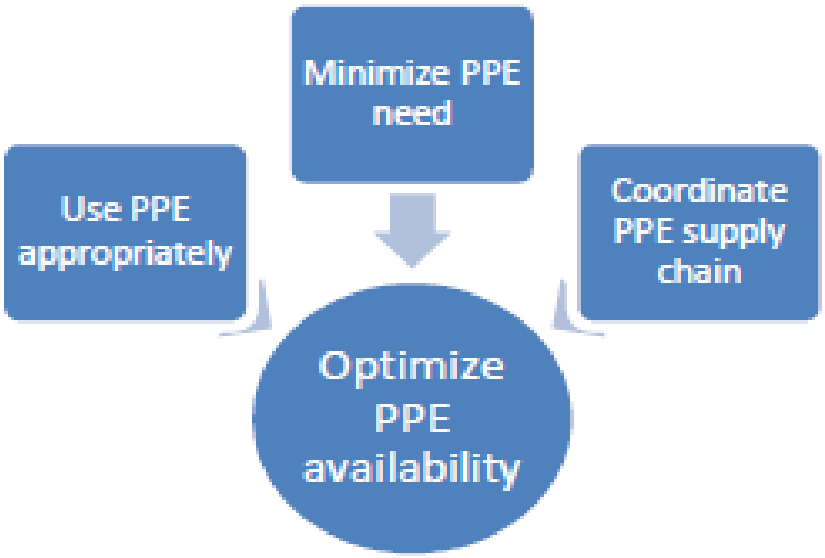
Rational use of Personal Protective Equipment for COVID-19: করোনা ভাইরাস ২০১৯ (কোভিড-১৯) নিয়ন্ত্রণের লক্ষ্যে Personal Protective Equipment (PPE) এ যুক্তিসংগত ব্যবহার। দ্বিতীয় সংস্কার: ২০.০৩.২০২০

Definition: specialized clothing or equipment worn by an employee for protection against infectious materials" (OSHA)

- Employers must provide their employees with appropriate PPE and ensure that PPE is disposed or, if reusable, that it is properly cleaned or laundered, repaired and stored after use.
- SOP clearly recommendations for when and what PPE should be used to prevent exposure to COVID-19 infectious diseases beginning with the hierarchy of safety and health controls according to WHO reference.
- Types of PPE Used in Healthcare Settings
    - Gloves – protect hands
    - Gowns/aprons – protect skin and/or clothing
    - Masks and respirators– protect mouth/nose
    - Respirators – protect respiratory tract from airborne infectious agents
    - Goggles – protect eyes
    - Face shields – protect face, mouth, nose, and eyes
- Recommendations for optimizing the availability of PPE.

In view of the global PPE shortage, the following strategies can facilitate optimal PPE availability (Fig. 2).

Figure: 2. Strategies to optimize the availability of personal protective equipment (PPE)



Recommended type of personal protective equipment (PPE) to be used in the context of COVID-19 disease, according to the setting, personnel and type of activity.

Setting	Target personnel or patients	Activity	Type of PPE or procedure
Healthcare facilities			
Inpatient facilities			
Patient room	Healthcare workers	Providing direct care to COVID-19 patients.	Medical mask Gown Gloves Eye protection (goggles or face shield).
		Aerosol-generating procedures performed on COVID-19 patients.	Respirator N95 or FFP2 standard, or equivalent. Gown Gloves Eye protection Apron
	Cleaners	Entering the room of COVID-19 patients.	Medical mask Gown Heavy duty gloves Eye protection (if risk of splash from organic material or chemicals). Boots or closed work shoes
	Visitors[b]	Entering the room of a COVID-19 patient	Medical mask Gown Gloves
Other areas of patient transit (e.g., wards, corridors).	All staff, including healthcare workers.	Any activity that does not involve contact with COVID-19 patients.	No PPE required
Triage	Healthcare workers	Preliminary screening not involving direct contact[c].	Maintain spatial distance of at least 1 m. No PPE required
	Patients with respiratory symptoms.	Any	Maintain spatial distance of at least 1 m. Provide medical mask if tolerated by patient.
	Patients without respiratory symptoms.	Any	No PPE required
Laboratory	Lab technician	Manipulation of respiratory samples.	Medical mask Gown Gloves Eye protection (if risk of splash)
Administrative areas	All staff, including healthcare workers.	Administrative tasks that do not involve contact with COVID-19 patients.	No PPE required

Annex: 8. Respiratory Protection

Different kinds of masks and respirators offer different levels of protection. Whether to use surgical masks or respirators depends on the level of exposure. A risk- and hazard-assessment for the different settings and activities is essential before any decisions are made on which level of protection is needed.

