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IGBC's Green Guidelines for Fast Track and Emergency Facilities for Treating COVID-19 Patients

Version 1.0

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Foreword from the Chairman, Indian Green Building Council (IGBC)

CII established the Indian Green Building Council (IGBC) in 2001 to strengthen the sustainability aspects and to sensitise various forms of built environment. IGBC, is a consensus driven not-for-profit Council, represents the building industry. The Council encourages, builders, developers, owners, architects, consultants and several other stakeholders to embrace green, thereby contributing to the National goals on sustainability. So far, IGBC has been instrumental in enabling 7.55 Billion sq.ft. of green buildings & green built environment in the country.

Today, the entire world is struggling with the global pandemic crisis. India being a developing country with the population of more than 1.3 billion, government is taking various initiatives to address the challenge. Many fast track and emergency facilities including temporary structures are being setup for treating thousands of COVID-19 patients. Though these are immediate response centres, they need to have basic facilities, good indoor environment for the patients and the health care workers, reduce the spread of infection within the centres and resource efficient.

In this regard, IGBC with the support of key stakeholders has developed '**Green Guidelines for Fast Track and Emergency Facilities for Treating COVID-19 Patients'**. In the present scenario, apart from addressing the increased requirement of treatment centres, it is also important to adopt healthy and sustainable practices within the centres to address the health and wellbeing of COVID patients, health care workers, reduce spread of infection within the centre and at the same time conserve resources. The development of IGBC's Green Guidelines for Fast Track and Emergency Facilities for Treating COVID-19 Patients' is an important step in this direction. I am sure this would go a long way in supporting the Indian health care sector in tackling the present pandemic situation in a sustainable manner.

V Suresh
Chairman
Indian Green Building Council

Table of Contents

Annexures on Recommendations & Specifications for COVID Facilities by MoHFW & NCDC, Govt. of India & World Health Organisation (WHO)

Acknowledgement

The IGBC's Green Guidelines for Fast Track and Emergency Facilities for Treating COVID-19 Patients, has been made possible through the efforts of dedicated Task Force members and staff members.

IGBC would like to thank the following members for their participation and contribution in developing the guidelines:

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- Dr Shakti Gupta, Med Suptd., Dr RP centre AIIMS New Delhi
- Mr B Gautham Baliga, Chair, Healthcare Technical Group, ISHRAE & Director, Opal HVAC Engineers Pvt. Ltd.
- Dr Rajiv Kumar Jain, Chief Consultant, Indian Railways
- Mr Jit Kumar Gupta, Chair, IGBC Chandigarh Chapter & Chief Town Planner, SPCL
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- Ar Hiten Sethi, Co-Chair, IGBC Mumbai Chapter & Founder, Hiten Sethi Architects, Mumbai
- Mr Chitranjan Kaushik, COO, Ecofirst Services Limited, Mumbai
- Ar Shamit Manchanda, Chief Architect Manchanda Associates, New Delhi

Introduction

The COVID 19 pandemic has taken the country by storm, affecting the lives and livelihood of people. The healthcare industry and the frontline healthcare workers are facing several challenges in combatting the pandemic. There are several temporary facilities being established in the country to cater to the growing affected population. While these are makeshift arrangements they deserve as much attention to detailing as any other healthcare facility. Besides the medical needs these facilities face the challenge of resources conservation and optimisation.

Against this backdrop, IGBC has formed a Task Force Committee to frame guidelines for New, Existing converted COVID facilities and Modular facility.

IGBC encourages all key stakeholders including hospital owners, doctors, administrators and facility managers to incorporate and practice relevant measures to combat spread of COVID 19 in Healthcare facilities.

The guidelines have been broadly developed addressing the following 12 areas of concern:

- Layout
- Site Selection for Greenfield Facility
- Modular Structures for Temporary Facilities
- Hygiene Practices
- Ventilation Parameters
- Energy Efficiency
- Water Conservation
- Waste Management
- Interior Furnishings
- Facilities for Health Workforce

To encourage the upcoming and existing healthcare facilities to implement the guidelines, 5 credit points would be awarded under innovation category in the IGBC Green Healthcare Facilities Rating System.

The guidelines mentioned herein are illustrative and recommendatory. Projects can explore the possibility of adopting measures over and above the guidelines, as applicable, to achieve the purpose of preventing large scale spread of infection and control.

1.0 Layout

Layout and design of the temporary COVID facilities plays significant role in avoiding the spread of infections within the facility. They are meant for managing only COVID positive tested individuals. Proper zoning is required for the patients having mild and severe symptoms and healthcare work force to avoid cross infection.

The layout design should cater to the requirements of the following categories of patients and have separate zone for each of these categories.

Level 1 (Quarantine Facilities)

The temporary COVID facility to provide care for symptomatic COVID patients who have only mild symptoms and do not require Oxygen or Mechanical Ventilation support.

Level 2 (Isolation Facilities)

The level 2 zone should have Oxygen Therapy for the needy patients who require oxygen support, but not in need of intensive care. This zone should have Isolation facilities and oxygen supply for treating the patients.

Level 3 (Critical Care Facilities)

This zone should have intensive Care (ICU Area) facilities with mechanical ventilators for the patients.

The layout design should facilitate unidirectional movement patients in each zone and health care workers offering treatment to patients to avoid cross infection within the facilities.

A recommended layout design for a 75-bed temporary COVID facility is given below:

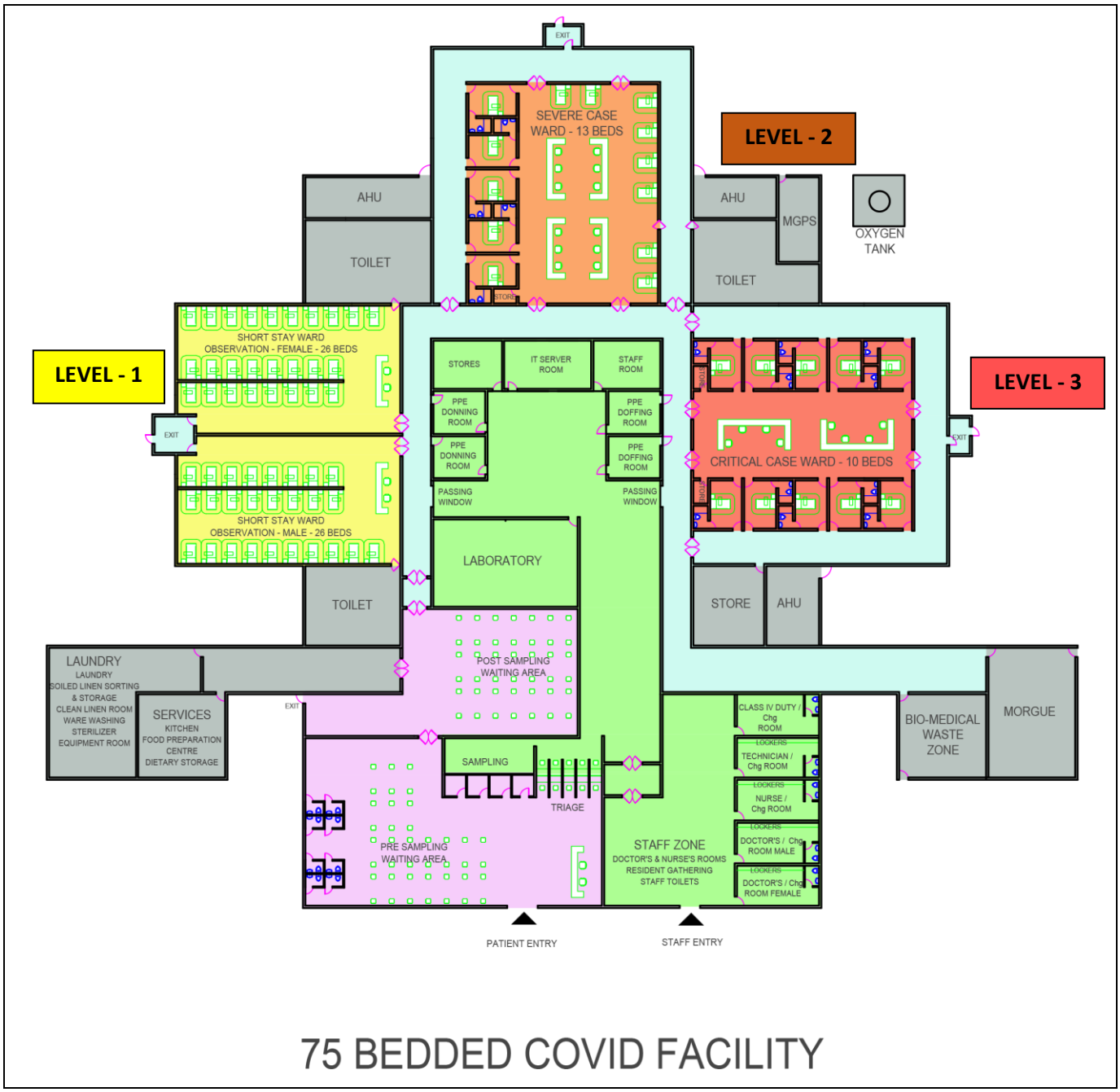


Figure 1: Basic layout of COVID Centre

Staff Area	Triage/ sampling/ waiting area
Level - 1 area	Level – 2 area
Level – 3 area	Service areas

The COVID facility layout is recommended to have two separate area, for patients and the healthcare workforce. Further the area for patients shall be divided into three zones i.e. Mild (Quaratine), Moderate (Isolation) and Critical (ICU) areas according to the medical conditions of the patients.

The layout design shall accommodate following facilities:

Patients and Visitors:

- **Entry with biocontainment unit**

  Separate entrance should be provided for the entry of patient and the visitors. The sanitisation points should be provided at the entrance so as to ensure that people are disinfected before entering the facility. The entrance should be spacious enough to avoid overcrowding. Appropriate measures should be taken to check Mask and the temperature of all the patients and visitors before entering the facility.

- **Reception**

  The information desk with the designated authority should be located in the reception area. The receptionist shall provide appropriate information to the patients and guide them to the concerned areas such as waiting room, sampling room and wards. The receptionist should also communicate regularly to the staff on patient flow to avoid confusion/mishaps.

- **Triage area**

  Triage is the preliminary area where patients are screened & tested for the virus. Triage is divided into two distinctive zones: a zone for staff and a high-risk zone for patients. A distance of 1 m between staff and patients is required. Double fencing or a Plexiglas barrier can be used for separation. Separate handwashing points (soap and water)/ Sanitizer are required for patients and staff.

- **Waiting room**

  The waiting room should be spacious and to be provided with adequate seating areas. Seating areas should be provided with minimum distance of 6ft to maintain social distancing. The waiting area shall be provided with good ventilation. The seating areas should be cleaned and disinfected regularly to avoid infection spread.

- **Sampling room**

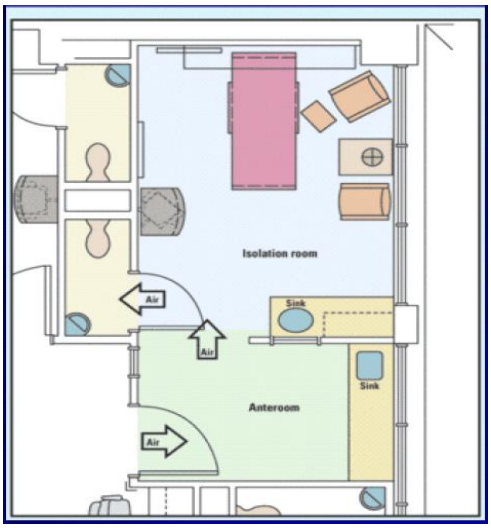
The samples from symptomatic and asymptomatic patients are collected here and sent for testing. Provide multiple booths for collecting samples. The sampling areas should be air conditioned or ventilated as per recommendations on the Chart Room Design for Air Conditioning & Ventilation Summary: Item 5, Laboratory, General indicated in chapter – Ventilation Parameters. Each booth should be properly labelled to avoid mistakes and allow proper flow of the patients

- **Wards**

The wards shall be provided in three zones including mild, moderate and critical areas according to the medical conditions of the patients. The beds in wards should be placed with a distance of 6 feet.

Details of Indoor air Quality is explained in ventilation parameters. Fabric ducts can be used, which are fast & flexible to erect.

Use of transparent partition between the patients' bed and the nursing station to enable visual contact with patients and regular monitoring of patients.



Typical Layout of Isolation Room

Moderate and severe areas should be properly equipped with the required medical gases supplied through manifold room by pipeline.

Dedicated area for Oxygen plant and storing of medical gases need to be located near Level 2 and Level 3 zones.

- **Washrooms**

  Dedicated washrooms for the patients and staff should be provided. Regular sanitisation and cleaning of washrooms is required. Adequate facilities such as hand wash area, showers, water closets and tissues should be provided. The toilet fixtures as far as possible preferably be touch free/sensor based.

- **Discharge room**

  Patients who have been recovered and tested negative are directed to the discharge room. The area should be provided with good ventilation and required facilities such as washrooms, handwashing points etc.

- **Pharmacy**

  A designated area for pharmacy should be provided within the facility where required medicines and personal protective items can be stored.

- **Morgue**

  A dedicated area away from the patient and staff areas should be provided to keep the dead bodies. This area should be highly restricted for any entry and isolated from other areas of the facility.

Healthcare Workforce

- **Entrance for staff**

  Separate entrance for staff shall be provided. Regular screening of staff entering the facility is required to monitor the temperature and avoid infection spread. The staff entry should be provided within the visibility of reception area such that the authorities would ensure only authorized people are entering the facility. It is recommended to provide sanitization points at the entrance.

- **Changing/ Retiring Rooms**

  Adequate male and female changing rooms should be provided in the facility. Consider installing locker facility for staff members to store their personal items. This area will also cater to retiring facilities for Staff during their prolong stay.

- **Disinfection room**

  Disinfectant chambers should be provided through which staff need to pass through before coming in and going out from premises.

- **Donning & Doffing Area**

  Donning area – This is the designated area for healthcare workforce to put on their personal protective equipment (PPE) such as gown, mask, eye protection and gloves before entering to the patient zone.

  Doffing Area – In this area, healthcare workforce would remove the PPE kits after treating the patients.

  The Donning and Doffing Area should be physically isolated. Doffing area is likely to be a highly contaminated zone and it cannot be mixed with any other activity. While the Donning areas should be located near the patient area and the Doffing areas should be located nearest to the exit from the patient area for the staff.

- **Passing Window**

  To avoid unnecessary movement and mixing of the staff, provide double door passing window at the entrance to the COVID Area. Items like Medicines, Food, Linen, etc. can be passed through the passing window and can be received by the staff working inside the COVID Area without the Pharmacy/ Laundry/ F&B staff having to enter the COVID Area. Similarly, all items to be passed out of the COVID Area can be sent out through the double door passing window eliminating the need for any COVID Staff to come out of the area.

- **Doctor rooms & Nurse stations**

  Designated rooms for doctors and nurse stations should be provided to perform their other duties when they are not working directly with patients. Nurse stations are recommended to be provided at every level of layout in the facility to regularly monitor the patients.

- **Laboratory**

  A dedicated area should be provided for laboratory for testing the collected samples. This area should be restricted for any entry other than the authorized hospital staff.

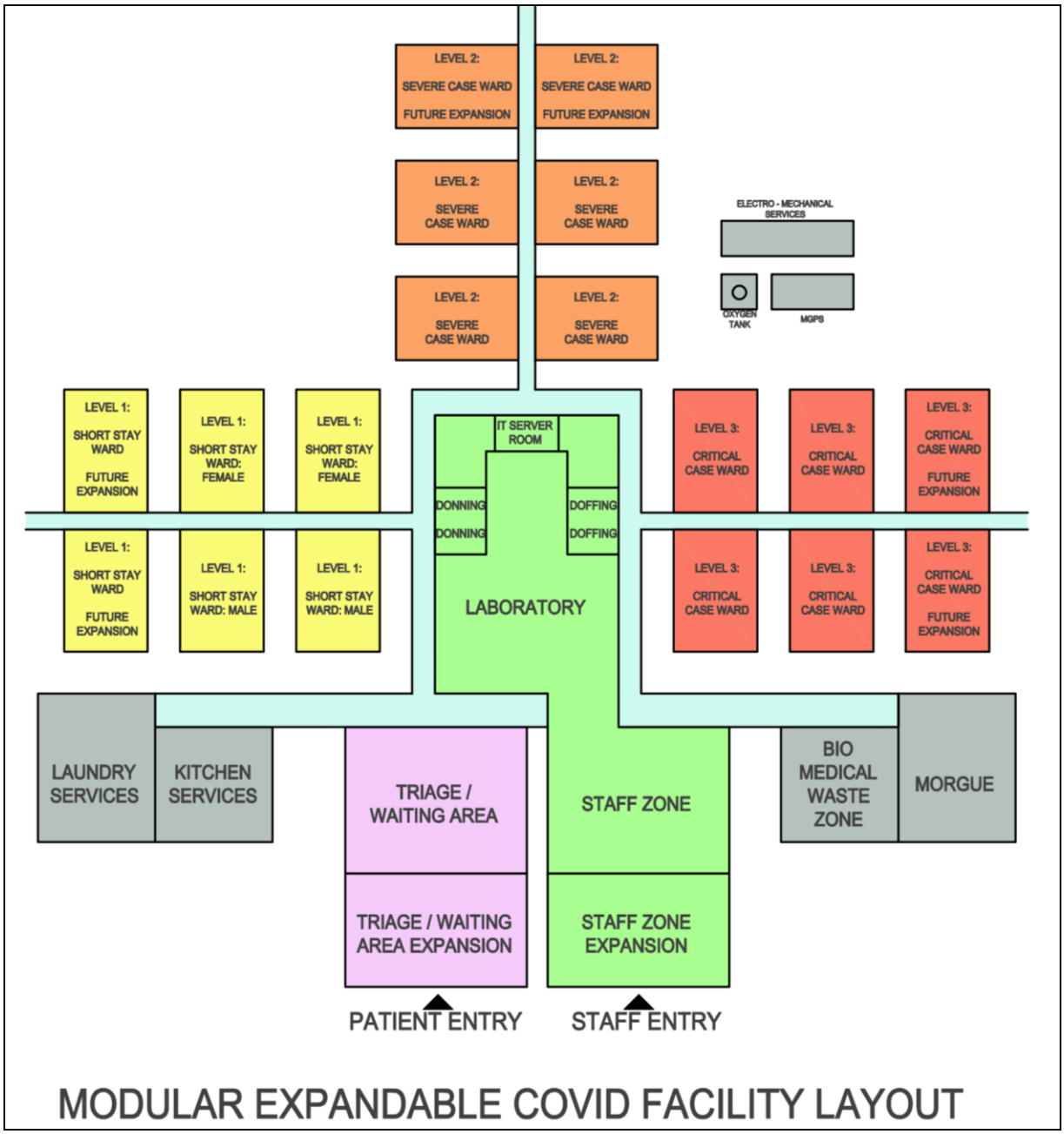
- **Hand washing points**

  Multiple sanitisation points have to be provided at all levels of the layout in the facility for better hygiene of the healthcare workforce.

- **IT Server Room**

  Provide IT systems in the facility to capture all patient data in digital format rather than having it is paper form. A designated room for IT server shall be provided in staff zone. The data can be accessed by senior staff/ doctors outside the COVID areas as well and treatment protocols can be modified accordingly. Also, a video calling facility shall be provided in wards for the patients to commute with their family members as they are restricted to meet physically. This would also facilitate patients to feel better psychologically.

The facility should also have modular expandable facility depending upon the requirement. Each level can be expanded by adding the modular facilities without compromising on the design for avoiding cross infection.



2.0 Site Selection for Greenfield Facility

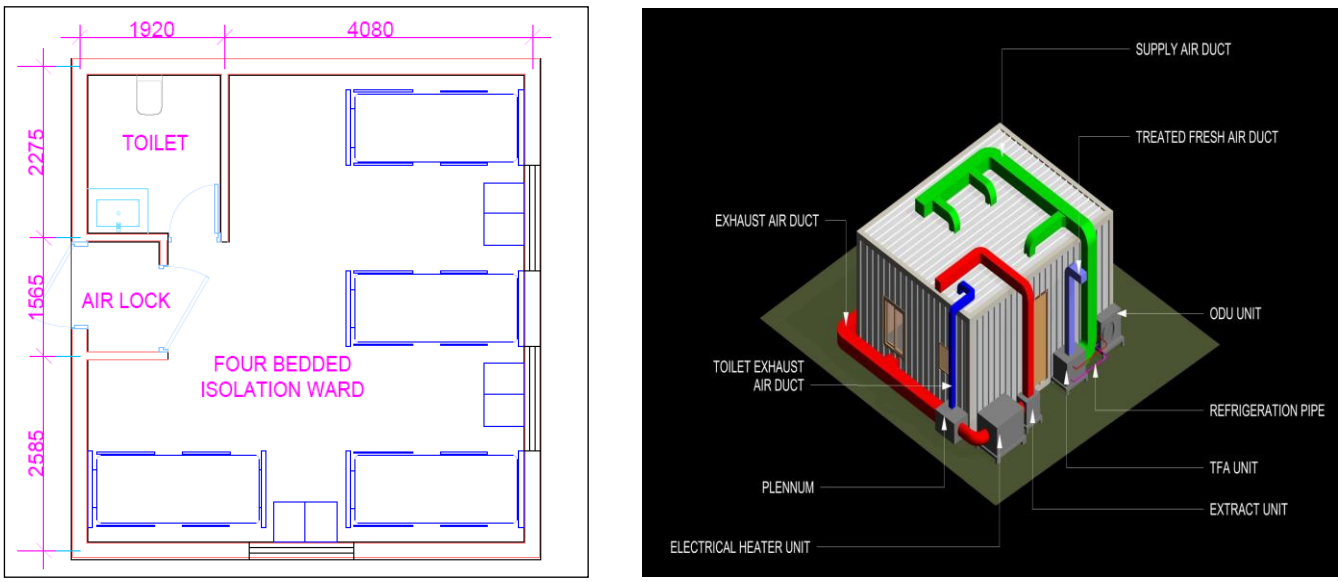
- The site selected for temporary facilities preferably should be near to an existing hospital
- Ideally the site should not be close to residential and commercial zones.

3.0 Mobile/ Modular Structures for Temporary Facilities

Temporary structures need to be built with minimum possible time and the best of medical facilities. Site work and construction should be planned simultaneously to reduce time.

- Explore the possibility of using mobile modular structures
- Mobile structures can be installed in any open area available or as an extension to the existing facility
    - Railway Yards, Hospital Vicinity - Parking Lot, Auditoriums, Shopping Mall, Hostels, Colleges, etc.
- Modular structures are constructed using prefabricated materials and assembled at the site.
- All the required infrastructure facilities in the modular structures need to be installed
    - Electrical – main utility power, individual unit level cabling, lights, electric points including 6A & 15A switches
        - All the points to be checked for polarity and continuity
    - Plumbing – water supply plumbing lines, drainage to sewer, plumbing fixtures
        - All the water supplied should be potable water to avoid any infections
    - Ventilation – Ducts to deliver & remove air, HEPA filtration, wet scrubber, fans in the individual units, exhaust fans, UV portable disinfectant

- Other facilities to be provided in the individual modular unit include
  - Clinical wash hand basin
  - Suitable extract fan
  - Transfer grille to en suite door
  - En suite facility
  - Doors to be fully glazed, with integral privacy blinds, to allow staff observation and patients views out.



Typical Container Unit

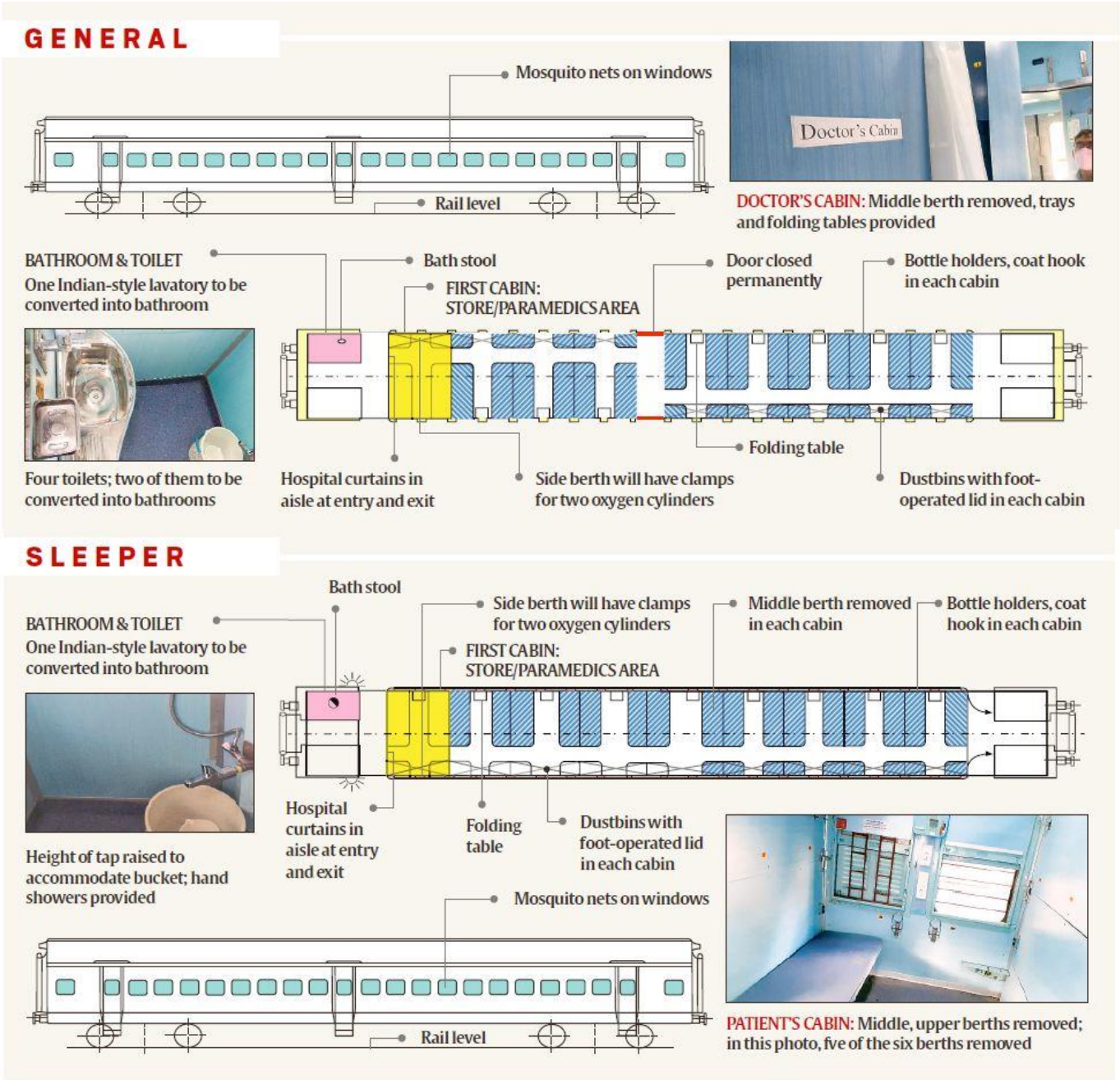
Railway Coaches:

The Ministry of Railways has taken several initiatives in developing railway coaches as temporary COVID care facilities to meet demand of increase in number of infected people across the country. The coaches are used for treating mild cases that can be clinically assigned to the COVID care facilities as per guidelines issued by the Ministry of Health.

Coaches have been converted into six to eight bays or cabins for patients and toilets are converted to bathrooms. The coaches have been provided with oxygen cylinders and power plug sockets for medical equipment.

For more details on railway coaches, please refer to 'Guidance document on appropriate suspect/confirmed cases of COVID-l9' issued by Ministry of Health & Family welfare and Ministry of Railways developed document on 'COVID Care coaches of Indian Railways'.

Appended below are schematic of coaches with COVID care facilities:



Railway Coach converted to COVID Care Centre

4.0 Hygiene Practices

Good hygiene would be the corner stone of combating COVID 19. Considering the various possibilities of spread within the premises, there is a need for significantly enhancing hygiene measures beyond regular practices. Hygiene measures should be adopted at the individual level and specific measures to be implemented at all the spaces and surfaces where in the occupants are likely to come in contact.

The following measures may be considered for implementation of hygiene in hospitals:

- Provide signages/ posters/ floor markings for social distancing
- Sensor based automatic doors from the entrance to all areas
- Use anti-microbial copper on high touch surfaces
    - Door handles, over patient tables, I.V. pole, Monitor pen, Bed liver, visitor chair arms etc.
- Patients/ Health workforce occupied area:
    - Use entryway mats in all the entry and exit points
    - Provide multiple hand wash/sanitisation stations
    - Regularly check temperature and other COVID symptoms
    - Carryout regular surface cleaning and disinfection of materials & equipment with appropriate sanitisers
    - Regularly change linen materials
    - Monitor proper cleaning of plates, cups, glasses and cutlery in cafeteria and kitchen
    - Periodically sanitise high touch surfaces
        - Workstations, door handles/ knobs, handrails, lift doors & buttons

Copper based Door Handles

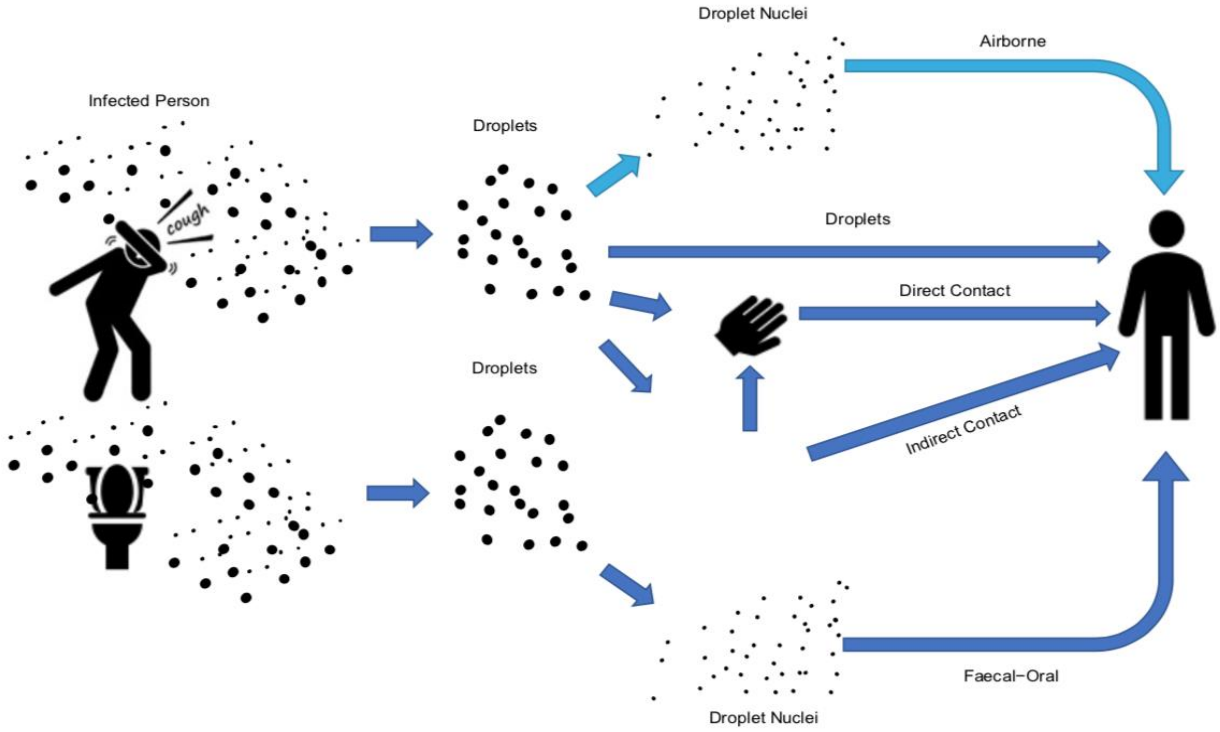
❖ Housekeeping protocols

- Rest Rooms
  - Clean restrooms with GreenPro ecolabelled housekeeping chemicals
  - Hourly cleaning of the high touch surfaces such as door handles / knobs and flush buttons etc.
  - Keep soap solutions/ sanitisers and tissue papers near wash basins
- Mop once in 4 hours all regularly occupied spaces with GreenPro/ equivalent ecolabelled cleaning chemicals or soap water.

5.0 Ventilation Parameters

There is growing evidence that there is likelihood of spread of the disease through the air-conditioning and ventilation systems thus needing extreme care to detail to ensure these systems, which are indispensable, while providing comfort should mitigate rather than propagate the spread of the disease.

The sketch below shows there are several transmission routes for the COVID-19 virus:



WHO reported exposure mechanisms of COVID 19 SARS CoV-2 droplets

The infectious droplets from infected person's cough or respiration come in a spectrum of sizes. The bigger droplets, typically larger than 5μ traverse some distance and subsequently settle down on nearby surfaces or floors or may be even directly respired by nearby people.

The smaller droplets which are <5μ float around in the air for longer times, even hours. Depending on the relative humidity of the surrounding air and the velocity of ejection from the cough, these droplets desiccate into smaller particles called 'Droplet Nuclei' aerosols. These aerosols travel considerable distances from the infected person. The HVAC systems need to primarily contend with the aerosolized droplet nuclei.

In simplified terms the infection equation can be expressed as:

Infection Rate = Viral Concentration x Exposure Time.

The HVAC systems will need to ensure that the viral concentration is substantially reduced so that the chance of airborne infection is diminished.

To achieve dilution of not only viral concentration, but also the other airborne pathogens, the HVAC system design will have to work around the following aspects:

i. *Makeup fresh air*

ii. *Passive filtration* using media filters

iii. *Air p*urification using UVGI [Ultra Violet Germicidal Irradiation]

iv. *Air distribution* of displacement to ensure that virus laden air is quickly replaced in the zone with clean air. The virus laden air is led away out of harm's way.

Apart from dilution of pathogens, the other parameters that need to be controlled are:

v. *Room pressure gradient*

vi. *Relative humidity*

vii. *Temperature*

viii. *Exhaust*

The other important aspect is how to deal with the used air or exhaust air. This is especially true when dealing with all infected patient areas viz. triage, quarantine and critical when dealing with ICUs, isolation rooms and patient area washrooms. We shall thus be discussing at length with this parameter.

ix. Energy Efficiency

HVAC systems consume a lot of energy and mostly work 24x7. It is important that we avoid profligate designs and adopt energy efficiency as an important parameter:

Ensure to choose environment friendly options for the various components of the HVAC systems wherever possible.

As detailed elsewhere in the document, there will be **Level 1, Level 2 or Level 3** facilities and these may have access to varied resources and affordability.

Finally, there are **converted facilities.** These are functioning hospitals and nursing homes which are converted to COVID hospitals.

For providing comfort and also sweeping out pathogens in the healthcare facilities, Natural ventilation, Mechanical ventilation, Air conditioning with unitary equipment viz. wall units/ window air conditioners or cassettes or with AHU systems with filtration are the options and the costs increase in the same order.

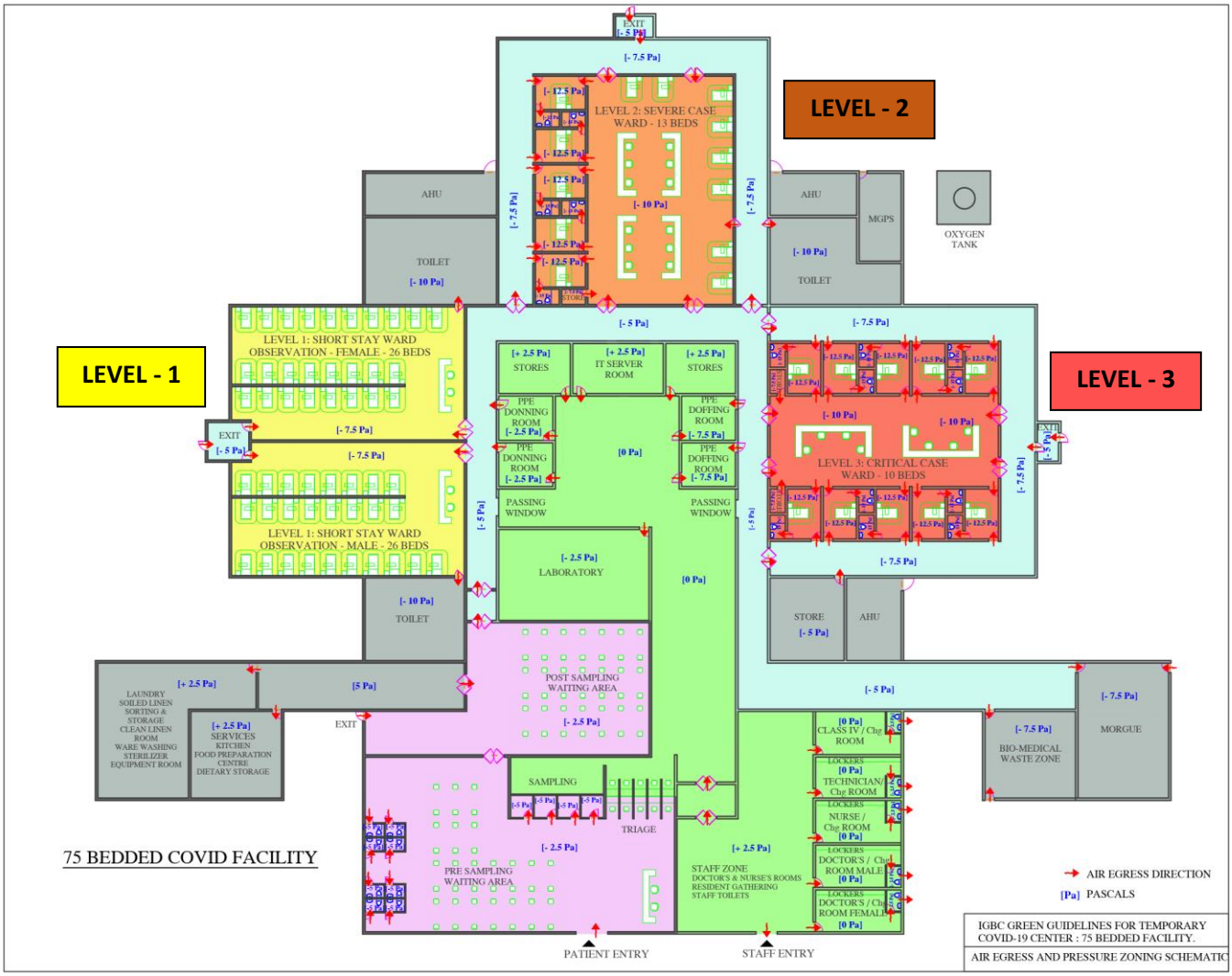
The room design options for the various areas are color coded in the recommendations as follows:

Air conditioning with AHUs: These systems incorporate the necessary air filtration and are the only option for critical areas viz. isolation rooms and ICUs. It is also the preferred option for quarantine and triage. The AHUs can induct fresh air & also create the necessary pressure gradients. Though it can be a good option for the other areas needing air conditioning, the economy of using the same has to be evaluated.

Air conditioning with Unitary Equipment (viz. wall units/ window air conditioners or cassettes) is an economical option where mechanical ventilation cannot provide necessary comfort. But the shortcoming of providing such systems is that the requisite air filtration is not there and there is no provision of fresh air. These systems can be used in quarantine, triage, patient waiting areas, doctors' and nurses' rooms provide separate provision for inducting fresh air is made and room pressure gradient where necessary is provided by exhaust modules where necessary.

Mechanical Ventilation is an option where the climate is favorable but natural ventilation is not practical in terms of availability of the necessary cross ventilation. Mechanical ventilation is acceptable in certain areas viz. quarantine, triage, and areas like resident gathering / activity / dining and physical therapy rooms. In service areas viz. wash, janitor room, store rooms mechanical ventilation is a practical option.

Natural Ventilation depends on favorable climate conditions (e.g. no risk of heat stress, no air pollution). Natural ventilation also depends on cross ventilation and convection principles and the facility will need to have the required attributes to make this a feasible option



Air Egress & Pressure Zoning Schematic

Recommended Design Parameters

IGBC recommends the following parameters while designing the HVAC systems for the various zones in COVID Care facilities.

IGBC Green Guidelines for Temporary COVID-19 Facilities: Room Design for Air-conditioning &Ventilation: Summary													
							Acceptable Options for Air conditioning & Ventilation						
Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
1	Intensive Care Unit	70F~75F [21~24]	40~70%	> (-) 2.5Pa	12	Nil	Only AHU	Unitary AC + Fresh Air/Exhaust Modules acceptable for converted hospitals only	N/A	N/A		
		Filtration					MERV7 + MERV14 for AHU	Coarse Filters of AC units and (MERV7 + MERV14) for Fresh Air Module	N/A	N/A	H13 HEPA/Chemical treatment/Plume for Exhaust for both AHU based & Unitary AC systems	UVGI for Cooling coil for AHU option

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
2	Airborne Infectious Isolation (A.I.I.) , also called Negative Isolation Room	70F~75F [21~24]	40~70%	> (-) 2.5Pa	12	Nil	Only AHU	Unitary AC + Fresh Air/Exhaust Modules acceptable for converted hospitals only	N/A	N/A		
		Filtration					MERV7 + MERV14 for AHU	Coarse Filters of AC units and (MERV7 + MERV14) for Fresh Air Module	N/A	N/A	H13 HEPA/Chemical treatment/Plume for Exhaust for both AHU based & Unitary AC systems	UVGI for Cooling coil for AHU
3	Quarantine	70F~75F [21~24]	40~70%	Negative	2	12	AHU	Unitary AC + Fresh Air/Exhaust Modules acceptable for converted hospitals only	Mechanical Ventilation with minimum 12ACH fresh air supply	Natural Ventilation (Supply Air 160Litres/s per person)		
		Filtration					MERV7 + MERV14 for AHU	Coarse Filters of AC units and (MERV7 + MERV14) for Fresh Air Module	(MERV7 + MERV14) for Supply Air	N/A	All exhausts to be to safe place	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3. Duct mounted UVGI for Supply Air for AHU

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
4	Triage	70F~75F [21~24]	40~70%	Negative	2	12	AHU	Unitary AC + Fresh Air/Exhaust Modules (for Converted Hospitals only)	Mechanical Ventilation with min 12ACH fresh air supply	Natural Ventilation (Supply Air 160Litres/s per person)		
		Filtration					MERV7 + MERV14 for AHU	Coarse Filters of AC units and (MERV7 + MERV14) for Fresh Air Module	(MERV7 + MERV14) for Fresh Air supply	N/A	All exhausts to be to safe place	1. Upper Room UVGI for all options 2. UVGI for cooling coil for AHU option 3. Duct mounted UVGI for supply air for AHU option.
5	Laboratory, general	70F~75F [21~24]	N/R	Negative	2	6	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation with min 12ACH fresh air supply	N/A		
		Filtration					MERV7 for AHU	MERV7 for Fresh Air	MERV7 for fresh Air supply	N/A	All exhausts to be to safe place	UVGI for Cooling coil for AHU opt

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
6	Laboratory, glass washing & Laboratory, strilizing	70F~75F [21~24]	N/R	Negative	2	10	AHU	Unitary AC + Fresh Air Modules	Mechanical Ventilation with min 12ACH fresh air supply	N/A		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV7 for fresh Air supply	N/A	All exhausts to be to safe place	UVGI for Cooling coil for AHU option
7	Resident Gathering/ Activity/ Dining	70F~75F [21~24]	N/R	N/R	4	4	AHU	Unitary AC + Fresh Air Modules	Mechanical Ventilation with min 12ACH fresh air supply	Natural Ventilation (Supply Air 160Litres/s per person)		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV7 for fresh Air supply	N/A	All exhausts to be to safe place	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3.Duct mounted UVGI for supply air for AHU option

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
8	Physical Therapy	70F~75F [21~24]	N/R	Negative	2	6	AHU	Unitary AC + Fresh Air Modules	Mechanical Ventilation with min 12ACH fresh air supply	Natural Ventilation (Supply Air 160Litres/s per person)		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV7 for fresh Air supply	N/A	All exhausts to be to safe place	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3.Duct mounted UVGI for supply air for AHU option
9	Main Entry External Change Room	70F~75F [21~24]	N/R	Positive	2	12	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation (min.12ACH supply)	N/A		
		Filtration					MERV 7 for AHU	MERV7 for fresh Air	MERV 7 for fresh Air	N/A	All exhausts to be to safe place	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3.Duct mounted UVGI for supply air for AHU option

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
10	(Entry to COVID Zone) Change Room Donning Area	70F~75F [21~24]	N/R	Positive	2	12	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation (min.12ACH supply)	N/A		
		Filtration					MERV 7 for AHU	MERV7for fresh Air	MERV 7 for fresh Air	N/A	All exhausts to be to safe place	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3.Duct mounted UVGI for supply air for AHU option
11	Change Room Doffing Area	70F~75F [21~24]	N/R	Positive	2	12	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation (min.12ACH fresh air supply)	N/A		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV 7 for fresh Air	N/A	H13 HEPA/Chemical treatment/Plume for Exhaust for both AHU based / Unitary AC systems/ Mechanical Ventilation Systems	1. Upper Room UVGI Recommended for all options 2. UVGI for cooling coil for AHU option 3.Duct mounted UVGI for supply air for AHU option

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
12	Doctors' Room, Nurses' Room	70F~75F [21~24]	N/R	Positive	2	6	AHU	Unitary AC + Fresh Air Modules	Mechanical Ventilation (min.12ACH fresh air supply)	N/A		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV 7 for fresh Air	N/A	All exhausts to be to safe place	1. UVGI for cooling coil for AHU option 2. Duct mounted UVGI for supply air for AHU option
13	Food Preparation Centre	70F~75F [21~24]	N/R	Negative	2	10	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation (min.12ACH fresh air supply)	N/A		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	NA	N/A		1. UVGI for cooling coil for AHU option 2. Duct mounted UVGI for supply air for AHU option

Serial No.	Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min. Fresh air ach	Min. Recirculation air ach	Only AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation	Natural Ventilation	Remarks # 1	Remarks # 2
14	Ware washing/ Laundry/ Soiled Linen/Bedpan roon/Janitor's Closet/ Bathroom/ Sterilizer Equip Room	N/R	N/R	Negative		10 [exhaust only]	N/A		Mechanical Ventilation (10 ACH Exhaust only)	N/A		
		Filtration							MERV7	N/A		
15	Dietary Storage	70F~75F [21~24]	N/R	N/R	2	10	AHU		Mechanical Ventilation (min10 ACH fresh air supply)	N/A		
		Filtration					MERV 7 for AHU		MERV7	N/A		1. UVGI for cooling coil for AHU option
16	Clean Linen room	70F~75F [21~24]	N/R	Positive	2	10	AHU	Unitary AC + Fresh Air/Exhaust Modules	Mechanical Ventilation (10 ACH supply)	N/A		
		Filtration					MERV 7 for AHU	MERV 7 for fresh Air	MERV7 for fresh air	N/A		1. UVGI for cooling coil for AHU option
17	Wash Room	N/R	N/R	Negative		10	N/A	Exhaust Fan only	Exhaust Fan only	N/A		
		Filtration					N/A	N/A	Please refer Remarks#1	N/A	H13 HEPA/Chemical treatment/Plume	

After setting up the system, IGBC recommends complete flush out of the system for about 72 hrs to ensure that all the pollutants including the dust particles and volatile organic compounds (VOCs) are completely flushed out.

Nightingale Hospital project,
UK- COVID section

Room Design:

The room design for the various rooms in the hospital are covered here with recommendations on the expectation as per the standard, options where possible in terms of air conditioning with unitary equipment viz. wall units, window air conditioners and cassettes, natural ventilation and mechanical ventilation.

The various areas require temperature and relative humidity settings (where air conditioned), air change rates for fresh air and re circulation, filtration, room pressure differential to prevent cross contamination between areas and air flow patterns to sweep away the pathogens from where they are generated to exhaust points. These concepts, named as 'Parameters' are discussed in greater detail in **Appendix I** and need to be read along with the recommendations given here.

Also, an important aspect of air distribution in the room is that there should not be turbulence. Turbulence vitiates the concept of air patterns as described above and will result in contamination spreading over the place.

The placement of grilles and diffusers and the sizing should be such that there are no air drafts. Typically at occupancy level, air velocities should be around 0.2m/s [ASHRAE 55].

Exposed Metal Ducts

An alternative method is to use Fabric Ducts (as against the normal sheet metal ducts). These fabric ducts can be used for supply as well as exhaust/ return air. These ducts are now available with antimicrobial and fire rating. The fabrics are cleanable in washing machines. As a sustainability initiative, some manufacturers offer fabrics out of recycled polyester

Fabric ducts have a number of air diffusion options which include linear vents, nozzles, orifices, and porous fabrics. These options can be made use of to achieve uniform air flow, necessary air throw and low turbulence. Fabric ducts can be procured and installed in relatively short time.

Recommendations for ventilation in the COVID Facility:

I. Intensive Care Units

Acceptable Options	**Only AHU**	**Unitary AC Units + Fresh Air/ Exhaust Modules (for Converted Hospitals only)**

The ASHRAE Standard 170-2017 specifies the following parameters for infectious ICUs:

Temperature F [C]	**Relative Humidity %**	**Room Pressure w.r.t surroundings**	**Min. Outside air ach**	**Min. Recirculation air ach**
70F~75F [21.1~23.9]	40~70%*	> [-]2.5Pa	Minimum 6**	Nil

Ach # air changes per hour

*ISHRAE COVID 19 document recommends Relative Humidity of 40~70% and this is acceptable as against 40~60% mentioned in ASHRAE Standard 170-2017

**WHO recommends 6~12ach, preferably 12ach. There will not be recirculation of air. ASHRAE Standard 170-2017 allows for recirculation of air if there is HEPA in the return.

Filtration recommended is MERV7 for as first stage & MERV14 or better as second stage for supply air.

The exhaust to atmosphere will have to be with minimum H13 grade HEPA filter (EN1822-1)

For **Converted Facilities** (existing Nursing Homes/ Hospitals being converted into COVID facilities) many of the ICUs are based on local air circulating air conditioning units such as room air conditioners, wall splits & cassettes units. These are not recommended because of various reasons:

i. Maintenance of the units has to be done in the patient area

ii. Filtration is inadequate
iii. There is no provision of fresh air or exhaust.

Till it is practical to go for an upgrade, following steps can be taken to alleviate the inside conditions:

1. Introduce an inline fan for inducting fresh air of minimum 2 air changes per hour. Use two stage filtrations with minimum MERV 7 and MERV14 rated filters.

2. Since directly inducting fresh air into the room can lead to condensation in the room especially during monsoon, make sure that the fresh air is led to the return air grill portion of the air conditioning unit.

The room will need to be kept at a negative pressure of a minimum 2.5Pascals. When the area is under negative pressure, the adjoining room should be maintained at the same level of hygiene as the ICU as air from this area will infiltrate into the ICU. An exhaust unit will be needed to achieve the [-]2.5Pa in the area with respect to the adjoining areas. The exhaust to atmosphere will have to be with H13 or equivalent grade HEPA filter.

II. **Airborne Infectious Isolation [A.I.I.] room** (also called **Negative Isolation Room**]

Acceptable Options	**Only AHU**	**Unitary AC Units + Fresh Air/ Exhaust Modules (for Converted Hospitals only)**

The ASHRAE Standard 170-2017 specifies the following parameters for these isolation rooms:

Temperature F [C]	**Relative Humidity %**	**Room Pressure w.r.t surroundings**	**Min. Outside air ach**	**Min. Recirculation air ach**
70F~75F [21~24]	40~70%*	> [-]2.5Pa	12*	Nil

Ach # air changes per hour:

* ISHRAE COVID 19 document recommends Relative Humidity of 40~70% and this is acceptable as against 40~60% mentioned in ASHRAE Standard 170-2017 I

**WHO recommends 6~12ach, preferably 12ach.

There will not be recirculation of air.

Filtration recommended is MERV7 for as first stage & MERV14 or better as second stage for supply air. The exhaust to atmosphere will have to be with minimum H13 grade HEPA filter (EN1822-1).

Additional Recommendation: UVGI for AHU cooling coil will be a useful option to keep the cooling coil & drain pan clean of biofilm.

For **Converted Facilities** (existing Nursing Homes/ Hospitals being converted into COVID facilities) Make-shift Isolation Enclosures may have to be built (Reference: IMA-HBI-ISHRAE covid-19 Guidance Document for Air-conditioning and Ventilation in Healthcare Facilities).

In resource constrained healthcare settings, several COVID-19 patients may be required to be admitted to a single large room. This presents a significant risk to the health care workers as well as a possibility for environmental spread of virus laden particles. For such instances, a make-shift patient isolation enclosure could provide the necessary protection. This could be a temporary makeshift cubicle or tent constructed out of a skeleton structure (of plastic or metal) and plastic sheet or canvas covering. The tent shall be covered on all sides excepting the front, where

PVC strip curtains or a similar arrangement can be provided. Arrangements for light and a fan inside the tent can be provided for the comfort of the patient, as necessary. The tent shall be provided with an exhaust blower to extract the air inside the enclosure and exhaust out into the atmosphere after suitable treatment. Exhaust air treatment can be done as mentioned earlier. The exhaust blower shall be so sized that a negative pressure of >2.5Pa is maintained inside the enclosure.

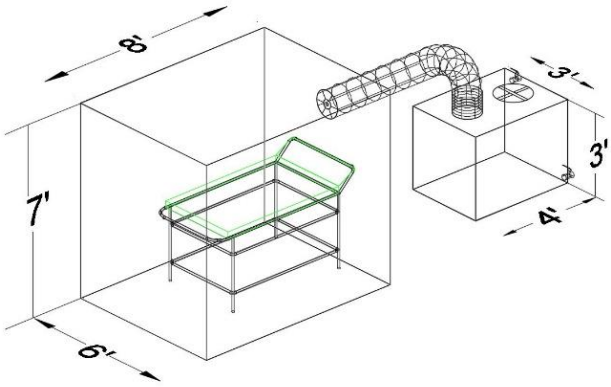


Figure 2: Isolation enclosure with Chemical disinfection for exhaust air. *(Dimensions are only indicative)*

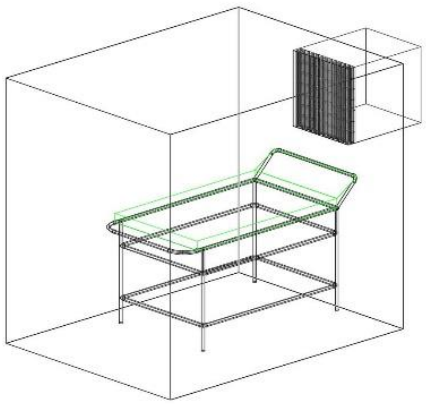


Figure 3: Isolation enclosure with HEPA filtration for exhaust air

Quarantine and Triage

Acceptable Options	AHU	Unitary AC Units + Fresh Air/ Exhaust Modules	Mechanical Ventilation with Filtration	Natural Ventilation

Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min Outside air ach	Min. Recirculation air
70F~75F [21~24]	40~70%	Negative	2	12 ach

Ach # air changes per hour

The ASHRAE Standard 170 recommends that in case of recirculation of air through AHU, there has to be HEPA filter in the return. The filtration in the AHU will be in two stages: MERV7 + MERV14 or better.

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes** are used, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced.

The room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas.

These areas may be ***mechanically ventilated***. If this is done, it has to be ensured that a minimum of 12 ach of fresh air is supplied in the room and the pressure relationship is negative with respect to surroundings. Here too, the room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas.

In case ***natural ventilation is*** adopted, the WHO recommendation is: Naturally ventilated facilities/areas: the recommended average natural ventilation rate is 160 L/s/patient.

Additional Recommendation: Considering the high viral loads that may be present in these areas, use of ***Upper Room UV Systems*** can be a beneficial addition for air purification.

UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

III. **Laboratory**

Acceptable Options	**AHU**	**Unitary AC Units + Fresh Air/ Exhaust Modules**

Recommendation as per ASHRAE Standard 170-2017 is as follows:

Room Type	**Temperature F [C]**	**Relative Humidity %**	**Room Pressure w.r.t surroundings**	**Min Outside air ach**	**Min. Recirculation air**
Laboratory, general	70F~75F [21~24]	N/R	Negative	2	6
Laboratory, glass washing	70F~75F [21~24]	N/R	Negative	2	10
Laboratory, sterilizing	70F~75F [21~24]	N/R	Negative	2	10

Ach # air changes per hour

Filtration recommended is MERV7

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes**, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced. The room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas

These areas may be **mechanically ventilated**. If this is done, it has to be ensured that a minimum of 12ach of fresh air is supplied and the pressure relationship is negative with respect to surroundings. The filtration in the fresh air supply AHU will be: MERV7 or better. Here too, the room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas.

IV. Resident Gathering/ Activity/ Dining and Physical Therapy Rooms

Recommendation as per ASHRAE Standard 170-2017 is as follows:

Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min Outside air ach	Min. Recirculation air
Resident Gathering/ Activity/ Dining	70F~75F [21~24]	N/R	N/R	4	4
Physical Therapy	70F~75F [21~24]	N/R	Negative	2	6

Ach # air changes per hour
For AHU, filtration has to be MERV7
The filtration in the AHU will be MERV7.

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes** are used, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced. The room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas.

These areas may be ***mechanically ventilated***. If this is done, it has to be ensured that a minimum of 12 ach of fresh air is supplied in the room and the pressure relationship is negative with respect to surroundings. Here too, the room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas.

In case ***natural ventilation is*** adopted, the WHO recommendation is: Naturally ventilated facilities/areas: the recommended average natural ventilation rate is 160 L/s/patient.

Additional Recommendation: Considering the high viral loads that may be present in these areas due to high occupancy, use of ***Upper Room UV Systems*** can be a beneficial addition for air purification.

UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

UVGI in supply air duct for air conditioning with AHU option for air disinfection will further improve the indoor air quality.

V. Entry to COVID Zone External Change Room

Acceptable Options	AHU	Unitary AC Units + Fresh Air/ Exhaust Modules	Mechanical Ventilation with Filtration

Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min Outside air ach	Min. Recirculation air
Main Entry External Change Room	70F~75F [21~24]	N/R	Positive	2	12

Ach # air changes per hour
Filtration with AHU system has to be with MERV7 filters for supply air

In case local unitary equipment are used viz. wall units, window air conditioners or cassettes are used, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced.

These areas may be mechanically ventilated. If this is done, it has to be ensured that a minimum of 12ach of fresh air is supplied in the room. The filtration in the fresh air supply AHU will be: MERV7 or better. The room exhausts have to be suitably placed to ensure that the exhaust air does not affect thoroughfares or susceptible areas

Additional Recommendation: Considering the high viral loads that may be present in these areas, use of Upper Room UV Systems can be a beneficial addition for air purification.

UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

UVGI in supply air duct for air conditioning with AHU option for air disinfection will further improve the indoor air quality.

VI. Change Room Suite for PPE Donning and Doffing

Acceptable Options	**AHU**	**Unitary AC Units + Fresh Air/ Exhaust Modules**	**Mechanical Ventilation with Filtration**

In case air conditioned, the following parameters need to be followed:

Room Type	**Temperature F [C]**	**Relative Humidity %**	**Room Pressure w.r.t surroundings**	**Min Outside air ach**	**Min. Recirculation air**
Donning Area	70F~75F [21~24]	N/R	Positive	2	12
Doffing Area	70F~75F [21~24]	N/R	Negative	6	Not recommended

Ach # air changes per hour

Filtration with AHU system has to be with MERV7 filters for supply air

The change room area is critical for the safety of the healthcare workers. The donning area has to be clean and the doffing area has a possibility of high viral load.

A diagram showing the recommended air infiltration/ exfiltration direction and pressure gradient to ensure a clean to dirty axis is given below:

The direction of doors should be made note of. This is to ensure that pressure aids in keeping the doors closed

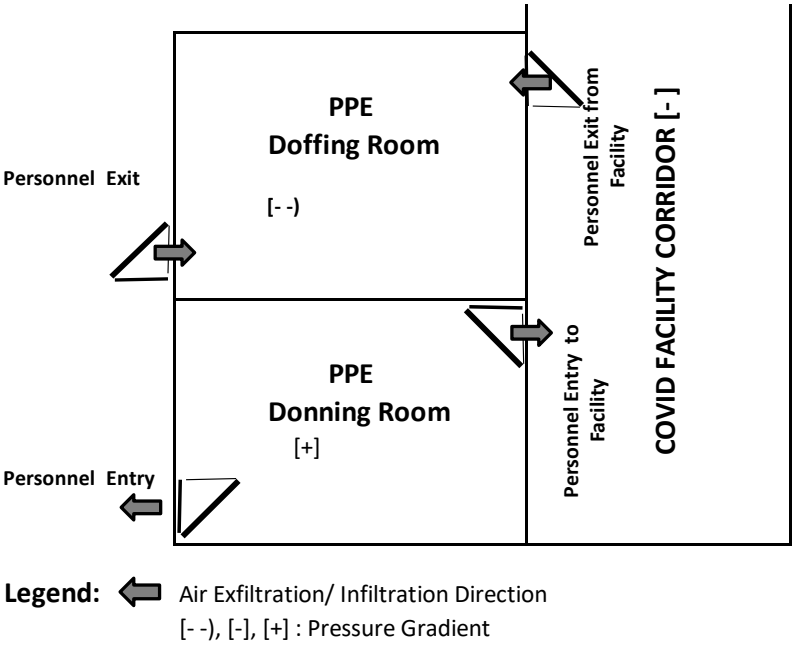


Figure 4: Pressure gradient criteria for change room suite comprising donning and doffing areas

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes** are used, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced.

These areas may be ***mechanically ventilated***. If this is done, it has to be ensured that a minimum of 12 ach of fresh air is supplied in the room and the pressure relationship is negative with respect to surroundings.

Additional Recommendation:

I Considering the high viral loads that may be present in these areas, use of **Upper Room UV Systems** can be a beneficial addition for air purification.

ii. The exhaust air from the doffing area will need to be discharged into atmosphere with minimum H13 grade HEPA filter (EN1822-1).

iii. UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

iv. UVGI in supply air duct for air conditioning with AHU option for air disinfection will further improve the indoor air quality

VII. Doctors' and Nurses' Rooms

Acceptable Options	AHU	Unitary AC Units + Fresh Air Modules	Mechanical Ventilation with Filtration

Room Type	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Min Outside air ach	Min. Recirculation air
Doctors' Room	70F~75F [21~24]	N/R	Positive	2	6
Nurses' Room	70F~75F [21~24]	N/R	Positive	2	6

Ach # air changes per hour
Filtration with AHU system has to be with MERV7 filters for supply air

Additional Recommendations:

i. UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.
ii. UVGI in supply air duct for air conditioning with AHU option for air disinfection will further improve the indoor air quality

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes** are used, use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced.

These areas may be ***mechanically ventilated***. If this is done, it has to be ensured that a minimum of 12ach of fresh air is supplied in the room and the pressure relationship is negative with respect to surroundings.

VIII. Service Areas

The Service Areas need to be mechanically ventilated.

For the food processing area (kitchen), air conditioning may be considered because of heat considerations.

In case of AHU for air conditioning of in the case of mechanical ventilation system, the supply air filtration can be MERV7.

The ventilation requirement and the pressure relationship with adjoining areas is listed below:

Function of Space	Temperature F [C]	Relative Humidity %	Room Pressure w.r.t surroundings	Outside air (min. ACH)	Recirculation air [min, ACH]
Food Preparation Centre	70F~75F [21~24]	N/R	Negative	2	10
Ware washing	N/R	N/R	Negative		10 [exhaust only]
Dietary Storage	70F~75F [21~24]	N/R	N/R	10	Nil
Laundry, general	N/R	N/R	Negative	10	Nil
Soiled linen sorting & storage	N/R	N/R	Negative	10	Nil
Clean Linen room	70F~75F [21~24]	N/R	Positive	2	10
Bedpan room	N/R	N/R	Negative	10	Nil
Bathroom	N/R	N/R	Negative	10	Nil
Janitor's closet	N/R	N/R	Negative	10	Nil
Sterilizer equipment room	N/R	N/R	Negative	10	Nil

Ach # air changes per hour

In case l**ocal unitary equipment are used viz. wall units, window air conditioners or cassettes** (for Food Preparation and Clean Linen Room), use of fresh air is mandatory. Fresh air has to be introduced towards the return air of the units so that the chance of condensation is reduced.

*Additional Recommendation: For air-conditioned space: Food Preparation Centre

i. UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

ii. UVGI in supply air duct for air conditioning with AHU option for air disinfection will further improve the indoor air quality

**Additional Recommendation: For air-conditioned space: Dietary Storage & Clean Linen Storage:

i. UVGI for AHU cooling coil for air conditioning with AHU option will keep the cooling coil & drain pan clean of biofilm.

IX. Wash Rooms

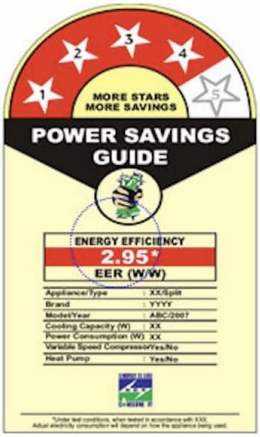
Wash rooms can have high viral load in the exhaust. The exhaust has to be a minimum of 10 air changes. It is necessary to ensure that the exhaust to atmosphere should not get into thoroughfares and occupied areas. If this Is not possible, it should be examined if it can be dispersed high into the air, 3M above the highest point of the building while taking care that this doesn't get into air intakes of adjacent buildings.

If even this is not possible, exhaust air has to be filtered through HEPA filters of minimum grade H13 (EN1822-1) before discharging into atmosphere.

6.0 Energy Efficiency

Healthcare facilities are energy intensive. Good energy management practices can reduce energy consumption to an extent of 30-40%, thereby reducing the operational expenses. Energy efficiency should be achieved without compromising on the quality of health care facilities to the patients.

The following measures may be considered for implementation of energy efficient equipment in the emergency COVID facilities:



- Air Conditioning system
  - Use of CFC free refrigerant HVAC systems
  - Install Halon free fire suppression systems
  - Use unitary air-conditioners with BEE 3-star rating (or) air-conditioners with a COP equivalent to 3.1
- Lighting
  - Use efficient lighting fixtures such as LEDs/CFLs
- Other Equipment
  - Use fans with efficiency equivalent to BEE 3-star rating or more.
  - Install Pumps & Motors in the building with efficiency equivalent to BEE 3-star rating or more.
  - Use efficient hot water systems such as solar hot water systems or BEE star rated geysers

Note: For more details on referring standards for choosing equipment to achieve energy efficiency, please refer to Annexure - III

7.0 Water Conservation

Experts indicate that, COVID 19 is not a waterborne disease. However, while consuming or using water, the associated sanitary fixtures and their surfaces can be a potential source of infection.

IGBC recommends the following measures to reduce the spread of infection through sanitary fixtures:

- Fixtures in Existing Buildings & New Buildings
  - Install sensor-based plumbing fixtures for Faucets, water closets & urinals
  - Use sensor-based hand dryers and paper towels in washrooms, kitchen / canteen
  - Use sensor based or foot operated drinking water dispensers
  - Use Long handle (Surgical) faucets which can be operated by elbow in washrooms / kitchen/ dining areas

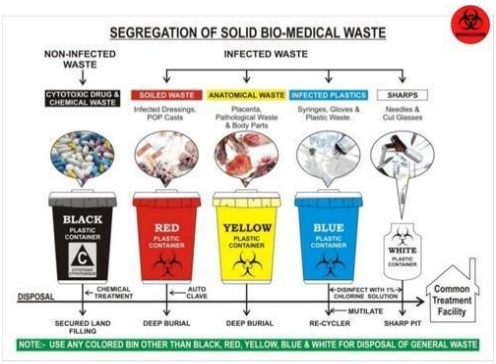
- Before Starting Operations
  - Carryout chemical cleaning of water storage tanks
  - Carryout flushing of water carrying pipes with clean water
- Check the quality of potable water regularly and take corrective measures

8.0 Waste Management

COVID facilities have to deal with biomedical waste and consumer waste during operations. Since COVID facilities have extensive requirement of personal protective equipment such as masks, gloves, gowns, PPE kits etc., the quantum of waste handled also increases. Furthermore, if the used kits are not disposed off in a proper manner it would lead to further infections and community spread.

Following are the few recommendations to manage waste in the COVID center:

- Install separate bins for waste segregation
  - Dry waste, wet waste, biomedical/hazardous waste.



- Biomedical waste management
  - Provide level wise waste segregation
    - Reference: MoEF- Bio-Medical Waste (Management and Handling) Rules-2016
- Provide centralised waste collection point
  - Locate the area with easy access to disposal
- Instruct housekeeping staff to avoid direct contact to waste while segregating and also during disposal
  - Housekeeping staff to use disposable masks and gloves
  - Install separate storage bins for disposing used masks, gloves and tissue papers

9.0 Interior Furnishings

Interior layout, furnishings and high touch surfaces could be potential sources of infection in the COVID facilities. Following measures are recommended:

- Abundant daylighting in design
- Maintain 6 feet distance in:
  - Arrangement of beds
  - Furniture layouts for workforce
  - Furniture layout in common areas

- Address Colour psychology through appropriate colour selection in the interior wall/surfaces
  - Walls, paintings, linens, bedsheets, curtains etc
- Use materials with recycled content and that are recyclable
- Select materials for interior furnishings that are
  - Antibacterial, Easy to maintain, Resistant to microbial growth, Nonporous and Seamless

10.0 Facilities for Health Workforce

Healthcare workers are the most exposed people and run the risk of high probability of infection. Hazards include direct exposure to the infected patients, long working hours, psychological stress and fatigue. It is recommended to provide following facilities to reduce the infection spread amongst the healthcare workforce:

- Provide adequate kits and protective items for healthcare workforce
  - Masks, PPE kits, Face shields, Gloves, sanitisers
- Provide stress relieving breakout spaces
  - Facilities for mental relaxation
- Provide basic facilities such as bathrooms in donning and doffing area
- Provide dormitories for workforce
- Optimise staff working timings appropriately

References

The IGBC guidelines for emergency COVID healthcare facilities have been developed referring the following recommendations released by various healthcare organizations.

- CDC Guidelines for Environmental Infection Control in Health-Care Facilities
- WHO Minimum requirement for infection prevention and control programmes
- WHO's Severe Acute Respiratory Infections Treatment Centre (SARI)
- ASHRAE 170 & 90.1 Guidelines (American HVAC &R Society)
- COVID19 TATA Isolation Wards – Public document

Appendix – I

Parameters

I. Fresh Air and Re-circulation Air Change Rates

Air change rate represents the number of times the entire volume of air in the room is replaced each hour.

One of the methods to reduce the exposure of the person to the concentration of toxic chemicals and the number of microbes is by providing ventilation i.e. introducing clean fresh air into the area. More number of air changes of ventilation per hour reduces the exposure of the patients and the healthcare workers to the toxic chemicals and microbes.

Similarly, in air conditioning systems, certain quantity of air is recirculated in the space through the air filtration system of the air handling unit. The number of times the air gets churned through the filtration system results in more of the particulate matter and the microbes getting filtered out of the air. This recirculation of air is also expressed in air changes per hour.

The chart given below is from the CDC and it shows the time required for airborne-contaminant removal efficiencies of 99% and 99.9% through air change rates. The chart assumes perfect mixing of the air within the space (i.e., mixing factor = 1). However, perfect mixing usually does not occur. Removal times will be longer in rooms or areas with imperfect mixing or air stagnation.

Air changes/hour (ACH) and time required for airborne-contaminant removal efficiencies of 99% and 99.9%*

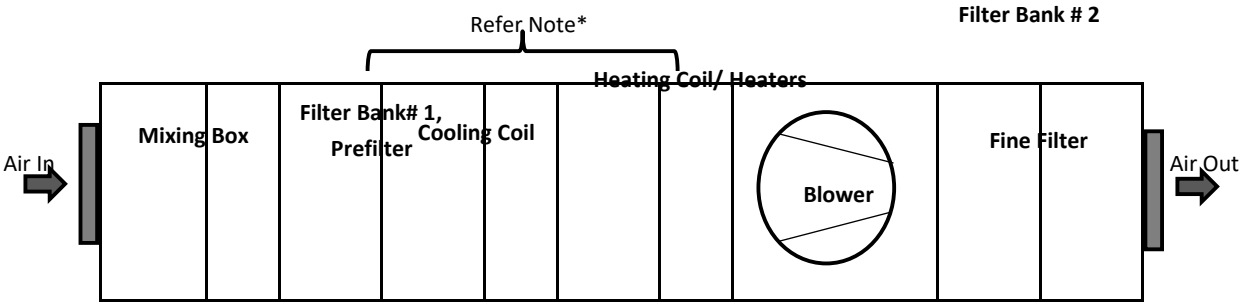
	Time (mins.) required for removal:	
ACH+ § ¶	99% efficiency	99.9% efficiency
2	138	207
4	69	104
6	46	69
8	35	52
10	28	41
12	23	35
15	18	28
20	14	21
50	6	8

Air Change Efficiency Chart (CDC)

II. Passive filtration using media filters

Filters can effectively trap particulate contaminants, including microbiological pathogens, and remove them from the air passing through them. Various grades of filters can be used to achieve different degrees of cleanliness. In critical care facilities such as in quarantine, triage and ICU, a proper filtration system generally consists of a pre-filter and a final filter in the air handling unit (AHU). The pre-filter should be placed upstream, ahead of the cooling/ heating coil (in the case of air conditioning systems), to remove large particles for a clean heat transfer medium. More

importantly, the pre-filter can prolong the life of the final filter placed downstream of the AHU (whether for air conditioning or mechanical ventilation), resulting in a cost-effective operation.



Note* Applicable for air conditioning systems & not for mechanical ventilation

Two Stage Filtration in an Air Handling Unit

Filter Classifications

The ASHRAE Standard 52.2 classifies filters used in HVAC application by their Minimum Efficiency Reporting values (MERV). The standard takes into consideration the fractional efficiencies of filters for particles in the size range of 0.3 to 10 microns.

Standard 52.2 Minimum Efficiency Reporting Value (MERV)	Composite Average Particle Size Efficiency, % In Size Range, µm			Average Arrestance, %
	Range 1 (0.3-1.0)	Range 2 (1.0-3.0)	Range 3 (3.0-10.0)	
1	n/a	n/a	E3 < 20	$A_{avg} < 65$
2	n/a	n/a	E3 < 20	$65 \le A_{avg} < 70$
3	n/a	n/a	E3 < 20	$70 \le A_{avg} < 75$
4	n/a	n/a	E3 < 20	$75 \le A_{avg}$
5	n/a	n/a	20 ≤ E3	n/a
6	n/a	n/a	35 ≤ E3	n/a
7	n/a	n/a	50 ≤ E3	n/a
8	n/a	$20 \le E_2$	70 ≤ E3	n/a
9	n/a	$35 \le E_2$	75 ≤ E3	n/a
10	n/a	$50 \le E_2$	80 ≤ E3	n/a
11	$20 \le E_1$	$65 \le E_2$	85 ≤ E3	n/a
12	$35 \le E_1$	$80 \le E_2$	90 ≤ E3	n/a
13	$50 \le E_1$	$85 \le E_2$	90 ≤ E3	n/a
14	$75 \le E_1$	$90 \le E_2$	95 ≤ E3	n/a
15	$85 \le E_1$	$90 \le E_2$	95 ≤ E3	n/a
16	$95 \le E_1$	$95 \le E_2$	95 ≤ E3	n/a

Minimum Efficiency Reporting Values (MERVs) and Filter Efficiencies by Particle Size

Air filters of MERV 13 and above have the potential to remove microbes and other particles ranging from 0.3micron to 10.0 micron.

HEPA Filters

High efficiency particulate air (HEPA) filters trap a vast majority of very small particulate contaminants from an air stream.

This worst case particle size at which the filter efficiency is least is called as the Most Penetrating Particle size (MPPS), and the efficiency of a filter at MPPS is called as the MPPS Efficiency. A HEPA filter would have an overall filtration efficiency of above 99.95% at MPPS. For any other particle size, smaller or larger than the MPPS, the filtration efficiency of the HEPA filter would be greater than its MPPS efficiency. The MPPS of a HEPA filter would most commonly fall between 0.10 to 0.30 microns.

Most viruses, including CoVs, range from 0.004 to 1.0 micron (Goldsmith CS et. al 2004, Ultra-structural characterization of SARS coronavirus). However, viruses are rarely observed as individual particles, but instead are expelled from the body already combined with water, proteins, salts, and other components as large droplets and aerosols. Thus far, SARS-CoV-2 has been observed in aerosolized particles in a spectrum of sizes, including 0.25 to 0.5 micron (Liu Y et. al, 2020. Aerodynamic characteristics and RNA concentration of SARS-CoV-2 aerosol in Wuhan hospitals during COVID-19 outbreak) necessitating high efficiency filtration techniques to reduce the transmission potential of pathogens such as SARSCoV-2,

HEPA & ULPA filters are classified as per their filtration efficiencies at MPPS. The classification chart of ISO 29463 is given below:

Filter Group / Filter Class	Integral value		Local value [ab]	
	Efficiency (%)	Penetration (%)	Efficiency (%)	Penetration (%)
E10	≥ 85	≤ 15	--[c]	--[c]
E11	≥ 95	≤ 5	--[c]	--[c]
E12	≥ 99,5	≤ 0,5	--[c]	--[c]
H13	≥ 99,95	≤ 0,05	≥ 99,75	≤ 0,25
H14	≥ 99,995	≤ 0,005	≥ 99,975	≤ 0,025
U15	≥ 99,999 5	≤ 0,000 5	≥ 99,997 5	≤ 0,002 5
U16	≥ 99,999 95	≤ 0,000 05	≥ 99,999 75	≤ 0,000 25
U17	≥ 99,999 995	≤ 0,000 005	≥ 99,999 9	≤ 0,000 1

[a] See 7.5.2 and EN ISO 29463-4.

[b] Local penetration values lower than those given in the table may be agreed between supplier and purchaser.

[c] Group E filters (Classes E10, E11 and E12) cannot and shall not be leak tested for classification purposes.

NOTE ISO 29463-1:2017 developed by ISO/TC 142 includes a classification system for high efficiency air filters according to their filtration performance (efficiency or penetration) similar to EN 1822-1. Table A.1 gives a by-side comparison of the classification in EN 1822-1 and ISO 29463-1:2017.

Classification of EPA, HEPA and ULPA Filters

E series: EPA# Efficient Particulate Air (Filter); H series: HEPA# High Efficiency Particulate Air (filter); U series: ULPA# Ultra Low Particulate Air (filter)

III. Air purification using UVGI [Ultra Violet Germicidal Irradiation]

In HVAC systems, UVGI is being increasingly used for surface sterilization (for cooling coils and condensate drain pans) and as a supplement to filters for air purification.

UVC Germicidal Ultraviolet wavelength (254nm) is effective in impacting the DNA structure and RNA of a micro-organism thereby inhibiting reproduction. Micro-organisms such as mold, bacteria & viruses will be destroyed with the required concentrations of germicidal irradiation.

All viruses and almost all bacteria (excluding spores) are vulnerable to moderate levels of UVGI exposure, but the magnitude of the effect is species-dependent.

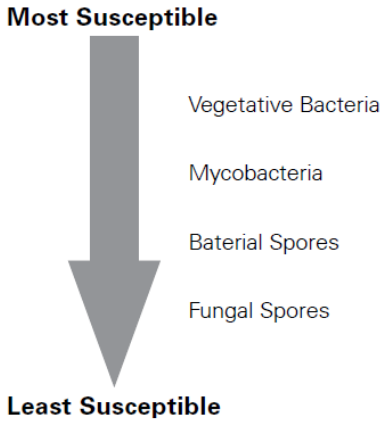
Out of the ultraviolet spectrum, it is the UV-C that has the maximum capability to destroy the microorganisms.

There are a number of factors to be considered that affect the deployment of UVC

- **Residence time**: Greater the exposure time (contact time between the contaminant and the UV source) results in more UV energy being delivered to the contaminant resulting in a greater Kill Rate.
- **Intensity**: Greater intensity results in more UV energy being delivered to the contaminant resulting in a greater Kill Rate
- **Reflection**: Reflection of the UV rays using reflectors and the inside surfaces of the AHU or duct can be a helpful tool to considerably increase the effectiveness of the UV rays produced.
- **Relative Humidity**: affects the susceptibility of microorganisms in the AHU as well as the duct where it is used. The susceptibility factor for the viruses was higher at 55% RH than that at 85% RH, possibly because under high RH (Tseng et al.: Inactivation of virus-containing aerosols by ultraviolet germicidal irradiation, Aerosol Sci Technol 2005). Microbial susceptibility to UVGI—may increase or decrease, depending on the organism.
- **Temperature:** Temperature affects the UV output of the lamp. Temperatures inside the AHU & duct can be below 13.3C [56F] and the output would be lower than 50% of the full output.

(Refer ASHRAE 2012 Systems and Equipment Handbook, Chapter 17 for further details)

Another consideration for the lamp selection is the lamp fouling factor when it is covered with dust. There is an advantage of locating the lamps downstream of high efficiency filters to protect them from dust accumulation. Otherwise, the lamps will need to be cleaned from time to time.
A point to note is that UVC can disinfect a pathogen only if it can reach it either directly or through reflection. In general, reducing the total number of pathogens reduces the risk of transmission.



Susceptibility of Microorganisms to UGVI
Reference: ASHRAE (2008c)

UVGI is being used as an engineering control to interrupt the transmission of pathogenic organisms, such as Mycobacterium tuberculosis (TB), influenza viruses (including COVID 19 virus), mold, and possible bioterrorism agents (Brickner 2003; CDC 2002, 2005; General Services Administration 2003).

Fungal spores are larger than most bacteria and are more resistant to UVGI than most bacteria. For spores, UV-C exposure is postulated to result in the formation of lethal photoactive products [Memarzadeh et al, American Journal of Infection Control, June 2010] For removal of spores, high efficiency air filtration, viz. MERV14 or superior, would be a better choice. Using a combination of UVGI and high efficiency filters can be an effective solution is certain situations.

CDC guideline addresses UVGI as a supplemental engineering control and are classified as Category II, 'Suggested for implementation and supported by suggestive clinical or epidemiological studies, or a theoretic rationale'

UVGI is used in two formats in the air conditioning systems:

- **In AHUs**: UVGI directed at environmental surfaces can damage microorganisms present or growing on the surface. Lower-intensity UVGI is effective for surface inactivation because irradiation is applied continuously. UVGI from lamps in AHU plenums has been used successfully to inactivate microorganisms present on airstream surfaces such as on cooling coils and drain pans (Menzies et al. 1999, 2003). This helps in keeping the cooling coils and drain pans clean. Since the bio films that normally develop on the heat exchanger surface get eliminated, studies have indicated better heat transfer because of the UVGI radiation.

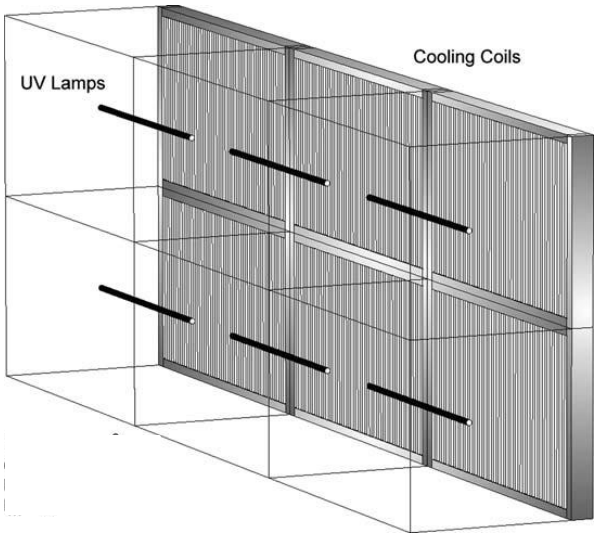
  Menzies et al. found a significant decline in building-related symptoms associated with use of UVGI in AHUs though significant declines in airborne levels of fungi and bacteria as well as endotoxins were not detected in the workplace

- **In Ducts:** UV lamps placed in ductwork have been used to inactivate Mycobacterium species and other microorganisms. The residence time of the microbe under UVGI illumination is an important factor while considering the UVGI lamp design inside the duct. This is achieved by installing the UV lamps parallel to the airflow inside the ducts.

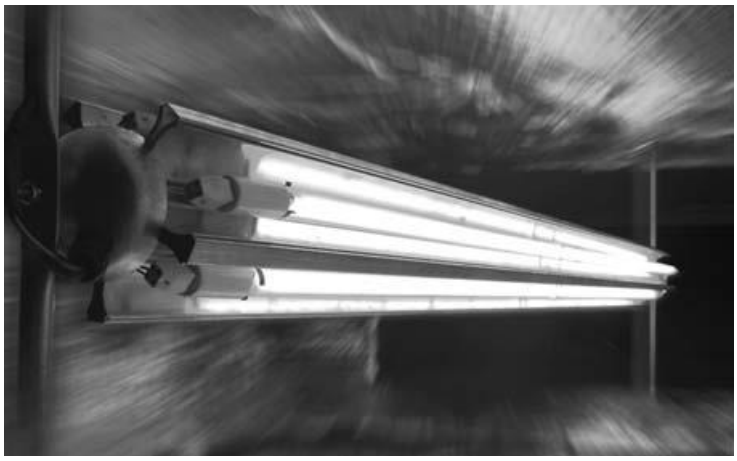
Safety Requirements

Inadvertent exposure to UVC can be dangerous for humans**.** Doors, covers and lamp mounting brackets that give direct access to Ultraviolet (UV) radiation lamp systems shall be equipped with an interlocking mechanism that removes power from the ultraviolet (UV) radiation lamp system when the door is open or cover removed.

Further, polymeric cabinet, structural, and current carrying parts and wiring which are subjected to irradiance from a UV lamp system will need to be shielded from the UVC light or be constructed of a material that is capable of withstanding UVC exposure levels expected in the product without degrading.



UVGI Lamps for irradiating cooling coil [diagram from Ultraviolet Germicidal Irradiation Handbook: Wladyslaw Kowalski, Springer Publication

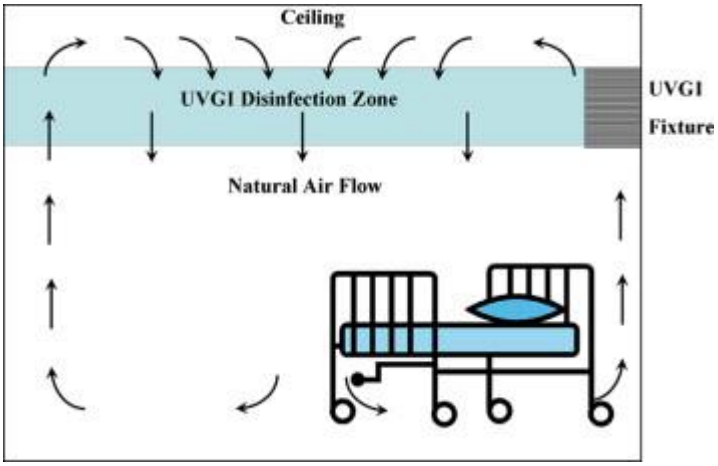


Multiple UV lamp fixture for installation in ventilation ductwork. [Photograph of Sanuvox from Ultraviolet Germicidal Irradiation Handbook: Wladyslaw Kowalski, Springer Publication

- Apart from air conditioning systems, UVGI lamps can be fitted in rooms to intercept microbes inside the room where they may be generated by occupants, thereby controlling infection at the source. When used in rooms, the systems are called **Upper Room UV systems**.
- The Upper Room UV systems create a germicidal zone of UV rays. This zone is confined to the upper portion of the room. Air that enters this zone gets disinfected.

Upper air UV disinfection is considered to be the most practical method of airborne infection control in resource limited locations since they are passive (no moving parts), have modest costs, and consume very low energy unlike air conditioning and mechanical ventilation systems which can be prohibitive.

Safety issues associated with Upper Room are addressed in the CDC/NIOSH and recommend REL of 0.006 J/cm2, or 60 J/m2 (at 254 nm) for 8 h of exposure.
The UV reflectance hazards for Upper Room (and Lower Room) systems should not be ignored and care should be taken to ensure there are no highly UV-reflective ceiling paints or materials in locations that may direct reflected UV rays towards the eyes or skin.

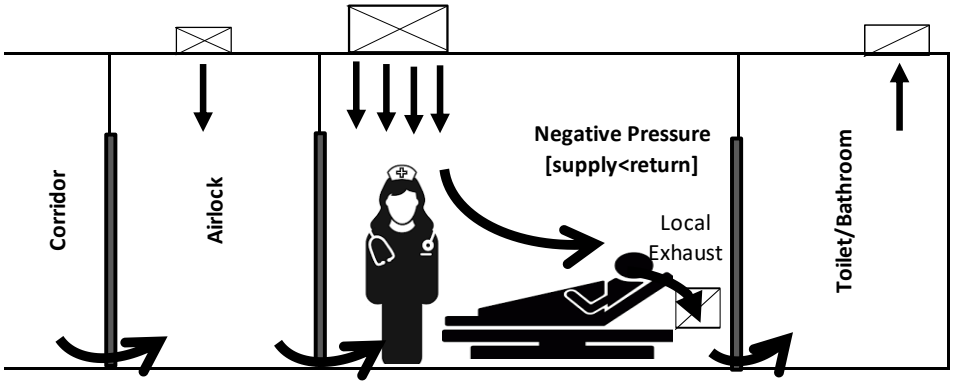


Upper Room UV System:
Schematic from ScienceDirect

IV. Air Distribution

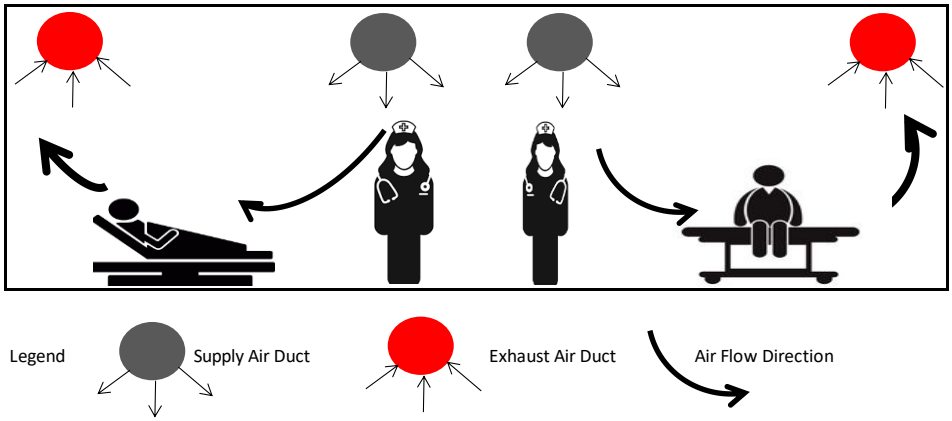
For infection control, it is not only about air filtration and differential pressure. How the air is introduced into the room and then how it sweeps away the contaminants is important. The supply of air has to reach each part of the space to improve dilution and removal of pollutants from the space .A few examples will make the concept clear.

- In an **Airborne Infectious Isolation [A.I.I.] room** (also called **Negative Isolation Room**], also called the negative isolation room, the people in the outside corridor and the healthcare workers will need to be protected from the patient. The room is thus kept under negative pressure. The healthcare worker should be safe when attending to the patient and the latter's respiration should be directly exhausted. The air pattern shown in the figure does just that. The clean air from the supply air duct comes first on the healthcare worker & thence to the patient and then exhausted from the nearby exhaust grille.



Air Pattern for a (negative pressure) A.I.I. Room

- In **Infectious Intensive Care Unit (ICU)** the air pattern will have to ensure that the aisles have clean air and so do the patients. The respiration from the patients will have viral load which will have to be swept away by the room air directly into the exhaust without mixing in the room air.

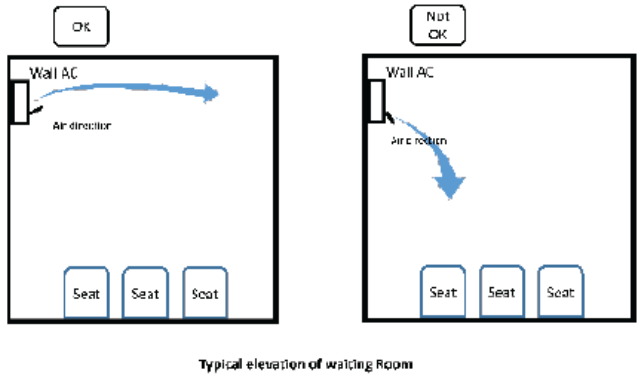


Air Pattern for an ICU

- ***Air Patterns for Window , Wall mounted and Cassette split air conditioners***

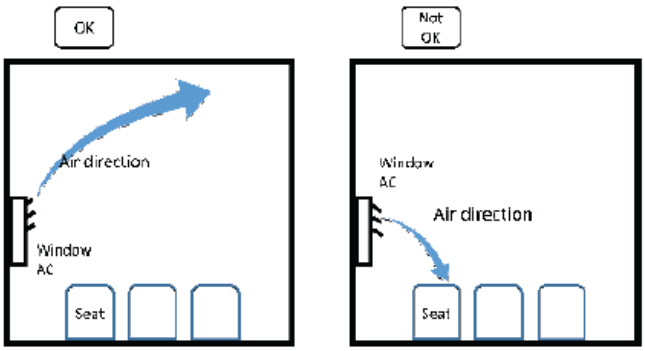
  (As recommended in IMA-HBI-ISHRAE COVID-19 Guidance Document for Air-conditioning and Ventilation in Healthcare Facilities).

  Considering that the virus spreads through coughing and sneezing by an infected patient, it is important to ensure that the draft of air from the AC unit is not directed to the occupants. It is recommended to direct the supply air into the occupied zone in such a way that a high velocity draft is avoided. Window and wall mount split AC units and cassettes have setting to direct the air flow. Figures are illustrated below for reference.



Typical elevation of waiting Room

Air Pattern for Wall AC Units



Air Pattern for Window AC Units

- The air patterns in rooms dealing with **quarantine and triage in emergency rooms**, need to be from clean to dirty axis as part of design considerations as this will impact transmission of disease.

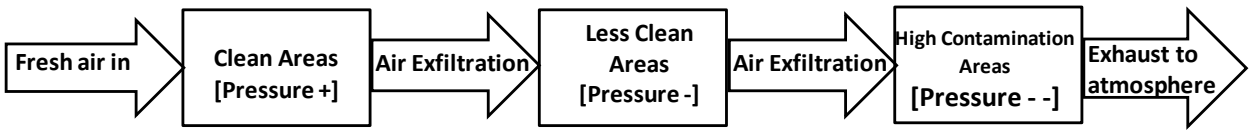
Some Important Points Regarding Air Distribution with Ducted Systems

- False ceiling returns are not acceptable. This is on account of the fact that the plenum above the false ceiling is not cleanable and thus can be a place where pathogens can grow.
- In re-circulatory AHU or ducted split units, the units shall not be shared between different rooms/zones. This is because infection in one room/ zone will get conveyed into the other rooms/zones.

V. Room Pressure Gradient

While the quantity of air distributed to the space and air patterns are important, from an air-quality standpoint, space pressurization is perhaps even more important. The air quantities of supply, return, fresh air and exhaust should be balanced so that air travels from the cleanest spaces to the dirtiest (or highly contaminated areas) spaces.

In COVID healthcare facilities the Admin Areas, Doctors' Rooms and Nursing Stations, Reception Areas may be considered as among the cleaner areas. The triage and quarantine areas have higher levels of contamination. The ICU, isolation rooms, washrooms and change room doffing areas have the highest levels of contamination. Accordingly, the room pressure gradient has to be planned as shown in Figure 17 below



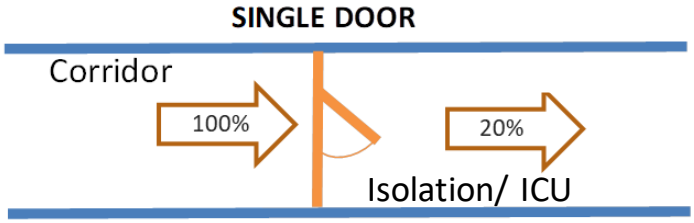
Pressure gradient to achieve air exfiltration from clean to contaminated rooms

The ASHRAE Standard 170-2017 has a recommendation for the pressure gradient for the various rooms in a hospital which indicates whether they should be positive, negative or neutral with respect to the surroundings.

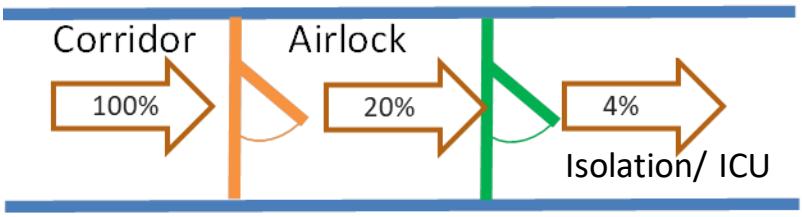
In particular the isolation rooms and ICU will have to be lower than (-) 2.5Pascals compared to the adjoining areas.

Introduction of an airlock (also called ante room) outside these critical rooms (isolation rooms and ICU)d can significantly improve the barrier effectiveness when doors get opened and the pressures equalised.

The illustration below from ASHRAE Design Guide for Cleanrooms makes the concept clear.



Barrier Effectiveness 80%
Contamination Rates 20%



Overall Barrier Effectiveness 96%
Contamination Rates 4%

Barrier Effectiveness 80%
Contamination Rates 20%

Barrier Effectiveness 80%
Contamination Rates 20%

Advantage of using airlock for contamination control

VI. Relative Humidity

Moisture in the air is the first arm of defense of our immune system and we now know that our body cannot fight off foreign particles or invaders as adequately when we're in a dry environment. Further, the infectivity of the bacteria too increases with low humidity. Relative humidity of at least 40% is considered the threshold. (Dr. Stephanie Taylor, Presenter, "Optimize Occupant Health, Building Energy Performance and Revenue through Indoor-Air Hydration, ASHRAE).

All microorganisms need water to grow initially. Too much humidity leads to higher levels of dust mites and fungi, two of the worst culprits for indoor allergy sufferers. Mold and fungi are known to exacerbate respiratory conditions such as upper respiratory (nasal and throat) symptoms, cough, wheeze and asthma. Immuno-suppressed or Immuno- compromised patients are at increased risk.

Effect of Humidity on Airborne Transmission of Cough Aerosol

Small particles get generated during the course of coughing and sneezing and to a lesser extent by even talking and breathing. Particle size distributions of coughed materials encompass a broad spectrum of diameters, from very small to large droplets.it is known that most of the viable particles ranging from 0.65 to 3.3µm in the cough-generated aerosols are immediately respirable

(K. P. Fennelly et. al "Cough-generated Aerosols of Mycobacterium tuberculosis: A New Method to Study Infectiousness," American Journal of Respiratory and Critical Care Medicine).

While big particles and droplets from cough promptly fall to ground and surfaces, the smaller ones float in the air for a long time. Small particles <5micron (droplet nuclei or residue) are formed from droplets (usually within milliseconds) in the air which shrink in size due to the process of evaporation and desiccation in low humidity and remain suspended in air for several hours.

How humidity affects the virulence of bacteria

Organisms that have been exposed to dry environment have increased virulence and increased rates of antibiotic resistance even in the absence of antibiotics.

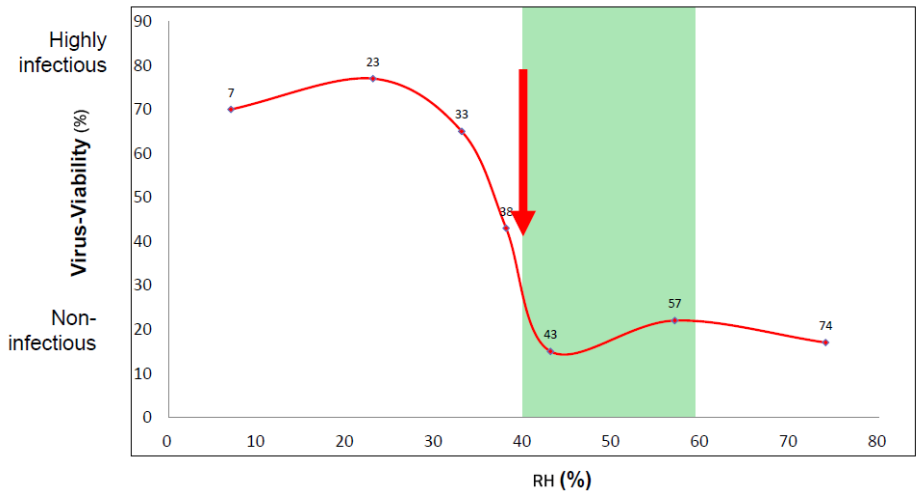


Figure 21: Stephanie Taylor, Presenter, "Optimize Occupant Health, Building Energy Performance and Revenue through Indoor-Air Hydration," ASHRAE

Apart from virus, there is a correlation of humidity with the growth of various pathogens as given in the Sterling chart below [figure20]

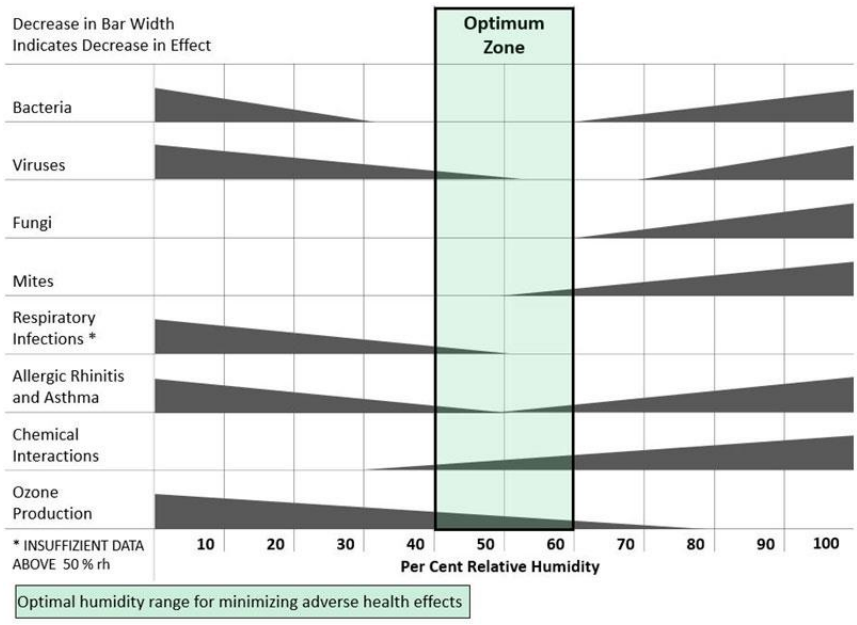


Figure 22: Criteria for Human Exposure to Humidity in Occupied Buildings, E.M. Sterling, 1985 ASHRAE Transactions CH85-13-1

All things considered, the humidity level of 40% ~ 60% is considered to be the most suitable environment for humans & decreases problems from pathogens.

VII. Temperature

(As recommended in IMA-HBI-ISHRAE COVID-19 Guidance Document for Air-conditioning and Ventilation in Healthcare Facilities).

Temperature tends to be a factor that directly affects the comfort of building or hospital occupants. Comfort temperature **is** generally considered between 24 - 30 °C , after accounting for air velocity, relative humidity and clothing. The study of the transmission of COVID-19 virus in 100 cities of China indicates that high temperature and high humidity significantly reduce the transmission of influenza (Jingyuan Wang, Ke Tang, Kai Fang, and Weifeng Lv, "High Temperature and High Humidity Reduce the Transmission of COVID-19," SSRN Electronic Journal, 9 March 2020, http://dx.doi.org/10.2139/ssrn.3551767.. Studies conducted at various RH levels have shown that using viral culture methods low temperatures (7–8 °C) were optimal for airborne influenza survival, with virus survival decreasing progressively at moderate temperatures (20.5–24 °C) and further decreases at higher (greater than 30 °C) temperatures [5]. As per some recent studies, SARS-CoV-2 has been found highly stable on surfaces for 14 days at 4 °C; one day at37 °C and 30 minutes at 56 °C were needed to inactivate the virus [6].

Though ISHRAE recommends temperature range of 24-30 °C for comfort conditioning, in case the job requires use of special clothing, for example PPE for healthcare staff, temperature lower than 24 °C may be considered to ensure sufficient dissipation of heat released from body through heavier clothing.

VIII. Exhaust Air

Hospital exhausts can have inordinate load of pathogens and we have to be careful where we exhaust the air. The exhaust air must be protected for containment by at least MERV10 grade filters [HVAC Design Manual for Hospitals and Clinics].

The exhaust air from isolation rooms and ICUs is most likely to contain a high viral load and hence a suitable technique should be deployed to prevent the spread of infections. **Treatment of exhaust air can be done preferably by HEPA filtration** (Reference: IMA-HBI-ISHRAE COVID-19 Guidance Document for Air-conditioning and Ventilation in Healthcare Facilities). These HEPA filters shall be a minimum of H13 (EN1822-1) filter class or equivalent.

When not possible, **treatment of exhaust air by Chemical disinfection is acceptable**. When both the methods are not viable, the exhaust air shall be let off into the atmosphere through a high velocity upward plume at a height of 3 m above the tallest point of the building, thereby lowering the viral load concentrations to insignificant levels by dilution. This exhaust discharge shall be well away from other air intake points and populated places.

When HEPA filters are used to treat the exhaust air, it is preferable to install them at the primary point of air extraction in the room and the exhaust blower shall be at the discharge end of the exhaust duct in order to maintain a negative pressure in the exhaust duct.

Chemical disinfection of the exhaust air from COVID-19 patient room can be done by bubbling the exhaust air through a "Diffused air aerator tank" (preferably of non-metallic material) holding a 1% sodium hypochlorite solution [Refer: i European Centre for Disease Prevention and Control,

"Disinfection of environments in healthcare and non- healthcare settings potentially contaminated with SARS-CoV-2," Stockholm: ECDC, 2020 ii. World Health Organization, "Collecting, preserving and shipping specimens for the diagnosis of avian influenza A(H5N1) virus infection : guide for field operations," Geneva: World Health Organization, 2006 and iii. Ministry of Health & Family Welfare, Government of India, "COVID 19: Guidelines on disinfection of common public places including offices," Delhi: Government of India, 10th April 2020, https://www.mohfw.gov.in/pdf/Guidelinesondisinfectionofcommonpublicplacesincludingoffices.pdf.]. The concentration of the solution shall be checked on a regular basis and dosing undertaken based on need. The aeration tank shall be placed in an unpopulated outdoor area and not inside enclosed space. Suitable PPE shall be used while handling the hypochlorite solution and direct contact with skin and eyes shall be avoided. The above chemical inactivation procedure for treatment of exhaust air is suggested based on the available information at this time.

The other two options available for **exhaust air treatment being UV irradiation and heating**. (MER Darnell et al Observed that, an exposure time of 45min at a temperature of 75 °C resulted in complete inactivation of SARS-CoV. Similarly, an UVC (254 nm wavelength) irradiation with an exposure time of 15 minutes at irradiation intensity of 4016 µW/Cm2 resulted in complete inactivation of SARS-CoV. Figure below shows the effect of heat treatment and UV radiation on infectivity of SARS- CoV

Appendix - II

General Notes on Maintenance of HVAC Systems

Location of AC Equipment & Its Servicing

All ac equipment will require servicing from time to time, whether it is to attend to the parts or for cleaning the filters. This puts the unitary equipment viz. wall units, window ac units, ducted splits and cassettes at a disadvantage in areas with contagion as the technicians will be at considerable risk in such areas and servicing with PPE suits can be very inconvenient.

Cleaning of Filters

Filters, whether of re-circulatory AHUs, unitary ac units or of exhaust units, are likely to have high viral load. Cleaning these filters will put the technician to high level of risk. Using filter cleaning booths is advocated. These booths should be located in a designated safe area and the technicians attending to the filter cleaning activity will have to wear appropriate PPE.
Sewage treatment of the cleaning water has to be taken care of.

Disposal of HEPA Filters

The replacement of these filters should be done by trained personnel with the necessary PPE and disposal of these filters shall be done in accordance to “Bio medical waste” regulations.

Cleaning of UVGI Lamps

The UVGI lamps in the ac systems function well only if they are not covered with dust. Maintenance schedule in the facility should include cleaning of these lamps.

Condensate Drain for AC Equipment

This water has to be treated for viral load before discharge into sewage. The condensate drain water should not be recycled for any usage.

Maintenance of All Equipment

All HVAC equipment will be required to be serviced and maintained as per the recommendations of the respective manufacturers.

Appendix - III

Energy Efficiency

The energy consumption of HVAC systems is very high and steps have to be taken to ensure that the installed systems are energy efficient.

New COVID Facilities: healthcare facilities:

Case A - Air-conditioned healthcare facilities:

Design the facility to comply with Energy Conservation Building Code (Revised Version May, 2008) (or) ASHRAE Standard 90.1-2013 (without amendments) through one of the following approaches:

- Option 1 - Performance based approach (Whole building simulation)
- Option 2 - Prescriptive approach

  The total annual energy consumption of the building should not exceed the total base case energy consumption computed, as per ECBC (or) ASHRAE Standard 90.1-2013.

- Option 1 - Performance Based Approach (Whole Building Simulation)
  Demonstrate compliance of the facility performance by whole facility simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2013 (without amendments), Appendix - G. Simulation is to be carried out at comfort temperatures of 24 +/- 2 deg C.

Notes:

- *In cases where lighting systems are yet to be installed, the proposed case LPD during*
- *simulation shall be same as the base case.*
- *Projects that use on-site renewable energy sources (such as solar energy, wind power,*
- *biomass, etc.,) can subtract renewable energy generated from the total annual energy*
- *consumption of the proposed case.*
- *Projects that use solar hot water systems can model the systems in the proposed case, as*
- *against electrical heaters in the base case, to show energy savings.*
- *Projects which have process loads not related to building operations should be considered*
- *during simulation. While reporting, such loads can be excluded from the base case and*
- *proposed case annual energy consumption. The process loads which are excluded shall be*
- *justified with a narrative.*
- *Project with multiple buildings (including projects with common basement) must independently*
- *meet the Minimum Energy Performance criteria for each building.*

- Option 2 - Prescriptive Approach

  The project should meet the applicable criteria as established in prescriptive measures of ECBC (or) ASHRAE Standard 90.1-2013 (without amendments).

Case B - Non air-conditioned healthcare facilities: (Prescriptive Approach)

Non air-conditioned facilities are those which are not serviced and will not be serviced in the future, either through central air-conditioned systems or unitary air-conditioners.

- Air-conditioning may be considered for critical areas, not more than 10% of the total regularly occupied area.
- Spaces with unitary air-conditioners shall comply with IEQ Mandatory Requirement 1 - Fresh Air Ventilation, Non air-conditioned buildings criteria

Non air-conditioned buildings shall meet the following prescriptive measures, as applicable:

1) Building Envelope:
The project must ensure that the following building envelope measures meet the baseline criteria as outlined in Annexure - VII

- Solar Heat Gain Coefficient (SHGC) *
- Window Glazing U-value (only if WWR > 40%) **
- Overall Wall Assembly U-value
- Overall Roof Assembly U-value

Notes:

- *For Climatic Zones of India, please refer Annexure - VI.*
- **Low SHGC value can be achieved through chajjas or other sun shading devices or efficient fenestration or a combination of both. For details, refer ECBC section 4.3.3 - Vertical Fenestration, Exception to ECBC 4.3.3.*
- ***Compliance for window glazing U-value should be shown only if Window-to-Wall Ratio (WWR) is more than 40%.*

2) Lighting:
The Lighting Power Density (LPD) in the building interior, exterior and parking areas shall be reduced by minimum 10% over ECBC base case.

Notes:

- *Compliance for the lighting power density shall be shown either through 'Building Area Method'*
- *or 'Space Function Method'. If 'Building Area Method' is considered, compliance for parking*
- *area lighting shall be shown separately.*
- *Exterior areas illuminated by lighting only should be considered for lighting power density*
- *calculations.*
- *The LPD should include power consumption of complete fixture, including lamps and ballasts*

3) Air-conditioning Systems:

Projects having air-conditioners (as per criteria the defined for non air-conditioned buildings), shall consider unitary air-conditioners with BEE 3-star rating (or) air-conditioners with a COP equivalent to 3.1 (EER of 10.58), or more.

4) Heating Systems:

Projects having more than 150 Heating degree days** (HDD18) shall consider heating systems in proposed case to meet a base line COP of 2.5 (EER of 8.53), when heat pumps are installed in the building.

Notes:

- *** Degree day: The difference in temperature between the outdoor mean temperature over 24 hour period and a given base temperature.*
- ***Heating degree day base 18oC, (HDD 18): For any one day, when the mean temperature is less than 18oC, there are as many degree-days as degree centigrade temperature difference between the mean temperature for the day and 18oC.*

Annual heating degree-days (HDDs) are the sum of the degree-days over the calendar year.

5) Fans:

Fans installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

6) Pumps & Motors:

Pumps & Motors installed in the building shall have an efficiency equivalent to BEE 3-star rating or more.

General Notes:

- *Projects which use on-site renewable energy sources (such as solar energy, wind power, biomass, etc.,) can subtract renewable energy generated from the total energy of the proposed case.*
- *Projects installing solar hot water systems can assume electrical heating in the base case.*
- *Energy efficient materials, products and equipment that are certified by IGBC under Green Product Certification Programme or by a third-party agency approved by IGBC can be used by the project to show compliance*

Existing facilities:

Option 1- EPI Approach

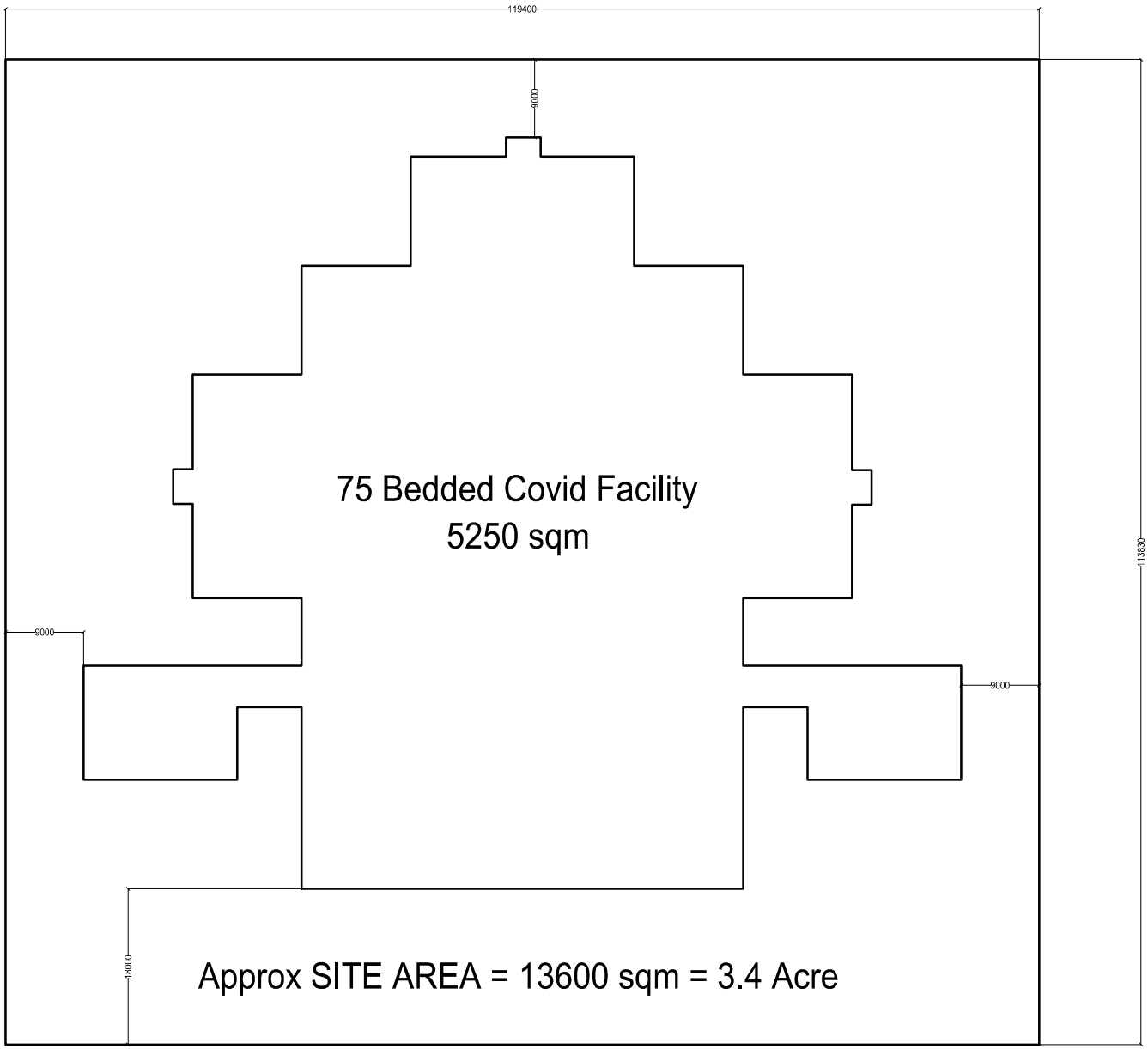
Demonstrate that the annual energy consumption in the facility is within the Energy Performance Index (EPI) limits as mentioned in the table below:

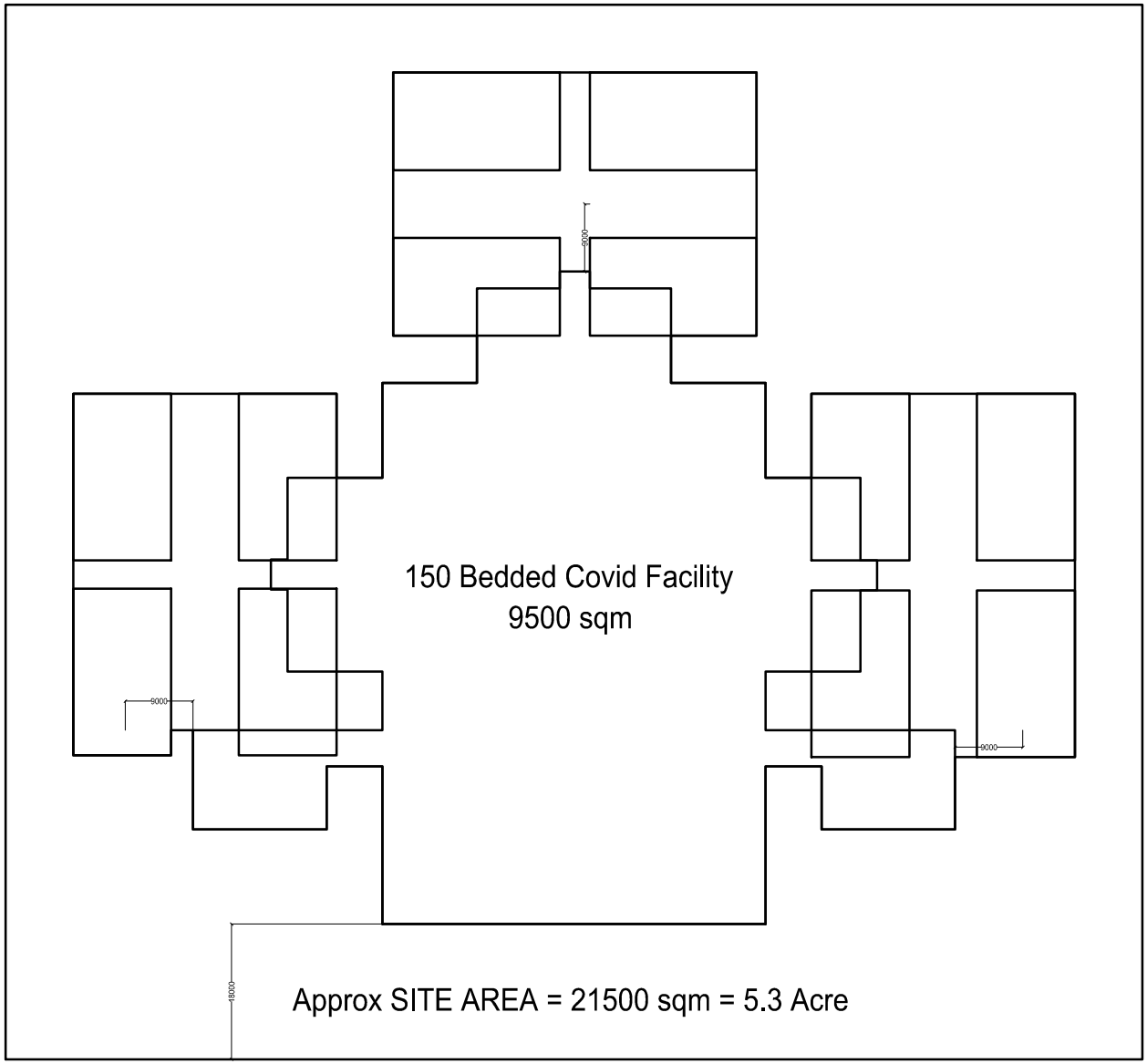
Climatic Zone	EPI range
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

Source: Implementing Energy Efficiency in Buildings (A report by UNDP, BEE)

Option 2 - Performance Based Approach (Whole Building Simulation)

Demonstrate compliance of the facility performance by whole building simulation, as per the baselines outlined in ECBC (or) ASHRAE Standard 90.1-2010 (without amendments), Appendix- G. Simulation is to be carried out at comfort temperatures of 24 + 2 deg C


119400
9000
75 Bedded Covid Facility
5250 sqm
9000
9000
13830
18000
Approx SITE AREA = 13600 sqm = 3.4 Acre


9000
150 Bedded Covid Facility
9500 sqm
9000
9000
18000
Approx SITE AREA = 21500 sqm = 5.3 Acre

ANNEXE '2'

Tender Specifications for COVID Centre

NAME OF PROJECT: COVID EMERGECY FACILITY USING LGFS TECHNOLOGY

Location of Projects:- Pan India basis
Type of buildings:- Ground Floor buildings.
.

FOUNDATION : As per the soil condition and seismic zone of the SITE and design to be vetted by IIT Engr.

SUPER STRUCTURE SYSTEM:
(Technology proposed:- Dry wall Light Gauge Framing Structure system with finishing items)

Tenders are invited from experienced approved PEB manufacturers for supply, engineered, design and erection of factory finished pre-engineered LGFS structure system. PEB Manufacture shall be ISO-9001 certified company, having experience of 15 years in similar field having minimum turnover of ……crore. Manufacture shall provide Design of buildings based on architectural drawings along with QC plan, GA drawings for approval before proceeding for execution. PEB vendor shall also provide stability certificate for their design of structure after completion of work. Main bidder will tie up with PEB manufacturers/their approved Vendors only for supply, design and erection of complete system along with drawings. The scope of work shall include Design, Engineering, Supply and Erection of Pre-engineered/Dry walls comprising of External walls , internal walls, internal partitions, Antimicrobial Bio-safe ceiling, Doors and windows UPVC /Aluminium powder coated, Wall and roof insulations etc as per approved GA drawings. Along with entire MEP of the project including HVAC as stipulated in ISHRAE and IGBC Guidelines.

Applicable Design Loads (Live / Wind) and codes.

Live Load on Sloping roof		0.57 Kn / m2
Wind Speed	**:**	As per IS 875 Part III 1987
Seismic Zone	**:**	As per IS 1893- 2002
Design Code	**:**	BS 5950 Part -5 AS / NZS-4600-1996

EXTERNAL FRAME STRUCTURE :

Providing and fixing of Shed with Design, Supply and custom design factory finished Light Framing super structure manufactured out of 0.95 thick Hi-tensile factory finished Bare Galvalume hi-tensile substrate (AZ150gsm-Aluminim Zinc alloy coated steel/550 Mpa yield strength) substrate. The framing section shall be of cold form section C- type having depth of (89mm depth x 39 mm flange x 12 lips) in required length as per site requirements duly punched with dimple/slot at required location as per manufacture approved drawings at various locations. The frame shall be supplied in knock down condition at site and fixed by mean of wafer head galvanised steel screws 4mm thick. The main frame shall be fixed to RCC slab or Plinth Tie beam using expanded steel anchor bolts fasteners in size of 12mm-16mm Grade (4.8 – 8.8) at 500mm spacing c/c as per manufactured approved drawings. The frame module shall span max 5mtr maximum with internal support member or wall. No welding shall

be permitted to the structure at site. All vertical frames shall be supported maximum at 600mm c/c and horizontally 800mm. Structure shall be designed for snow load as well as wind up lift. The factory finished slot of 30 mm round dia shall be given in frame to accommodate the electrical conduits as per electrical conduits lay out at fixed location as per approved GA drawings by engineer in charge. Applicator shall follow the approved GA/erection drawings of manufacture.

EXTERNAL WALL BOARD FINISH :

Supply and fixing of external grade Cement board double skin insulated using 8mm-Type-B and 9mm Heavy duty Type-A category exposed side fixed to LGFS frame using Wafer head steel screws. The board shall have uniform groove of 3-4 mm in between two panels filled using PU Sealant and then given final coat of primer, joint tape etc and 2 coat of weathers held or texture paint exterior grade. The wall panel shall terminate at the bottom of floor above 100mm skirting and embedded in flooring 10 mm from outside. The final coat shall be of approved make (Berger or Asian paint.) The board shall conform to IS:14862. Density 1250kg/cum & 13500kg/cum as per grade and category.

Rock wool slab wall insulation 75mm shall be provided between Cement board and LGFS Frame vertically in 48kg density.

INTERNAL WALL & PARTITION FINISHES :

Supply and fixing double layer boarding is considered factory finished custom designed using 8mm Cement board-Type-B and inner surface of 12.5mm thick fixed to main structure framing using wafer head steel screws in flush or uniform groove of 2mm in between two panels. The wall panel shall terminate at the bottom of floor and embedded in flooring of minimum 10mm. The panel shall be given one coat of primer/joint tape at groove and given 2 coat of OBD or Acrylic paint of approved make. Berger or Asian paint. The board shall conform to IS: 2095.

EXTERNAL VAPOUR BARRIER :

Supply and fixing of breather wall FRP Vapor barrier comprises of Aluminium Foil one side and other side polythene face. Wall wrap shall be laid vertically over LGFS Frame. The wrap shall comply of reflective surface as per class 3 having 0.10mm thickness with four layer single sided reflective foil with a combination of antioxidant UV Stabilized woven polypropylene face. The vapor barrier shall be provided in accordance with AS/NSZ 4200:1:2017 standard. Optionally we can offer 4mm Bubble insulation with both side foil face of approved make Flame stop. This barrier shall be applied before the laying the Cement boards.

EXTERNAL & INTERNAL WALL INSULATION :

Supply and fixing of Rock wool slab insulation in 75 mm thick/48kg density plain fixed on wall between framing.

FALSE CEILING :

" ANTIMICROBIAL BIO-SAFE LIGHT WEIGHT CALCIUM SILICATE FALSE CEILING SYSTEM ""

Providing and fixing false ceiling at all heights with integral densified calcium silicate reinforced with fibre and natural filler false ceiling tiles of Size 595x595mm of approved texture, design and patterns having NRC (**Noise Reduction coefficient**) of 0.15 – 0.75 (minimum) as per IS 8225:1987, Light reflectance of 85% (minimum). **Non-combustible** as per BS:476 (part-4), fire performance as per

BS:476 (part 6 &7), Smoke Free as per ASTM E-84 **, humidity resistance** of 100%, **thermal conductivity** < 0.048-0.052 W/m K as per ASTM 518:1991, with 15 mm thick integral densified tegular/Butt edge of **antimicrobial** BIOSAFE coating for bacteria as per JIS- Z2801 and ASTM G-21 for fungal having weight of 5.0 – 5.5 kg/m2, (Avg density of tile 370 Kgm3),in true horizontal level suspended on interlocking metal T-Grid of hot dipped galvanised iron section of 0.33mm thick (galvanized @ 120 grams per sqm including both sides) comprising of main-T runners of size 24x38 mm of length 3000 mm, cross - T of size 24x32 mm of length 1200 mm and secondary intermediate cross-T of size 24x32 mm of length 600mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanised mild steel items (galvanizing @ 80 grams per sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 76x25x25x1.6 mm and Z cleat of 25x37x25x1.6 mm. Galvanised iron perimeter wall angle of size 24x24x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm center to center and 40 mm long dry wall S.S screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge.
Note : This item is a scheduled CPWD DSR item no: 26.22.2

ROOFING SYSTEM :

Supply and Fixing of Hi-rib SMP Coated Galvalume roof sheet in 0.50mm thick with cover width of 1020-1050mm and crest ht up to 28mm and having 3 pans. The side lap shall have anti-capillary flute at male end. Sheet shall be fixed using self-drilling hex- head steel fasteners 12-14 x 55mm with EPDM nylon washer. The stitching screws shall be applied over side laps using 12-14 x 19mm stitch screws at 900mm c/c. The end laps shall be 200mm maximum and shall be given silicon sealant.

GUTTER & DOWNTAKE :

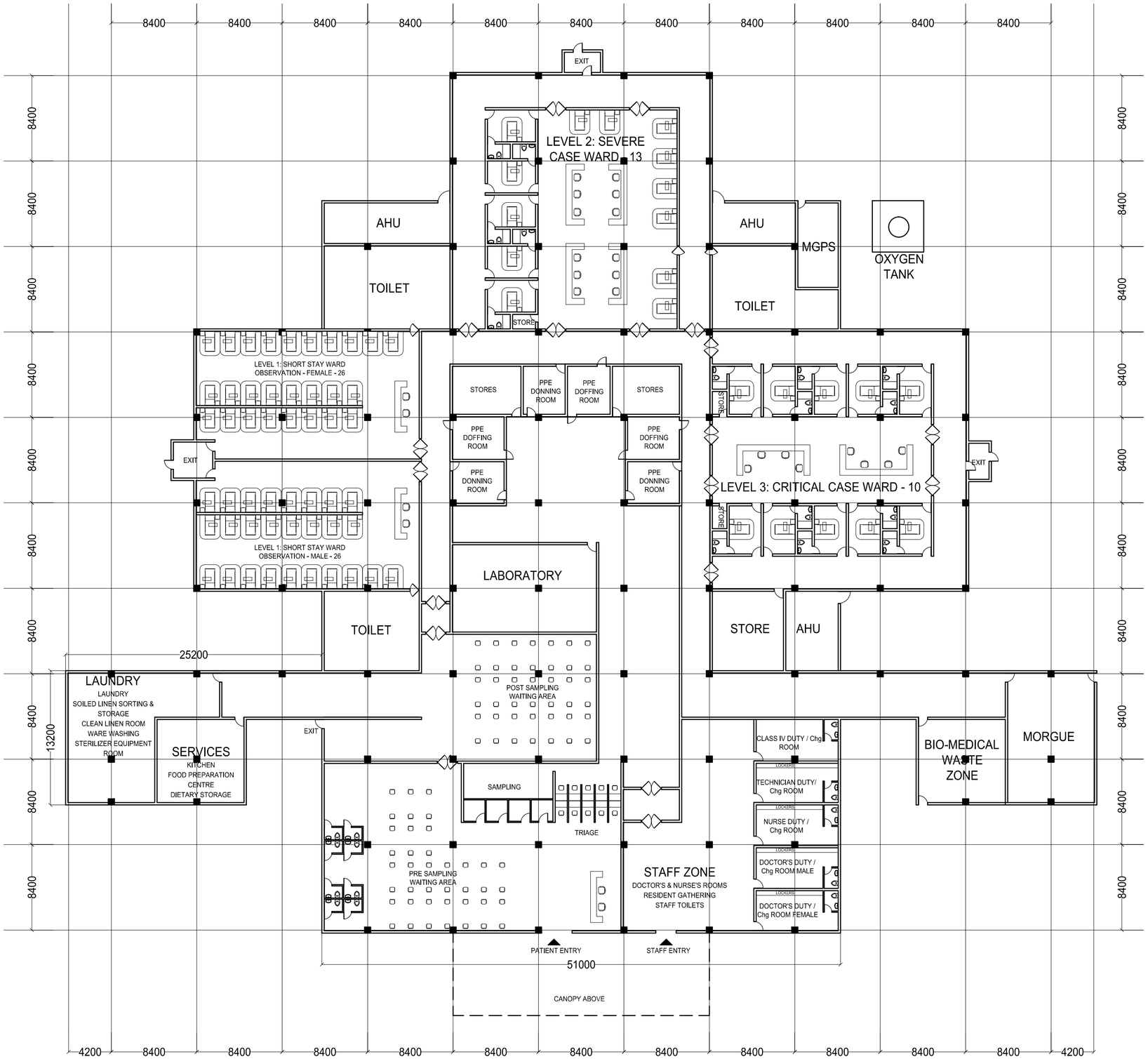
Supply and fixing of Metal Gutter in similar material of roof sheeting bare galvalume 0.47mm thick in required girth and depth supported to main framing system. Gutter shall be over lapped and jointed at every 3 mtr and shall be sealed using silicon sealant. PVC down takes shall be provided two sides of building in 100-150mm dia as per approved make. The vertical support shall be provided at 500mm c/c to support PVC down takes. Gutter shall be supported at every 500mm c/c with G.I. Clips.

Alternatively

External and internal Walls of RIGID POLY URETHENE FOAM

Wall Panel : It should have CE compliance under Class 1 Medical devices directive. Copy of valid certificate must be submitted. The 50mmthk wall panels will be constructed using EGP steel 0.8mm thk sandwich panel with core consisting of rigid polyurethane foam, which has been injected under high pressure, with a minimum density of 40 kg/m3 and back side with 0.5mm PPGI sheet. The individual wall panels shall use the tongue and groove technology for joining two panels, no welding should be allowed. The gaps between panels shall be suitably filled with metal filler/epoxy and sanded flush.

****Please Refer FINISHING Schedule for the Room wise finishing Details



AREA : 5250 sqm

NOTE :
GRID IS SUGGESTIVE
THE SAME CAN BE MODIFIED FOR A LARGER SPAN AS PER LOCAL VENDORS STRUCTURAL DESIGN

75 BEDDED COVID FACILITY AS PER IGBC Guidelines (www.igbc.in)

Specifications for Prtable Healthcare Facilities

Finishing Schedule for COVID FACILTY Pan India

SL.	SPACE	WALL	DADO	PAINTING/CLADDING	FLOORING	CEILING	DOOR	WINDOW
1	**Pre Sampling/ Post Sampling Area**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.2 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**-Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-**Non slippery Double Charge Vertified Floor Tile . **Make**-Johnson, Kajaria, Somany**.**	**CEILING-**Light wt**.**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
2	**Short Stay Ward**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.2 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**-Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC** **Make- FORBO, TARKETT, GER** **..Certificate of Origin from European Plant**	**CEILING-**Light wt**.**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
3	**Severe Case Ward ICU**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Acrylic Mineral surface upto bed head panel. (1.2 m) Above Antibacterial Paint. **Make** ; Dupont Corean …….Paints :Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-A**NTI BACTERIAL PVC ANTISTATIC FLOORING**.** **Make-** FORBO, TARKETT, GER **..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**Glass Door (Side Hung Door) . **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
4	**LABORATORY**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Acrylic Mineral surface on Counter Top and on wall 0.6m above counter as Homogenous with Coving, Above Antibacterial Paint. **Make** ; Dupont Corean …….Paints :Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-A**NTI BACTERIAL PVC **Make-** FORBO, TARKETT, GER **..Certificate of Origin from European Plant**	**CEILING-**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. . **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
5	**CORRIDORS**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.5 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**-Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian.	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC** **Make- FORBO, TARKETT, GER** **..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**Glass Door (Side Hung Door) . **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING, FENESTA , ALUPLAST
6	**STORES**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	**Dry Distember**	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC** **Make- FORBO, TARKETT, GER** **..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
7	**TOILETS**	BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A .	Ceramic Glazed tile till bottom of False Ceiling. **Make :** Johnson, Kajaria, Somany.	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-8 to 10**mm thick Anti skid Ceramic Floor Tiles **.** **Make-**Johnson, Kajaria, Somany.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32 FRP Door with Frame or PVC Doors Rajashri make or Equivalent as per DSR of CPWD **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
8	**PARKING /PAVING**	NA	NA	NA	**FLOORING-**25 mm thick GRC (Glass reinforced Concret) paver block . **Make : UNISTONE**	NA	NA	NA
9	**COURTYARD**	NA	NA	NA	**FLOORING-**25 mm thick GRC (Glass reinforced Concret) paver block . **Make : UNISTONE**	NA	NA	NA

Specifications for Prtable Healthcare Facilities

Finishing Schedule for COVID FACILTY Pan India

SL.	SPACE	WALL	DADO	PAINTING/CLADDING	FLOORING	CEILING	DOOR	WINDOW
10	**KITCHEN**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make-**Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring. .	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
11	**LAUNDARY**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make-**Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
12	**Bio Medical Waste**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make-**Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
13	**MORTUARY / MORGUE**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make-**Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
14	**STAFF AREA**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall **or** External and internal Walls of RIGID POLY URETHENE FOAM . **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**		**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC Make- FORBO, TARKETT, GER ..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST

List of Equipments for COVID Care Centres, Dedicated COVID Health Centre, Dedicated COVID Hospital

Sr. No	Equipment	Dedicated Covid Hospital		Dedicated COVID Health Centre (only Oxygen therapy)	COVID Care Centre
1	Beds	ICU Beds	HDU Beds	Standard Hospital beds	Standard Hospital beds
2	Air mattresses	1 per bed	1 per bed	not required	not required
3	Oxygen Source	2 per bed	1 per bed	1 per bed	not required
4	Compressed air	1 per bed	not required	not required	not required
5	Suction source	1 per bed	1 per bed	1 per10 beds	not required
6	ICU Ventilators	1 per bed	not required	not required	not required
7	Transport ventilator	1 per 15 beds	1 per 10 beds	1 per 100 beds	not required
8	Multipara monitor (with invasive monitoring modules	1 per bed	1 per bed	not required	not required
9	Pulse Oxymeters	Not required	not required	1 per bed	1 per 10 beds
10	Defibrillator with AED	One per 10 beds	1 per 10 beds	1 per 100 beds	not required
11	Infusion pumps	3 per Bed	1 per bed	Optional	-
12	Nebulizer (in line with ventilator)	1 per bed	not required	Not required	Not required
13	ECG (5 channel) machine	1 per 10 beds	can be shared with ICU	1 per area	Not required
14	Video Laryngoscope with disposable blades	1 per 5 beds	1 per 10 beds	not required	not required
15	High flow nasal cannula machines	1 per 5 beds	1 per 5 beds	not required	not required
16	Bronchoscope[6]	Desirable	can be shared with ICU	not required	not required

18-06-2020 18.6.20 18/6/2020

17	Hemo-Dialysis machine7	Desirable	not required	not required	not required
18	Intermittent leg compression machine	1 per bed	1 per bed	not required	not required
19	Crash cart	1 per 10 beds	1 per 10 beds	1 per 20 beds	1 per 100 beds
20	Self Inflating resuscitation bag	1 per bed	1per bed	1 per10 beds	1 per 100 beds
21	Mobile X-ray Unit with CR system	At least one	can be shared with ICU	At least one	not required
22	Portable Ultrasound machine	At least one	can be shared with ICU	not required	not required
23	ABG Machine	At least one	can be shared with ICU	not required	not required
24	Facilities for hematology and Bio chemistry tests	1 Point of Care (POC) chemistry analyzer	can be shared with ICU	Mandatory	not required
25	Glucometer	Yes	Yes	Yes	2 per 50 bed
26	ALS ambulance	1 per ICU (15 beds)	can be shared with ICU	1 per 100 beds (1 per centre)	1 per 100
27	Stethoscope	1 per bed	1 per bed	2 per 10 beds	2 per 50 bed
28	Digital B.P Apparatus	nil	nil	2 per 10 beds	1 per 50 bed
29	Digital Thermometer	1 per bed	1 per bed	6 per 100 beds	6 per 50 bed
30	IV Stand	1 per bed	1 per bed	1 per 2 bed	Not required
31	Mattress	Not required	Not required	1 per bed	1 per bed
32	Refrigerators 165 litres	1 per 15 beds	1 per 15 beds	1 per 100 beds	1 per 200 beds
33	Foldable bed side Screen	4 per 15 beds	4 per 15 beds	0	0
34	LED Torch Light	1 per 15 beds	1 per 15 beds	1 per 50 beds	1 per 100 beds

19-06-2020 18.6.20 18/6/2020

35	Blankets	2 per bed	2 per bed	2 per bed	2 per bed
36	AED	Not required	not required	not required	1 per CCC
37	Laryngoscope	Not required	not required	1 per 50 beds	Not required

18-06-2020
(Dr Mallika Pandey)

18.6.20

18/6/2020
(Dr. Akhilesh)

List of Consumables in COVID Care Centres, Dedicated COVID Health Centres and Dedicated COVID Hospitals

Sr. No	Consumables	Dedicate Covid Hospital		Dedicated COVID Health Centre	COVID Care Centre
		ICU	HDU		
1	Percutaneous tracheotomy kits	1 per 10 beds	Not required	Not required	Not required
2	Kits for central arterial/venous line(20G cannula, pressure line, Transducer, 3-way stopcock)	1-2 per bed	1 per 2 beds	Not required	Not required
3	Gel pads & accessories for proning	√	Not required	Not required	Not required
4	Oxygen mask with reservoir	√	√	√	Not required
5	Nasal prongs (all sizes)	√	√	√	Not required
6	High Flow nasal cannula	√	√	Not required	Not required
7	Endotracheal tubes cuffed (all sizes)	√	√	√	Not required
8	Endotracheal tubes non-cuffed (all sizes)	√	√	√	Not required
9	Airways (all sizes)	√	√	√	Not required
10	Complete Personal protection kits	√	√	√	√
11	Gown, protective	√	√	√	√
12	Scrubs, tops	√	√	√	√
13	Scrubs, pants	√	√	√	√
14	Apron, disposable	√	√	√	√
15	Apron, non - permeable	√	√	√	√
16	N-95 masks	√	√	√	√
17	Medical masks	√	√	√	√
18	Gloves, examination	√	√	√	√
19	Gloves, heavy duty	√	√	√	√
20	Goggles, protective	√	√	√	√
21	Face shield	√	√	√	√
22	Oxygen tubings	√	√	√	Not required
23	Closed suction Catheters	2/day/bed	Not required	Not required	Not required
24	IV catheters (all sizes)	√	√	√	Not required
25	Stopcock, 3-way, for infusion giving set, with connection line, sterile, single use	√	√	√	Not required
26	Syringes, Luer (all sizes)	√	√	√	Not required

18-06-2020

18/6/2020

27	Needles, hypodermic (all sizes)	√	√	√	Not required
28	IV Drip Set	√	√	√	Not required
29	Bio-hazardous bags	√	√	√	√
30	Urinary catheters with Urometer	√	√	√	Not required
31	Glucometers with strips(1000 strps with each glucometer in packets of 50 and lancets)	√	√	√	√
32	Nebulizer Mask Disposable kit Adult	√	√	√	Not required
33	Nebulizer Mask Disposable kit Paediatric	√	√	√	Not required
34	Oxygen Cylinders B Type with trolly,regulator,flow meter humidifier	√	√	√	√
35	Oxygen face mask adult	√	√	√	Not required
36	Oxygen face mask pedeatric	√	√	√	Not required
37	Ortho Toludine Solution for refill(1 litre Bottle)	√	√	√	√
38	Supraglottic Airway Device - dispoable	√	√	Not required	Not required
39	Suction Catheter	√	√	√	Not required
40	Ventilator Circuit	√	Not required	Not required	Not required
41	Nasogastric Tube	√	√	√	Not required
42	Bains Circuit	√	√	√	Not required
43	Extension Tubing	√	√	Not required	Not required

Pandey
18-06-2020
(Dr Maitrei Pandey)

18/6/2020

HUMAN RESOURCES - CFTC Kerala Model				
Sl. No.	Item	Quantity		Procurement
		As per 1 CFTC (100 beds)	Minimum 1 CFTC (100 beds)	
1	Doctors	32	6	Central
2	Nurses	48	24	Central
3	Pharmacist	12	3	Central
4	Ward boy/ attender	48	24	Local
5	House keeping staff	40	18	Local
6	Health care volunteer	24	12	Local
7	Security	12	6	Local
TOTAL		216	**93**	

NOTE:

8 hours per shift for HR.

Number of personnel per shift = 93/3 = 31.

Services such as ambulance, diagnostics (including sample collection), food, laundry, data entry could be pooled to optimize man power and resources.

Ministry of Health & Family Welfare
Directorate General of Health Services
EMR Division

Guidance document on appropriate management of suspect/confirmed cases of COVID-19

1. Introduction: Since its first detection in China, Coronavirus Disease 2019 (COVID-19) has now spread to over 210 countries/territories, with reports of local transmission happening across the world. As per WHO (as of 7th April, 2020), there has been a total of 12,14,466 confirmed cases and 67,767 deaths due to COVID-19 worldwide.

In India, as on 7th April, 2020, 4421 confirmed cases and 114 deaths reported from 31States/UTs.

2. Purpose of this document

A series of measures have been taken by both the Central and State Governments to break the chain of transmission. One among these is to isolate all suspect and confirmed cases of COVID-19. However, as the number of cases increases, it would be important to appropriately prepare the health systems and use the existing resources judicially. Available data in India suggests that nearly 70% of cases affected with COVID-19 either exhibit mild or very mild symptoms. Such cases may not require admission to COVID-19 blocks/ dedicated COVID-19 hospitals.

It is important to put in place mechanisms for triaging and decisions making for identification of the appropriate COVID dedicated facility for providing care to COVID-19 patients. The purpose of this document is to put in place such SOPs to ensure optimal utilization of available resources and thereby providing appropriate care to all the COVID-19 patients. This will ensure that available hospital beds capacity is used only for moderate to severe cases of COVID-19. The SOPs specified hereafter also specify the different types of facilities to be set up for various categories of Covid-19 cases.

Guiding principles

All the selected facilities must be dedicated for COVID management. Three types of COVID dedicated facilities are proposed in this document. All 3 types of COVID Dedicated facilities will have separate ear marked areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances.

All suspect cases (irrespective of severity of their disease) will be tested for COVID-19. Further management of these cases will depend on their (i) clinical status and (ii) result of COVID-19 testing.
All three types of facilities will be linked to the Surveillance team (IDSP)
All these facilities will follow strict infection prevention and control practices

3. Types of COVID Dedicated Facilities: There are three types of COVID Dedicated Facilities –

(1) COVID Care Center (CCC):

1.1. The COVID Care Centers shall offer care only for cases that have been clinically assigned as **mild or very mild cases or COVID suspect cases.**

1.2. The COVID Care Centers are makeshift facilities. These may be set up in hostels, hotels, schools, stadiums, lodges etc., both public and private. If need be, existing quarantine facilities could also be converted into COVID Care Centers. Functional hospitals like CHCs, etc, which may be handling regular, non-COVID cases should be designated as COVID Care Centers as a last resort. This is important as essential non COVID Medical services like those for pregnant women, newborns etc, are to be maintained.

1.3. Wherever a COVID Care Center is designated for admitting both the confirmed and the suspected cases, these facilities **must have separate areas for suspected and confirmed cases with preferably separate entry and exit. Suspect and confirmed cases must not be allowed to mix under any circumstances.**

1.4. As far as possible, wherever suspect cases are admitted in the COVID Care Center, preferably individual rooms should be assigned for such cases.

1.5. Every Dedicated COVID Care Centre must necessarily be mapped to one or more Dedicated COVID Health Centres and at least one Dedicated COVID Hospital for referral purpose (details

given below).

1.6. Every Dedicated COVID Care Centre must also have a dedicated Basic Life Support Ambulance (BLSA) equipped with sufficient oxygen support on 24x7 basis, for ensuring safe transport of a case to Dedicated higher facilities if the symptoms progress from mild to moderate or severe.

1.7. The human resource to man these Care Centre facilities may also be drawn from AYUSH doctors. Training protocols developed by AIIMS is uploaded on MoHFW website. Ministry of AYUSH has also carried out training sessions. The State AYUSH Secretary/ Director should be involved in this deployment. State wise details of trained AYUSH doctors has been shared with the States. Their work can be guided by an Allopathic doctor.

(2) Dedicated COVID Health Centre (DCHC):

2.1. The Dedicated COVID Health Centre are hospitals that shall offer care for all cases that have been **clinically assigned as moderate**.

2.2. These should either be a full hospital or a separate block in a hospital with preferably separate entry\exit/zoning.

2.3. Private hospitals may also be designated as COVID Dedicated Health Centres.

2.4. Wherever a Dedicated COVID Health Center is designated for admitting both the confirmed and the suspect cases with moderate symptoms, these hospitals **must have separate areas for suspect and confirmed cases. Suspect and confirmed cases must not be allowed to mix under any circumstances.**

2.5. These hospitals would have beds with assured Oxygen support.

2.6. Every Dedicated COVID Health Centre must necessarily be mapped to one or more Dedicated COVID Hospitals.

2.7. Every DCHC must also have a dedicated Basic Life Support Ambulance (BLSA) equipped with sufficient oxygen support for ensuring safe transport of a case to a Dedicated COVID Hospital if the symptoms progress from moderate to severe.

(3) Dedicated COVID Hospital (DCH):

3.1. The Dedicated COVID Hospitals are hospitals that shall offer comprehensive care primarily for those who have been **clinically assigned as severe**.

3.2. The Dedicated COVID Hospitals should either be a full hospital or a separate block in a hospital with preferably separate entry\exit.

3.3. Private hospitals may also be designated as COVID Dedicated Hospitals.

3.4. These hospitals would have fully equipped ICUs, Ventilators and beds with assured Oxygen support.

3.5. These hospitals **will have separate areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances.**

3.6. The Dedicated COVID Hospitals would also be referral centers for the Dedicated COVID Health Centers and the COVID Care Centers.

All these facilities will follow strict infection prevention and control practices.

4. Management of COVID cases

4.1. Assessment of patients:

In addition to patients arriving directly through helpline/ referral to above categories of COVID dedicated facilities, in field settings during containment operations, the supervisory medical officer to assess for severity of the case detected and refer to appropriate facility.

States\UTs may identify hospitals with dedicated and separate space and set up Fever Clinics in such hospitals. The Fever Clinics may also be set up in CHCs, in rural areas subject to availability of sufficient space to minimize the risk of cross infections. In urban areas, the civil\general hospitals, Urban CHCs and Municipal Hospitals may also be designated as Fever Clinics. These could be set up preferably near the main entrance for triage and referral to appropriate COVID Dedicated Facility. Wherever space allows, a temporary make shift arrangement outside the facility may be arranged for this triaging.

The medical officer at the fever clinics could identify suspect cases and refer to COVID Care Centre, Dedicated COVID Health Centre or Dedicated COVID Hospital, depending on the clinical severity.

4.2 Categorization of patients

Patients may be categorized into three groups and managed in the respective COVID hospitals – Dedicated COVID Care Centre, dedicated COVID Health Centre and dedicated COVID

Hospitals.

Group 1: Suspect and confirmed cases clinically assigned as mild and very mild

Group 2: Suspect and confirmed cases clinically assigned as moderate

Group 3: Suspect and confirmed cases clinically assigned as severe

Group 1: **Suspect and confirmed cases clinically assigned as mild and very mild (COVID Care Centres)**

- **Clinical criteria**: Cases presenting with fever and/or upper respiratory tract illness (Influenza Like Illness, ILI).
- These patients will be accommodated in COVID Care Centers.
- The patients would be tested for COVID-19 and till such time their results are available they will remain in the "suspect cases" section of the COVID Care Center preferably in an individual room.
- Those who test positive, will be moved into the "confirmed cases" section of the COVID Care Center.
- If test results are negative, patient will be given symptomatic treatment and be discharged with advice to follow prescribed medications and preventive health measures as per prescribed protocols.
- If any patient admitted to the COVID Care Center qualifies the clinical criteria for moderate or severe case, such patient will be shifted to a Dedicated COVID Health Centre or a Dedicated COVID Hospital.
- Apart from medical care the other essential services like food, sanitation, counseling etc. at the COVID Care Centers will be provided by local administration. Guidelines for quarantine facilities (available on MoHFW website) may be used for this purpose.

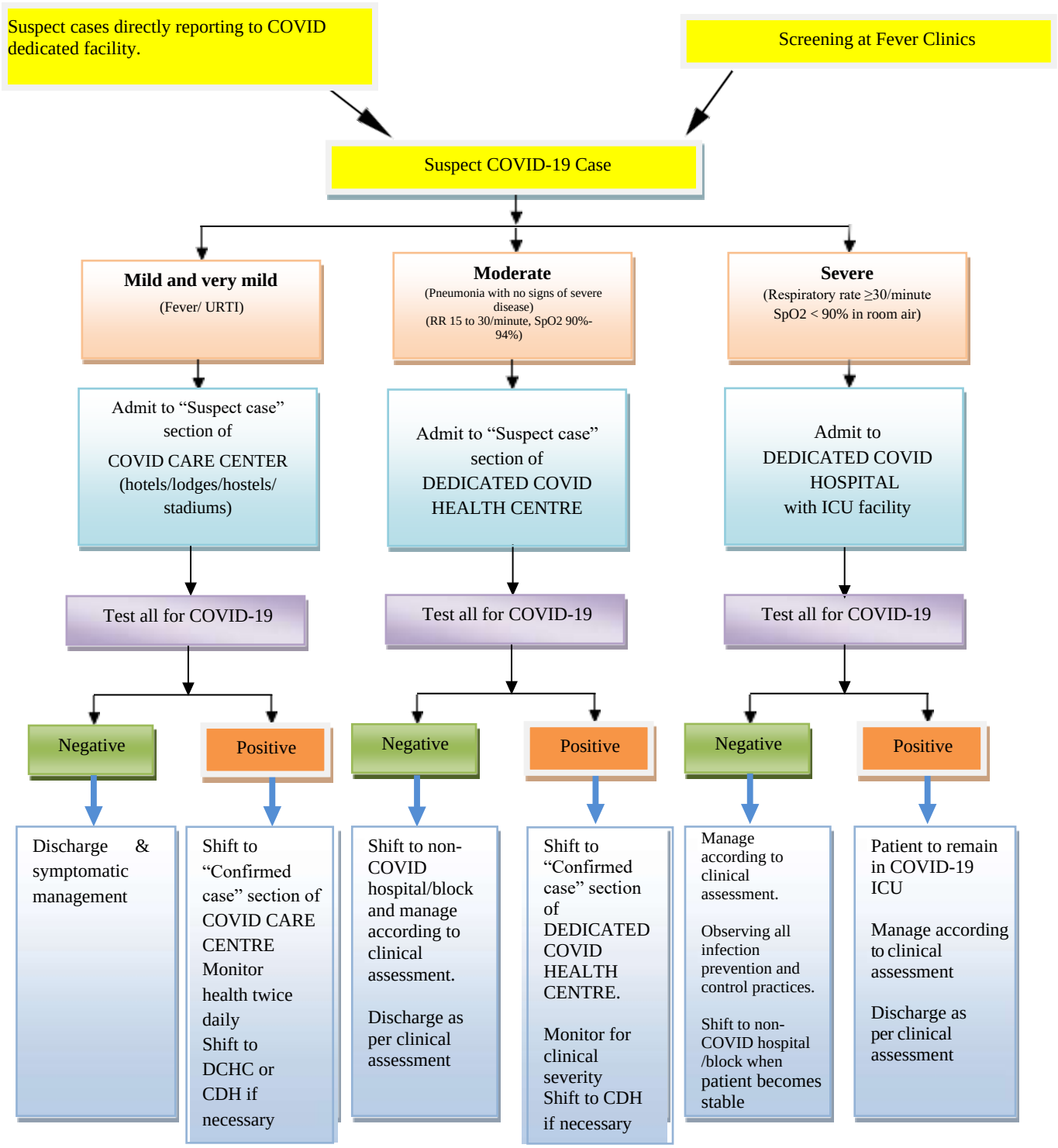
Group 2: **Suspect and confirmed cases clinically assigned as moderate (Dedicated COVID Health Centres)**

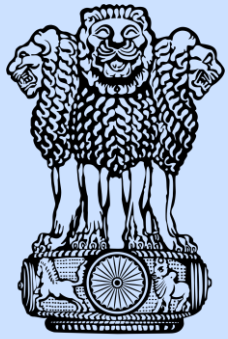
- **Clinical criteria**: Pneumonia with no signs of severe disease (Respiratory Rate 15 to 30/minute, SpO2 90%-94%).
- Such cases will not be referred to COVID Care Centers but instead will be admitted to Dedicated COVID Health centres.
- It will be manned by allopathic doctors and cases will be monitored on above mentioned clinical parameters for assessing severity as per treatment protocol (available on MoHFW website).
- They will be kept in "suspect cases" section of Dedicated COVID Health Centres, till such time as their results are not available preferably in an individual room.
- Those testing positive shall be shifted to "confirmed cases" section of Dedicated COVID Health Centre.
- Any patient, for whom the test results are negative, will be shifted to a non-COVID hospital and will be managed according to clinical assessment. Discharge as per clinical assessment.
- If any patient admitted to the Dedicated COVID Health Center qualifies the clinical criteria for severe case, such patient will be shifted to a Dedicated COVID Hospital.

Group 3: Suspect and confirmed cases clinically assigned as severe (Dedicated COVID Hospital)

- **Clinical criteria**: Severe Pneumonia (with respiratory rate ≥30/minute and/or SpO2 < 90% in room air) or ARDS or Septic shock
- Such cases will be directly admitted to a Dedicated COVID Hospital's ICU till such time as test results are obtained.
- If test results are positive, such patient will remain in COVID-19 ICU and receive treatment as per standard treatment protocol. Patients testing negative will be managed with adequate infection prevention and control practices.

Algorithm for isolation of suspect/confirmed cases of COVID-19





COVID -19 Outbreak

Guidelines for Setting up Isolation Facility/Ward

National Centre for Disease Control

22 Sham Nath Marg, Delhi 110054

Directorate General of Health Services

Ministry of Health and Family Welfare

Table of Contents

WHO has declared the COVID-19 (SARS-CoV-2) outbreak as Public Health Emergency of international concern and has raised the risk assessment of China, Regional Level and Global Level to Very High and "all countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of SARS-CoV-2 infection. Among the factors affecting cluster containment, Isolation of cases and quarantine of contacts is the mainstay of outbreak containment.

Scope of document: This guidance document has been prepared to establish an isolation facility at the level of district hospital, a secondary health care facility.

A. Quarantine and isolation

Quarantine and Isolation are important mainstay of cluster containment. These measures help by breaking the chain of transmission in the community.

Quarantine

Quarantine refers to separation of individuals who are not yet ill but have been exposed to COVID-19 and therefore have a potential to become ill. There will be voluntary home quarantine of contacts of suspect /confirmed cases. The guideline on home quarantine available on the website of the Ministry provides detail guidance on home quarantine.

Isolation refers to separation of individuals who are ill and suspected or confirmed of COVID-19. All suspect cases detected in the containment/buffer zones (till a diagnosis is made), will be hospitalized and kept in isolation in a designated facility till such time they are tested negative. Persons testing positive for COVID-19 will remain to be hospitalized till such time 2 of their samples are tested negative as per MoHFW's discharge policy. About 15% of the patients are likely to develop pneumonia, 5 % of whom requires ventilator management.

Hence dedicated Intensive care beds need to be identified earmarked. Some among them may progress to multi organ failure and hence critical care facility/ dialysis facility/ and Salvage therapy [Extra Corporeal Membrane Oxygenator (ECMO)] facility for managing the respiratory/renal complications/ multi-organ failure shall be required. If such facilities are not available in the containment zone, nearest tertiary care facility in Government / private sector needs to be identified, that becomes a part of the micro-plan.

There are various modalities of isolating a patient. Ideally, patients can be isolated in individual isolation rooms or negative pressure rooms with 12 or more air-changes per hour.

In resource constrained settings, all positive COVID-19 cases can be cohorted in a ward with good ventilation. Similarly, all suspect cases should also be cohorted in a separate

ward. However under no circumstances these cases should be mixed up. A minimum distance of 1 meter needs to be maintained between adjacent beds. All such patients need to wear a triple layer surgical mask at all times.

Nosocomial infection in fellow patients and attending healthcare personnel are well documented in the current COVID-19 outbreak as well. There shall be strict adherence to Infection prevention control practices in all health facilities. IPC committees would be formed (if not already in place) with the mandate to ensure that all healthcare personnel are well aware of IPC practices and suitable arrangements for requisite PPE and other logistic (hand sanitizer, soap, water etc.) are in place. The designated hospitals will ensure that all healthcare staff is trained in washing of hands, respiratory etiquettes, donning/doffing & proper disposal of PPEs and bio-medical waste management.

At all times doctors, nurses and para-medics working in the clinical areas will wear three layered surgical mask and gloves. The medical personnel working in isolation and critical care facilities will wear full complement of PPE (including N95 masks).

The support staff engaged in cleaning and disinfection will also wear full complement of PPE. Environmental cleaning should be done twice daily and consist of damp dusting and floor mopping with Lysol or other phenolic disinfectants and cleaning of surfaces with sodium hypochlorite solution. Detailed guidelines available on MoHFW's website may be followed.

B. Setting up isolation facility/ward

An isolation facility aims to control the airflow in the room so that the number of airborne infectious particles is reduced to a level that ensures cross-infection of other people within a healthcare facility is highly unlikely.

- At State level, a minimum of **50** bed isolation ward should be established.
- At District level, a minimum of **10** bed isolation ward should be established.
  - Post signages on the door indicating that the space is an isolation area.
  - Remove all non-essential furniture and ensure that the remaining furniture is easy to clean, and does not conceal or retain dirt or moisture within or around it.
  - COVID-19 patients should be housed in single rooms.
  - However, if sufficient single rooms are not available, beds could be put with a spatial separation of at least 1 meter (3 feet) from one another.
  - To create a 10 bed facility, a minimum space of 2000 sq. feet area clearly segregated from other patientcare areas is required.
  - Preferably the isolation ward should have a separate entry/exit and should not be co-located with post-surgical wards/dialysis unit/SNCU/labour room etc.
  - It should be in a segregated area which is not frequented by outsiders.
  - The access to isolation ward should be through dedicated lift/guarded stairs.

- There should be double door entry with changing room and nursing station. Enough PPE should be available in the changing room with waste disposal bins to collect used PPEs.Used PPEs should be disposedas per the BMWM guidelines.
- Stock the PPE supply and linen outside the isolation room or area (e.g. in the change room). Setup a trolley outside the door to hold PPE. A checklist may be useful to ensure that all equipment is available.
- Place appropriate waste bags in a bin. If possible, use a touch-free bin. Ensure that used (i.e. dirty) bins remain inside the isolation rooms.
- Place a puncture-proof container for sharps disposal inside the isolation room/area and bio-medical waste should be managed as per the BMWM guidelines.
- Keep the patient's personal belongings to a minimum. Keep water pitchers and cups, tissue wipes, and all items necessary for attending to personal hygiene within the patient's reach.
- Non-critical patient-care equipment (e.g. stethoscope, thermometer, blood pressure cuff, and sphygmomanometer) should be dedicated for the patient, if possible. Any patient-care equipment that is required for use by other patients should be thoroughly cleaned and disinfected before use.
- Place an appropriate container with a lid outside the door for equipment that requires disinfection or sterilization.
- Ensure that appropriate hand washing facilities and hand-hygiene supplies are available. Stock the sink area with suitable supplies for hand washing, and with alcohol-based hand rub, near the point of care and the room door.
- Ensure adequate room ventilation. If room is air-conditioned, ensure 12 air changes/ hour and filtering of exhaust air. A negative pressure in isolation rooms is desirable for patients requiring aerosolization procedures (intubation, suction nebulisation). These rooms may have standalone air-conditioning. These areas should not be a part of the central air-conditioning.
- If air-conditioning is not available negative pressure could also be created through putting up 3-4 exhaust fans driving air out of the room.
- In **district hospital**, where there is sufficient space, natural ventilation may be followed. Such isolation facility should have large windows on opposite walls of the room allowing a natural unidirectional flow and air changes. The principle of natural ventilation is to allow and enhance the flow of outdoor air by natural forces such as wind and thermal buoyancy forces from one opening to another to achieve the desirable air change per hour.
- The isolation ward should have a separate toilet with proper cleaning and supplies.
- Avoid sharing of equipment, but if unavoidable, ensure that reusable equipment is appropriately disinfected between patients.

- Ensure regular cleaning and proper disinfection of common areas, and adequate hand hygiene by patients, visitors and care givers.Keep adequate equipment required for cleaning or disinfection inside the isolation room or area, and ensure scrupulous daily cleaning of the isolation room or area.
- **Visitors to the isolation facility should be restricted /disallowed**. For unavoidable entries, they should use PPE according to the hospital guidance, and should be instructed on its proper use and in hand hygiene practices prior to entry into the isolation room/area.
- Ensure that visitors consult the health-care worker in charge (who is also responsible for keeping a visitor record) before being allowed into the isolation areas. Keep a roster of all staff working in the isolation areas, for possible outbreak investigation and contact tracing.
- Doctors, nurses and paramedics posted to isolation facility **need to be dedicated** and not allowed to work in other patient-care areas.
- Consider having designated portable X-ray and portable ultrasound equipment.
- Corridors with frequent patient transport should be well-ventilated.
- All health staff involved in patient care should be well trained in the use of PPE.
- Set up a telephone or other method of communication in the isolation room or area to enable patients, family members or visitors to communicate with health-care workers. This may reduce the number of times the workers need to don PPE to enter the room or area.

C. Checklist for isolation rooms

- Eye protection (visor or goggles)
- Face shield (provides eye, nose and mouth protection)
- Gloves
- reusable vinyl or rubber gloves for environmental cleaning
- latex single-use gloves for clinical care
- Hair covers
- Particulate respirators (N95, FFP2, or equivalent)
- Medical (surgical or procedure) masks
- Gowns and aprons
- single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns
- plastic aprons (for use over non-fluid-resistant gowns if splashing is anticipated and if fluid-resistant gowns are not available)
- Alcohol-based hand rub
- Plain soap (liquid if possible, for washing hands in clean water)
- Clean single-use towels (e.g. paper towels)
- Sharps containers

- Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment
- Large plastic bags
- Appropriate clinical waste bags
- Linen bags
- Collection container for used equipment
- Standard IEC
- Standard protocols for hand hygiene, sample collection and BMW displayed clearly
- Standard Clinical management protocols

D. Wearing and removing Personal Protective Equipment (PPE)

Before entering the isolation room or area:

- Collect all equipment needed;
- Perform hand hygiene with an alcohol-based hand rub (preferably when hands are not visibly soiled) or soap and water;
- Put on PPE in the order that ensures adequate placement of PPE items and prevent self-contamination and self-inoculation while using and taking off PPE; an example of the order in which to don PPE when all PPE items are needed is hand hygiene, gown, mask or respirator, eye protection and gloves

Leaving the isolation room or area

- Either remove PPE in the anteroom or, if there is no anteroom, make sure that the PPE will not contaminate either the environment outside the isolation room or area, or other people.
- Remove PPE in a manner that prevents self-contamination or self-inoculation with contaminated PPE or hands. General principles are:
  - remove the most contaminated PPE items first;
  - perform hand hygiene immediately after removing gloves;
  - remove the mask or particulate respirator last (by grasping the ties and discarding in a rubbish bin);
  - discard disposable items in a closed rubbish bin;
  - put reusable items in a dry (e.g. without any disinfectant solution) closed container; an example of the order in which to take off PPE when all PPE items are needed is gloves (if the gown is disposable, gloves can be peeled off together with gown upon removal), hand hygiene, gown, eye protection, mask or respirator, and hand hygiene
  - Perform hand hygiene with an alcohol-based hand rub (preferably) or soap and water whenever un-gloved hands touch contaminated PPE items.

E. Transport of Infectious Patients

It is recommended that transport of infectious patients is limited to movement considered medically essential by the clinicians, e.g. for diagnostic or treatment purposes. Where infectious patients are required to be transported to other units within the hospital or outside the following precautions may be implemented:

- Infected or colonised areas of the patient's body are covered: - For contact isolation this may include a gown, sheets or dressings to surface wounds; these patients are transferred to a Standard Pressure or Protective Environment Isolation room - For respiratory isolation the patient is dressed in a mask, gown and covered in sheets; these patients are accommodated in a Negative Pressure Isolation Room - For quarantine isolation the patient may be transported in a fully enclosed transport cell or isolator with a filtered air supply and exhaust; these patients are accommodated in a high level quarantine isolation suite.
- The transport personnel remove existing PPE, cleanse hands and transport the patient on a wheelchair, bed or trolley, applying clean PPE to transport the patients and when handling the patient at the destination. Gown-up and gown-down rooms located at the entry to a Unit will assist the staff to enter and exit the facility according to the strict infection control protocols required, thereby reducing the risk of contamination
- The destination unit should be contacted and notified prior to the transfer to ensure suitable accommodation on arrival.
- It is preferred that the patient is transported through staff and service corridors, not public access corridors During planning stages, design can assist transfer of infectious patients by providing service corridors and strategically placed lifts, capable of separation from other lifts. The nominated lift may be isolated from public and staff transit through access control measures and cleaned following transit of the infectious patient.
- Design may also incorporate a designated floor for horizontal bed transfers of infectious patients away from busy clinical areas. The designated floor may be located at mid-level in the hospital
- A combination of nominated lifts, corridors and a bed transfer floor would assist in the movement of infectious patients through the hospital and minimise the risk of spread of infection.

Annexure I

Checklist for isolation rooms

- Eye protection (visor or goggles)
- Face shield (provides eye, nose and mouth protection)
- Gloves
- reusable vinyl or rubber gloves for environmental cleaning
- latex single-use gloves for clinical care
- Hair covers
- Particulate respirators (N95, FFP2, or equivalent)
- Medical (surgical or procedure) masks
- Gowns and aprons
- single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns
- plastic aprons (for use over non-fluid-resistant gowns if splashing is anticipated and if fluid-resistant gowns are not available)
- Alcohol-based hand rub
- Plain soap (liquid if possible, for washing hands in clean water)
- Clean single-use towels (e.g. paper towels)
- Sharps containers
- Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment
- Large plastic bags
- Appropriate clinical waste bags
- Linen bags
- Collection container for used equipment
- Standard IEC
- Standard protocols for hand hygiene, sample collection and BMW displayed clearly
- Standard Clinical management protocols

Annexure II

Hospital Preparedness & Isolation Facility Assessment Checklist - COVID19

I . GENERAL INFORMATION

1. Name of the healthcare facility (HCF)				
2. Type	☐Public ☐Private			
3. Category of HCF	☐Primary ☐Secondary ☐Tertiary			
4. Subcategory	☐PHC ☐UPHC ☐CHC ☐Taluk/Sub-District Hospital ☐ District Hospital ☐General Hospital ☐Medical College Hospital ☐ Multi-Speciality Hospital ☐Nursing Home ☐ Dispensary ☐Clinic			
5. Address of the health facility a) Block b) District c) State d) Email ID e) Contact no.				
6. Name of Director/ Principal/Medical superintendent a) Email ID b) Contact no.				
7. Name of RMO/Hospital In-charge a) Email ID b) Contact no				
8. Total number of inpatient beds				
9. Total number of ICU beds				
10. Average number of OPD attendance per month				
11. Average number of new admissions /months				
12. Bed occupancy rate (Annual)				
13. Total staff strength	Doctors – MBBS			
	Doctors- AYUSH			
	Clinical Specialists other than Intensivist/Pulmonologist			
	Non-Clinical specialists other than Microbiologist			
	Microbiologists			
	Intensivists #	Pulmonologist #	Int	Pulm
	Senior Resident #	Junior Resident #	SR	JR
	Interns			
	Nurses			
	Lab technicians			

	Pharmacists	
	Laboratory Technicians	
	Cleaning staff	
	Ambluance drivers	
14. Does this HCF have a designated COVID 19 isolation facility		☐Yes☐No

II. HCF PREPAREDNESS TO MANAGE MAJOR EPIDEMICS & PANDEMICS

15. Core Emergency Response / Rapid Response Team for outbreak management identified?	☐Available ☐In progress☐ Not started
16. Roles and responsibilities of RRT/ERT clearly defined?	☐Available ☐In progress☐ Not started
17. Is there a contingency plan for covering for a core team member who is absent?	☐Available ☐In progress☐ Not started
18. Monitoring and managing Health Care Personnel (HCP) a) The facility follows the Central/State public health policies/procedures for monitoring and managing HCP with potential for exposure to COVID-19 b) The facility have a process to conduct symptom and temperature checks prior to the start of duty shift for HCP	☐Yes ☐No ☐Yes ☐No
19. Training for Healthcare Personnel (HCP) a) Education and job-specific training to HCP regarding • Signs and symptoms of infection • Triage procedures including patient placement and filling the CIF • Safely collect clinical specimen • Correct infection control practices and PPE use • HCP sick leave policies • Recommended actions for not using recommended PPE • How and to whom suspected cases (COVID-19)should be reported	☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started

III. TRIAGE

20. Triage protocols available at the healthcare facility?	☐Available ☐In progress ☐ Not started
21. Availability of telemedicine facility as a way to provide clinical support without direct interaction with the patient	☐Available ☐In progress ☐ Not started
22. Is there specific waiting area for people with respiratory symptoms?	
23. Availability of designated ARI/COVID-19 triage area	☐Available ☐In progress ☐ Not started
24. Do they have non-contact Infra-Red thermometer available near the registration desk?	
25. Availability of signage directing to triage area and signage to instruct patients to alert staff if they have symptoms of COVID-19	☐Available ☐In progress ☐ Not started
26. Do they have dedicated/single examination rooms in Triage area? (Dedicated room should satisfy criteria of one patient per room with door closed for examination)	☐Yes ☐No
27. Triage area has signs/alerts about respiratory etiquette and hand hygiene?	☐Yes ☐No
28. Does the HCF provide masks for patients with respiratory symptoms?	☐Yes ☐No

29. Triage staff trained on revised COVID19 case definition and identify suspected cases ?	☐Yes ☐No
30. Screening questionnaire and algorithm for triage available with staff	☐Available ☐In progress ☐ Not started
31. Infrared thermometer available with the triage staff	☐Available ☐In progress ☐ Not started
32. Waste bins and access to cleaning/ disinfection supplies available in Triage area	☐Available ☐In progress ☐ Not started
33. Physical barriers (e.g., glass or plastic screens) at reception areas available to limit close contact between triage staff and potentially infectious patients	☐Available ☐In progress ☐ Not started
34. Does the patient waiting area have cross ventilation	☐Yes ☐No
35. Waiting area cleaned at least twice daily with 0.5% hypochlorite solution (or) 70% alcohol for surfaces that do not tolerate chlorine	☐Yes ☐No
36. Does the hospital have dedicated infrastructure for isolation facility? (If No skip to Section IV)	☐Yes ☐No
37. Type of isolation Facility	☐Temporary ☐ Permanent
IV Isolation Facility	
38. Is the isolation facility near OPD/IPD/other crowded area?	☐Yes ☐No
39. Screening rooms identified and available at the isolation area?	☐Available ☐In progress☐ Not started
40. Is there separate entry to the isolation area?	☐Yes ☐No
41. Dedicated space for staff to put on PPE while entering the isolated area	☐Available ☐In progress☐ Not started
42. Is there separate exit for isolation area?	☐Yes ☐No
43. Dedicated space for staff to take off PPE near exit?	☐Available ☐In progress☐ Not started
44. Isolation facility is separate and has rooms/wards?	☐Rooms☐Wards
45. Are washrooms available as 1 toilet per 20 persons?	☐Yes ☐No
46. Number of beds in each isolation rooms/wards	
47. Is the distance between two beds in isolation wards/rooms more than 1 meter?	☐Yes ☐No
48. Do the hospital have policy to segregate clinical staff (e.g. nurses) for care of COVID19 cases?	☐Yes ☐No
49. Whether PPEs available and located near point of use? a. Gloves b. Gowns c. Face masks d. 95 respirators	 ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
50. Whether the hospital limits the movement of patients in the isolation facility outside for medically necessary purposes only?	☐Yes ☐No
51. Are the known or suspected COVID19 patients placed on contact and droplet precautions?	☐Yes ☐No
52. If a patient leaves their room for medical purposes, are they provided face mask ?	☐Yes ☐No
53. Do staff transporting the patient wear PPE?	☐Yes ☐No
54. While transporting patients are specific routes used to minimize contact with other patients and staff?	☐Yes ☐No
55. For a patient on Airborne Precautions, air pressure is monitored daily with visual indicators (e.g., smoke tubes, flutter strips), regardless of the presence of differential pressure sensing devices (e.g., manometers):	☐Yes ☐No

56. Are these isolation rooms/wards satisfying the criteria of negative pressure class N? (Applicable if an aerosol generating procedure is performed)	☐Yes ☐No
57. Is there Provision food in the isolation area?	☐Available ☐In progress☐ Not started
58. Policy for leftover food waste management?	☐Available ☐In progress☐ Not started
59. Is there an ICU facility attached to isolation area?	☐Yes ☐No
60. Availability of cross ventilation	☐Yes ☐No
61. Is there any designated area for sample collection?	☐Yes ☐No
62. Are they following standard precautions and PPE while taking sample?	☐Yes ☐No
63. Does the facility have a written policy for sample collection and transport?	☐Yes ☐No
64. Are these sample transported in triple packing?	☐Yes ☐No
65. Does the transportation package contain IATA DG code (UN3373)?	☐Yes ☐No
66. Are they following standard precautions while transporting the sample?	☐Yes ☐No
67. Are the floors of isolation facility suitable for moping?	☐Yes ☐No
68. Is drinking water available at isolation area?	☐Yes ☐No
69. Availability of management protocols for COVID19	☐Available ☐In progress☐ Not started
70. Is rotation roster of duty shift for staff posted at isolation facility	☐Available ☐In progress☐ Not started
71. Is there any protocol for limiting the entry of visitors at isolation area?	☐Available ☐In progress☐ Not started
72. Availability of separate Thermometers BP apparatus with adult & Pediatric cuffs?	☐Yes ☐No
73. Availability of discharge policy for COVID19	☐Available ☐In Progress☐ Not Started

IV. INFECTION PREVENTION AND CONTROL PRACTICES

74. Does the hospital have Hospital Infection control Committee (HICC)?	☐Yes ☐No
75. Are there any infection control protocols/guidelines available?	☐Available ☒In progress☐ Not started
76. Functioning hand washing stations (including water, soap and paper towel or air dry) at isolation area?	
77. Does the facility have uninterrupted running water supply?	☐Yes ☐No
78. Is alcohol based hand sanitizer available at isolation area?	☐Yes ☐No
79. Are the staff following five movements of hand washing?	☐Yes ☐No
80. Are the staff following six steps of hand washing?	☐Yes ☐No
81. Is there posters to reinforce hand washing and PPE at hand washing stations	☐Available ☐In progress☐ Not started

VI. ENVIRONMENTAL CLEANING

82. Are objects and environmental surfaces in patient care areas touched frequently (e.g., bed rails, overbed table, bedside commode, lavatory surfaces) are cleaned	☐Yes ☐No
83. Are they disinfected with an approved disinfectant frequently (at least daily) and when visibly soiled?	☐Yes ☐No
84. Is there cleaning chart?	☐Yes ☐No
85. Frequency of cleaning of high touch areas, Bed rails, Tables, Chairs, Keyboards etc.,	
86. Is there any housekeeping policy available at isolation area?	☐Yes ☐No

87. Availability of terminal cleaning checklist	☐Available ☐In progress☐ Not started
88. Availability of three bucket system	☐Yes ☐No
89. Are they following correct contact time for disinfection with hypochlorite solution? (10 minutes for non-porous surfaces)	☐Yes ☐No
90. Are the staff following outward mopping technique	☐Yes ☐No
91. Availability of separate mops for each area	☐Yes ☐No
92. Frequency of cleaning of isolation rooms?	
93. Frequency of cleaning of ambulatory areas?	
94. Frequency of cleaning of bathrooms of isolation areas?	
95. Staff wearing PPE while cleaning a. Gloves b. Masks c. Apron	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
96. Are the staff trained in housekeeping and infection control practices?	☐Yes ☐No
97. Doctors, nurses & cleaning staff available/ shift at isolation area?	☐Yes ☐No
98. Barrier nursing practiced at isolation area in 1:1 ratio?	☐Yes ☐No
99. Is there any policy for linen management for isolation facility?	☐Available ☐In progress☐ Not started
100. What is the frequency of changing linen in isolation rooms?	☐Daily ☐Alternate Days ☐Weekly ☐When Soiled
101. Type of linen used	☐ Disposable ☐Reusable

VII. BIOMEDICAL WASTE MANAGEMENT (BMWM)

102. Availability of SOP for BMW management?	☐Available ☐In progress☐ Not started
103. Availability of agreement with CWTF	☐Available ☐In progress☐ Not started
104. Are they following color codes bins in BMW management?	☐Yes ☐No
105. Is there sufficient quantity color coded bags available?	☐Yes ☐No
106. Are they disinfecting the waste before it is disposed?	☐Yes ☐No
107. Method of disposing biomedical wastes?	☐CWTF ☐Deep burial ☐Incineration
108. Disposal of sharps as per the standard protocol?	☐Yes ☐No
109. Availability of biomedical waste trolley?	☐Yes ☐No
110. Availability of dedicated BMW collection area?	☐Yes ☐No
111. BMW collected from isolation facility within 48hrs?	☐Yes ☐No

VIII. ICU FACILITY

112. Are there any beds dedicated for COVID 19 infection?	☐Yes ☐No
113. If Yes, Number of beds dedicated to COVID 19 cases?	
114. Is the distance between beds in ICU more than 1 meter?	☐Yes ☐No
115. Is the oxygen supply is by cylinder or central connection?	
116. Are there any separate Ventilators, nebulizers, Infusion pumps in ICU?	☐Yes ☐No
117. Adequate supply of masks, ET tubes, PPE kits available at ICU?	☐Yes ☐No
118. All ICU Staff received training in donning & doffing of PPE?	☐Completed ☐In progress☐ Not started
119. Are there separate area for donning & doffing of PPE?	☐Yes ☐No
120. Hand washing facility & hand sanitizer available at donning & doffing areas?	☐Yes ☐No

XII.OTHER ESSENTIAL SERVICES

121.Is there strategy available for optimizing the PPE supply	☐Available ☐In progress☐ Not started
122.Are there any stockout experience for PPEs in the las year.	☐Yes ☐No
123.Designated ambulance facility for transporting patients from isolation area?	☐Yes ☐No
124.list of contact numbers of ambulance drivers displayed at isolation area?	☐Available ☐In progress☐ Not started
125.Ambulance staff trained in wearing PPE & and other Infection control practices?	☐Yes ☐No
126.SOP for disinfecting ambulance after transporting confirmed case/dead body?	☐Available ☐In progress☐ Not started
127.Written protocol available for disposing dead bodies of confirmed cases?	☐Available ☐In progress☐ Not started
128.Is there enough availability of body bags?	☐Yes ☐No
129.Are the staff trained in handling dead bodies and wearing PPE?	☐Yes ☐No

Guidelines for Quarantine facilities COVID-19

The purpose of this document is to provide interim guidance for setting up of quarantine facilities

Guidelines for Quarantine facilities

1.0. Introduction

Quarantine is the separation and restriction of movement or activities of persons who are not ill but who are believed to have been exposed to infection, for the purpose of preventing transmission of diseases. Persons are usually quarantined in their homes, but they may also be quarantined in community-based facilities.