Surgical face masks mainly protect from exhaled droplets. If marked 'IIR' (surgical masks Type IIR), they are also splash-resistant and protect the wearer's mucosae and skin from fluid splashes. Surgical masks don't require fit testing.

A respirator instead protects from the inhalation of droplets and particles. However, most respirators are not certified 'splash-proof', especially if they are provided with an exhalation valve. They require a fit test.

Qualitative fit test:

A qualitative respirator fit test needs to be performed before choosing a respirator for regular use as part of the PPE ensemble. A fit test verifies the seal between the respirator and the PPE user's face. The test is based on an indicator aerosol, sprayed on the user while wearing the respirator under a designated test hood. If the test person can detect the saccharin contained in the aerosol, the fit test is positive, which means that the respirator is leaking**.** Another model, style, or size which fits the user properly must be found.

Eye protection:

It is important that goggles have a close fit to the face so no liquids can enter the goggles. Therefore goggles with soft-sealing edges are the preferred choice. The goggles need to fit the face physiognomy of the PPE user and be compatible with neighboring PPE components (respirator and hood). Providing a choice of different goggle designs increases the chances of finding the right pair for any user. Ideally goggles won't fog up while being worn, because fogging seriously compromises patient care activities and staff safety. Modern goggles with anti-fog coating are highly effective and are seen as the best option to guarantee perfect vision in all situations. Additionally, external antifogging agents (e.g. spray) should be made available in the donning area.

Generally, goggles use either ventilation or anti-fog coating to prevent fogging. Both methods might be combined. Ventilated goggles can have open or covered vents. Open vents potentially can make splashes enter inside the goggles. Covered vents still would let pass through aerosols. Only air- or gastight goggles protect against aerosols or airborne pathogens.

Glasses can be worn under the goggles if the seal fit is fully preserved. However, they can also compromise the required tight seal and increase the risk of fogging. Additional application of anti-fogging spray helps in keeping fogging issues under control.

Different to a full face respirator, goggles should be worn over the hood of the PPE. Most goggles are secured with textile elastic straps. Wearing goggles over the hood prevents liquids from soaking through to the skin via the textile and also ensures a close fit of the hood, avoiding gaps between hood and goggles.

Body cover:

PPE user needs to test the coverall's fit by kneeling down and lifting the arms when fully covered by the PPE ensemble. This needs to be done before entering a contaminated work zone.(Annex)

Some PPE coveralls come with finger loops to hold the sleeves in position, thus preventing the sleeves from moving up and opening gaps between glove and coveralls while working.(Annex)

Some coveralls have integrated foot parts, which potentially simplifies the donning and doffing process because the PPE user can easily remove boots or clogs when leaving the contaminated area. The clogs or boots can then stay behind, which facilitates waste management and the disinfection process for clogs/boots.)(Annex)

Gloves:

For annex:

- Latex gloves should not be the only option provided, as allergies are a common issue in healthcare settings. Nitrile gloves, although less flexible, are a good alternative.
- Gloves with extended cuffs are useful to cover potential gaps between the coveralls sleeves and the hand.

Nitrile gloves protect against a wide variety of chemicals including caustics and alcohols which makes them more resistant to glove hygiene (hand sanitizer is an alcohol-based disinfectant). They eliminate the risk of an allergic reaction.

Natural (latex) rubber gloves are ideally used as outer gloves targeted to medical interventions. Good tactility, elasticity and resistance to temperature. Hypoallergenic gloves and un-powdered gloves help in preventing allergic reactions. Glove selection guidance by national and international organisations can be followed to ensure meaningful glove procurement.

Inner gloves:

- A glove of intermediate thickness works well as an inner layer
- Consider gloves with extended cuffs as they cover a larger section of the coverall sleeves

- Ideally, the inner pair of gloves should have a longer sleeve than the outer pair of gloves. This makes it easier to change gloves.

The outer pair of gloves should be adapted to the tasks that the PPE user has to perform.

PPE during investigation:

Use appropriate PPE for specimen collection (droplet and contact precautions for URT specimens; airborne precautions for LRT specimens). When collecting URT samples, use viral swabs (sterile Dacron or rayon, not cotton) and viral transport media. Do not sample the nostrils or tonsils. In a patient with suspected COVID-19, especially with pneumonia or severe illness, a single URT sample does not exclude the diagnosis, and additional URT and LRT samples are recommended. LRT (vs URT) samples are more likely to be positive and for a longer period. Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients). Sputum induction should be avoided due to increased risk of aerosol transmission. For pregnant patients: COVID-19 testing of symptomatic pregnant women may need to be prioritized to enable access to specialized care.