Quarantine can be applied to

- An individual or to a group of persons who are exposed at a large public gathering or to persons believed exposed on a conveyance during international travel.
- A wider population- or geographic-level basis.

Examples of this application include the closing of local or community borders or erection of a barrier around a geographic area (cordon sanitaire) with strict enforcement to prohibit movement into and out of the area.

The purpose of this document is to provide guidelines for setting up of quarantine facilities during the current COVID-19 outbreak.

The recommended duration of quarantine for Covid-19 based on available information is upto 14 days from the time of exposure.

The purpose of quarantine during the current outbreak is to reduce transmission by

- Separating contacts of COVID-19 patients from community
- Monitoring contacts for development of sign and symptoms of COVID-19, and
- Segregation of COVID-19 suspects, as early as possible from among other quarantined persons

The scope of this document is to cover the procedures required for

- Physical infrastructure/Functional Services requirement at quarantine facilities
- Procedure for medical monitoring of contacts, reporting formats
- Protocol for referrals of suspects/ Symptomatics and isolation of symptomatics if required temporarily
- Infection control practices by medical personnel, supporting staffs and catering staffs etc.

2.0. Evaluation of potential sites for facility-based quarantine is important for preparedness planning (Checklist at Annexure-11).

Requirements for Quarantine facility in a community-based facility is as under

1. **Location:**
    - preferably placed in the outskirt of the urban/ city area (can be a hostel/unused health facilities/buildings, etc.)
    - away from the people's reach, crowded and populated area
    - well protected and secured (preferably by security personnel/ army)
    - preferably should have better approachability to a tertiary hospital facility having critical care and isolation facility
2. **Access considerations**
    - Parking space including Ambulances etc.
    - Ease of access for delivery of food/medical/other supplies
    - Differently-abled Friendly facilities (preferably)
3. **Ventilation capacity:** Well ventilated preferably natural
4. **Basic infrastructure/functional requirements:**
    - Rooms/Dormitory separated from one another may be preferable with in-house capacity of 5-10 beds/room
    - Each bed to be separated 1-2 meters (minimum 1 metre) apart from all sides.
    - Lighting, well-ventilation, heating, electricity, ceiling fan
    - Potable water to be available
    - Functional telephone system for providing communications.
    - Support services- fooding, snacks, recreation areas including television
    - Laundry services
    - Sanitation services/Cleaning and House keeping
    - Properly covered bins as per BMW may be placed

5. **Space requirements for the facility:**

    - Administrative offices- Main control room/clerical room
    - Logistics areas/Pharmaceutical rooms

- Rest rooms- doctors/nurses/supporting staffs
- Clinical examination room/ nursing station / Sampling area
- Laundry facilities (on- or off-site)
- Mess/Meal preparation (on- or off-site)
- Holding area for contaminated waste
- Wash room/Bathroom/Toilet

6. **Social support resources/ Recreational areas**
    - Television and radio / Reading materials/ indoor plays

7. **Monitoring the health of contacts:** During that period, contacts should be monitored at least daily for fever and respiratory symptoms.

2.2. Standard operating Procedures: To ensure smooth operation in the quarantine facility, the standard Operative procedures (SOPs) needs to be framed as under

- Daily monitoring surveillance using the daily reporting format (annex 1)
- Fever triage/ Isolation
- Case and contact monitoring and response
- Transfers of suspect/symptomatic to designated hospital (through ambulances)
- Public information
- Provider information (SOPs)
    - medical personnel (annex 2),
    - nursing staff (annex 3),
    - movement of health personnel and support staff (annex 4) and
    - security staff (annex 5)

Functional flow should be maintained to reduce/minimise the interactions between quarantine people and healthcare professionals/supporting staffs so that transmission of disease is prevented and controlled

3.0. Risk assessment of the quarantine facility

The risk level refers to how likely it is that someone in the Quarantine camp will become infected with corona virus as a result of movements and activities performed in the Quarantine camp.

Risk assessment includes identification of the biohazard risk precaution levels, along with its associated activities. The risk level refers to how

likely it is that someone in the Quarantine camp will become infected with corona virus as a result of procedures performed in the Quarantine camp. Areas were sagregated and labeled as:

- **Low risk areas:** Areas having less direct contact with evacuee suspects such as control room center in the quarantine center, nursing station and areas of kitchen where food is cooked.
- **Moderate risk areas:** Moderate risk areas are where infectious aerosols are generated from areas where the suspects were inhabiting in their bed linen, pillows and nearby clothes; low concentration of infectious particles. Contaminated surface near the quarantine zones.
- **High risk areas (containment Quarantine camp):** Areas where direct dealing with the suspects are as under

  Medical examination room, sample collection areas(high concentration of infectious particles while coughing, sneezing, gag reflex during nasopharangeal & oropharangeal sample collection). Toilet and bathroom areas, dining areas, areas of bio-waste collections, segregation and disposal.

  Based on risk assessment, areas should be earmarked and infection prevention control measures to be applied as per MOHFW guidelines.

4.0 Securing Entry and Exit points

- In order to prevent and control infection in the facility, strategic points in the facility needs to be identified including
- The Control room where a person entering inside quarantined building to get proper awareness and training on infection control measures,
- A well informed and trained security to check (main entrance gate of the area) and a guard (24*7) with registers for ins and outs and a designated nursing officer for checking proper PPE wear (main entrance gate in the building)
- The international biohazard warning symbol and sign to be displayed on the doors of the rooms where suspects are kept, BMW management areas,samples of higher risk groups are handled

- Only authorized & trained persons or those designated in work areas to permitted to enter the quarantine areas;
- Doors to keep closed at all times preferably under observation of a guard.
- There should be double door entry was managed with only one door to be open at a single time.

5.0 . Human resource Deployment: In the quarantine facility, Chief Medical officer needs to be appointed as In-charge /nodal officer for overall coordination and supervision of the quarantine center. Services of General duty medical doctors, Medicine specialists, Pediatrics, Microbiologist (for diagnostic support and IPC), Psychiatrists & Psychologists are required for routine examination and relevant clinical care of the quarantined people. Para-medics including Staff Nurse and Lab. Technician, Pharmacist need to be posted. Public health specialist are required for monitoring public health aspects of the facility while services of clinical microbiologist are required for sample collection, packaging and infection prevention & control practices. House keeping staff also need to be deployed.

6.0 Training – Training is the most important and critical part to ensure that all activities takes place as per established protocol and SOPs, training of health care professionals and other relevant staffs was undertaken initially. Training of medical officers on SOPs needs to be followed at Quarantine centers for daily examination, movements in the facility, infection prevention control measures and use of PPE kit etc.

Training of clinicians, laboratory technicians and medics needs to be undertaken on appropriate sample collection (nasopharyngeal and throat) and triple layer packaging with cold chain maintenance.

Paramedical staffs i.e., staff nurses; medics, pharmacist etc. needs to be trained on SOPs to be followed at Quarantine centers and use of PPE kit. Staff undertaking the work in Laundry, Mess/Canteen, security and other related staff i.e., drivers, general duty staff etc. needs to be trained on use of mask, gloves , cleaning and disinfection procedures and use of PPE kit, etc.

Refresher training or regular direction to all the above staffs needs to be provided as on need basis. During the quarantine period as and when new staff was posted, it needs to be ensured that he/she received proper training before undertaking the work. It is to emphasized that all activities / procedures must be done under strict monitoring/observations of trained specialists.

7.0 . **Daily Clinical Examination and referral -** All quarantined people needs to be examined twice (morning & evening) daily clinically and those requiring

referrals for related symptoms of Corona virus (fever, cough, sore throat, breathlessness etc.) or any other reason needs to be referred to designated hospital in ambulance directly with due precautions as per referral SOP. Ambulances need to be placed in the facility in standby mode for transport including advanced lifesaving ambulance.

Daily census of the people needs to be undertaken twice a day (ex. Morning 8 am and evening 6 pm).

8.0 Coordination– Chief medical officer needs to supervise and coordinate with various organizations working with the facility. To ensure all activities take place according to standard protocol, separate teams were constituted for various purposes- Supervisory team, admin team, logistic team, referral team, medicine / equipment team, hygiene sanitation team.

Daily review meetings needs to be conducted under chairmanship of Chief medical officer to discuss day to day affairs and sort out any issue requiring attention.

24*7 control room needs to be established at the facility with monitor for CCTV cameras and speakers at each floor so that quarantined people can be communicated on routine basis and necessary instructions can be provided.

9.0 Recording and reporting mechanisms- To ensure standardized reporting, daily reporting formats of suspected cases with symptoms related to corona virus, no. of cases requiring referral, sample collection status needs to designed (as per annexure 1). It needs to be sent daily to relevant higher authorities.

10.0 Monitoring and Supervision – Daily monitoring visit needs to be conducted inside quarantine facility and outside the facility in the surrounding campus by public health and incharge officers and gaps to be noted. Necessary corrective actions and preventive actions to be taken by the nodal officer.

Visits also given by senior officers from for regular review.

11.0 Establishment of Infection Prevention Control (IPC) measures – As per risk assessment was undertaken with respect to probability of infection from possibly infected quarantine people to health care, other staffs and surrounding areas. Special map of the facility needs to be prepared to outline the details of movement of health care and other personnel around the quarantine area and in the building. It need to be ensured that movement of health care staffs and other personnel to undertake as per the designed map to prevent and control infections.

Separate fence needs to be raised around the building to prevent entry of animals especially dogs, monkeys and even birds if possible.

Well informed and trained security personnel needs to be deployed all around the building on 24*7 rotation basis to monitor the facility and to avoid entry of un-desired persons/animals and even birds for eating any food remains/droppings inside the area.

To ensure that all health care personnel use PPE as per guidelines, they need to be properly trained and assisted during wearing of PPE. Separate areas to be earmarked for PPE Donning and Doffing. Compliance for same to be ensured by nodal officer.

Separate well informed and trained nursing officers need to be stationed at the building to regulate the movement of the staffs entering the facility. He/ She should be assigned the duty that every person entering the facility enters in the register of all the details on time of name, designation entry/exit. Nursing officer to ensure that all the persons are labeled while entering the building so that they can be identified by security staff. At the entrance, two door entries may be ensured to avoid mixing of quarantine people with health care staff.

It is to be ensured that all the quarantine facility is decontaminated daily (refer to infection prevention control guidelines) with disinfectants (freshly prepared 1% hypochlorite, detergent solution) including surface mopping of all the floor, bathrooms, toilets facility, under side of beds, other related items placed in the rooms of quarantine people .

A separate cubicle for people developing mild symptoms for temporary observation (transit room) may be considered so that it will lead to an early isolation of any symptomatic person and to prevent transmission to other cluster of groups.

12.0 Lodging, **Catering, Laundry and other related activities** –Disposable and pre-packed food to be needs to be served to quarantined people. All the quarantined people to be kept on separate beds with distance of 1-2 meters with no bed facing opposite to each other. All Beds were having disposable bed sheet that should be changed on daily basis. Personal toiletries/ towel/ blanket/ pillow with covers/electric kettle, room heater and water dispenser may be provided to each person depending on availability.

A separate room needs to be assigned to perform laundry services for cleaning of all the clothes and other washing related activities. Before laundering, all the washable items needs to be placed in 1% hypochlorite up to 30 minutes and later washed in detergent solution.

13.0 Biomedical waste (BMW) management- To ensure that biomedical waste management in the facility takes place as per standard guidelines, separate yellow, red /black bags, foot operating dustbins needs to be kept at each floor and outside the facility. It is to strictly ensured that Doffing takes place in the designated area with all the PPE kit including mask, gloves is properly placed in yellow bags. All the health care workers collecting the possible infectious material such as food items, PPE kits from yellow bags should also wear PPE and following the IPC measures. Designated place to be earmarked outside the building for collection of yellow and black bags. It should be collected at least twice daily by biomedical waste management vehicle/any other local established practice.

Site of collection of biomedical waste should be regularly disinfected with freshly prepared 1% hypochlorite solution. All officials concerned with the administration and all other health care workers including medical, paramedical, nursing officers, other paramedical staff and waste handlers such as safaikarmacharis, attendants & Sanitation attendants needs to be well oriented to requirements of handling and management of general and biomedical waste generated at the facility. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal as mentioned in the SOP needs to be followed. Continuous training, monitoring & supervision to monitor the implementation to be done on daily basis to manage compliance related issues. All the generated waste from Quarantine facility to be treated as isolation waste and its disinfection /treatment was strictly monitored by specialists in the health authorities.

14.0 Logistic management- All logistic to be used in quarantine facility i.e., PPE , medical equipments i.e. Thermal thermometer, Stethoscope, BP machine etc., office logistic, sample collection and packaging material, etc.to purchased in advance.

Performa needs to be prepared for daily consumption of PPE, triple layer mask, gloves, etc. and monitored by logistic team on daily basis.

15.0 Information, Education & Communication (IEC) and Psycho-social support – As on arrival, there might be an obvious sense of psychological fear and panic among all the quarantine people and some of the involved stakeholders like health care professionals/staffs including doctors, security personnel etc.. An interpersonal communication needs to made to all of them one after another in groups by Psychiatrist team initially and later on with individual counselling sessions. Quarantine people needs to be explained on Universal infection control

measures , personal protective measures, written instructions on Do's and Don'ts in the quarantine zone to be provided to contain and avoid spread of the infection. Importance of frequent Hand washing specially after touching surfaces like door handles, stair railings, bed railings, etc. to be instructed for strict compliance. Everyday quarantine people to be counseled by clinicians regarding day to day queries. If needed, referral to be made to psychiatrist /psychologist team. If there is fear in the surrounding community it needs to be addressed.

16.0 Sample collection and packaging – For baseline testing, Samples (Nasopharyngeal swab and throat swabs) for COVID-19 need to be collected from all quarantine people & sent with triple layer packaging maintained in cold chain (2-8^{o}C) to designated laboratory .

Safe collection & handling of specimens in the Quarantine camp needs to be performed in identified locations as per the SOP. Specimen containers generally used are viral transport medim (VTM vials containing 3 ml medium) with falcon tubes (50 ml) as secondary layer of Triple layer packaging system. Containers needs to be correctly labeled to facilitate proper identification. Specimen request or specification forms to be placed in separate waterproof zip pouch envelopes with locking facility and pasted on the outside walls of the sample transport containers (Performa annexure). Just before the end of the 14 days quarantine period, resampling of nasopharyngeal swabs needs to be done.

17.0 Discharge of quarantine people from Quarantine Facility - The quarantine people needs to be discharged at the end of 14 days of incubation period provided samples are negative on resampling. Instructions should be provided to self-monitor their health at their home (home quarantine) for next 14 days and immediately report to their District Surveillance officer (DSO), in case of development of symptoms suggestive of COVID-19. Written instructions were handed over to them individually. The District Surveillance Units (DSO) and State Surveillance Units (SSO) to be provided with contact details of the quarantine people to conduct active surveillance for next 14 days under intimation to the Central Surveillance Unit, IDSP (NCDC).

18.0 Terminal Disinfection and decontamination procedures: Quarantine facility terminal disinfection procedures to be performed as per guidelines. Cleaning/ decontamination to be performed using the proper personal protective equipment (PPE) and adopting three bucket system as prescribed in the SOP (at attached annexure).

Spraying of 1% sodium hypochlorite working solution (dilution 1:4 from an initial concentration of 4%) to be done on all the surfaces (protecting electrical points/appliances). This was followed by cleaning with a neutral detergent that is used for removing the traces formed by hypochlorite solution. While

cleaning, windows need to be opened in order to protect the health of cleaning personnel.

All frequently touched areas, such as all accessible surfaces of walls and windows, the toilet bowl and bathroom surfaces needs to be carefully cleaned. All textiles (e.g. pillow linens, curtains, etc.) should be first treated with 1% hypochlorite spray and then, packed and sent to get washed in laundry using a hot-water cycle (90°C) and adding laundry detergent. 1% hypochlorite solution should also sprayed in the PPE doffing area and discard area twice a day on daily basis. Mattresses / pillows after spraying with 1% hypochlorite should be allowed to get dry (both sides) in bright sunlight for upto 3 hrs each.

Annex 1

DAILY REPORTING FORMAT
(Daily Clinical Examination)

COVID-19

Name of the Centre:

Address:

Centre In Charge:

Contact No:

S.no	Date of reporting	Census in the Centre (8 AM)	Clinically examined	Suggestive Symptoms like fever, cough, breathing difficulty, other respiratory problems,	Other clinical cases and non 2019-nCoV	Cases referred to designated hospital	Cumulative cases referred to designated hospital	Cases discharged from designated hospital	Cases still admitted at designated hospital	Census in the Centre (8PM)	Remarks

etc

M	FM	FM	F	M	FM	FM	FM	FM	F

Annex 2

Standard Operative Producers for medical personnel

There are shift duties of the doctors may be as under

Morning : 800AM to 200 PM
Afternoon : 200PM to 800 PM
Night : 800PM to 800 AM (next day)

General instructions for medical doctors from designated hospital (s) for performing their duty at Quarantine facility may be as under:

a. The name of the duty officers and duty roster for to be displayed at the control room.
b. Each team to follow the procedure mentioned below:
c. The resident doctors on duty will report to the centre at the reporting time and mark attendance in the register.
d. After that, they will go to clinical area to examine the quarantined people in the centre.

e. The doctors on working duty will team up with medical officers from Quarantine facility to form a paired team (one from hospital and another from the Quarantine facility) to examine the cases.
f. They will examine and assess the patients and report to the In-charge of the Quarantine facility.
g. They will take care of the infection control/protective measures while examining the persons and follow guidelines placed at the door for safety/infection control measures.
h. If any symptomatic case/ additional symptoms are observed/ reported, it should be discussed with the In-charge of the Quarantine facility for referral to the designated hospital, if required.
i. They will complete examination of all patients and report before 12 noon on the same day and handover the report to the Office In-charge for onward transmission to the Ministry.
j. They will not leave till the next relieving team arrived.
k. They will hand over this information to the next relieving team.
l. They will leave the Quarantine facility with due permission of In-charge of the Quarantine facility.
m. If any doctor has not reported due to unavoidable circumstances, present available team will inform to the concerned authority of designated hospital for substitute.
n. In case any patient needs to be transferred due to any eventuality to the referral centre, senior most doctor will accompany the ALS Ambulance to take care of the patient till he/she reaches and handed over to the centre.
o. The medical team may take help of psychiatric/ counsellor team if required, for psychosocial support
p. Team to work in harmony with the Quarantine facility medical team.
θ. The senior most doctor on duty from the designated hospital will take decision of the clinical management.

Annex 3

Standard Operative Producers for Nursing Officer (supervisor)

- Maintain log of medical professionals/staffs entering/exiting in the quarantine facility, where the quarantine people are housed.
- A designated nursing officer (infection prevention & control nurse) has to ensure that the incoming officers/ staff to the quarantine building that are wearing appropriate PPE, and they are aware of universal infection control precautions {hand washing (alcohol/ sanitizers or soap + water; mask, gloves, PPE).
- After this he/she will allow the person to enter.
- The PPE doffed off by the outgoing medical professionals needs to be disposed in the yellow bag and hand sanitization should be ensured after disposing the PPE. **(PPE- donning On / doffing Off enclosed).**
- Yellow bags containing the infected materials placed in the nearby gate should be disposed off daily as per the Biomedical Waste Management Rules.
- The dustbins should be covered at all times. This should be ensured by Nursing officer. If required, disinfection has to be done as advised.
- Black bags (municipal wastes) - to be disposed after proper packaging daily as per the Biomedical Waste Management Rules.
- Supervise IPC in the facility in coordination with Microbiologist/Clinician

Annex 4

Standard Operative Producers for Movement of Health Professionals and Support Staff Inside the Quarantine facility

The movements of health professionals are to be monitored at three vital points considering the control of infection for the prevailing disease-

CONTROL ROOM:

- Health professionals and support staff need to be made aware and trained in correct procedure of wearing mask and gloves.
- They need to be trained to follow the infection control measures as instructed including
    - hand washing with soap and water and sanitizing with alcohol-based sanitizers,
    - cough etiquettes,
    - donning and doffing of PPE etc.
    - before entering the quarantine facility.

Main Gate Security post: To monitor entry of persons/visitors to the facility and ensure that the personnel should comply with instructions / including wear the mask correctly.

Nursing Station at Quarantine building (ground floor):

1. Registration of name with time and purpose for entering the building
2. PPE should be donned here.
3. Nursing officer will check and ensure strict and correct wearing of PPE before entering the main quarantine area
4. After coming out from the main quarantine area, PPE to be doffed properly and placed in the designated bin for infective material (Yellow bag)
5. The hands should be sanitized before exiting the quarantine area
6. Mobile phones are not allowed to be used inside the building
7. Name of doctors to be written on the PPE with permanent marker for identification.

Annexure-5

Standard Operative Producers for Security Personnel at Quarantine facility

1. For security purpose, ensure 24 hours manning of the post of the quarantine facility.
2. The person manning the area must be trained and instructed to wear mask and gloves during the duty period.
3. Instructions for infection control measures like hand washing etc. should be properly briefed.
4. Doctors/Nursing staff/supporting staffs/other entering the quarantine area should wear appropriate PPE before entering the quarantine centers.
5. Log of those entering/exiting the Quarantine facility should be maintained. Only those having specific purpose inside the Quarantine facility should be allowed to enter.
6. The log should be put up daily to the controlling authority.
7. Security guard should have a whistle to give signals to people to not come near the quarantine facility if they do not have any purpose to visit the Quarantine facility.
8. He should report immediately to the officer In-charge controlling the security of the quarantine facility, if anybody does not follow the instructions as directed.
9. The security personnel should not leave after completing his shift till his reliever reports for duty.
10. The officer In-charge controlling the security of the quarantine facility will supervise the duty roster and roles and responsibilities of all the personnel deployed at the quarantine area for smooth functioning.

Annexure-6

Requirements of Equipment for Quarantine Facility

Equipment	Daily Consumption for holding 300 persons
Gloves • reusable vinyl or rubber gloves for environmental cleaning • latex single-use gloves for clinical care	200
Hair covers (optional)	1500
Particulate respirators (N95, FFP2, or equivalent)	150
Medical (surgical or procedure) masks	1500
Gowns and aprons (single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns)	150
PPE Kit	130
Alcohol-based hand rub	50
Plain soap (liquid if possible, for washing hands in clean water)	500
Clean single-use towels (e.g. paper towels)	1500
Sharps containers	5
Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment	20 litres
Large plastic bags	200
Appropriate clinical waste bags	100
Linen bags	500
Collection container for used equipment	200

Annexure - 7

Human Resource requirement for Quarantine Facility

The requisite human resources at a Quarantine Facility can be divided into two broad categories:

General Requirements of medical personnel for the facility as under

Medical personnel- (catering facility of 300 people)

I. On- Duty Doctors in 6 hours shift of 2 doctors
II. Nusring Staff in 6 hours shift of 4 nurses
III. Lab. Technicians in 6 hours shift of 4 technicians

1. Health professionals: (Multi-disciplinary team)

- Medical doctors (Multi-Speciality team)- General duty doctors, Specialists like Medicine, Paediatrician, Psychiatrist / Psychologist, Public Health specialist, Microbiologist etc.
- Nursing officers
- Pharmacists
- Paramedics
- Lab. Technicians (preferably)

2. Supporting staffs like Safai Karamchari, Housekeeping, Laundry workers, Cooks, etc.
3. Security staffs

Annexure- 8

Checklist for screening entry of persons inside the quarantine building

- Only authorised personnel should enter the quarantine facility for carrying out pre-determined activity. While entering the quarantine facility, it should be ensured that personnel are wearing the requisite personal protective equipment

- A pre-identified staff should be designated to screen the personnel entering in the quarantine facility using following check-list.

I. Is the person entering the quarantine building either doctors/nursing officers/ supporting staffs/ Govt. officials etc. posted or authorized to enter the quarantine building in the Centre?

II. Whether the person entering the quarantine building is having duty inside the building during that time?

III. Whether the person entering wear protective suit correctly?

IV. Whether the person entering wear N-95 Mask correctly?

V. Whether the person entering wear goggles correctly?

VI. Whether the person entering wear headgear correctly?

VII. Whether the person entering wear boots correctly?

VIII. Whether PPE has no gaps/physical damages which can be a risk in the disease transmission?

IX. If it is 'YES' in all Qs from 1to 9, then, the person is allowed to enter the quarantine building.

X. If any of the Qs is NO, then , to ask for appropriate donning of PPE initially and if not still then, to contact the concerned officer supervising the

nursing officers and if required, NCDC Team on duty /In-charge of the center.

Annexure – 9

Guidelines for Disinfection of quarantine facility (for COVID-19)

(Refer to NCDC Website for latest updates)

Guidelines for disinfection of quarantine facility (for COVID-19)

Scope*:* This document aims to provide interim guidance about the environmental cleaning / decontamination in quarantine camp facilities (e.g. barracks, cubicles in rooms, offices, and toilets, etc.) where persons with potential exposure to COVID-19 have housed.

The causative agent involved in the current outbreaks of 2019-nCoV acute respiratory disease, the 2019-nCoV (genus: Betacoronavirus), belongs to the family of Coronaviridae, a large family of enveloped, positive-sense single-stranded RNA viruses. Coronaviruses are transmitted in most instances through large respiratory droplets and contact transmission, but other modes of transmission have also been proposed worldwide.

The time of survival and the conditions affecting the 2019-nCoV viability in the environment are currently unknown. According to studies assessing the environmental stability of other coronaviruses, the Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) is estimated to survive several days in the environment and the Middle East Respiratory Syndrome-related coronavirus (MERS-CoV) more than 48 hours at an average room temperature (20°C) on different surfaces [1-3].

Environmental cleaning: Due to the potential survival of the virus in the environment for several days, the premises and areas potentially contaminated with the 2019-nCoV should be cleaned before their re-use, using products containing antimicrobial agents known to be effective against coronaviruses. Although there is lack of specific evidence for their effectiveness against 2019-nCoV virus, cleaning with water and household detergents and use of common disinfectant products should be sufficient for general precautionary cleaning. Tests carried out using SARS-CoV showed that sodium hypochlorite is effective.

These guidelines provide guidance for environmental cleaning in quarantine facilities housing people exposed/ potential exposure toCOVID-19 and have been adapted based on the Hospital Infection Prevention and Control guidelines drafted by NCDC in collaboration with WHO and other stakeholders.

Area/Items	Item/Equipment	Process	Method/ Procedure
Clinical Area			
General clinical areas Floors (clinical areas) – daily mopping	Dust mops Mop (No broom will be used for sweeping) Detergent/ sanitizer–hot water, sodium hypochlorite(1%) Three buckets (one with plain water and one with detergent solution; one bucket for sodium hypochlorite(1%)	Sweeping Cleaning Daily mopping	• Sweep with the dust mop or damp mop to remove surface dust. Sweep under the furniture and remove dust from corners. Gathered dust must be removed using a hearth brush and shovel. • The sweep tool should be cleaned or replaced after use. • Prepare cleaning solution using detergent with warm water • Use the three-bucket technique for mopping the floor, one bucket with plain water and one with the detergentsolution. • First mop the area with the warm water and detergent solution. • After mopping clean the mop in plain water and squeeze it. • Repeat this procedure for the remaining area. • Mop area again using sodium hypochlorite 1% after drying the area. • In between mopping if solution or water is dirty change it frequently. • Mop the floor starting at the far corner of the room and work towards thedoor. • Clean articles between cleaning. **Note:** Mopping should be done twice a day
Ceiling and Walls	Sweeping tool Duster Bowl/ small bucket of soap solution Plain water	Damp dusting	• Damp dusting with a long handledtool for the walls and ceiling done with very little moisture, just enough to collect thedust. • Damp dusting should be done in straight lines that overlap one another. • Change the mop head/cover when soiled. **Note:** Should be done once a week or after examining a suspect case

	Care of mop	Hot water Detergent Sodium hypochlorite 1%	• Clean with hot water and detergent solution, disinfect it with sodium hypochlorite and keep for drying upsidedown.
Doors and door knobs	Damp cloth or Sponge squeeze mop Detergent	Thorough washing	• The doors are to be washed with a brush, using detergent and water once a week (on one defined day); gently apply cloth to soiled area, taking care not to remove paint, then wipe with warm water to remove excess cleaningagent. • Door knobs and other frequently touched surfaces should be cleaned daily.
Isolation room	Detergent/ Sanitizer– warm water, sodium hypochlorite (1%) Three buckets (one with plain water and one with detergent solution); separate bucket for sodium hypochlorite (1%)	Terminal cleaning	• Before cleaning an isolation room, liaise with infection control team for details of any special requirements. Staff will be instructed on specific cleaning procedures required with reference to • Safety uniform to be worn. • Chemicals or disinfectants to be used. • Also, if bed screen and shower screen are to be cleaned or changed, refer cleaning in isolation rooms.
All clinical areas/ Laboratories/ Wherever spill care is required	Sodium hypochlorite (1%) Rag piece Absorbent paper Unsterile gloves Spill care kit Mop Hot water	Blood and body fluid spill care	• Wear non-sterile gloves. • For large spills, cover with absorbent paper/ rag piece • if any broken glass and sharps, using a pair of forceps and gloves, carefully retrieve.Use a large amount of folded absorbent paper to collect small glass splinters. Place the broken items into the puncture proof sharps container. • Cover the spill with sodium hypochlorite(1%)for 10–20 minutes contact time. • Clean up spill and discard into infectious waste bin, and mop area with soap and hot water. • Clean the mop and mop area with 1% sodium hypochlorite. • Wash mop with detergent and hot water and allow it to dry.

Stethoscope	Alcohol-based rub/Spirit swab	Cleaning	• Should be cleaned with detergent and water. • Should be wiped with alcohol based rub/spirit swab before each patient contact.
BP cuffs and covers	Detergent Hot water	Washing	• Cuffsshouldbewipedwithalcohol-based disinfectant and regular laundering is recommended for the cover.
Thermometer	Detergent and water Alcohol rub Individual thermometer holder	Cleaning	• Should be stored dry in individual holder. • Clean with detergent and tepid water and wipe with alcohol rub in between patient use. • Store in individual holder inverted. • Preferably one thermometer for each patient.
Injection and dressing trolley	Detergent and water Duster Disinfectant (70% alcohol)	Cleaning	• To be cleaned daily with detergent and water. • After each use should be wiped with disinfectant.
Refrigerators	Detergent and water Absorbent paper or clean cloth	Cleaning (weekly)	• Empty the fridge and store thingsappropriately. • Defrost, decontaminate and clean with detergent. • Dry it properly and replace the things. • Weekly cleaning is recommended.

Area/Items	Item/Equipment	Process	Method/ procedure
Lodging area			
General cleaning	Detergent and warm water Mop Two buckets Clean utility gloves Handmops	Daily mopping floors Thorough washing	• Scrub floors with hot water and detergent with using minimal water. (Do not pour thewater.) • Clean with plainwater. • Allow to dry • Hypochlorite 1% mopping canbe done. **Note:**Recommend general cleaning procedure should be done twice a day
Lockers, tables, cupboard, wardrobes, benches, shelves and cots	Damp duster Warm water Detergent Dry duster	Damp dusting	• Damp dust with warm waterand detergent.
Railings	Detergent/ Sanitizer–hotwater, sodium hypochlorite	Daily dusting	• Damp dust with warm water and detergent followed by disinfection with hypochlorite

	1% Three small buckets/ or big bowls One with plain water One with detergent solution One for sodium hypochlorite 1%		
Mirrors and Glass	Warm water Detergent water/ cleaning solution Damp cloth Wiper	Cleaning	• Using warm water and a small quantity of detergent and using a damp cloth, wipe over the mirror and surround, then using a dry lint-free cloth, buff the mirror and glass to a clean dryfinish.
Sluice room Stainless steel/ Any other sink	Powder cleanser Detergent powder Wiper Cloth	Cleaning	• Sinks are to be cleaned witha powder cleanser. • Firstwetthesink.Sprinkleonalittle powder cleanser and work around the surface with a cloth, include the plughole. • Do not use the powder cleanseron dry sink. • After removing spillage and any stains, flush away with running water. Wipe down the surface of the sink.
Pantry furniture	Duster	Dusting	• Dampdust
Telephone	Warm water detergent solution Duster	General cleaning	• Damp dust with warm waterand detergent. • **Payingspecialattentiontotheear and mouth piece and dry it properly.**
Desks	Damp cloth Furniture polish	Dusting	• Wipe top sides and draw handles with a damp cloth. Wooden desks should be cleaned with furniture polish and buffed to clear glows. Pen holder etc. to be cleaned ordusted.
Chairs (Vinyl)	Warm water and detergent	Cleaning	• Wipe down with warm water and detergent. Remove any marks under arms and seat. Check fordamage to stoppers, if stopper require replacement, report to maintenance department.
Furniture and fittings	Warm water and detergent Rag piece	Dusting	• Using warm water and detergent, damp dust all furniture and fittings, including chairs, stools, beds, tables, cupboards, wardrobes, lockers, trolleys, benches, shelves and storage racks, waste/ bins, fire extinguishers, oxygen cylinders, televisions window sills and dry properly.
Bed tables, bedside lockers	Warm water and detergent Wiper Duster	Cleaning	• Wipe down over bed table. Wipe top and underneath base and stand, using warm water and detergent. Dry oncompletion. • Wipe down the bedside. Remove marks from fronts of draws and sides. Using warm water and detergent, wash the top to remove any sticky marks anddust.
Light switches	Damp cloth (never	Cleaning	• Light switches to be cleaned of dust, spots and finger

and over-bed lights	wet) Detergent Warm water		marks. Clean with a damp cloth (never wet) and detergent. • Over-bed lighting to be damp dusted. Clean with warm water and detergent.
Curtains	Soft clothes Water Mild soap solution	Cleaning	• Clean with water and soap for curtains
White clothes	Sodium hypochlorite 1% Tap water	Washing	• Should be washed under running water and soaked in 1% sodium hypochlorite for 20minutes. **Note:** PPE should be worn while washing soiled linen.
Mattress and pillow covers (cloth)	Tap water	Washing	• Mattress and pillows should be covered with a reusable mattress cover. • It should be changed for each patient and when soiled sent to the laundry according to schedule.
Mattress/ Pillow with rexin cover Normal/ without rexin	Sodium hypochlorite 1% Sunlight	Terminal Damp dusting and cleaning Drying in sunlight	• If with rexin cover, can be cleaned with 1% sodium hypochlorite before use for next patient • If routine mattress, dry it in bright sunlight for 1-2 days before using for next patient
Water jars	Vim powder Soap and water	Cleaning	• Recommended boiled water for drinking • Water jars should be scrubbed/ cleaned with soap and water and boiled water before filling withwater.

Areas	Agents / Toilet cleaner	Procedure
Cleaning of toilets		
Toilet pot/ commode	Sodium hypochlorite 1%/ Soap powder / long handle angular brush	• Inside of toilet pot/commode: • Scrub with the recommended agents and the long handle angular brush. • Outside: Clean with recommended agents; use a nylon scrubber.
Lid/commode	Nylon scrubber and soap powder	• Wet and scrub with soap powder and the nylon scrubber inside and outside
Toilet floor	Soap powder and scrubbing brush/ nylon broom	• Scrub floor with soap powder and the scrubbing brush • Wash with water • Use sodium hypochlorite1% dilution
Tap	Nylon scrubber and soap powder	• Wet and scrub with soap powder and the nylon scrubber.
Outside sink	Soap powder and nylon scrubber	• Scrub with the nylon scrubber.
Showers area / Taps and fittings	Warm water Detergent powder Nylon Scrubber	• Thoroughly scrub the floors/tiles with warm water and detergent • Wipe over taps and fittings with a damp cloth and detergent. • Care should be taken to clean the underside of taps and fittings.

		• Taps should be dried aftercleaning
Soap dispensers	Detergent and water	• Daily dusting • Should be cleaned weeklywith detergent and water and dried.

Note: Dry the floors with a separate drying mop.

Annexure- 10

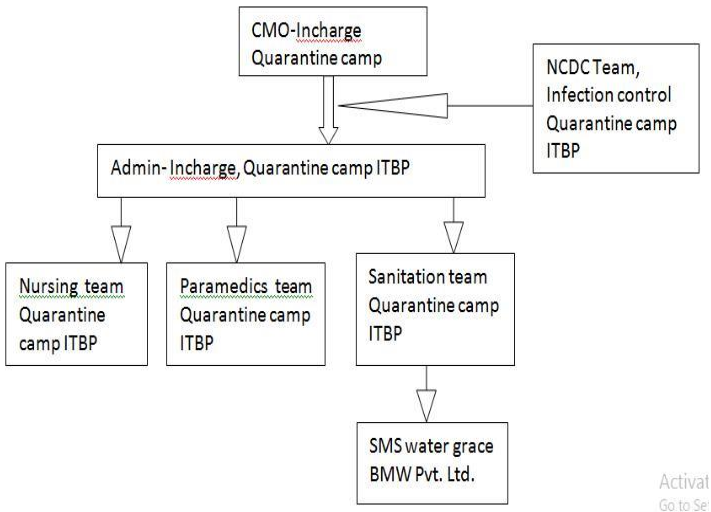
SoPs for Management of Bio-medical Waste (BMW) in the Quarantine Quarantine facility

"Bio-medical waste" means any waste, which is generated during the surveillance, monitoring, diagnosis, treatment or immunization of quarantined personnel in health Quarantine facility. The Bio-medical Waste Management rules are applicable to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form at the quarantine Quarantine facility.

Management of Hospital/Healthcare/Biomedical waste at the quarantine Quarantine facility is of utmost concern having global implications and immediate attention. It is documented that even the general waste generated from Quarantine Quarantine facility is a potential health hazard to the health care workers, public, flora and fauna of the area.

All officials concerned with the Quarantine facility administration and all other health care workers including medical, dental, nursing officers, other paramedical staff and waste handlers such as safai karmacharis, attendants & Sanitation attendants are well oriented to requirements of handling and management of general and biomedical waste generated at the Quarantine facility. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal.

Organogram for Biomedical waste management(ITBP Chhawla):



Bio-medical waste has been classified in to 4 major categories to improve the segregation of waste at the source itself:

Categories	Type of Bags	Type of Waste	Treatment/Disposal
Yellow 	Non chlorinated plastic, autoclavable bags	1. Donned off PPE 2. PPE with spill 3. Gloves 4. Shoe covers 5. Head Covers 6. disposable bed sheets	Incineration or Plasma pyrolysis or deep burial*
Red 	Non chlorinated plastic, autoclavable bags	1. Eye protection goggles 2. recyclable materials like pens 3. plastic water bottles used by quarantine people 4. Bed sheets	Autoclaving/microwaving /hydroclaving and then sent for recyling not be sent to landfill
White 	Puncture, leak, tamper proof containers	1. sharp waste including metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue 	Cardboard boxes with blue coloured marking	Glassware/tubelight/CFL bulbs/LED used in quarantine Quarantine facility	Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling

Duties of the Quarantine Quarantine facility Authorities:

1. Provide training to all its health care workers and others involved in handling of bio medical waste.
2. To provide a safe, ventilated and secured location for storage of segregated BMW within premises of quarantine Quarantine facility.
3. Provide legal authorization and access to Waste collecting van/vehicle.

Duties of the Bio-medical waste management company (SMS water grace BMW Pvt. Ltd.):

1. Ensure timely collection (atleast twice daily morning & evening) of BMW from Quarantine Quarantine facility
2. Handing over of recyclable waste after treatment by autoclaving and incineration to authorized agencies identified by Government of India.
3. Assist health care facilities in training of workers.

4. Provide PPE kits and other safety measures to their vehicle driver, collector, helper, safai karamchari.
5. Issue authorized Identity card to all the persons coming to the Quarantine Quarantine facilityus.

Treatment and Disposal:
1. Quarantine Quarantine facility does not have an onsite setup for BMW treatment facilities there it should be taken to their designated BMW facility and treatment/disposal must be done as per BMW regulations approved in their contract.
2. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.
3. All the waste (even the general waste) generated from the quarantine Quarantine facility must be treated as Biomedical waste.

Maintenance of Records:

1. Records in relation to generation, collection, reception, storage, transportation, treatment and disposal shall be maintained as per rules For 5 years.

Accident Reporting: In case of major accident-intimate immediately and submit a report within 24 hours to the Quarantine facility incharge(CMO-Incharge ITBP Quarantine facility).

Implementation:

Efficient implementation of the bio-medical waste management pivots on orientation, training and

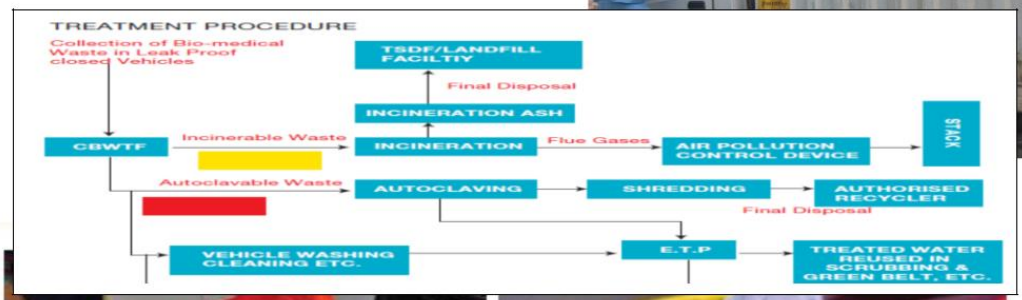
involvement of all the staff in the Quarantine facility. Ensuring proper disposal and segregation at source is the most important step as this is the limiting factor for most health care settings. Continuous training, monitoring & supervision to monitor the implementation must be done on daily basis.

Generation to Disposal process:

1. BMW is collected from various sites in the quarantine facility.

2. All Collected Bags are loaded on to special Bio Medical Waste Trucks/Van and are transported to BMW management facility for treatment and disposal thereafter.

Procedure/ Flowchart for Treatment of Biomedical Waste:



Annex 11

Guidelines for Quarantine facility Incharge, Health professionals, Quarantine people and their family members to guide them with respect to the discharge from Quarantine facility and follow up action in the community.

A. For the Quarantine facility Incharge & Health Professionals at the Quarantine facility:

- The final sample collection for all the travellers shall be taken up on the 13^{th} and 14^{th} day while being in the facility.
- The samples shall be collected and sent to the designated laboratories.
- The reports for the same shall be received latest by $16^{th}/17^{th}$ day in the facility through ICMR.
- Based on the reports a decision can be taken to discharge the travellers.
- Discharge shall accordingly, if agreed to, will be done on the 18^{th} day from the Quarantine facility. Quarantine facility Incharge shall accordingly intimate the travellers in advance for them to make arrangement for their onward journey.
- A detailed enumeration of the proposed place of stay by the travllers during the next 14 days will be obtained including contact numbers by the Quarantine facility Incharge.
- The Quarantine facility Incharges will plan dropping the travellers in either of the locations i.e. ISBT, Railway Station or Airport as per the preference of the travellers.

B. For the Travellers in the Quarantine facility:

1. While travelling back home:

- Provide details of your stay for next 14 days including the contact numbers.
- Obtain list of District and State Surveillance Officers for follow up and reporting in case of any issue.
- Use triple layer surgical mask (follow correct use and disposal of mask as briefed during the stay in quarantine centre)
- Follow frequent hand-wash with soap and water or use alcohol based hand sanitizer.
- Use respiratory etiquettes (use tissue paper/ hand-kerchief to cover your nose and mouth, turn head away from the person facing of you, while coughing/ sneezing).
- Monitor your temperature twice daily.

- Retain the aircraft boarding pass/ rail ticket/ details of Journey by taxi (including contact number of drivers etc)

2. After reaching home

- Avoid crowded places.
- Monitor your health for a period of next 14 days (after leaving the quarantine centre).
- Monitor body temperature twice daily.
- At all times:
    - Maintain personal hygiene
    - Wash hands with soap and water frequently or use alcohol based hand sanitizer.
    - Use respiratory etiquettes (use tissue paper/ hand-kerchief to cover your nose and mouth, turn head away from the person facing of you, while coughing/ sneezing).
- Report to nearest health facility if you develop fever, cough or difficulty in breathing besides reporting it to the State and District Surveillance Officer.
- Allow attendance by health workers / respond to call received from Health functionaries. Keep their contact numbers handy.
- Inform about your health at the end of 14 days period to the Healthcare worker and State and District Surveillance Officer.

3. In case you develop <u>fever, cough or difficulty in breathing</u> any time after leaving the quarantine Centre (within next 14 days):

- Call the nearest health facility or health worker visiting you/ talking to you besides informing the State and District Surveillance Officer.
- An identified care giver (among family members) will only attend to you. He / she will wear mask and wash hands, every time he/ she comes in contact with you.
- Use surgical triple layer mask immediately on realization of symptoms.
- Get admitted to the identified health facility as advised.
- The vehicle/ ambulance which was used for transportation also needs to be disinfected. (Contact the health facility for the disinfection procedure).
- Follow infection prevention and control practices at all times and places.
- If further assistance is required, call Ministry of Health, Government of India's Control Room no. +91-11-23978046.

C. Advice to other family members at home:

- Wash your hands with soap and water frequently.
- If the person (discharged from the quarantine centre) develops symptoms inform the health worker and also the State and District Surveillance Officer.
- In case advised to shift the patient to a health facility:
    - Share list of all contacts till date with the treating doctor/ health care worker and the State and District Surveillance
    - Family members to be in home quarantine till either medical examination rules out novel coronavirus infection or the result of sample is negative.
    - Proper disinfection of bedding/ clothing/ room/ all personal belongings should be followed with 1% Sodium hypochlorite solution.

CHECKLIST FOR ESTABLISHING A QUARANTINE CENTER

I. Basic Information:

1) Name of the Quarantine Centre_
2) Address: _

3) Officer In charge:_
4) Email address:
5) Phone Number: _
6) GPS Coordinates:_

II. Location of quarantine centre

7) Located away from the residential area? ☐ Yes ☐ No
8) Distance to nearby residential area?
9) Away from an area where gathering expected (Eg: Temples, stadiums, Churches etc):

☐ Yes ☐ No

III. Accessibility to the quarantine centre :

10) How far is it from the nearby airport?
11) How far is from the nearest railway station?
12) How far is the nearest bus station?
13) Is the road to quarantine centre is free from heavy traffic?
14) Is the road to quarantine centre is wide enough to have two vehicles at a time?

☐ Yes ☐ No

15) How far is the nearest tertiary care centre?
16) How far is the nearest District Hospital?

IV. Facilities & basic amenities at quarantine facility:

17) How many floors are there in the quarantine building?
18) How many rooms available at the quarantine facility?
19) How many numbers of beds in each room at quarantine facility?

20) What is the distance between beds in the quarantine room?
21) Is there is 24*7 supply of electricity at the facility? ☐ Yes ☐ No
22) Is there 24*7 supply of water at the facility? ☐ Yes ☐ No
23) Is there air conditioning available? ☐ Yes ☐ No
24) If yes, it is by centralised AC or individual air conditioning in each room?
    i. If individual AC ? a: Split b: Window
25) Does window space covers at least 10% of total area? ☐ Yes ☐ No
26) How many windows in each room?
27) Is there exhaust fans in each room? ☐ Yes ☐ No
    i. If Yes, how much air exchange rate expressed in cubic feet per minute (CFM)?
28) Is there drainage facility available in each floor? ? ☐ Yes ☐ No
29) Is there any separate sewage line from Quarantine areas?
30) Are there separate exit & entry points? ☐ Yes ☐ No
31) Is there availability of 24*7 security services at the quarantine area?
32) Is there any separate door for entry of non-health professionals for housekeeping, catering?
33) ☐ Yes ☐ No
34) Is there any separate washroom facility for each room at the facility? ☐ Yes ☐ No
35) If not, how many wash rooms per person/area?
36) Are the floors washable & easily dried? ☐ Yes ☐ No
37) Is the floor mappable? ☐ Yes ☐ No
38) Is there any in-house mess facility available at quarantine area?
39) Is there any separate room/ resting facility for?
    i. Doctors
    ii. Nurses
    iii. Paramedics
    iv. Cleaning staffs

v. Linen management

40) What is the Frequency of changing linen in Quarantine rooms?
41) Whether disposable of Linen used? ☐ Yes ☐ No
    i. If No then, How they are disinfecting & cleaning linen?
    ii. How frequently linens changed?

42) Is there any curtains available in the quarantine rooms/wards? ☐ Yes ☐ No

   i. If yes frequency of changing them?
   ii. frequency of disinfecting & cleaning?

43) Is there any policy for disinfecting mattress at quarantine facility? ☐ Yes ☐ No

44) Is there any written policy for disinfecting beds at quarantine centres?

☐ Yes ☐ No

45) If yes, please verify policy and elaborate /

VI. Infection control practices

46) Is adequate PPE supply available at the quarantine facility? ☐ Yes ☐ No

47) Is there adequate supply of disinfectants at the centre? ☐ Yes ☐ No

48) Are the staffs in the facility trained in wearing PPE? ☐ Yes ☐ No

49) Is there a separate area for donning & doffing PPE? ☐ Yes ☐ No

50) Is there hand washing facility with soap with dispenser / hand sanitizer available at donning & doffing areas?

☐ Yes ☐ No

51) If yes, what type of hand rub dispensers are available? (select all applicable answers)

   i. Pocket bottle
   ii. Bottle affixed to trolley/tray
   iii. Bottle affixed to bed
   iv. Wall dispenser
   v. Dispenser located on bedside table/trolley

52) Whether all staff has access to hand rub dispensers? ? ☐ Yes ☐ No

53) Are hand rub dispensers replaced when empty?

   i. Always
   ii. Intermittently

iii. Rarely
iv. Never
v. Not applicable

54) Are posters illustrating handwash technique displayed beside each sink?

☐ Yes ☐ No

55) Is there availability of bleaching solution of different strength available?

% of hypochlorite solution	YES	NO
1%		
5%		
10%		

56) Is there any policy for rodent & pest control management? ☐ Yes ☐ No

57) If yes, is it being implemented & followed? ☐ Yes ☐ No

58) Are the staffs trained in infection control practices? ☐ Yes ☐ No

59) Is there a structured curriculum / training module for Infection Control Practices? ? ☐ Yes ☐ No

60) What is the Frequency of cleaning of
   i. floors of quarantine rooms/wards
   ii. Bathrooms
   iii. Ambulatory areas
   iv. Resting rooms
   v. What is the Frequency of cleaning high touch surfaces like door knobs, bed rails etc?

61) Is there any separate sample collection area? ☐ Yes ☐ No

62) Is there is separate thermometer & BP apparatus available at the quarantine centre?

☐ Yes ☐ No

63) Are there colour coded bags available for BMW management?

64) Is the waste being segregated and disposed as per protocol? ☐ Yes ☐ No

65) Are the sharps being disposed as per protocol? ☐ Yes ☐ No

66) How the food waste is being disposed?

VII. Recreational facilities

67) Is there provision for mobile phone or internet at the facility? ☐ Yes ☐ No

68) Are the mobiles phone disinfected?
   i. If Yes how
   ii. How frequently

69) Is there any recreational room / area available? ☐ Yes ☐ No

70) Is there any provision for Television or Radio at the quarantine facility?
☐ Yes ☐ No

71) Is there a provision of printed reading materials at the facility? ☐ Yes ☐ No
   i. If Yes how the materials are disposed off?

VIII. Human resources & logistics

72) Is there a dedicated Infection nurse for the quarantine facility to monitor IPC activities?

73) Is there is rotational shift for doctors/nurses/paramedics?
   i. If Yes, how many shifts?
   ii. Doctors in each shift
   iii. Nurses in each shift
   iv. Cleaning staffs in each shift

74) Is there any pulmonologists/physician available when it is needed? ☐ Yes ☐ No

75) Is there a phlebotomist/ lab technician available when it is needed? ☐ Yes ☐ No

76) Is there any availability of clinical psychologist in quarantine facility? ☐ Yes ☐ No

IX. SOP & policies

77) Is there any guidelines/ inhouse SOP for infection control practices? ☐ Yes ☐ No

78) Is there any protocol for limiting the visitors to quarantine area? ☐ Yes ☐ No

79) Is there any written policy for the recreational area? ? ☐ Yes ☐ No

80) Biomedical waste management guidelines 2016 & amendments 2019 available? ☐ Yes ☐ No

81) Does the quarantine health facility in charge aware of National IPC guidelines for healthcare facilities 2020? ☐ Yes ☐ No

82) Is there any linen policy available? ☐ Yes ☐ No

83) Is there any SOP for working of doctors, nurses & paramedics at quarantine facility? ☐ Yes ☐ No

84) Is there any protocol for disinfecting ambulance after transporting patient to isolation centre?

85) Is there any policy for monitoring health of staffs at quarantine area?

86) Is there enough IEC displayed at the quarantine centre?

X. Transporting Patients to Isolation centre

87) Is there any protocol for transfer of patients to tertiary care/transfer of symptomatic cases to isolation centre?

88) Is there separate ambulance available for transporting patients to isolation centre? ☐ Yes ☐ No

89) Are the ambulance staff trained in wearing PPE & infection control practices?

90) How far is the Isolation facility from the quarantine centre

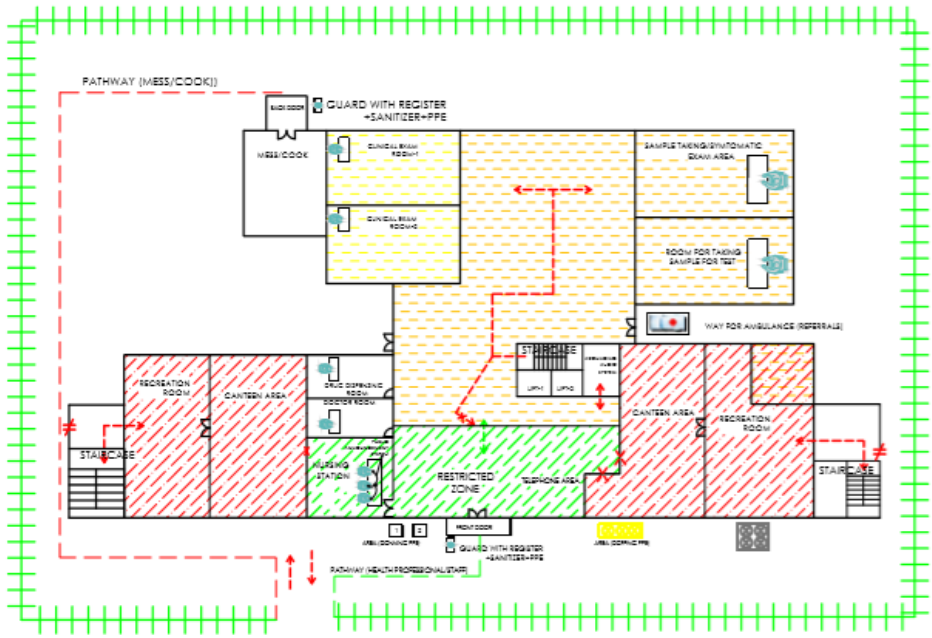
National Centre for Disease Control

National Centre for Disease Control
(formerly National Institute of Communicable Diseases)
Directorate General of Health Services , Ministry of Health & Family Welfare
Government of India

सत्यमेव जयते

MAP SHOWING FUNCTIONAL AREAS IN THE GROUND FLOOR

(QUARANTINE BUILDING) RESTRICTIONS & FLOW OF MOVEMENT OF PEOPLE



CHHAWLA QUARANTINE CENTRE (ITBP CAMP)

LEGENDS:-

1. UNSAFE ZONE(Only people with H/O traveling to China access)

AREA WHERE QUARANTINED PEOPLE ENJOYS IN THE GROUND FLOOR AREA

PATHWAY FOR QUARANTINED PEOPLE

NO ENTRY FOR QUARANTINED PEOPLE

2. SAFE AND RESTRICTED ZONE

SAFE

NO QUARANTINED PEOPLE ENTERS HERE

ONLY HEALTH PROFESSIONALS/ STAFFS STAY

3.ALERT ZONE (Transmission of infection from quarantined people to health professionals can occur here)

AREA WHERE QUARANTINED PEOPLE AND HEALTH PROFESSIONAL OR STAFFS MAY INTERACT (RISK ZONE FOR TRANSMISSION OF INFECTION)

4. BLACK BAG (BMW)

5. YELLOW BAG (BMW)

6. CLOSED DOORS WITH KEYS IN NURSING STATION (In case of emergency to open).

7. INCOMING QUARANTINED PEOPLE (From China) CANENTER FROM THESE DOORS TO THE QUARANTINE BUILDING ON THE DAY OF ARRIVAL

8. PUBLIC ANNOUNCEMENT SYSTEM AT RECEPTION

EMT

World Health Organization

EMERGENCY MEDICAL TEAMS INITIATIVE

COMMUNITY FACILITIES

for preparedness and response to COVID-19

Isolation, treatment and step down of COVID-19 cases in community facilities

A scalable, modular and temporary solution based on the Emergency Medical Team methodology

content

The Emergency Medical Teams Secretariat of the World Health Organization (WHO) gratefully acknowledges the contributions that many individuals and organizations have made to the development of these guidelines.

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Foreword

The unprecedented spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) overwhelmed health care systems across the globe. Countries were faced with the challenge to isolate and treat cases of coronavirus disease 2019 (COVID-19) while continuing to provide essential health care services, especially for acute and chronic illnesses. As the demand increased, capacities were stretched, prompting health ministries to seek new and efficient ways to manage the isolation and treatment of cases.

The Emergency Medical Teams Network works with countries to prepare their health care systems for outbreaks and through the years have worked closely with governments experiencing outbreaks such as the diphtheria outbreak in Cox's Bazar, Bangladesh, and in the recent Ebola outbreaks in the Democratic Republic of Congo and West Africa. Using the EMT methodology and by incorporating the latest guidance from this novel disease, the EMT Network has pooled its experience to fill an important gap in a country's response to managing COVID-19.

This document presents options to facilitate the immediate isolation and treatment of COVID-19 cases within existing or new community facilities. Readers will recognize that, to be effective, these facilities must be modular, scalable, and seamlessly integrated into a country's healthcare system at national or subnational levels. Aligning recommended practices with the local context is of paramount importance.

This publication is a product of collaboration between global experts from the World Health Organization (WHO) and throughout the EMT network. It should be considered a living document that continues to evolve as new information, evidence, and experiences from this pandemic response come to light. I would like to extend my sincere gratitude to all contributors for sharing their experience, expertise, and knowledge in seeing this publication realized. I would particularly like to thank Jorge Durand Zurdo and Veronica Sanchez Carrera for guiding this document from its inception to final publication; a significant achievement indeed.

With such resolve and innovation shown across the Network, I am confident that the EMT community will continue to play a crucial role in supporting the global response to this unprecedented emergency.

Flavio Salio
Network Lead
Emergency Medical Teams
World Health Organization

COVID-19	coronavirus disease 2019
FTE	full-time equivalent
ICU	intensive care unit
IPC	infection prevention and control
IT	information technology
IV	intravenous
PCR	polymerase chain reaction
PPE	personal protective equipment
ppm	parts per million
SIPA	specific inpatient profile area
WASH	water, sanitation and hygiene
WHO	World Health Organization

1. Objective

This document assists countries in their planning and response efforts to isolate and treat suspected and confirmed cases of coronavirus disease 2019 (COVID-19) through the establishment of isolation and treatment centres in community facilities. It proposes a model for community facilities that is flexible, adaptable and easy to set up, through the use of a modular approach. It offers an alternative solution at the community level and complements the Severe Acute Respiratory Infections Treatment Centre guidance (*1*).

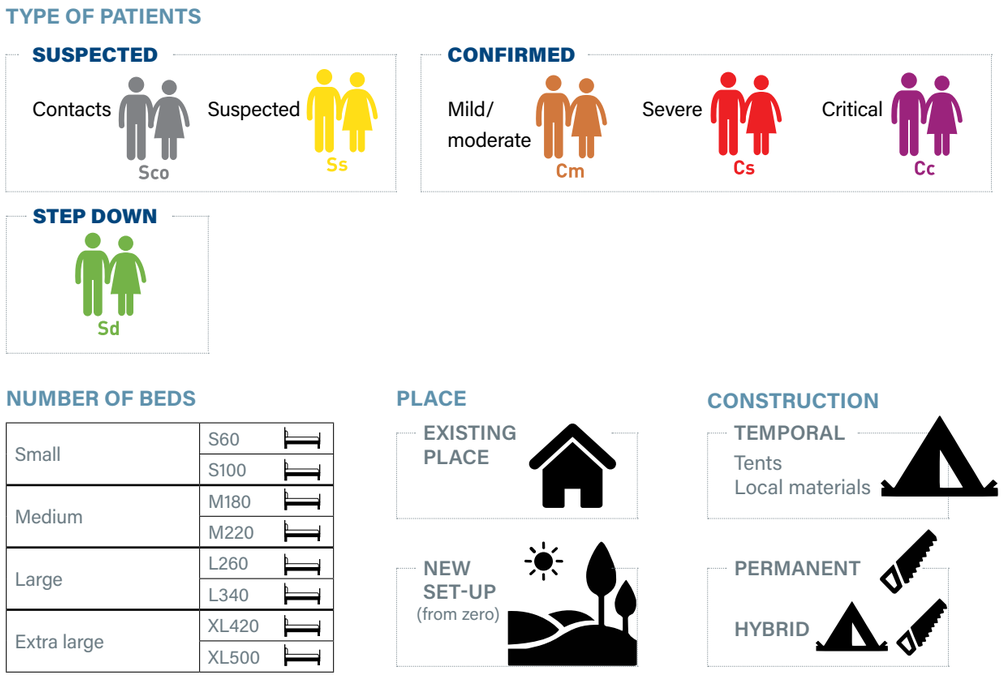
The scope of this document outlines the structure and flow of a COVID-19 community facility that is meant to increase the capacity of the health system to respond to this emergency. The proposed models can be situated within an existing community area, such as an open field, sports stadium, convention centre, event hall or warehouse. This model can be activated as part of the national/local surge plan, when health-care facilities anticipate that they will not have the capacity to serve COVID-19 patients, and should be part of a more comprehensive health system readaptation. If required and appropriate to the circumstances, community facilities can be scaled up and adapted to provide higher levels of care for severe and critical patients, taking into consideration the requirement of additional skilled staff, dedicated equipment and supplies.

In summary, this set-up can be used for the following purposes:

a. isolating contacts (i.e. quarantine);
b. treating patients with suspected COVID-19 (i.e. isolated individually);[1]
c. managing confirmed cases with mild or moderate disease severity without risk factors (i.e. cohorted care);
d. managing of confirmed cases with severe or critical disease severity (i.e. cohorted care); and
e. step-down care for recovering patients.

A community facility providing options a and e should have rapid access to health advice, for example, by an adjacent COVID-19 health post, via telemedicine, or using another modality. There are several variables that inform the final considerations for establishing community facilities (*see Fig. 1.1*); the proposed models are intended to cover all potential combinations of those variables, providing a wide set of likely configurations. For one example, see Fig. 1.2.

Fig. 1.1 *Variables that impact on design selection*



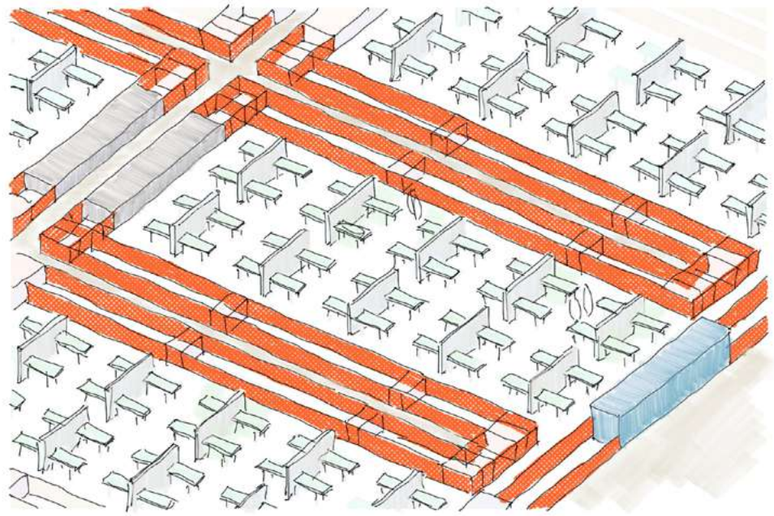
Considering the characteristics of the virus, strict and specific infection prevention and control (IPC) measures must be implemented at all times. Based on this assumption and on current knowledge, health facilities have to adapt their activities, taking into consideration that any person who enters the facility might pose a risk or be at risk.

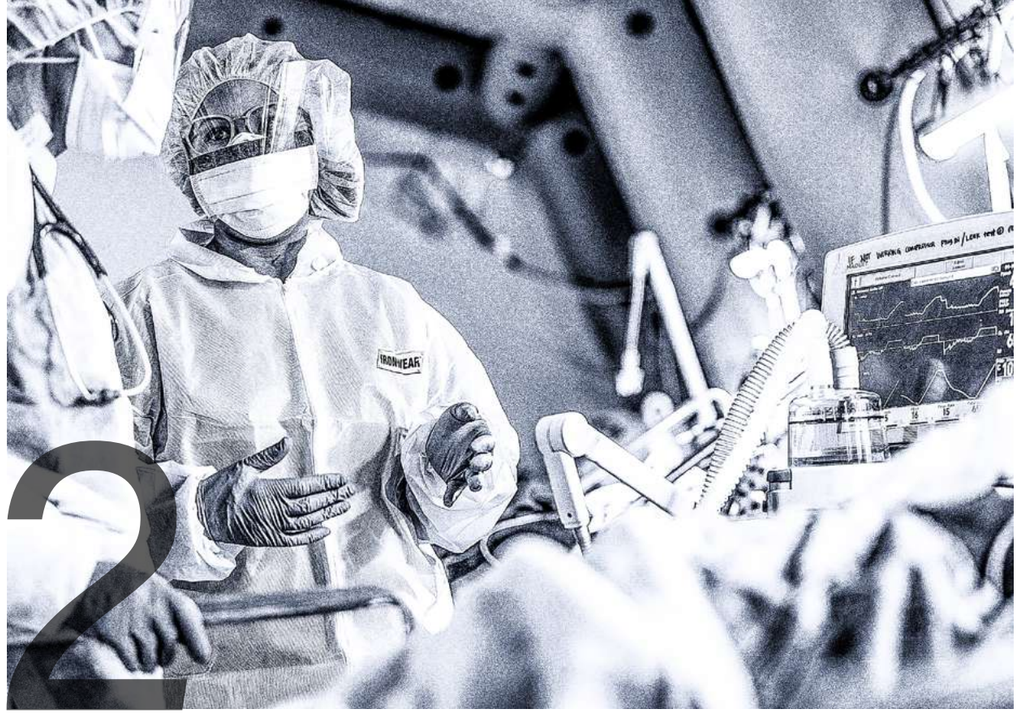
The World Health Organization (WHO) has recommended the actions shown in Table 1.1 for the different severities of COVID-19 (*2*).

Table 1.1 *Case management recommendation by case severity and risk factors*

Case severity, risk factors	Recommendations
Mild and moderate, with no risk factors	Patient should be instructed to self-isolate and contact COVID-19 information line for advice on testing and referral. Test suspected COVID-19 cases according to diagnostic strategy, with isolation/cohorting in: • health facilities, if resources allow; • community facilities (i.e. stadiums, gymnasiums, hotels) with access to rapid health advice (i.e. adjacent COVID-19-designated health post, telemedicine); or • self-isolation at home according to WHO guidance.
Moderate, with risk factors and all severe/critical cases	Patient should be instructed to self-isolate and call COVID-19 hotline for emergency referral as soon as possible. Test suspected COVID-19 cases according to diagnostic strategy. Patient should be hospitalized for isolation (or cohorting) and inpatient treatment.

Fig. 1.2 *Artistic representation of a 40-bed ward for confirmed COVID-19 patients*





2. Staff, supplies and equipment, structure and systems for a COVID-19 treatment centre in community facilities

This document is structured based on the main components of health-care system readiness or "surge capacity" (staff, supplies and equipment, structure and systems) needed to rapidly establish and operate community facilities.

2.1 Staff

Experience from China has demonstrated that, if possible, staff should limit working time in isolation areas to less than four consecutive hours (*1*). Staffing patterns should be pre-established to ensure effective coverage, and shifts should be monitored to ensure compliance. Insufficient staffing could impact the ability to effectively deliver services over time.[1] Staffing calculations in this document assume a standard average working week of 40 hours per person (1 full-time equivalent or FTE). Where available, minimum requirements are indicated as per Emergency Medical Team network minimum standards (*5*).

2.2 Supplies and equipment

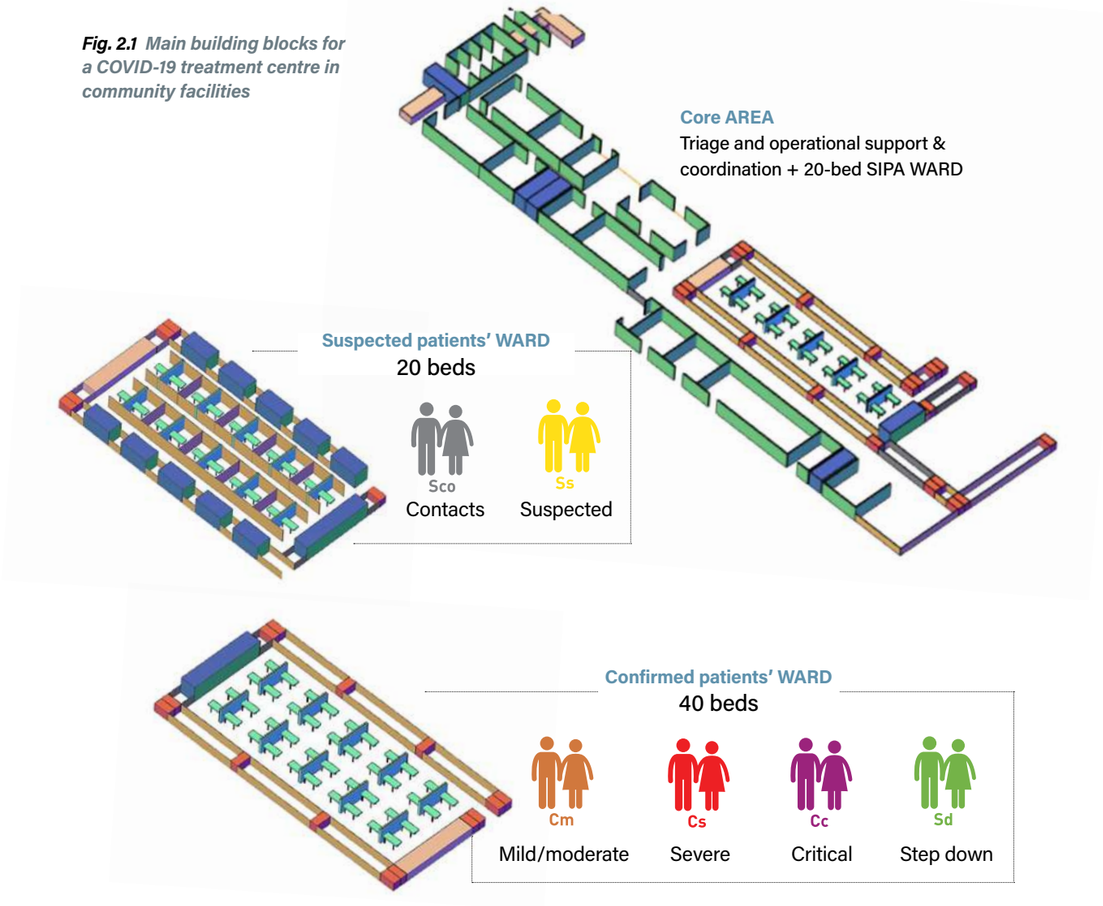
In terms of development and maintenance of medical and operational support services, supplies and equipment include medical equipment, pharmaceutical products and nonmedical supplies needed to provide clinical care in line with the services provided.[2]

2.3 Structure

The layouts presented are designed to be set up either within an existing building or in an open area. For selection of the location, some characteristics must be taken into consideration (i.e. site, physical characteristics, existing facilities, comfort conditions, etc.; *see Web Annex 1*; for criteria for the reuse of spaces, *see Web Annex 2*). Layouts have been designed for tented structures or for building in temporary or permanent settings if needed (*see Web Annex 3*). Any adaptation requires careful analysis of the pathways in the facility and crossover points. In addition, the flexibility of the design allows planning for the future, such as building a permanent health-care centre (60 beds) and/or planning for potential extensions up to 500 beds in case they are needed.

The main building blocks for the proposed facility layout are composed of core areas – operational support and coordination areas, screening and triage areas, variable 40- or 20-bed wards, plus one block of 20 beds that can be used for the specific inpatient profile area (SIPA) for children or people requiring specialized or intensive care unit (ICU) care (*see Fig. 2.1*). This also includes the separation of areas for patients with suspected and confirmed COVID-19, without any crossing of patient and staff flows (*see Fig. 2.2*). Detailed models and plans are available in Web Annex 3.

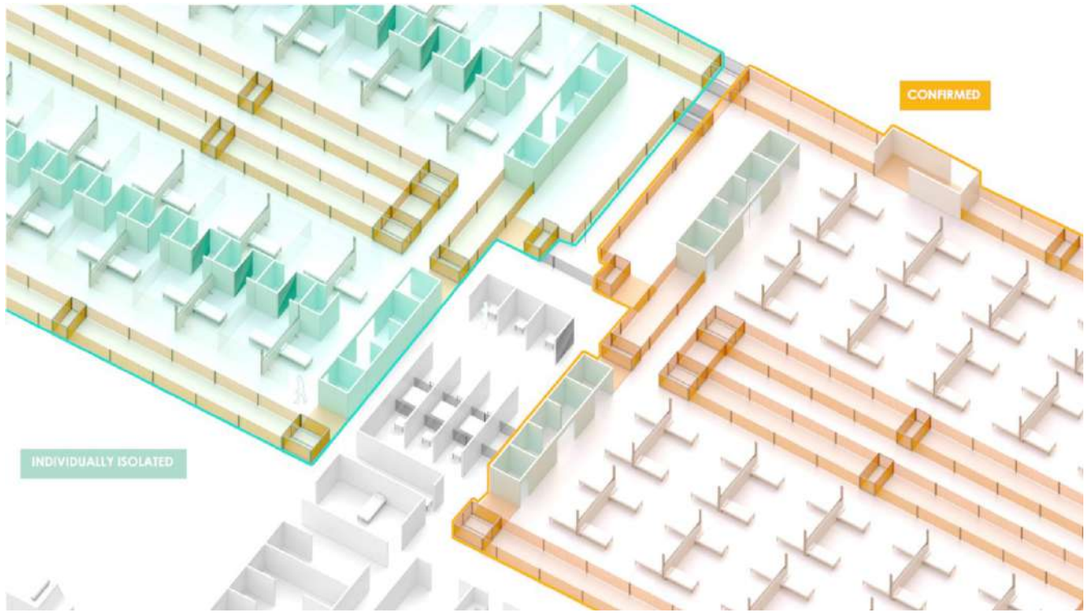
***Fig. 2.1** Main building blocks for a COVID-19 treatment centre in community facilities*



SIPA: specific inpatient profile area. *For description of patient types, see Fig. 1.1. (see page 10)*

Staff, supplies and equipment, structure and systems for a COVID-19 treatment centre in community facilities

Fig. 2.2 *Artistic representation of a community facility with wards for suspected (individually isolated – left) and confirmed (cohorted – right) cases*



2.4 Systems

Systems refer to the standard operating procedures and protocols that define the operating model of each community facility, including support systems to safeguard the quality of care.

3. Key considerations

3.1 Characteristics of the structural design

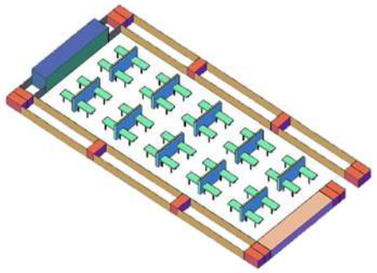
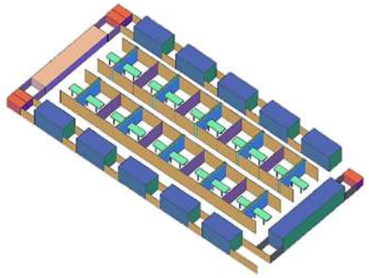
The COVID-19 community facilities have four major characteristics:

- **modularity** – the ability for areas to be expanded and/or repurposed;
- **separation** – clearly divided and dedicated areas:
  - high-risk area: every area where there are patients or items that are considered to be contaminated;
  - low-risk area: all areas where there are no patients or items that could be potentially contaminated;
- **line-of-sight** – the ability to view one area from another between low- and high-risk areas;
- **clear and efficient** patient pathways and staff flows.

3.2 Modularity

The modular approach enables the community facility to adapt to diverse needs and requirements, including space availability, number of patients and local conditions. Modules can also be adapted to function within and/or augment existing health facilities. Any module can be extended or stood down without impacting other modules while the facility is operational and accommodating patients (*see Table 3.1*).

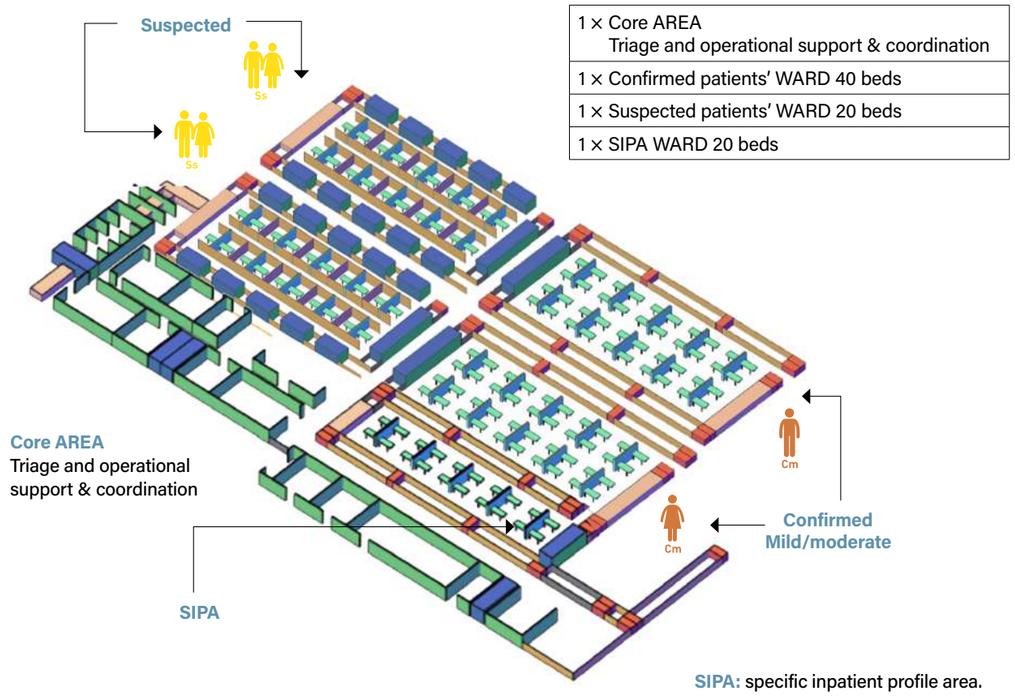
Table 3.1 *Suggested layout for 40-bed and 20-bed COVID-19 wards*

40-bed ward for confirmed cases	20-bed ward for suspected/probable cases
	
Description Module of 40-bed capacity in a cohorted structure for confirmed cases, with two toilets with handwashing basins,[1] two showers, power supply and lighting services. Storage space available at premises. This type of module can accommodate patients with confirmed COVID-19 of different degrees of severity: mild, moderate, severe and critical. Each module is conceived for one type of gender user.	**Description** Module of 20-bed capacity in an isolation room structure for separate case management. Independent toilets and shower for each patient, power supply and lighting services. This type of module can accommodate patients with suspected COVID-18 waiting for results, and contacts. Each module is conceived for one type of gender user.
If there is no dedicated ICU ward provided in the facility, a few beds could be adapted to provide critical care where referral to a higher level of care is not possible.	A few beds (e.g. 4 beds in the 20-bed unit) could be adapted to provide critical care.
Cm Mild/ moderate; Cs Severe; Cc Critical; Sd Step down	Sco Contacts; Ss Suspected

ICU: intensive care unit. *For description of patient types, see Fig. 1.1. (see page 10)*

The high-risk area should comprise one or more modules, each with 40 beds (confirmed patients) or 20 beds (suspected patients). This area can be augmented by adding more modules for up to 80, 120 or more beds, for either suspected or confirmed cases. Modules can be divided by gender and/or dedicated space for children or people requiring specialized or intensive care, if required (*see Fig. 3.1*).

Fig. 3.1 *Model of 180-bed layout, with modularity showing different types of potential patient typology*



SIPA: specific inpatient profile area.
For description of patient types, see Fig. 1.1 (See page 10)

Scaling up the model from 60 to 500 beds (*see detailed plans in Web Annex 3*)

Modularity enables the establishment of new treatment areas while maintaining continuity of care. Fig. 3.2 demonstrates how to scale up a COVID-19 community facility so that previously established modules remain functional as bed capacity is increased progressively. Modularity enables expansion of the care facility to be planned in advance and established in phases. It is important to take into consideration that technical areas should be expanded as the facility grows.

Fig. 3.2 *Scaling up: adapting to different sizes*

3.3 Separation: clearly divided and dedicated areas

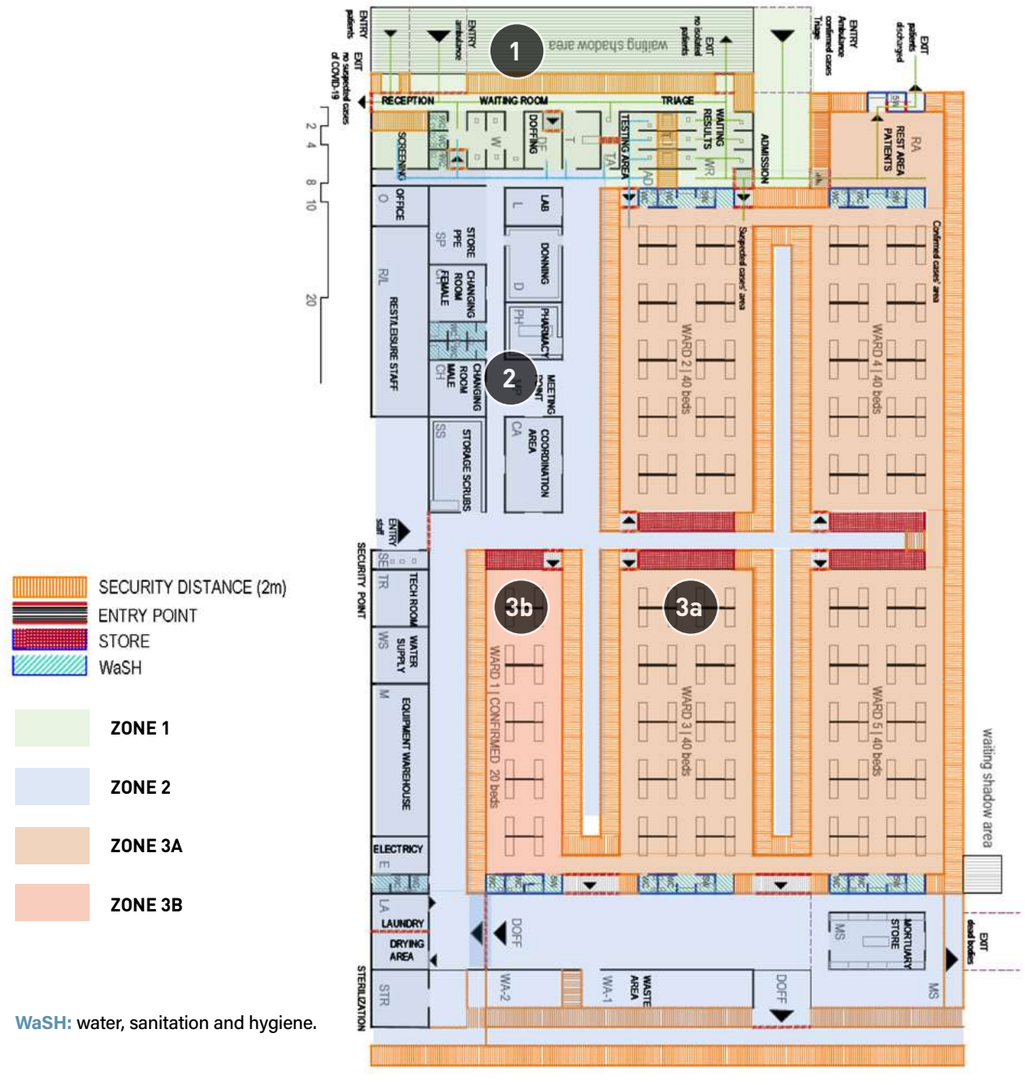
The care facility should be composed of four key areas, outlined in Table 3.1.

Table 3.1 *Key areas of the care facility*

Area	Description
1	Screening/triage/admission and registration area (high-risk area)
2	Technical (clinical and operational support) area (low-risk area)
3	Areas for treatment of confirmed or suspected cases (high-risk area): a. inpatient area b. specific inpatient profile area
4	Other complementary areas

There should be a safety zone of not less than 2 m (and/or with a physical barrier as appropriate) between modules. Fig. 3.3 illustrates a 180-bed model (100 × 80 m; Model M) with four clearly defined areas.

Fig. 3.3 *Model M: 180 beds (100 m × 80 m) with four areas*



WaSH: water, sanitation and hygiene.

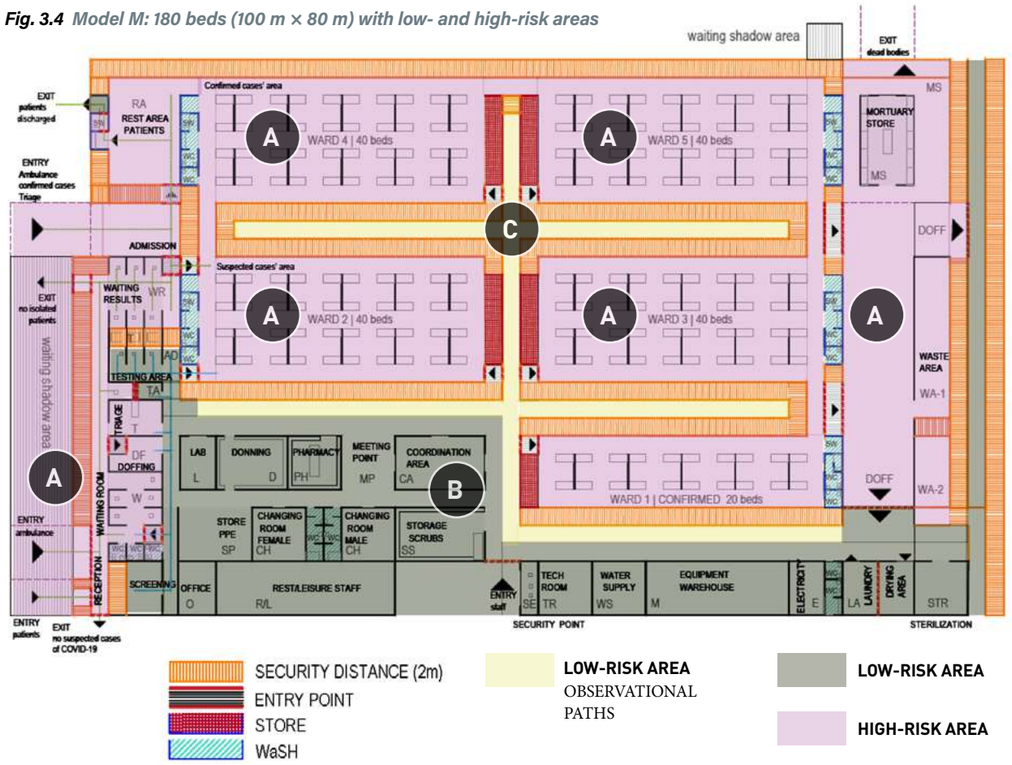
3.4 Lines of sight

A key characteristic of the design illustrated in Fig. 3.4 is the separation of high- and low-risk areas with both physical barriers and safety zones. Visual lines of sight between risk areas should be maintained if possible, to ensure that clinical staff can observe patients in other areas without donning or doffing additional personal protective equipment (PPE). Lines of sight between risk areas:

- **minimize** staff time required in higher-risk areas;
- **minimize** overuse of PPE and thus the impact on supply shortages (*1*); and
- **enable** more continuous patient monitoring.

PPE should be used based on the risk of exposure (e.g. type of activity) and the transmission dynamics of the pathogen (e.g. contact, droplet, or aerosol). For specific IPC recommendations for COVID-19, refer to the WHO COVID-19 website (*2*). The layout illustrated in Fig. 3.4 and described in Table 3.2 is designed to establish three main areas which divide the community facility.

***Fig. 3.4** Model M: 180 beds (100 m × 80 m) with low- and high-risk areas*



Area		Description
A	HIGH RISK	All staff entering this area should be wearing adequate PPE; the doffing area for PPE removal is located for staff exiting the high-risk zone.
B	LOW RISK	Clinical coordination and operational support staff area, donning/dressing area located at the high-risk zone entrances, a second donning/dressing area can be set up near a direct entrance into the ICU ward in case it needs to be set up.
C	OBSERVATION PATHS	Allow clear vision from the low-risk area to patient areas for clinical staff not wearing PPE to be able to observe patients.

ICU: Intensive care unit; **PPE:** personal protective equipment; **WaSH:** water, sanitation and hygiene.

3.5 Clear and efficient flows

Logical flows for patient, staff and visitors

This document describes the recommended flows for access to moving around the different areas; entering and exiting risk areas; and donning and doffing. For the facility to best function, it is necessary to have single-path order flows that avoid crossing paths, and a clear indication of the difference between patients, staff and visitors. It is also important to control the operational support flows, including a special consideration for waste-collection routes.

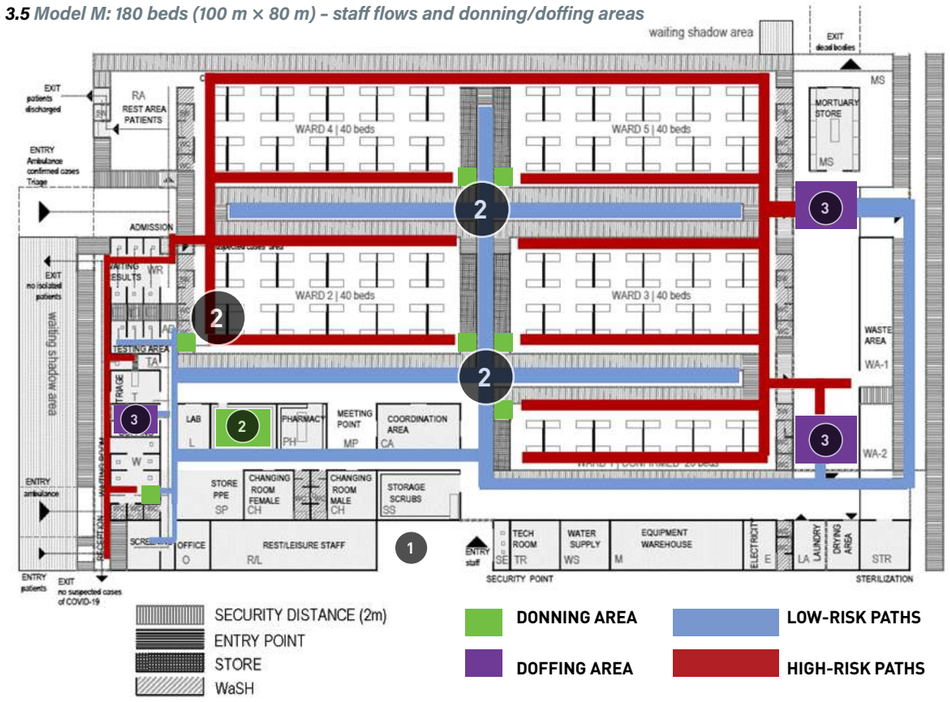
Staff flows

The following criteria ensure safe and efficient flow of staff:

1. access to low-risk area;
2. access to high-risk area, after changing room and donning; and
3. exit from high-risk area, through the doffing area.

A dedicated donning zone in each module is supported by a single large-capacity donning area at the main staff entrance and a single large-capacity doffing area at the exit of every two wards. This ensures unidirectional flow from high-risk to low-risk areas (*see Fig. 3.5*).

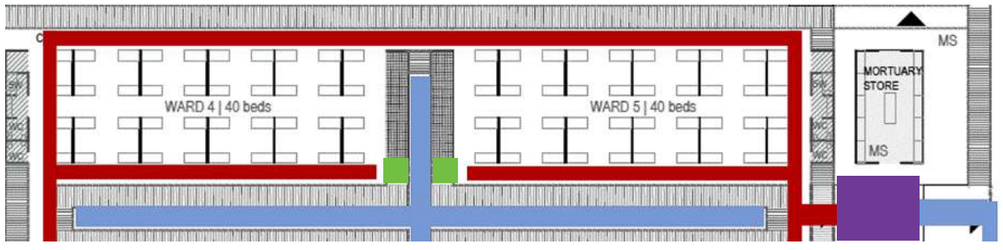
Fig. 3.5 *Model M: 180 beds (100 m × 80 m) – staff flows and donning/doffing areas*



WaSH: water, sanitation and hygiene.

Where possible, it is advisable to cohort staff, reducing the risk of cross-contamination. The configuration in Fig. 3.6 shows the compartmentalized area of two wards (80 beds) with the dedicated doffing area.

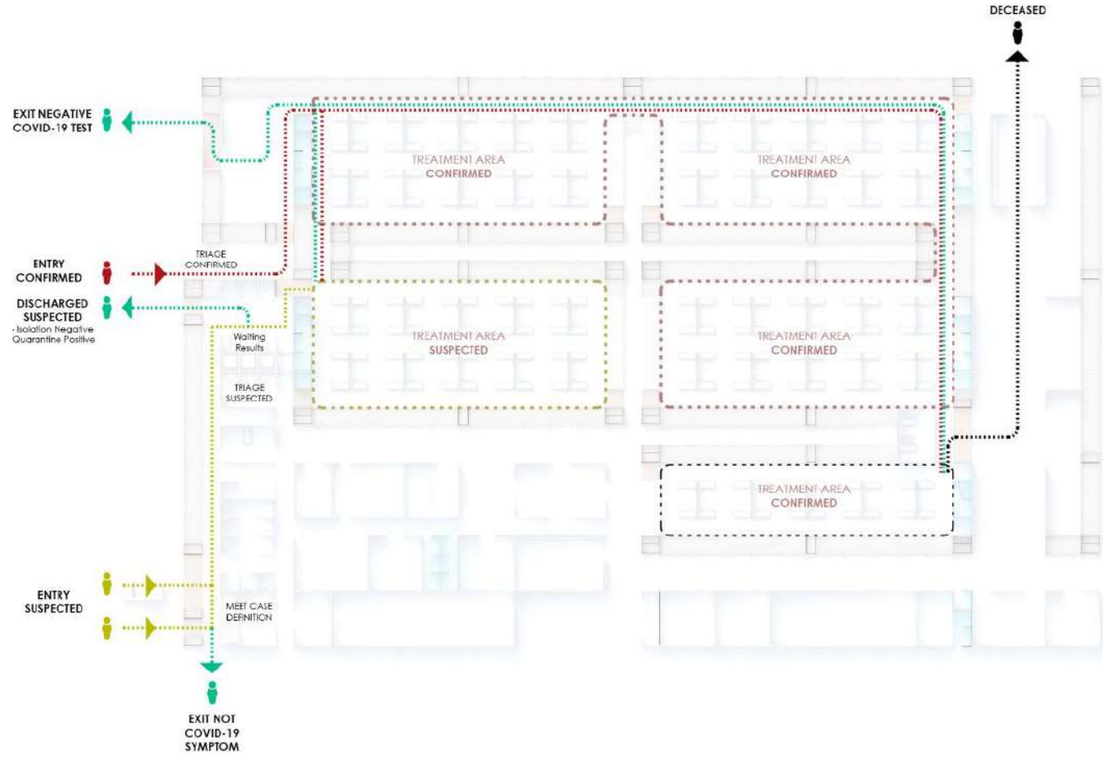
Fig. 3.6 *Model M: 180 beds (100 m × 80 m) – cohorting strategy donning/doffing areas*



Patient flows

Figs 3.7 and 3.8 present graphic and conceptual representations of safe and efficient patient flows through the community facilities.

Fig. 3.7 *Graphic representation of patient flows*



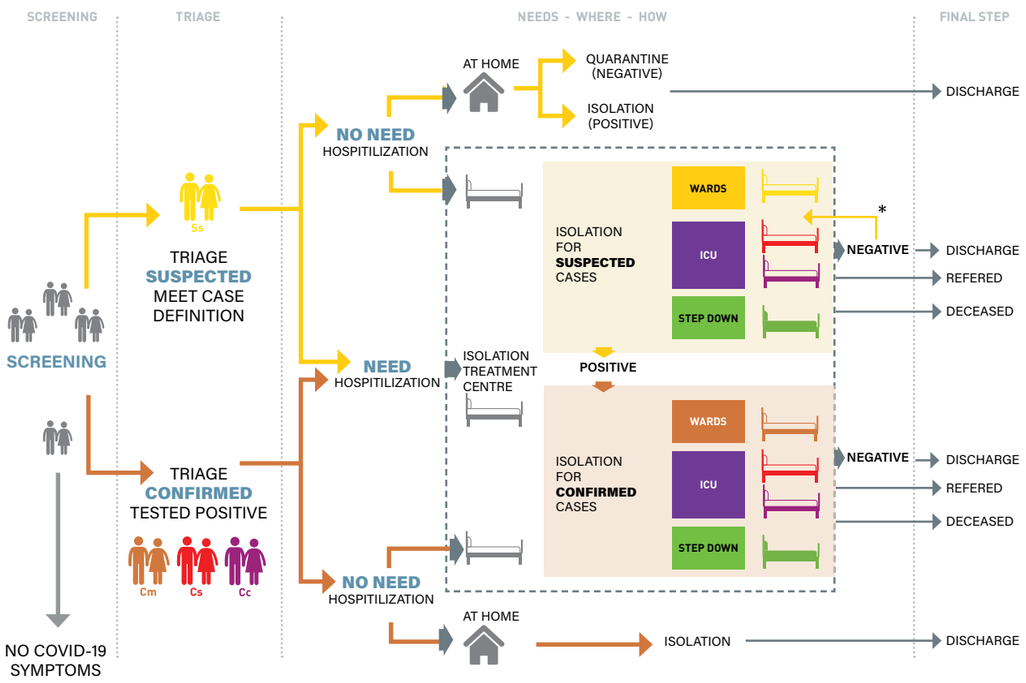


***Fig. 3.8** Conceptual representation of patient flows*

Remark: all discharges and referals are based on clinical decisions
For description of patient types, see Fig. 1.1. (see page 10)

Visitor flows

Fig. 3.9 shows the places where potential visitors can see and talk to patients (a). This option is only advised for confirmed COVID-19 patients, to reduce the risk of cross-contamination. It can also be used for interviews with contact-tracing teams or psychosocial support activities. Fig. 3.9 also indicates an area allocated for relatives of a deceased patient waiting for the dead body (b).

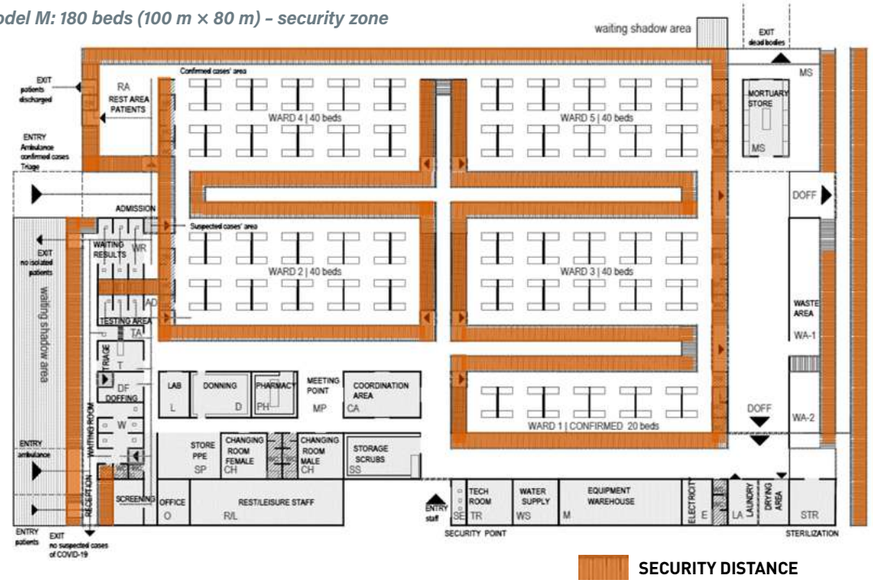
***Fig. 3.9** Model M: 180 beds (100 m × 80 m) – visitor flow*

WaSH: water, sanitation and hygiene.

Security zone

There is a security zone (2 m distance) between modules or, at some points, a physical barrier (*see Fig. 3.10*).

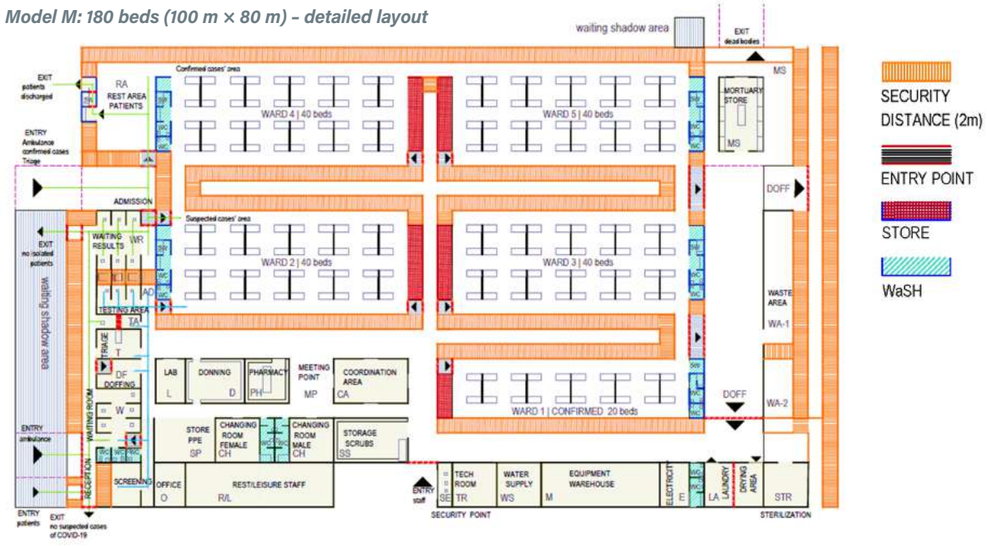
Fig. 3.10 *Model M: 180 beds (100 m × 80 m) – security zone*



3.6 Description of each area

Throughout this document, Model M 180 BEDS (100 × 80 m) is used as a reference point to help understand the proposed facility. It consists of four wards consisting of 40 beds each and a SIPA of 20 beds (*see Fig. 3.11*).

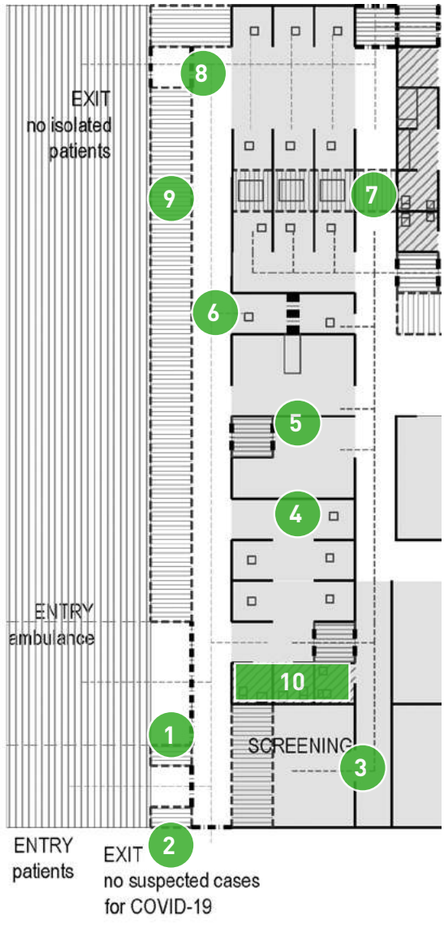
Fig. 3.11 *Model M: 180 beds (100 m × 80 m) – detailed layout*



Area 1: Reception, screening and triage areas

Area 1 is the reception, screening and triage station (*see Fig. 3.12*). The screening process involves evaluation of the patient using the standardized case definition for suspected cases of COVID-19 (*3*). The triage system will sort the patients based on the severity of their disease.

Fig. 3.12 *Model M: 180 beds (100 m × 80 m) – Area 1, Reception area*



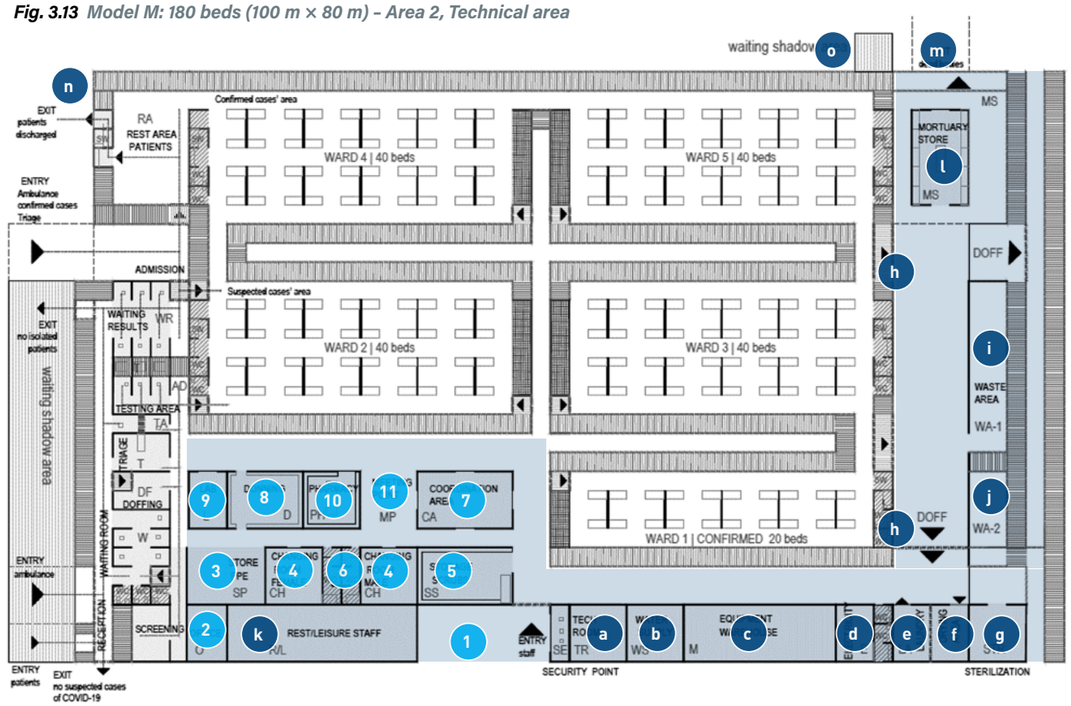
1	**ENTRY** Patients and ambulance
2	**RECEPTION** Patients'/companions' orientation
3	**SCREENING** The place where the health personnel screen each patient entering the facility, using the standardized case definition (keep >1 m distance)
4	**WAITING ROOM** The place where patients with symptoms wait to be taken care of by the health personnel – 7 independent cabins (2 m × 2 m)
5	**SAMPLE AREA** To collect testing samples from the patients
6	**TRIAGE** 3 separate cubicles where the health personnel determine the acuity level of patients, using a standardized, validated tool, and health workers will direct the patient to the appropriate section of the facility
7	**ADMISSION** Registration and entrance for admitted patients
8	**RESULTS WAITING ROOM** 6 independent cabins (2 m × 2 m) with separated positions
9	**EXIT** For patients who are not admitted
10	**WC** (toilet) Two bathrooms (male and female) for the use of patients during waiting and being attended to

WaSH: water, sanitation and hygiene.

Area 2: Technical (clinical and operational support) area

Area 2 is the main component of the core area of the facility and includes staff entry and spaces for coordination, clinical and operational support services (*see Fig. 3.13*). This area should be expandable in case the facility grows in size.

Fig. 3.13 *Model M: 180 beds (100 m × 80 m) – Area 2, Technical area*



SECURITY DISTANCE (2m) · ENTRY POINT · STORE · WaSH

WaSH: water, sanitation and hygiene.

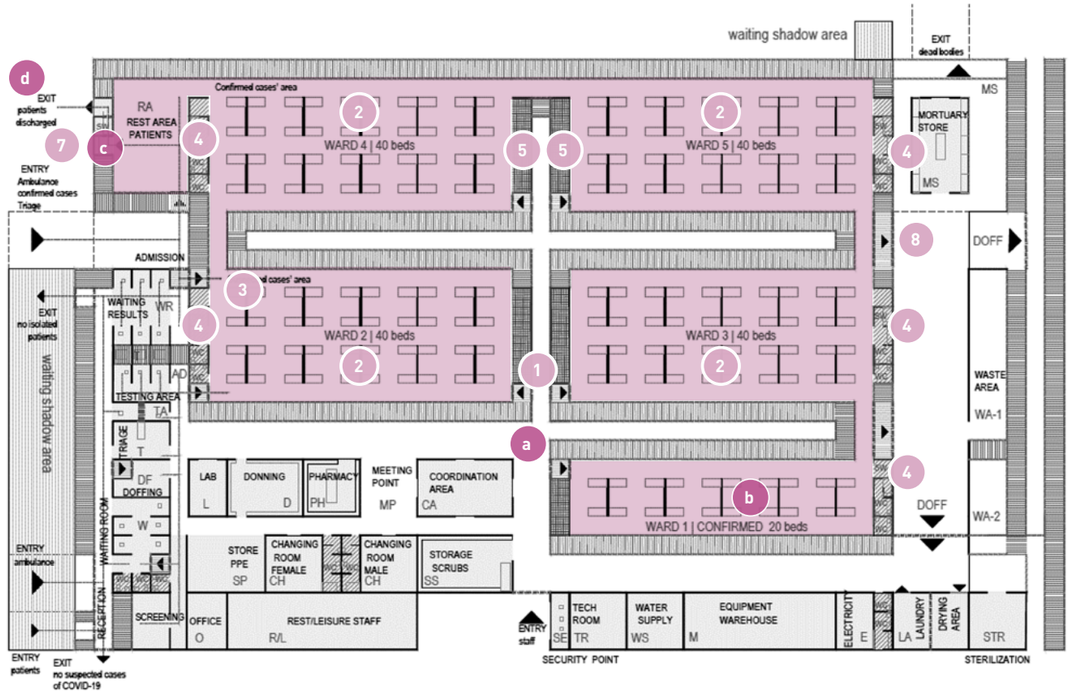
OPERATIONAL SUPPORT	
a	**TECH ROOM** Reserved for the storage and control of technical systems and equipment. Technical personnel only
b	**WATER SUPPLY** Control point for water storage, treatment and distribution
c	**EQUIPMENT WAREHOUSE** Storage of spare parts, tools and machinery for technical areas
d	**ELECTRICITY AREA** For main electrical control panels and spare parts
e	**LAUNDRY** Sorting, washing, extracting, drying, ironing, folding and delivery of linen facility material and disinfection of PPE and scrubs
f	**DRYING AREA** For clothing and equipment
g	**STERILIZATION** Disinfection of reusable medical instruments and equipment
h	**DOFFING AREA** Where PPE is removed after leaving the high-risk area
i	**WASTE AREA 1** For storage and treatment of infected waste
j	**WASTE AREA 2** For storage and treatment of waste from the low-risk area
k	**REST/LEISURE STAFF** Break/on-call room for resting during shift
l	**MORTUARY STORE** Temporary location for deceased prior to removal from the community facilities
m	**EXIT DEAD BODIES** For removal of dead bodies
n	**VISITORS' AREA** Area where visitors and relatives could establish visual and verbal contact with patients
o	**RELATIVES' AREA** The place where relatives wait for identification or for burial

CLINICAL	
1	**STAFF ENTRY** Entrance for clinical and operational staff, including security control point. Staff wear a mask from entry to the facility
2	**OFFICE** Administrative workspace for personnel
3	**PPE STORE** Storage location for personal protective equipment (PPE) – gloves, masks, goggles, aprons and other PPE
4	**CHANGING ROOM** Area where staff change from street clothes into scrubs and mask
5	**SCRUB STORAGE** Storage and distribution of work clothing to staff
6	**BATHROOMS** Male and female toilet, showers
7	**COORDINATION AREA** Dedicated space for office activities
8	**DONNING ROOM** The place where the PPE is put on before entering the high-risk area
9	**LABORATORY** It is recommended this space be reserved even if it is not initially required/available
10	**PHARMACY** Storage and dispensing of medicine
11	**MEETING POINT** Dedicated space for organization of daily activities

Area 3: Wards

The wards are set up for the provision of care for suspected COVID-19 patients in individual spaces or for confirmed COVID-19 patients in cohorts (*see Fig. 3.14*). They are expandable and can accommodate from 20 to 40 beds.

Fig. 3.14 *Model M: 180 beds (100 m x 80 m) – Area 3, Wards*



WaSH: water, sanitation and hygiene.

INPATIENT AREA (MODULE OF 40 BEDS OR 20 BEDS)	
1	**ENTRY POINTS** For staff wearing personal protective equipment (PPE)
2	**WARDS** 40 beds or 20 beds each with gender separation
3	**ICU** inside suspected case-treatment area or in confirmed patients' ward when there is no dedicated intensive care unit (ICU) ward in the facility: beds designated for patients who arrive in need of immediate invasive intervention i.e. such as central lines, intubation, catheters. Positive (already confirmed) patients are directly moved to ICU from triage
4	**WASH MODULES** (toilet, handwashing basin, shower)
5	**STORAGE MODULES** For consumables and other items
6	**REST AREA FOR PATIENTS** Area of relaxation for admitted ambulatory patients
7	**EXIT** For recovered patients
8	**STAFF EXIT** Exit for staff with PPE

SPECIFIC INPATIENT PROFILE AREA (MODULE OF 20 BEDS)	
a	**STAFF ENTRANCE** Staff with PPE
b	**WARDS** 20-bed module
c	**DISCHARGE SHOWER** Wash and disinfection point for recovered patients before they go outside
d	**EXIT** For recovered patients

Area 4: **Other complementary areas**

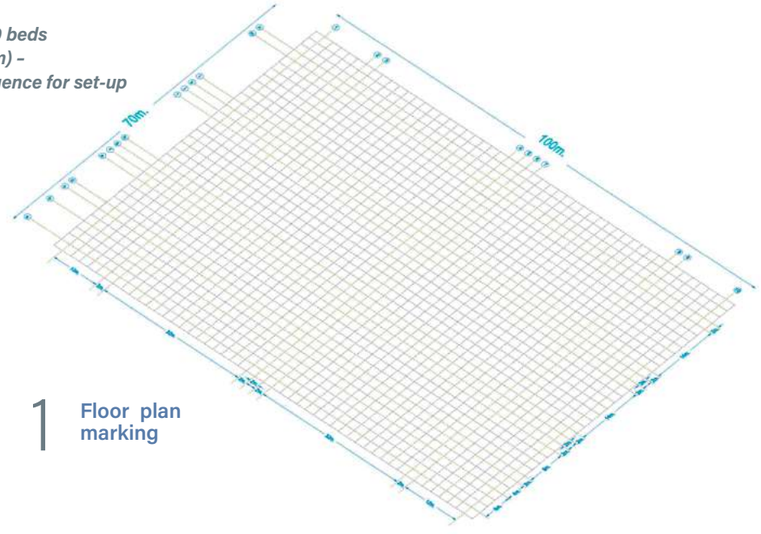
The following additional areas should be established or expanded to support the community facilities:

- control and security points;
- resting areas for staff;
- kitchen;
- living room;
- power generation;
- fuel farm;
- parking;
- visitors' area;
- warehouse external; and
- shadow for external waiting area.

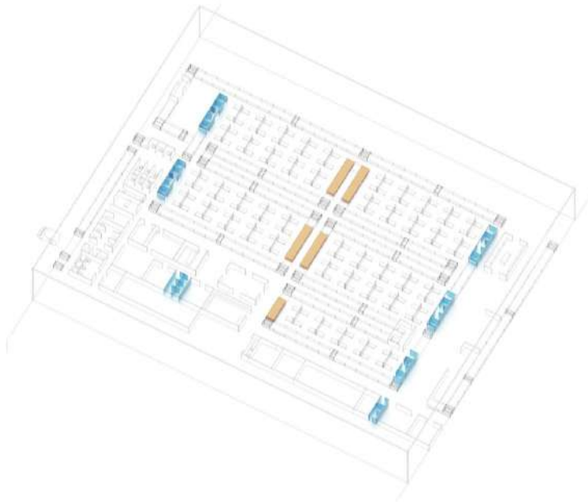
3.7 Building sequence for set-up

Fig. 3.15 illustrates the recommended building sequence, constructive elements, and scaled gridded plans that detail module construction. Measurement tools such as surveyors' tape and/or laser measurement tools can be utilized to adapt the illustrated layouts to identified locations and facilitate site clearing and levelling if required in outdoor settings. Preparation of land will facilitate the subsequent phases of the work, such as water drainage and assembly of tents and structures, etc.

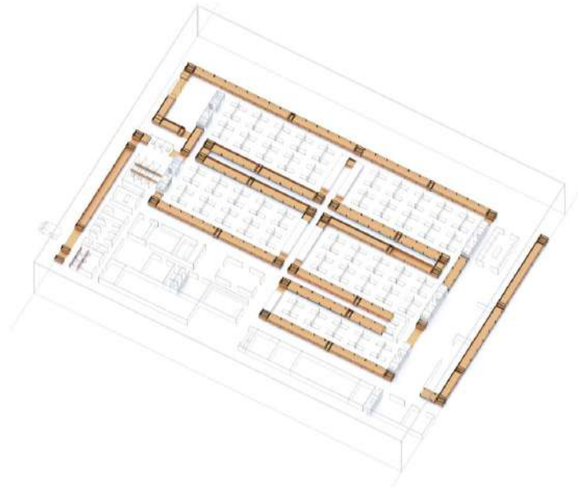
Fig. 3.15 *Model M: 180 beds (100 m × 80 m) – building sequence for set-up*



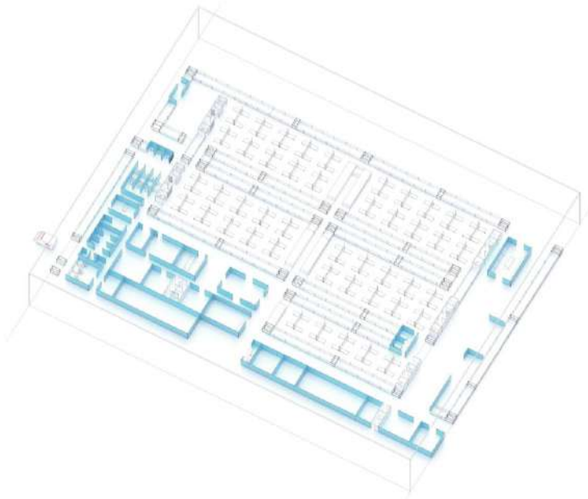
1 Floor plan marking



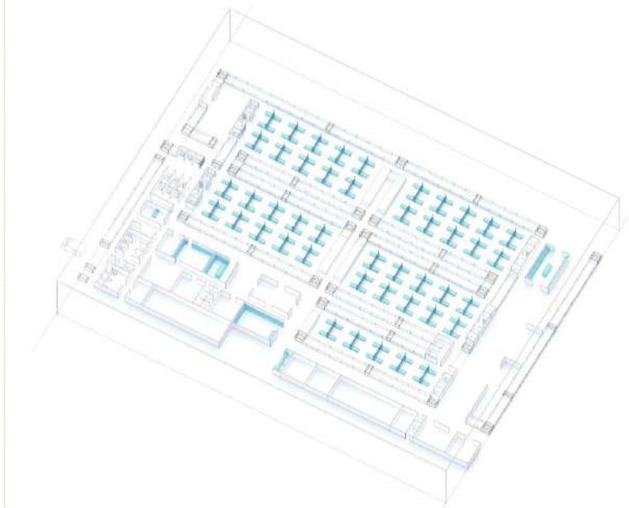
2 Corner modules set-up



3 WC and storage modules set-up



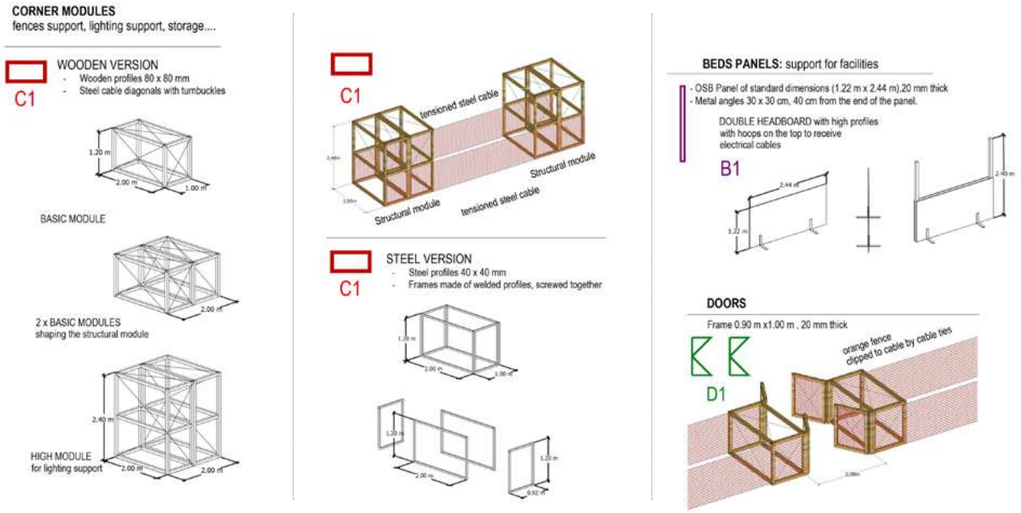
4 Fence separations set-up



5 Technical area modules set-up

Modular structures

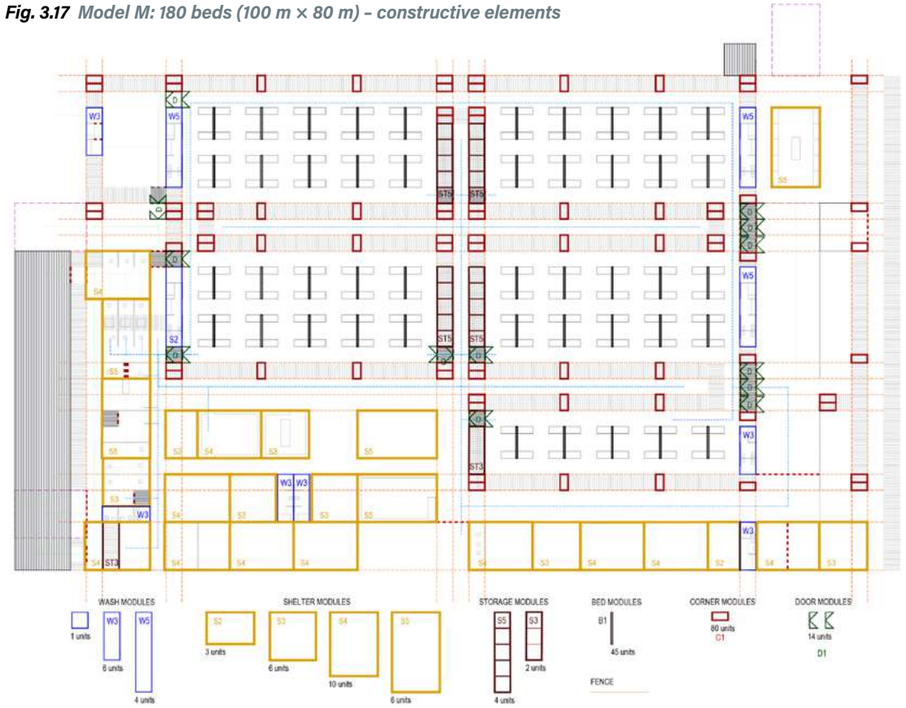
The conceptual design allows building of a temporary facility by using different types of available materials (for a detailed bill of quantities see Web Annex 4). To simplify the set-up of the centre, a structured order is proposed (*see Figs 3.16 and 3.17* and detailed plans on Web Annex 3).



OSB: oriented standard board.

- **Corner modules** are key in establishing the community facility's footprint and circumscribe the required area. They can be made of wood or welded metal.
- **Storage modules** can provide a space to house equipment, consumables, cleaning materials and other supplies. If not already constructed, they can be fabricated from plastered wood or other building materials.
- **Bed modules** can be constructed of oriented standard board (OSB, or plywood) of standard dimensions, which serve as a separation between zones. They will hold the power and lighting support systems if needed.
- **Shelter modules** should be 6 m wide, to enable set-up using commercially available tents or locally available materials
- **Water, sanitation and hygiene (WASH) modules** contain all WC/toilet and WASH infrastructure and can be constructed or developed on site, ideally with prefabricated superstructures and established sanitation technologies.
- **Separation modules** should be linked to corner modules, establishing the safe distances required to maintain effective IPC, including contact and droplet precautions. Modules can be constructed from orange plastic mesh initially or in low-resource settings and, as time permits, be replaced with panels with translucent openings to enable line of sight between areas.
- **Fence elements** or other physical barriers should be utilized to designate different areas and zones.

Fig. 3.17 *Model M: 180 beds (100 m × 80 m) – constructive elements*



3.8 Support systems with no interference

The community facility has different modules and areas that should be integrated within the structure (*see Section 8 and Figs 8.1, 8.3 and 8.7 for details*):

- water;
- sanitation;
- electricity and illumination;
- waste management;
- fire safety;
- telecommunication;
- ventilation; and
- oxygen.

All support systems, including but not limited to power supply, water supply, sewage and greywater systems and waste management can be established, maintained and scaled up without interrupting the operations of the community facility.

4. STAFF

Table 4.1 outlines the core staffing requirements for all proposed set-ups of wards in a COVID-19 community facility. It shows the suggested staff for each clinical module, based on a 40-bed module (mild/moderate and severe) or for a 20-bed isolation and ICU module. For clarity, the full-time equivalent (FTE) has been used for those functions that are suggested to be available in shifts. One FTE equals a staff member working 40 hours per week in shifts of 8 hours.

***Table 4.1** Suggested staffing numbers for the different proposed ward set-ups*

	NUMBER **PER BEDS**				
	20 beds isolation of contacts	**40 beds** mild and moderate patients	**40 beds** severe patients	**20 beds** ICU patients	**20 beds** step-down patients
Head nurse	1	1	1	1	1
Nurses	n/a	8.5 FTE	21 FTE	42 FTE	8.5 FTE
Nurse assistants	n/a	8.5 FTE	17 FTE	8.5 FTE	8.5 FTE
Medical doctors	n/a	n/a	4 FTE	n/a	n/a
Intensivists/anaesthesiologists	n/a	n/a	n/a	8.5 FTE	n/a
Respiratory physiotherapists (or national equivalent)	n/a	n/a	8.5 FTE	8.5 FTE	n/a
Physiotherapists (or national equivalent)	n/a	n/a	n/a	n/a	3 FTE
ICU speech and language therapists (or national equivalent)	n/a	n/a	n/a	1 FTE	1 FTE
Intensivists/anaesthesiologists	n/a	n/a	n/a	8.5 FTE	n/a
Occupational therapists (or national equivalent)	n/a	n/a	1.5 FTE	n/a	3 FTE
Psychologists (or national equivalent)	n/a	n/a	n/a	n/a	1 FTE
WASH /IPC officers	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE
Cleaners and helpers	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE

FTE: full-time equivalent; **ICU:** intensive care unit; **IPC:** infection prevention and control; n/a: not applicable; **WaSH:** water, sanitation and hygiene

Table 4.2 clarifies the suggested FTEs for screening and triage. The suggestion is to have two staff available for screening and two more for triage at any given time. Every shift should also have two WASH/IPC officers and two cleaners, to ensure IPC standards are met and patients appropriately instructed. It also includes a rapid response team that can provide 24/7 medical supervision for those facilities with mild cases or quarantined contacts, or provide emergency assistance in wards with moderately or severely ill patients. For those facilities that only accommodate contacts or mild cases, the implementing organization may choose to have a doctor on call rather than 24/7 medical presence in the facility. It is advised to have a nurse present at all times.

***Table 4.2** Full-time equivalents (FTE) for screening and triage*

Staff members	**Screening and triage rapid response team**
Screening and triage nurses	17 FTE
Rapid response team doctors	4 FTE
Rapid response team nurses	4 FTE
WASH/IPC officers	8 FTE
Cleaners and helpers	8 FTE

Depending on the size and focus of the facility, additional functions should be considered: hospital manager, senior medical doctor, nursing manager, operational support lead, IPC/WASH-lead, rehabilitation lead, supply chain manager, data manager, epidemiologist, psychosocial support, pharmacist, staff health doctor, X-ray technician, laboratory technician, kitchen staff, cleaners and helpers, security guards, warehouse staff, technical staff, biomedical engineer, and laundry. These functions could be combined or expanded, based on the system implemented and staff availability.

4.1 Management

Clear lines of command and control are critical to the effective operation of any facility. Fig. 4.1 illustrates suggested roles and responsibilities of the community facility management team

Each member of the management team is responsible for following up on safe staffing levels and rostering of their respective teams. Some organizations advise to have staff work in fixed teams with minimal contact with the other teams. The objective of this strategy is to minimize the danger of deactivation of a large percentage of the department staff in case of exposure.

A sample organigram is proposed in Fig. 4.1.

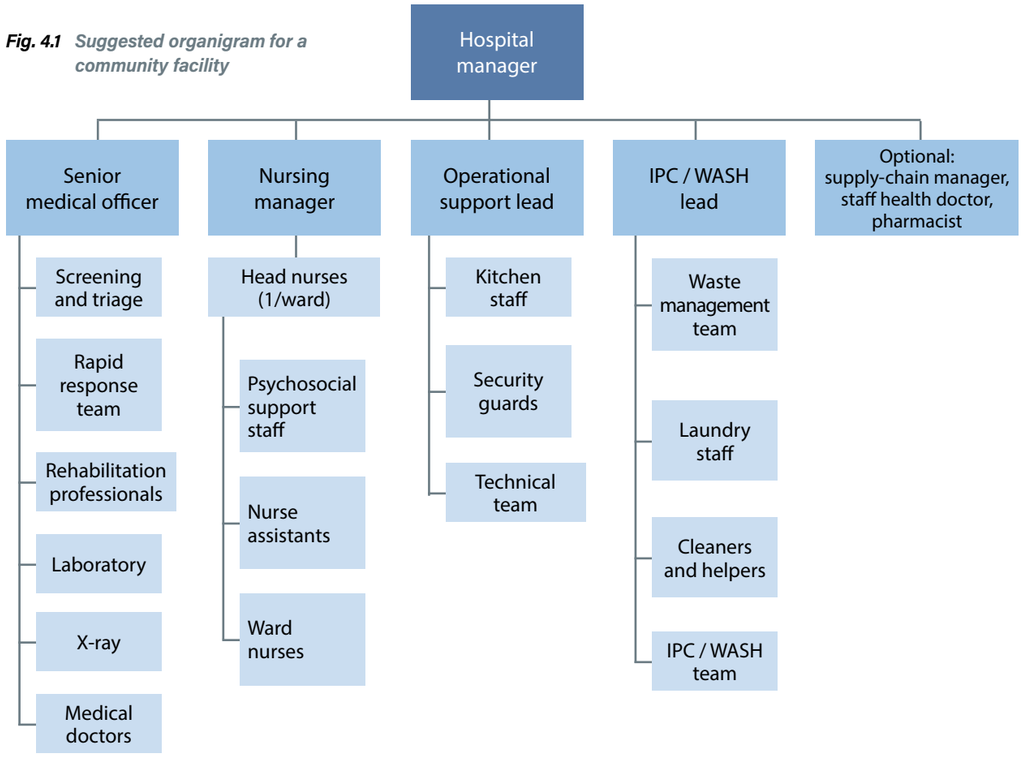


Fig. 4.1 *Suggested organigram for a community facility*

4.2 Screening and triage personnel

Screening and triage areas should be expected to have a high throughput. Bottlenecks should be avoided as much as possible, as they bring people close together, which can accommodate cross-contamination.

The staff at the screening area should be trained and updated regularly on changes in the case definition. Two nurses at the screening station at any moment should be considered the minimum, and this number should be increased on demand; 8.5 FTE nurses should therefore be considered. The implementing agency can, of course, choose to assign other trained professionals to perform screening functions.

It is recommended to have at least two nurses assigned to the triage area, with the ability to surge staffing as needed; 8.5 FTE nurses are required to ensure two nurses are always present. Organizations may choose to add other health professionals to the triage staff as required (e.g. medical doctors). IPC officers and cleaners/helpers should be available 24/7 here as well.

The triage personnel should have specific training in application of a standardized, validated triage tool, such as the Interagency Integrated Triage Tool (*1*).

4.3 Nurses

International guidelines indicate that no fewer than one nurse should be assigned for every eight beds (*2*). Accordingly, five nurses should be assigned to each ward for severely ill patients. This means 21 FTE nurses are required for each severe ward module (plus one head nurse). It should be recognized that use of full PPE for extended periods of time challenges staff members' ability to work effectively. Adherence to minimum staffing requirements ensures that patient deterioration is identified early, and necessary interventions are being undertaken to prevent patient decompensation. One head nurse per ward should be responsible for shift planning, liaison with the nursing manager, interdisciplinary communication, facilitation of admissions, discharges and referrals. When the head nurse for a ward is not on duty, another nurse should be assigned as a shift-responsible professional, assuming all head-nurse activities and giving reports to the head nurse on their return to duty at the next shift handover.

If the ward is used to isolate contacts, it is suggested that there is no need for additional nursing staffing. Access to health-care service can be ensured through the rapid response team (one nurse and one doctor 24/7). One head nurse could be included to supervise the planning (e.g. admissions and discharges) for the ward.

In areas for patients with mild or moderate disease, or as step-down ward, no fewer than two nurses are required for every 40-bed module (20 beds for step-down ward). Patients in these areas should be capable of some self-care and tolerance to oral medication regimens that can be distributed by nurses, potentially for several days at a time. This calculates into 8.5 FTE nurses per ward and one head nurse.

A 20-bed ward for suspected cases should include, for example, four beds that can safely accommodate ICU-level care for those patients who are not confirmed COVID-19-patients but require a higher level of care. This should reflect in the staffing for this ward by adding two (1 per 2 beds) ICU-trained nurses per shift (8.5 FTE). The nursing staffing for the remaining 16 patients should be adapted to the disease severity (one nurse per eight beds in each shift for severely ill patients; one nurse per shift for all patients if all are mildly or moderately ill)

In the event that a 20-bed SIPA module is used for ICU beds, the international standard indicates that no fewer than one nurse be assigned to every two patients. For a 20-bed ICU module, this equates to 42 FTE nurses.

4.4 Nurse assistants

For mildly or moderately sick patients or for step-down ward modules, no fewer than 8.5 FTE nurse assistants per 40-bed ward (20 beds for step-down ward) are required. No fewer than 17 FTE nurse assistants are required for every ward for 40 severely sick patients.

Large proportions of severely sick patients will be bed-bound and require a continuous supply of oxygen and continuous care for all basic needs. These needs include, but are not limited to, hygiene, feeding and provision of drinking water. The community facility should be designed so that equipment and supplies are brought in from the "low-risk areas". The suggestion is to add one nurse assistant for every nurse during the day and two nurse assistants for every ward during the night.

For situations where the SIPA is utilized as an ICU, two nurse assistants per shift are required, adding another 8.5 FTE for a 20-bed ICU module.

4.5 Medical doctors

For wards only accommodating isolation of contacts or mild- or moderate-severity patients, the rapid response team doctor can supervise, as these patients should not need too much medical care. The rapid response team doctor can also care for the (for example) four ICU beds in the ward for suspected cases.

Each 40-patient ward module for severely ill patients should be staffed by no fewer than one medical doctor during each shift, including overnight periods.

Depending on staff availability, shift patterns, and differing ways of working, the required number of doctors may vary across health systems and should be carefully considered and reassessed periodically, in advance of opening one or more ward modules. At the minimum, one doctor per shift working 40 hours per week equates to 4 FTE doctors per ward module.

In an ICU ward module, no fewer than one doctor for every 10 patients should be considered. A doctor from the rapid response team can support this ward module indirectly, as may be necessary for emergency procedures and/or referrals. For a 20-bed ICU, no fewer than 8.5 FTE intensivists/anaesthesiologists should be considered.

4.6 Rapid response team

A roving emergency team with skills, experience and required equipment should be included for every 5 × 40-bed ward module. This team should consist of no fewer than one specialized nurse and one doctor. The rapid response team should have a technological or a resilient notification system that enables immediate notification when a ward identifies a decompensating patient who requires acute intervention and/or resuscitation. When not required, the team should be assigned to support in the triage area, to deliver acute stabilizing interventions and/or to work in an ICU ward module when not called upon to respond to an emergency elsewhere in the COVID-19 community facility. The rapid response team and other clinicians should be mindful of the criticality of the rapid response team's resilience and provide for adequate breaks and, if appropriate, critical incident stress debriefing following extended or challenging interventions, particularly with paediatric patients.

The rapid response team should be available to all wards on all shifts. It also ensures medical supervision in those facilities where only contacts or mildly sick patients are accommodated. This equates to no fewer than 4 FTE doctors and 4 FTE nurses for up to five ward modules of 40 beds.

4.7 Physiotherapists (or national equivalent)

Physiotherapists (or national equivalents) working in a COVID-19 community facility require competencies to maintain/optimize patient mobility and function and deliver specialist respiratory interventions that aim to improve oxygenation and manage hypersecretions.

Each 40-bed ward module for severely ill patients should be staffed by no fewer than two respiratory physiotherapists (or respiratory therapists or other national equivalent) during each shift, with no fewer than one during overnight periods. This requires 8.5 FTE. Each 20-bed ICU ward should have no fewer than two respiratory specialist therapists at any time (8.5 FTE). For each 20-bed step-down ward that is established, there should be two physiotherapists during each shift, but overnight cover is not required (3 FTE).

4.8 Speech and language therapists (or national equivalent)

When the community facility includes ICU capacity and is using mechanical ventilation, no fewer than one speech and language therapist, or national equivalent, should be available per shift (1 FTE; overnight cover is not required). They will work across wards to assess patients for swallowing and speech impairments that may occur as the result of mechanical ventilation and sedation, and provide interventions that facilitate oral intake of nutrition and prevent aspiration pneumonia.

4.9 Occupational therapists (or national equivalent)

Each 40-bed ward for severe cases requires one FTE occupational therapist or national equivalent. Each 20-bed step-down ward should be staffed by no fewer than two occupational therapists each shift (no overnight cover required). Occupational therapists working in a community facility require competencies to conduct cognitive assessment and rehabilitation, as well as graded activity and functional retraining.

4.10 Psychologists, psychosocial support staff

The community facility should have easy access to psychosocial support personnel for both patients and staff. This can vary from providing entertainment up to professional support according to local custom. Where step-down wards are included, at least one qualified psychologist or national equivalent (1 FTE), is advised, to provide psychological strategies and trauma counselling as needed.

4.11 Pharmacist

Most of the patients can be expected to require continued treatment for pre-existing conditions and may require medication to treat chronic illness. The size, staffing, and resource requirements of the pharmacy module will vary depending on the size and resources available to the community facility. The clinical team, in consultation with the supply-chain manager and pharmacist, should establish the requisite formulary and supply-chain management system, to ensure that an efficient system of decentralized stores with provision for restocking of medication is implemented in advance.

4.12 Staff health and safety lead

A staff health and safety lead should be designated before the commencement of any treatment activities. The lead will ensure that all staff remain aware of and report any signs of illness and/or absenteeism immediately. The lead will meet regularly with the community facility management team and liaise closely with the IPC lead. The staff health and safety lead will ensure administrative controls are in place, in order to guarantee provision of adequate training for health workers, ensuring an adequate patient-to-staff ratio and establishing a surveillance process for acute respiratory infections potentially caused by COVID-19 among health workers; ensuring that health workers and the public understand the importance of promptly seeking medical care; monitoring health workers' compliance with standard precautions; and providing mechanisms for improvement as needed.

The lead will ensure operations of the community facility prioritize protection for frontline health workers and non-clinical staff. The staff health and safety lead may be responsible for testing and tracking isolation for staff, reporting this information regularly to the community facility management team. No fewer than 2 FTE experienced clinicians should be assigned to this function for a facility.

Staff members who show signs or symptoms of COVID-19 should be tested and isolated promptly, to ensure that effective IPC for both staff and patients is maintained as soon as possible and prevent spreading of the disease to colleagues.

4.13 Cleaners and helpers/WASH/IPC officers (IPC team)

For every ward module, no fewer than two environmental staff should be assigned. An additional six staff members should be assigned to the triage area, staff areas and waste management. Staff should be available for both day and night shifts. One or two experienced environmental leads, ideally with both IPC and staff management experience should be appointed before the commencement of patient care activities. In total, 26 FTE should be utilized for triage, staff areas and waste management, plus 8.5 FTE for each 40-bed ward module (or 20 beds for ICU or step-down ward).

4.14 Other

Additional functions might be required:

- nutritionist;
- kitchen staff (kitchen and food delivery);
- security;
- warehouse;
- biomedical engineers;
- information technology (IT) professionals;
- laboratory;
- laundry;
- water supply;
- waste management;
- electrician;
- mortuary;
- patient transport;
- administration and finance;
- social services; and
- clergy.

5. Supplies and equipment

WHO has developed kit lists for treatment of patients with COVID-19. The lists provided in Web Annex 4 should be considered, and will drive procurement planning scaled to the number of patients to be treated. Specifications for critical medical equipment can be found on the WHO website (*1*). Therefore, details and numbers are not mentioned in this section.

5.1 Emergency equipment

Equipment for the acute management of decompensating patients (equivalent to a "crash cart") should be available in every ward module. Equipment includes a self-inflating ambu-bag with the ability to connect to high-flow oxygen; a resuscitation board for cardiopulmonary resuscitation (CPR); a suction unit; a kit with the materials for oxygen delivery; intravenous (IV) catheters/cannulas;, drip sets; and fluids (*2*).

Equipment that is not assigned to an individual patient must be thoroughly cleaned following every use. While using the emergency equipment, or during any other aerosol-generating procedure, staff should wear appropriate PPE, including N95/FFP3 masks.

A cart or backpack with specialized emergency equipment for the rapid response team must be placed in a strategic location in the facility. This contains (additional to the kit in the wards) medication, intubation equipment, a suction unit and a defibrillator. Suspected and confirmed areas in the facility have separate sets of emergency equipment to avoid cross-contamination. In the ICU area, several of these kits should be present.

5.2 Personal protective equipment

A table with estimated PPE usage for different patient numbers is provided in Web Annex 4. Refer to existing WHO guidance, such as *Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations* (*3*), *Infection prevention and control during health care when COVID-19 is suspected* (*4*) and *Rational use of personal protective equipment for coronavirus disease (COVID-19)* (*5*), for more detailed information.

5.3 Patient observation

COVID-19 patients need to be monitored closely, mainly for development of complications of COVID-19 such as sepsis, septic shock, respiratory failure or acute respiratory distress syndrome. Therefore, nurses in wards for moderately or severely sick patients need to monitor vital signs on a regular basis. Oxygen therapy is guided by oxygen saturation. Infection is a complex disease process that can affect all vital systems. Following temperature, urine output, pulse rate, respiratory rate, oxygen saturation, blood pressure and mental status are hence all equally important. Staff should have access to sufficient equipment to monitor patients in an efficient way.

In the area for suspected cases, equipment should be assigned to each individual patient and cleaned and disinfected after discharge, or thoroughly cleaned and disinfected in between usage.

An early warning score system can be put in place to identify deteriorating patients.

5.4 Administrative equipment and furniture

Furniture should be assigned to specific zones. Staff and patients need sufficient chairs and tables to sit and work efficiently. In the zone for confirmed cases, nurses can use trolleys to move from patient to patient with their equipment. In the areas for suspected cases, this should be avoided as it can initiate cross-infections.

Beds should be adapted to the disease severity of the patient. Patients in critical care areas should have pressure-relief mattresses if available.

The recommended characteristics for finishes and furniture are:

- leanable (material easy cleanable and resistant to repeated cleaning);
- easy to maintain and repair (select materials that are durable and/or easy to repair);
- resistant to microbial growth (select metals and hard plastics);
- nonporous (avoid porous plastics, such as polypropylene, in patient care area); and
- seamless (avoid upholstered furniture in patient care areas).

5.5 Imaging

Chest X-rays have limited sensitivity in the early stages of COVID-19 pneumonia. A computerized tomography (CT) scan is more sensitive but raises logistical problems and exposes patients to significant amounts of radiation. If ultrasound competencies are available, lung ultrasound can be used (*6*).

When these are used in the facility, there must be significant attention to IPC, as this equipment is used for larger numbers of patients and can possibly be a cause of cross-infection. In case the SIPA is adapted for ICU, mobile bedside X-ray should be available.

5.6 Medication and consumables

Detailed lists of medications and medical consumables are included in Web Annex 4.

5.7 Other medical equipment

Web Annex 4 includes detailed equipment for each ward module, and other clinical areas.

6. Systems

6.1 Screening

All health facilities should introduce a screening station at the entrance of the facility. The screening process involves evaluation of the patient using the standardized case definition for COVID-19 (*1*). If the patient fulfils the case definition, the triage system will define the acuity level of the patient (see later). Suspected and probable cases will be treated similarly in this proposed set-up.

Suspected case

A. A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease [e.g. cough, shortness of breath]) AND a history of travel to or residence in a location reporting community transmission of COVID-19 during the 14 days prior to symptom onset

or

B. A patient with any acute respiratory illness AND having been in contact[1] with a confirmed or probable COVID-19 case in the last 14 days prior to onset of symptoms

or

C. A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g. cough, shortness breath) AND requiring hospitalization AND in the absence of an alternative diagnosis that fully explains the clinical presentation

Probable case

A. A suspected case for whom testing for COVID-19 is inconclusive (inconclusive being the result of the test reported by the laboratory)

or

B. A suspected case for whom testing could not be performed for any reason

Confirmed case

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms

The case definition should be reviewed regularly on the WHO website (*2*).

Patients who do not fulfil the definition of a suspected case should be referred to regular health-care services. They do not need to wear a mask any longer. Patients clearly requiring intensive care are referred to ICU immediately. For patients defined as a suspected or probable case, laboratory sampling should be undertaken as soon as resources allow. People who were in contact with a confirmed case, but do not (yet) show symptoms (*see also reference* (*3*)) should be quarantined for 14 days. This can be done either at home, in a dedicated ward or facility for quarantining of contacts, or even in a ward for suspected patients (*3*).

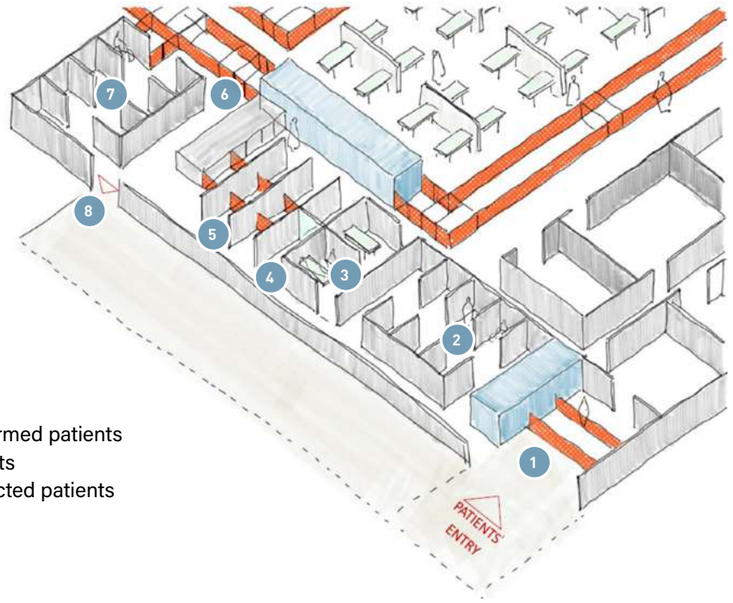
Informing

Everyone entering the facility should be informed about the signs and symptoms of COVID-19 and measures to be put in place (e.g. handwashing, respiratory hygiene, limiting visitors). Those without symptoms should not enter the facility, in order not to put themselves at risk.

Waiting areas

Waiting areas should be designed to allow those patients waiting to be pre-screened to see and speak with relatives separated by a safe distance (*see Fig. 6.1*). Regarding dimensions, sufficient space is recommended, as the number of people waiting can be very variable. Waiting areas should be spacious enough to allow distancing between those waiting or using screens in between patients, to reduce the area needed.

Fig. 6.1 *Artistic representation of waiting area and entrance*



1 Reception
2 Waiting area
3 Crash room
4 Test sample
5 Triage
6 Access for confirmed patients
7 Waiting for results
8 Exit for non-infected patients

Entrance screening points

At a screening point, all patients suspected of having COVID-19 (*1*) are directed to the triage point. Guidance on building and managing the screening points can be found in the earlier published document on building centres for treatment of severe acute respiratory disease (*4*). Checkpoints should be properly equipped with the correct PPE for patients and staff. Patients referred from other facilities can pass immediately through a separate entrance.

The following items should be provided at the entrance screening point:

- guidance posters for staff (e.g. to guide the process) and non-staff (e.g. to self-report, respiratory hygiene, etc.);
- masks for staff (if there is no physical contact with a patient, PPE does not have to be changed by the health worker);
- gloves for staff (if there is no physical contact with a patient, PPE does not have to be changed by the health worker);
- masks for patients: patients who are referred to the triage point are given a mask and an explanation that they should wear it until instructed otherwise at or after the triage;
- thermometers (infrared);
- facilities for hand hygiene (handwashing and alcohol-based hand rub) in staff and non-staff areas (i.e. for public/patient use as well); and
- waste bins for safe disposal of PPE.

Design considerations for screening and triage points

- The entry and exit points of the screening areas must be clear and signposted following a unidirectional flow.
- All patients should be able to perform hand hygiene (handwashing with soap and running water or alcohol-based hand rub/sanitizer) at entry and exit points.
- A fence between the staff and patients' area should be set up in, for example, a tent in front of the entrance. The distance between the areas must be a minimum of 1 m.
  - The more ventilation that is possible the better (e.g. a tent with open sides oriented in the same direction as the dominant wind direction).
- The routes and walkways must be wide enough to prevent overcrowding, as sometimes these can be points of contact of several people with different degrees of contamination or protection.
- The whole area must have good visibility, so that the guard can control it all from his or her position. A dedicated staff member should evaluate whether the presenting person fulfills the case definition for COVID-19.
- Triage staff only need to move to the patient area when absolutely needed; on indication from the triage office, two dedicated staff members should accompany patients to a dedicated ward. Documents should stay in the staff area at all times. One nurse should stand behind a desk in a secure area, while two health staff work between the entrance, triage and suspected cases' area, moving patients in need and helping the triage officer.

Referral and transport

For acutely ill patients who do NOT meet the COVID-19 case definition, measures must be taken to ensure rapid referral to an appropriate level of care (*2*). It is advised to contact beforehand to ensure there is capacity available to accept the patient and to avoid additional transport needs.[1] A staging area could be put in place where patients can wait until the appropriate facility is identified and transport is arranged. No special transport considerations need to be in place to move these patients. However, if an ambulance is used it is essential to ensure that appropriate cleaning and disinfection is performed between patients.

For transport of suspected, probable or confirmed COVID-19 patients, ambulance staff should have access to appropriate PPE. It is not recommended to transport several patients in one vehicle if they are not all confirmed COVID-19 cases.

The ambulance needs to be disinfected after each use. Therefore, it is useful to reduce the equipment in the patient compartment to the essentials. Currently, WHO recommends using 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (e.g. thermometers) and sodium hypochlorite at 0.1% (equivalent to 1000 parts per million [ppm]) for disinfecting surfaces; however, disinfection with a minimum concentration of 0.5% (5000 ppm) sodium hypochlorite (bleach) is strongly recommended. Disinfection should preferably be done near the triage area, so the ambulance is immediately available. Waste should be handled as infectious medical waste and can be handed over at the triage area after handing over the patient.

Facilities with particular capacities (such as critical care, obstetrics, etc.) should be identified during initiation of coordination, and clear referral criteria should be delineated for all staff. Referral of a patient is always a medical decision.

After screening

Patients meeting the case definition of COVID-19 proceed to the triage area.

6.2 Triage point

Triage is an acuity-based sorting of patients best done with a standardized, validated triage tool, such as the Integrated Interagency Triage Tool (*7*).

Triage set-up

The triage area (*see example in Fig. 6.2*) should be properly equipped with correct distancing measures and PPE for staff; no patient should enter the triage area without a mask, received at the entrance. The figure shows two entrances, where one is used for patients that have already received their laboratory result confirming infection. They do not need to go through the screening station.

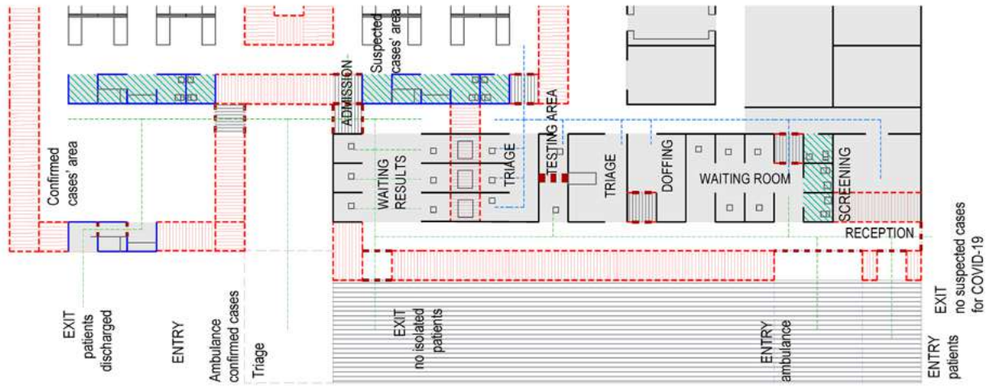
After triage, patients can be categorized by disease severity and clinical syndromes and admitted to the appropriate modular area.

Patient identification/administration

Upon arrival in the facility, every patient should be identified with a unique identifier and full name, which should both be written on a bracelet and follow the patient throughout their journey in the facility. The identifier and the patient's name should be on each document, sample and item allocated to the patient.

A whiteboard (physical or electronic) should be provided in every section of the facility and in a central place, so there is a track of which patient is where in the facility.

Fig. 6.2 *Triage layout in the proposed centre*



6.3 After screening and triage

1. Patients are referred to the "suspected cases" area until their laboratory result is known, when they:
   fulfil the case definition of suspected or probable case
   AND
   are too sick to self-isolate.
2. Patients who do not fulfil the case definition are sent home or referred to appropriate relevant care (primary care provider, telemedicine, or referral facility for other acute needs).
3. Patients who fulfil the case definition may be instructed to stay isolated in the facility or referred elsewhere according to local protocol. If testing is conducted at the facility, they should be admitted and isolated in a health facility or community facility as long as resources allow. If this is not possible, they need to remain in home isolation. If negative, they can resume their normal activities. The destination of the patient should be determined based on classification of disease severity: mild, moderate, severe or critical, to ensure appropriate care is provided.

6.4 Patient documentation

Every patient needs to have a record, containing the unique identifier and name of the patient and the notes of their disease status and progress, results of laboratory tests and other examinations, treatment, etc. Since there are several different lay-outs and set-ups in use, no particular set of documents is promoted here. Attention needs to be placed on the IPC measures related to the patient documentation. The file should not travel from a contaminated zone to a clean area. Options are to keep the file on the clean-side and communicate observations for each patient "over the fence" to a colleague who takes the notes. Electronic options may also be possible but require significant investment.

Informed consent should be requested when possible for all invasive procedures. A system should be put in place to report adverse events and near misses.

On discharge, or at referral, the patient has the right to receive a report about their stay in the facility. This is not only for information but also to ensure continuity of care when needed. A death certificate should be issued when a patient passes away, according to local protocol.

Every facility should contribute to a reporting system implemented by health authorities. This is important for following up activities in the facility, for epidemiological follow-up in the region and for follow-up of contacts and implementing actions in cooperation with other pillars of the outbreak response. The patient documentation should allow easy collection of the required data in a structured way.

6.5 Laboratory assessment

Polymerase chain reaction (PCR) for COVID-19

When resources allow, all suspected cases should be tested using a molecular test (PCR). Based on clinical judgment, clinicians may opt to order a test for the COVID-19 virus in a patient who does not strictly meet the case definition, for example, if there is acute respiratory illness among a cluster of health workers or severe acute respiratory infection or pneumonia in families, workplaces or social networks (*8*).

For mobile patients who are not significantly sick and require no admission, the sampling can be done in the triage area. Wherever possible, the patient (suspected case) should wait in the suspected cases' area until the laboratory result is known.

Patients who need to be admitted can be tested either at triage or in the suspected cases' area. Patients should always be instructed not to get in close contact with each other and to wear their mask when moving with other people. Patients requiring critical care should be referred immediately to an area or facility with critical care capacity and testing performed there.

Specimens to be collected

At a minimum, the following respiratory material should be collected:

- upper respiratory specimens: nasopharyngeal and oropharyngeal swab or wash in ambulatory patients; and/or
- lower respiratory specimens: sputum (if produced) and/or endotracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease who are too sick to self-isolate. (Note the high risk of aerosolization; adhere strictly to IPC procedures, including airborne precautions).

Specific infection prevention and control measures when collecting and handling laboratory specimens

All specimens collected for laboratory investigations should be regarded as potentially infectious. Health workers who collect, handle or transport any clinical specimens should adhere rigorously to the following standard precaution measures and biosafety practices, to minimize the possibility of exposure to pathogens (*9*):

- ensure that health workers who collect specimens use appropriate PPE (i.e. eye protection, a medical mask, a long-sleeved gown, gloves). If the specimen is collected with an aerosol-generating procedure, personnel should wear a particulate respirator that is at least as protective as a NIOSH-certified N95, an EU standard FFP2, or an equivalent;
- ensure that all personnel who transport specimens are trained in safe handling practices and spill-decontamination procedures;
- place specimens for transport in leakproof specimen bags (i.e. secondary containers) that have a separate sealable pocket for the specimen (i.e. a plastic biohazard specimen bag), with the patient's label on the specimen container (i.e. the primary container), and a clearly written laboratory request form;
- ensure that laboratories in health-care facilities adhere to appropriate biosafety practices and transport requirements, according to the type of organism being handled;
- deliver all specimens by hand whenever possible. DO NOT use pneumatic-tube systems to transport specimens; and
- document clearly each patient's full name, date of birth and suspected COVID-19 of potential concern on the laboratory request form. Notify the laboratory as soon as possible that the specimen is being transported.

Other laboratory tests

During the patient's stay in the facility, there will be other tests required for further diagnosis and follow-up. While the capacities for testing at each facility will be different, the general principles remain the same. Everything should be done to ensure the safety of the patient (by e.g. correct identification of each sample), health worker (by e.g. taking measures to avoid needlestick injury or cross-infection), other staff members (by safe transport of contaminated samples) and laboratory staff (e.g. correct packing of samples and safe work environment, efficient waste-collection mechanisms etc.). Point-of-care testing can be considered for some tests when resources and training are available.

Laboratory tests to be considered available in the facility (*10*) include, but are not limited to:

- blood cultures;
- malaria/dengue/chikungunya;
- other respiratory viruses;
- blood gases;
- haematology and biochemistry;
- liver and kidney function; and
- lactate.

6.6 Referral systems

As already explained, patients will be referred to and from the facility. A system needs to be organized for this, including the contact details of all relevant facilities and their capacities, transport methods, criteria for referral, documentation to be completed, etc. Receiving facilities should be contacted in advance, to ensure they have the capacity and resources to take care of the patient, and patients clearly need to consent to referral, which is always based on a medical decision.

6.7 Admission/discharge criteria

Admission

It is good practice to clearly define which patients can be admitted in each zone of the facility and which patients should be discharged. This can be done using clinical parameters, but the resources needed should also be considered. In countries where access or provision of a higher level of care is difficult, palliative care could be considered.

Discharge

Discharge of COVID-19 patients can be considered if a patient shows clinical improvement and two negative PCR results with a 24-hour interval between the samples. In the presence of two negative results, but with additional clinical requirements, the patient can be referred to a non-COVID hospital or health facility for the continuation of care. A discharge note should be handed over to the patient.

If laboratory tests are not readily available, discharge can be considered after resolution of symptoms and 14 days more of isolation (in a facility or at home). See WHO guidance (*11*).

Admission packages

It is advised to provide an admission package to each patient upon admission to the facility. Items to be included could be (but are not limited to) a blanket, clothing, slippers, a cup, soap, towel and toothbrush. All these items should be for personal use and, if possible, identified with the patient's unique identifier.

Bed capacity and allocation overview

The larger the facility is, the more complicated it is to keep an overview of which patient is admitted on which ward and who has responsibility during a certain shift. Assigning specific call-signs or mobile numbers to a specific caregiver responsible for a set of patients or a certain ward can be an option for keeping this overview.

A large board with all the wards and beds listed can allow recording of the unique identifier of each patient in a specific bed, which then ensures an overview is kept of each patient's location. Regular checking to see if this is still correct is essential.

This method also allows a fast overview of bed-occupancy and empty beds if there is a request for referral or a new admission presenting at the triage area.

6.8 Suspected cases' area

Patients are admitted in the suspected cases' area until the laboratory result is known. This area should be staffed with sufficient staff numbers, as patients may also be quite sick here. Oxygen provision and initial medical care may need to be initiated here. Equipment needs to be at hand to provide qualitative and dignified care, as well as to intervene in emergencies. Four beds (for example) in a suspected cases' area of 20 beds could be equipped and staffed for ICU-level care for those patients requiring critical care who have no confirmed laboratory result.

Patient education

It is important to explain to the patient how long the average waiting time for the test result is in the specific setting, as this might take significant amounts of time.

Patients should be educated about the importance of their isolation. Breaches in isolation should be well documented and followed up, as this can mean close contact between one suspected patient and another.

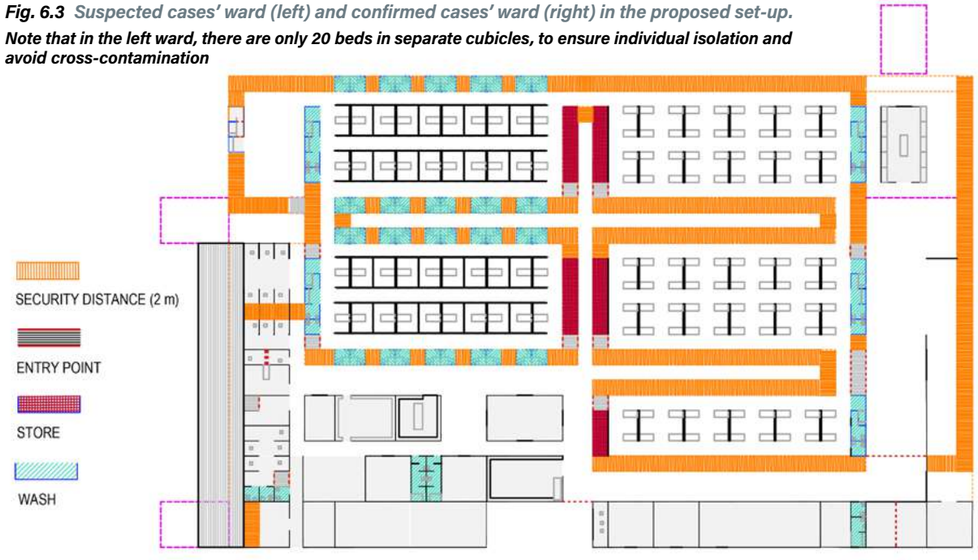
Patients should also receive guidance on hand hygiene and respiratory hygiene (covering the mouth and nose when coughing or sneezing, using paper towel or an elbow and use of a mask whenever they need to or are instructed to leave their room).

Specific infection prevention and control measures in the suspected cases' area

Until their laboratory result is known, patients should be treated in individual isolation to avoid cross-contamination (*see Fig. 6.3*). This means staff will have to don and doff PPE and ensure hand hygiene between every patient in the suspected cases' area. The safest and easiest way to guarantee this is by using individual rooms or cubicles with individual donning and doffing areas, but at a minimum there should be sufficient distance between patient cubicles, in line with WHO IPC recommendations (*9, 12*). With regard to the safe access to toilet facilities on the suspected cases' ward, two potential approaches could be taken, either having dedicated cleaning staff who will disinfect the bathroom after each use (high demand for staff and PPE), or providing individual commode toilets in separated cabins for each patient (*see below*).

All patients in this area should already be wearing a surgical mask when moving out of their individual room, as long as it is tolerated, and if no oxygen therapy is required.

***Fig. 6.3** Suspected cases' ward (left) and confirmed cases' ward (right) in the proposed set-up.*
Note that in the left ward, there are only 20 beds in separate cubicles, to ensure individual isolation and avoid cross-contamination



WaSH: water, sanitation and hygiene.

6.9 Step-down ward

Admission

A COVID-19 step-down ward provides a dedicated inpatient area, where patients recovering from COVID-19 who are not ready for or able to be discharged will be cared for, for an interim period. Step-down wards have a different staffing composition to acute medical wards; they have a rehabilitative focus and aim to help patients address the physical, respiratory, cognitive, swallowing and psychological impairments that may be experienced following severe COVID-19 (*see Fig. 6.4*). It is important to note that in this context, "step down" refers to a facility for post-acute, rehabilitation-focused care, not acute step down from critical care/mechanical ventilation. Step-down wards are not intended for acutely unwell patients or for patients who are immediately post critical care (i.e. this is not a high-dependency unit), nor are they an alternative to palliative care/patients who are not for escalation.

Fig. 6.4 *Rehabilitation in a community facility: overview of input*

Acute wards	ICU	Step down
» Mobilization and supportive respiratory techniques » Assessment: rehabilitation needs and discharge readiness » Discharge facilitation	» Optimization oxygenation » Secretion management » Mobilization	» Comprehensive rehab • Mobility • Respiration • ADL • Cognition • Swallowing/speech • Psychosocial » Discharge planning

ADL: activities of daily living; **ICU**: intensive care unit.

The objectives of the step down ward are to:

- prepare patients for discharge through nursing care, rehabilitation and discharge planning; and
- relieve medical wards of patients who do not have acute medical needs.

6.10 Training

Staff recruited to work in the facility should receive training on several topics. Since this is a long list and the numbers of available workforce are low, the advice is to start recruiting as early as possible, even before building the facility, and to start training staff as soon as possible. Examples of training to be provided include, but are not limited to:

- IPC – standard precautions, use of PPE in the context of COVID-19 (donning and doffing);
- staff behaviour in an outbreak setting: hand hygiene, respiratory hygiene;
- COVID-19 (disease symptoms, diagnosis, treatment, admission criteria, discharge criteria, etc.);
- screening and triage;
- early recognition and initial approach to the management of the acutely ill patient;
- staff, supplies and equipment and patient flow (low risk, high risk, suspected, confirmed cases);
- emergency interventions (resuscitation, alerting emergency team, etc.);
- self-care (monitoring own health, what to do if I get sick, my rights and duties, etc.);
- psychological first aid (or equivalent);
- use of equipment (oxygen concentrator, monitoring equipment, saturation, continuous positive airway pressure], etc.)
- documentation; and
- triage.

6.11 Staff health monitoring

Staff working in the facility are the most valuable resource. It is extremely important to monitor their health and to intervene as early as possible (*13*). Addressing staff health issues helps the individual health worker and prevents spread of disease in the health-care community and thus major outbreak among health workforces.

It is advised to measure the temperature of every staff member on entering and leaving the workplace, as well as monitoring for respiratory and other symptoms. Every staff member should wear a mask from the time they enter the facility, to reduce the risk of virus transmission between staff. Staff should be motivated on a regular basis to report if they notice symptoms for themselves or colleagues. Health workers should have free access to testing and health care (general health care as well as COVID-19-related care), including insurance and continued payment during sick leave, to promote seeking advice early when they feel unwell. Interventions should be put in place to prevent stigmatization of health workers who are working in the response in the communities, as well as for those becoming sick among their colleagues.

Absences from work should be monitored and followed up, to make sure that staff not showing up for their shift are not hiding away while being sick.

The need for psychosocial support should be assessed and group sessions organized on a regular basis. Case-by-case need for individual support should be assessed and offered when needed. Measures for accidental exposure should be in place.

6.12 Psychosocial support

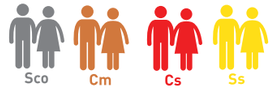
Being sick and being isolated is a huge burden on the psychological well-being of a patient. The uncertainty of a new and unknown disease is a stress factor. The fact that there is no contact possible with loved ones, as visitors are not allowed, makes it even harder to bear. The first action to undertake is to inform the patient repeatedly about the evolution of their disease and the prognosis. Patients should have access to their mobile phones, so they can maintain contact. The proposed electric plan provides electric plugs at each bed for charging purposes. If possible, wireless internet could be provided as well.

For patients who are not severely sick, entertainment can be planned for. Psychosocial support staff can also be included in the staffing schedule (see earlier). Examples can be movie evenings, information sessions, play sessions with children, etc. IPC measures need to be kept in mind strictly for patients with suspected COVID-19, so the risk of cross-infection is avoided. A lot of these activities can be organized even without entering the high-risk zone. The proposed plans have a patient relaxation area where mobile patients with confirmed COVID-19 can relax or activities can be organized.

7. Clinical modules

The following summary tables are structured in line with the main patient typologies described throughout this document. They provide details regarding the main characteristics and special considerations of each ward, and following the main “4S” approach (staff, supplies and equipment, structure, systems).

COVID-19: Screening and triage



Descriptor

Provides a dedicated area for safe initial screening and triage of the patients with symptoms of COVID-19.

Key characteristics

All health facilities, no matter the configuration, should introduce a screening and triage station at the entrance of the facility. The screening point will be the entrance point and identify those patients that fulfil the case definition of COVID-19. The triage will be the area where, according to the triage system chosen at the facility level, the acuity level of the patient will be defined. The area will have a reception area waiting room with independent cabins, and a sample area to collect testing.

Special considerations

- The screening and triage areas should consider adequately the flow between the different spaces to avoid crossing pathways.
- Screening and triage should be available 24/7 and staffed according to the needs, avoiding excessive waiting times and crowding.
- Patients wash hands at the entrance and every patient fitting the case definition should be provided a mask.
- Visitors should not be allowed to accompany the patient into the facility.
- Staff should wear a mask at all times and appropriate PPE when physically interacting with patients.
- Patients should be identified by bracelet and assigned a unique identifier. All patients, samples and documents should be identified by full name and the unique identifier.
- The triage area and facilities should be cleaned and disinfected after each patient use.

For description of patient types, see Fig. 1.1 *(see page 10)*

STAFF	
AVERAGE STAFF NUMBER: » 17 FTE nurses (4 nurses per shift) for the screening and triage management; additional staff and profiles can be added as required (e.g. medical doctors) or staffing numbers can be expanded to overcome the busier periods » Rapid response team can be called in for critical patients » Security guards » Cleaners and helpers as required **INDICATIVE ROLES:** » **Screening:** identify those patients fitting the case definition	» **Triage:** assign the acuity level to each patient according to the chosen triage system » **Sampling:** take a laboratory sample for testing for COVID-19 » **Cleaning:** clean and disinfect a specific area after use by each individual patient **STAFF SKILLS AND COMPETENCIES:** » The staff at the screening area should be trained and updated regularly on eventual changes of the case definitions » The triage personnel should have specific training in application of a standardized, validated triage tool
SUPPLIES AND EQUIPMENT	
EMERGENCY EQUIPMENT: » Stretchers » Set of emergency equipment **LABORATORY SAMPLING EQUIPMENT:** » Equipment for taking samples in a safe way	**PPE:** » Masks for staff and patients » Gloves » Eye protection » Gown » Hand-hygiene stations » Full PPE for physical interaction with patients
STRUCTURE	
FACILITIES: » Reception area, with patients' /companions' orientations » A screening place » 6 waiting room cabins (2 m × 2 m) » Triage place » A testing area » An admissions area	**SPACE NEEDED:** » Variable, but usually 240 m^2 and additional 240 m^2 with an additional waiting area **DESIGN CONSIDERATIONS:** » One-way flow
SYSTEMS	
PATIENT DOCUMENTATION: » Patient record and unique identifiers (bracelets) **OXYGEN SYSTEM:** » Set of emergency equipment **AIRFLOW VENTILATION SYSTEM:** » Natural ventilation » 60 L/s/patient **WATER:** » Water supply at lavatories » Handwashing facilities at entrance of the facility **WASTE MANAGEMENT:** » All waste bins considered as potentially infectious waste	**SANITATION:** » 2 accessible bathrooms (male and female) for the use of the patients **HYGIENE AND ENVIRONMENTAL CLEANING:** » Intensive regular cleaning of waiting areas » Dedicated cleaners for toilets after each use **ELECTRICITY AND LIGHTING:** » Power requirements will vary, depending on the electromedical devices, computers and printers connected » All areas should be well lit

FTE: full-time equivalent; **PPE:** personal protective equipment.

COVID-19: Isolation of contacts and mild suspected cases WARD 20 beds

Sco
Ss

Descriptor

Provides individually isolated accommodation and basic services for people who have been in contact with confirmed patients in those settings where home isolation is not possible, or for mildly sick patients with suspected COVID-19.

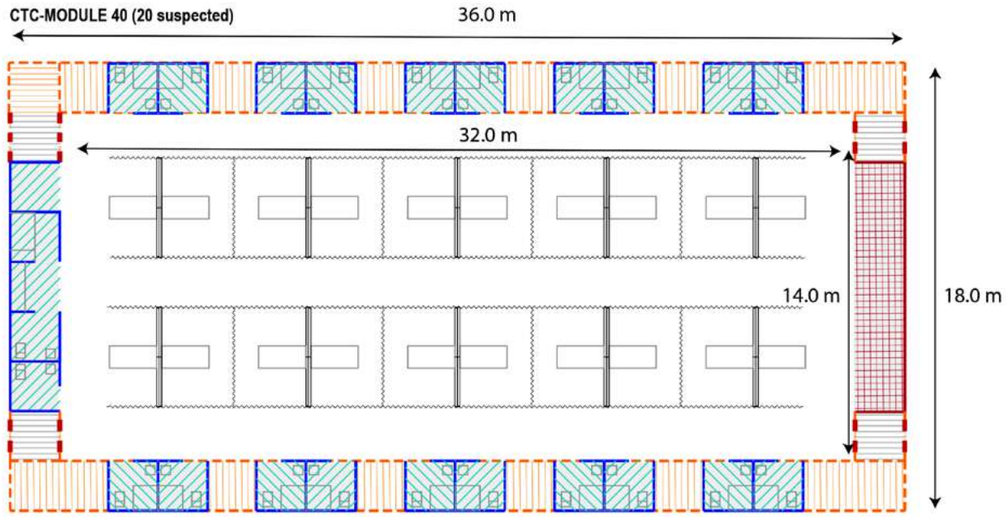
Key characteristics

In certain environments, it might be difficult for contacts or mildly sick patients at home. This might, for example, be the case in settings where larger families are living together in small, one-room houses or in very remote areas. The facility will then provide possibilities for individual isolation, where basic services such as hygiene, food and basic health care are foreseen. This means that these residents will have individual cubicles with individual sanitary facilities and showers. Staffing levels will be lower, since these patients are expected to be relatively healthy and able to take care of themselves. A permanent presence of a medical doctor and a nurse should be considered, to ensure follow-up of the health of the current residents, emergency situations and care for chronic conditions.

Special considerations

- There should be individual cubicles with individual sanitary installations.
- Residents leaving the cubicle should be wearing a mask and handwashing facilities should be widely available and their use promoted.
- Patients should be well-informed and educated about COVID-19, and the measures they need to keep in place to prevent cross-contamination.
- Staff should use new PPE for every patient contact; there is no cohorted care in these areas.
- Equipment used should be properly cleaned between each patient.
- Permanent presence of health staff should be provided. The rapid response team can be used to staff a health post to follow up on development of symptoms, serve in emergencies or ensure treatment for chronic conditions.
- Food, water and psychosocial support should be provided.
- Patients should be offered the possibility to have contact with relatives, for example, by use of their mobile phone.
- In a 20-bed ward for suspected cases, it is advised to allocate, for example, four beds for care for those patients that require high-level care but do not yet have a laboratory-confirmed result.

For description of patient types, see Fig. 1.1 *(see page 10)*



FTE: full-time equivalent; HEPA: high-efficiency particulate air; ICU: intensive care unit; WaSH: water, sanitation and hygiene; IPC: infection prevention and control; IV: intravenous; PPE: personal protective equipment.

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- Health care can be provided from a health post that is staffed by members of the rapid response team
- 1 ICU nurse in every shift for every 2 ICU beds if implemented

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the cleaners/helpers
- **Cleaners and helpers**: keep the ward clean and serve food and other services
- **Rapid response team:** provide a health post

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Rapid response team skilled in basic health care and emergency care

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed
- All required ICU equipment for ICU beds if implemented

PPE:

- Masks for staff and patients
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations
- Sufficient numbers of PPE needed since these patients are isolated individually

PATIENT OBSERVATION:

- Thermometer to be provided to each individual patient for self-monitoring and/or to the health post responsible for follow-up on all the patients
- Full set of vital sign monitoring equipment at the health post, to be cleaned properly between each use

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for chronic conditions
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:

- Ward with individual cubicles and private sanitation and showers

BED CAPACITY:

- 20 beds, of which, for example, 4 are ICU beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual cubicles with three potential configurations
- See Web Annex 3 for detailed Information

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:

- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:

- Natural ventilation
- 60 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each toilet cubicle

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available for each bed

SANITATION:

- 20 accessible bathrooms (male and female) for the individual use of the patients, or 2 gender-separated bathrooms with dedicated cleaners who will clean and disinfect after each use

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward
- Intensive terminal cleaning of bed and toilet
- Dedicated cleaners for toilets after each use

ELECTRICITY AND LIGHTING:

- Wall sockets for all cubicles
- Hallways, toilets and showers should be well lit

COVID-19: Mild and moderate confirmed cases WARD 40 beds

Cm

Descriptor

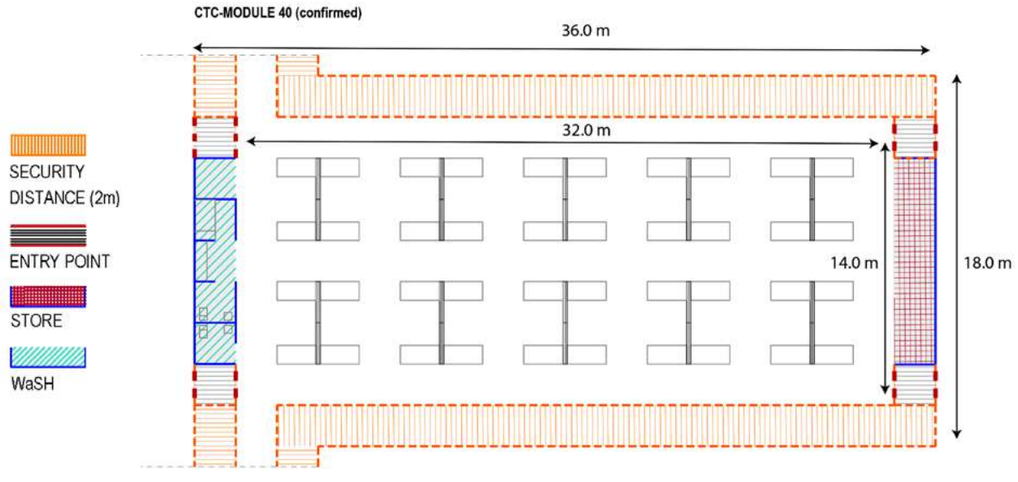
Provides cohorted care for patients who are mildly or moderately sick and have received a positive laboratory result.

Key characteristics

These wards provide care in cohorts for 40 patients. There is no need for isolation at the individual level, since all these patients have confirmed COVID-19. Therefore, sanitary facilities can also be shared. Since these patients are not very dependent on medical care, staffing requirements are medium.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- Mild and moderately sick patients will require some nursing care, for example, for distribution of medication, oxygen therapy and patient observations.
- Oxygen therapy could be initiated for moderately sick patients and then should be guided by oxygen saturation.
- The medical doctor of the rapid response team can provide medical supervision for these patients.



For description of patient types, see Fig. 1.1 (*see page 10*) **WaSH:** water, sanitation and hygiene.

STAFF

AVERAGE STAFF NUMBER:
- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 8.5 FTE nurses and 8.5 FTE nurse assistants (2 each per shift)
- Medical supervision can be provided from a health post that is staffed by member of the rapid response team

INDICATIVE ROLES:
- **Head nurse:** organize the ward, e.g. discharges and admissions, referrals; supervise the cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **Rapid response team:** provide medical supervision

STAFF SKILLS AND COMPETENCIES:
- Good knowledge of IPC and cleaning practices
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:
- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed

PPE:
- Mask
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations

PATIENT OBSERVATION:
- Sufficient sets of monitoring equipment (blood pressure cuffs, clock/watch with second hand, oxygen saturation monitors)

ADMINISTRATIVE EQUIPMENT AND FURNITURE:
- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:
- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:
- Ward with shared toilets and showers
- Access to a relaxation area/rest area could be provided (e.g. movie shown or games to play)
- Crash room at triage
- Sterilization area
- Morgue

BED CAPACITY:
- 40 beds

SPACE NEEDED:
- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:
- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:
- Patient record

REFERRAL SYSTEM:
- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:
- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:
- Natural ventilation
- 60 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:
- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:
- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:
- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:
- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:
- Wall sockets for all bed panels
- If X-rays are portable, there should be dedicated power outlets for them
- Hallways, toilets and showers should be well lit

COVID-19: Severe confirmed cases WARD 40 beds

Cs

Descriptor

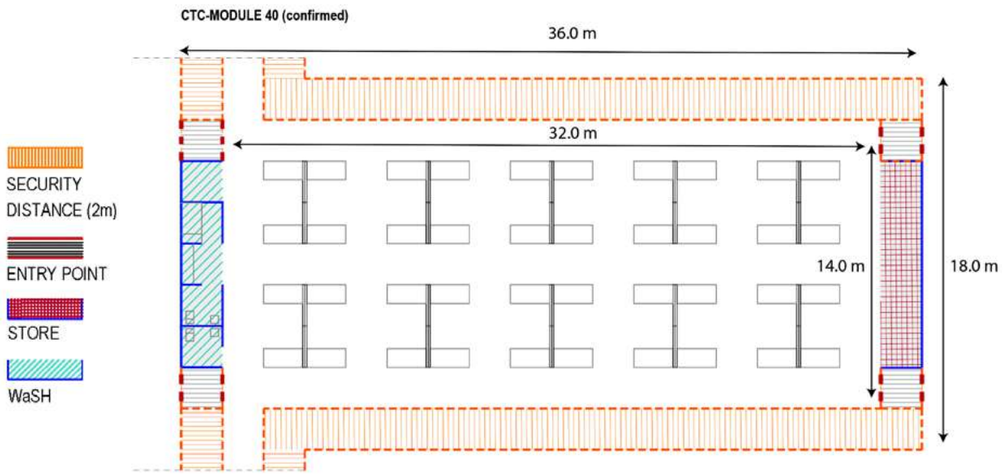
Provides cohorted care for patients who are severely sick and have received a positive laboratory result.