List of SOPs:

Sl. no.	Title	Responsible Member
1.	Communication (Internal/ External)	Prof. Khan Abul Kalam Azad
2.	Sample collection, and transport	Prof. Titu Miah
3.	Precaution during first assessment (Triage)	Prof. Ahmedul Kabir
4.	Waste management	Prof. M A Kashem
5.	Hand Hygiene	Prof. Md Robed Amin
6.	Sanitation& plumbing	Dr. Sudeep Ranjan Deb
7.	Cleaning, disinfectionand safe disposal	Dr. Motlebur Rahman
8.	Toilet and safe disposal of excreta	Dr. Md. Abdur Sattar Sarker
9.	Patient placement	Dr. Amiruzzaman
10.	Patient movement within hospital	Dr. Md. Murad Hossain
11.	Roster for healthcare professionals, illness and sick leave management	Dr. Fazle Rabbi Chowdhury
12.	PPE	Dr. Ariful Basher
13.	Monitoring of IPC	Dr. Abdur Rahim
14.	Environmental cleaning	Dr. Md. Shafiur Rahman

করোনা ভাইরাস (COVID-19) এর গাইডলাইনের তালিকা (DGHS)

১. National Guidelines on Clinical Management of Coronavirus Disease 2019 (Covid-19). Version 5.0. 6 April 2020.

২. National Guideline for Health Care Provider on Infection Prevention and Control of COVID-19 pandemic in Healthcare Setting. Version: 2.0: Date: 19.3.2020

৩. করোনা (COVID-19) জীবানুমুক্ত করণ এবং পরিবেশগত সংক্রমণ রোধ সংক্রান্ত নির্দেশনা বা স্ট্যান্ডার্ড অপারেটিং প্রসেজিওর (SOP) ।- প্রথম সংস্করণ: ১৫.৩.২০২০

৪. করোনা (COVID-19)রোগে মৃত ব্যক্তির মৃত দেহ নিরাপদভাবে দাফন/সৎকার/ব্যবস্থাপনার নির্দেশনা বা স্ট্যান্ডার্ড অপারেটিং প্রসেজিওর (SOP) । দ্বিতীয় সংস্করণ: ২৩.৩.২০২০

৫. হাসপাতালে করোনা (COVID-19) সংক্রান্ত বর্জ্য ব্যবস্থাপনা নির্দেশনা বা স্ট্যান্ডার্ড অপারেটিং প্রসেজিওর (SOP) ।- দ্বিতীয় সংস্করণ: ২৩.৩.২০২০

৬. করোনা (COVID-19) এর জন্য বিমানবন্দর বর্জ্য ব্যবস্থাপনা ।- প্রথম সংস্করণ: ২২.৩.২০২০

৭. বিশ্বজুড়ে (COVID-19) প্রতিরোধে গর্ভবতী মা ও পরিবারের করণীয় ।

৮. করোনা ভাইরাস রোগ/কোভিড-১৯ আক্রান্ত ব্যক্তিদের সংস্পর্শে আসা সন্দেহে থাকা ব্যক্তিদের কোয়ারেন্টিন সম্পর্কে জ্ঞাতব্য ।

৯. Rational use of Personal Protective Equipment for COVID-19: করোনা ভাইরাস ২০১৯ (কোভিড-১৯) নিয়ন্ত্রণের লক্ষ্যে Personal Protective Equipment (PPE) এ যুক্তিসংগত ব্যবহার । দ্বিতীয় সংস্কার: ২০.০৩.২০২০

১০. করোনা মোকাবেলায় জীবাণুনাশক দ্রবণ (Antiseptic Solution) তৈরীর নিয়ম ।

১১. COVID-19 আক্রান্ত সন্দেহজনক রোগী যার মৃদু সংক্রমণ রয়েছে এবং COVID-19 আক্রান্ত রোগী যার যার আর হাসপাতালে থাকার প্রয়োজন নেই তাদের জন্য প্রযোজ্য (বিশ্ব স্বাস্থ্য সংস্থা ও সিডিসি, আমেরিকা-এর নির্দেশনা অনুযায়ী পরিমার্জিত): Home care for patients with COVID-19 presenting with mild symptoms.দ্বিতীয় সংস্কার: ১৫.০৩.২০২০

১২. করোনা ভাইরাস সংক্রমণ (কোভিড-১৯): শিশুদের মানসিক আক্রান্ত ব্যক্তিদের সংস্পর্শে আসা সন্দেহে থাকা ব্যক্তিদের কোয়ারেন্টিন সম্পর্কে জ্ঞাতব্য ।

১৩. করোনা ভাইরাস সংক্রমণ (কোভিড-১৯): মানসিক চাপ মুক্ত থাকতে কি করবেন ।

১৪. IFRC, UNICEF & WHOএর যৌথ গাইডলাইন অনুযায়ী প্রণীত ।

১৫. রসুন খাওয়া কি করোনা ভাইরাসের সংক্রমণ প্রতিরোধে কাজ করবে?

১৬. Case Definition of COVID-19