Key characteristics

These wards provide care in cohorts for 40 patients. There is no need for isolation at the individual level, since all these patients have confirmed COVID-19. Therefore, sanitary facilities can also be shared. Since these patients are severely sick, higher medical staffing levels are required.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- Severely sick patients will have high demands in nursing and medical care.
- Oxygen therapy is likely to be required for all patients and then should be guided by oxygen saturation.
- In a facility that has no dedicated ICU, it is advised to allocate, for example, four beds for care for those patients who require critical care.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 21 FTE nurses (1 for every 8 patients in every shift) and 17 FTE nurse assistants (1 each for every 8 patients per shift during the day, 2 per ward during the night)
- 1 ICU nurse in every shift for every 2 ICU beds if implemented
- 8.5 FTE respiratory physiotherapists (or national equivalent)
- 1.5 FTE occupational therapists (or national equivalent)

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the nurses, nurse assistants and cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **Ward doctor:** ensure medical supervision of the patients
- **Rapid response team:** provide emergency care in case of deteriorating patient
- **Physiotherapist** (or national equivalent)**:** perform respiratory interventions and mobilization
- **Occupational therapist** (or national equivalent)**:** perform cognitive and functional assessment

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care
- Rehabilitation professionals skilled in general medical and pulmonary rehabilitation (for physiotherapists and occupational therapists

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed
- All required ICU equipment for ICU beds if implemented

PPE:

- Mask
- Eye protection
- Hand-hygiene stations
- Gloves
- Gown

PATIENT OBSERVATION:

- Sufficient sets of monitoring equipment (blood pressure cuffs, clock/watch with second hand, oxygen saturation monitors)

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:

- Ward with shared toilets and showers
- Sterilization area
- Morgue

BED CAPACITY:

- 40 beds, of which, for example, 4 ICU are beds if there is no dedicated ICU in the facility

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:

- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:

- Natural/hybrid mechanical ventilation
- 160 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:

- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:

- Wall sockets for all bed panels
- If X-rays are portable, there should be dedicated power outlets for them
- Hallways, toilets and showers should be well lit

COVID-19: Critical confirmed cases WARD 40 beds

Cc

Descriptor

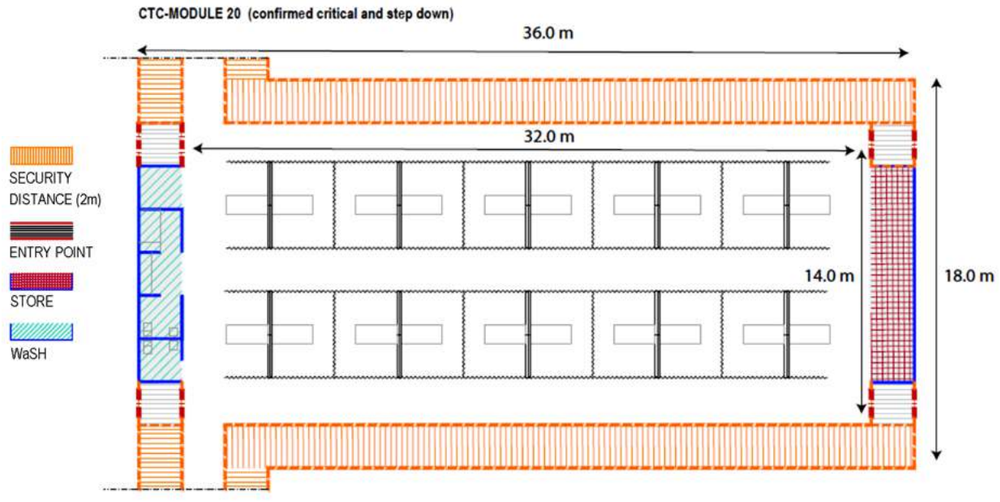
Provides a dedicated ICU area where treatment of critical cases can be provided.

Key characteristics

Critical cases are admitted in a ward area with preferably fewer beds to ensure enough working space around each bed. These patients will require artificial ventilation and invasive monitoring and, therefore, staffing level requirements (in both numbers and qualifications) will be very high.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- There are very high requirements in specialized staff.
- Requirements in sanitation will be lower, as these patients are bed-bound.
- There will be high needs in specialized equipment, medicines and consumables.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 42 FTE nurses (1 for every 2 patients in every shift) and 8.5 FTE nurse assistants (2 per shift)
- 8.5 FTE ICU doctors (2 per shift)
- 8.5 FTE respiratory physiotherapists (or national equivalents)
- 1 FTE speech and language therapist (or national equivalent)

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the nurses, nurse assistants and cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **ICU doctor:** ensure medical supervision of the patients
- **Rapid response team:** provide emergency care in case of a deteriorating patient
- **Physiotherapist:** perform specialist respiratory interventions and early mobilization
- **Speech and language therapist:** perform swallowing assessment and interventions (conducted once patients have de-escalated to other wards)

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Nurses and doctors skilled in intensive care observation and management
- Rapid response team skilled in basic health care and emergency care
- **Physiotherapist:** skills in specialist respiratory interventions
- **Speech and language therapy:** skills in post-ICU assessment and intervention

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available at each bed (ambu-bag).
- Specialized emergency equipment available at key places in the ward (multiple sets)

PPE:

- Mask (N95 if aerosol-generating procedures are performed)
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations

PATIENT OBSERVATION:

- Intensive care continuous monitoring equipment

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision, including ventilators
- Suction unit at each bed
- Multiple sets of medication and consumables for emergency care: full set of emergency equipment available at key places in the ward (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, emergency medications)
- Continuous infusion pumps for medications

STRUCTURE

FACILITIES:

- Ward with sufficient space around each bed
- Crash room at triage
- Sterilization area
- Morgue

BED CAPACITY:

- 20 beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
  - Supplementary modules of 648 m^2 external dimensions
  - See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of recovering patients who can move back to a ward for severe patients or step-down area

OXYGEN SYSTEM:

- Oxygen and ventilator available for every bed

AIRFLOW VENTILATION SYSTEM:

- Natural/hybrid mechanical ventilation
- 160 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:

- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:

- Several wall sockets for all cubicles
- Hallways, toilets and showers should be well lit

COVID-19: Step down cases WARD 20 beds

Sd

Descriptor

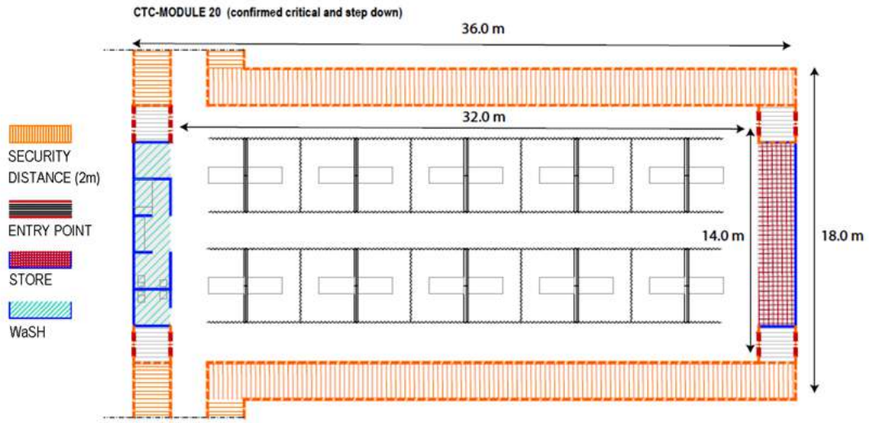
Provides a dedicated inpatient area where patients recovering from severe COVID-19, who are not ready for or able to be discharged, will receive rehabilitation and nursing support for an interim period.

Key characteristics

In centres where severe and ICU cases are being managed, it is essential to consider a dedicated inpatient area where recovering severe cases will be cared for for an interim period. This may be known as a "step down area". Recovering severe cases are likely to present with ongoing challenges that will delay safe discharge, including post-intensive care syndrome, and may require some ongoing respiratory support, but they will also require lower medical and nursing staffing ratios than severe cases. It is common for patients with severe COVID-19, especially those who have been mechanically ventilated, to experience substantial weakness and functional decline. When this is the case, some patients may require a period of inpatient recovery in a step-down ward before being discharged home. These wards provide care in cohorts of 20 patients (10 per gender), with a dedicated space left open for rehabilitation activities. These wards are designed for COVID-19-positive patients; therefore, there is no need for isolation at the individual level and sanitation facilities can be shared. These patients are no longer severely sick, so lower medical staffing levels are required, while rehabilitation staffing levels are higher. Permanent nursing presence in the ward is still required.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- There will be lower needs in medicines and consumables, although it should be expected that patients are likely to require dressings for pressure areas.
- Permanent presence of health staff should be provided.
- Most patients will require some nursing care, for example, for distribution of medication, mobility assistance and patient observations.
- The medical doctor of the mild-moderate ward can provide medical care to these patients.
- Equipment used should be properly cleaned between each patient.
- Patients should be encouraged to have contact with relatives, for example, by use of their mobile phone.
- Separate step-down areas for (recovering) COVID-negative patients should be considered.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- Medical, nursing and support staffing based on mild/moderate ward cover
- 10 FTE rehabilitation professionals with the suggested composition of (where locally applicable): 3 FTE physiotherapists (2 per shift); 3 FTE occupational therapists (2 per shift); 1 FTE speech and language therapist; and 1 FTE psychologist

NOTE: rehabilitation professionals are not required to work overnight in step down.

INDICATIVE ROLES:

- **Physiotherapist** (or national equivalent)**:** functional rehabilitation, graded exercise, basic respiratory interventions, and balance training
- **Occupational therapist** (or national equivalent)**:** cognitive assessment and intervention, occupational based exercise, activity of daily living retraining, discharge planning
- **Speech and language therapist** (or national equivalent)**:** swallowing assessment and intervention, speech assessment and retraining
- **Psychologist** (or national equivalent)**:** counselling and other psychological techniques

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices; psychological first aid
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care in post-ICU
- Swallowing assessment and rehabilitation (for speech and language therapists); Trauma counselling (for psychologists)

SUPPLIES AND EQUIPMENT

PPE:

- Adequate PPE for staff

REHABILITATION-SPECIFIC EQUIPMENT:

- 4× tables and 10 basic chairs for table-based activities and meals
- 4× inpatient wheelchairs
- 4× pulpit/gutter frames
- 8× four-wheel walkers/walking frames
- Elastic exercise bands of varying resistance, or 4 sets of free weights (or locally manufactured equivalent) for basic strengthening
- Over toilet-frame (1 per toilet) and/or 2 portable commodes
- Shower chair with back and armrests (1 per shower)
- Equipment for basic food preparation/assembly (not for cooking)
- Table-based games, for example, cards, board games, puzzles
- Access to supportive discharge equipment (a small number of walking frames and wheelchairs) is desirable

STRUCTURE

FACILITIES:

- Ward area with shared toilets and showers
- Small rehabilitation/relaxation space

BED CAPACITY:

- 20 beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens
- Divide the bed portion of the ward in two for single-gender use (10 beds each side)

SYSTEMS

REFERRAL SYSTEM:

- Good and rapid access for referral of patients from mild-severe wards (patients should not be referred directly from ICU/critical care)
- Ensure clear referral criteria are established

CONSIDER THE FOLLOWING FOR EACH PATIENT:

- Has significantly reduced function from baseline and is not suitable for discharge (considering support available at home)
- Is medically stable
- Is able to actively participate in rehabilitation
- Has established referral links with local outpatient and community-based rehabilitation services for follow-up

All the other items listed in previous tables are also required: Oxygen system, Airflow ventilation system, Water, Waste management, Sanitation, Hygiene and environmental cleaning, Electricity and lighting,

FTE: full-time equivalent; **HEPA:** high-efficiency particulate air; **ICU:** intensive care unit; **IPC:** infection prevention and control; **IV:** intravenous; **PPE:** personal protective equipment.

8

8. Operational support

8.1 Communication

Patient to relatives

As discussed in Section 4.11, patients in a COVID-19 ward should have access to a mobile phone and/or internet to stay in contact with their relatives. If this is not possible, or the patient is too sick to contact relatives, contact details of a central contact point should be given to relatives or vice versa, so the medical doctor or other staff member can keep contact with relatives of the patients.

Patient to staff

If the patient needs support from a nurse, there should be a system to call for assistance. This can be a sophisticated bedside call system or a simple bell.

Staff internal

Different systems are possible for staff to keep contact with each other in the facility. While staff members should not be allowed to take their mobile phones inside the potentially contaminated zones, specific mobile phones could be provided for use in these zones (and stay in there). Other options are the use of VHF radio or other radio communication systems or landlines. This is highly recommended during the construction phase.

Rapid response team

A priority communication line should be available to alert the rapid response team in case a patient deteriorates and specialized assistance is needed. For this option too, radio or mobile phone could be an option.

Communication with other health-care facilities

It is advised to have a rapid system for referring patients to other facilities or to accept referrals from other facilities. The mobile phone is the best option for this, but the number needs to be assigned to the right person and handed over at shift change. This person should have an overview on the availability of resources (beds, staff, specialized equipment) for the specific patient.

8.2 Decentralized stocks and restocking

In a large facility, experience has shown that it is extremely useful to establish standard lists of consumables and medications that should be available in the wards. Every ward serving the same category of patients should use the same list.

Once a standard list (with the name of each item and required minimum and maximum stock) is established, this can be used to stock the decentralized stores in each ward to the maximum level on opening the ward. Later the list can be used as an order list to restock the wards, for example, twice per week, once the minimum stock has been reached for a specific item. The minimum stock should always be sufficient to last until the next restocking moment.

The pharmacy and warehouse can use these ordering lists to deliver the items to each ward. Attention must be given to the fact that an item that has been handed out to a specific ward can never move to a "cleaner" zone any more (e.g. not from the confirmed patients' area to the suspected patients' area, or not back outside of the patient zones from any non-patient area).

8.3 Food distribution

To avoid big logistical challenges and risks for cross-infection, the best way to provide food will probably be to use reusable plates and cutlery; in the case of disposable plates and cutlery, it is important to be aware of the high volume of daily waste to be dealt with. Systems for distribution of food and drinking water and collection of leftovers and waste need to be well in place, respecting the one-way flow (from the clean/safe side to the more contaminated zones). Meals for patients could be introduced in to the high-risk area by the side walls of the central corridors, via a specific wall closet fitted with compartments for safe transfer.

8.4 Oxygen system

Oxygen in the temporary facility could be supplied in four different ways: oxygen cylinders, oxygen concentrators, an oxygen generator supply system, or liquid oxygen tanks connected to an oxygen supply system. See WHO guidance on *Oxygen sources and distribution for COVID-19 treatment centres* (*1*) for more details on oxygen supply and distribution. For a correct calculation, regardless of the chosen system, the high oxygen consumption of a COVID-19 patient must be taken into consideration. It is also necessary to provide oxygen supply for the treatment area for suspected cases.

- **Oxygen cylinders:** these are suitable for short-term missions and a relatively small hospital (limited number of beds).
  - *Advantages:* easy to deploy, personal cylinder per bed/operating room
  - *Disadvantages:* logistics are more complicated, difficult to take on aircraft, requires refilling, and puts great emphasis on safety in storage and use
- **Oxygen concentrators:** these are suitable for a small-medium size hospital.
  - *Advantages:* easy to deploy, one oxygen concentrator per bed/per 2 beds, some models could be connected to an accessory device to the oxygen concentrator that enables refilling of custom portable oxygen cylinders
  - *Disadvantages:* difficult market availability for large numbers, requires continuous power supply

» **Oxygen plant connected to an oxygen supply system:** suitable for long-term facilities, and for a medium-large size hospital.
- *Advantages:* gives logistical independence, does not require refilling
- *Disadvantages:* heavy, demanding special layout. High demand for electricity supply is a critical element for a pressure swing adsorption (PSA) oxygen plant. Deployment takes time and requires trained personnel for repair, operation and supervision 24/7. Can be damaged and therefore requires the backing of oxygen cylinders

» **Liquid oxygen tanks connected to an oxygen supply system:** suitable for long-term facilities, and for a medium-large size hospital
- *Advantages:* gives logistical independence, could be set up in more semi-permanent structures
- *Disadvantages:* needs refilling or replacement of the tank (if the oxygen tank is set up in a truck). Deployment takes time and requires trained personnel for repair, operation and supervision 24/7. Liquid oxygen needs to be converted into gas through vaporization, adding complexity to the process Can be damaged and therefore requires the backing of oxygen cylinders

The selected option depends on the country's own resources and skills. In this document, oxygen concentrators are proposed as the first-phase option while a more suitable system is set up (*2*).

All areas where patients with severe acute respiratory infection are cared for should be equipped with pulse oximeters, functioning oxygen systems and disposable, single-use, oxygen-delivering interfaces (nasal cannula, nasal prongs, simple face mask and mask with reservoir bag).

8.5 Airflow ventilation system

To help prevent airborne and droplet infections in health-care facilities, adequate ventilation in necessary in all patient-care areas (*3*). The design and set up of a COVID-19 facility in community settings must take fluctuations in ventilation rate and predominant wind direction into account. When natural ventilation alone cannot satisfy the recommended ventilation requirements, alternative ventilation systems should be considered. Hybrid (mixed-mode) natural ventilation, for example, should be used, or if that is not enough, mechanical ventilation.

Noting that in low-resource settings with the use of contingency facilities (e.g. outdoor isolation tents open to the wind), when the prevailing wind direction and average velocity may be used, the design of natural ventilation for infection control should consider the worst-case situation – that is, when the wind is absent, and where supplementary mechanical ventilation may be needed. It is also important to consider that large openings in natural ventilation without any protection increase the risk of security breaches and the spread of vector-borne diseases. Purpose-designed barred windows and semi-transparent mosquito meshes can be used in these situations. If the COVID-19 community facility will surge to care for ICU patients, then adequate ventilation must be put into place. See the recently released manual from the Severe Acute Respiratory Infections Treatment Centre for more information (*2*).

8.6 Water

Water supply – **quality**

The most likely scenario is that the facility will have access to existing water supply systems that will be functional; however, residual chlorine testing should be performed regularly and corrective measures taken if needed. If there is no water supply system, conventional, centralized water-treatment methods that utilize filtration and disinfection via chlorination should be used to inactivate COVID-19.

Systematic disinfection should be ensured by proper chlorination of all water supplied, with monitoring. For more information, see the WHO publication, *Essential environmental health standards in health care* (*4*). For effective centralized disinfection, there should be a residual concentration of free chlorine of ≥0.5 mg/L after at least 30 min contact time at pH < 8.0. A chlorine residual should be maintained throughout the distribution system.

Factors for proper monitoring of water quality include turbidity, free residual chlorine (FRC) concentration and pH. For more detailed information, see *The Sphere handbook: humanitarian charter and minimum standards in humanitarian response* (*5*).

Any COVID-19 treatment centre in a temporary facility should be able to test and monitor the quality and safety of their treated water, and this includes an ability to analyse the raw water in order to optimize water treatment; if turbidity is higher than 5 NTU (nephelometric turbidity units), it is important to change the source or pre-treat. In case of doubt and/or if possible, rapid tests should be used and/or laboratory analysis performed for chemical compounds (*6*). If changes appear after preparation of chlorine solutions (colour, smell, etc.), analysis should be carried out.

Water supply – **quantity**

Effective functioning of a health-care facility, and the ability to prevent the spread of infections, relies on a sufficient and reliable supply of water through estimations of minimum and peak demand. This should include supply for all staff, patients, procedures and potential visitors and should include other water demands, for example, water for pour/flush latrines, water for sterilizers, water for cleaning facilities and water for producing disinfecting solutions. Large quantities of water are required for cleaning/decontamination procedures, laundry, drinking and personal hygiene (including hand hygiene). Water consumption depends more on the number of staff and size of the centre than on the number of patients.

Estimation of water quantity requirement, based on two scenarios: [1]

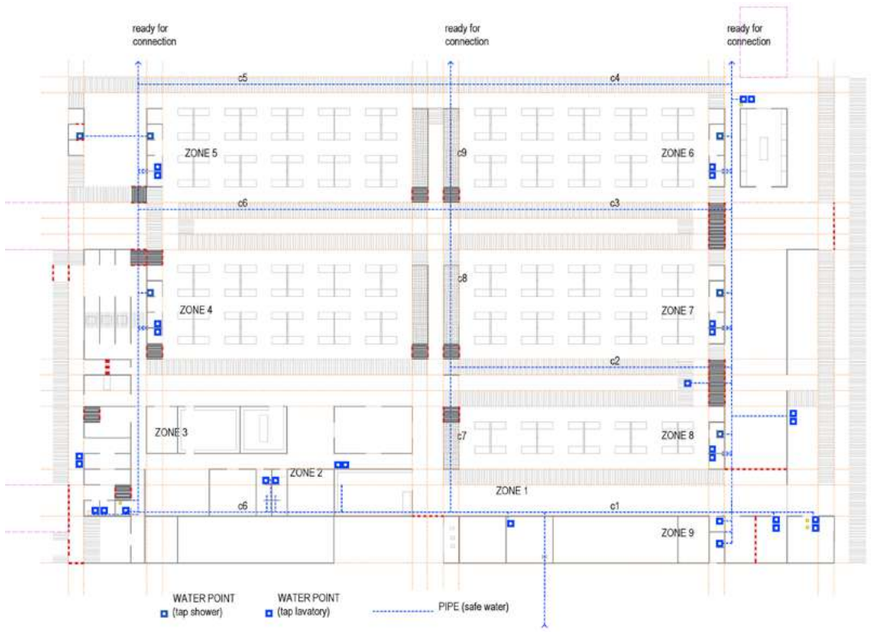
1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff: around 20 000 L/day; 40 000 L storage capacity required
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff: varound 56 0000 L/day; 112 000 L storage capacity required

Water supply – **distribution**

The most likely scenario is that the facility will have access to existing water supply systems that will be functional but when setting up the facility it must have, as a minimum, water access points at each toilet area, within each clinical work area, and at shower, waste-management, laundry and food-preparation points (*see Fig. 8.1*). All equipment in contact with water or chlorine solutions must be made of plastic, to avoid damage. Several fundamental parameters must be considered when designing the network that will supply water to the hospital:

- a ring-based rather than reticular layout should be implemented – this allows even pressure distribution throughout the facility; the possibility of doing repairs at any point of the system without compromising the water supply; circulation of water in cold weather conditions, to avoid freezing; and, in case of high retention time, the ability to recirculate for further chlorination;
- at all times the hospital and facilities in the operational support area must have a supply system that covers the needs at times of both peak and low demand;
- sufficient pressure should be provided by pumps, ensuring that patients, health and support staff receive the water they need at all water supply points:
  - pressure should be maintained between 1 bar and 3 bar (10 m and 30 m of water column);
  - water velocity in the pipeline should be kept between 0.5 m/s and 2 m/s at peak consumption; and
- residual chlorination should be ensured, so that between 0.2 mg/L and 0.5 mg/L (or parts per million [ppm]) is maintained at all water supply points.

Fig. 8.1 *Proposed design for the water supply network for the Model M (100 m × 80 m) 160 moderately ill inpatients + 20 specific inpatient profile area beds*



WaSH: water, sanitation and hygiene.

8.7 Waste management

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. All staff who handle health-care waste should wear appropriate PPE (that is, 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: a summary* (*7*) and *Overview of technologies for the treatment of infectious and sharp waste from health care facilities* (*8*).

Waste-**management plan**

The waste management plan should detail the supplies needed, including PPE, sharps containers, waste bins and bags, cleaning supplies and the type and capacity of waste-treatment technology or off-site treatment arrangements with public or private bodies. In planning supplies, it is important to calculate the usage of consumables and restocking needs. Finally, the plan should consider weather conditions and protection of waste from rain to avoid run-off. The division of a simple clear waste-management plan will help to structure the daily waste-management activities for the COVID-19 community facility from the outset. This should include a brief descriptor of the responsibilities of all team members, specialist assigned roles and an outline of the daily waste routine, which should all help to control the build-up of waste and reduce it where possible. 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.

Waste **generation**

In emergency situations like outbreaks of infectious diseases, the volume of waste rises quickly and needs to be considered in the selection of waste-treatment technologies. Owing to the elevated numbers of PPE used, the COVID-19 community facility should plan for an increase of containment capacity as waste generation is likely to be increased.

Waste **segregation**

All health-care waste produced during the care of COVID-19 patients should be considered as infectious waste. The four major categories of health-care waste recommended for organizing segregation and separate storage, collection, and disposal are:

- sharps (needles, scalpels, etc.), which may be infectious or not;
- infectious waste (anatomical waste, pathological waste, dressings, used syringes, used single-use gloves, used disposable PPE, all health-care waste during the care of COVID-19 patients, except sharps);
- general waste (paper, packaging, etc.); and
- hazardous waste (expired drugs, laboratory reagents, radioactive waste, insecticides, etc.).

Estimation of health-care waste-management requirement, based on two scenarios:[1]

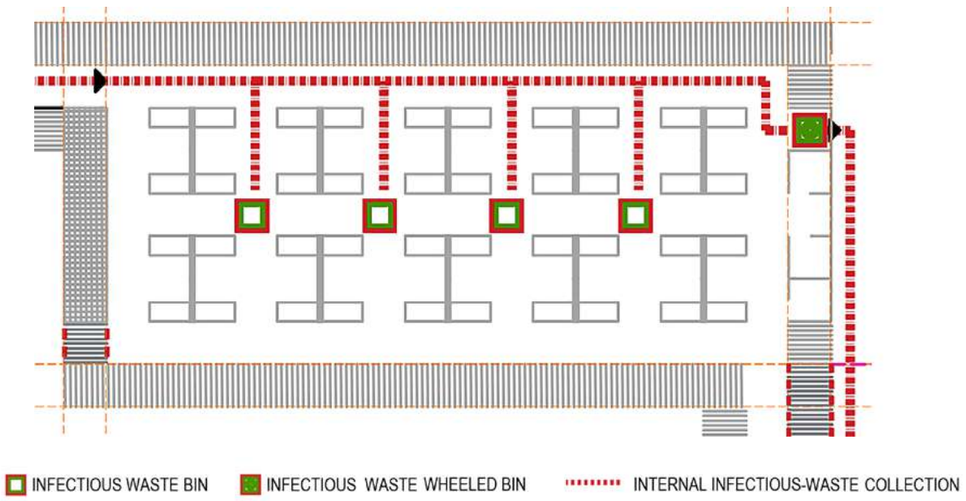
1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   - **General waste:** 2 kg/patient /day = 360 kg/day
   - **Sharps:** 0.1 kg/ patient/day = 18 kg/day
   - **Infectious waste:** 0.4 kg/patient /day – 72 kg/day
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   - **General waste:** 2 kg/patient/day = 1000 kg/day
   - **Sharps:** 0.1 kg/patient/day = 50 kg/day
   - **Infectious waste:** 0.4 kg/patient/day = 200 kg/day

Functional colour-coded and/or clearly labelled waste bins in close proximity to all waste-generation points should be made available; such containers should not be more than three-quarters full, and should be leak-proof with a lid and pedal opening and be clearly labelled (i.e. easily distinguishable according to a colour, label or symbol). Single-use PPE should be placed in waste bins (such as 220 L barrels) at the entrance to the doffing area.

Waste **collection**

Waste-collection routes are designed to minimize contact of waste-management staff with the high-risk area (*see Fig. 8.2*). Clinical staff entering the wards would be responsible for replacing bags that are three-quarters full for empty ones and depositing the three-quarters-full bags in the wheeled bin on the external side. Different collection routes for suspected and confirmed patients should be coordinated with PPE renewal and disinfection of collection containers.

Fig. 8.2 *Proposed collection mechanism for inpatient wards*



Collection will be made by waste-management staff and wheeled containers should be directed to the waste-management area (*see Fig. 8.3*). It is essential to implement stringent waste-handling precautions, using full PPE, based on the recommendations provided in *Rational use of personal protective equipment for coronavirus disease* (COVID-19) (*9*).

Fig. 8.3 *Proposed collection mechanism for the community facility by type of waste*

Waste **treatment**

Waste should be dealt with onsite or as close as possible to where it is generated, and should be separated (combustible/recyclable). In some cases, waste may be treated offsite. If so, there should be a means to confirm it is treated safely once removed from the facility premises.

Estimation of containment capacity requirement, based on two scenarios:[1]

1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   a minimum containment capacity for infectious waste of 720 l every 2 days
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   a minimum containment capacity for infectious waste of 2000 litres for every two days

Regarding treatment of infectious waste as per WHO guidelines (*8*), non-incineration technologies are the preferred option, that is, steam-based technologies (autoclaves, microwaves), dry-heat technologies or chemical-based technologies (such as ozone treatment and alkaline hydrolysis). If incineration technology is used, an incinerator for the treatment of infectious and sharp waste should be functional and of a sufficient capacity (if designed for infectious waste and not just general waste).

Specific design requirements must be followed, such as using bricks/refractory bricks and mortar rather than common building bricks, to withstand the temperatures needed for these incinerators (greater than 800 °C). For complete burning, a dual-chamber incinerator is needed that reaches temperatures above 800 °C and 1100 °C, respectively. If dual incinerators are not available and there is an immediate need for public health protection, small-scale incinerators may be used. This involves a compromise between the environmental impacts from controlled combustion and an overriding need to protect public health if the only alternative is indiscriminate dumping.

Estimation of the minimum capacity of waste-treatment technology, based on two scenarios[2]

1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   a minimum treatment capacity for infectious waste of 8 kg/h, assuming 10 working hours
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   a minimum treatment capacity for infectious waste of 20 kg/h, assuming 10 working hours

Waste- **management area**

The waste-management area should be considered as a normal health-care facility waste zone. A cleaning and disinfection point, temporary waste storage, organic pit, sharp pit and incinerator with ash pit should be planned (*7, 10*).

8.8 Sanitation

Wastewater

All wastewater coming from patients' showers, sinks, handwashing points and laundry should be properly treated before infiltration. 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 avoid possible exposure in the case of overflow. Means should be made available for safely disposing of greywater or water from washing PPE, surfaces and floors.

The recommended technology for the proposed layout is illustrated in Fig. 8.4. All handwashing stations, showers and emptying/filling basins for cleaning should be connected to a gravity-fed grease trap with the possibility of performing treatment in those stations that are being used by infectious patients. The last stage would be a pumping station connecting to the existing sewage systems, infiltration trenches, soakaway pit or temporary containment storage, such as flexible greywater tanks.

Fig. 8.4 *Proposed collection mechanism for wastewater*

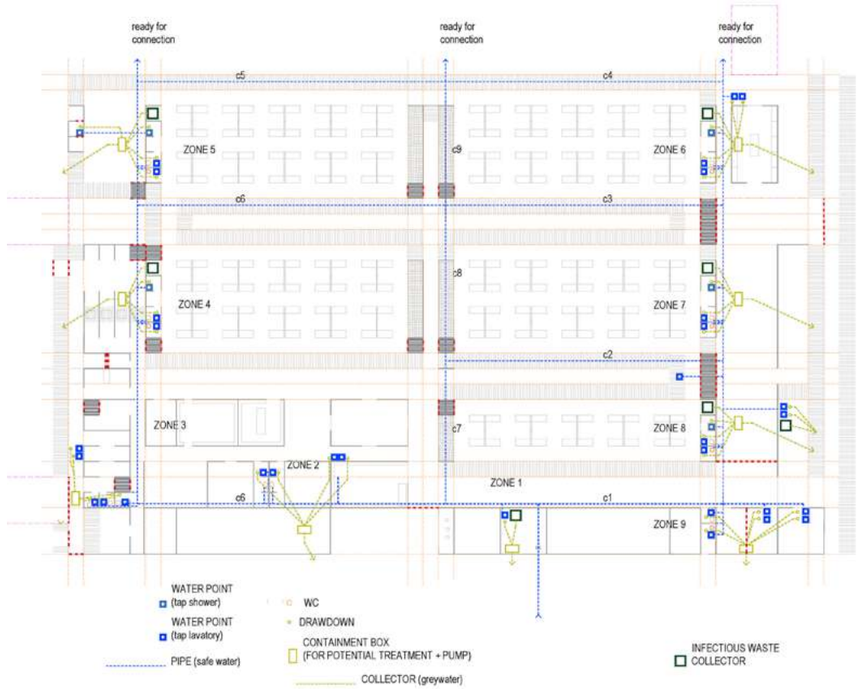
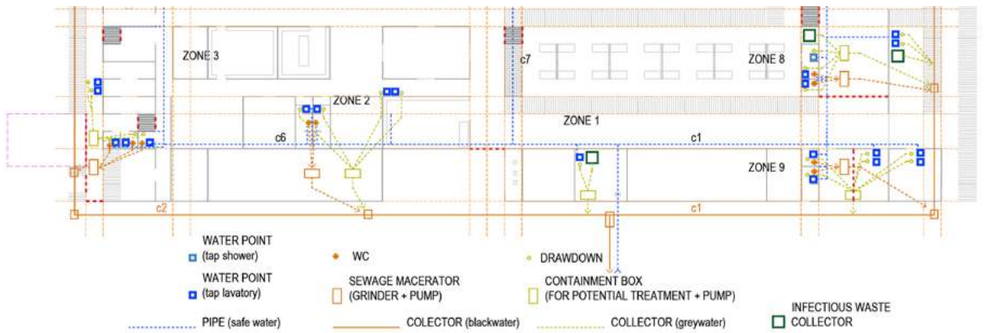


Fig. 8.5 *Proposed collection mechanism for faecal sludge and greywater*



Excreta disposal

People with suspected or confirmed COVID-19 should be provided with a 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. Furthermore, and consistent with existing guidance, staff and health workers should have toilet facilities that are separate from those used by all patients.

WHO recommends the use of standard, well-maintained plumbing (*7*), such as sealed bathroom drains, and backflow valves on sprayers and taps, to prevent aerosolized faecal matter from entering the plumbing or ventilation system (*11*), together with standard wastewater treatment (*12*).

The recommended technology for the proposed layout, illustrated in Fig. 8.5, consists of individual prefabricated cubicles with pour-flush technology, which will create a hydraulic seal avoiding odours and flies; this would be connected to a macerator (shredding and pumping) type that will pump the sewage out to the existing sewage systems.

If health-care facilities are connected to sewers, a risk assessment should be conducted to confirm that wastewater is contained within the system (i.e. the system does not leak), prior to 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 (*13*), with critical control points prioritized for mitigation.

Excreta should be retained in impermeable storage containers and left for as long as feasibly possible, to allow for a reduction in virus levels before moving the containers off-site for additional treatment or safe disposal, or both. A two-tank system with parallel tanks would help to 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.

Fig. 8.6 illustrates the proposed sanitation system for a Model M facility.

Handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (soap and water is preferred after handling exposures to bodily fluids; if not available, use 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 COVID-19 cases, respectively. In all health-care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling faeces should follow WHO guidelines (*14*) and use PPE instructions for COVID-19 (*9*) to prevent exposure, including boots, apron, long-sleeved gown, thick gloves, mask 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.

Fig. 8.6 *Proposed sanitation system for Model M (100 m × 80 m) 160 moderately ill inpatients + 20 specific inpatient profile area beds + 60 staff*

Workers should be properly trained in how to put on, use and remove PPE, so that these protective barriers are maintained and not breached (*15*). 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 the manufacturer's instructions, and peracetic or peroxyacetic acid at a concentration of 500–2000 mg/L (*16*).

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 this will 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. PPE (that is, boots, apron, long-sleeved gown, thick gloves, mask 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 Section 8.9,* Cleaning procedures).

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. 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 per 10 parts of waste.

8.9 Hygiene and environmental cleaning

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" (*17*). If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20–30 s, using the appropriate technique (*18*). When hands are visibly dirty, they should be washed with soap and water for 40–60 s, using the appropriate technique (*19*). Hand hygiene should be performed at all five moments, as well as before putting on PPE and after removing it or 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 (*14*). 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 (*20*). However, if other options are not available or feasible, using chlorinated water for handwashing can be an interim solution. All efforts should be made to procure soap and water and/or alcohol-based hand rub, as these are the two recommended and validated practices.

Functional hand-hygiene facilities should be present for all health workers at all points of care and in areas where PPE is put on and 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. In all suspected and confirmed patient areas, there should ideally be hand-hygiene points at all cubicles (or at least strategically placed), to allow for hand-hygiene.

Cleaning procedures

Existing recommended cleaning and disinfection procedures for health-care facilities should be followed consistently and correctly (*21*). Laundry should be done and surfaces in all environments in which COVID-19 cases receive care (e.g. treatment units, community care centres) should be cleaned at least twice a day (regular cleaning) and when a patient is discharged (terminal cleaning) (*21*). Moreover, particular attention must be paid to cleaning and sanitizing surfaces with the aim of constantly reducing the viral load across 24 hours. 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); and
- sodium hypochlorite at 0.1% (equivalent to 1000 ppm) for at least 1 minute of contact time for disinfecting surfaces.

Procedures for spills of COVID-19 patient blood/fluids

If there are spills of patient blood or fluids from a COVID-19 patient, the area should then be cleaned and disinfected (with, for example, 0.5% chlorine-containing disinfecting solution), following published guidance on cleaning and disinfection procedures for spilled body fluids (*22*).

Staff should perform hand hygiene after exposure to blood or body fluids and after removing PPE.

8.10 Laundry

All individuals dealing with soiled bedding, towels and clothes from patients with COVID-19 infection should wear appropriate PPE before touching it, including boots, apron, long-sleeved gown, thick gloves, mask and goggles or a face shield.

Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine. Machine washing with warm water at 60–90 °C and 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 linen soaked in 0.05% chlorine-containing disinfecting solution for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linen allowed to dry fully in sunlight.

If excreta are on surfaces (such as linen or the floor), they should be carefully removed with towels and safely disposed of immediately, 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 linen.

The area should then be cleaned and disinfected (with, for example, 0.5% chlorine-containing dis-infecting solution), following published guidance on cleaning and disinfection procedures for spilled body fluids (*22*).

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 (i.e. nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed.

8.11 Management of dead bodies

To date, there is no evidence of persons having become infected from exposure to the bodies of persons who have died from COVID-19. The safety and well-being of everyone who tends to bodies should be the first priority. Before attending to a body, people should ensure that the necessary supplies for hand hygiene and PPE are available.

- The dignity of the dead, their cultural and religious traditions, and their families should be respected and protected throughout.
- It is important to ensure that personnel who interact with the body (health or mortuary staff) apply standard precautions, including hand hygiene, before and after interaction with the body and the environment; and use appropriate PPE according to the level of interaction with the body, including a gown and gloves. If there is a risk of splashes from the body fluids or secretions, personnel should use facial protection, including the use of face shield or goggles and medical mask.
- The body should be prepared for transfer, including removal of all lines, catheters and other tubes.
- Any body fluids leaking from orifices should be contained.
- Both the movement and handling of the body should be kept to a minimum.
- The body should be wrapped in cloth and transferred as soon as possible to the mortuary area.
  - There is no need to disinfect the body before transfer to the mortuary area.
  - Body bags are not necessary, although they may be used for other reasons (e.g. excessive leakage of body fluid leakage) (*23*).

8.12 Fire safety system

As in all health facilities, a system should be in place to prevent fire (e.g. no smoking) and to alert and contain if there is a fire (siren, smoke detectors, carbon monoxide detectors, bell, fire extinguishers, fire blankets, hoses), as well as an evacuation procedure if the fire cannot be contained (first from the zone where the fire actually is to another zone and, if needed, outside of the facility). Everything possible should be done to prevent mixing of suspected and confirmed patients (e.g. separate evacuation zones), but of course saving lives is the most important action in case of fire.

Staff should be trained on using the fire safety system, and contacts with the local fire department should be initiated early on, including informing the fire department on IPC measures in place.

These basic indications should always be followed:

- fire training is given to the personnel, especially to the security and maintenance personnel;
- the telephone number of the fire service is put in a visible position;
- the evacuation route is signposted;
- ABC[1] 6 kg powder extinguishers are sited in wards, stores and offices; and
- 6 kg carbon dioxide extinguishers are sited in the area of the generators and electrical boards.

8.13 Electricity and illumination

Sufficient and safe power supply and lighting for clinical care and support services is a key component for fulfilling all needs for this type of set-up where clinical care teams and facilities require reliable power and lighting (*see Fig. 8.7*). The electric system should be made available for:

- general illumination, around the perimeter and in the main paths;
- specific illumination (cable 2 × 1.5 mm)
  - in beds
  - in rooms; and
- Sockets and point for electricity (3G2.5 mm^2)
  - in beds for patient's use;
  - for medical equipment: oxygen, X-ray, fridge, laboratory.

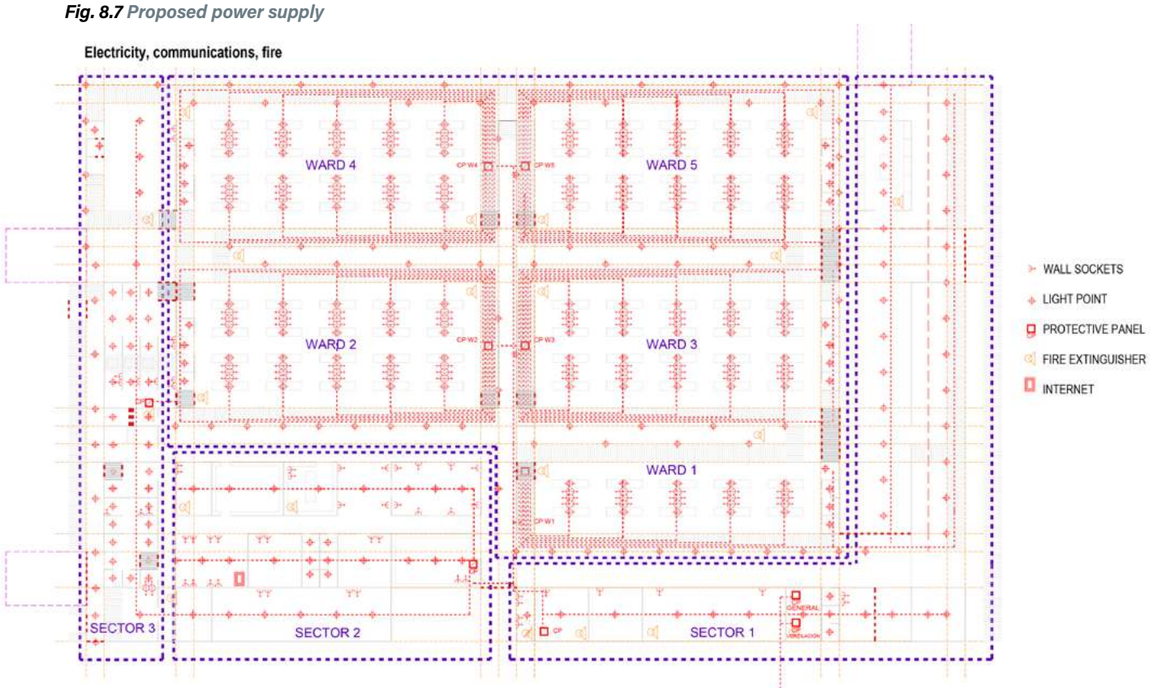
All circuits and electrical cabling and boards must be rated for their intended use and should be installed and certified for use by a qualified electrician in the site, with regular maintenance checks performed (using similar routines as per normal health clinic electrical equipment in their country). The recommended set-up for wiring[2] where there are no underground pass ways would be an aerial installation, with cables following the security area paths to avoid contact with anyone in the facility.

Generators can produce noise that can interfere with patients' rest and the centre's communication. A quiet generator model should be chosen, or, if not, a location should be chosen to avoid possible annoyance. If the supply is by means of the local power supply network, generators should be installed as an auxiliary system. A 50-kVA generator is needed as back-up.

Generators and electrical boards should be centralized, to facilitate their control. The different circuits should be independent, especially those specific to the high-risk area, which should have independent power and lighting circuits.

The high-risk area should be lit from the low-risk area where possible, and its switching should always be controlled from the low-risk area. All dimensioning is made available for the 180-bed model. The use of LED lamps for the exterior is recommended. The electrical system should be aerial but if it goes underground, it should be protected. Attempts should be made to adapt the lighting in the patient area so that it is sufficient during the night, but also guarantees an atmosphere that is suitable for rest and privacy.

***Fig. 8.7** Proposed power supply*



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9	[1] *In this document, suspected and probable cases will be treated as one category.*
12	[1] *The WHO Regional Office for Europe has developed a suite of complementary surge calculators (2), including two for health workforces. All tools use the same base clinical attack rate ranges and classify the health workforce using International Labour Organization International Standard Classification of Occupations codes (3), but their outputs are intentionally different due to their primary focus.* [2] *WHO has developed another complementary surge calculator that provides specific, focused outputs, including detailed quantifications of equipment and consumables (4).*
16	[1] *per 20 inpatients (separated for men, women, children and health workers).*
45	[1] *A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:* *A. face-to-face contact with a probable or confirmed case within 1 m and for more than 15 min;* *B. direct physical contact with a probable or confirmed case;* *C. direct care for a patient with probable or confirmed COVID-19 without using proper PPE; or* *D. other situations as indicated in local risk assessments.*
48	[1] *A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:* *A. face-to-face contact with a probable or confirmed case within 1 m and for more than 15 min;* *B. direct physical contact with a probable or confirmed case;* *C. direct care for a patient with probable or confirmed COVID-19 without using proper PPE; or* *D. other situations as indicated in local risk assessments.*
73	[1] *See detailed calculations and assumptions in Web Annex 5.*
75	[1] *See detailed calculations and assumptions in Web Annex 5.*
77	[1] *See detailed calculations and assumptions in Web Annex 5.*
78	[2] *See detailed calculations and assumptions in Web Annex 5.*
85	[1] *ABC dry powder extinguisher is a multi-purpose extinguisher suitable for use on Class A, B and C fires involving combustible solids, flammable liquids and gases.* [2] *See Web Annex 3 for detailed electrical layout.*

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COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

1

WEB ANNEX

Analysis tool for construction of COVID-19 community facilities and treatment centres

World Health Organization

Context

- [ ] To obtain information on the characteristics of pre-existing health infrastructures
- [ ] To choose a location with appropriate characteristics
- [ ] Good access and communications
- [ ] To guarantee good access to the infrastructures
- [ ] To understand the physical characteristics of the environment
- [ ] To obtain information about the socio-cultural characteristics of the location

WHO reference no.:

Areas of analysis

1. Functional-spatial analysis

Area 1 Triage/admission and registration area

- [ ] Entry
- [ ] Reception
- [ ] Waiting room
- [ ] Crash room
- [ ] Triage
- [ ] Sample area
- [ ] Admission
- [ ] Waiting for results room
- [ ] Exit
- [ ] Bathrooms

Area 2 Technical area

Clinical

- [ ] Entry for staff
- [ ] Office
- [ ] Personal access
- [ ] Changing room
- [ ] Store PPE
- [ ] Storage scrubs
- [ ] Bathrooms
- [ ] Rest/leisure, staff
- [ ] Coordination area
- [ ] Meeting point
- [ ] Laboratory
- [ ] Pharmacy
- [ ] Donning room
- [ ] Changing rooms male/female

Operational support

- [ ] Technical room
- [ ] Water supply
- [ ] Equipment warehouse
- [ ] Electricity area
- [ ] Laundry
- [ ] Drying area
- [ ] Sterilization
- [ ] Doffing area
- [ ] Waste area 1
- [ ] Waste area 2
- [ ] Rest area
- [ ] Mortuary store
- [ ] Transfer of deceased patients
- [ ] Visitors' and relatives' area
- [ ] Waste management area
- [ ] Sterilization room
- [ ] Bathroom

Area 3 Wards

Inpatient area (Module of 40 beds)

- [ ] Entrance
- [ ] Wards
- [ ] Water modules
- [ ] Storage modules
- [ ] Rest area for patients
- [ ] Exit, staff with PPE
- [ ] Doffing area
- [ ] Bathrooms
- [ ] Exit, not admitted patients

Area 3 Wards - *continued*

High supervision (Module of 20 beds)

- ☐ Wards
- ☐ Crash room
- ☐ Discharge shower
- ☐ Bathrooms

Area 4 Other complementary areas

- ☐ Resting areas for staff
- ☐ Kitchen
- ☐ Living room
- ☐ Parking
- ☐ Visitors' area
- ☐ Warehouse, external
- ☐ Control and security points

Access and routes: entrances, exits, paths and zones

- ☐ Vehicle access: ambulances, logistics, personnel, visitors
- ☐ Footpaths: patients, staff, visitors
- ☐ Equipment path: contaminated/ uncontaminated
- ☐ Waste path
- ☐ Signage

2. Technical programme

Inspection of technical infrastructure

- ☐ Structural system
- ☐ Construction system
- ☐ Electricity and lighting system
- ☐ Fire prevention and extinguishing system
- ☐ Telecommunications system
- ☐ Medical equipment
- ☐ Laboratory equipment
- ☐ Oxygen system
- ☐ Furniture

- ☐ Water system
  - ☐ storage
  - ☐ treatment
  - ☐ distribution system
  - ☐ water points

- [ ] Sanitation and hygiene system
  - [ ] WC
  - [ ] showers
  - [ ] drainage greywater
  - [ ] drainage blackwater
- [ ] Waste management
  - [ ] general waste
  - [ ] infectious waste
  - [ ] sharp waste
  - [ ] treatment technology

3. Implementation needs

- [ ] Physical and technical definition (drawings and documentation)
- [ ] Human resources
- [ ] Materials, resources and tools
- [ ] Timeline
- [ ] Budget
- [ ] Conservation and maintenance programme

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

WEB ANNEX

Criteria for the reuse of the spaces

World Health Organization

WHO reference no.:

Spaces for reuse as COVID-19 community facilities and treatment centres

<table>
<tr><td>Location</td><td colspan="2">» Strategic location, close to or well connected with the health system.
» Strategic location in relation to urban hubs.
» Communications: accessible for pedestrians and vehicles.
» Roads and perimeters appropriate for ambulances and trucks.
» Connection with public transport.
» Distant from other crowded places (markets, schools, etc.)</td></tr>
<tr><td>Relevant characteristics</td><td>» Flexibility: capacity to adapt the space for different uses.
» Wide spaces: large spaces (wide with high ceilings) without obstacles.
» Accessibility: entries, circuits and spaces accessible for population.
» IPC-friendly.
» Parking: areas for vehicles or logistic uses.
» Storage: areas to store materials safely and in good condition (dry, clean), including medical, logistic and technical equipment.</td><td>» Comfort: Places with comfortable areas to work, offices, rooms, outdoor spaces.
» Privacy: Possible areas for private activities (meetings, rest, psychological support, etc.).
» Roofing: Consider whether the space is covered or could be.
» Floor: Suitable floor covering to allow cleaning, disinfection and maintenance.
» Materials: The surfaces can be easily cleaned and disinfected.
» Support areas and services: laundry, kitchen, security, maintenance, etc.</td></tr>
<tr><td>Facilities</td><td>» Consider the state of existing facilities for the following:
• water (quantity and quality)
• sanitation: drainage grey- and blackwater
• toilets and showers
• electricity and illumination
• communication
• area for waste management
• fire system
• air conditioning
• security.</td><td>» Possibilities to install new facilities: WCs, showers, kitchen, etc.
» Consider installing other systems: medical equipment (oxygen, X-ray machines, call for nurses)
» Consider increasing the existing facilities: waste management, electricity, fire safety system, etc.</td></tr>
<tr><td>Comfort level</td><td colspan="2">» Consider the control and improvement of:
• ventilation system (natural and forced)
• air flow
• temperature
• humidity
• illumination
• noise levels.</td></tr>
<tr><td>Others</td><td colspan="2">» Impact of the use of the building in the medium and long term.
» Capacity to adapt systems and dismantle them without damage to the building.
» Capacity to provide accommodation for staff if needed.
» Human resources: companies or assembly teams to assemble and disassemble the facilities, laundry service, catering service, security service, etc.
» Community acceptance.</td></tr>
</table>

Possible locations and their main characteristics

	ADVANTAGES	DISADVANTAGES
Exhibition halls, congress venues, events spaces	Communication Logistics Extra support services	Potential difficulties with adding new systems or facilities
Sports pavilions	Location Communication	Size may be insufficient
Stadiums, sports fields	Size IPC friendly	Lack of roof Floor not appropriate
Hotels, resorts	Comfort Extra support services	No visual control for the staff Not IPC friendly Potential difficulties with logistics
Warehouses	Big space Easily adaptable Easy to install facilities	Location Lack of comfort
Airports and ports	Big size Good communications Extra support services	Location

Possible locations and their main characteristics

	LOCATION	SIZE	PHYSICAL CHARACTERISTICS	FLEXIBILITY	FACILITIES	IPC FRIENDLY	LOGISTICS CHARACTERISTICS	COMFORT
Exhibition halls, congress venues, event spaces								
Sports pavilions								
Stadiums, sports fields								
Hotels, resorts								
Warehouses								
Airports and ports								

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

3

WEB ANNEX

Detailed plans

World Health Organization

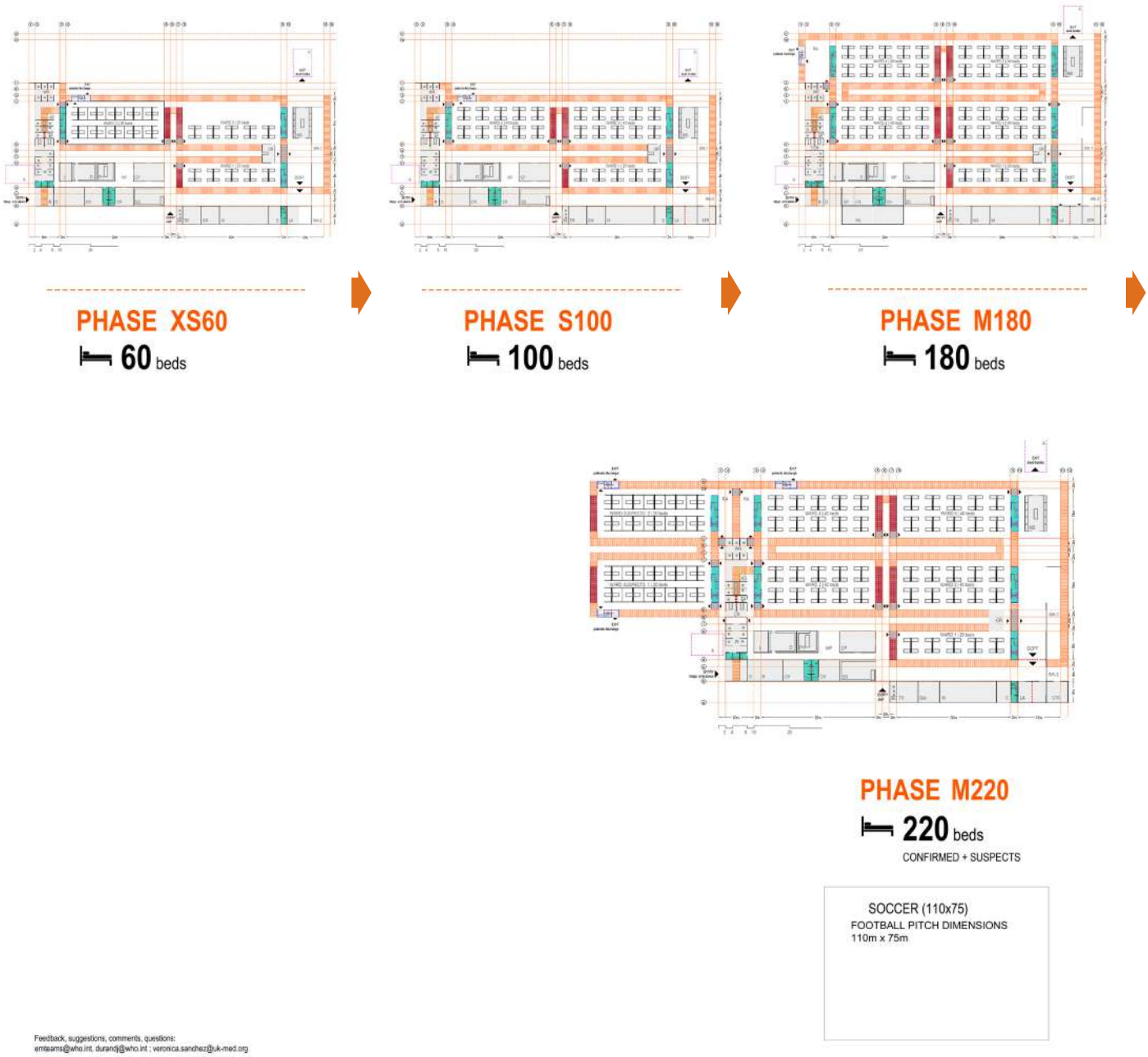
For further information, suggestions or comments on the plans included in this document, contact emteams@who.int

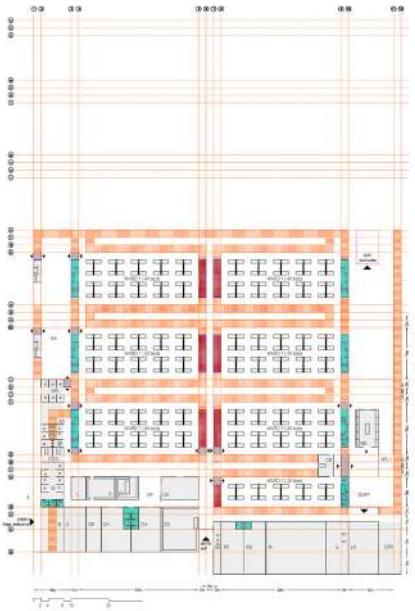
WHO reference no.:

Contents

Fig. A3.1

Scaling up plan – strategy from S to XL





PHASE L260

260 beds

PHASE L340

340 beds

PHASE XL420

420 beds

STADIUM (180x100)

STADIUM FIELD DIMENSION
180 m x 100 m

PHASE XL500

500 beds

Fig. A3.2

Alternative plan – layout for 100 beds

Feedback, suggestions, comments, questions:
emtasms@who.int, durandj@who.int ; veronica.sanchez@uk-med.org

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A AMBULANCES
AD ADMISSION
CP COORDINATION POINT
CH CHANGING ROOM
CR CRASH ROOM
D DONNING
DF DOFFING
E ELECTRICITY
EW EQUIPMENT WAREHOUSE
L LABORATORY
LA LAUNDRY
MO MORGUE
MP MEETING POINT
O OFFICE
PH PHARMACY
R RECEPTION
RA REST AREA PATIENTS
RL REST/LEISURE STAFF
T TRIAGE
TA TESTING AREA
TR TECHNICAL ROOM
S STORAGE
SE SECURITY POINT
SS STORAGE SCRUBS
STR STERILIZATION ROOM
SP STORE PPE
W WAITING ROOM
WR WAITING RESULTS
WA WASTE AREA
WC WC
WS WATER SUPPLY

SECURITY DISTANCE (2 m)
ENTRY POINT
STORE
WASH

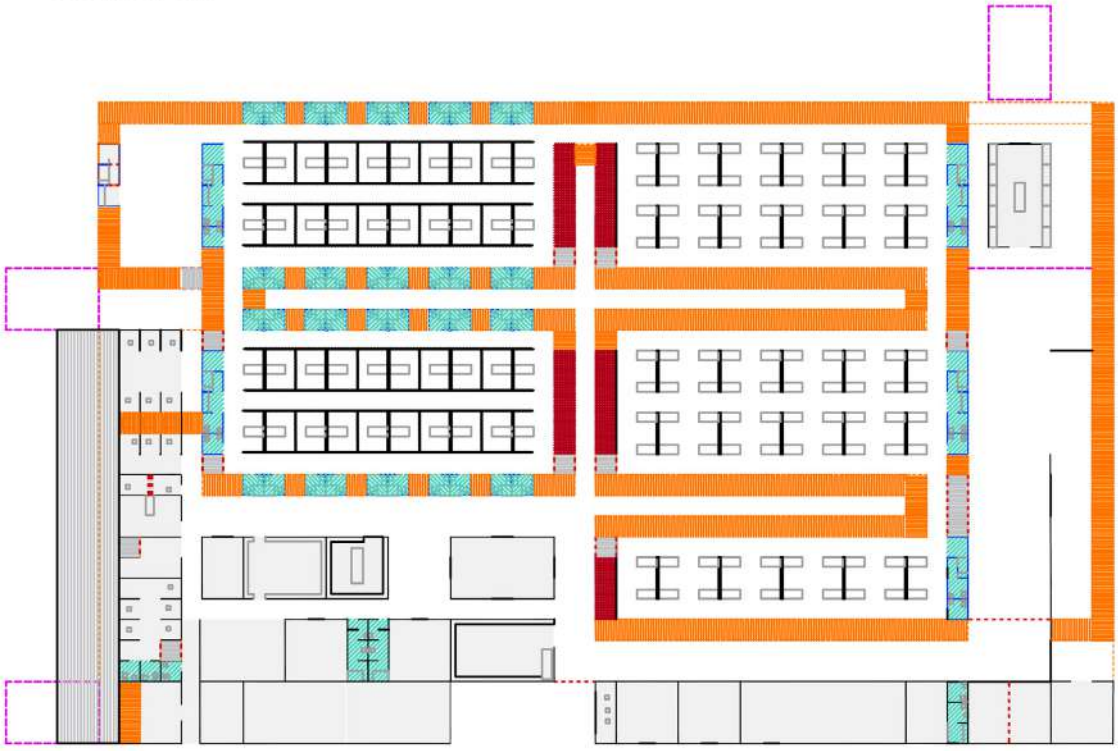
CTC-S100

CTC_S100 (SMALL SIZE)
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400 - 1/600

Fig. A3.3

Alternative plan – layout for 180 beds

CTC-M180-90s



CTC-M180-40s+100c

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A AMBULANCES
AD ADMISSION
CP COORDINATION POINT
CH CHANGING ROOM
CR CRASH ROOM
D DONNING
DF DOFFING
E ELECTRICITY
EW EQUIPMENT WAREHOUSE
L LABORATORY
LA LAUNDRY
MO MORGUE
MP MEETING POINT
O OFFICE
PH PHARMACY
R RECEPTION
RA REST AREA PATIENTS
RL REST/LEISURE STAFF
T TRIAGE
TA TESTING AREA
TR TECHNICAL ROOM
S STORAGE
SE SECURITY POINT
SS STORAGE SCRUBS
STR STERILIZATION ROOM
SP STORE PPE
W WAITING ROOM
WR WAITING RESULTS
WA WASTE AREA
WC WC
WS WATER SUPPLY

SECURITY DISTANCE (2 m)
ENTRY POINT
STORE
WASH

CTC-M180

CTC_M180 (SMALL SIZE)
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400 - 1/600

Fig. A3.4

Alternative plan – layout for 260 beds (suspected area and confirmed area)

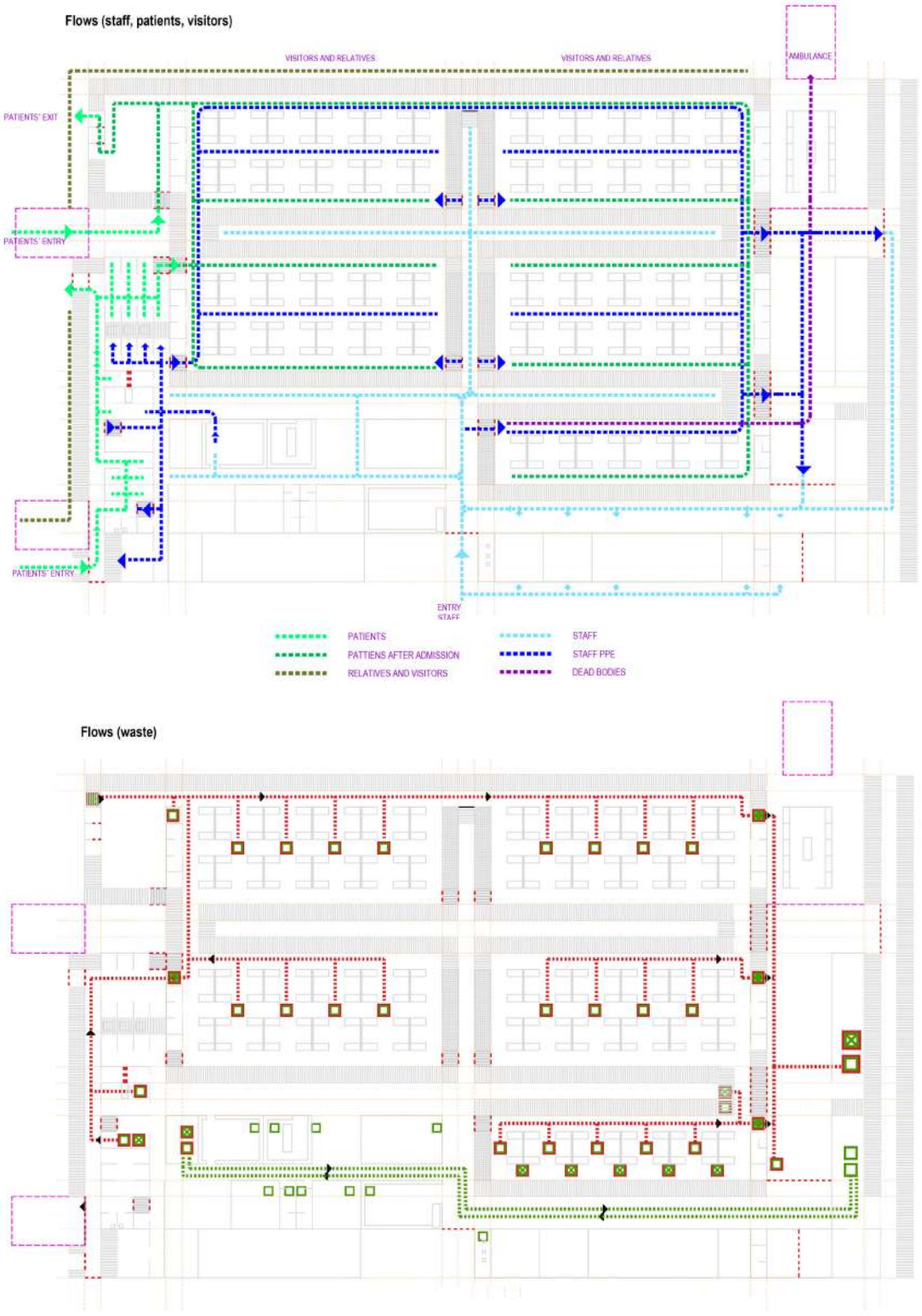

CTC-L260-260c
ENTRY patients
EXIT no suspected cases of COVID-19
ENTRY ambulance
waiting shadow area
EXIT no isolated patients
ENTRY Ambulance confirmed cases Triage
EXIT patients discharged
EXIT patients discharged
SCREENING
W
DF
T
TA
WR
AD
RA
O
R/L
SP
CH
CH
L
D
PH
MP
CA
SS
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
ENTRY staff
SE
TR
WS
M
E
LA
WARD 1 | 20 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
DOFF
WA-2
WA-1
DOFF
DOFF
DOFF
MS
EXIT dead bodies

Fig. A3.5

Alternative plan – layout for 500 beds

Fig. A3.6

Plan of layout showing patient and staff flows



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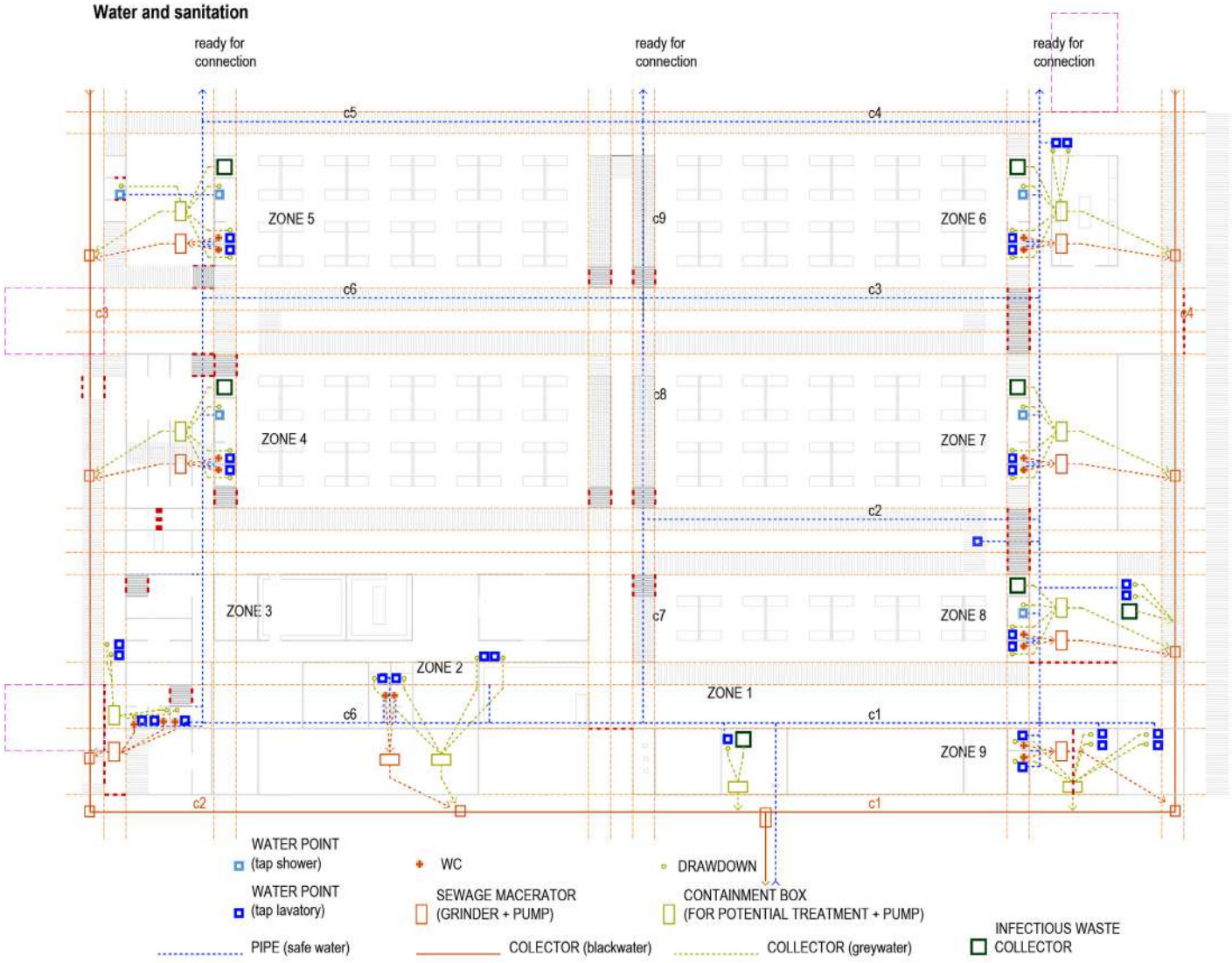
F2-FLOWS

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/500

Fig. A3.7

Plan of facilities



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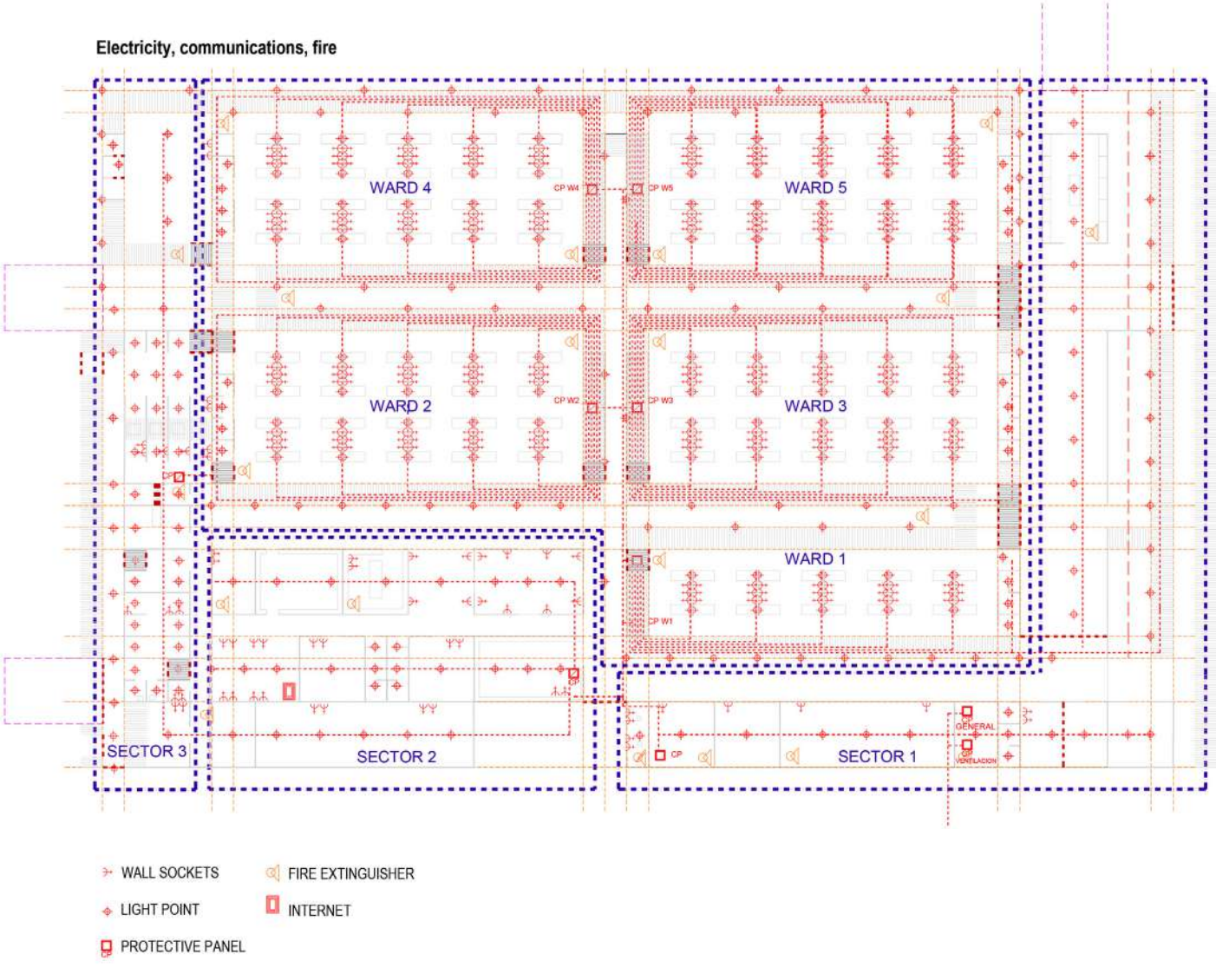
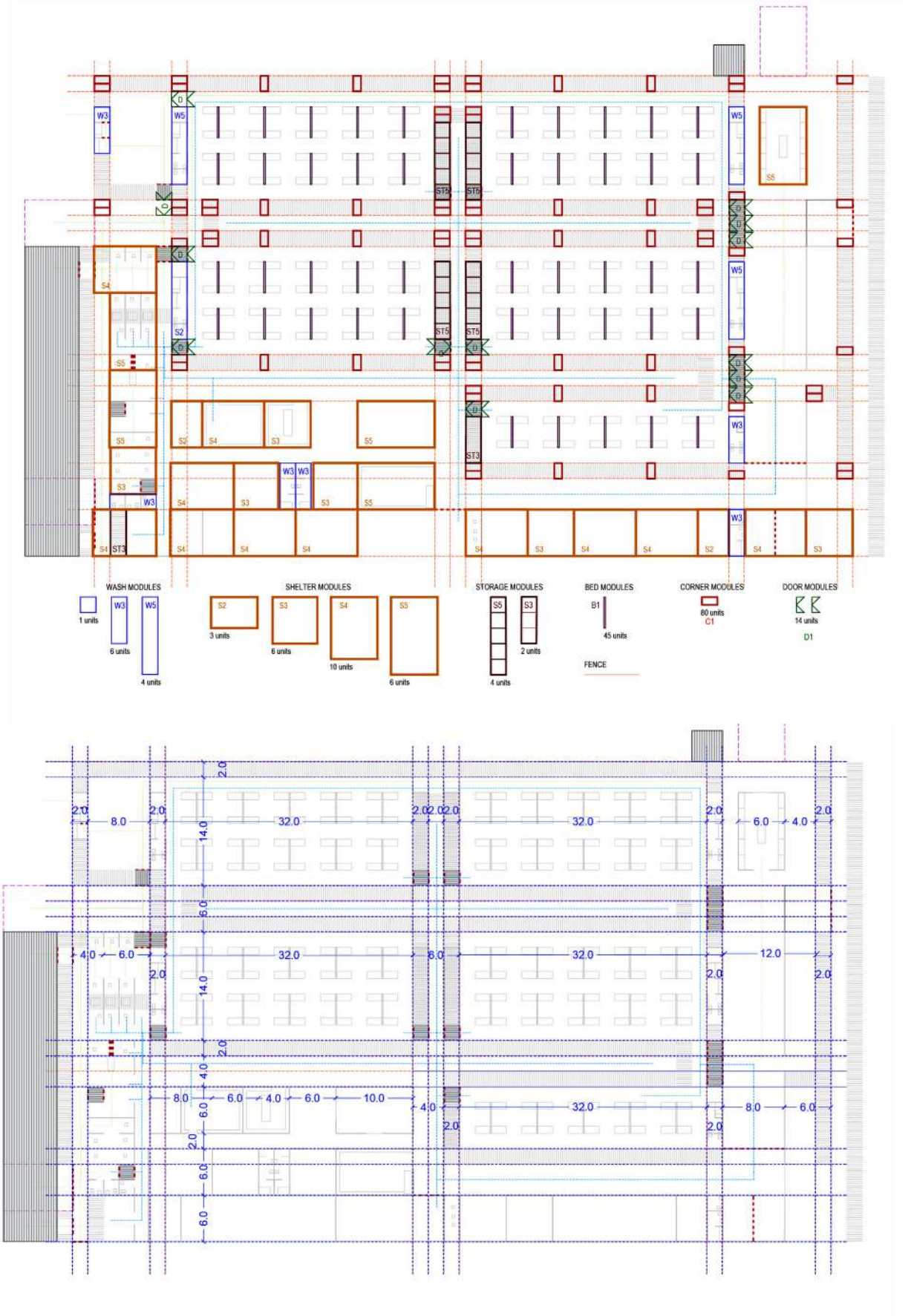


F1-FACILITIES

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/500

Fig. A3.8

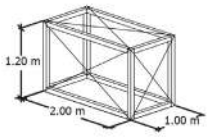
Plan of structures



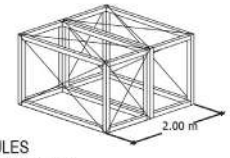
CORNER MODULES
fences support, lighting support, storage....

C1

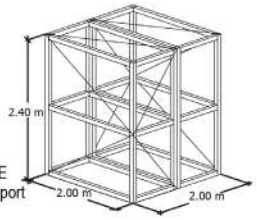
WOODEN VERSION
- Wooden profiles 80 x 80 mm
- Steel cable diagonals with turnbuckles



BASIC MODULE

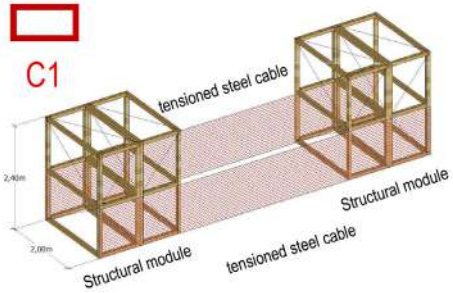


2 x BASIC MODULES
shaping the structural module



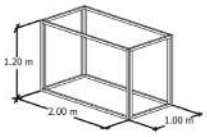
HIGH MODULE
for lighting support

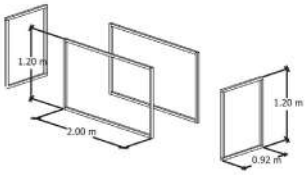
C1



C1

STEEL VERSION
- Steel profiles 40 x 40 mm
- Frames made of welded profiles, screwed together



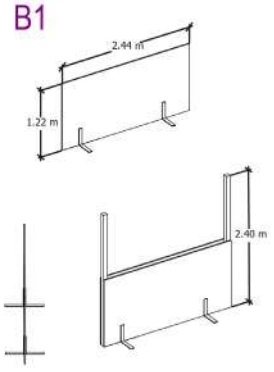


BED PANELS: support for facilities

- OSB panel of standard dimensions (1.22 x 2.44 m), 20 mm thick
- Metal angles 30 x 30 cm, 40 cm from the end of the panel.

DOUBLE HEADBOARD with high profiles
with hoops on the top to receive
electrical cables

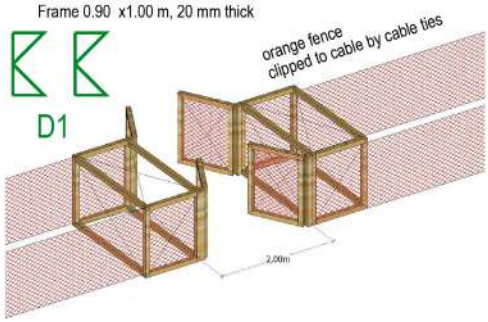
B1



DOORS

Frame 0.90 x1.00 m, 20 mm thick

D1



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C1-STRUCTURE

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400

Fig. A3.9

Detailed view of ward modules

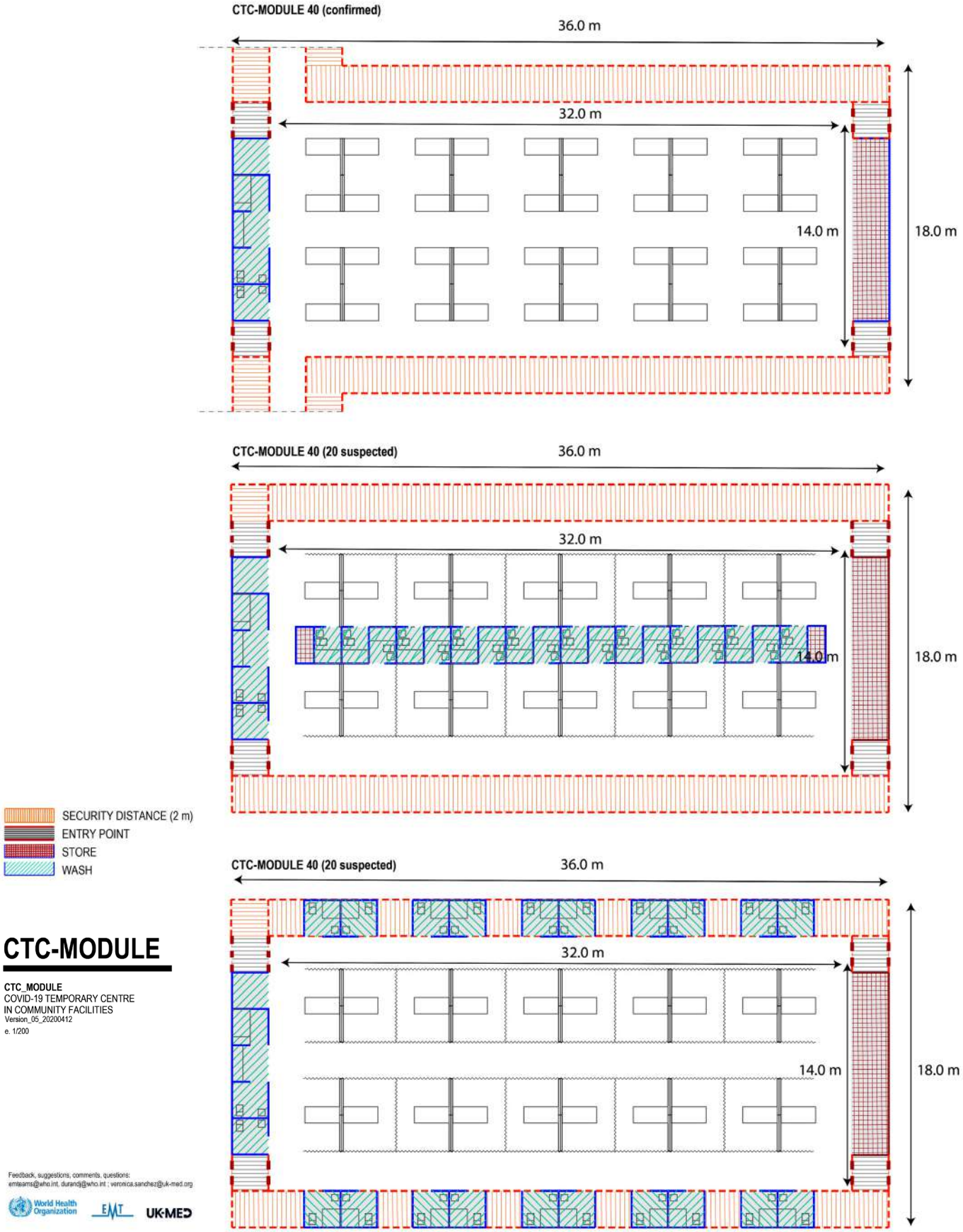
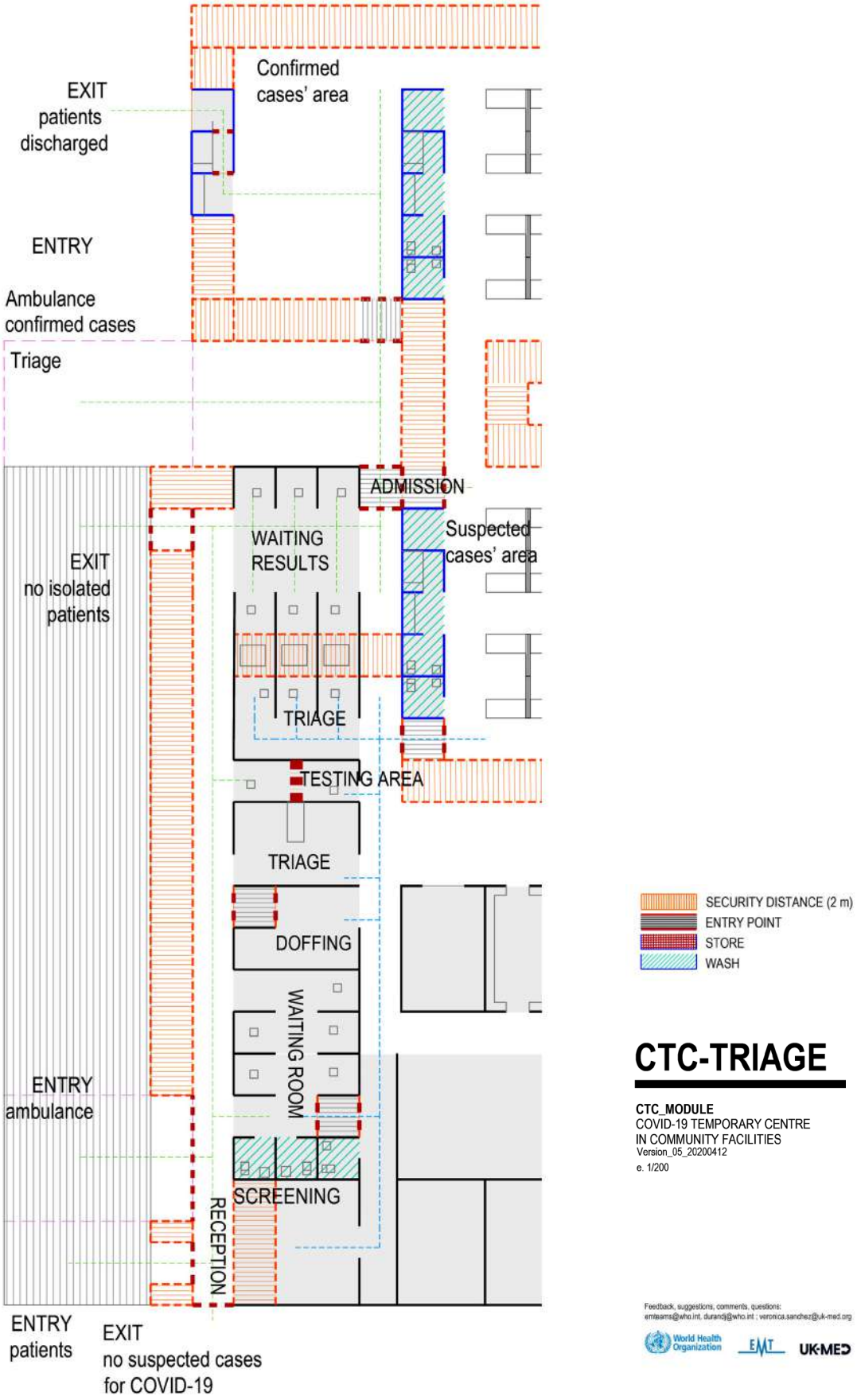


Fig. A3.10

Detailed view of screening and triage



COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

4

WEB ANNEX

Bill of quantities

World Health Organization

WHO reference no.:

Source: *This publication: COVID-19 community facilities and treatment centres*

C1. STRUCTURES

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Structure water modules W3 (2 m × 6 m × 2.40 m)	pieces	5	6	7	8	9	10
Structure water modules W5 (2 m × 10 m × 2.40 m)	pieces	2	4	6	8	10	12
Structure shelter modules Sh2 (6 m × 4 m × 2.40 m)	pieces	3	3	3	3	3	3
Structure shelter modules Sh3 (6 m × 6 m × 2.40 m)	pieces	6	6	6	6	6	6
Structure shelter modules Sh4 (6 m × 8 m × 2.40 m)	pieces	7	8	9	10	11	12
Structure shelter modules Sh5 (6 m × 10 m)	pieces	6	6	6	6	6	6
Structure storage module St3 (2 m × 6 m × 1.20 m)	pieces	2	2	2	2	2	2
Structure storage module St5 (2 m × 10 m × 1.20 m)	pieces	3	4	5	6	7	8
Structure doors module (2 m × 1.2 m – 2 units)	pieces	8	10	12	14	16	18
Structure corner module (2 m × 1.2 m × 1 m)	pieces	28	80	132	184	236	288
Structure beds module (1.2 m × 2.4 m × 0,10 m)	pieces	25	45	65	85	105	125
Fence	m	600	1,000	1,400	1,800	2,200	2,600
Floor (not considered – to build in existing facility)	m^2	5,000	7,000	10,000	12,000	14,000	16,000
Roofing (not considered – to build in existing facility)	m^2	0	0	0	0	0	0

F1. SANITATION

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
WC cubicles superstructure (gender-appropriate)	pieces	5	6	7	8	9	10
Plastic or resin latrine slabs 1.20 × 1.80	pieces	12	16	20	24	28	32
P-Trap adaptor	pieces	12	16	20	24	28	32
Commode toilet seat	pieces	12	16	20	24	28	32

F1. SANITATION *continued*		**Model S 100 beds**	**Model L 180 beds**	**Model L 260 beds**	**Model L 340 beds**	**Model XL 420 beds**	**Model XL 500 beds**
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Flexible irrigation hose 3/4" with nozzle	pieces	12	16	20	24	28	32
Teflon	rolls	30	40	50	60	70	80
Basin	pieces	5	7	9	11	13	15
Grease trap	pieces	8	10	12	14	16	18
Grey water pump	pieces	8	10	12	14	16	18
Shower (1 × 20 persons)	pieces	10	14	18	22	26	30
Macerator	pieces	7	9	11	13	15	17
32 mm flexible grey PVC pipe	lineal metres	240	300	360	420	480	540
32 mm PVC gate valve	pieces	10	12	14	16	18	20
32 mm PVC tee	pieces	16	20	24	28	32	36
PVC glue	tubes	14	18	22	26	30	34
90 mm rigid PVC pipe	lineal metres	150	210	270	330	390	450
90 mm rigid PVC wye (Y) connection		4	8	12	16	20	24

F1. WATER DISTRIBUTION NETWORK		**Model S 100 beds**	**Model L 180 beds**	**Model L 260 beds**	**Model L 340 beds**	**Model XL 420 beds**	**Model XL 500 beds**
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
High-density polyethylene (HDPE) pipe 25 mm	m	336	560	784	1,008	1,232	1,456
Tee 25 mm	pieces	22	32	42	52	62	72
Elbow 25 mm	pieces	2	4	6	8	10	12
Gate valves 25 mm	pieces	28	40	52	64	76	88
Water supply points connections	connections	22	28	34	40	46	52
PVC reducer 1"× 3/4"	pieces	22	28	34	40	46	52
PVC pressure tubing 3/4 "	pieces	22	28	34	40	46	52
PVC ball valves 3/4 "	pieces	22	28	34	40	46	52

F1. WATER DISTRIBUTION NETWORK *continued*		Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Elbow action taps 3/4 "	pieces	22	28	34	40	46	52
Sink	pieces	10	16	22	28	34	40
PVC valve, tank outlet 1 1/2"	pieces	4	10	16	22	28	34
Tanks HDPE 5000 L	pieces	4	10	16	22	28	34
Red plastic paint (5 kg)	pieces	3	4	5	6	7	8
Yellow plastic paint (5 kg)	pieces	3	4	5	6	7	8
Green plastic paint (5 kg)	pieces	3	4	5	6	7	8
Teflon	rolls	100	120	140	160	180	200

F2. ELECTRICITY

		Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Generator 250 KVA	pieces	1	1	1	1	1	11
Protective electrical panels	pieces	8	9	10	11	12	13
Earthing system	pieces	1	1	1	1	1	45
Cable 2 × 1.5 mm	m	2,770	3,000	3,230	3,460	3,690	3,920
Cable 3G2.5 mm	m	4,680	5,000	5,320	5,640	5,960	6,280
Cable 5G6 mm	m	200	200	200	200	200	200
Cable 5G16 mm	m	500	500	500	500	500	500
Cable 4 × 25 mm	pieces	50	50	50	50	50	50
Staples for cable (100-unit box)	pieces	23	25	27	29	31	33
Connection boxes	pieces	138	150	162	174	186	198
Connection plugs	pieces	138	150	162	174	186	198
Wall sockets	m	560	620	680	740	800	860
LED lights 10W		120	160	200	240	280	320
Metal tray for cable conduction		160	200	240	280	320	360

F2. TELECOMS

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Radio system	pieces	1	1	1	1	1	1
Internet system	pieces	1	1	1	1	1	1

F2. FIRE SAFETY

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Extinguishers CO_2 6 kg	pieces	18	22	26	30	34	38
Extinguishers ABC powder 6 kg	pieces	2	2	2	2	2	2

F2. VENTILATION

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Individual ventilators		100	180	260	260	420	500
Portable high efficiency particulate air (HEPA) filtration units		3	5	7	7	11	13

F4. WASTE MANAGEMENT

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Pedal opening bins 30 L (infectious waste)	pieces	22	30	38	46	54	62
Biohazard bags	pieces	1,500	2,000	2,500	3,000	3,500	4,000
IPC box 3 L (sharp waste)	pieces	8	10	12	14	16	18
IPC bins 30 L (general waste)	pieces	9	10	11	12	13	14
IPC wheeled bins 120 L (3 colours)	pieces	3	3	3	3	3	3
IPC bucket for disinfection 120 L	pieces	2	2	2	2	2	2
Pressure washer	pieces	1	1	1	1	1	1

F4. HYGIENE AND ENVIRONMENTAL CLEANING

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Liquid soap dispensers	pieces	10	16	22	28	34	40
Liquid soap	pieces	70	90	110	130	150	170
Alcohol-based hand rub	pieces	60	108	156	204	252	300
Chlorine, NaDCC 65%	pieces	40	60	80	100	120	140
IPC bucket for laundry 120 L	pieces	8	12	16	20	24	28
IPC bucket for washing 15 L	pieces	6	10	14	18	22	26
IPC sprayers 10 L	pieces	3	4	5	6	7	8
IPC body bags	pieces	10	40	70	100	130	160
IPC mops	pieces	4	6	8	10	12	14

F4. EQUIPMENT AND FURNITURE

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Medical equipment, X-ray	pieces	2	2	2	2	2	2
Furniture, tables	pieces	6	8	10	12	14	16
Furniture, chairs	pieces	40	50	60	70	80	90
Furniture, mirrors	pieces	19	21	23	25	27	29
Furniture, clocks	pieces	8	10	12	14	16	18
Furniture, benches	pieces	6	6	6	6	6	6
Furniture, shelves	pieces	12	12	12	12	12	12
Furniture, beds	pieces	102	182	262	342	422	502
Signage	pieces	36	40	44	48	52	56

F2. TELECOMS

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Structure, water modules W1 (2 m × 1.5 m × 2.40 m)		20	0	4
Structure, water modules W3 (2 m × 6 m × 2.40 m)	pieces	1	1	0
Structure, water modules W5 (2 m × 10 m × 2.40 m)	pieces	0	0	4
Structure, shelter modules Sh2 (6 m × 4 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh3 (6 m × 6 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh4 (6 m × 8 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh5 (6 m × 10 m)	pieces	0	0	2
Structure, storage module St3 (2 m × 6 m × 1.20 m)	pieces	0	0	2
Structure, storage module St5 (2 m × 10 m × 1.20 m)	pieces	1	1	6
Structure, doors module (2 m × 1.2 m – 2 units)	pieces	2	2	-24
Structure, corner module (2 m × 1.2 m × 1 m)	pieces	14	14	5
Structure, beds module (1.2 m × 2.4 m × 0.10 m)	pieces	10	10	200
Fence	m	220	220	3,000
Floor (not considered – to build in existing facility)	m^2	648	648	3,000
Roofing (not considered – to build in existing facility)	m^2	648	648	0

SIPA, specific inpatient profile area.

F1. SANITATION

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
WC cubicles superstructure (taking into account gender)	pieces	20	2	8
Plastic or resin latrine slabs 1.20 × 1.80	pieces	20	2	8
P-trap adaptor	pieces	20	2	8
Commode toilet seat	pieces	20	2	8
Flexible irrigation hose 3/4" with nozzle	pieces	20	2	8
Teflon	rolls	12	2	20
Basin	pieces	20	2	3
Grease trap	pieces	2	1	6
Grey water pump	pieces	1	1	6
Shower (1 × 20 persons)	pieces	20	1	6
Macerator	pieces	1	1	5
32 mm flexible grey PVC pipe	lineal metres	240	60	180
32 mm PVC gate valve	pieces	4	2	8
32 mm PVC tee	pieces	4	2	12
PVC glue	tubes	16	2	10
90 mm rigid PVC pipe	lineal metres	100	25	90
90 mm rigid PVC wye (Y) connection		18	4	0

F1. WATER DISTRIBUTION NETWORK

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
HDPE pipe 25 mm	m	140	112	112
Tee 25 mm	pieces	22	5	12
Elbow 25mm	pieces	2	2	0
Gate valves 25 mm	pieces	22	6	16
Water supply points connections	connections	22	3	16
PVC reducer 1"× 3/4"	pieces	22	3	16
PVC pressure tubing 3/4"	pieces	22	3	16

F1. WATER DISTRIBUTION NETWORK *continued*		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
PVC ball valves 3/4"	pieces	22	3	16
Elbow action taps 3/4"	pieces	22	3	16
Sink	pieces	22	3	4
PVC valve, tank outlet 1 1/2 "	pieces	0	0	-2
Tanks HDPE 5000 L	pieces	0	0	-2
Red plastic paint (5 kg)	pieces	0	0	2
Yellow plastic paint (5 kg)	pieces	0	0	2
Green plastic paint (5 kg)	pieces	0	0	2
Teflon	rolls	48	12	80

F2. ELECTRICITY

		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Generator 250 KVA	pieces	0	0	1
Protective electrical panels	pieces	1	1	7
Earthing system	pieces	0	0	1
Cable 2 × 1.5 mm	m	115	115	2,540
Cable 3G2.5 mm	m	160	160	4,360
Cable 5G6 mm	m	0	0	200
Cable 5G16 mm	m	0	0	500
Cable 4 × 25	pieces	0	0	50
Staples for cable (100-unit box)	pieces	1	1	21
Connection boxes	pieces	6	6	126
Connection plugs	pieces	6	6	126
Wall sockets	m	30	40	500
LED lights 10W	pieces	20	20	80
Metal tray for cable conduction	pieces	20	20	120

F2. TELECOM

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Radio system	pieces	0	0	1
Internet system	pieces	0	0	1

F2. FIRE SAFETY

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Extinguishers CO_2 6 kg	pieces	2	2	14
Extinguishers ABC powder 6 kg	pieces	0	0	2

F2. VENTILATION

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Individual ventilators	pieces	20	40	20
Portable HEPA filtration units	pieces	2	1	1

F4. WASTE MANAGEMENT

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Pedal opening bins 30 L (infectious waste)	pieces	4	4	14
Biohazard bags	pieces	250	250	1,000
IPC box 3 L (sharp waste)	pieces	2	2	6
IPC bins 30 L (general waste)	pieces	0	0	8
IPC wheeled bins 120 L (3 colours)	pieces	0	0	3
IPC bucket for disinfection 120 L	pieces	0	0	2
Pressure washer	pieces	0	0	1

F4. HYGIENE AND ENVIRONMENTAL CLEANING		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Liquid soap dispensers	pieces	20	3	4
Liquid soap	pieces	10	10	50
Alcohol-based hand rub	pieces	24	24	12
Chlorine, NaDCC 65%	pieces	10	10	20
IPC bucket for laundry 120 L	pieces	2	2	4
IPC bucket for washing 15 L	pieces	2	2	2
IPC sprayers 10 L	pieces	1	1	2
IPC body bags	pieces	10	10	20
IPC mops	pieces	1	1	2

F4. EQUIPMENT AND FURNITURE		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Medical equipment, X-ray	pieces	0	0	2
Furniture, tables	pieces	1	1	4
Furniture, chairs	pieces	20	5	30
Furniture, mirrors	pieces	1	1	17
Furniture, clocks	pieces	1	1	6
Furniture, benches	pieces	0	0	6
Furniture, shelves	pieces	0	0	12
Furniture, beds	pieces	20	40	22
Signage	pieces	2	2	32

A1 Module, PPE

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YMEQGLASWSI--AI	GOGGLES PROTECTIVE, wraparound, soft frame, indirect vent	300	540	780	1020	1260	1500
PEXTALCOIG---AI	ALCOHOL-BASED HAND RUB, gel, 100 mL, bottle	60	108	156	204	252	300
EWASBAGBR007 -AI	BAG BIOHAZARD, REFUSE,AUTOCLAVABLE , 30 × 50 cm, yellow	100	180	260	340	420	500
EWASYCHN5GI--AI	CHLORINE NaDCC, 45–55%, granules, 1 kg, pot	8	15	21	28	34	40
CPPEGOWI3L---AI	GOWN,AAMI level 3, nonsterile, disp., size L	540	972	1404	1836	2268	2700
CPPEGOWI3M ---AI	GOWN,AAMI level 3, nonsterile, disp., size M	630	1134	1638	2142	2646	3150
CPPEGOWI3XL--AI	GOWN,AAMI level 3, nonsterile, disp., size XL	450	810	1170	1530	1890	2250
CPPEGOWI3XXL-AI	GOWN,AAMI level 3, nonsterile, disp., size XXL	180	324	468	612	756	900
CMSUGLENILI--AI	GLOVE EXAMINATION, nitrile, size L	22,00	3,960	5,720	7,480	9,240	11,000
CMSUGLENIMI--AI	GLOVE EXAMINATION, nitrile, size M	4,200	7,560	10,920	14,280	17,640	21,000
CMSUGLENISI--AI	GLOVE EXAMINATION, nitrile, size S	4,200	7,560	10,920	14,280	17,640	21,000
CMSUGLENIXL--AI	GLOVE EXAMINATION, nitrile, size XL	1,600	2,880	4,160	5,440	6,720	8,000
CPPEMASS2RL--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size L	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASS2RM--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size M	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASS2RS--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size S	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASPF205-AI	RESPIRATOR, mask, FFP2/N95, type IIR, single use, unvalved, noseclip	6,000	10,800	15,600	20,400	25,200	30,000
CPPEFSHIE002-AI	FACESHIELD,clear plastic, disp.	2,700	4,860	7,020	9,180	11,340	13,500
CMSUTHERIOI--AI	THERMOMETER, INFRARED, no contact, handheld	30	54	78	102	126	150
CINSCONTC51--AI	SAFETY BOX, needles/syringes, 5L, cardboard for incineration	40	72	104	136	168	200
OPACUN62BS1--AI	BOX, triple packaging, biological substance UN3373 + pouch	100	180	260	340	420	500
OPACUN621SI--AI	BOX, triple packaging, infectious substance UN2814	20	36	52	68	84	100
CMSUBAGB4A04-AI	BAG BODY, 8 handles, U-shaped zip, white, 400 microns, adult, 230 × 100 cm	20	36	52	68	84	100

A2.2 Personal protective equipment (PPE) and scrubs

Source: *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, WHO, March 2020*

Kit staff module, uniform × 4 shifts

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YPPESTUTROSS-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (S)	50	80	112	142	172	200
YPPESTUTROSM-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (M)	88	140	196	249	301	350
YPPESTUTROSL-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (L)	75	120	168	213	258	300
YPPESTUTROSXLAI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (XL)	38	60	84	107	129	150
OUFBOOTW38--AI	BOOTS, rubber, size (38), dark colour (green or black), pair	32	50	70	89	108	125
OUFBOOTW40--A1	BOOTS, rubber, size (40), dark colour (green or black), pair	63	100	140	178	215	250
OLIFBOOTW42--AI	BOOTS, rubber, size (42), dark colour (green or black), pair	50	80	112	142	172	200
OUFBOOTW44--AI	BOOTS, rubber, size (44), dark colour (green or black), pair	38	60	84	107	129	150
OLIFBOOTW46--A1	BOOTS, rubber, size (46),dark colour (green or black), pair	19	30	42	54	65	75

Kit nCoV hygienist staff module × 4 shifts: uniform and PPE

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YPPESTUTROSS-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (S)	50	80	112	142	172	200
YPPESTUTROSM-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (M)	88	140	196	249	301	350
YPPESTUTROSL-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (L)	75	120	168	213	258	300
YPPESTUTROSXLAI	SET, TUNIC+ TROUSERS SURGICAL. woven, reusable, green, size (XL)	38	60	84	107	129	150
OUFBOOTW38--AI	BOOTS, rubber, size (38),dark colour (green or black), pair	32	50	70	89	108	125
OUFBOOTW40--A1	BOOTS, rubber, size (40),dark colour (green or black), pair	63	100	140	178	215	250
OLIFBOOTW42--AI	BOOTS, rubber, size (42),dark colour (green or black), pair	50	80	112	142	172	200
OUFBOOTW44--AI	BOOTS, rubber, size (44), dark colour (green or black), pair	38	60	84	107	129	150
OLIFBOOTW46--A1	BOOTS, rubber, size (46),dark colour (green or black), pair	19	30	42	54	65	75
CPPEMASPF205-AI	RESPIRATOR, mask, FFP2/N95, type IIR, single use, unvalved, noseclip	48	64	80	96	112	128
YMEQGLASWSI–AI	GOGGLES PROTECTIVE, wraparound, soft frame, indirect vent	48	64	80	96	112	128
	APRON, disposable	1,440	1,920	2,400	2,880	3,360	3820
	APRON HEAVY DUTY, reusable	48	64	80	96	112	128

Kit COVID-19 – module medical equipment

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
Severe	Monitoring	Patient monitor	Equipment	MONITOR PATIENT, NIBP, w/o ECG, battery, trolley, +acc.	Per bed	1		80	80
Severe	Oxygen therapy	Pulse oximeter	Equipment	PULSE OXIMETER – FINGERTIP	Per bed	0.8		64	65
Severe	Oxygen therapy	Concentrator O^2	Equipment	CONCENTRATOR O2 10L, 230V, 50 Hz + acc.	Per bed	1		80	81
Severe	Oxygen therapy	Concentrator O^2	Accessories	(humidifier) HOSE CONNECTOR	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Accessories	HUMIDIFIER, autoclavable	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Accessories	(concentr. O2) FLOW SPLITTER paediat., 5 flowmeters 0-2L/min	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2.1m, 2 prongs + tube, adult	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, paediatric	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, neonate	Per case		0.05	6	6
Severe	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, adult, non-sterile, single use	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, paediatric, non-sterile, single use	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , adult	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , paediatric	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	Catheter, nasal, 8 Fr, 40 cm, with lateral eyes, sterile, single use	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	CONNECTOR, biconical, symmetric, ext. diam. 7–11 mm, autoclavable	Per case		1	115	114
Severe	Oxygen therapy	Concentrator O^2	Consumables	TUBE, silicone, autoclavable, int. diam. 5 mm, 25 m	Per case		2	229	229
Severe	Oxygen therapy	O_2 wall	Equipment	Flowmeter, Thorpe tube, for oxygen 0-15 L/min	Per bed	2		160	161
Severe	Oxygen therapy	CPAP, infant	Equipment	CPAP 10 machine, w/twin flowmeters	Per bed	0.01		1	1
Severe	Oxygen therapy	CPAP, adult	Equipment	CPAP unit w/nasal tubing and mask for adult	Per bed	0.08		7	6
Severe	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, MECHANICAL + collection bottles	Per centre			12	0
Severe	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam.8 mm, 10 m	Per case		0.025	3	3
Severe	Drug administration	Drop counter	Equipment	ELECTRONIC DROP COUNTER, IV fluids infu. gravity monitor, alarm, batt. AA	Per bed	1		80	81
Severe	Blood chemistry	Chemistry analyser	Equipment	CLINICAL CHEMISTRY ANALYSER	Per centre			3	0
Severe	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE for chemistry analyser (lactic acidosis and hyperlactataemia)	Per case		2	229	229
Severe	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE (metabolic status and renal function)	Per case		1	115	114
Severe	Blood Chemistry	Chemistry Analyser	Consumables	CONTROL, solution 1	Per equipment			6	0

Source: *Electro-mechanical medical equipment for NCoV case management WHE/OSL V 1.0*

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
Severe	Blood Chemistry	Chemistry analyser	Consumables	CONTROL, solution 2	Per equipment			6	0
Severe	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 3	Per equipment			6	0
Severe	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 2 mL green	Per case		2	229	229
Severe	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 4 mL green	Per case		2	229	229
ICU	Monitoring	Patient monitor	Equipment	MONITOR PATIENT, multiparamet, ECG/CAPNO/SpO2/NIBP/Temp,230V,+acc	Per bed	1		20	NA
ICU	Monitoring	Patient monitor	Consumables	(ECG) ELECTRODE GEL, bottle	Per case		0.05	3	NA
ICU	Oxygen therapy	Pulse oximeter	Equipment	PULSE OXIMETER – FINGERTIP	Per bed	0.8		16	NA
ICU	Oxygen therapy	Concentrator O^2	Equipment	CONCENTRATOR O2 10 L, 230 V, 50 Hz + acc.	Per bed	1		20	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	(humidifier) HOSE CONNECTOR 9/16	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	HUMIDIFIER, autoclavable	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	(concentrator O2) FLOW SPLITTER paediat., 5 flowmeters 0–2 L/min	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2.1 m, 2 prongs + tube, adult	Per case		0.8	35	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, paediatric	Per case		0.15	7	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, neonate	Per case		0.05	3	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, adult, non-sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, paediatric, non-sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , adult	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , paediatric	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Catheter, nasal, 8 Fr, 40 cm, with lateral eyes, sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	CONNECTOR, biconical, symmetric, ext. diam. 7–11 mm, autoclavable	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	TUBE, silicone, autoclavable, int. diam. 5 mm, 25 m	Per case		2	86	NA
ICU	Oxygen therapy	O2 wall	Equipment	FLOWMETER, Thorpe tube, for oxygen 0–15 L/min	Per bed	2		40	NA
ICU	Airway management	Independent	Equipment	CRICOTHYROTOMY, SET, emergency, 6 mm, sterile, single use, w/acc.	Per centre			12	NA
ICU	Airway management	Independent	Consumables	AIRWAY, NASOPHARYNGEAL, sterile, set, single use (from Fr20 to Fr36)	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	AIRWAY, OROPHARYNGEAL, Guedel, sterile, set, single use (00, 0, 1, 2, 3, 4, 5)	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Bougie, sterile, single use, Fr15, 70cm	Per case		1	43	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Bougie, sterile, single use, Fr10, 60cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Stylet, sterile, single use, Fr14, 30 to 45 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Stylet, sterile, single use, Fr10, 30 to 45 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 2, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 2.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 3, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 3.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 4, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 4, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 5, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 6, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 7, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No.8, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 9, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 2, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 3, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 4, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	COLORIMETRIC END TIDAL CO2 DETECTOR, adult, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	COLORIMETRIC END TIDAL CO2 DETECTOR, paediatric, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	SYRINGE, Luer slip, 10 mL, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LUBRICATING jelly, 5 g, box of 150	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, paediatric, 15 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, child, 19 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, adult, 24 cm	Per case		1	43	NA
ICU	Airway management	Laryngoscope, adult	Equipment	LARYNGOSCOPE, fib.opt, ad/ch, diam. 28 mm, blades (Macintosh2/3/4 + Miller1), sp. bulbs	Per case			24	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Airway management	Laryngoscope, infant	Equipment	LARYNGOSCOPE, fib. opt, neonate, diam.19 mm, blades (Macintosh 0/1/2), sp. bulbs, batt.	Per centre			12	NA
ICU	Mechanical ventilation	Resuscitator, adult	Equipment	SELF-INFLATING BAG, ad./child + masks RH5 / RH2 (Ambu type)	Per centre			12	NA
ICU	Mechanical ventilation	Resuscitator, infant	Equipment	SELF-INFLATING BAG, child/neonate + masks RH2/S1 (Ambu type)	Per centre			6	NA
ICU	Mechanical ventilation	Suction device	Equipment	SUCTION BULB, for newborn, reusable, autoclavable	Per centre			6	NA
ICU	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, MECHANICAL + collection bottles	Per centre			12	NA
ICU	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam. 8 mm, 10 m	Per case		0,025	2,00	NA
ICU	Mechanical ventilation	Independent	Consumables	FILTER, HEAT AND MOISTURE EXCHANGER (HMEF), high efficiency, with connectors, adult, single use	Per case		0,8	35	NA
ICU	Mechanical ventilation	Independent	Consumables	FILTER, HEAT AND MOISTURE EXCHANGER (HMEF), high efficiency, with connectors, paediatric, single use	Per case		0,2	9	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 10 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 12 Fr, 90 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 14 Fr, 90 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 6 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 8 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 1 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 10 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 2.5 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 20 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 5 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 60 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	LUBRICATING jelly, 50 g, tube	Per bed	1		20	NA
ICU	Gastro-enteral feeding	Independent	Consumables	PAD, absorbent	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	BASIN, KIDNEY, stainless steel, 825 mL	Per bed	1		20	NA
ICU	Gastro-enteral feeding	Independent	Consumables	STETHOSCOPE, binaural, double cup, adult/child, single use	Per bed	1		20	NA
ICU	Central line	Independent	Consumables	CENTRAL VENOUS CATHETERS KIT	Per case		1	43	NA
ICU	Central line	Independent	Consumables	Transparent adhesive plasters, washproof, 5 × 5 cm	Per case		3	129	NA
ICU	Urine collection	Independent	Consumables	Bag, collecting, urine, with outlet tap, with non-return valve, 2000 mL, adult, non-sterile, single use	Per case		1	43	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 10 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 12 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 14 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 16 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 18 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 20 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 8 Fr, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Compress, gauze, 10 × 10 cm, 8 to 12 ply, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Tape, surgical, hypoallergenic, 5 × 2.5 cm	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Drape, surgical, nonwoven, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, large, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, medium, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, small, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Antiseptic wipe with alcohol and chlorhexidine	Per case		1	43	NA
ICU	Blood Chemistry	Independent	Consumables	Arterial blood sample kits	Per case		1	43	NA
ICU	Mechanical ventilation	Patient ventilator	Equipment	VENTILATOR PATIENT, for adult, paediatric and neonate w/acc.	Per bed	0.5		10	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), ADULT, single use	Per case		0.8	35	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), PAEDIATRIC, single use	Per case		0.15	7	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), NEONATE, single use	Per case		0.05	3	NA
ICU	Oxygen therapy	HFNC	Equipment	High flow nasal cannula (HFNC)	Per bed	0.5		10	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, small, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, medium, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, large, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Disinfection kit	Per case		0,8	35	NA
ICU	Oxygen therapy	HFNC	Consumables	Cleaning sponge stick, pack of 20	Per case		0.15	7	NA
ICU	Oxygen therapy	HFNC	Consumables	Disinfection filter, pack of 2	Per case		0.05	3	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, ELECTRICAL, 100–230 V, 50–60 Hz	Per bed	1		20	NA
ICU	Oxygen therapy	Suction pump	Consumables	BACTERIA FILTER, unit	Per case		0.5	22	NA
ICU	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam. 8 mm, 10 m	Per case		1	43	NA
ICU	Drug administration	Infusion pump	Equipment	INFUSION PUMP	Per bed	1		20	NA
ICU	Drug administration	Infusion pump	Consumables	(infusion pump) INFUSION LINE	Per case		2	86	NA
ICU	Drug administration	Drill	Equipment	DRILL, FOR VASCULAR ACCESS, with transport bag	Per centre			3	NA
ICU	Drug administration	Drill	Consumables	NEEDLE + STABILIZER KIT, 15 G, 15 mm, PAEDIATRIC	Per case		0.1	5	NA
ICU	Drug administr-ation	Drill	Consumables	NEEDLE + STABILIZER KIT, 15 G, 25 mm, ADULT	Per case		0.08	4	NA
ICU	Monitoring	Defibrillator	Equipment	DEFIBRILLATOR, mobile, semi-auto., multi-paramet, AC/DC, w/acc + trolley	Per centre			3	NA
ICU	Monitoring	Defibrillator	Consumables	(defibrillator) ELECTRODE PADS, adult, adhesive, disp.	Per case		0.08	4	NA
ICU	Monitoring	Defibrillator	Consumables	(defibrillator) ELECTRODE PADS, paediatric, adhesive, disp.	Per case		0.02	1	NA
ICU	Monitoring	ECG	Equipment	ELECTROCARDIOGRAPH, portable, 3 ch + ACC	Per centre			3	NA
ICU	Monitoring	ECG	Consumables	(ECG) RECORDING PAPER, pack	Per bed-day			6	NA
ICU	Monitoring	ECG	Consumables	(ECG) ELECTRODE GEL, bottle	Per case		0.01	1	NA
ICU	Diagnostic imaging	Ultrasound	Equipment	ULTRASOUND, SYSTEM, MOBILE, transducer, trolley, 220 V, w/acc.	Per centre			3	NA
ICU	Diagnostic imaging	Ultrasound	Consumables	(ultrasound transducer) CONDUCTIVE GEL, 5 L, container	Per case		0.01	1	NA
ICU	Blood chemistry	Chemistry analyser	Equipment	CLINICAL CHEMISTRY ANALYSER	Per centre			3	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE for chemistry analyser (lactic acidosis and hyperlactatemia)	Per case		2	86	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE (metabolic status and renal function)	Per case		1	43	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 1	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 2	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 3	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 2 mL green	Per case		2	86	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 4 mL green	Per case		2	86	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Monitoring	Table, neonate	Equipment	Table, resuscitation, neonate	Per centre			6	NA
Ancillary	Drug administration	Scale, infant	Equipment	INFANT SCALE, electronic, 0–20 kg	Per centre			6	NA
Ancillary	Drug administration	Scale, adult	Equipment	SCALE, electronic, 50 g/0–200 kg	Per centre			6	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	AUTOCLAVE, 39 L, with single burner	Per centre			3	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Indicator, TST (Time, Steam, Temperature), Type 5	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Paper sheet, crepe, for sterilization, 60 g/m2, 90 × 90 cm	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Paper sheet, non-woven, for sterilization, 120 × 120 cm	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Tape, adhesive, indicator Type 1, for steam sterilizer, 18 mm × 48 m	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	Kerosene stove, electric heating plate	Per centre			3	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	Timer	Per centre			3	NA

Acc, accessories; CPAP, continuous positive airway pressure; ICU, intensive care unit; int. diam., internal diameter; LDT, low-dose tip; Li-HEPARIN, lithium heparin; NA, not applicable; s.u., single use; ster., sterile; w/, with; w/o, without.

A2.4 Medical drugs

Source: ECOVID-19 100 PATIENT KIT - MODULE DRUGS & Med Supplies_050320_2

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo

WHO CODE	WHO Description	Total qty
PINJADEN6A---A1	ADENOSINE, 3 mg/mL, 2 mL, amp.	15
PEXTALCO1G---A1	ALCOHOL-BASED HAND RUB, gel, 100 mL, bottle	100
PEXTALCO5S---A1	ALCOHOL-BASED HAND RUB, solution, 500 mL, bottle	50
PINJAMIO1A---A1	AMIODARONE hydrochloride, 50 mg/mL, 3 mL, amp.	15
PORLAMOC15S1-A1	AMOXICILLIN 125 mg/CLAVULANIC acid 31.25mg, eq.156.25 mg/5 mL, oral suspension, 100 mL bottle	50
PORLAMOC5T1--A1	AMOXICILLIN 500 mg/CLAVULANIC acid 125 mg, eq. 625 mg/tab, tablet	200
PORLAMOX2T---A1	AMOXICILLIN, 250 mg, tab.	200
PORLAMOX5T---A1	AMOXICILLIN, 500 mg, tab.	1000
PINJAMPI1V---A1	AMPICILLIN, 1 g, powder, vial	250
PINJAMPI5V---A1	AMPICILLIN, 500 mg, powder, vial	100
PORLASCA2T---A1	ASCORBIC acid (vitamin C), 250 mg, tab.	200
PORLATEN5T---A1	ATENOLOL, 50 mg, tab.	100
PINJATRO1A---A1	ATROPINE sulfate, 1 mg/mL, 1 mL, ampoule	20
PORLAZIT2S---A1	AZITHROMYCIN, 200 mg/5 mL, powder oral suspension, 15 mL, bottle	50
PORLAZIT2T---A1	AZITHROMYCIN, 250 mg, tab.	100
PORLAZIT5T---A1	AZITHROMYCIN, 500 mg, tab	200
PINJPENB5V---A1	BENZYLPENICILLIN, 5 MIU (3 g), powder, vial	100
PINJCALG1A1--A1	CALCIUM GLUCONATE, 100 mg/mL, 10 mL, ampoule	25
PINJCEFT25V--A1	CEFTRIAXONE sodium, 250 mg, powder, vial	200
PINJCEFT1V---A1	CEFTRIAXONE sodium, eq. 1 g base, powder for injection, vial	500
PORLCHLA5T---A1	CHLORAL HYDRATE, 500 mg, tab.	250
PEXTCHLH1C15SA1	CHLORHEXIDINE digluconate 1.5% + CETRIMIDE 15%, solution, 1000 mL, bottle	50
PORLCHLM2T---A1	CHLORPROMAZINE hydrochloride, eq. 25 mg base, tab.	100
PINJCLOX5V---A1	CLOXACILLIN sodium salt, 500 mg, powder, vial	300
PORLCLOX2C---A1	CLOXACILLIN sodium, eq. 250 mg base, caps.	100
PINJDEXA4A---A1	DEXAMETHASONE phosphate, 4 mg/mL, 1 mL, ampoule	200
PINJDEXM1A2--A1	DEXMEDETOMIDINE, 100 mcg/mL, IV, 2 mL amp.	30
PINFDEXT5N1--A1	DEXTROSE (GLUCOSE) 5%, 1 L, plastic pouch	50
PINFDEXT5N5--A1	DEXTROSE (GLUCOSE) 5%, 500 mL, plastic pouch	20

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo - *continued*

WHO CODE	WHO Description	Total qty
PORLDOXY1T---A1	DOXYCYCLINE salt, 100 mg, tab.	300
PINJEPIN1AV--A1	EPINEPHRINE (adrenaline) tartrate, eq. 1 mg/mL base, 1 mL amp. IV	100
PINJFLUM1A5--A1	FLUMAZENIL, 0.1 mg/mL, IV, 5 mL amp.	15
PINJFURO1A---A1	FUROSEMIDE, 10 mg/mL, 2 mL, ampoule	100
PORLFURO4T---A1	FUROSEMIDE, 40 mg, tab.	100
PINJGLUC5V5--A1	GLUCOSE hypertonic, 50%, 50 mL, vial	20
PORLGLYT3T---A1	GLYCERYL TRINITRATE, 0.3 mg, sublingual tab.	100
PINJGLYT5A1--A1	GLYCERYL TRINITRATE, 5 mg/mL, for infusion, 10 mL amp.	15
PINJHYDA2A---A1	HYDRALAZINE hydrochloride, 20 mg, powder, ampoule	40
PORLHYDO5T---A1	HYDROCHLOROTHIAZIDE, 50 mg, tab.	100
PINJHYDR1V---A1	HYDROCORTISONE sodium succinate, eq. 100 mg base, powder, vial	100
PORLIBUP4T---A1	IBUPROFEN, 400 mg, tab.	200
PINJLIDO1V2--A1	LIDOCAINE hydrochloride, 1%, for injection, 20 mL, vial	100
PINJMAGS5A1--A1	MAGNESIUM sulfate, 500 mg/mL, 10 mL, ampoule	40
PINJMETO5A---A1	METOCLOPRAMIDE hydrochloride, 5 mg/mL, 2 mL, amp.	500
PINJMPRO1A---A1	METOPROLOL tartrate, 1 mg/mL, IV injection, 5 mL, amp.	15
PINJMETN5SR1-A1	METRONIDAZOLE, 5 mg/mL, 100 mL, semi-rigid bot.	100
PORLMULT1T---A1	MULTIVITAMINS, tab.	200
PINJNALO4A1--A1	NALOXONE hydrochloride, 0.4 mg/mL, 1 mL, ampoule	50
PINJNORA1AV4-A1	NORADRENALINE tartrate, solution for infusion, eq. 1 mg/mL base, 4 mL, amp/vial	200
PORLNYST1S---A1	NYSTATIN, 100.000 IU/mL, oral suspension	50
PORLOMEP2CG--A1	OMEPRAZOLE, 20 mg, gastro-resistant, caps.	100
PINJOMEP4V---A1	OMEPRAZOLE, 40 mg, powder, vial	100
PINJONDA2A---A1	ONDANSETRON hydrochloride, 2 mg/mL, 2 mL, amp.	50
PORLONDA4A---A1	ONDANSETRON hydrochloride, 4 mg, tab.	200
PORLORSA2S---A1	ORAL REHYDRATION SALTS (ORS) low osmolarity, sachet 20.5 g/1L	100
PORLPARA1T---A1	PARACETAMOL (acetaminophen), 100 mg, tab.	300
PINJPARA1B5--A1	PARACETAMOL (acetaminophen), 10 mg/mL, inject, 50 mL, bottle	20
PINJPARA1I1N-A1	PARACETAMOL (acetaminophen), 10mg/mL, inject., 100 mL, plastic pouch	80

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo - *continued*

WHO CODE	WHO Description	Total qty
PORLPARA1S10-A1	PARACETAMOL (acetaminophen), 120 mg/5 mL, syrup, 100 mL, bottle	80
PORLPARA5T---A1	PARACETAMOL (acetaminophen), 500 mg, tab.	2000
PORLPHEY10T--A1	PHENYTOIN sodium, 100 mg, coated tab.	450
PINJPHEY5V5--A1	PHENYTOIN sodium, 50 mg/mL, 5 mL, vial	100
PINJPOTC1A---A1	POTASSIUM chloride, 100 mg/mL, 10 mL, amp.	100
PORLPRED5T---A1	PREDNISOLONE, 5 mg, tab.	1000
PORLRANI1T---A1	RANITIDINE, 150 mg, tab.	75
PINFRINL1N1--A1	RINGER lactate, 1L, plastic pouch	400
PINFRINL1N5--A1	RINGER lactate, 500 mL, plastic pouch	50
PORLSALB2S---A1	SALBUTAMOL sulfate, eq. 0.1mg base/puff, 200 puffs, inhaler	100
PINJSODB8A2--A1	SODIUM BICARBONATE, 8.4%, 1 mEq/mL, 20 mL amp.	10
PINFSODC9N1--A1	SODIUM chloride, 0.9%, 1L, plastic pouch	100
PINFSODC9N5--A1	SODIUM chloride, 0.9%, 500 mL, plastic pouch	25
PORLSULF4T8T-A1	SULFAMETHOXAZOLE 400 mg/TRIMETHOPRIM 80 mg, tab.	200
PORLTHIA5T---A1	THIAMINE hydrochloride (vitamin B1), 50 mg, tab.	100
PINJWATE1A1--A1	WATER for injection, 10 mL, ampoule	4000
PORLYINS2T---A1	ZINC sulfate, eq. to 20 mg zinc mineral, dispersible tab.	100
	Saline ampoules, 10 cc	
	Linezoli IV	
	Heparin LMW	
	Lacilube	

Kit COVID-19 - 100 patients/20 severe: module drugs, cold chain

WHO CODE	WHO Description	Total qty
PINJATRB1A5--A1	ATRACURIUM BESILATE, 10mg/mL, 5mL, amp. INSULIN RAPID (Actrapid), rDNA insul.,100 IU/mL, 10mL, vial SUXAMETHONIUM CHLORIDE, 50mg/mL, 2mL, amp.ADENOSINE, 3 mg/mL, 2 mL, amp.	45
PINJINSH1V1R-A1	ALCOHOL-BASED HAND RUB, gel, 100mL, bottle	25
PINJSUXA5A2--A1	ALCOHOL-BASED HAND RUB, solution, 500mL, bottle	45

Kit COVID-19 – 100 patients/20 severe: module drugs, controlled drugs

WHO CODE	WHO Description	Total qty
PORLDIAZ5T-–A1	DIAZEPAM, 5 mg, tab.	100
PINJDIAZ5A2--A1	DIAZEPAM, 5 mg/mL, 2 mL, amp.	100
PINJFENT1A-–A1	FENTANYL citrate, e.q. 0.05 mg/mL base, 2 mL, amp.	50
PINJFENT5A-–A1	FENTANYL, 0.05 mg/mL, 10mL, amp.	50
PINJHALP5A1--A1	HALOPERIDOL, 5 mg/mL, solution for injection, 1 mL, ampoule	200
PINJKETA5V---A1	KETAMINE hydrochloride, eq. 50 mg/mL base, 10 mL, vial	50
PINJMIDA5A3–A1	MIDAZOLAM, 5 mg/mL, 3mL, amp.	50
PINJMORP10A1-A1	MORPHINE sulfate, 10 mg/mL, 1 mL, amp.	100
PINJPHEN20A1-A1	PHENOBARBITAL (sodium), 200 mg/mL, 1 mL, amp.	100
PORLPHEN5T---A1	PHENOBARBITAL, 50 mg, tab.	100
PINJPROP1A-–A1	PROPOFOL, 10 mg/mL, 10 mL, amp.	100

Kit COVID-19 – 100 patients/20 severe: supplies for medicine administration

MEDICAL PURPOSE	WHO CODE	WHO Description	Total qty
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, large, non-sterile, single use	300
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, medium, non-sterile, single use	200
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, small, non-sterile, single use	100
Injection, intravenous, infusion	CINSSETI2----A1	SET, INFUSION 'Y', Luer lock, air inlet, sterile, single use	2,000
Injection, intravenous, infusion		Infusion giving set, with air intake, with injection port, with burette, sterile, single use	200
Injection, intravenous, infusion	CINSIVCRW16–A1	IV CATHETER, retractable, 16 G (1.7 × 45 mm), wings, grey	200
Injection, intravenous, infusion	CINSIVCRW18--A1	IV CATHETER, retractable, 18 G (1.2 × 45 mm), wings, green	200
Injection, intravenous, infusion	CINSIVCRW20–A1	IV CATHETER, retractable, 20 G (1.0 × 32 mm), wings, pink	200
Injection, intravenous, infusion	CINSIVCRW22–A1	IV CATHETER, retractable, 22 G (0.8 × 25 mm), wings, blue	200
Injection, intravenous, infusion	CINSIVCRW24--A1	IV CATHETER, retractable, 24 G (0.7 × 19 mm), wings, yellow	200
Injection, intravenous, infusion	CINSSCAV21---A1	SCALP VEIN, butterfly needle, 21 G (0.8 × 19 mm), single use, sterile, green	200

Kit COVID-19 – 100 patients/20 severe: supplies for medicine administration - *continued*

MEDICAL PURPOSE	WHO CODE	WHO Description	Total qty
Injection, intravenous, infusion	CINSSCAV23-–A1	SCALP VEIN, butterfly needle, 23 G (0.6 × 19 mm), single use, sterile, blue	200
Injection, intravenous, infusion	CINSSCAV25---A1	SCALP VEIN, butterfly needle, 25 G (0.5 × 19 mm), single use, sterile, orange	200
Injection, intravenous, infusion	CINSEXTS3----A1	Stopcock, 3-way, for infusion giving set, with connection line, sterile, single use	200
Injection, intravenous, infusion		Stopper/closing cone, for IV sets, with male and female Luer lock, sterile, single use	2,000
Injection, intravenous, infusion	CINSNEED18H1-A1	NEEDLE, hypodermic, Luer, 18 G, sterile, single use, pink	200
Injection, intravenous, infusion	CINSNEED19H1-A1	NEEDLE, hypodermic, Luer, 19 G × 1.5" (1.1 × 40 mm), sterile, single use, cream	200
Injection, intravenous, infusion	CINSNEED21H1-A1	NEEDLE, hypodermic, Luer, 21 G × 1.5" (0.8 × 40 mm), sterile, single use, green	300
Injection, intravenous, infusion	CINSNEED22H1-A1	NEEDLE, hypodermic, Luer, 22 G, sterile, single use, black	200
Injection, intravenous, infusion	CINSNEED23H1-A1	NEEDLE, hypodermic, Luer, 23 G × 1"(0.6 × 25mm), sterile, single use, blue	200
Injection, intravenous, infusion	CINSSYDL20---A1	SYRINGE, Luer, 20 mL, sterile, single use	100
Injection, intravenous, infusion	CINSSYDL05---A1	SYRINGE, Luer, 5 mL, sterile, single use	1,000
Injection, intravenous, infusion	CINSSYDL02---A1	SYRINGE, Luer, 2 mL, sterile, single use	1,000
Injection, intravenous, infusion	CINSSYDL10---A1	SYRINGE, Luer, 10 mL, sterile, single use	200
Injection, intravenous, infusion	YMEQTOURR01--A1	TOURNIQUET, elastic, rubber, latex free, single use, 100 × 1.8 cm	20
Injection, intravenous, infusion	CINSCONTC51–A1	SAFETY BOX, needles/syringes, 5 L, cardboard for incineration	20
Injection, intravenous, infusion		Adhesive plasters, washproof, spot shape or 2 × 1.3 cm	2,500
Injection, intravenous, infusion		IODINE POVIDONE, 10%, solution, 1 L, bottle	8
Injection, intravenous, infusion	CDRECOTW5R---A1	COTTON WOOL, hydrophilic, 500 g, roll	20
Injection, intravenous, infusion		COMPRESS, GAUZE, 10 × 10 cm, 8 plys, 17 thr., sterile, 2 pcs	1,000
Injection, intravenous, infusion		COMPRESS, GAUZE, 10 × 20 cm, 12 plys, 17 threads, non-sterile	1,000
Injection, intravenous, infusion		FORCEPS, DRESSING, BLANK, 14.5 cm, atraumatic serration	4
Injection, intravenous, infusion		BOWL, ROUND, 100 mL, 80 × 35 mm, stainless steel	4
Injection, intravenous, infusion	CDRETAPZO2-–A1	ZINC OXIDE, TAPE, self-adhesive, 2.5 cm × 5 m, white, roll	50
Injection, intravenous, infusion		Spacer, for metered dose inhaler	20

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

WEB ANNEX

Calculations

World Health Organization

WHO reference no.:

Source: *EMT technical consultants' assumptions based on standards*

A3.1.1 Water quantity calculations

WATER DEMAND ESTIMATE

Table A3.1L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff – around 20,000 litres per day*

WATER QUANTITY

There is enough water to drink, to prepare food, "to perform personal grooming and medical activities, cleaning and laundry at all times."

Use		Patients/person/ toilets	Unit	Quantity according to standard (litre/unit/day)	Standard[a]	Needed water supply (litres per day)
Drinking	Running water	180	Inpatient	60	Sphere/WHO	10,800
		60	EMT staff	40	Sphere/WHO	2,400
Other uses	Flush toilets	400	Toilet uses per day	5	Sphere	2,000
	Cleaning floors	8000	Total m^2 installations	0.2	–	1,600
	Cleaning inpatient	180	Inpatients' beds	20		3,600
	Cleaning toilets	14	Toilets	20	Sphere	280
						20,680

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

Table A3.2 XL Model *(180m × 100m) 480 moderate inpatients + 20 ICU beds + 140 staff*

WATER QUANTITY

There is enough water to drink, to prepare food, "to perform personal grooming and medical activities, cleaning and laundry at all times."

Use		Patients/person/ toilets	Unit	Quantity according to standard (litre/unit/day)	Standard[a]	Needed water supply (litres per day)
Drinking	Running water	500	Inpatient	60	Sphere/WHO	30,000
		140	EMT staff	40	Sphere/WHO	5,600
Other Uses	Flush toilets	12,00	Toilet uses per day	5	Sphere	6,000
	Cleaning floors	180,00	Total m^2 installations	0.2	–	3,600
	Cleaning inpatient	500	Inpatients' beds	20		10,000
	Cleaning toilets	50	Toilets	20	Sphere	1,000
						20,680

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

A3.1.2 Water storage capacity calculations

STORAGE CAPACITY: If there is a continuous water supply, it would be expedient to store a certain amount of water for contingency purposes.

Table A3.3 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff – 40,000 litres*

WATER STORAGE

There is enough water storage capacity for 48 hours' supply

Total water storage capacity required	39,440 litres/day	Number of storage tanks 1000 litres	40	Units
		OR		
		Number of storage tanks 2000 litres	20	Units
		OR		
		Number of storage tanks 5000 litres	8	Units

Table A3.4 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

WATER STORAGE

There is enough water storage capacity for 48 hours supply

Total water storage capacity required	112,400 litres/day	Number of storage tanks 5000 litres	23	Units
		OR		
		Number of storage tanks 10,000 litres	12	Units
		OR		
		Number of storage tanks 20,000 litres	6	Units

A3.1.3 Water distribution network calculations

Table A3.5 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Model L	Quantity	Units
Total pipe length	511.95	metres
Total tee 25 mm	32	units
Total elbow	4	units
Total gate valves	45	units
Total water supply points connections	24	connections

Table A3.6 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

Model XL	Quantity	Units
Total pipe length	1138.59	metres
Total tee 25 mm	64	units
Total elbow	12	units
Total gate valves	88	units
Total water supply points connections	48	connections

A3.2.1 Waste generation calculations

Table A3.7 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Average quantity of waste (kg/ bed/day)	Standard	Comments	kg/day
2	WHO	GENERAL WASTE 2 kg/patient/day	360
0.1	WHO	SHARPS 0.1 kg/patient/day	18
0.4	WHO	INFECTIOUS WASTE 0.4 kg/patient/day	72
			450 kg/day

Table A3.8 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

Average quantity of waste (kg/ bed/day)	Standard	Comments	kg/day
2	WHO	GENERAL WASTE 2 kg/patient/day	1000
0.1	WHO	SHARPS 0.1 kg/patient/day	50
0.4	WHO	INFECTIOUS WASTE 0.4 kg/patient /day	200
			1250 kg/day

A3.2.2 Waste containment calculations

Table A3.9 L Model *(100m × 80m) 160 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions:	**i)** maximum storage period for infectious waste should be 2 days; **ii)** The average density of the uncompacted waste is 200 kg/m^3 or 1000 litres/200 kg		
	Volume of waste/day (m^3)	Containment capacity for 2 days (m^3)	Containment capacity for 2 days (litres)
INFECTIOUS WASTE	0.36	0.72	720

Table A3.10 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions:	**i)** maximum storage period for infectious waste should be 2 days **ii)** The average density of the uncompacted waste is 200 kg/m^3 or 1000 litres/200 kg		
	Volume waste/day (m^3)	Working hours, treatment technology (hours)	Treatment capacity needed (kg/hour)
INFECTIOUS WASTE	72	10	8

Table A3.12 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions: 10 working hours			
	weight (kg/day)	Working hours, treatment technology (hours)	Treatment capacity needed (kg/hour)
INFECTIOUS WASTE	72	10	8

A3.3 Sanitation

A3.3.1 Sanitation facilities calculations

Table A3.13 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Estimating the demand for sanitation facilities TST

Adequate, accessible and culturally appropriate toilets and showers are available to patients, staff and caregivers.

Area	Facility	Quantity	Unit	Quantity according to standard ratio persons per facility	Standard[a]	Comments	WCs/ bathrooms needed
Triage/ reception	WC	1	Area	1	Sphere/ WHO	Separate facilities for males and females	2
	Basin	2	Area	1			2
2 modules of 40 beds (80 patients)	WC	80	Inpatient	20	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	8
	Shower	80	Inpatient	40			8
	Basin	2	Area	1			4
Module ICU 20 patients	WC	20	Inpatient	20	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	2
	Shower	20	Inpatient	40			2
	Basin	1	Area	1			1
Technical area	WC	4	Inpatient	1	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	4
	Shower	4	Inpatient	1			4
	Basin	4	Area	1		Waste management	4

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

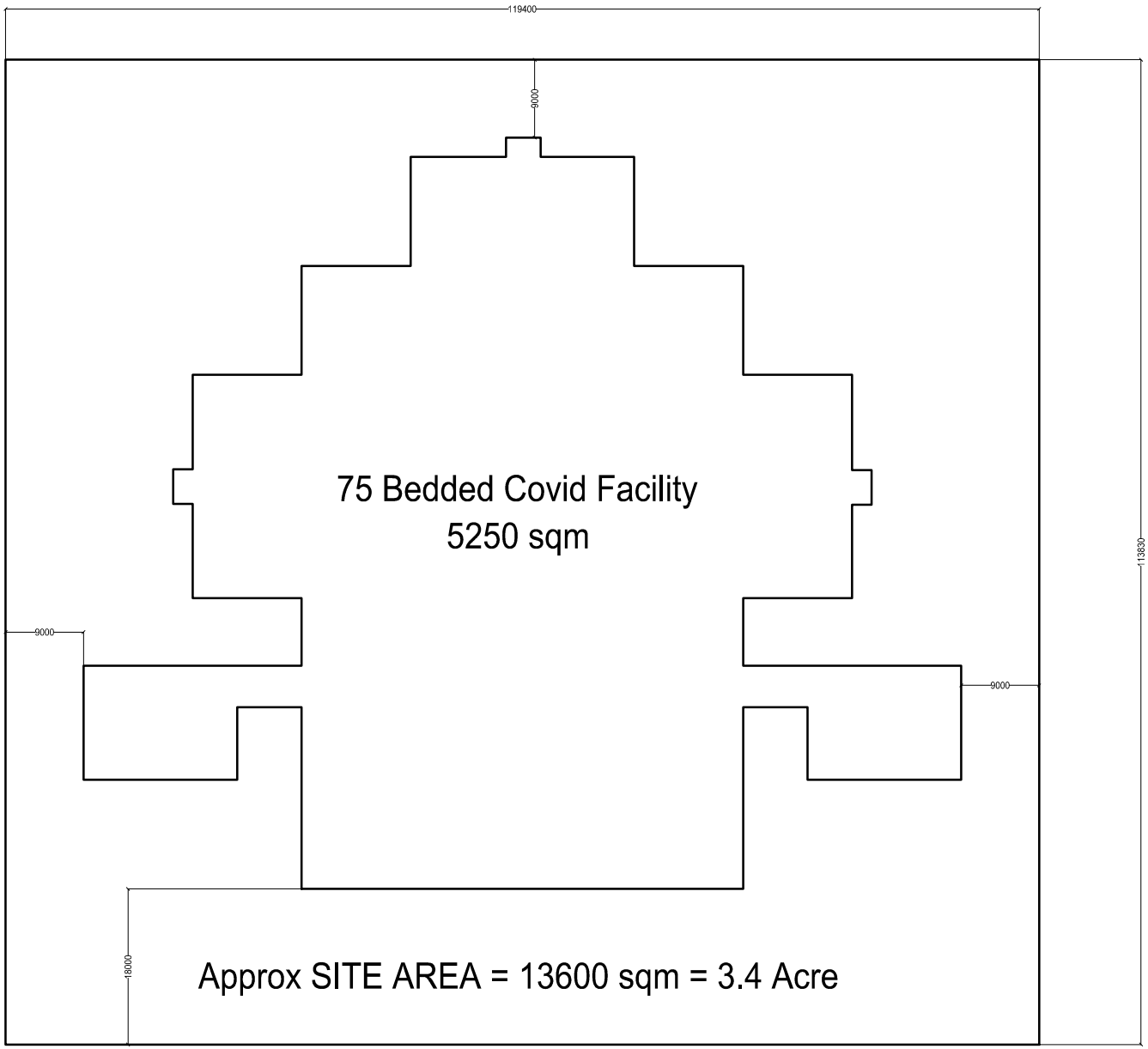
Table A3.14 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

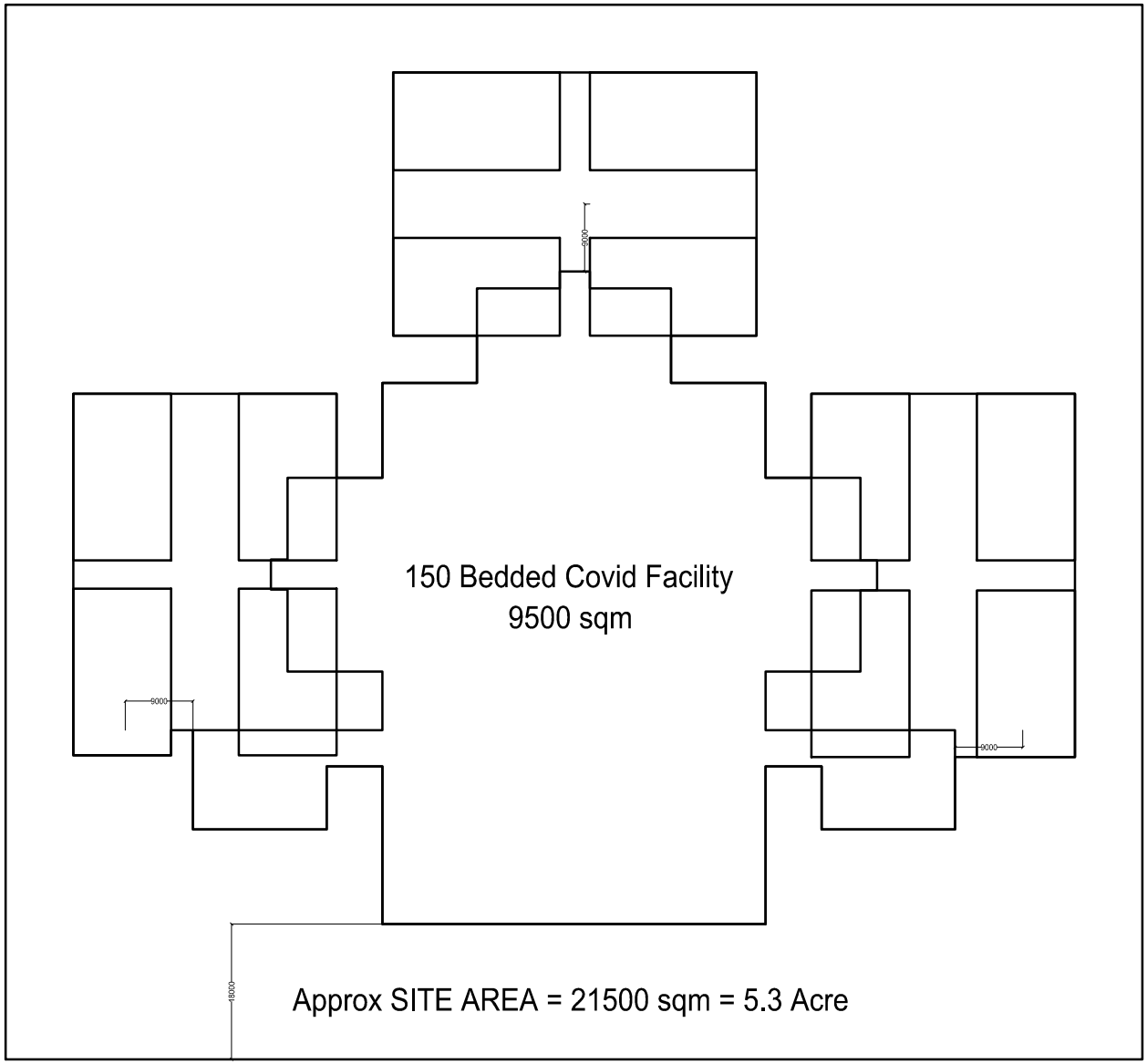
Estimating the demand for sanitation facilities TST

Adequate, accessible and culturally appropriate toilets and showers are available to patients, staff and caregivers.

Area	Facility	Quantity	Unit	Quantity according to standard ratio persons per facility	Standard[a]	Comments	WCs/ bathrooms needed
Triage/ reception	WC	1	Area	1	Sphere/ WHO	Separate facilities for males and females	2
	Basin	2	Area	1			2
6 module 80 patients	WC	80	Inpatient	20	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	24
	Shower	80	Inpatient	40			24
	Basin	2	Area	1			12
Module ICU 20 patients	WC	20	Inpatient	20	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	2
	Shower	20	Inpatient	40			2
	Basin	1	Area	1			1
Technical area	WC	4	Inpatient	1	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	4
	Shower	4	Inpatient	1			4
	Basin	4	Area	1		Waste management	4

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).


119400
9000
75 Bedded Covid Facility
5250 sqm
9000
9000
13830
18000
Approx SITE AREA = 13600 sqm = 3.4 Acre


9000
150 Bedded Covid Facility
9500 sqm
9000
9000
18000
Approx SITE AREA = 21500 sqm = 5.3 Acre

ANNEXE 'A'

NAME OF PROJECT: COVID EMERGECY FACILITY USING LGFS TECHNOLOGY

Location of Projects:- Pan India basis
Type of buildings:- Ground Floor buildings.
.

FOUNDATION : As per the soil condition and seismic zone of the SITE and design to be vetted by IIT Engr.

SUPER STRUCTURE SYSTEM:
(Technology proposed:- Dry wall Light Gauge Framing Structure system with finishing items)

Tenders are invited from experienced approved PEB manufacturers for supply, engineered, design and erection of factory finished pre-engineered LGFS structure system. PEB Manufacture shall be ISO-9001 certified company, having experience of 15 years in similar field having minimum turnover of ……crore. Manufacture shall provide Design of buildings based on architectural drawings along with QC plan, GA drawings for approval before proceeding for execution. PEB vendor shall also provide stability certificate for their design of structure after completion of work. Main bidder will tie up with PEB manufacturers/their approved Vendors only for supply, design and erection of complete system along with drawings. The scope of work shall include Design, Engineering, Supply and Erection of Pre-engineered/Dry walls comprising of External walls , internal walls, internal partitions, Antimicrobial Bio-safe ceiling, Doors and windows UPVC /Aluminium powder coated, Wall and roof insulations etc as per approved GA drawings. Along with entire MEP of the project including HVAC as stipulated in ISHRAE and IGBC Guidelines.

Applicable Design Loads (Live / Wind) and codes.

Live Load on Sloping roof		0.57 Kn / m2
Wind Speed	**:**	As per IS 875 Part III 1987
Seismic Zone	**:**	As per IS 1893- 2002
Design Code	**:**	BS 5950 Part -5 AS / NZS-4600-1996

EXTERNAL FRAME STRUCTURE :

Providing and fixing of Shed with Design, Supply and custom design factory finished Light Framing super structure manufactured out of 0.95 thick Hi-tensile factory finished Bare Galvalume hi-tensile substrate (AZ150gsm-Aluminim Zinc alloy coated steel/550 Mpa yield strength) substrate. The framing section shall be of cold form section C- type having depth of (89mm depth x 39 mm flange x 12 lips) in required length as per site requirements duly punched with dimple/slot at required location as per manufacture approved drawings at various locations. The frame shall be supplied in knock down condition at site and fixed by mean of wafer head galvanised steel screws 4mm thick. The main frame shall be fixed to RCC slab or Plinth Tie beam using expanded steel anchor bolts fasteners in size of 12mm-16mm Grade (4.8 – 8.8) at 500mm spacing c/c as per manufactured approved drawings. The frame module shall span max 5mtr maximum with internal support member or wall. No welding shall be permitted to the structure at site. All vertical frames shall be supported maximum at 600mm c/c

and horizontally 800mm. Structure shall be designed for snow load as well as wind up lift. The factory finished slot of 30 mm round dia shall be given in frame to accommodate the electrical conduits as per electrical conduits lay out at fixed location as per approved GA drawings by engineer in charge. Applicator shall follow the approved GA/erection drawings of manufacture.

EXTERNAL WALL BOARD FINISH :

Supply and fixing of external grade Cement board double skin insulated using 8mm-Type-B and 9mm Heavy duty Type-A category exposed side fixed to LGFS frame using Wafer head steel screws. The board shall have uniform groove of 3-4 mm in between two panels filled using PU Sealant and then given final coat of primer, joint tape etc and 2 coat of weathers held or texture paint exterior grade. The wall panel shall terminate at the bottom of floor above 100mm skirting and embedded in flooring 10 mm from outside. The final coat shall be of approved make (Berger or Asian paint.) The board shall conform to IS:14862. Density 1250kg/cum & 13500kg/cum as per grade and category.

Rock wool slab wall insulation 75mm shall be provided between Cement board and LGFS Frame vertically in 48kg density.

INTERNAL WALL & PARTITION FINISHES :

Supply and fixing double layer boarding is considered factory finished custom designed using 8mm Cement board-Type-B and inner surface of 12.5mm thick fixed to main structure framing using wafer head steel screws in flush or uniform groove of 2mm in between two panels. The wall panel shall terminate at the bottom of floor and embedded in flooring of minimum 10mm. The panel shall be given one coat of primer/joint tape at groove and given 2 coat of OBD or Acrylic paint of approved make. Berger or Asian paint. The board shall conform to IS: 2095.

EXTERNAL VAPOUR BARRIER :

Supply and fixing of breather wall FRP Vapor barrier comprises of Aluminium Foil one side and other side polythene face. Wall wrap shall be laid vertically over LGFS Frame. The wrap shall comply of reflective surface as per class 3 having 0.10mm thickness with four layer single sided reflective foil with a combination of antioxidant UV Stabilized woven polypropylene face. The vapor barrier shall be provided in accordance with AS/NSZ 4200:1:2017 standard. Optionally we can offer 4mm Bubble insulation with both side foil face of approved make Flame stop. This barrier shall be applied before the laying the Cement boards.

EXTERNAL & INTERNAL WALL INSULATION :

Supply and fixing of Rock wool slab insulation in 75 mm thick/48kg density plain fixed on wall between framing.

FALSE CEILING :

" ANTIMICROBIAL BIO-SAFE LIGHT WEIGHT CALCIUM SILICATE FALSE CEILING SYSTEM ""

Providing and fixing false ceiling at all heights with integral densified calcium silicate reinforced with fibre and natural filler false ceiling tiles of Size 595x595mm of approved texture, design and patterns having NRC (**Noise Reduction coefficient**) of 0.15 – 0.75 (minimum) as per IS 8225:1987, Light reflectance of 85% (minimum). **Non-combustible** as per BS:476 (part-4), fire performance as per BS:476 (part 6 &7), Smoke Free as per ASTM E-84 **, humidity resistance** of 100%, **thermal conductivity**

< 0.048-0.052 W/m K as per ASTM 518:1991, with 15 mm thick integral densified tegular/Butt edge of **antimicrobial** BIOSAFE coating for bacteria as per JIS- Z2801 and ASTM G-21 for fungal having weight of 5.0 – 5.5 kg/m2, (Avg density of tile 370 Kgm3),in true horizontal level suspended on interlocking metal T-Grid of hot dipped galvanised iron section of 0.33mm thick (galvanized @ 120 grams per sqm including both sides) comprising of main-T runners of size 24x38 mm of length 3000 mm, cross - T of size 24x32 mm of length 1200 mm and secondary intermediate cross-T of size 24x32 mm of length 600mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanised mild steel items (galvanizing @ 80 grams per sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 76x25x25x1.6 mm and Z cleat of 25x37x25x1.6 mm. Galvanised iron perimeter wall angle of size 24x24x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm center to center and 40 mm long dry wall S.S screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge.
Note : This item is a scheduled CPWD DSR item no: 26.22.2

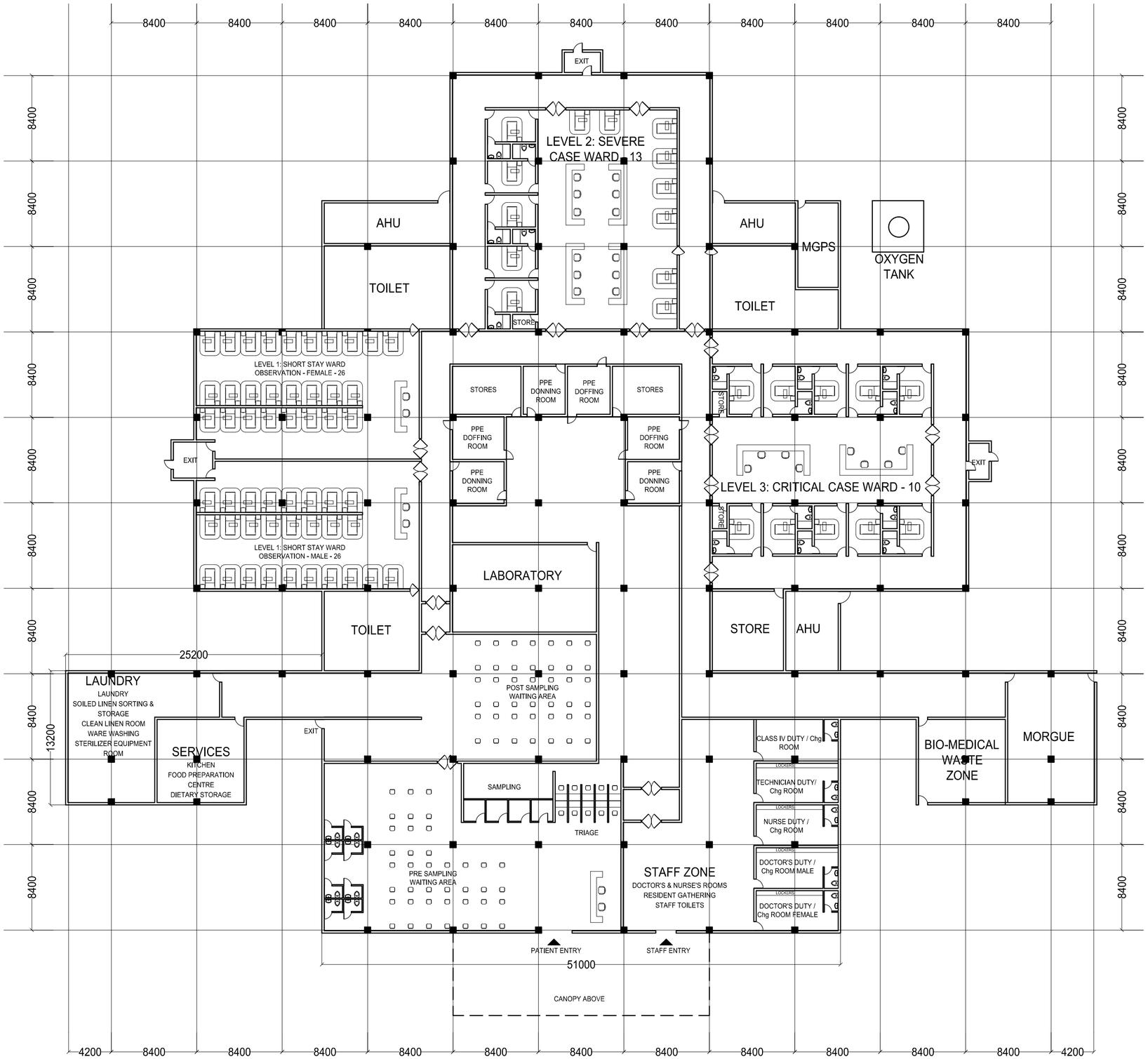
ROOFING SYSTEM :

Supply and Fixing of Hi-rib SMP Coated Galvalume roof sheet in 0.50mm thick with cover width of 1020-1050mm and crest ht up to 28mm and having 3 pans. The side lap shall have anti-capillary flute at male end. Sheet shall be fixed using self-drilling hex- head steel fasteners 12-14 x 55mm with EPDM nylon washer. The stitching screws shall be applied over side laps using 12-14 x 19mm stitch screws at 900mm c/c. The end laps shall be 200mm maximum and shall be given silicon sealant.

GUTTER & DOWNTAKE :

Supply and fixing of Metal Gutter in similar material of roof sheeting bare galvalume 0.47mm thick in required girth and depth supported to main framing system. Gutter shall be over lapped and jointed at every 3 mtr and shall be sealed using silicon sealant. PVC down takes shall be provided two sides of building in 100-150mm dia as per approved make. The vertical support shall be provided at 500mm c/c to support PVC down takes. Gutter shall be supported at every 500mm c/c with G.I. Clips.

****Please Refer FINISHING Schedule for the Room wise finishing Details



AREA : 5250 sqm

NOTE :
GRID IS SUGGESTIVE
THE SAME CAN BE MODIFIED FOR A LARGER SPAN AS PER LOCAL VENDORS STRUCTURAL DESIGN

75 BEDDED COVID FACILITY AS PER IGBC Guidelines (www.igbc.in)

NITI AAYOG , GOVT. OF INDIA.

NAME OF WORK-

Finishing Schedule for COVID FACILTY Pan India

SL.	SPACE	WALL	DADO	PAINTING/CLADDING	FLOORING	CEILING	DOOR	WINDOW
1	**Pre Sampling/ Post Sampling Area**	**BUILDING PERIPHERIAL WALL-** LGFS (Light Gauge Framing Structure) with Insulated Wall . **INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.2 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**- Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-**Non slippery Double Charge Vertified Floor Tile . **Make**-Johnson, Kajaria, Somany**.**	**CEILING-**Light wt**.**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
2	**Short Stay Ward**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.2 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**- Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC Make- FORBO, TARKETT, GER ..Certificate of Origin from European Plant**	**CEILING-**Light wt**.**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
3	**Severe Case Ward ICU**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	Acrylic Mineral surface upto bed head panel. (1.2 m) Above Antibacterial Paint. **Make** ; Dupont Corean …….Paints :Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-A**NTI BACTERIAL PVC ANTISTATIC FLOORING**.** **Make-** FORBO, TARKETT, GER **..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**Glass Door (Side Hung Door) . **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
4	**LABORATORY**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	Acrylic Mineral surface on Counter Top and on wall 0.6m above counter as Homogenous with Coving, Above Antibacterial Paint. **Make** ; Dupont Corean …….Paints :Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-A**NTI BACTERIAL PVC **Make-** FORBO, TARKETT, GER **..Certificate of Origin from European Plant**	**CEILING-**Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. . **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
5	**CORRIDORS**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	Jointless Vitrified Tiles upto 1.5 mt. ht. Above Acrylic/OBD with Crash Barriers **Make**- Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian.	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC Make- FORBO, TARKETT, GER ..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**Glass Door (Side Hung Door) . **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING, FENESTA , ALUPLAST
6	**STORES**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A**	**Dry Distember**	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC Make- FORBO, TARKETT, GER ..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
7	**TOILETS**	BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall . INTERNAL PARTITION WALL-----DO -------- FOR DETAIL SPECS. REFERE ANNEXE A .	Ceramic Glazed tile till bottom of False Ceiling. **Make :** Johnson, Kajaria, Somany.	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make-**Berger, Nerolac, Asian. . **INTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . . **MAKE-**Berger, Nerolac, Asian.	**FLOORING-8 to 10**mm thick Anti skid Ceramic Floor Tiles **.** **Make-**Johnson, Kajaria, Somany.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32 FRP Door with Frame or PVC Doors Rajashri make or Equivalent as per DSR of CPWD **Make-**	UPVC Framed sliding glazed window with Stainless steel mesh. **Make-** KOMERLING , FENESTA , ALUPLAST
8	**PARKING /PAVING**	NA	NA	NA	**FLOORING-**25 mm thick GRC (Glass reinforced Concret) paver block . **Make : UNISTONE**	NA	NA	NA
9	**COURTYARD**	NA	NA	NA	**FLOORING-**25 mm thick GRC (Glass reinforced Concret) paver block . **Make : UNISTONE**	NA	NA	NA

NITI AAYOG , GOVT. OF INDIA.

NAME OF WORK-

Finishing Schedule for COVID FACILTY Pan India

SL.	SPACE	WALL	DADO	PAINTING/CLADDING	FLOORING	CEILING	DOOR	WINDOW
10	**KITCHEN**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall .** **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make**-Berger, Nerolac, Asian. I**NTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make**-Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring. .	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
11	**LAUNDARY**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall .** **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make**-Berger, Nerolac, Asian. I**NTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make**-Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
12	**Bio Medical Waste**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall .** **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make**-Berger, Nerolac, Asian. I**NTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make**-Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
13	**MORTUARY / MORGUE**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall .** **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**	Ceramic Glazed Tiles upto 2.1 mt. ht. Above Acrylic/OBD **Make-** Johnson, Kajaria, Somany. Paint: Berger, Nerolac, Asian	**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make**-Berger, Nerolac, Asian. I**NTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make**-Berger, Nerolac, Asian.	**FLOORING-**16 mm thick Kota stone flooring.	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial False Ceiling. **Make-** Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST
14	**STAFF AREA**	**BUILDING PERIPHERIAL WALL- LGFS (Light Gauge Framing Structure) with Insulated Wall .** **INTERNAL PARTITION WALL-----DO --------** **FOR DETAIL SPECS. REFERE ANNEXE A**		**EXTERNAL PAINTING**-(Exterior Grade Acrylic emulsion paint) . **Make**-Berger, Nerolac, Asian. I**NTERNAL PAINTING**-(Cement based putty finished & Acrylic Emulsion paint) . **Make**-Berger, Nerolac, Asian.	**FLOORING-ANTI BACTERIAL PVC Make- FORBO, TARKETT, GER ..Certificate of Origin from European Plant**	**CEILING-**Light wt.Calcium Silicate Board Anti Bacterial Acoustical False Ceiling. Make- Aerolite, Hilux, Promat.	**DOOR-**32mm hick Flush door. **Make-**Century, Mayur, Kitply, Archid, Green Ply.	UPVC Framed sliding glazed window with Stainless steel mesh. Make- KOMERLING , FENESTA , ALUPLAST

List of Equipments for COVID Care Centres, Dedicated COVID Health Centre, Dedicated COVID Hospital

Sr. No	Equipment	Dedicated Covid Hospital		Dedicated COVID Health Centre (only Oxygen therapy)	COVID Care Centre
1	Beds	ICU Beds	HDU Beds	Standard Hospital beds	Standard Hospital beds
2	Air mattresses	1 per bed	1 per bed	not required	not required
3	Oxygen Source	2 per bed	1 per bed	1 per bed	not required
4	Compressed air	1 per bed	not required	not required	not required
5	Suction source	1 per bed	1 per bed	1 per10 beds	not required
6	ICU Ventilators	1 per bed	not required	not required	not required
7	Transport ventilator	1 per 15 beds	1 per 10 beds	1 per 100 beds	not required
8	Multipara monitor (with invasive monitoring modules	1 per bed	1 per bed	not required	not required
9	Pulse Oxymeters	Not required	not required	1 per bed	1 per 10 beds
10	Defibrillator with AED	One per 10 beds	1 per 10 beds	1 per 100 beds	not required
11	Infusion pumps	3 per Bed	1 per bed	Optional	-
12	Nebulizer (in line with ventilator)	1 per bed	not required	Not required	Not required
13	ECG (5 channel) machine	1 per 10 beds	can be shared with ICU	1 per area	Not required
14	Video Laryngoscope with disposable blades	1 per 5 beds	1 per 10 beds	not required	not required
15	High flow nasal cannula machines	1 per 5 beds	1 per 5 beds	not required	not required
16	Bronchoscope[6]	Desirable	can be shared with ICU	not required	not required

18-06-2020 18.6.20 18/6/2020

17	Hemo-Dialysis machine7	Desirable	not required	not required	not required
18	Intermittent leg compression machine	1 per bed	1 per bed	not required	not required
19	Crash cart	1 per 10 beds	1 per 10 beds	1 per 20 beds	1 per 100 beds
20	Self Inflating resuscitation bag	1 per bed	1per bed	1 per10 beds	1 per 100 beds
21	Mobile X-ray Unit with CR system	At least one	can be shared with ICU	At least one	not required
22	Portable Ultrasound machine	At least one	can be shared with ICU	not required	not required
23	ABG Machine	At least one	can be shared with ICU	not required	not required
24	Facilities for hematology and Bio chemistry tests	1 Point of Care (POC) chemistry analyzer	can be shared with ICU	Mandatory	not required
25	Glucometer	Yes	Yes	Yes	2 per 50 bed
26	ALS ambulance	1 per ICU (15 beds)	can be shared with ICU	1 per 100 beds (1 per centre)	1 per 100
27	Stethoscope	1 per bed	1 per bed	2 per 10 beds	2 per 50 bed
28	Digital B.P Apparatus	nil	nil	2 per 10 beds	1 per 50 bed
29	Digital Thermometer	1 per bed	1 per bed	6 per 100 beds	6 per 50 bed
30	IV Stand	1 per bed	1 per bed	1 per 2 bed	Not required
31	Mattress	Not required	Not required	1 per bed	1 per bed
32	Refrigerators 165 litres	1 per 15 beds	1 per 15 beds	1 per 100 beds	1 per 200 beds
33	Foldable bed side Screen	4 per 15 beds	4 per 15 beds	0	0
34	LED Torch Light	1 per 15 beds	1 per 15 beds	1 per 50 beds	1 per 100 beds

19-06-2020 18.6.20 18/6/2020

35	Blankets	2 per bed	2 per bed	2 per bed	2 per bed
36	AED	Not required	not required	not required	1 per CCC
37	Laryngoscope	Not required	not required	1 per 50 beds	Not required

18-06-2020
(Dr Mallika Pandey)

18.6.20

18/6/2020
(Dr. Akhilesh)

List of Consumables in COVID Care Centres, Dedicated COVID Health Centres and Dedicated COVID Hospitals

Sr. No	Consumables	Dedicate Covid Hospital		Dedicated COVID Health Centre	COVID Care Centre
		ICU	HDU		
1	Percutaneous tracheotomy kits	1 per 10 beds	Not required	Not required	Not required
2	Kits for central arterial/venous line(20G cannula, pressure line, Transducer, 3-way stopcock)	1-2 per bed	1 per 2 beds	Not required	Not required
3	Gel pads & accessories for proning	√	Not required	Not required	Not required
4	Oxygen mask with reservoir	√	√	√	Not required
5	Nasal prongs (all sizes)	√	√	√	Not required
6	High Flow nasal cannula	√	√	Not required	Not required
7	Endotracheal tubes cuffed (all sizes)	√	√	√	Not required
8	Endotracheal tubes non-cuffed (all sizes)	√	√	√	Not required
9	Airways (all sizes)	√	√	√	Not required
10	Complete Personal protection kits	√	√	√	√
11	Gown, protective	√	√	√	√
12	Scrubs, tops	√	√	√	√
13	Scrubs, pants	√	√	√	√
14	Apron, disposable	√	√	√	√
15	Apron, non - permeable	√	√	√	√
16	N-95 masks	√	√	√	√
17	Medical masks	√	√	√	√
18	Gloves, examination	√	√	√	√
19	Gloves, heavy duty	√	√	√	√
20	Goggles, protective	√	√	√	√
21	Face shield	√	√	√	√
22	Oxygen tubings	√	√	√	Not required
23	Closed suction Catheters	2/day/bed	Not required	Not required	Not required
24	IV catheters (all sizes)	√	√	√	Not required
25	Stopcock, 3-way, for infusion giving set, with connection line, sterile, single use	√	√	√	Not required
26	Syringes, Luer (all sizes)	√	√	√	Not required

18-06-2020

18/6/2020

27	Needles, hypodermic (all sizes)	√	√	√	Not required
28	IV Drip Set	√	√	√	Not required
29	Bio-hazardous bags	√	√	√	√
30	Urinary catheters with Urometer	√	√	√	Not required
31	Glucometers with strips(1000 strps with each glucometer in packets of 50 and lancets)	√	√	√	√
32	Nebulizer Mask Disposable kit Adult	√	√	√	Not required
33	Nebulizer Mask Disposable kit Paediatric	√	√	√	Not required
34	Oxygen Cylinders B Type with trolly,regulator,flow meter humidifier	√	√	√	√
35	Oxygen face mask adult	√	√	√	Not required
36	Oxygen face mask pedeatric	√	√	√	Not required
37	Ortho Toludine Solution for refill(1 litre Bottle)	√	√	√	√
38	Supraglottic Airway Device - dispoable	√	√	Not required	Not required
39	Suction Catheter	√	√	√	Not required
40	Ventilator Circuit	√	Not required	Not required	Not required
41	Nasogastric Tube	√	√	√	Not required
42	Bains Circuit	√	√	√	Not required
43	Extension Tubing	√	√	Not required	Not required

Pandey
18-06-2020
(Dr Maitrei Pandey)

18/6/2020

HUMAN RESOURCES - CFTC Kerala Model				
Sl. No.	Item	Quantity		Procurement
		As per 1 CFTC (100 beds)	Minimum 1 CFTC (100 beds)	
1	Doctors	32	6	Central
2	Nurses	48	24	Central
3	Pharmacist	12	3	Central
4	Ward boy/ attender	48	24	Local
5	House keeping staff	40	18	Local
6	Health care volunteer	24	12	Local
7	Security	12	6	Local
TOTAL		216	**93**	

NOTE:

8 hours per shift for HR.

Number of personnel per shift = 93/3 = 31.

Services such as ambulance, diagnostics (including sample collection), food, laundry, data entry could be pooled to optimize man power and resources.

Ministry of Health & Family Welfare
Directorate General of Health Services
EMR Division

Guidance document on appropriate management of suspect/confirmed cases of COVID-19

1. Introduction: Since its first detection in China, Coronavirus Disease 2019 (COVID-19) has now spread to over 210 countries/territories, with reports of local transmission happening across the world. As per WHO (as of 7th April, 2020), there has been a total of 12,14,466 confirmed cases and 67,767 deaths due to COVID-19 worldwide.

In India, as on 7th April, 2020, 4421 confirmed cases and 114 deaths reported from 31States/UTs.

2. Purpose of this document

A series of measures have been taken by both the Central and State Governments to break the chain of transmission. One among these is to isolate all suspect and confirmed cases of COVID-19. However, as the number of cases increases, it would be important to appropriately prepare the health systems and use the existing resources judicially. Available data in India suggests that nearly 70% of cases affected with COVID-19 either exhibit mild or very mild symptoms. Such cases may not require admission to COVID-19 blocks/ dedicated COVID-19 hospitals.

It is important to put in place mechanisms for triaging and decisions making for identification of the appropriate COVID dedicated facility for providing care to COVID-19 patients. The purpose of this document is to put in place such SOPs to ensure optimal utilization of available resources and thereby providing appropriate care to all the COVID-19 patients. This will ensure that available hospital beds capacity is used only for moderate to severe cases of COVID-19. The SOPs specified hereafter also specify the different types of facilities to be set up for various categories of Covid-19 cases.

Guiding principles

All the selected facilities must be dedicated for COVID management. Three types of COVID dedicated facilities are proposed in this document. All 3 types of COVID Dedicated facilities will have separate ear marked areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances.

All suspect cases (irrespective of severity of their disease) will be tested for COVID-19. Further management of these cases will depend on their (i) clinical status and (ii) result of COVID-19 testing.
All three types of facilities will be linked to the Surveillance team (IDSP)
All these facilities will follow strict infection prevention and control practices

3. Types of COVID Dedicated Facilities: There are three types of COVID Dedicated Facilities –

(1) COVID Care Center (CCC):

1.1. The COVID Care Centers shall offer care only for cases that have been clinically assigned as **mild or very mild cases or COVID suspect cases.**

1.2. The COVID Care Centers are makeshift facilities. These may be set up in hostels, hotels, schools, stadiums, lodges etc., both public and private. If need be, existing quarantine facilities could also be converted into COVID Care Centers. Functional hospitals like CHCs, etc, which may be handling regular, non-COVID cases should be designated as COVID Care Centers as a last resort. This is important as essential non COVID Medical services like those for pregnant women, newborns etc, are to be maintained.

1.3. Wherever a COVID Care Center is designated for admitting both the confirmed and the suspected cases, these facilities **must have separate areas for suspected and confirmed cases with preferably separate entry and exit. Suspect and confirmed cases must not be allowed to mix under any circumstances.**

1.4. As far as possible, wherever suspect cases are admitted in the COVID Care Center, preferably individual rooms should be assigned for such cases.

1.5. Every Dedicated COVID Care Centre must necessarily be mapped to one or more Dedicated COVID Health Centres and at least one Dedicated COVID Hospital for referral purpose (details

given below).

1.6. Every Dedicated COVID Care Centre must also have a dedicated Basic Life Support Ambulance (BLSA) equipped with sufficient oxygen support on 24x7 basis, for ensuring safe transport of a case to Dedicated higher facilities if the symptoms progress from mild to moderate or severe.

1.7. The human resource to man these Care Centre facilities may also be drawn from AYUSH doctors. Training protocols developed by AIIMS is uploaded on MoHFW website. Ministry of AYUSH has also carried out training sessions. The State AYUSH Secretary/ Director should be involved in this deployment. State wise details of trained AYUSH doctors has been shared with the States. Their work can be guided by an Allopathic doctor.

(2) Dedicated COVID Health Centre (DCHC):

2.1. The Dedicated COVID Health Centre are hospitals that shall offer care for all cases that have been **clinically assigned as moderate**.

2.2. These should either be a full hospital or a separate block in a hospital with preferably separate entry\exit/zoning.

2.3. Private hospitals may also be designated as COVID Dedicated Health Centres.

2.4. Wherever a Dedicated COVID Health Center is designated for admitting both the confirmed and the suspect cases with moderate symptoms, these hospitals **must have separate areas for suspect and confirmed cases. Suspect and confirmed cases must not be allowed to mix under any circumstances.**

2.5. These hospitals would have beds with assured Oxygen support.

2.6. Every Dedicated COVID Health Centre must necessarily be mapped to one or more Dedicated COVID Hospitals.

2.7. Every DCHC must also have a dedicated Basic Life Support Ambulance (BLSA) equipped with sufficient oxygen support for ensuring safe transport of a case to a Dedicated COVID Hospital if the symptoms progress from moderate to severe.

(3) Dedicated COVID Hospital (DCH):

3.1. The Dedicated COVID Hospitals are hospitals that shall offer comprehensive care primarily for those who have been **clinically assigned as severe**.

3.2. The Dedicated COVID Hospitals should either be a full hospital or a separate block in a hospital with preferably separate entry\exit.

3.3. Private hospitals may also be designated as COVID Dedicated Hospitals.

3.4. These hospitals would have fully equipped ICUs, Ventilators and beds with assured Oxygen support.

3.5. These hospitals **will have separate areas for suspect and confirmed cases. Suspect and confirmed cases should not be allowed to mix under any circumstances.**

3.6. The Dedicated COVID Hospitals would also be referral centers for the Dedicated COVID Health Centers and the COVID Care Centers.

All these facilities will follow strict infection prevention and control practices.

4. Management of COVID cases

4.1. Assessment of patients:

In addition to patients arriving directly through helpline/ referral to above categories of COVID dedicated facilities, in field settings during containment operations, the supervisory medical officer to assess for severity of the case detected and refer to appropriate facility.

States\UTs may identify hospitals with dedicated and separate space and set up Fever Clinics in such hospitals. The Fever Clinics may also be set up in CHCs, in rural areas subject to availability of sufficient space to minimize the risk of cross infections. In urban areas, the civil\general hospitals, Urban CHCs and Municipal Hospitals may also be designated as Fever Clinics. These could be set up preferably near the main entrance for triage and referral to appropriate COVID Dedicated Facility. Wherever space allows, a temporary make shift arrangement outside the facility may be arranged for this triaging.

The medical officer at the fever clinics could identify suspect cases and refer to COVID Care Centre, Dedicated COVID Health Centre or Dedicated COVID Hospital, depending on the clinical severity.

4.2 Categorization of patients

Patients may be categorized into three groups and managed in the respective COVID hospitals – Dedicated COVID Care Centre, dedicated COVID Health Centre and dedicated COVID

Hospitals.

Group 1: Suspect and confirmed cases clinically assigned as mild and very mild

Group 2: Suspect and confirmed cases clinically assigned as moderate

Group 3: Suspect and confirmed cases clinically assigned as severe

Group 1: **Suspect and confirmed cases clinically assigned as mild and very mild (COVID Care Centres)**

- **Clinical criteria**: Cases presenting with fever and/or upper respiratory tract illness (Influenza Like Illness, ILI).
- These patients will be accommodated in COVID Care Centers.
- The patients would be tested for COVID-19 and till such time their results are available they will remain in the "suspect cases" section of the COVID Care Center preferably in an individual room.
- Those who test positive, will be moved into the "confirmed cases" section of the COVID Care Center.
- If test results are negative, patient will be given symptomatic treatment and be discharged with advice to follow prescribed medications and preventive health measures as per prescribed protocols.
- If any patient admitted to the COVID Care Center qualifies the clinical criteria for moderate or severe case, such patient will be shifted to a Dedicated COVID Health Centre or a Dedicated COVID Hospital.
- Apart from medical care the other essential services like food, sanitation, counseling etc. at the COVID Care Centers will be provided by local administration. Guidelines for quarantine facilities (available on MoHFW website) may be used for this purpose.

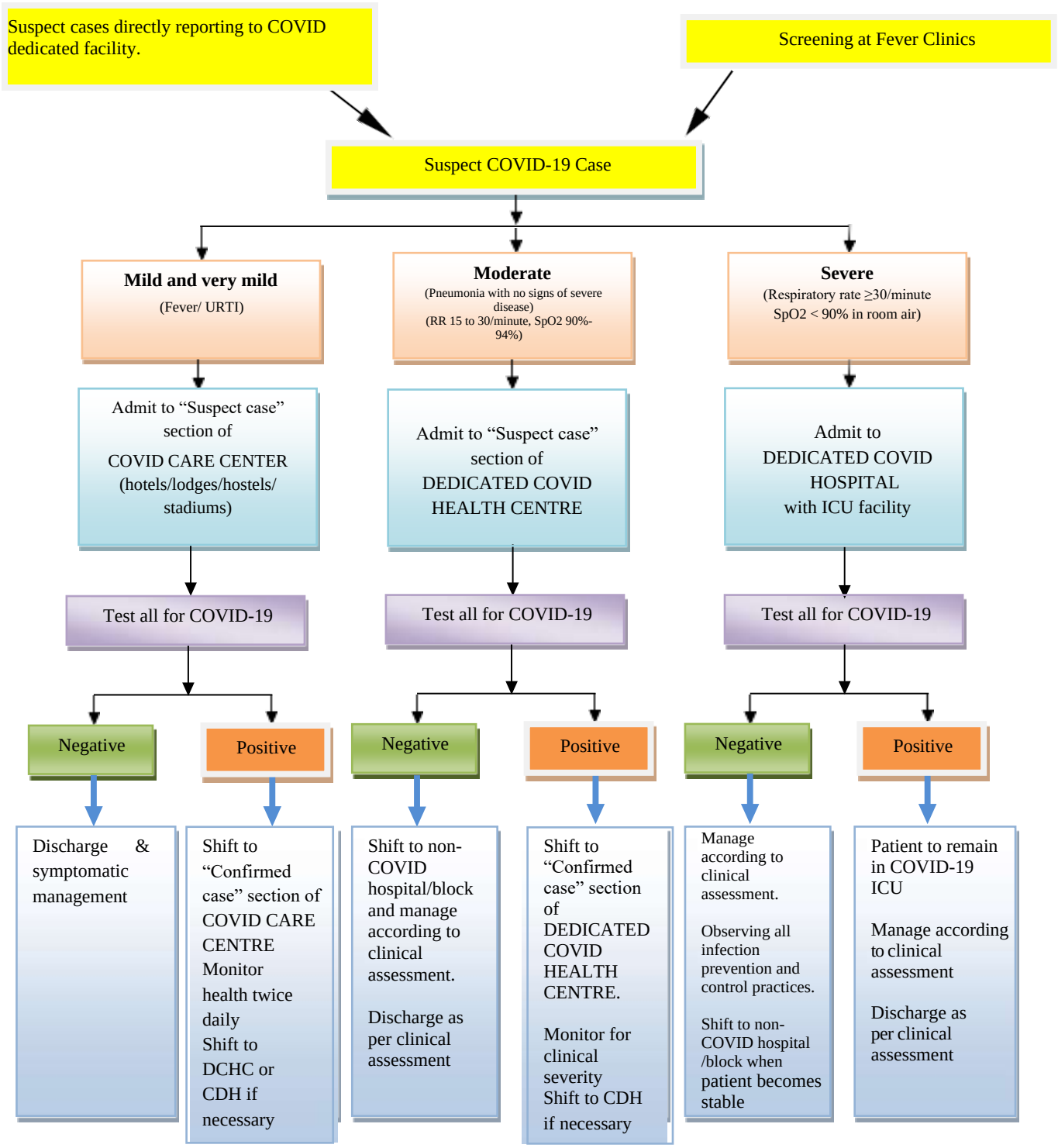
Group 2: **Suspect and confirmed cases clinically assigned as moderate (Dedicated COVID Health Centres)**

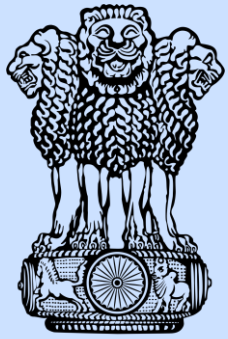
- **Clinical criteria**: Pneumonia with no signs of severe disease (Respiratory Rate 15 to 30/minute, SpO2 90%-94%).
- Such cases will not be referred to COVID Care Centers but instead will be admitted to Dedicated COVID Health centres.
- It will be manned by allopathic doctors and cases will be monitored on above mentioned clinical parameters for assessing severity as per treatment protocol (available on MoHFW website).
- They will be kept in "suspect cases" section of Dedicated COVID Health Centres, till such time as their results are not available preferably in an individual room.
- Those testing positive shall be shifted to "confirmed cases" section of Dedicated COVID Health Centre.
- Any patient, for whom the test results are negative, will be shifted to a non-COVID hospital and will be managed according to clinical assessment. Discharge as per clinical assessment.
- If any patient admitted to the Dedicated COVID Health Center qualifies the clinical criteria for severe case, such patient will be shifted to a Dedicated COVID Hospital.

Group 3: Suspect and confirmed cases clinically assigned as severe (Dedicated COVID Hospital)

- **Clinical criteria**: Severe Pneumonia (with respiratory rate ≥30/minute and/or SpO2 < 90% in room air) or ARDS or Septic shock
- Such cases will be directly admitted to a Dedicated COVID Hospital's ICU till such time as test results are obtained.
- If test results are positive, such patient will remain in COVID-19 ICU and receive treatment as per standard treatment protocol. Patients testing negative will be managed with adequate infection prevention and control practices.

Algorithm for isolation of suspect/confirmed cases of COVID-19





COVID -19 Outbreak

Guidelines for Setting up Isolation Facility/Ward

National Centre for Disease Control

22 Sham Nath Marg, Delhi 110054

Directorate General of Health Services

Ministry of Health and Family Welfare

Table of Contents

WHO has declared the COVID-19 (SARS-CoV-2) outbreak as Public Health Emergency of international concern and has raised the risk assessment of China, Regional Level and Global Level to Very High and "all countries should be prepared for containment, including active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread of SARS-CoV-2 infection. Among the factors affecting cluster containment, Isolation of cases and quarantine of contacts is the mainstay of outbreak containment.

Scope of document: This guidance document has been prepared to establish an isolation facility at the level of district hospital, a secondary health care facility.

A. Quarantine and isolation

Quarantine and Isolation are important mainstay of cluster containment. These measures help by breaking the chain of transmission in the community.

Quarantine

Quarantine refers to separation of individuals who are not yet ill but have been exposed to COVID-19 and therefore have a potential to become ill. There will be voluntary home quarantine of contacts of suspect /confirmed cases. The guideline on home quarantine available on the website of the Ministry provides detail guidance on home quarantine.

Isolation refers to separation of individuals who are ill and suspected or confirmed of COVID-19. All suspect cases detected in the containment/buffer zones (till a diagnosis is made), will be hospitalized and kept in isolation in a designated facility till such time they are tested negative. Persons testing positive for COVID-19 will remain to be hospitalized till such time 2 of their samples are tested negative as per MoHFW's discharge policy. About 15% of the patients are likely to develop pneumonia, 5 % of whom requires ventilator management.

Hence dedicated Intensive care beds need to be identified earmarked. Some among them may progress to multi organ failure and hence critical care facility/ dialysis facility/ and Salvage therapy [Extra Corporeal Membrane Oxygenator (ECMO)] facility for managing the respiratory/renal complications/ multi-organ failure shall be required. If such facilities are not available in the containment zone, nearest tertiary care facility in Government / private sector needs to be identified, that becomes a part of the micro-plan.

There are various modalities of isolating a patient. Ideally, patients can be isolated in individual isolation rooms or negative pressure rooms with 12 or more air-changes per hour.

In resource constrained settings, all positive COVID-19 cases can be cohorted in a ward with good ventilation. Similarly, all suspect cases should also be cohorted in a separate

ward. However under no circumstances these cases should be mixed up. A minimum distance of 1 meter needs to be maintained between adjacent beds. All such patients need to wear a triple layer surgical mask at all times.

Nosocomial infection in fellow patients and attending healthcare personnel are well documented in the current COVID-19 outbreak as well. There shall be strict adherence to Infection prevention control practices in all health facilities. IPC committees would be formed (if not already in place) with the mandate to ensure that all healthcare personnel are well aware of IPC practices and suitable arrangements for requisite PPE and other logistic (hand sanitizer, soap, water etc.) are in place. The designated hospitals will ensure that all healthcare staff is trained in washing of hands, respiratory etiquettes, donning/doffing & proper disposal of PPEs and bio-medical waste management.

At all times doctors, nurses and para-medics working in the clinical areas will wear three layered surgical mask and gloves. The medical personnel working in isolation and critical care facilities will wear full complement of PPE (including N95 masks).

The support staff engaged in cleaning and disinfection will also wear full complement of PPE. Environmental cleaning should be done twice daily and consist of damp dusting and floor mopping with Lysol or other phenolic disinfectants and cleaning of surfaces with sodium hypochlorite solution. Detailed guidelines available on MoHFW's website may be followed.

B. Setting up isolation facility/ward

An isolation facility aims to control the airflow in the room so that the number of airborne infectious particles is reduced to a level that ensures cross-infection of other people within a healthcare facility is highly unlikely.

- At State level, a minimum of **50** bed isolation ward should be established.
- At District level, a minimum of **10** bed isolation ward should be established.
  - Post signages on the door indicating that the space is an isolation area.
  - Remove all non-essential furniture and ensure that the remaining furniture is easy to clean, and does not conceal or retain dirt or moisture within or around it.
  - COVID-19 patients should be housed in single rooms.
  - However, if sufficient single rooms are not available, beds could be put with a spatial separation of at least 1 meter (3 feet) from one another.
  - To create a 10 bed facility, a minimum space of 2000 sq. feet area clearly segregated from other patientcare areas is required.
  - Preferably the isolation ward should have a separate entry/exit and should not be co-located with post-surgical wards/dialysis unit/SNCU/labour room etc.
  - It should be in a segregated area which is not frequented by outsiders.
  - The access to isolation ward should be through dedicated lift/guarded stairs.

- There should be double door entry with changing room and nursing station. Enough PPE should be available in the changing room with waste disposal bins to collect used PPEs.Used PPEs should be disposedas per the BMWM guidelines.
- Stock the PPE supply and linen outside the isolation room or area (e.g. in the change room). Setup a trolley outside the door to hold PPE. A checklist may be useful to ensure that all equipment is available.
- Place appropriate waste bags in a bin. If possible, use a touch-free bin. Ensure that used (i.e. dirty) bins remain inside the isolation rooms.
- Place a puncture-proof container for sharps disposal inside the isolation room/area and bio-medical waste should be managed as per the BMWM guidelines.
- Keep the patient's personal belongings to a minimum. Keep water pitchers and cups, tissue wipes, and all items necessary for attending to personal hygiene within the patient's reach.
- Non-critical patient-care equipment (e.g. stethoscope, thermometer, blood pressure cuff, and sphygmomanometer) should be dedicated for the patient, if possible. Any patient-care equipment that is required for use by other patients should be thoroughly cleaned and disinfected before use.
- Place an appropriate container with a lid outside the door for equipment that requires disinfection or sterilization.
- Ensure that appropriate hand washing facilities and hand-hygiene supplies are available. Stock the sink area with suitable supplies for hand washing, and with alcohol-based hand rub, near the point of care and the room door.
- Ensure adequate room ventilation. If room is air-conditioned, ensure 12 air changes/ hour and filtering of exhaust air. A negative pressure in isolation rooms is desirable for patients requiring aerosolization procedures (intubation, suction nebulisation). These rooms may have standalone air-conditioning. These areas should not be a part of the central air-conditioning.
- If air-conditioning is not available negative pressure could also be created through putting up 3-4 exhaust fans driving air out of the room.
- In **district hospital**, where there is sufficient space, natural ventilation may be followed. Such isolation facility should have large windows on opposite walls of the room allowing a natural unidirectional flow and air changes. The principle of natural ventilation is to allow and enhance the flow of outdoor air by natural forces such as wind and thermal buoyancy forces from one opening to another to achieve the desirable air change per hour.
- The isolation ward should have a separate toilet with proper cleaning and supplies.
- Avoid sharing of equipment, but if unavoidable, ensure that reusable equipment is appropriately disinfected between patients.

- Ensure regular cleaning and proper disinfection of common areas, and adequate hand hygiene by patients, visitors and care givers.Keep adequate equipment required for cleaning or disinfection inside the isolation room or area, and ensure scrupulous daily cleaning of the isolation room or area.
- **Visitors to the isolation facility should be restricted /disallowed**. For unavoidable entries, they should use PPE according to the hospital guidance, and should be instructed on its proper use and in hand hygiene practices prior to entry into the isolation room/area.
- Ensure that visitors consult the health-care worker in charge (who is also responsible for keeping a visitor record) before being allowed into the isolation areas. Keep a roster of all staff working in the isolation areas, for possible outbreak investigation and contact tracing.
- Doctors, nurses and paramedics posted to isolation facility **need to be dedicated** and not allowed to work in other patient-care areas.
- Consider having designated portable X-ray and portable ultrasound equipment.
- Corridors with frequent patient transport should be well-ventilated.
- All health staff involved in patient care should be well trained in the use of PPE.
- Set up a telephone or other method of communication in the isolation room or area to enable patients, family members or visitors to communicate with health-care workers. This may reduce the number of times the workers need to don PPE to enter the room or area.

C. Checklist for isolation rooms

- Eye protection (visor or goggles)
- Face shield (provides eye, nose and mouth protection)
- Gloves
- reusable vinyl or rubber gloves for environmental cleaning
- latex single-use gloves for clinical care
- Hair covers
- Particulate respirators (N95, FFP2, or equivalent)
- Medical (surgical or procedure) masks
- Gowns and aprons
- single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns
- plastic aprons (for use over non-fluid-resistant gowns if splashing is anticipated and if fluid-resistant gowns are not available)
- Alcohol-based hand rub
- Plain soap (liquid if possible, for washing hands in clean water)
- Clean single-use towels (e.g. paper towels)
- Sharps containers

- Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment
- Large plastic bags
- Appropriate clinical waste bags
- Linen bags
- Collection container for used equipment
- Standard IEC
- Standard protocols for hand hygiene, sample collection and BMW displayed clearly
- Standard Clinical management protocols

D. Wearing and removing Personal Protective Equipment (PPE)

Before entering the isolation room or area:

- Collect all equipment needed;
- Perform hand hygiene with an alcohol-based hand rub (preferably when hands are not visibly soiled) or soap and water;
- Put on PPE in the order that ensures adequate placement of PPE items and prevent self-contamination and self-inoculation while using and taking off PPE; an example of the order in which to don PPE when all PPE items are needed is hand hygiene, gown, mask or respirator, eye protection and gloves

Leaving the isolation room or area

- Either remove PPE in the anteroom or, if there is no anteroom, make sure that the PPE will not contaminate either the environment outside the isolation room or area, or other people.
- Remove PPE in a manner that prevents self-contamination or self-inoculation with contaminated PPE or hands. General principles are:
  - remove the most contaminated PPE items first;
  - perform hand hygiene immediately after removing gloves;
  - remove the mask or particulate respirator last (by grasping the ties and discarding in a rubbish bin);
  - discard disposable items in a closed rubbish bin;
  - put reusable items in a dry (e.g. without any disinfectant solution) closed container; an example of the order in which to take off PPE when all PPE items are needed is gloves (if the gown is disposable, gloves can be peeled off together with gown upon removal), hand hygiene, gown, eye protection, mask or respirator, and hand hygiene
  - Perform hand hygiene with an alcohol-based hand rub (preferably) or soap and water whenever un-gloved hands touch contaminated PPE items.

E. Transport of Infectious Patients

It is recommended that transport of infectious patients is limited to movement considered medically essential by the clinicians, e.g. for diagnostic or treatment purposes. Where infectious patients are required to be transported to other units within the hospital or outside the following precautions may be implemented:

- Infected or colonised areas of the patient's body are covered: - For contact isolation this may include a gown, sheets or dressings to surface wounds; these patients are transferred to a Standard Pressure or Protective Environment Isolation room - For respiratory isolation the patient is dressed in a mask, gown and covered in sheets; these patients are accommodated in a Negative Pressure Isolation Room - For quarantine isolation the patient may be transported in a fully enclosed transport cell or isolator with a filtered air supply and exhaust; these patients are accommodated in a high level quarantine isolation suite.
- The transport personnel remove existing PPE, cleanse hands and transport the patient on a wheelchair, bed or trolley, applying clean PPE to transport the patients and when handling the patient at the destination. Gown-up and gown-down rooms located at the entry to a Unit will assist the staff to enter and exit the facility according to the strict infection control protocols required, thereby reducing the risk of contamination
- The destination unit should be contacted and notified prior to the transfer to ensure suitable accommodation on arrival.
- It is preferred that the patient is transported through staff and service corridors, not public access corridors During planning stages, design can assist transfer of infectious patients by providing service corridors and strategically placed lifts, capable of separation from other lifts. The nominated lift may be isolated from public and staff transit through access control measures and cleaned following transit of the infectious patient.
- Design may also incorporate a designated floor for horizontal bed transfers of infectious patients away from busy clinical areas. The designated floor may be located at mid-level in the hospital
- A combination of nominated lifts, corridors and a bed transfer floor would assist in the movement of infectious patients through the hospital and minimise the risk of spread of infection.

Annexure I

Checklist for isolation rooms

- Eye protection (visor or goggles)
- Face shield (provides eye, nose and mouth protection)
- Gloves
- reusable vinyl or rubber gloves for environmental cleaning
- latex single-use gloves for clinical care
- Hair covers
- Particulate respirators (N95, FFP2, or equivalent)
- Medical (surgical or procedure) masks
- Gowns and aprons
- single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns
- plastic aprons (for use over non-fluid-resistant gowns if splashing is anticipated and if fluid-resistant gowns are not available)
- Alcohol-based hand rub
- Plain soap (liquid if possible, for washing hands in clean water)
- Clean single-use towels (e.g. paper towels)
- Sharps containers
- Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment
- Large plastic bags
- Appropriate clinical waste bags
- Linen bags
- Collection container for used equipment
- Standard IEC
- Standard protocols for hand hygiene, sample collection and BMW displayed clearly
- Standard Clinical management protocols

Annexure II

Hospital Preparedness & Isolation Facility Assessment Checklist - COVID19

I . GENERAL INFORMATION

1. Name of the healthcare facility (HCF)				
2. Type	☐Public ☐Private			
3. Category of HCF	☐Primary ☐Secondary ☐Tertiary			
4. Subcategory	☐PHC ☐UPHC ☐CHC ☐Taluk/Sub-District Hospital ☐ District Hospital ☐General Hospital ☐Medical College Hospital ☐ Multi-Speciality Hospital ☐Nursing Home ☐ Dispensary ☐Clinic			
5. Address of the health facility a) Block b) District c) State d) Email ID e) Contact no.				
6. Name of Director/ Principal/Medical superintendent a) Email ID b) Contact no.				
7. Name of RMO/Hospital In-charge a) Email ID b) Contact no				
8. Total number of inpatient beds				
9. Total number of ICU beds				
10. Average number of OPD attendance per month				
11. Average number of new admissions /months				
12. Bed occupancy rate (Annual)				
13. Total staff strength	Doctors – MBBS			
	Doctors- AYUSH			
	Clinical Specialists other than Intensivist/Pulmonologist			
	Non-Clinical specialists other than Microbiologist			
	Microbiologists			
	Intensivists #	Pulmonologist #	Int	Pulm
	Senior Resident #	Junior Resident #	SR	JR
	Interns			
	Nurses			
	Lab technicians			

	Pharmacists	
	Laboratory Technicians	
	Cleaning staff	
	Ambluance drivers	
14. Does this HCF have a designated COVID 19 isolation facility		☐Yes☐No

II. HCF PREPAREDNESS TO MANAGE MAJOR EPIDEMICS & PANDEMICS

15. Core Emergency Response / Rapid Response Team for outbreak management identified?	☐Available ☐In progress☐ Not started
16. Roles and responsibilities of RRT/ERT clearly defined?	☐Available ☐In progress☐ Not started
17. Is there a contingency plan for covering for a core team member who is absent?	☐Available ☐In progress☐ Not started
18. Monitoring and managing Health Care Personnel (HCP) a) The facility follows the Central/State public health policies/procedures for monitoring and managing HCP with potential for exposure to COVID-19 b) The facility have a process to conduct symptom and temperature checks prior to the start of duty shift for HCP	☐Yes ☐No ☐Yes ☐No
19. Training for Healthcare Personnel (HCP) a) Education and job-specific training to HCP regarding • Signs and symptoms of infection • Triage procedures including patient placement and filling the CIF • Safely collect clinical specimen • Correct infection control practices and PPE use • HCP sick leave policies • Recommended actions for not using recommended PPE • How and to whom suspected cases (COVID-19)should be reported	☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started ☐Completed ☐In Progress☐ Not Started

III. TRIAGE

20. Triage protocols available at the healthcare facility?	☐Available ☐In progress ☐ Not started
21. Availability of telemedicine facility as a way to provide clinical support without direct interaction with the patient	☐Available ☐In progress ☐ Not started
22. Is there specific waiting area for people with respiratory symptoms?	
23. Availability of designated ARI/COVID-19 triage area	☐Available ☐In progress ☐ Not started
24. Do they have non-contact Infra-Red thermometer available near the registration desk?	
25. Availability of signage directing to triage area and signage to instruct patients to alert staff if they have symptoms of COVID-19	☐Available ☐In progress ☐ Not started
26. Do they have dedicated/single examination rooms in Triage area? (Dedicated room should satisfy criteria of one patient per room with door closed for examination)	☐Yes ☐No
27. Triage area has signs/alerts about respiratory etiquette and hand hygiene?	☐Yes ☐No
28. Does the HCF provide masks for patients with respiratory symptoms?	☐Yes ☐No

29. Triage staff trained on revised COVID19 case definition and identify suspected cases ?	☐Yes ☐No
30. Screening questionnaire and algorithm for triage available with staff	☐Available ☐In progress ☐ Not started
31. Infrared thermometer available with the triage staff	☐Available ☐In progress ☐ Not started
32. Waste bins and access to cleaning/ disinfection supplies available in Triage area	☐Available ☐In progress ☐ Not started
33. Physical barriers (e.g., glass or plastic screens) at reception areas available to limit close contact between triage staff and potentially infectious patients	☐Available ☐In progress ☐ Not started
34. Does the patient waiting area have cross ventilation	☐Yes ☐No
35. Waiting area cleaned at least twice daily with 0.5% hypochlorite solution (or) 70% alcohol for surfaces that do not tolerate chlorine	☐Yes ☐No
36. Does the hospital have dedicated infrastructure for isolation facility? (If No skip to Section IV)	☐Yes ☐No
37. Type of isolation Facility	☐Temporary ☐ Permanent
IV Isolation Facility	
38. Is the isolation facility near OPD/IPD/other crowded area?	☐Yes ☐No
39. Screening rooms identified and available at the isolation area?	☐Available ☐In progress☐ Not started
40. Is there separate entry to the isolation area?	☐Yes ☐No
41. Dedicated space for staff to put on PPE while entering the isolated area	☐Available ☐In progress☐ Not started
42. Is there separate exit for isolation area?	☐Yes ☐No
43. Dedicated space for staff to take off PPE near exit?	☐Available ☐In progress☐ Not started
44. Isolation facility is separate and has rooms/wards?	☐Rooms☐Wards
45. Are washrooms available as 1 toilet per 20 persons?	☐Yes ☐No
46. Number of beds in each isolation rooms/wards	
47. Is the distance between two beds in isolation wards/rooms more than 1 meter?	☐Yes ☐No
48. Do the hospital have policy to segregate clinical staff (e.g. nurses) for care of COVID19 cases?	☐Yes ☐No
49. Whether PPEs available and located near point of use? a. Gloves b. Gowns c. Face masks d. 95 respirators	 ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
50. Whether the hospital limits the movement of patients in the isolation facility outside for medically necessary purposes only?	☐Yes ☐No
51. Are the known or suspected COVID19 patients placed on contact and droplet precautions?	☐Yes ☐No
52. If a patient leaves their room for medical purposes, are they provided face mask ?	☐Yes ☐No
53. Do staff transporting the patient wear PPE?	☐Yes ☐No
54. While transporting patients are specific routes used to minimize contact with other patients and staff?	☐Yes ☐No
55. For a patient on Airborne Precautions, air pressure is monitored daily with visual indicators (e.g., smoke tubes, flutter strips), regardless of the presence of differential pressure sensing devices (e.g., manometers):	☐Yes ☐No

56. Are these isolation rooms/wards satisfying the criteria of negative pressure class N? (Applicable if an aerosol generating procedure is performed)	☐Yes ☐No
57. Is there Provision food in the isolation area?	☐Available ☐In progress☐ Not started
58. Policy for leftover food waste management?	☐Available ☐In progress☐ Not started
59. Is there an ICU facility attached to isolation area?	☐Yes ☐No
60. Availability of cross ventilation	☐Yes ☐No
61. Is there any designated area for sample collection?	☐Yes ☐No
62. Are they following standard precautions and PPE while taking sample?	☐Yes ☐No
63. Does the facility have a written policy for sample collection and transport?	☐Yes ☐No
64. Are these sample transported in triple packing?	☐Yes ☐No
65. Does the transportation package contain IATA DG code (UN3373)?	☐Yes ☐No
66. Are they following standard precautions while transporting the sample?	☐Yes ☐No
67. Are the floors of isolation facility suitable for moping?	☐Yes ☐No
68. Is drinking water available at isolation area?	☐Yes ☐No
69. Availability of management protocols for COVID19	☐Available ☐In progress☐ Not started
70. Is rotation roster of duty shift for staff posted at isolation facility	☐Available ☐In progress☐ Not started
71. Is there any protocol for limiting the entry of visitors at isolation area?	☐Available ☐In progress☐ Not started
72. Availability of separate Thermometers BP apparatus with adult & Pediatric cuffs?	☐Yes ☐No
73. Availability of discharge policy for COVID19	☐Available ☐In Progress☐ Not Started

IV. INFECTION PREVENTION AND CONTROL PRACTICES

74. Does the hospital have Hospital Infection control Committee (HICC)?	☐Yes ☐No
75. Are there any infection control protocols/guidelines available?	☐Available ☒In progress☐ Not started
76. Functioning hand washing stations (including water, soap and paper towel or air dry) at isolation area?	
77. Does the facility have uninterrupted running water supply?	☐Yes ☐No
78. Is alcohol based hand sanitizer available at isolation area?	☐Yes ☐No
79. Are the staff following five movements of hand washing?	☐Yes ☐No
80. Are the staff following six steps of hand washing?	☐Yes ☐No
81. Is there posters to reinforce hand washing and PPE at hand washing stations	☐Available ☐In progress☐ Not started

VI. ENVIRONMENTAL CLEANING

82. Are objects and environmental surfaces in patient care areas touched frequently (e.g., bed rails, overbed table, bedside commode, lavatory surfaces) are cleaned	☐Yes ☐No
83. Are they disinfected with an approved disinfectant frequently (at least daily) and when visibly soiled?	☐Yes ☐No
84. Is there cleaning chart?	☐Yes ☐No
85. Frequency of cleaning of high touch areas, Bed rails, Tables, Chairs, Keyboards etc.,	
86. Is there any housekeeping policy available at isolation area?	☐Yes ☐No

87. Availability of terminal cleaning checklist	☐Available ☐In progress☐ Not started
88. Availability of three bucket system	☐Yes ☐No
89. Are they following correct contact time for disinfection with hypochlorite solution? (10 minutes for non-porous surfaces)	☐Yes ☐No
90. Are the staff following outward mopping technique	☐Yes ☐No
91. Availability of separate mops for each area	☐Yes ☐No
92. Frequency of cleaning of isolation rooms?	
93. Frequency of cleaning of ambulatory areas?	
94. Frequency of cleaning of bathrooms of isolation areas?	
95. Staff wearing PPE while cleaning a. Gloves b. Masks c. Apron	☐Yes ☐No ☐Yes ☐No ☐Yes ☐No
96. Are the staff trained in housekeeping and infection control practices?	☐Yes ☐No
97. Doctors, nurses & cleaning staff available/ shift at isolation area?	☐Yes ☐No
98. Barrier nursing practiced at isolation area in 1:1 ratio?	☐Yes ☐No
99. Is there any policy for linen management for isolation facility?	☐Available ☐In progress☐ Not started
100. What is the frequency of changing linen in isolation rooms?	☐Daily ☐Alternate Days ☐Weekly ☐When Soiled
101. Type of linen used	☐ Disposable ☐Reusable

VII. BIOMEDICAL WASTE MANAGEMENT (BMWM)

102. Availability of SOP for BMW management?	☐Available ☐In progress☐ Not started
103. Availability of agreement with CWTF	☐Available ☐In progress☐ Not started
104. Are they following color codes bins in BMW management?	☐Yes ☐No
105. Is there sufficient quantity color coded bags available?	☐Yes ☐No
106. Are they disinfecting the waste before it is disposed?	☐Yes ☐No
107. Method of disposing biomedical wastes?	☐CWTF ☐Deep burial ☐Incineration
108. Disposal of sharps as per the standard protocol?	☐Yes ☐No
109. Availability of biomedical waste trolley?	☐Yes ☐No
110. Availability of dedicated BMW collection area?	☐Yes ☐No
111. BMW collected from isolation facility within 48hrs?	☐Yes ☐No

VIII. ICU FACILITY

112. Are there any beds dedicated for COVID 19 infection?	☐Yes ☐No
113. If Yes, Number of beds dedicated to COVID 19 cases?	
114. Is the distance between beds in ICU more than 1 meter?	☐Yes ☐No
115. Is the oxygen supply is by cylinder or central connection?	
116. Are there any separate Ventilators, nebulizers, Infusion pumps in ICU?	☐Yes ☐No
117. Adequate supply of masks, ET tubes, PPE kits available at ICU?	☐Yes ☐No
118. All ICU Staff received training in donning & doffing of PPE?	☐Completed ☐In progress☐ Not started
119. Are there separate area for donning & doffing of PPE?	☐Yes ☐No
120. Hand washing facility & hand sanitizer available at donning & doffing areas?	☐Yes ☐No

XII.OTHER ESSENTIAL SERVICES

121.Is there strategy available for optimizing the PPE supply	☐Available ☐In progress☐ Not started
122.Are there any stockout experience for PPEs in the las year.	☐Yes ☐No
123.Designated ambulance facility for transporting patients from isolation area?	☐Yes ☐No
124.list of contact numbers of ambulance drivers displayed at isolation area?	☐Available ☐In progress☐ Not started
125.Ambulance staff trained in wearing PPE & and other Infection control practices?	☐Yes ☐No
126.SOP for disinfecting ambulance after transporting confirmed case/dead body?	☐Available ☐In progress☐ Not started
127.Written protocol available for disposing dead bodies of confirmed cases?	☐Available ☐In progress☐ Not started
128.Is there enough availability of body bags?	☐Yes ☐No
129.Are the staff trained in handling dead bodies and wearing PPE?	☐Yes ☐No

Guidelines for Quarantine facilities COVID-19

The purpose of this document is to provide interim guidance for setting up of quarantine facilities

Guidelines for Quarantine facilities

1.0. Introduction

Quarantine is the separation and restriction of movement or activities of persons who are not ill but who are believed to have been exposed to infection, for the purpose of preventing transmission of diseases. Persons are usually quarantined in their homes, but they may also be quarantined in community-based facilities.

Quarantine can be applied to

- An individual or to a group of persons who are exposed at a large public gathering or to persons believed exposed on a conveyance during international travel.
- A wider population- or geographic-level basis.

Examples of this application include the closing of local or community borders or erection of a barrier around a geographic area (cordon sanitaire) with strict enforcement to prohibit movement into and out of the area.

The purpose of this document is to provide guidelines for setting up of quarantine facilities during the current COVID-19 outbreak.

The recommended duration of quarantine for Covid-19 based on available information is upto 14 days from the time of exposure.

The purpose of quarantine during the current outbreak is to reduce transmission by

- Separating contacts of COVID-19 patients from community
- Monitoring contacts for development of sign and symptoms of COVID-19, and
- Segregation of COVID-19 suspects, as early as possible from among other quarantined persons

The scope of this document is to cover the procedures required for

- Physical infrastructure/Functional Services requirement at quarantine facilities
- Procedure for medical monitoring of contacts, reporting formats
- Protocol for referrals of suspects/ Symptomatics and isolation of symptomatics if required temporarily
- Infection control practices by medical personnel, supporting staffs and catering staffs etc.

2.0. Evaluation of potential sites for facility-based quarantine is important for preparedness planning (Checklist at Annexure-11).

Requirements for Quarantine facility in a community-based facility is as under

1. **Location:**
    - preferably placed in the outskirt of the urban/ city area (can be a hostel/unused health facilities/buildings, etc.)
    - away from the people's reach, crowded and populated area
    - well protected and secured (preferably by security personnel/ army)
    - preferably should have better approachability to a tertiary hospital facility having critical care and isolation facility
2. **Access considerations**
    - Parking space including Ambulances etc.
    - Ease of access for delivery of food/medical/other supplies
    - Differently-abled Friendly facilities (preferably)
3. **Ventilation capacity:** Well ventilated preferably natural
4. **Basic infrastructure/functional requirements:**
    - Rooms/Dormitory separated from one another may be preferable with in-house capacity of 5-10 beds/room
    - Each bed to be separated 1-2 meters (minimum 1 metre) apart from all sides.
    - Lighting, well-ventilation, heating, electricity, ceiling fan
    - Potable water to be available
    - Functional telephone system for providing communications.
    - Support services- fooding, snacks, recreation areas including television
    - Laundry services
    - Sanitation services/Cleaning and House keeping
    - Properly covered bins as per BMW may be placed

5. **Space requirements for the facility:**

    - Administrative offices- Main control room/clerical room
    - Logistics areas/Pharmaceutical rooms

- Rest rooms- doctors/nurses/supporting staffs
- Clinical examination room/ nursing station / Sampling area
- Laundry facilities (on- or off-site)
- Mess/Meal preparation (on- or off-site)
- Holding area for contaminated waste
- Wash room/Bathroom/Toilet

6. **Social support resources/ Recreational areas**
    - Television and radio / Reading materials/ indoor plays

7. **Monitoring the health of contacts:** During that period, contacts should be monitored at least daily for fever and respiratory symptoms.

2.2. Standard operating Procedures: To ensure smooth operation in the quarantine facility, the standard Operative procedures (SOPs) needs to be framed as under

- Daily monitoring surveillance using the daily reporting format (annex 1)
- Fever triage/ Isolation
- Case and contact monitoring and response
- Transfers of suspect/symptomatic to designated hospital (through ambulances)
- Public information
- Provider information (SOPs)
    - medical personnel (annex 2),
    - nursing staff (annex 3),
    - movement of health personnel and support staff (annex 4) and
    - security staff (annex 5)

Functional flow should be maintained to reduce/minimise the interactions between quarantine people and healthcare professionals/supporting staffs so that transmission of disease is prevented and controlled

3.0. Risk assessment of the quarantine facility

The risk level refers to how likely it is that someone in the Quarantine camp will become infected with corona virus as a result of movements and activities performed in the Quarantine camp.

Risk assessment includes identification of the biohazard risk precaution levels, along with its associated activities. The risk level refers to how

likely it is that someone in the Quarantine camp will become infected with corona virus as a result of procedures performed in the Quarantine camp. Areas were sagregated and labeled as:

- **Low risk areas:** Areas having less direct contact with evacuee suspects such as control room center in the quarantine center, nursing station and areas of kitchen where food is cooked.
- **Moderate risk areas:** Moderate risk areas are where infectious aerosols are generated from areas where the suspects were inhabiting in their bed linen, pillows and nearby clothes; low concentration of infectious particles. Contaminated surface near the quarantine zones.
- **High risk areas (containment Quarantine camp):** Areas where direct dealing with the suspects are as under

  Medical examination room, sample collection areas(high concentration of infectious particles while coughing, sneezing, gag reflex during nasopharangeal & oropharangeal sample collection). Toilet and bathroom areas, dining areas, areas of bio-waste collections, segregation and disposal.

  Based on risk assessment, areas should be earmarked and infection prevention control measures to be applied as per MOHFW guidelines.

4.0 Securing Entry and Exit points

- In order to prevent and control infection in the facility, strategic points in the facility needs to be identified including
- The Control room where a person entering inside quarantined building to get proper awareness and training on infection control measures,
- A well informed and trained security to check (main entrance gate of the area) and a guard (24*7) with registers for ins and outs and a designated nursing officer for checking proper PPE wear (main entrance gate in the building)
- The international biohazard warning symbol and sign to be displayed on the doors of the rooms where suspects are kept, BMW management areas,samples of higher risk groups are handled

- Only authorized & trained persons or those designated in work areas to permitted to enter the quarantine areas;
- Doors to keep closed at all times preferably under observation of a guard.
- There should be double door entry was managed with only one door to be open at a single time.

5.0 . Human resource Deployment: In the quarantine facility, Chief Medical officer needs to be appointed as In-charge /nodal officer for overall coordination and supervision of the quarantine center. Services of General duty medical doctors, Medicine specialists, Pediatrics, Microbiologist (for diagnostic support and IPC), Psychiatrists & Psychologists are required for routine examination and relevant clinical care of the quarantined people. Para-medics including Staff Nurse and Lab. Technician, Pharmacist need to be posted. Public health specialist are required for monitoring public health aspects of the facility while services of clinical microbiologist are required for sample collection, packaging and infection prevention & control practices. House keeping staff also need to be deployed.

6.0 Training – Training is the most important and critical part to ensure that all activities takes place as per established protocol and SOPs, training of health care professionals and other relevant staffs was undertaken initially. Training of medical officers on SOPs needs to be followed at Quarantine centers for daily examination, movements in the facility, infection prevention control measures and use of PPE kit etc.

Training of clinicians, laboratory technicians and medics needs to be undertaken on appropriate sample collection (nasopharyngeal and throat) and triple layer packaging with cold chain maintenance.

Paramedical staffs i.e., staff nurses; medics, pharmacist etc. needs to be trained on SOPs to be followed at Quarantine centers and use of PPE kit. Staff undertaking the work in Laundry, Mess/Canteen, security and other related staff i.e., drivers, general duty staff etc. needs to be trained on use of mask, gloves , cleaning and disinfection procedures and use of PPE kit, etc.

Refresher training or regular direction to all the above staffs needs to be provided as on need basis. During the quarantine period as and when new staff was posted, it needs to be ensured that he/she received proper training before undertaking the work. It is to emphasized that all activities / procedures must be done under strict monitoring/observations of trained specialists.

7.0 . **Daily Clinical Examination and referral -** All quarantined people needs to be examined twice (morning & evening) daily clinically and those requiring

referrals for related symptoms of Corona virus (fever, cough, sore throat, breathlessness etc.) or any other reason needs to be referred to designated hospital in ambulance directly with due precautions as per referral SOP. Ambulances need to be placed in the facility in standby mode for transport including advanced lifesaving ambulance.

Daily census of the people needs to be undertaken twice a day (ex. Morning 8 am and evening 6 pm).

8.0 Coordination– Chief medical officer needs to supervise and coordinate with various organizations working with the facility. To ensure all activities take place according to standard protocol, separate teams were constituted for various purposes- Supervisory team, admin team, logistic team, referral team, medicine / equipment team, hygiene sanitation team.

Daily review meetings needs to be conducted under chairmanship of Chief medical officer to discuss day to day affairs and sort out any issue requiring attention.

24*7 control room needs to be established at the facility with monitor for CCTV cameras and speakers at each floor so that quarantined people can be communicated on routine basis and necessary instructions can be provided.

9.0 Recording and reporting mechanisms- To ensure standardized reporting, daily reporting formats of suspected cases with symptoms related to corona virus, no. of cases requiring referral, sample collection status needs to designed (as per annexure 1). It needs to be sent daily to relevant higher authorities.

10.0 Monitoring and Supervision – Daily monitoring visit needs to be conducted inside quarantine facility and outside the facility in the surrounding campus by public health and incharge officers and gaps to be noted. Necessary corrective actions and preventive actions to be taken by the nodal officer.

Visits also given by senior officers from for regular review.

11.0 Establishment of Infection Prevention Control (IPC) measures – As per risk assessment was undertaken with respect to probability of infection from possibly infected quarantine people to health care, other staffs and surrounding areas. Special map of the facility needs to be prepared to outline the details of movement of health care and other personnel around the quarantine area and in the building. It need to be ensured that movement of health care staffs and other personnel to undertake as per the designed map to prevent and control infections.

Separate fence needs to be raised around the building to prevent entry of animals especially dogs, monkeys and even birds if possible.

Well informed and trained security personnel needs to be deployed all around the building on 24*7 rotation basis to monitor the facility and to avoid entry of un-desired persons/animals and even birds for eating any food remains/droppings inside the area.

To ensure that all health care personnel use PPE as per guidelines, they need to be properly trained and assisted during wearing of PPE. Separate areas to be earmarked for PPE Donning and Doffing. Compliance for same to be ensured by nodal officer.

Separate well informed and trained nursing officers need to be stationed at the building to regulate the movement of the staffs entering the facility. He/ She should be assigned the duty that every person entering the facility enters in the register of all the details on time of name, designation entry/exit. Nursing officer to ensure that all the persons are labeled while entering the building so that they can be identified by security staff. At the entrance, two door entries may be ensured to avoid mixing of quarantine people with health care staff.

It is to be ensured that all the quarantine facility is decontaminated daily (refer to infection prevention control guidelines) with disinfectants (freshly prepared 1% hypochlorite, detergent solution) including surface mopping of all the floor, bathrooms, toilets facility, under side of beds, other related items placed in the rooms of quarantine people .

A separate cubicle for people developing mild symptoms for temporary observation (transit room) may be considered so that it will lead to an early isolation of any symptomatic person and to prevent transmission to other cluster of groups.

12.0 Lodging, **Catering, Laundry and other related activities** –Disposable and pre-packed food to be needs to be served to quarantined people. All the quarantined people to be kept on separate beds with distance of 1-2 meters with no bed facing opposite to each other. All Beds were having disposable bed sheet that should be changed on daily basis. Personal toiletries/ towel/ blanket/ pillow with covers/electric kettle, room heater and water dispenser may be provided to each person depending on availability.

A separate room needs to be assigned to perform laundry services for cleaning of all the clothes and other washing related activities. Before laundering, all the washable items needs to be placed in 1% hypochlorite up to 30 minutes and later washed in detergent solution.

13.0 Biomedical waste (BMW) management- To ensure that biomedical waste management in the facility takes place as per standard guidelines, separate yellow, red /black bags, foot operating dustbins needs to be kept at each floor and outside the facility. It is to strictly ensured that Doffing takes place in the designated area with all the PPE kit including mask, gloves is properly placed in yellow bags. All the health care workers collecting the possible infectious material such as food items, PPE kits from yellow bags should also wear PPE and following the IPC measures. Designated place to be earmarked outside the building for collection of yellow and black bags. It should be collected at least twice daily by biomedical waste management vehicle/any other local established practice.

Site of collection of biomedical waste should be regularly disinfected with freshly prepared 1% hypochlorite solution. All officials concerned with the administration and all other health care workers including medical, paramedical, nursing officers, other paramedical staff and waste handlers such as safaikarmacharis, attendants & Sanitation attendants needs to be well oriented to requirements of handling and management of general and biomedical waste generated at the facility. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal as mentioned in the SOP needs to be followed. Continuous training, monitoring & supervision to monitor the implementation to be done on daily basis to manage compliance related issues. All the generated waste from Quarantine facility to be treated as isolation waste and its disinfection /treatment was strictly monitored by specialists in the health authorities.

14.0 Logistic management- All logistic to be used in quarantine facility i.e., PPE , medical equipments i.e. Thermal thermometer, Stethoscope, BP machine etc., office logistic, sample collection and packaging material, etc.to purchased in advance.

Performa needs to be prepared for daily consumption of PPE, triple layer mask, gloves, etc. and monitored by logistic team on daily basis.

15.0 Information, Education & Communication (IEC) and Psycho-social support – As on arrival, there might be an obvious sense of psychological fear and panic among all the quarantine people and some of the involved stakeholders like health care professionals/staffs including doctors, security personnel etc.. An interpersonal communication needs to made to all of them one after another in groups by Psychiatrist team initially and later on with individual counselling sessions. Quarantine people needs to be explained on Universal infection control

measures , personal protective measures, written instructions on Do's and Don'ts in the quarantine zone to be provided to contain and avoid spread of the infection. Importance of frequent Hand washing specially after touching surfaces like door handles, stair railings, bed railings, etc. to be instructed for strict compliance. Everyday quarantine people to be counseled by clinicians regarding day to day queries. If needed, referral to be made to psychiatrist /psychologist team. If there is fear in the surrounding community it needs to be addressed.

16.0 Sample collection and packaging – For baseline testing, Samples (Nasopharyngeal swab and throat swabs) for COVID-19 need to be collected from all quarantine people & sent with triple layer packaging maintained in cold chain (2-8^{o}C) to designated laboratory .

Safe collection & handling of specimens in the Quarantine camp needs to be performed in identified locations as per the SOP. Specimen containers generally used are viral transport medim (VTM vials containing 3 ml medium) with falcon tubes (50 ml) as secondary layer of Triple layer packaging system. Containers needs to be correctly labeled to facilitate proper identification. Specimen request or specification forms to be placed in separate waterproof zip pouch envelopes with locking facility and pasted on the outside walls of the sample transport containers (Performa annexure). Just before the end of the 14 days quarantine period, resampling of nasopharyngeal swabs needs to be done.

17.0 Discharge of quarantine people from Quarantine Facility - The quarantine people needs to be discharged at the end of 14 days of incubation period provided samples are negative on resampling. Instructions should be provided to self-monitor their health at their home (home quarantine) for next 14 days and immediately report to their District Surveillance officer (DSO), in case of development of symptoms suggestive of COVID-19. Written instructions were handed over to them individually. The District Surveillance Units (DSO) and State Surveillance Units (SSO) to be provided with contact details of the quarantine people to conduct active surveillance for next 14 days under intimation to the Central Surveillance Unit, IDSP (NCDC).

18.0 Terminal Disinfection and decontamination procedures: Quarantine facility terminal disinfection procedures to be performed as per guidelines. Cleaning/ decontamination to be performed using the proper personal protective equipment (PPE) and adopting three bucket system as prescribed in the SOP (at attached annexure).

Spraying of 1% sodium hypochlorite working solution (dilution 1:4 from an initial concentration of 4%) to be done on all the surfaces (protecting electrical points/appliances). This was followed by cleaning with a neutral detergent that is used for removing the traces formed by hypochlorite solution. While

cleaning, windows need to be opened in order to protect the health of cleaning personnel.

All frequently touched areas, such as all accessible surfaces of walls and windows, the toilet bowl and bathroom surfaces needs to be carefully cleaned. All textiles (e.g. pillow linens, curtains, etc.) should be first treated with 1% hypochlorite spray and then, packed and sent to get washed in laundry using a hot-water cycle (90°C) and adding laundry detergent. 1% hypochlorite solution should also sprayed in the PPE doffing area and discard area twice a day on daily basis. Mattresses / pillows after spraying with 1% hypochlorite should be allowed to get dry (both sides) in bright sunlight for upto 3 hrs each.

Annex 1

DAILY REPORTING FORMAT
(Daily Clinical Examination)

COVID-19

Name of the Centre:

Address:

Centre In Charge:

Contact No:

S.no	Date of reporting	Census in the Centre (8 AM)	Clinically examined	Suggestive Symptoms like fever, cough, breathing difficulty, other respiratory problems,	Other clinical cases and non 2019-nCoV	Cases referred to designated hospital	Cumulative cases referred to designated hospital	Cases discharged from designated hospital	Cases still admitted at designated hospital	Census in the Centre (8PM)	Remarks

etc

M	FM	FM	F	M	FM	FM	FM	FM	F

Annex 2

Standard Operative Producers for medical personnel

There are shift duties of the doctors may be as under

Morning : 800AM to 200 PM
Afternoon : 200PM to 800 PM
Night : 800PM to 800 AM (next day)

General instructions for medical doctors from designated hospital (s) for performing their duty at Quarantine facility may be as under:

a. The name of the duty officers and duty roster for to be displayed at the control room.
b. Each team to follow the procedure mentioned below:
c. The resident doctors on duty will report to the centre at the reporting time and mark attendance in the register.
d. After that, they will go to clinical area to examine the quarantined people in the centre.

e. The doctors on working duty will team up with medical officers from Quarantine facility to form a paired team (one from hospital and another from the Quarantine facility) to examine the cases.
f. They will examine and assess the patients and report to the In-charge of the Quarantine facility.
g. They will take care of the infection control/protective measures while examining the persons and follow guidelines placed at the door for safety/infection control measures.
h. If any symptomatic case/ additional symptoms are observed/ reported, it should be discussed with the In-charge of the Quarantine facility for referral to the designated hospital, if required.
i. They will complete examination of all patients and report before 12 noon on the same day and handover the report to the Office In-charge for onward transmission to the Ministry.
j. They will not leave till the next relieving team arrived.
k. They will hand over this information to the next relieving team.
l. They will leave the Quarantine facility with due permission of In-charge of the Quarantine facility.
m. If any doctor has not reported due to unavoidable circumstances, present available team will inform to the concerned authority of designated hospital for substitute.
n. In case any patient needs to be transferred due to any eventuality to the referral centre, senior most doctor will accompany the ALS Ambulance to take care of the patient till he/she reaches and handed over to the centre.
o. The medical team may take help of psychiatric/ counsellor team if required, for psychosocial support
p. Team to work in harmony with the Quarantine facility medical team.
θ. The senior most doctor on duty from the designated hospital will take decision of the clinical management.

Annex 3

Standard Operative Producers for Nursing Officer (supervisor)

- Maintain log of medical professionals/staffs entering/exiting in the quarantine facility, where the quarantine people are housed.
- A designated nursing officer (infection prevention & control nurse) has to ensure that the incoming officers/ staff to the quarantine building that are wearing appropriate PPE, and they are aware of universal infection control precautions {hand washing (alcohol/ sanitizers or soap + water; mask, gloves, PPE).
- After this he/she will allow the person to enter.
- The PPE doffed off by the outgoing medical professionals needs to be disposed in the yellow bag and hand sanitization should be ensured after disposing the PPE. **(PPE- donning On / doffing Off enclosed).**
- Yellow bags containing the infected materials placed in the nearby gate should be disposed off daily as per the Biomedical Waste Management Rules.
- The dustbins should be covered at all times. This should be ensured by Nursing officer. If required, disinfection has to be done as advised.
- Black bags (municipal wastes) - to be disposed after proper packaging daily as per the Biomedical Waste Management Rules.
- Supervise IPC in the facility in coordination with Microbiologist/Clinician

Annex 4

Standard Operative Producers for Movement of Health Professionals and Support Staff Inside the Quarantine facility

The movements of health professionals are to be monitored at three vital points considering the control of infection for the prevailing disease-

CONTROL ROOM:

- Health professionals and support staff need to be made aware and trained in correct procedure of wearing mask and gloves.
- They need to be trained to follow the infection control measures as instructed including
    - hand washing with soap and water and sanitizing with alcohol-based sanitizers,
    - cough etiquettes,
    - donning and doffing of PPE etc.
    - before entering the quarantine facility.

Main Gate Security post: To monitor entry of persons/visitors to the facility and ensure that the personnel should comply with instructions / including wear the mask correctly.

Nursing Station at Quarantine building (ground floor):

1. Registration of name with time and purpose for entering the building
2. PPE should be donned here.
3. Nursing officer will check and ensure strict and correct wearing of PPE before entering the main quarantine area
4. After coming out from the main quarantine area, PPE to be doffed properly and placed in the designated bin for infective material (Yellow bag)
5. The hands should be sanitized before exiting the quarantine area
6. Mobile phones are not allowed to be used inside the building
7. Name of doctors to be written on the PPE with permanent marker for identification.

Annexure-5

Standard Operative Producers for Security Personnel at Quarantine facility

1. For security purpose, ensure 24 hours manning of the post of the quarantine facility.
2. The person manning the area must be trained and instructed to wear mask and gloves during the duty period.
3. Instructions for infection control measures like hand washing etc. should be properly briefed.
4. Doctors/Nursing staff/supporting staffs/other entering the quarantine area should wear appropriate PPE before entering the quarantine centers.
5. Log of those entering/exiting the Quarantine facility should be maintained. Only those having specific purpose inside the Quarantine facility should be allowed to enter.
6. The log should be put up daily to the controlling authority.
7. Security guard should have a whistle to give signals to people to not come near the quarantine facility if they do not have any purpose to visit the Quarantine facility.
8. He should report immediately to the officer In-charge controlling the security of the quarantine facility, if anybody does not follow the instructions as directed.
9. The security personnel should not leave after completing his shift till his reliever reports for duty.
10. The officer In-charge controlling the security of the quarantine facility will supervise the duty roster and roles and responsibilities of all the personnel deployed at the quarantine area for smooth functioning.

Annexure-6

Requirements of Equipment for Quarantine Facility

Equipment	Daily Consumption for holding 300 persons
Gloves • reusable vinyl or rubber gloves for environmental cleaning • latex single-use gloves for clinical care	200
Hair covers (optional)	1500
Particulate respirators (N95, FFP2, or equivalent)	150
Medical (surgical or procedure) masks	1500
Gowns and aprons (single-use long-sleeved fluid-resistant or reusable non-fluid-resistant gowns)	150
PPE Kit	130
Alcohol-based hand rub	50
Plain soap (liquid if possible, for washing hands in clean water)	500
Clean single-use towels (e.g. paper towels)	1500
Sharps containers	5
Appropriate detergent for environmental cleaning and disinfectant for disinfection of surfaces, instruments or equipment	20 litres
Large plastic bags	200
Appropriate clinical waste bags	100
Linen bags	500
Collection container for used equipment	200

Annexure - 7

Human Resource requirement for Quarantine Facility

The requisite human resources at a Quarantine Facility can be divided into two broad categories:

General Requirements of medical personnel for the facility as under

Medical personnel- (catering facility of 300 people)

I. On- Duty Doctors in 6 hours shift of 2 doctors
II. Nusring Staff in 6 hours shift of 4 nurses
III. Lab. Technicians in 6 hours shift of 4 technicians

1. Health professionals: (Multi-disciplinary team)

- Medical doctors (Multi-Speciality team)- General duty doctors, Specialists like Medicine, Paediatrician, Psychiatrist / Psychologist, Public Health specialist, Microbiologist etc.
- Nursing officers
- Pharmacists
- Paramedics
- Lab. Technicians (preferably)

2. Supporting staffs like Safai Karamchari, Housekeeping, Laundry workers, Cooks, etc.
3. Security staffs

Annexure- 8

Checklist for screening entry of persons inside the quarantine building

- Only authorised personnel should enter the quarantine facility for carrying out pre-determined activity. While entering the quarantine facility, it should be ensured that personnel are wearing the requisite personal protective equipment

- A pre-identified staff should be designated to screen the personnel entering in the quarantine facility using following check-list.

I. Is the person entering the quarantine building either doctors/nursing officers/ supporting staffs/ Govt. officials etc. posted or authorized to enter the quarantine building in the Centre?

II. Whether the person entering the quarantine building is having duty inside the building during that time?

III. Whether the person entering wear protective suit correctly?

IV. Whether the person entering wear N-95 Mask correctly?

V. Whether the person entering wear goggles correctly?

VI. Whether the person entering wear headgear correctly?

VII. Whether the person entering wear boots correctly?

VIII. Whether PPE has no gaps/physical damages which can be a risk in the disease transmission?

IX. If it is 'YES' in all Qs from 1to 9, then, the person is allowed to enter the quarantine building.

X. If any of the Qs is NO, then , to ask for appropriate donning of PPE initially and if not still then, to contact the concerned officer supervising the

nursing officers and if required, NCDC Team on duty /In-charge of the center.

Annexure – 9

Guidelines for Disinfection of quarantine facility (for COVID-19)

(Refer to NCDC Website for latest updates)

Guidelines for disinfection of quarantine facility (for COVID-19)

Scope*:* This document aims to provide interim guidance about the environmental cleaning / decontamination in quarantine camp facilities (e.g. barracks, cubicles in rooms, offices, and toilets, etc.) where persons with potential exposure to COVID-19 have housed.

The causative agent involved in the current outbreaks of 2019-nCoV acute respiratory disease, the 2019-nCoV (genus: Betacoronavirus), belongs to the family of Coronaviridae, a large family of enveloped, positive-sense single-stranded RNA viruses. Coronaviruses are transmitted in most instances through large respiratory droplets and contact transmission, but other modes of transmission have also been proposed worldwide.

The time of survival and the conditions affecting the 2019-nCoV viability in the environment are currently unknown. According to studies assessing the environmental stability of other coronaviruses, the Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) is estimated to survive several days in the environment and the Middle East Respiratory Syndrome-related coronavirus (MERS-CoV) more than 48 hours at an average room temperature (20°C) on different surfaces [1-3].

Environmental cleaning: Due to the potential survival of the virus in the environment for several days, the premises and areas potentially contaminated with the 2019-nCoV should be cleaned before their re-use, using products containing antimicrobial agents known to be effective against coronaviruses. Although there is lack of specific evidence for their effectiveness against 2019-nCoV virus, cleaning with water and household detergents and use of common disinfectant products should be sufficient for general precautionary cleaning. Tests carried out using SARS-CoV showed that sodium hypochlorite is effective.

These guidelines provide guidance for environmental cleaning in quarantine facilities housing people exposed/ potential exposure toCOVID-19 and have been adapted based on the Hospital Infection Prevention and Control guidelines drafted by NCDC in collaboration with WHO and other stakeholders.

Area/Items	Item/Equipment	Process	Method/ Procedure
Clinical Area			
General clinical areas Floors (clinical areas) – daily mopping	Dust mops Mop (No broom will be used for sweeping) Detergent/ sanitizer–hot water, sodium hypochlorite(1%) Three buckets (one with plain water and one with detergent solution; one bucket for sodium hypochlorite(1%)	Sweeping Cleaning Daily mopping	• Sweep with the dust mop or damp mop to remove surface dust. Sweep under the furniture and remove dust from corners. Gathered dust must be removed using a hearth brush and shovel. • The sweep tool should be cleaned or replaced after use. • Prepare cleaning solution using detergent with warm water • Use the three-bucket technique for mopping the floor, one bucket with plain water and one with the detergentsolution. • First mop the area with the warm water and detergent solution. • After mopping clean the mop in plain water and squeeze it. • Repeat this procedure for the remaining area. • Mop area again using sodium hypochlorite 1% after drying the area. • In between mopping if solution or water is dirty change it frequently. • Mop the floor starting at the far corner of the room and work towards thedoor. • Clean articles between cleaning. **Note:** Mopping should be done twice a day
Ceiling and Walls	Sweeping tool Duster Bowl/ small bucket of soap solution Plain water	Damp dusting	• Damp dusting with a long handledtool for the walls and ceiling done with very little moisture, just enough to collect thedust. • Damp dusting should be done in straight lines that overlap one another. • Change the mop head/cover when soiled. **Note:** Should be done once a week or after examining a suspect case

	Care of mop	Hot water Detergent Sodium hypochlorite 1%	• Clean with hot water and detergent solution, disinfect it with sodium hypochlorite and keep for drying upsidedown.
Doors and door knobs	Damp cloth or Sponge squeeze mop Detergent	Thorough washing	• The doors are to be washed with a brush, using detergent and water once a week (on one defined day); gently apply cloth to soiled area, taking care not to remove paint, then wipe with warm water to remove excess cleaningagent. • Door knobs and other frequently touched surfaces should be cleaned daily.
Isolation room	Detergent/ Sanitizer– warm water, sodium hypochlorite (1%) Three buckets (one with plain water and one with detergent solution); separate bucket for sodium hypochlorite (1%)	Terminal cleaning	• Before cleaning an isolation room, liaise with infection control team for details of any special requirements. Staff will be instructed on specific cleaning procedures required with reference to • Safety uniform to be worn. • Chemicals or disinfectants to be used. • Also, if bed screen and shower screen are to be cleaned or changed, refer cleaning in isolation rooms.
All clinical areas/ Laboratories/ Wherever spill care is required	Sodium hypochlorite (1%) Rag piece Absorbent paper Unsterile gloves Spill care kit Mop Hot water	Blood and body fluid spill care	• Wear non-sterile gloves. • For large spills, cover with absorbent paper/ rag piece • if any broken glass and sharps, using a pair of forceps and gloves, carefully retrieve.Use a large amount of folded absorbent paper to collect small glass splinters. Place the broken items into the puncture proof sharps container. • Cover the spill with sodium hypochlorite(1%)for 10–20 minutes contact time. • Clean up spill and discard into infectious waste bin, and mop area with soap and hot water. • Clean the mop and mop area with 1% sodium hypochlorite. • Wash mop with detergent and hot water and allow it to dry.

Stethoscope	Alcohol-based rub/Spirit swab	Cleaning	• Should be cleaned with detergent and water. • Should be wiped with alcohol based rub/spirit swab before each patient contact.
BP cuffs and covers	Detergent Hot water	Washing	• Cuffsshouldbewipedwithalcohol-based disinfectant and regular laundering is recommended for the cover.
Thermometer	Detergent and water Alcohol rub Individual thermometer holder	Cleaning	• Should be stored dry in individual holder. • Clean with detergent and tepid water and wipe with alcohol rub in between patient use. • Store in individual holder inverted. • Preferably one thermometer for each patient.
Injection and dressing trolley	Detergent and water Duster Disinfectant (70% alcohol)	Cleaning	• To be cleaned daily with detergent and water. • After each use should be wiped with disinfectant.
Refrigerators	Detergent and water Absorbent paper or clean cloth	Cleaning (weekly)	• Empty the fridge and store thingsappropriately. • Defrost, decontaminate and clean with detergent. • Dry it properly and replace the things. • Weekly cleaning is recommended.

Area/Items	Item/Equipment	Process	Method/ procedure
Lodging area			
General cleaning	Detergent and warm water Mop Two buckets Clean utility gloves Handmops	Daily mopping floors Thorough washing	• Scrub floors with hot water and detergent with using minimal water. (Do not pour thewater.) • Clean with plainwater. • Allow to dry • Hypochlorite 1% mopping canbe done. **Note:**Recommend general cleaning procedure should be done twice a day
Lockers, tables, cupboard, wardrobes, benches, shelves and cots	Damp duster Warm water Detergent Dry duster	Damp dusting	• Damp dust with warm waterand detergent.
Railings	Detergent/ Sanitizer–hotwater, sodium hypochlorite	Daily dusting	• Damp dust with warm water and detergent followed by disinfection with hypochlorite

	1% Three small buckets/ or big bowls One with plain water One with detergent solution One for sodium hypochlorite 1%		
Mirrors and Glass	Warm water Detergent water/ cleaning solution Damp cloth Wiper	Cleaning	• Using warm water and a small quantity of detergent and using a damp cloth, wipe over the mirror and surround, then using a dry lint-free cloth, buff the mirror and glass to a clean dryfinish.
Sluice room Stainless steel/ Any other sink	Powder cleanser Detergent powder Wiper Cloth	Cleaning	• Sinks are to be cleaned witha powder cleanser. • Firstwetthesink.Sprinkleonalittle powder cleanser and work around the surface with a cloth, include the plughole. • Do not use the powder cleanseron dry sink. • After removing spillage and any stains, flush away with running water. Wipe down the surface of the sink.
Pantry furniture	Duster	Dusting	• Dampdust
Telephone	Warm water detergent solution Duster	General cleaning	• Damp dust with warm waterand detergent. • **Payingspecialattentiontotheear and mouth piece and dry it properly.**
Desks	Damp cloth Furniture polish	Dusting	• Wipe top sides and draw handles with a damp cloth. Wooden desks should be cleaned with furniture polish and buffed to clear glows. Pen holder etc. to be cleaned ordusted.
Chairs (Vinyl)	Warm water and detergent	Cleaning	• Wipe down with warm water and detergent. Remove any marks under arms and seat. Check fordamage to stoppers, if stopper require replacement, report to maintenance department.
Furniture and fittings	Warm water and detergent Rag piece	Dusting	• Using warm water and detergent, damp dust all furniture and fittings, including chairs, stools, beds, tables, cupboards, wardrobes, lockers, trolleys, benches, shelves and storage racks, waste/ bins, fire extinguishers, oxygen cylinders, televisions window sills and dry properly.
Bed tables, bedside lockers	Warm water and detergent Wiper Duster	Cleaning	• Wipe down over bed table. Wipe top and underneath base and stand, using warm water and detergent. Dry oncompletion. • Wipe down the bedside. Remove marks from fronts of draws and sides. Using warm water and detergent, wash the top to remove any sticky marks anddust.
Light switches	Damp cloth (never	Cleaning	• Light switches to be cleaned of dust, spots and finger

and over-bed lights	wet) Detergent Warm water		marks. Clean with a damp cloth (never wet) and detergent. • Over-bed lighting to be damp dusted. Clean with warm water and detergent.
Curtains	Soft clothes Water Mild soap solution	Cleaning	• Clean with water and soap for curtains
White clothes	Sodium hypochlorite 1% Tap water	Washing	• Should be washed under running water and soaked in 1% sodium hypochlorite for 20minutes. **Note:** PPE should be worn while washing soiled linen.
Mattress and pillow covers (cloth)	Tap water	Washing	• Mattress and pillows should be covered with a reusable mattress cover. • It should be changed for each patient and when soiled sent to the laundry according to schedule.
Mattress/ Pillow with rexin cover Normal/ without rexin	Sodium hypochlorite 1% Sunlight	Terminal Damp dusting and cleaning Drying in sunlight	• If with rexin cover, can be cleaned with 1% sodium hypochlorite before use for next patient • If routine mattress, dry it in bright sunlight for 1-2 days before using for next patient
Water jars	Vim powder Soap and water	Cleaning	• Recommended boiled water for drinking • Water jars should be scrubbed/ cleaned with soap and water and boiled water before filling withwater.

Areas	Agents / Toilet cleaner	Procedure
Cleaning of toilets		
Toilet pot/ commode	Sodium hypochlorite 1%/ Soap powder / long handle angular brush	• Inside of toilet pot/commode: • Scrub with the recommended agents and the long handle angular brush. • Outside: Clean with recommended agents; use a nylon scrubber.
Lid/commode	Nylon scrubber and soap powder	• Wet and scrub with soap powder and the nylon scrubber inside and outside
Toilet floor	Soap powder and scrubbing brush/ nylon broom	• Scrub floor with soap powder and the scrubbing brush • Wash with water • Use sodium hypochlorite1% dilution
Tap	Nylon scrubber and soap powder	• Wet and scrub with soap powder and the nylon scrubber.
Outside sink	Soap powder and nylon scrubber	• Scrub with the nylon scrubber.
Showers area / Taps and fittings	Warm water Detergent powder Nylon Scrubber	• Thoroughly scrub the floors/tiles with warm water and detergent • Wipe over taps and fittings with a damp cloth and detergent. • Care should be taken to clean the underside of taps and fittings.

		• Taps should be dried aftercleaning
Soap dispensers	Detergent and water	• Daily dusting • Should be cleaned weeklywith detergent and water and dried.

Note: Dry the floors with a separate drying mop.

Annexure- 10

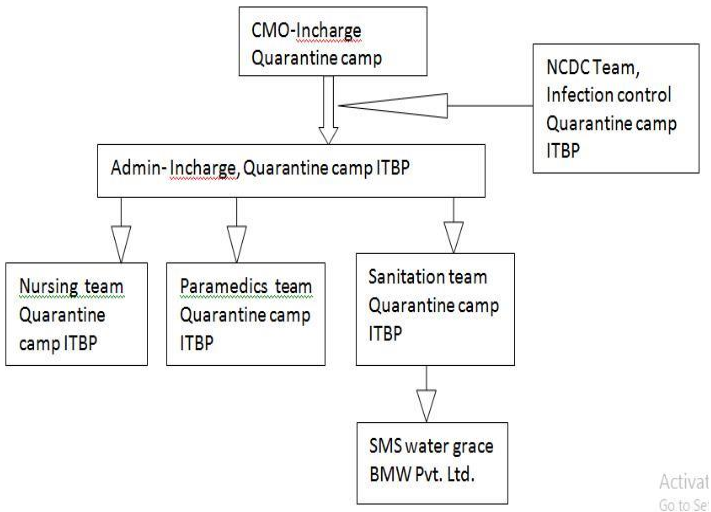
SoPs for Management of Bio-medical Waste (BMW) in the Quarantine Quarantine facility

"Bio-medical waste" means any waste, which is generated during the surveillance, monitoring, diagnosis, treatment or immunization of quarantined personnel in health Quarantine facility. The Bio-medical Waste Management rules are applicable to all persons who generate, collect, receive, store, transport, treat, dispose, or handle bio medical waste in any form at the quarantine Quarantine facility.

Management of Hospital/Healthcare/Biomedical waste at the quarantine Quarantine facility is of utmost concern having global implications and immediate attention. It is documented that even the general waste generated from Quarantine Quarantine facility is a potential health hazard to the health care workers, public, flora and fauna of the area.

All officials concerned with the Quarantine facility administration and all other health care workers including medical, dental, nursing officers, other paramedical staff and waste handlers such as safai karmacharis, attendants & Sanitation attendants are well oriented to requirements of handling and management of general and biomedical waste generated at the Quarantine facility. Steps in the management of biomedical waste include generation, accumulation, handling, storage, treatment, transport and disposal.

Organogram for Biomedical waste management(ITBP Chhawla):



Bio-medical waste has been classified in to 4 major categories to improve the segregation of waste at the source itself:

Categories	Type of Bags	Type of Waste	Treatment/Disposal
Yellow 	Non chlorinated plastic, autoclavable bags	1. Donned off PPE 2. PPE with spill 3. Gloves 4. Shoe covers 5. Head Covers 6. disposable bed sheets	Incineration or Plasma pyrolysis or deep burial*
Red 	Non chlorinated plastic, autoclavable bags	1. Eye protection goggles 2. recyclable materials like pens 3. plastic water bottles used by quarantine people 4. Bed sheets	Autoclaving/microwaving /hydroclaving and then sent for recyling not be sent to landfill
White 	Puncture, leak, tamper proof containers	1. sharp waste including metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue 	Cardboard boxes with blue coloured marking	Glassware/tubelight/CFL bulbs/LED used in quarantine Quarantine facility	Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling

Duties of the Quarantine Quarantine facility Authorities:

1. Provide training to all its health care workers and others involved in handling of bio medical waste.
2. To provide a safe, ventilated and secured location for storage of segregated BMW within premises of quarantine Quarantine facility.
3. Provide legal authorization and access to Waste collecting van/vehicle.

Duties of the Bio-medical waste management company (SMS water grace BMW Pvt. Ltd.):

1. Ensure timely collection (atleast twice daily morning & evening) of BMW from Quarantine Quarantine facility
2. Handing over of recyclable waste after treatment by autoclaving and incineration to authorized agencies identified by Government of India.
3. Assist health care facilities in training of workers.

4. Provide PPE kits and other safety measures to their vehicle driver, collector, helper, safai karamchari.
5. Issue authorized Identity card to all the persons coming to the Quarantine Quarantine facilityus.

Treatment and Disposal:
1. Quarantine Quarantine facility does not have an onsite setup for BMW treatment facilities there it should be taken to their designated BMW facility and treatment/disposal must be done as per BMW regulations approved in their contract.
2. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.
3. All the waste (even the general waste) generated from the quarantine Quarantine facility must be treated as Biomedical waste.

Maintenance of Records:

1. Records in relation to generation, collection, reception, storage, transportation, treatment and disposal shall be maintained as per rules For 5 years.

Accident Reporting: In case of major accident-intimate immediately and submit a report within 24 hours to the Quarantine facility incharge(CMO-Incharge ITBP Quarantine facility).

Implementation:

Efficient implementation of the bio-medical waste management pivots on orientation, training and

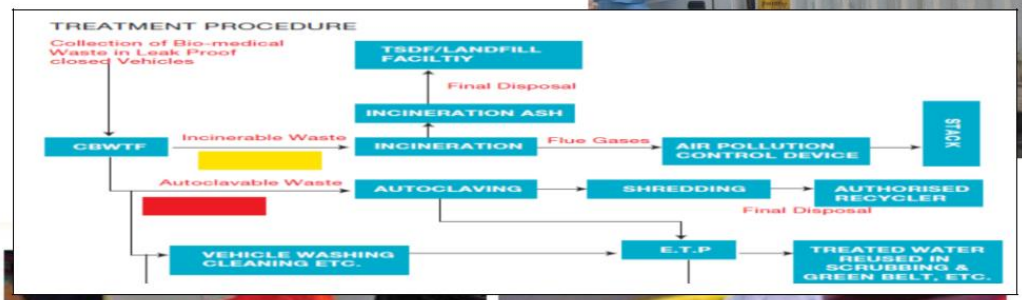
involvement of all the staff in the Quarantine facility. Ensuring proper disposal and segregation at source is the most important step as this is the limiting factor for most health care settings. Continuous training, monitoring & supervision to monitor the implementation must be done on daily basis.

Generation to Disposal process:

1. BMW is collected from various sites in the quarantine facility.

2. All Collected Bags are loaded on to special Bio Medical Waste Trucks/Van and are transported to BMW management facility for treatment and disposal thereafter.

Procedure/ Flowchart for Treatment of Biomedical Waste:



Annex 11

Guidelines for Quarantine facility Incharge, Health professionals, Quarantine people and their family members to guide them with respect to the discharge from Quarantine facility and follow up action in the community.

A. For the Quarantine facility Incharge & Health Professionals at the Quarantine facility:

- The final sample collection for all the travellers shall be taken up on the 13^{th} and 14^{th} day while being in the facility.
- The samples shall be collected and sent to the designated laboratories.
- The reports for the same shall be received latest by $16^{th}/17^{th}$ day in the facility through ICMR.
- Based on the reports a decision can be taken to discharge the travellers.
- Discharge shall accordingly, if agreed to, will be done on the 18^{th} day from the Quarantine facility. Quarantine facility Incharge shall accordingly intimate the travellers in advance for them to make arrangement for their onward journey.
- A detailed enumeration of the proposed place of stay by the travllers during the next 14 days will be obtained including contact numbers by the Quarantine facility Incharge.
- The Quarantine facility Incharges will plan dropping the travellers in either of the locations i.e. ISBT, Railway Station or Airport as per the preference of the travellers.

B. For the Travellers in the Quarantine facility:

1. While travelling back home:

- Provide details of your stay for next 14 days including the contact numbers.
- Obtain list of District and State Surveillance Officers for follow up and reporting in case of any issue.
- Use triple layer surgical mask (follow correct use and disposal of mask as briefed during the stay in quarantine centre)
- Follow frequent hand-wash with soap and water or use alcohol based hand sanitizer.
- Use respiratory etiquettes (use tissue paper/ hand-kerchief to cover your nose and mouth, turn head away from the person facing of you, while coughing/ sneezing).
- Monitor your temperature twice daily.

- Retain the aircraft boarding pass/ rail ticket/ details of Journey by taxi (including contact number of drivers etc)

2. After reaching home

- Avoid crowded places.
- Monitor your health for a period of next 14 days (after leaving the quarantine centre).
- Monitor body temperature twice daily.
- At all times:
    - Maintain personal hygiene
    - Wash hands with soap and water frequently or use alcohol based hand sanitizer.
    - Use respiratory etiquettes (use tissue paper/ hand-kerchief to cover your nose and mouth, turn head away from the person facing of you, while coughing/ sneezing).
- Report to nearest health facility if you develop fever, cough or difficulty in breathing besides reporting it to the State and District Surveillance Officer.
- Allow attendance by health workers / respond to call received from Health functionaries. Keep their contact numbers handy.
- Inform about your health at the end of 14 days period to the Healthcare worker and State and District Surveillance Officer.

3. In case you develop <u>fever, cough or difficulty in breathing</u> any time after leaving the quarantine Centre (within next 14 days):

- Call the nearest health facility or health worker visiting you/ talking to you besides informing the State and District Surveillance Officer.
- An identified care giver (among family members) will only attend to you. He / she will wear mask and wash hands, every time he/ she comes in contact with you.
- Use surgical triple layer mask immediately on realization of symptoms.
- Get admitted to the identified health facility as advised.
- The vehicle/ ambulance which was used for transportation also needs to be disinfected. (Contact the health facility for the disinfection procedure).
- Follow infection prevention and control practices at all times and places.
- If further assistance is required, call Ministry of Health, Government of India's Control Room no. +91-11-23978046.

C. Advice to other family members at home:

- Wash your hands with soap and water frequently.
- If the person (discharged from the quarantine centre) develops symptoms inform the health worker and also the State and District Surveillance Officer.
- In case advised to shift the patient to a health facility:
    - Share list of all contacts till date with the treating doctor/ health care worker and the State and District Surveillance
    - Family members to be in home quarantine till either medical examination rules out novel coronavirus infection or the result of sample is negative.
    - Proper disinfection of bedding/ clothing/ room/ all personal belongings should be followed with 1% Sodium hypochlorite solution.

CHECKLIST FOR ESTABLISHING A QUARANTINE CENTER

I. Basic Information:

1) Name of the Quarantine Centre_
2) Address: _

3) Officer In charge:_
4) Email address:
5) Phone Number: _
6) GPS Coordinates:_

II. Location of quarantine centre

7) Located away from the residential area? ☐ Yes ☐ No
8) Distance to nearby residential area?
9) Away from an area where gathering expected (Eg: Temples, stadiums, Churches etc):

☐ Yes ☐ No

III. Accessibility to the quarantine centre :

10) How far is it from the nearby airport?
11) How far is from the nearest railway station?
12) How far is the nearest bus station?
13) Is the road to quarantine centre is free from heavy traffic?
14) Is the road to quarantine centre is wide enough to have two vehicles at a time?

☐ Yes ☐ No

15) How far is the nearest tertiary care centre?
16) How far is the nearest District Hospital?

IV. Facilities & basic amenities at quarantine facility:

17) How many floors are there in the quarantine building?
18) How many rooms available at the quarantine facility?
19) How many numbers of beds in each room at quarantine facility?

20) What is the distance between beds in the quarantine room?
21) Is there is 24*7 supply of electricity at the facility? ☐ Yes ☐ No
22) Is there 24*7 supply of water at the facility? ☐ Yes ☐ No
23) Is there air conditioning available? ☐ Yes ☐ No
24) If yes, it is by centralised AC or individual air conditioning in each room?
    i. If individual AC ? a: Split b: Window
25) Does window space covers at least 10% of total area? ☐ Yes ☐ No
26) How many windows in each room?
27) Is there exhaust fans in each room? ☐ Yes ☐ No
    i. If Yes, how much air exchange rate expressed in cubic feet per minute (CFM)?
28) Is there drainage facility available in each floor? ? ☐ Yes ☐ No
29) Is there any separate sewage line from Quarantine areas?
30) Are there separate exit & entry points? ☐ Yes ☐ No
31) Is there availability of 24*7 security services at the quarantine area?
32) Is there any separate door for entry of non-health professionals for housekeeping, catering?
33) ☐ Yes ☐ No
34) Is there any separate washroom facility for each room at the facility? ☐ Yes ☐ No
35) If not, how many wash rooms per person/area?
36) Are the floors washable & easily dried? ☐ Yes ☐ No
37) Is the floor mappable? ☐ Yes ☐ No
38) Is there any in-house mess facility available at quarantine area?
39) Is there any separate room/ resting facility for?
    i. Doctors
    ii. Nurses
    iii. Paramedics
    iv. Cleaning staffs

v. Linen management

40) What is the Frequency of changing linen in Quarantine rooms?
41) Whether disposable of Linen used? ☐ Yes ☐ No
    i. If No then, How they are disinfecting & cleaning linen?
    ii. How frequently linens changed?

42) Is there any curtains available in the quarantine rooms/wards? ☐ Yes ☐ No

   i. If yes frequency of changing them?
   ii. frequency of disinfecting & cleaning?

43) Is there any policy for disinfecting mattress at quarantine facility? ☐ Yes ☐ No

44) Is there any written policy for disinfecting beds at quarantine centres?

☐ Yes ☐ No

45) If yes, please verify policy and elaborate /

VI. Infection control practices

46) Is adequate PPE supply available at the quarantine facility? ☐ Yes ☐ No

47) Is there adequate supply of disinfectants at the centre? ☐ Yes ☐ No

48) Are the staffs in the facility trained in wearing PPE? ☐ Yes ☐ No

49) Is there a separate area for donning & doffing PPE? ☐ Yes ☐ No

50) Is there hand washing facility with soap with dispenser / hand sanitizer available at donning & doffing areas?

☐ Yes ☐ No

51) If yes, what type of hand rub dispensers are available? (select all applicable answers)

   i. Pocket bottle
   ii. Bottle affixed to trolley/tray
   iii. Bottle affixed to bed
   iv. Wall dispenser
   v. Dispenser located on bedside table/trolley

52) Whether all staff has access to hand rub dispensers? ? ☐ Yes ☐ No

53) Are hand rub dispensers replaced when empty?

   i. Always
   ii. Intermittently

iii. Rarely
iv. Never
v. Not applicable

54) Are posters illustrating handwash technique displayed beside each sink?

☐ Yes ☐ No

55) Is there availability of bleaching solution of different strength available?

% of hypochlorite solution	YES	NO
1%		
5%		
10%		

56) Is there any policy for rodent & pest control management? ☐ Yes ☐ No

57) If yes, is it being implemented & followed? ☐ Yes ☐ No

58) Are the staffs trained in infection control practices? ☐ Yes ☐ No

59) Is there a structured curriculum / training module for Infection Control Practices? ? ☐ Yes ☐ No

60) What is the Frequency of cleaning of
   i. floors of quarantine rooms/wards
   ii. Bathrooms
   iii. Ambulatory areas
   iv. Resting rooms
   v. What is the Frequency of cleaning high touch surfaces like door knobs, bed rails etc?

61) Is there any separate sample collection area? ☐ Yes ☐ No

62) Is there is separate thermometer & BP apparatus available at the quarantine centre?

☐ Yes ☐ No

63) Are there colour coded bags available for BMW management?

64) Is the waste being segregated and disposed as per protocol? ☐ Yes ☐ No

65) Are the sharps being disposed as per protocol? ☐ Yes ☐ No

66) How the food waste is being disposed?

VII. Recreational facilities

67) Is there provision for mobile phone or internet at the facility? ☐ Yes ☐ No

68) Are the mobiles phone disinfected?
   i. If Yes how
   ii. How frequently

69) Is there any recreational room / area available? ☐ Yes ☐ No

70) Is there any provision for Television or Radio at the quarantine facility?
☐ Yes ☐ No

71) Is there a provision of printed reading materials at the facility? ☐ Yes ☐ No
   i. If Yes how the materials are disposed off?

VIII. Human resources & logistics

72) Is there a dedicated Infection nurse for the quarantine facility to monitor IPC activities?

73) Is there is rotational shift for doctors/nurses/paramedics?
   i. If Yes, how many shifts?
   ii. Doctors in each shift
   iii. Nurses in each shift
   iv. Cleaning staffs in each shift

74) Is there any pulmonologists/physician available when it is needed? ☐ Yes ☐ No

75) Is there a phlebotomist/ lab technician available when it is needed? ☐ Yes ☐ No

76) Is there any availability of clinical psychologist in quarantine facility? ☐ Yes ☐ No

IX. SOP & policies

77) Is there any guidelines/ inhouse SOP for infection control practices? ☐ Yes ☐ No

78) Is there any protocol for limiting the visitors to quarantine area? ☐ Yes ☐ No

79) Is there any written policy for the recreational area? ? ☐ Yes ☐ No

80) Biomedical waste management guidelines 2016 & amendments 2019 available? ☐ Yes ☐ No

81) Does the quarantine health facility in charge aware of National IPC guidelines for healthcare facilities 2020? ☐ Yes ☐ No

82) Is there any linen policy available? ☐ Yes ☐ No

83) Is there any SOP for working of doctors, nurses & paramedics at quarantine facility? ☐ Yes ☐ No

84) Is there any protocol for disinfecting ambulance after transporting patient to isolation centre?

85) Is there any policy for monitoring health of staffs at quarantine area?

86) Is there enough IEC displayed at the quarantine centre?

X. Transporting Patients to Isolation centre

87) Is there any protocol for transfer of patients to tertiary care/transfer of symptomatic cases to isolation centre?

88) Is there separate ambulance available for transporting patients to isolation centre? ☐ Yes ☐ No

89) Are the ambulance staff trained in wearing PPE & infection control practices?

90) How far is the Isolation facility from the quarantine centre

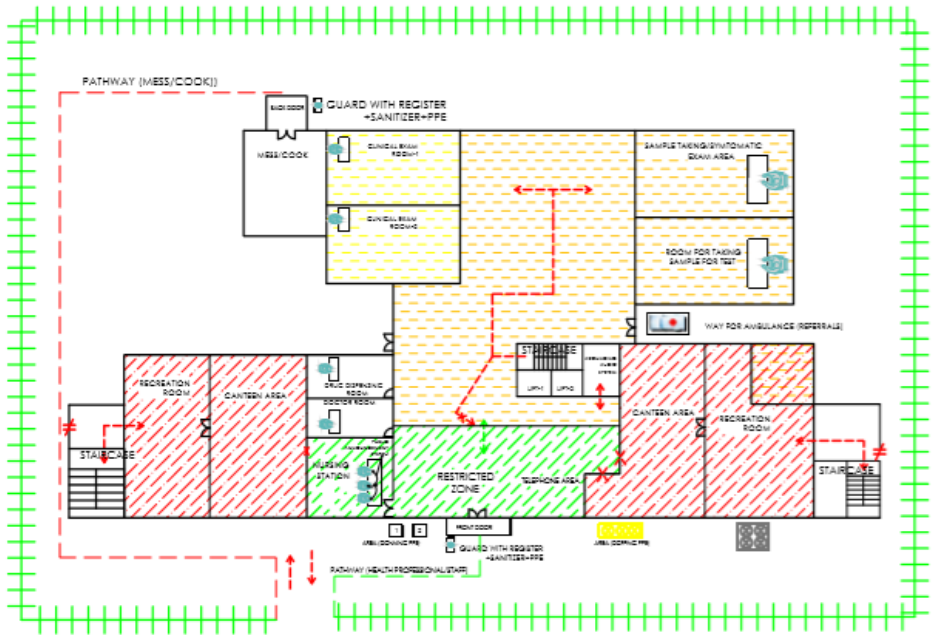
National Centre for Disease Control

National Centre for Disease Control
(formerly National Institute of Communicable Diseases)
Directorate General of Health Services , Ministry of Health & Family Welfare
Government of India

सत्यमेव जयते

MAP SHOWING FUNCTIONAL AREAS IN THE GROUND FLOOR

(QUARANTINE BUILDING) RESTRICTIONS & FLOW OF MOVEMENT OF PEOPLE



CHHAWLA QUARANTINE CENTRE (ITBP CAMP)

LEGENDS:-

1. UNSAFE ZONE(Only people with H/O traveling to China access)

AREA WHERE QUARANTINED PEOPLE ENJOYS IN THE GROUND FLOOR AREA

PATHWAY FOR QUARANTINED PEOPLE

NO ENTRY FOR QUARANTINED PEOPLE

2. SAFE AND RESTRICTED ZONE

SAFE

NO QUARANTINED PEOPLE ENTERS HERE

ONLY HEALTH PROFESSIONALS/ STAFFS STAY

3.ALERT ZONE (Transmission of infection from quarantined people to health professionals can occur here)

AREA WHERE QUARANTINED PEOPLE AND HEALTH PROFESSIONAL OR STAFFS MAY INTERACT (RISK ZONE FOR TRANSMISSION OF INFECTION)

4. BLACK BAG (BMW)

5. YELLOW BAG (BMW)

6. CLOSED DOORS WITH KEYS IN NURSING STATION (In case of emergency to open).

7. INCOMING QUARANTINED PEOPLE (From China) CANENTER FROM THESE DOORS TO THE QUARANTINE BUILDING ON THE DAY OF ARRIVAL

8. PUBLIC ANNOUNCEMENT SYSTEM AT RECEPTION

EMT

World Health Organization

EMERGENCY MEDICAL TEAMS INITIATIVE

COMMUNITY FACILITIES

for preparedness and response to COVID-19

Isolation, treatment and step down of COVID-19 cases in community facilities

A scalable, modular and temporary solution based on the Emergency Medical Team methodology

content

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Foreword

The unprecedented spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) overwhelmed health care systems across the globe. Countries were faced with the challenge to isolate and treat cases of coronavirus disease 2019 (COVID-19) while continuing to provide essential health care services, especially for acute and chronic illnesses. As the demand increased, capacities were stretched, prompting health ministries to seek new and efficient ways to manage the isolation and treatment of cases.

The Emergency Medical Teams Network works with countries to prepare their health care systems for outbreaks and through the years have worked closely with governments experiencing outbreaks such as the diphtheria outbreak in Cox's Bazar, Bangladesh, and in the recent Ebola outbreaks in the Democratic Republic of Congo and West Africa. Using the EMT methodology and by incorporating the latest guidance from this novel disease, the EMT Network has pooled its experience to fill an important gap in a country's response to managing COVID-19.

This document presents options to facilitate the immediate isolation and treatment of COVID-19 cases within existing or new community facilities. Readers will recognize that, to be effective, these facilities must be modular, scalable, and seamlessly integrated into a country's healthcare system at national or subnational levels. Aligning recommended practices with the local context is of paramount importance.

This publication is a product of collaboration between global experts from the World Health Organization (WHO) and throughout the EMT network. It should be considered a living document that continues to evolve as new information, evidence, and experiences from this pandemic response come to light. I would like to extend my sincere gratitude to all contributors for sharing their experience, expertise, and knowledge in seeing this publication realized. I would particularly like to thank Jorge Durand Zurdo and Veronica Sanchez Carrera for guiding this document from its inception to final publication; a significant achievement indeed.

With such resolve and innovation shown across the Network, I am confident that the EMT community will continue to play a crucial role in supporting the global response to this unprecedented emergency.

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COVID-19	coronavirus disease 2019
FTE	full-time equivalent
ICU	intensive care unit
IPC	infection prevention and control
IT	information technology
IV	intravenous
PCR	polymerase chain reaction
PPE	personal protective equipment
ppm	parts per million
SIPA	specific inpatient profile area
WASH	water, sanitation and hygiene
WHO	World Health Organization

1. Objective

This document assists countries in their planning and response efforts to isolate and treat suspected and confirmed cases of coronavirus disease 2019 (COVID-19) through the establishment of isolation and treatment centres in community facilities. It proposes a model for community facilities that is flexible, adaptable and easy to set up, through the use of a modular approach. It offers an alternative solution at the community level and complements the Severe Acute Respiratory Infections Treatment Centre guidance (*1*).

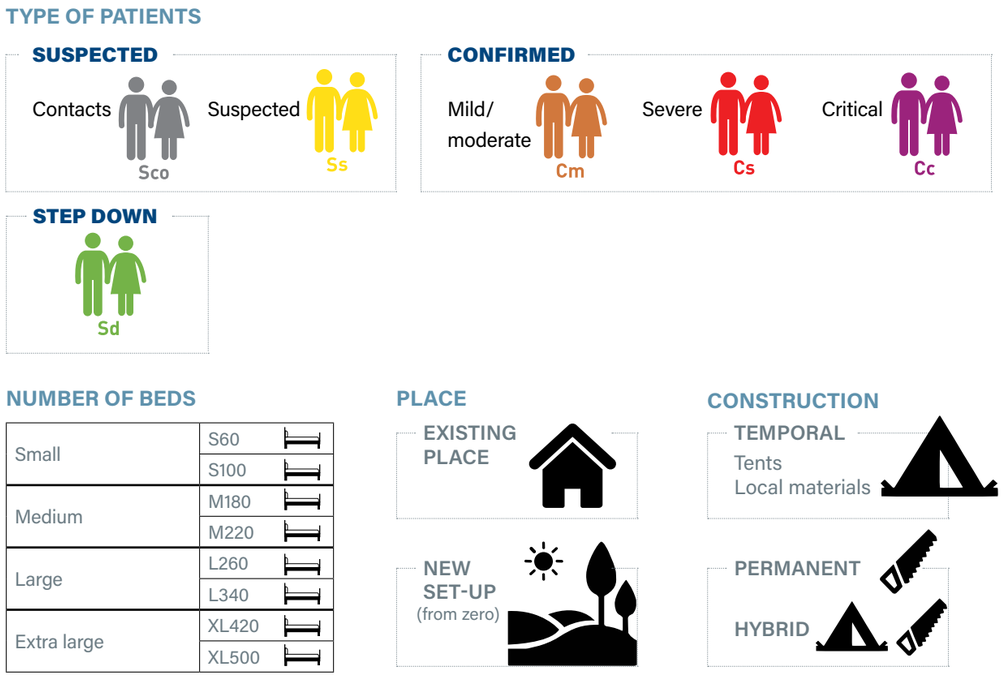
The scope of this document outlines the structure and flow of a COVID-19 community facility that is meant to increase the capacity of the health system to respond to this emergency. The proposed models can be situated within an existing community area, such as an open field, sports stadium, convention centre, event hall or warehouse. This model can be activated as part of the national/local surge plan, when health-care facilities anticipate that they will not have the capacity to serve COVID-19 patients, and should be part of a more comprehensive health system readaptation. If required and appropriate to the circumstances, community facilities can be scaled up and adapted to provide higher levels of care for severe and critical patients, taking into consideration the requirement of additional skilled staff, dedicated equipment and supplies.

In summary, this set-up can be used for the following purposes:

a. isolating contacts (i.e. quarantine);
b. treating patients with suspected COVID-19 (i.e. isolated individually);[1]
c. managing confirmed cases with mild or moderate disease severity without risk factors (i.e. cohorted care);
d. managing of confirmed cases with severe or critical disease severity (i.e. cohorted care); and
e. step-down care for recovering patients.

A community facility providing options a and e should have rapid access to health advice, for example, by an adjacent COVID-19 health post, via telemedicine, or using another modality. There are several variables that inform the final considerations for establishing community facilities (*see Fig. 1.1*); the proposed models are intended to cover all potential combinations of those variables, providing a wide set of likely configurations. For one example, see Fig. 1.2.

Fig. 1.1 *Variables that impact on design selection*



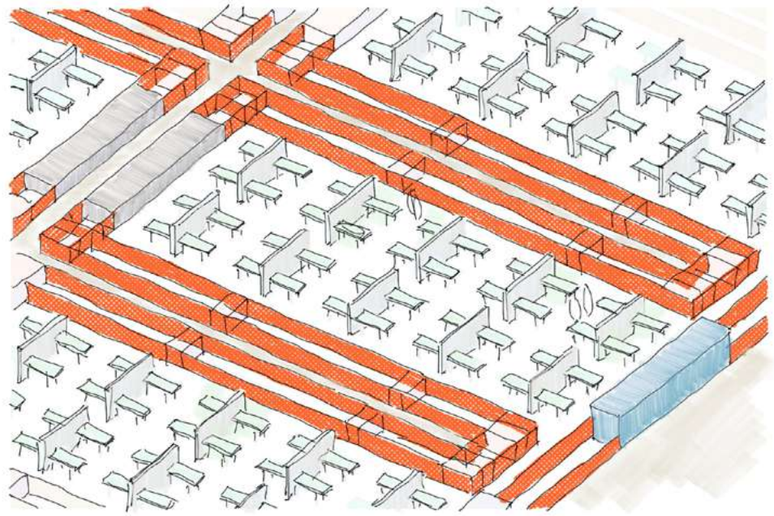
Considering the characteristics of the virus, strict and specific infection prevention and control (IPC) measures must be implemented at all times. Based on this assumption and on current knowledge, health facilities have to adapt their activities, taking into consideration that any person who enters the facility might pose a risk or be at risk.

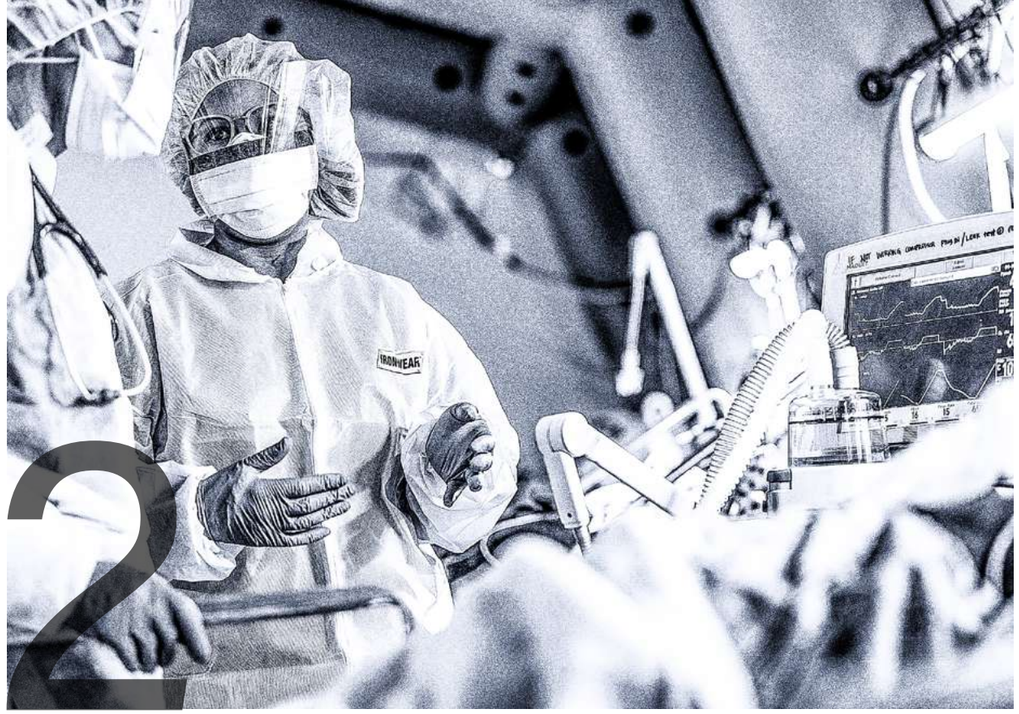
The World Health Organization (WHO) has recommended the actions shown in Table 1.1 for the different severities of COVID-19 (*2*).

Table 1.1 *Case management recommendation by case severity and risk factors*

Case severity, risk factors	Recommendations
Mild and moderate, with no risk factors	Patient should be instructed to self-isolate and contact COVID-19 information line for advice on testing and referral. Test suspected COVID-19 cases according to diagnostic strategy, with isolation/cohorting in: • health facilities, if resources allow; • community facilities (i.e. stadiums, gymnasiums, hotels) with access to rapid health advice (i.e. adjacent COVID-19-designated health post, telemedicine); or • self-isolation at home according to WHO guidance.
Moderate, with risk factors and all severe/critical cases	Patient should be instructed to self-isolate and call COVID-19 hotline for emergency referral as soon as possible. Test suspected COVID-19 cases according to diagnostic strategy. Patient should be hospitalized for isolation (or cohorting) and inpatient treatment.

Fig. 1.2 *Artistic representation of a 40-bed ward for confirmed COVID-19 patients*





2. Staff, supplies and equipment, structure and systems for a COVID-19 treatment centre in community facilities

This document is structured based on the main components of health-care system readiness or "surge capacity" (staff, supplies and equipment, structure and systems) needed to rapidly establish and operate community facilities.

2.1 Staff

Experience from China has demonstrated that, if possible, staff should limit working time in isolation areas to less than four consecutive hours (*1*). Staffing patterns should be pre-established to ensure effective coverage, and shifts should be monitored to ensure compliance. Insufficient staffing could impact the ability to effectively deliver services over time.[1] Staffing calculations in this document assume a standard average working week of 40 hours per person (1 full-time equivalent or FTE). Where available, minimum requirements are indicated as per Emergency Medical Team network minimum standards (*5*).

2.2 Supplies and equipment

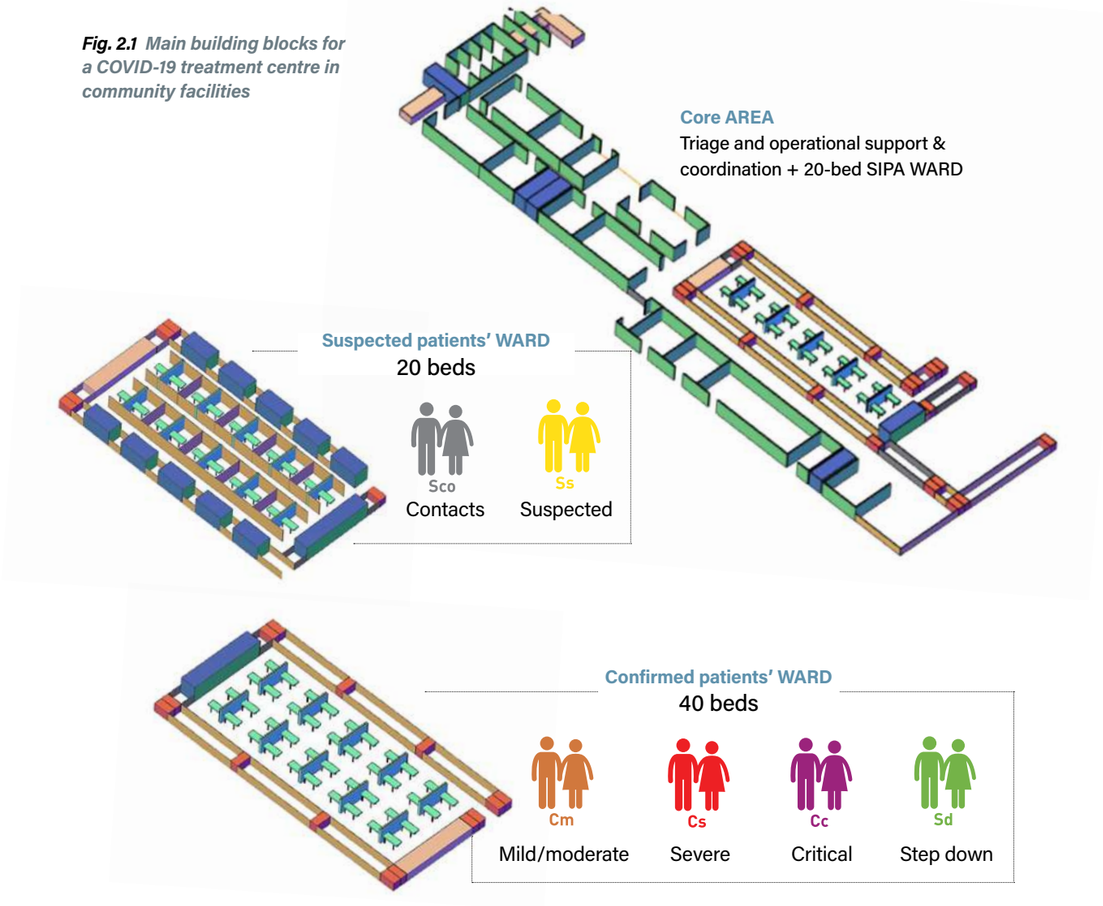
In terms of development and maintenance of medical and operational support services, supplies and equipment include medical equipment, pharmaceutical products and nonmedical supplies needed to provide clinical care in line with the services provided.[2]

2.3 Structure

The layouts presented are designed to be set up either within an existing building or in an open area. For selection of the location, some characteristics must be taken into consideration (i.e. site, physical characteristics, existing facilities, comfort conditions, etc.; *see Web Annex 1*; for criteria for the reuse of spaces, *see Web Annex 2*). Layouts have been designed for tented structures or for building in temporary or permanent settings if needed (*see Web Annex 3*). Any adaptation requires careful analysis of the pathways in the facility and crossover points. In addition, the flexibility of the design allows planning for the future, such as building a permanent health-care centre (60 beds) and/or planning for potential extensions up to 500 beds in case they are needed.

The main building blocks for the proposed facility layout are composed of core areas – operational support and coordination areas, screening and triage areas, variable 40- or 20-bed wards, plus one block of 20 beds that can be used for the specific inpatient profile area (SIPA) for children or people requiring specialized or intensive care unit (ICU) care (*see Fig. 2.1*). This also includes the separation of areas for patients with suspected and confirmed COVID-19, without any crossing of patient and staff flows (*see Fig. 2.2*). Detailed models and plans are available in Web Annex 3.

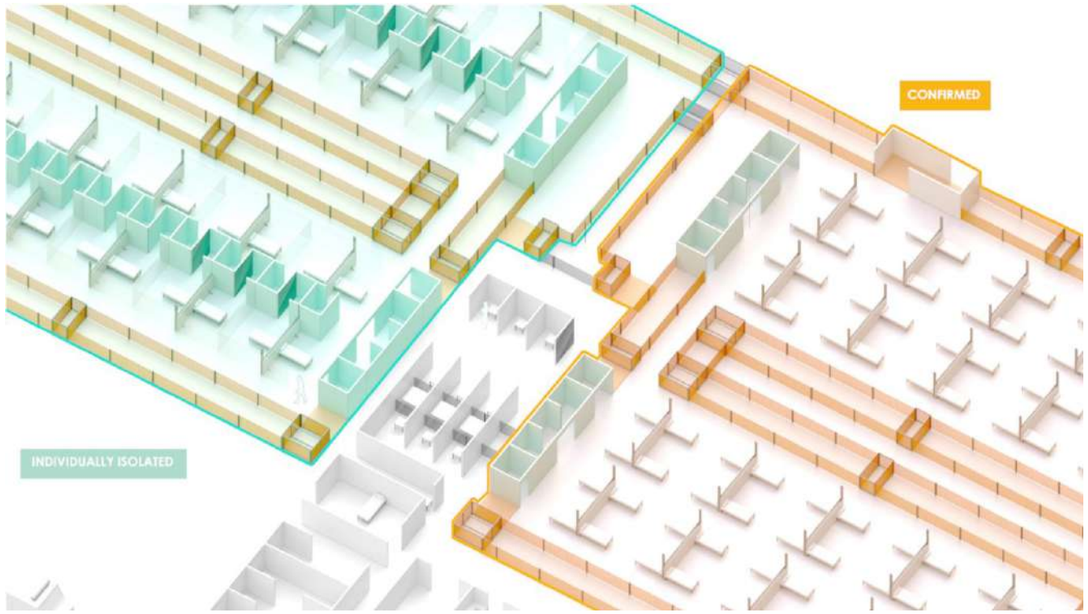
***Fig. 2.1** Main building blocks for a COVID-19 treatment centre in community facilities*



SIPA: specific inpatient profile area. *For description of patient types, see Fig. 1.1. (see page 10)*

Staff, supplies and equipment, structure and systems for a COVID-19 treatment centre in community facilities

Fig. 2.2 *Artistic representation of a community facility with wards for suspected (individually isolated – left) and confirmed (cohorted – right) cases*



2.4 Systems

Systems refer to the standard operating procedures and protocols that define the operating model of each community facility, including support systems to safeguard the quality of care.

3. Key considerations

3.1 Characteristics of the structural design

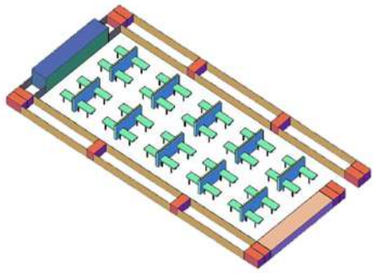
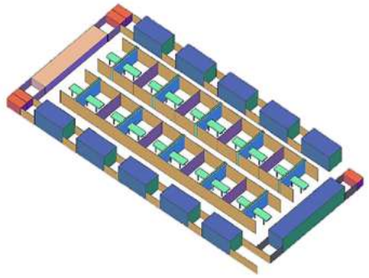
The COVID-19 community facilities have four major characteristics:

- **modularity** – the ability for areas to be expanded and/or repurposed;
- **separation** – clearly divided and dedicated areas:
  - high-risk area: every area where there are patients or items that are considered to be contaminated;
  - low-risk area: all areas where there are no patients or items that could be potentially contaminated;
- **line-of-sight** – the ability to view one area from another between low- and high-risk areas;
- **clear and efficient** patient pathways and staff flows.

3.2 Modularity

The modular approach enables the community facility to adapt to diverse needs and requirements, including space availability, number of patients and local conditions. Modules can also be adapted to function within and/or augment existing health facilities. Any module can be extended or stood down without impacting other modules while the facility is operational and accommodating patients (*see Table 3.1*).

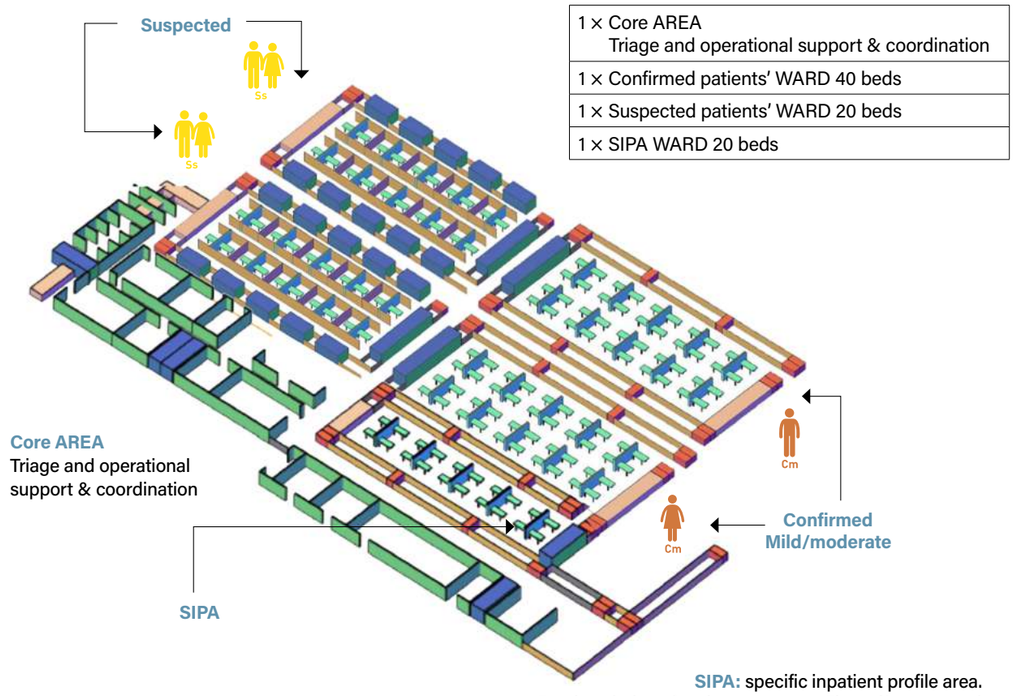
Table 3.1 *Suggested layout for 40-bed and 20-bed COVID-19 wards*

40-bed ward for confirmed cases	20-bed ward for suspected/probable cases
	
Description Module of 40-bed capacity in a cohorted structure for confirmed cases, with two toilets with handwashing basins,[1] two showers, power supply and lighting services. Storage space available at premises. This type of module can accommodate patients with confirmed COVID-19 of different degrees of severity: mild, moderate, severe and critical. Each module is conceived for one type of gender user.	**Description** Module of 20-bed capacity in an isolation room structure for separate case management. Independent toilets and shower for each patient, power supply and lighting services. This type of module can accommodate patients with suspected COVID-18 waiting for results, and contacts. Each module is conceived for one type of gender user.
If there is no dedicated ICU ward provided in the facility, a few beds could be adapted to provide critical care where referral to a higher level of care is not possible.	A few beds (e.g. 4 beds in the 20-bed unit) could be adapted to provide critical care.
Cm Mild/ moderate; Cs Severe; Cc Critical; Sd Step down	Sco Contacts; Ss Suspected

ICU: intensive care unit. *For description of patient types, see Fig. 1.1. (see page 10)*

The high-risk area should comprise one or more modules, each with 40 beds (confirmed patients) or 20 beds (suspected patients). This area can be augmented by adding more modules for up to 80, 120 or more beds, for either suspected or confirmed cases. Modules can be divided by gender and/or dedicated space for children or people requiring specialized or intensive care, if required (*see Fig. 3.1*).

Fig. 3.1 *Model of 180-bed layout, with modularity showing different types of potential patient typology*



SIPA: specific inpatient profile area.
For description of patient types, see Fig. 1.1 (See page 10)

Scaling up the model from 60 to 500 beds (*see detailed plans in Web Annex 3*)

Modularity enables the establishment of new treatment areas while maintaining continuity of care. Fig. 3.2 demonstrates how to scale up a COVID-19 community facility so that previously established modules remain functional as bed capacity is increased progressively. Modularity enables expansion of the care facility to be planned in advance and established in phases. It is important to take into consideration that technical areas should be expanded as the facility grows.

Fig. 3.2 *Scaling up: adapting to different sizes*

3.3 Separation: clearly divided and dedicated areas

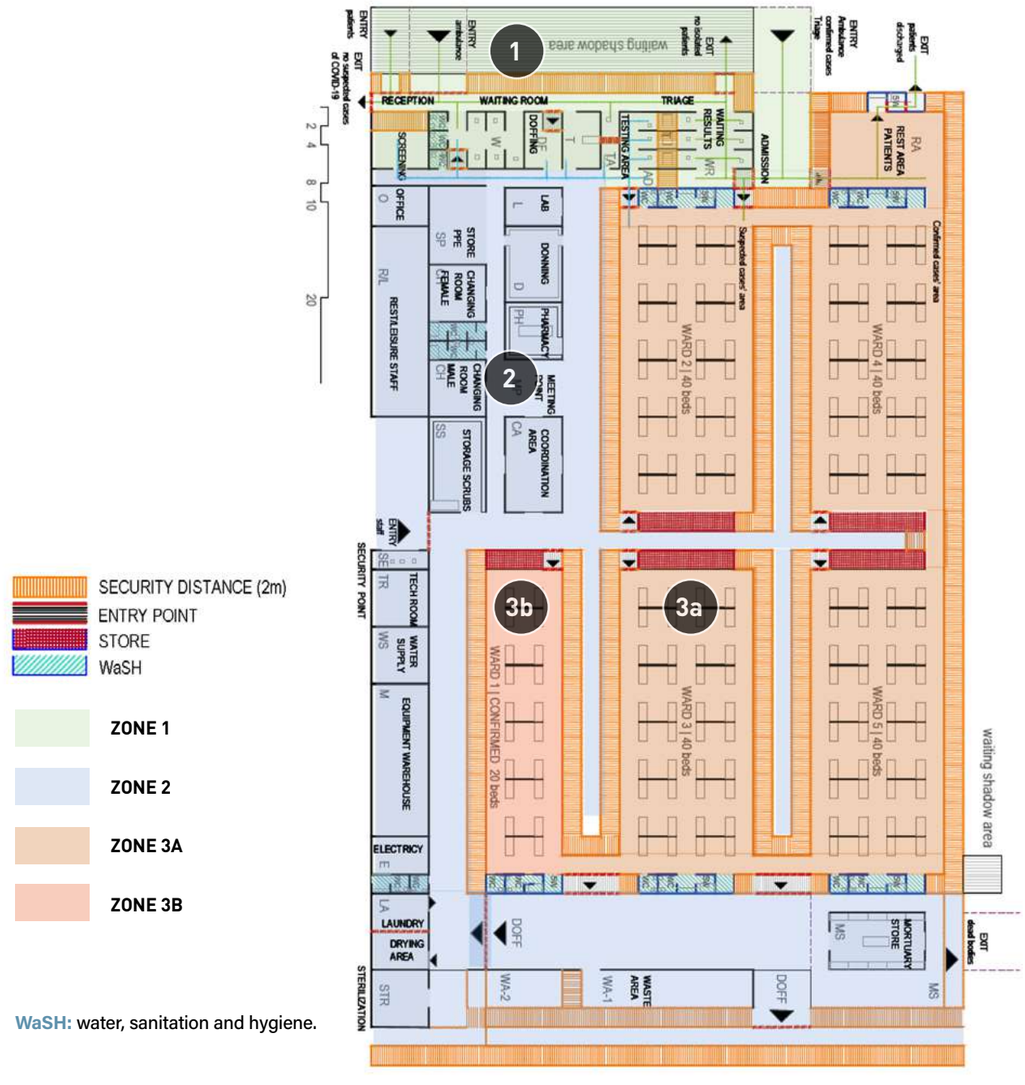
The care facility should be composed of four key areas, outlined in Table 3.1.

Table 3.1 *Key areas of the care facility*

Area	Description
1	Screening/triage/admission and registration area (high-risk area)
2	Technical (clinical and operational support) area (low-risk area)
3	Areas for treatment of confirmed or suspected cases (high-risk area): a. inpatient area b. specific inpatient profile area
4	Other complementary areas

There should be a safety zone of not less than 2 m (and/or with a physical barrier as appropriate) between modules. Fig. 3.3 illustrates a 180-bed model (100 × 80 m; Model M) with four clearly defined areas.

Fig. 3.3 *Model M: 180 beds (100 m × 80 m) with four areas*



WaSH: water, sanitation and hygiene.

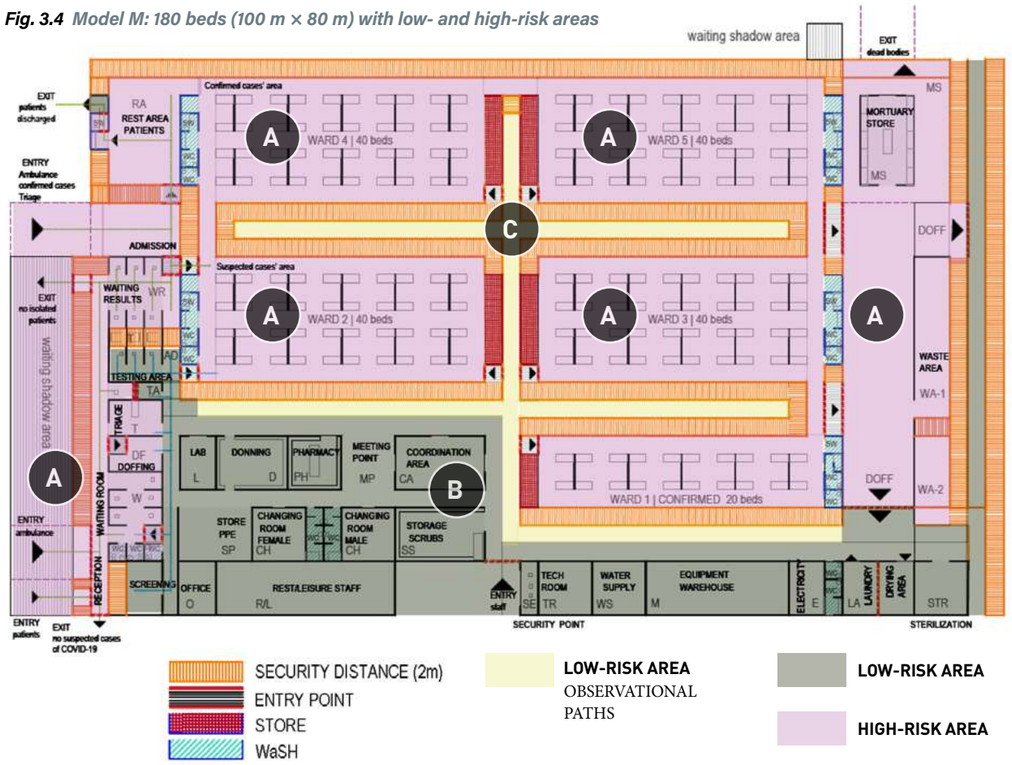
3.4 Lines of sight

A key characteristic of the design illustrated in Fig. 3.4 is the separation of high- and low-risk areas with both physical barriers and safety zones. Visual lines of sight between risk areas should be maintained if possible, to ensure that clinical staff can observe patients in other areas without donning or doffing additional personal protective equipment (PPE). Lines of sight between risk areas:

- **minimize** staff time required in higher-risk areas;
- **minimize** overuse of PPE and thus the impact on supply shortages (*1*); and
- **enable** more continuous patient monitoring.

PPE should be used based on the risk of exposure (e.g. type of activity) and the transmission dynamics of the pathogen (e.g. contact, droplet, or aerosol). For specific IPC recommendations for COVID-19, refer to the WHO COVID-19 website (*2*). The layout illustrated in Fig. 3.4 and described in Table 3.2 is designed to establish three main areas which divide the community facility.

***Fig. 3.4** Model M: 180 beds (100 m × 80 m) with low- and high-risk areas*



Area		Description
A	HIGH RISK	All staff entering this area should be wearing adequate PPE; the doffing area for PPE removal is located for staff exiting the high-risk zone.
B	LOW RISK	Clinical coordination and operational support staff area, donning/dressing area located at the high-risk zone entrances, a second donning/dressing area can be set up near a direct entrance into the ICU ward in case it needs to be set up.
C	OBSERVATION PATHS	Allow clear vision from the low-risk area to patient areas for clinical staff not wearing PPE to be able to observe patients.

ICU: Intensive care unit; **PPE:** personal protective equipment; **WaSH:** water, sanitation and hygiene.

3.5 Clear and efficient flows

Logical flows for patient, staff and visitors

This document describes the recommended flows for access to moving around the different areas; entering and exiting risk areas; and donning and doffing. For the facility to best function, it is necessary to have single-path order flows that avoid crossing paths, and a clear indication of the difference between patients, staff and visitors. It is also important to control the operational support flows, including a special consideration for waste-collection routes.

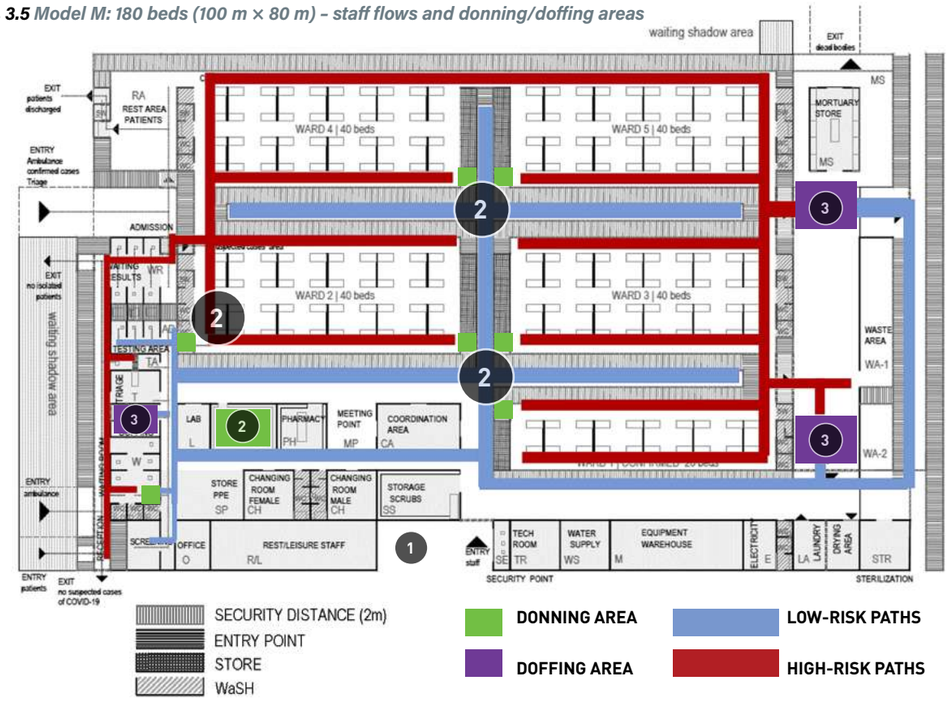
Staff flows

The following criteria ensure safe and efficient flow of staff:

1. access to low-risk area;
2. access to high-risk area, after changing room and donning; and
3. exit from high-risk area, through the doffing area.

A dedicated donning zone in each module is supported by a single large-capacity donning area at the main staff entrance and a single large-capacity doffing area at the exit of every two wards. This ensures unidirectional flow from high-risk to low-risk areas (*see Fig. 3.5*).

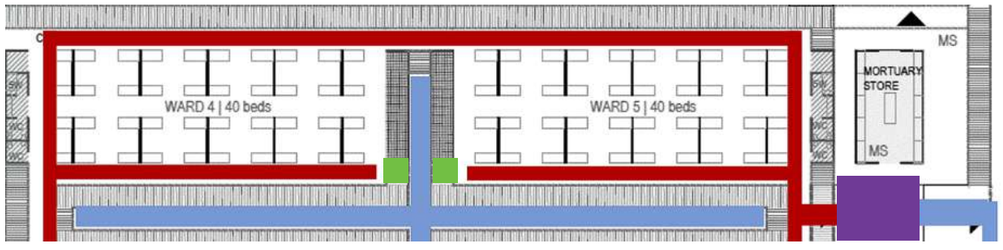
Fig. 3.5 *Model M: 180 beds (100 m × 80 m) – staff flows and donning/doffing areas*



WaSH: water, sanitation and hygiene.

Where possible, it is advisable to cohort staff, reducing the risk of cross-contamination. The configuration in Fig. 3.6 shows the compartmentalized area of two wards (80 beds) with the dedicated doffing area.

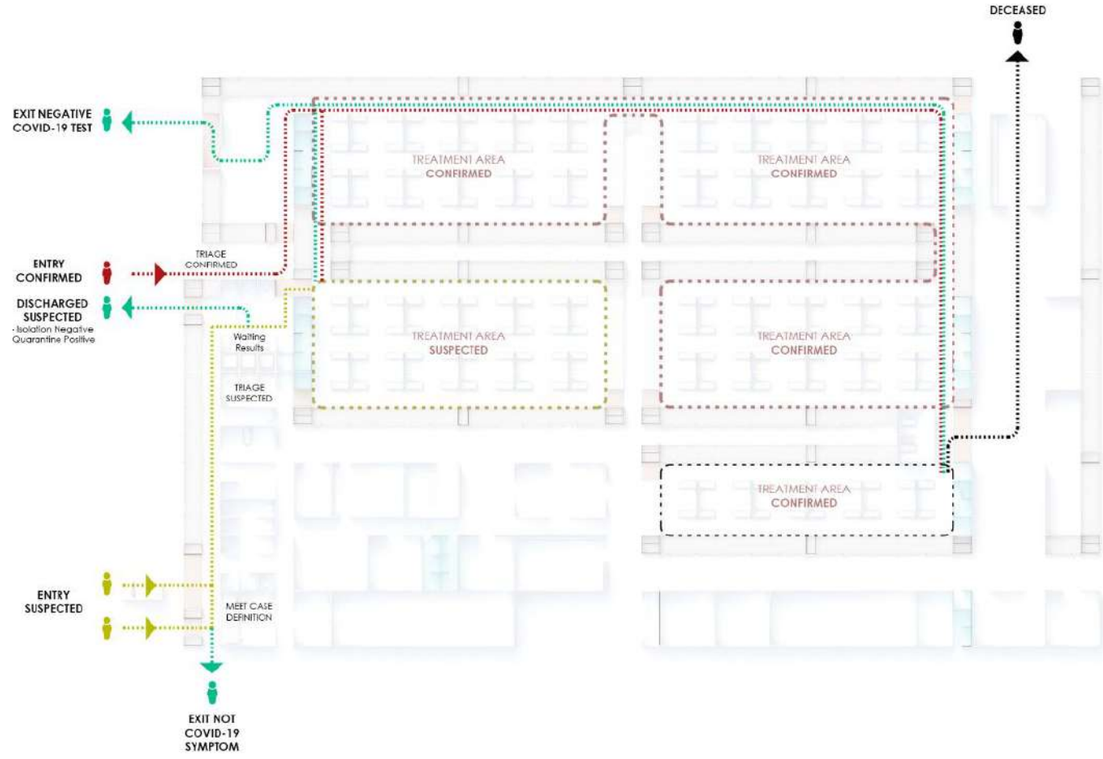
Fig. 3.6 *Model M: 180 beds (100 m × 80 m) – cohorting strategy donning/doffing areas*



Patient flows

Figs 3.7 and 3.8 present graphic and conceptual representations of safe and efficient patient flows through the community facilities.

Fig. 3.7 *Graphic representation of patient flows*



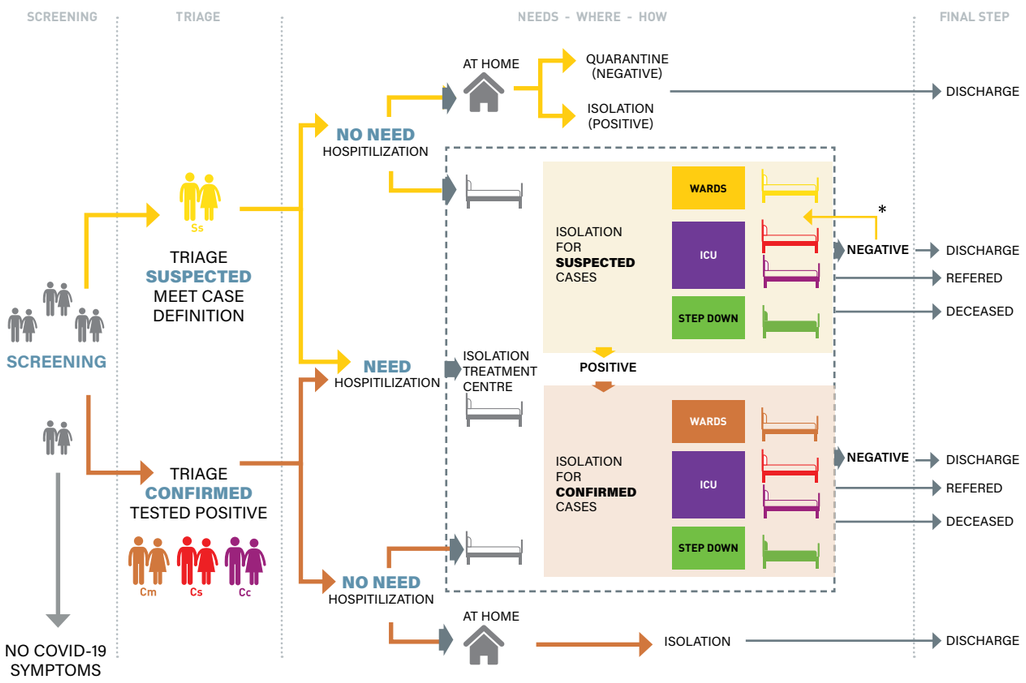


***Fig. 3.8** Conceptual representation of patient flows*

Remark: all discharges and referals are based on clinical decisions
For description of patient types, see Fig. 1.1. (see page 10)

Visitor flows

Fig. 3.9 shows the places where potential visitors can see and talk to patients (a). This option is only advised for confirmed COVID-19 patients, to reduce the risk of cross-contamination. It can also be used for interviews with contact-tracing teams or psychosocial support activities. Fig. 3.9 also indicates an area allocated for relatives of a deceased patient waiting for the dead body (b).

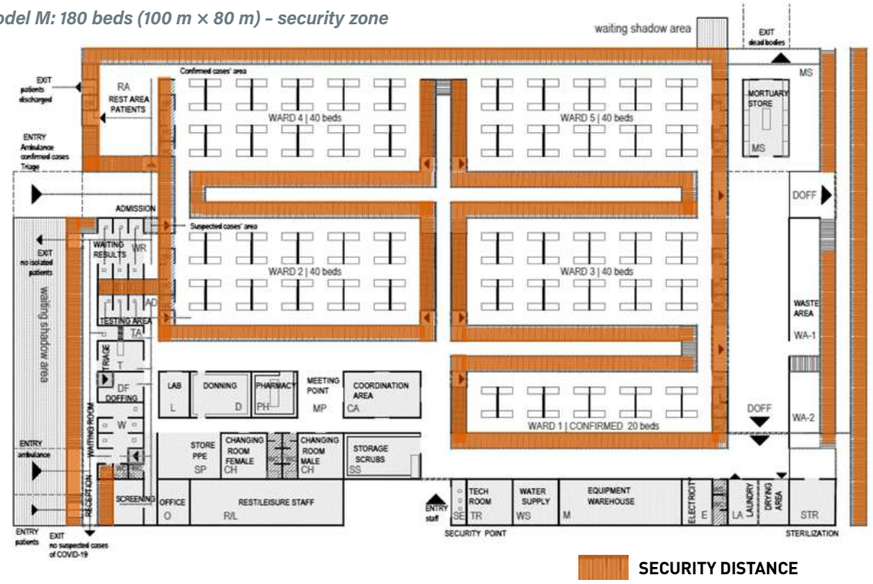
***Fig. 3.9** Model M: 180 beds (100 m × 80 m) – visitor flow*

WaSH: water, sanitation and hygiene.

Security zone

There is a security zone (2 m distance) between modules or, at some points, a physical barrier (*see Fig. 3.10*).

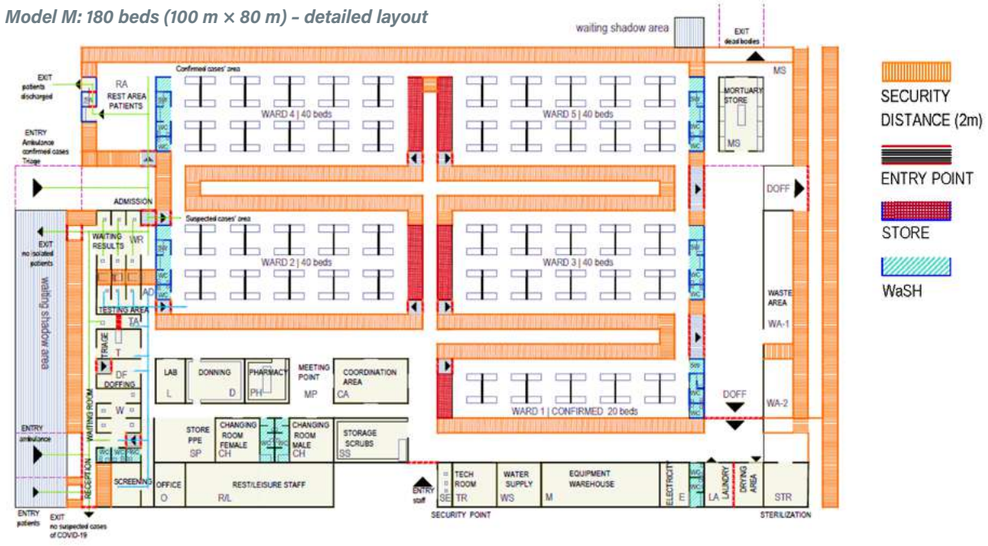
Fig. 3.10 *Model M: 180 beds (100 m × 80 m) – security zone*



3.6 Description of each area

Throughout this document, Model M 180 BEDS (100 × 80 m) is used as a reference point to help understand the proposed facility. It consists of four wards consisting of 40 beds each and a SIPA of 20 beds (*see Fig. 3.11*).

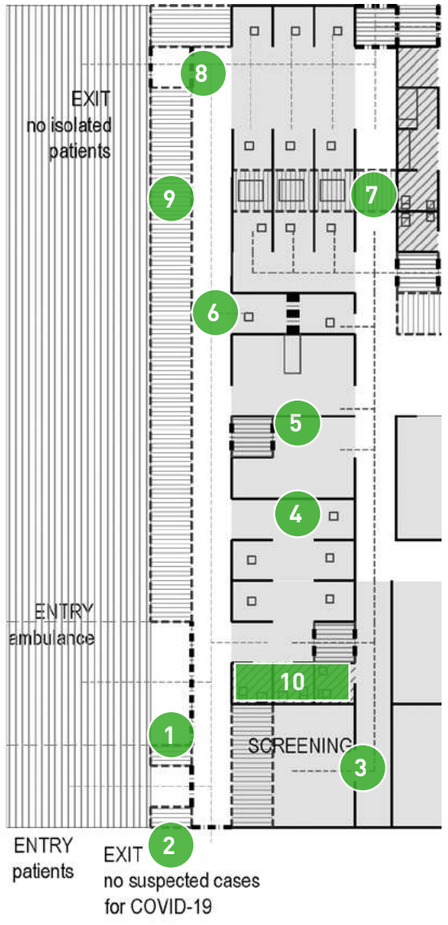
Fig. 3.11 *Model M: 180 beds (100 m × 80 m) – detailed layout*



Area 1: Reception, screening and triage areas

Area 1 is the reception, screening and triage station (*see Fig. 3.12*). The screening process involves evaluation of the patient using the standardized case definition for suspected cases of COVID-19 (*3*). The triage system will sort the patients based on the severity of their disease.

Fig. 3.12 *Model M: 180 beds (100 m × 80 m) – Area 1, Reception area*



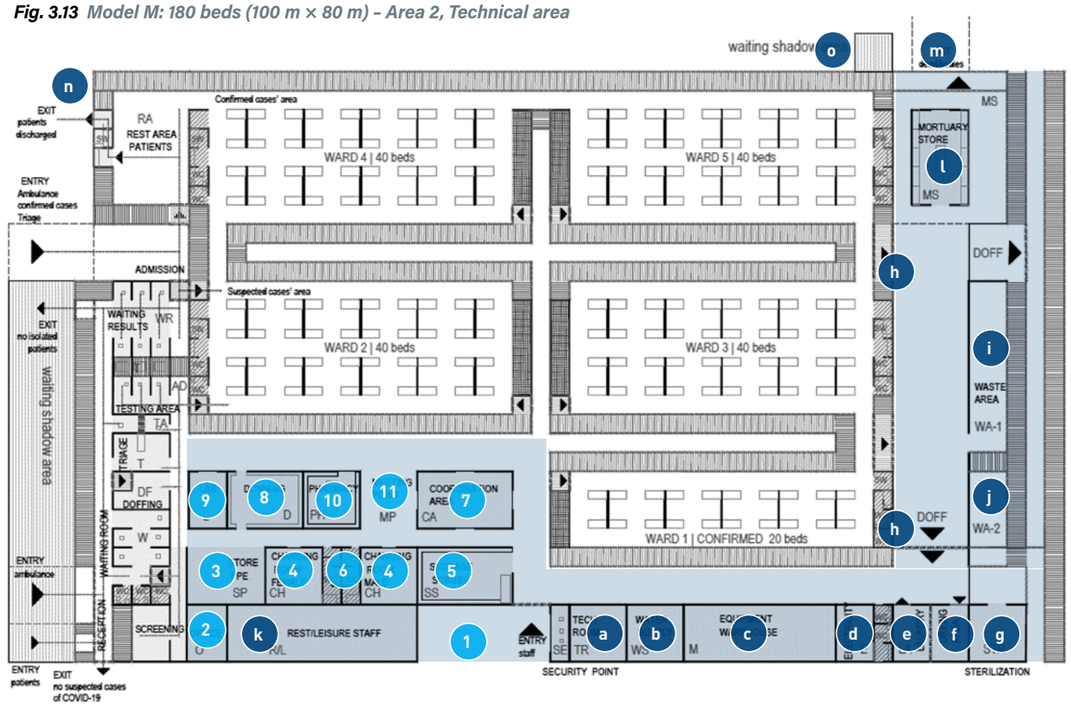
1	**ENTRY** Patients and ambulance
2	**RECEPTION** Patients'/companions' orientation
3	**SCREENING** The place where the health personnel screen each patient entering the facility, using the standardized case definition (keep >1 m distance)
4	**WAITING ROOM** The place where patients with symptoms wait to be taken care of by the health personnel – 7 independent cabins (2 m × 2 m)
5	**SAMPLE AREA** To collect testing samples from the patients
6	**TRIAGE** 3 separate cubicles where the health personnel determine the acuity level of patients, using a standardized, validated tool, and health workers will direct the patient to the appropriate section of the facility
7	**ADMISSION** Registration and entrance for admitted patients
8	**RESULTS WAITING ROOM** 6 independent cabins (2 m × 2 m) with separated positions
9	**EXIT** For patients who are not admitted
10	**WC** (toilet) Two bathrooms (male and female) for the use of patients during waiting and being attended to

WaSH: water, sanitation and hygiene.

Area 2: Technical (clinical and operational support) area

Area 2 is the main component of the core area of the facility and includes staff entry and spaces for coordination, clinical and operational support services (*see Fig. 3.13*). This area should be expandable in case the facility grows in size.

Fig. 3.13 *Model M: 180 beds (100 m × 80 m) – Area 2, Technical area*



SECURITY DISTANCE (2m) · ENTRY POINT · STORE · WaSH

WaSH: water, sanitation and hygiene.

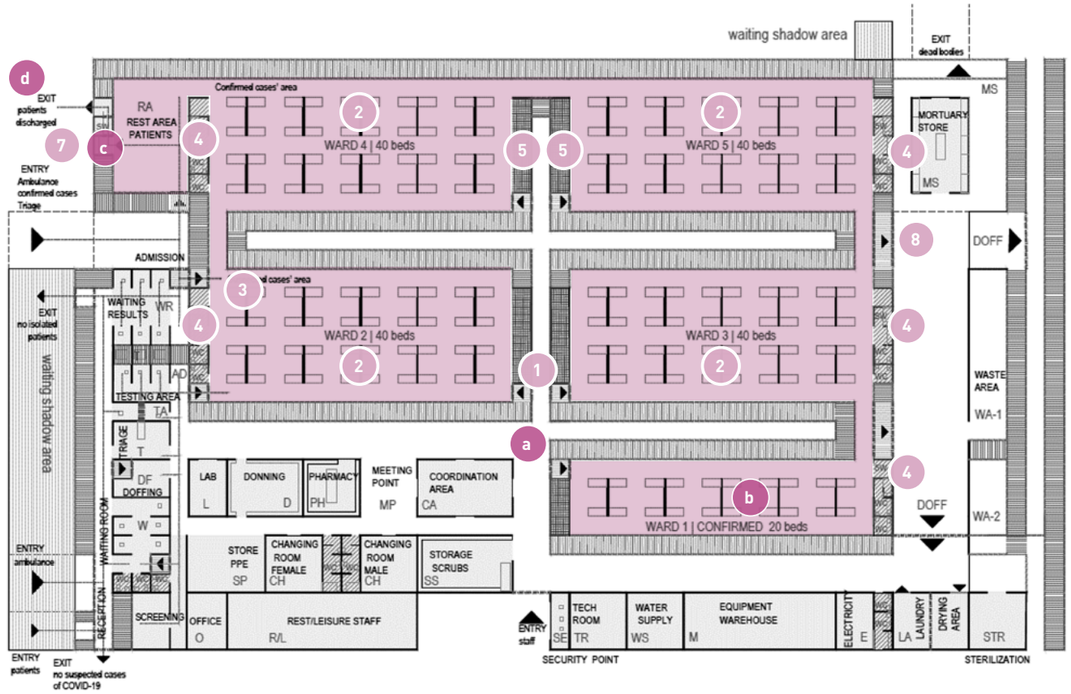
OPERATIONAL SUPPORT	
a	**TECH ROOM** Reserved for the storage and control of technical systems and equipment. Technical personnel only
b	**WATER SUPPLY** Control point for water storage, treatment and distribution
c	**EQUIPMENT WAREHOUSE** Storage of spare parts, tools and machinery for technical areas
d	**ELECTRICITY AREA** For main electrical control panels and spare parts
e	**LAUNDRY** Sorting, washing, extracting, drying, ironing, folding and delivery of linen facility material and disinfection of PPE and scrubs
f	**DRYING AREA** For clothing and equipment
g	**STERILIZATION** Disinfection of reusable medical instruments and equipment
h	**DOFFING AREA** Where PPE is removed after leaving the high-risk area
i	**WASTE AREA 1** For storage and treatment of infected waste
j	**WASTE AREA 2** For storage and treatment of waste from the low-risk area
k	**REST/LEISURE STAFF** Break/on-call room for resting during shift
l	**MORTUARY STORE** Temporary location for deceased prior to removal from the community facilities
m	**EXIT DEAD BODIES** For removal of dead bodies
n	**VISITORS' AREA** Area where visitors and relatives could establish visual and verbal contact with patients
o	**RELATIVES' AREA** The place where relatives wait for identification or for burial

CLINICAL	
1	**STAFF ENTRY** Entrance for clinical and operational staff, including security control point. Staff wear a mask from entry to the facility
2	**OFFICE** Administrative workspace for personnel
3	**PPE STORE** Storage location for personal protective equipment (PPE) – gloves, masks, goggles, aprons and other PPE
4	**CHANGING ROOM** Area where staff change from street clothes into scrubs and mask
5	**SCRUB STORAGE** Storage and distribution of work clothing to staff
6	**BATHROOMS** Male and female toilet, showers
7	**COORDINATION AREA** Dedicated space for office activities
8	**DONNING ROOM** The place where the PPE is put on before entering the high-risk area
9	**LABORATORY** It is recommended this space be reserved even if it is not initially required/available
10	**PHARMACY** Storage and dispensing of medicine
11	**MEETING POINT** Dedicated space for organization of daily activities

Area 3: Wards

The wards are set up for the provision of care for suspected COVID-19 patients in individual spaces or for confirmed COVID-19 patients in cohorts (*see Fig. 3.14*). They are expandable and can accommodate from 20 to 40 beds.

Fig. 3.14 *Model M: 180 beds (100 m x 80 m) – Area 3, Wards*



WaSH: water, sanitation and hygiene.

INPATIENT AREA (MODULE OF 40 BEDS OR 20 BEDS)	
1	**ENTRY POINTS** For staff wearing personal protective equipment (PPE)
2	**WARDS** 40 beds or 20 beds each with gender separation
3	**ICU** inside suspected case-treatment area or in confirmed patients' ward when there is no dedicated intensive care unit (ICU) ward in the facility: beds designated for patients who arrive in need of immediate invasive intervention i.e. such as central lines, intubation, catheters. Positive (already confirmed) patients are directly moved to ICU from triage
4	**WASH MODULES** (toilet, handwashing basin, shower)
5	**STORAGE MODULES** For consumables and other items
6	**REST AREA FOR PATIENTS** Area of relaxation for admitted ambulatory patients
7	**EXIT** For recovered patients
8	**STAFF EXIT** Exit for staff with PPE

SPECIFIC INPATIENT PROFILE AREA (MODULE OF 20 BEDS)	
a	**STAFF ENTRANCE** Staff with PPE
b	**WARDS** 20-bed module
c	**DISCHARGE SHOWER** Wash and disinfection point for recovered patients before they go outside
d	**EXIT** For recovered patients

Area 4: **Other complementary areas**

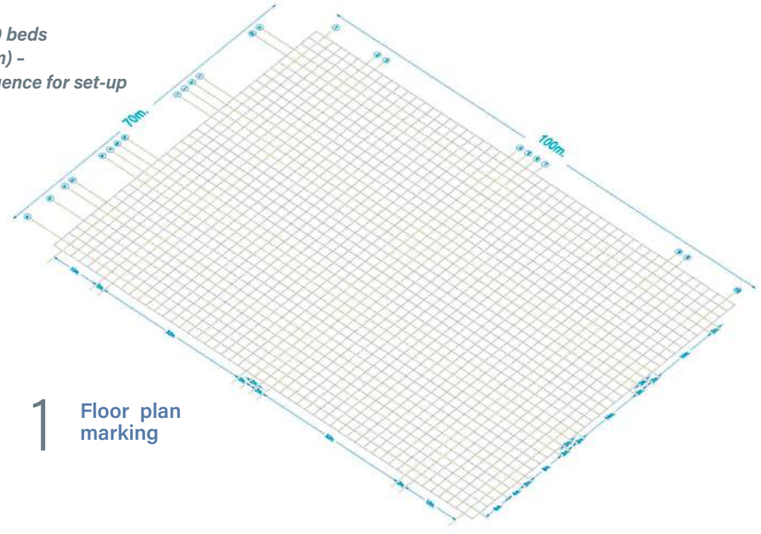
The following additional areas should be established or expanded to support the community facilities:

- control and security points;
- resting areas for staff;
- kitchen;
- living room;
- power generation;
- fuel farm;
- parking;
- visitors' area;
- warehouse external; and
- shadow for external waiting area.

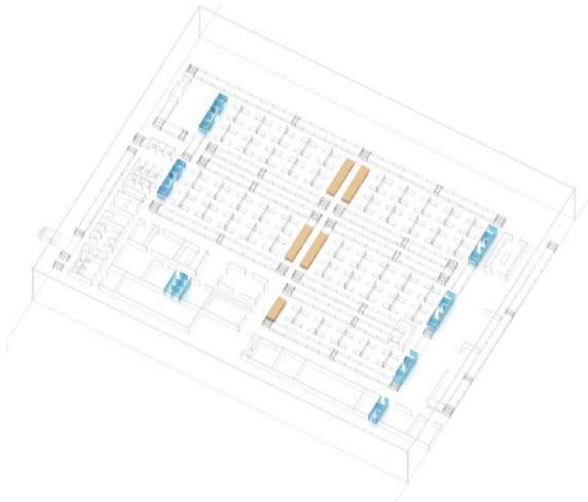
3.7 Building sequence for set-up

Fig. 3.15 illustrates the recommended building sequence, constructive elements, and scaled gridded plans that detail module construction. Measurement tools such as surveyors' tape and/or laser measurement tools can be utilized to adapt the illustrated layouts to identified locations and facilitate site clearing and levelling if required in outdoor settings. Preparation of land will facilitate the subsequent phases of the work, such as water drainage and assembly of tents and structures, etc.

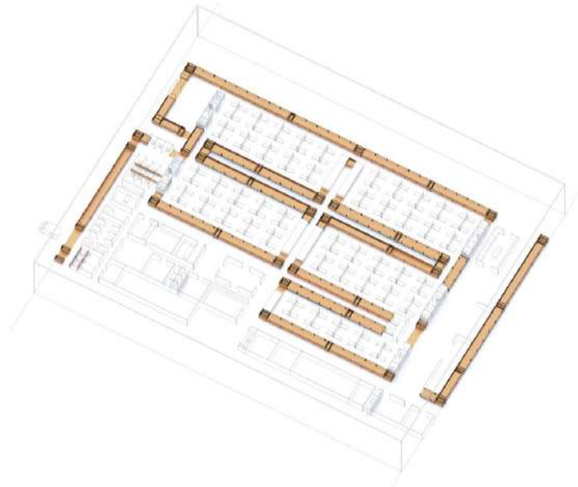
Fig. 3.15 *Model M: 180 beds (100 m × 80 m) – building sequence for set-up*



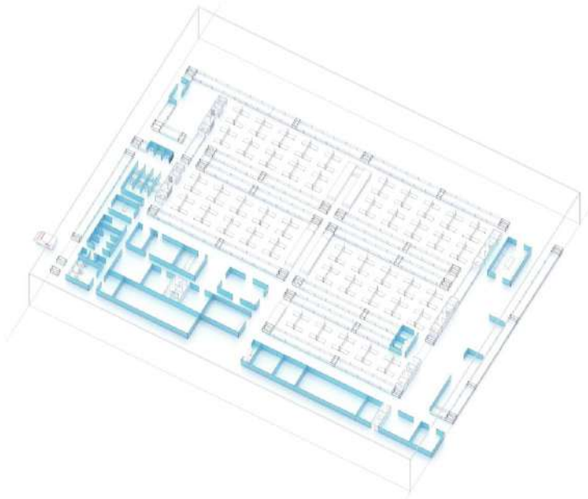
1 Floor plan marking



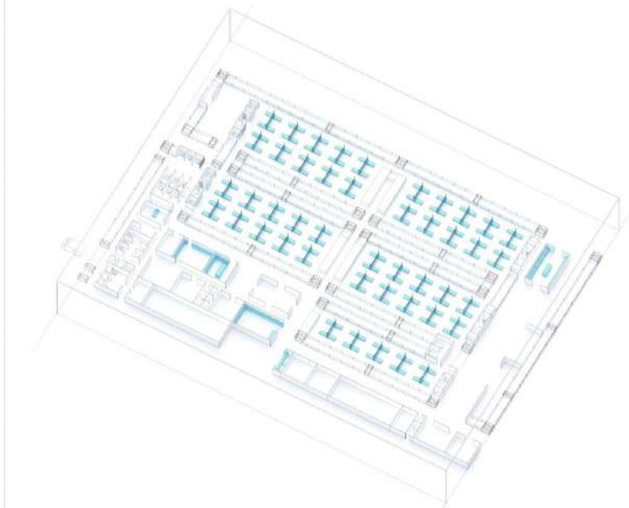
2 Corner modules set-up



3 WC and storage modules set-up



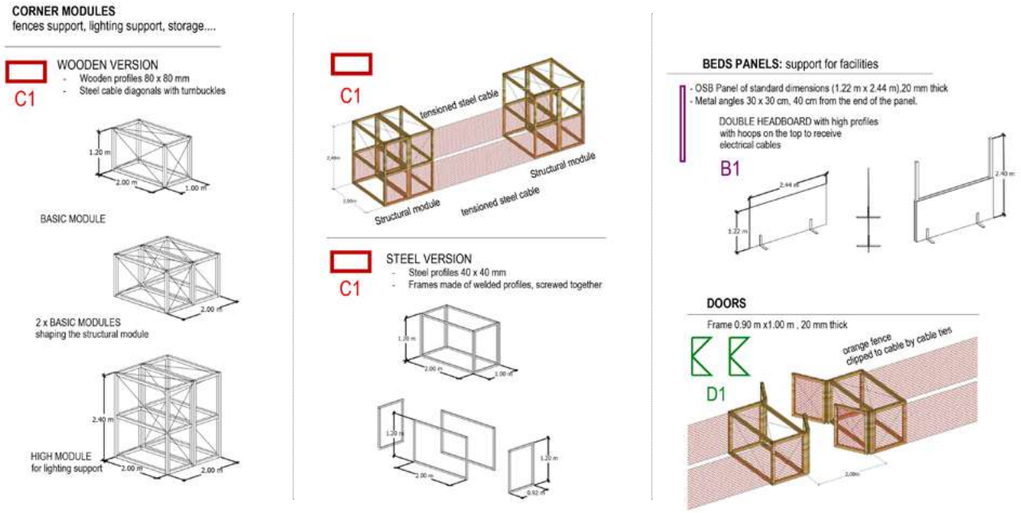
4 Fence separations set-up



5 Technical area modules set-up

Modular structures

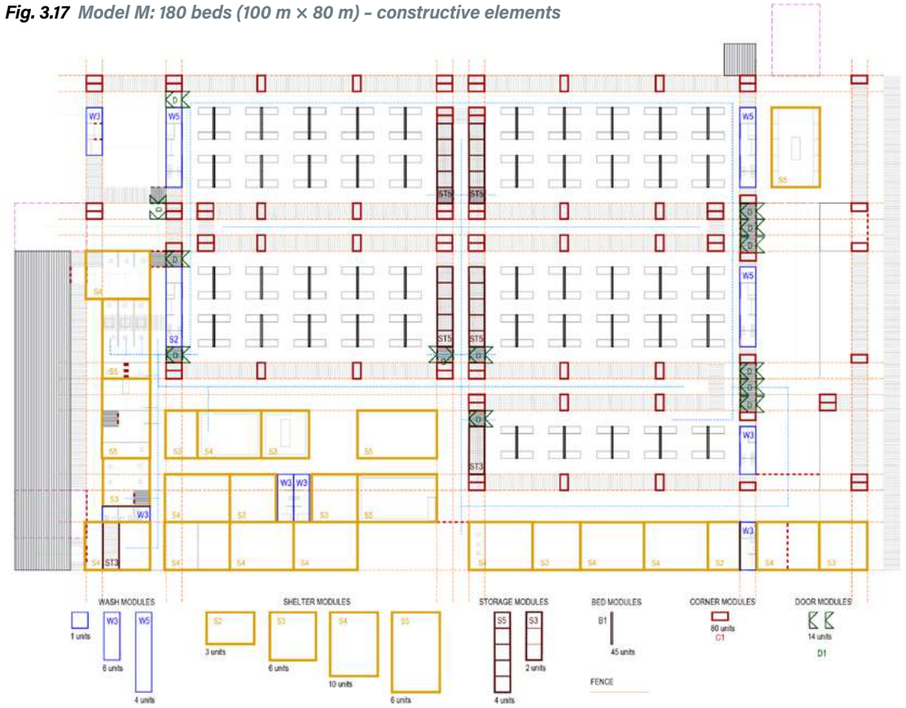
The conceptual design allows building of a temporary facility by using different types of available materials (for a detailed bill of quantities see Web Annex 4). To simplify the set-up of the centre, a structured order is proposed (*see Figs 3.16 and 3.17* and detailed plans on Web Annex 3).



OSB: oriented standard board.

- **Corner modules** are key in establishing the community facility's footprint and circumscribe the required area. They can be made of wood or welded metal.
- **Storage modules** can provide a space to house equipment, consumables, cleaning materials and other supplies. If not already constructed, they can be fabricated from plastered wood or other building materials.
- **Bed modules** can be constructed of oriented standard board (OSB, or plywood) of standard dimensions, which serve as a separation between zones. They will hold the power and lighting support systems if needed.
- **Shelter modules** should be 6 m wide, to enable set-up using commercially available tents or locally available materials
- **Water, sanitation and hygiene (WASH) modules** contain all WC/toilet and WASH infrastructure and can be constructed or developed on site, ideally with prefabricated superstructures and established sanitation technologies.
- **Separation modules** should be linked to corner modules, establishing the safe distances required to maintain effective IPC, including contact and droplet precautions. Modules can be constructed from orange plastic mesh initially or in low-resource settings and, as time permits, be replaced with panels with translucent openings to enable line of sight between areas.
- **Fence elements** or other physical barriers should be utilized to designate different areas and zones.

Fig. 3.17 *Model M: 180 beds (100 m × 80 m) – constructive elements*



3.8 Support systems with no interference

The community facility has different modules and areas that should be integrated within the structure (*see Section 8 and Figs 8.1, 8.3 and 8.7 for details*):

- water;
- sanitation;
- electricity and illumination;
- waste management;
- fire safety;
- telecommunication;
- ventilation; and
- oxygen.

All support systems, including but not limited to power supply, water supply, sewage and greywater systems and waste management can be established, maintained and scaled up without interrupting the operations of the community facility.

4. STAFF

Table 4.1 outlines the core staffing requirements for all proposed set-ups of wards in a COVID-19 community facility. It shows the suggested staff for each clinical module, based on a 40-bed module (mild/moderate and severe) or for a 20-bed isolation and ICU module. For clarity, the full-time equivalent (FTE) has been used for those functions that are suggested to be available in shifts. One FTE equals a staff member working 40 hours per week in shifts of 8 hours.

***Table 4.1** Suggested staffing numbers for the different proposed ward set-ups*

	NUMBER **PER BEDS**				
	20 beds isolation of contacts	**40 beds** mild and moderate patients	**40 beds** severe patients	**20 beds** ICU patients	**20 beds** step-down patients
Head nurse	1	1	1	1	1
Nurses	n/a	8.5 FTE	21 FTE	42 FTE	8.5 FTE
Nurse assistants	n/a	8.5 FTE	17 FTE	8.5 FTE	8.5 FTE
Medical doctors	n/a	n/a	4 FTE	n/a	n/a
Intensivists/anaesthesiologists	n/a	n/a	n/a	8.5 FTE	n/a
Respiratory physiotherapists (or national equivalent)	n/a	n/a	8.5 FTE	8.5 FTE	n/a
Physiotherapists (or national equivalent)	n/a	n/a	n/a	n/a	3 FTE
ICU speech and language therapists (or national equivalent)	n/a	n/a	n/a	1 FTE	1 FTE
Intensivists/anaesthesiologists	n/a	n/a	n/a	8.5 FTE	n/a
Occupational therapists (or national equivalent)	n/a	n/a	1.5 FTE	n/a	3 FTE
Psychologists (or national equivalent)	n/a	n/a	n/a	n/a	1 FTE
WASH /IPC officers	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE
Cleaners and helpers	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE	4.25 FTE

FTE: full-time equivalent; **ICU:** intensive care unit; **IPC:** infection prevention and control; n/a: not applicable; **WaSH:** water, sanitation and hygiene

Table 4.2 clarifies the suggested FTEs for screening and triage. The suggestion is to have two staff available for screening and two more for triage at any given time. Every shift should also have two WASH/IPC officers and two cleaners, to ensure IPC standards are met and patients appropriately instructed. It also includes a rapid response team that can provide 24/7 medical supervision for those facilities with mild cases or quarantined contacts, or provide emergency assistance in wards with moderately or severely ill patients. For those facilities that only accommodate contacts or mild cases, the implementing organization may choose to have a doctor on call rather than 24/7 medical presence in the facility. It is advised to have a nurse present at all times.

***Table 4.2** Full-time equivalents (FTE) for screening and triage*

Staff members	**Screening and triage rapid response team**
Screening and triage nurses	17 FTE
Rapid response team doctors	4 FTE
Rapid response team nurses	4 FTE
WASH/IPC officers	8 FTE
Cleaners and helpers	8 FTE

Depending on the size and focus of the facility, additional functions should be considered: hospital manager, senior medical doctor, nursing manager, operational support lead, IPC/WASH-lead, rehabilitation lead, supply chain manager, data manager, epidemiologist, psychosocial support, pharmacist, staff health doctor, X-ray technician, laboratory technician, kitchen staff, cleaners and helpers, security guards, warehouse staff, technical staff, biomedical engineer, and laundry. These functions could be combined or expanded, based on the system implemented and staff availability.

4.1 Management

Clear lines of command and control are critical to the effective operation of any facility. Fig. 4.1 illustrates suggested roles and responsibilities of the community facility management team

Each member of the management team is responsible for following up on safe staffing levels and rostering of their respective teams. Some organizations advise to have staff work in fixed teams with minimal contact with the other teams. The objective of this strategy is to minimize the danger of deactivation of a large percentage of the department staff in case of exposure.

A sample organigram is proposed in Fig. 4.1.

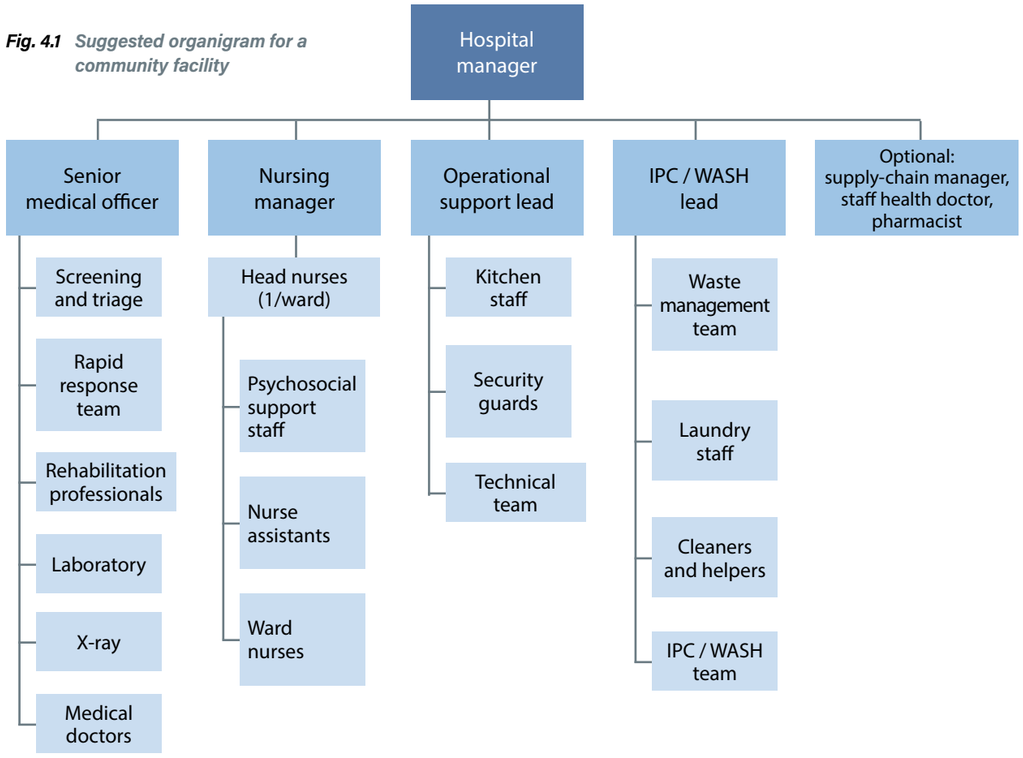


Fig. 4.1 *Suggested organigram for a community facility*

4.2 Screening and triage personnel

Screening and triage areas should be expected to have a high throughput. Bottlenecks should be avoided as much as possible, as they bring people close together, which can accommodate cross-contamination.

The staff at the screening area should be trained and updated regularly on changes in the case definition. Two nurses at the screening station at any moment should be considered the minimum, and this number should be increased on demand; 8.5 FTE nurses should therefore be considered. The implementing agency can, of course, choose to assign other trained professionals to perform screening functions.

It is recommended to have at least two nurses assigned to the triage area, with the ability to surge staffing as needed; 8.5 FTE nurses are required to ensure two nurses are always present. Organizations may choose to add other health professionals to the triage staff as required (e.g. medical doctors). IPC officers and cleaners/helpers should be available 24/7 here as well.

The triage personnel should have specific training in application of a standardized, validated triage tool, such as the Interagency Integrated Triage Tool (*1*).

4.3 Nurses

International guidelines indicate that no fewer than one nurse should be assigned for every eight beds (*2*). Accordingly, five nurses should be assigned to each ward for severely ill patients. This means 21 FTE nurses are required for each severe ward module (plus one head nurse). It should be recognized that use of full PPE for extended periods of time challenges staff members' ability to work effectively. Adherence to minimum staffing requirements ensures that patient deterioration is identified early, and necessary interventions are being undertaken to prevent patient decompensation. One head nurse per ward should be responsible for shift planning, liaison with the nursing manager, interdisciplinary communication, facilitation of admissions, discharges and referrals. When the head nurse for a ward is not on duty, another nurse should be assigned as a shift-responsible professional, assuming all head-nurse activities and giving reports to the head nurse on their return to duty at the next shift handover.

If the ward is used to isolate contacts, it is suggested that there is no need for additional nursing staffing. Access to health-care service can be ensured through the rapid response team (one nurse and one doctor 24/7). One head nurse could be included to supervise the planning (e.g. admissions and discharges) for the ward.

In areas for patients with mild or moderate disease, or as step-down ward, no fewer than two nurses are required for every 40-bed module (20 beds for step-down ward). Patients in these areas should be capable of some self-care and tolerance to oral medication regimens that can be distributed by nurses, potentially for several days at a time. This calculates into 8.5 FTE nurses per ward and one head nurse.

A 20-bed ward for suspected cases should include, for example, four beds that can safely accommodate ICU-level care for those patients who are not confirmed COVID-19-patients but require a higher level of care. This should reflect in the staffing for this ward by adding two (1 per 2 beds) ICU-trained nurses per shift (8.5 FTE). The nursing staffing for the remaining 16 patients should be adapted to the disease severity (one nurse per eight beds in each shift for severely ill patients; one nurse per shift for all patients if all are mildly or moderately ill)

In the event that a 20-bed SIPA module is used for ICU beds, the international standard indicates that no fewer than one nurse be assigned to every two patients. For a 20-bed ICU module, this equates to 42 FTE nurses.

4.4 Nurse assistants

For mildly or moderately sick patients or for step-down ward modules, no fewer than 8.5 FTE nurse assistants per 40-bed ward (20 beds for step-down ward) are required. No fewer than 17 FTE nurse assistants are required for every ward for 40 severely sick patients.

Large proportions of severely sick patients will be bed-bound and require a continuous supply of oxygen and continuous care for all basic needs. These needs include, but are not limited to, hygiene, feeding and provision of drinking water. The community facility should be designed so that equipment and supplies are brought in from the "low-risk areas". The suggestion is to add one nurse assistant for every nurse during the day and two nurse assistants for every ward during the night.

For situations where the SIPA is utilized as an ICU, two nurse assistants per shift are required, adding another 8.5 FTE for a 20-bed ICU module.

4.5 Medical doctors

For wards only accommodating isolation of contacts or mild- or moderate-severity patients, the rapid response team doctor can supervise, as these patients should not need too much medical care. The rapid response team doctor can also care for the (for example) four ICU beds in the ward for suspected cases.

Each 40-patient ward module for severely ill patients should be staffed by no fewer than one medical doctor during each shift, including overnight periods.

Depending on staff availability, shift patterns, and differing ways of working, the required number of doctors may vary across health systems and should be carefully considered and reassessed periodically, in advance of opening one or more ward modules. At the minimum, one doctor per shift working 40 hours per week equates to 4 FTE doctors per ward module.

In an ICU ward module, no fewer than one doctor for every 10 patients should be considered. A doctor from the rapid response team can support this ward module indirectly, as may be necessary for emergency procedures and/or referrals. For a 20-bed ICU, no fewer than 8.5 FTE intensivists/anaesthesiologists should be considered.

4.6 Rapid response team

A roving emergency team with skills, experience and required equipment should be included for every 5 × 40-bed ward module. This team should consist of no fewer than one specialized nurse and one doctor. The rapid response team should have a technological or a resilient notification system that enables immediate notification when a ward identifies a decompensating patient who requires acute intervention and/or resuscitation. When not required, the team should be assigned to support in the triage area, to deliver acute stabilizing interventions and/or to work in an ICU ward module when not called upon to respond to an emergency elsewhere in the COVID-19 community facility. The rapid response team and other clinicians should be mindful of the criticality of the rapid response team's resilience and provide for adequate breaks and, if appropriate, critical incident stress debriefing following extended or challenging interventions, particularly with paediatric patients.

The rapid response team should be available to all wards on all shifts. It also ensures medical supervision in those facilities where only contacts or mildly sick patients are accommodated. This equates to no fewer than 4 FTE doctors and 4 FTE nurses for up to five ward modules of 40 beds.

4.7 Physiotherapists (or national equivalent)

Physiotherapists (or national equivalents) working in a COVID-19 community facility require competencies to maintain/optimize patient mobility and function and deliver specialist respiratory interventions that aim to improve oxygenation and manage hypersecretions.

Each 40-bed ward module for severely ill patients should be staffed by no fewer than two respiratory physiotherapists (or respiratory therapists or other national equivalent) during each shift, with no fewer than one during overnight periods. This requires 8.5 FTE. Each 20-bed ICU ward should have no fewer than two respiratory specialist therapists at any time (8.5 FTE). For each 20-bed step-down ward that is established, there should be two physiotherapists during each shift, but overnight cover is not required (3 FTE).

4.8 Speech and language therapists (or national equivalent)

When the community facility includes ICU capacity and is using mechanical ventilation, no fewer than one speech and language therapist, or national equivalent, should be available per shift (1 FTE; overnight cover is not required). They will work across wards to assess patients for swallowing and speech impairments that may occur as the result of mechanical ventilation and sedation, and provide interventions that facilitate oral intake of nutrition and prevent aspiration pneumonia.

4.9 Occupational therapists (or national equivalent)

Each 40-bed ward for severe cases requires one FTE occupational therapist or national equivalent. Each 20-bed step-down ward should be staffed by no fewer than two occupational therapists each shift (no overnight cover required). Occupational therapists working in a community facility require competencies to conduct cognitive assessment and rehabilitation, as well as graded activity and functional retraining.

4.10 Psychologists, psychosocial support staff

The community facility should have easy access to psychosocial support personnel for both patients and staff. This can vary from providing entertainment up to professional support according to local custom. Where step-down wards are included, at least one qualified psychologist or national equivalent (1 FTE), is advised, to provide psychological strategies and trauma counselling as needed.

4.11 Pharmacist

Most of the patients can be expected to require continued treatment for pre-existing conditions and may require medication to treat chronic illness. The size, staffing, and resource requirements of the pharmacy module will vary depending on the size and resources available to the community facility. The clinical team, in consultation with the supply-chain manager and pharmacist, should establish the requisite formulary and supply-chain management system, to ensure that an efficient system of decentralized stores with provision for restocking of medication is implemented in advance.

4.12 Staff health and safety lead

A staff health and safety lead should be designated before the commencement of any treatment activities. The lead will ensure that all staff remain aware of and report any signs of illness and/or absenteeism immediately. The lead will meet regularly with the community facility management team and liaise closely with the IPC lead. The staff health and safety lead will ensure administrative controls are in place, in order to guarantee provision of adequate training for health workers, ensuring an adequate patient-to-staff ratio and establishing a surveillance process for acute respiratory infections potentially caused by COVID-19 among health workers; ensuring that health workers and the public understand the importance of promptly seeking medical care; monitoring health workers' compliance with standard precautions; and providing mechanisms for improvement as needed.

The lead will ensure operations of the community facility prioritize protection for frontline health workers and non-clinical staff. The staff health and safety lead may be responsible for testing and tracking isolation for staff, reporting this information regularly to the community facility management team. No fewer than 2 FTE experienced clinicians should be assigned to this function for a facility.

Staff members who show signs or symptoms of COVID-19 should be tested and isolated promptly, to ensure that effective IPC for both staff and patients is maintained as soon as possible and prevent spreading of the disease to colleagues.

4.13 Cleaners and helpers/WASH/IPC officers (IPC team)

For every ward module, no fewer than two environmental staff should be assigned. An additional six staff members should be assigned to the triage area, staff areas and waste management. Staff should be available for both day and night shifts. One or two experienced environmental leads, ideally with both IPC and staff management experience should be appointed before the commencement of patient care activities. In total, 26 FTE should be utilized for triage, staff areas and waste management, plus 8.5 FTE for each 40-bed ward module (or 20 beds for ICU or step-down ward).

4.14 Other

Additional functions might be required:

- nutritionist;
- kitchen staff (kitchen and food delivery);
- security;
- warehouse;
- biomedical engineers;
- information technology (IT) professionals;
- laboratory;
- laundry;
- water supply;
- waste management;
- electrician;
- mortuary;
- patient transport;
- administration and finance;
- social services; and
- clergy.

5. Supplies and equipment

WHO has developed kit lists for treatment of patients with COVID-19. The lists provided in Web Annex 4 should be considered, and will drive procurement planning scaled to the number of patients to be treated. Specifications for critical medical equipment can be found on the WHO website (*1*). Therefore, details and numbers are not mentioned in this section.

5.1 Emergency equipment

Equipment for the acute management of decompensating patients (equivalent to a "crash cart") should be available in every ward module. Equipment includes a self-inflating ambu-bag with the ability to connect to high-flow oxygen; a resuscitation board for cardiopulmonary resuscitation (CPR); a suction unit; a kit with the materials for oxygen delivery; intravenous (IV) catheters/cannulas;, drip sets; and fluids (*2*).

Equipment that is not assigned to an individual patient must be thoroughly cleaned following every use. While using the emergency equipment, or during any other aerosol-generating procedure, staff should wear appropriate PPE, including N95/FFP3 masks.

A cart or backpack with specialized emergency equipment for the rapid response team must be placed in a strategic location in the facility. This contains (additional to the kit in the wards) medication, intubation equipment, a suction unit and a defibrillator. Suspected and confirmed areas in the facility have separate sets of emergency equipment to avoid cross-contamination. In the ICU area, several of these kits should be present.

5.2 Personal protective equipment

A table with estimated PPE usage for different patient numbers is provided in Web Annex 4. Refer to existing WHO guidance, such as *Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations* (*3*), *Infection prevention and control during health care when COVID-19 is suspected* (*4*) and *Rational use of personal protective equipment for coronavirus disease (COVID-19)* (*5*), for more detailed information.

5.3 Patient observation

COVID-19 patients need to be monitored closely, mainly for development of complications of COVID-19 such as sepsis, septic shock, respiratory failure or acute respiratory distress syndrome. Therefore, nurses in wards for moderately or severely sick patients need to monitor vital signs on a regular basis. Oxygen therapy is guided by oxygen saturation. Infection is a complex disease process that can affect all vital systems. Following temperature, urine output, pulse rate, respiratory rate, oxygen saturation, blood pressure and mental status are hence all equally important. Staff should have access to sufficient equipment to monitor patients in an efficient way.

In the area for suspected cases, equipment should be assigned to each individual patient and cleaned and disinfected after discharge, or thoroughly cleaned and disinfected in between usage.

An early warning score system can be put in place to identify deteriorating patients.

5.4 Administrative equipment and furniture

Furniture should be assigned to specific zones. Staff and patients need sufficient chairs and tables to sit and work efficiently. In the zone for confirmed cases, nurses can use trolleys to move from patient to patient with their equipment. In the areas for suspected cases, this should be avoided as it can initiate cross-infections.

Beds should be adapted to the disease severity of the patient. Patients in critical care areas should have pressure-relief mattresses if available.

The recommended characteristics for finishes and furniture are:

- leanable (material easy cleanable and resistant to repeated cleaning);
- easy to maintain and repair (select materials that are durable and/or easy to repair);
- resistant to microbial growth (select metals and hard plastics);
- nonporous (avoid porous plastics, such as polypropylene, in patient care area); and
- seamless (avoid upholstered furniture in patient care areas).

5.5 Imaging

Chest X-rays have limited sensitivity in the early stages of COVID-19 pneumonia. A computerized tomography (CT) scan is more sensitive but raises logistical problems and exposes patients to significant amounts of radiation. If ultrasound competencies are available, lung ultrasound can be used (*6*).

When these are used in the facility, there must be significant attention to IPC, as this equipment is used for larger numbers of patients and can possibly be a cause of cross-infection. In case the SIPA is adapted for ICU, mobile bedside X-ray should be available.

5.6 Medication and consumables

Detailed lists of medications and medical consumables are included in Web Annex 4.

5.7 Other medical equipment

Web Annex 4 includes detailed equipment for each ward module, and other clinical areas.

6. Systems

6.1 Screening

All health facilities should introduce a screening station at the entrance of the facility. The screening process involves evaluation of the patient using the standardized case definition for COVID-19 (*1*). If the patient fulfils the case definition, the triage system will define the acuity level of the patient (see later). Suspected and probable cases will be treated similarly in this proposed set-up.

Suspected case

A. A patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease [e.g. cough, shortness of breath]) AND a history of travel to or residence in a location reporting community transmission of COVID-19 during the 14 days prior to symptom onset

or

B. A patient with any acute respiratory illness AND having been in contact[1] with a confirmed or probable COVID-19 case in the last 14 days prior to onset of symptoms

or

C. A patient with severe acute respiratory infection (fever and at least one sign/symptom of respiratory disease (e.g. cough, shortness breath) AND requiring hospitalization AND in the absence of an alternative diagnosis that fully explains the clinical presentation

Probable case

A. A suspected case for whom testing for COVID-19 is inconclusive (inconclusive being the result of the test reported by the laboratory)

or

B. A suspected case for whom testing could not be performed for any reason

Confirmed case

A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms

The case definition should be reviewed regularly on the WHO website (*2*).

Patients who do not fulfil the definition of a suspected case should be referred to regular health-care services. They do not need to wear a mask any longer. Patients clearly requiring intensive care are referred to ICU immediately. For patients defined as a suspected or probable case, laboratory sampling should be undertaken as soon as resources allow. People who were in contact with a confirmed case, but do not (yet) show symptoms (*see also reference* (*3*)) should be quarantined for 14 days. This can be done either at home, in a dedicated ward or facility for quarantining of contacts, or even in a ward for suspected patients (*3*).

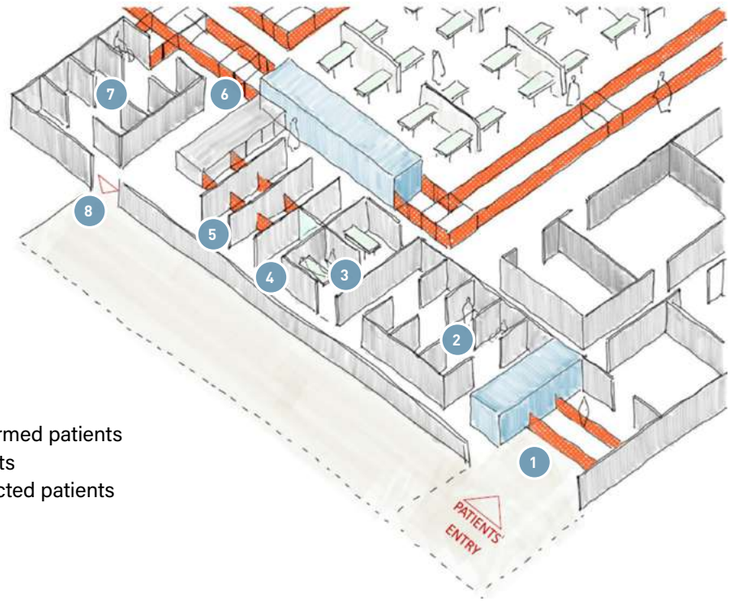
Informing

Everyone entering the facility should be informed about the signs and symptoms of COVID-19 and measures to be put in place (e.g. handwashing, respiratory hygiene, limiting visitors). Those without symptoms should not enter the facility, in order not to put themselves at risk.

Waiting areas

Waiting areas should be designed to allow those patients waiting to be pre-screened to see and speak with relatives separated by a safe distance (*see Fig. 6.1*). Regarding dimensions, sufficient space is recommended, as the number of people waiting can be very variable. Waiting areas should be spacious enough to allow distancing between those waiting or using screens in between patients, to reduce the area needed.

Fig. 6.1 *Artistic representation of waiting area and entrance*



1 Reception
2 Waiting area
3 Crash room
4 Test sample
5 Triage
6 Access for confirmed patients
7 Waiting for results
8 Exit for non-infected patients

Entrance screening points

At a screening point, all patients suspected of having COVID-19 (*1*) are directed to the triage point. Guidance on building and managing the screening points can be found in the earlier published document on building centres for treatment of severe acute respiratory disease (*4*). Checkpoints should be properly equipped with the correct PPE for patients and staff. Patients referred from other facilities can pass immediately through a separate entrance.

The following items should be provided at the entrance screening point:

- guidance posters for staff (e.g. to guide the process) and non-staff (e.g. to self-report, respiratory hygiene, etc.);
- masks for staff (if there is no physical contact with a patient, PPE does not have to be changed by the health worker);
- gloves for staff (if there is no physical contact with a patient, PPE does not have to be changed by the health worker);
- masks for patients: patients who are referred to the triage point are given a mask and an explanation that they should wear it until instructed otherwise at or after the triage;
- thermometers (infrared);
- facilities for hand hygiene (handwashing and alcohol-based hand rub) in staff and non-staff areas (i.e. for public/patient use as well); and
- waste bins for safe disposal of PPE.

Design considerations for screening and triage points

- The entry and exit points of the screening areas must be clear and signposted following a unidirectional flow.
- All patients should be able to perform hand hygiene (handwashing with soap and running water or alcohol-based hand rub/sanitizer) at entry and exit points.
- A fence between the staff and patients' area should be set up in, for example, a tent in front of the entrance. The distance between the areas must be a minimum of 1 m.
  - The more ventilation that is possible the better (e.g. a tent with open sides oriented in the same direction as the dominant wind direction).
- The routes and walkways must be wide enough to prevent overcrowding, as sometimes these can be points of contact of several people with different degrees of contamination or protection.
- The whole area must have good visibility, so that the guard can control it all from his or her position. A dedicated staff member should evaluate whether the presenting person fulfills the case definition for COVID-19.
- Triage staff only need to move to the patient area when absolutely needed; on indication from the triage office, two dedicated staff members should accompany patients to a dedicated ward. Documents should stay in the staff area at all times. One nurse should stand behind a desk in a secure area, while two health staff work between the entrance, triage and suspected cases' area, moving patients in need and helping the triage officer.

Referral and transport

For acutely ill patients who do NOT meet the COVID-19 case definition, measures must be taken to ensure rapid referral to an appropriate level of care (*2*). It is advised to contact beforehand to ensure there is capacity available to accept the patient and to avoid additional transport needs.[1] A staging area could be put in place where patients can wait until the appropriate facility is identified and transport is arranged. No special transport considerations need to be in place to move these patients. However, if an ambulance is used it is essential to ensure that appropriate cleaning and disinfection is performed between patients.

For transport of suspected, probable or confirmed COVID-19 patients, ambulance staff should have access to appropriate PPE. It is not recommended to transport several patients in one vehicle if they are not all confirmed COVID-19 cases.

The ambulance needs to be disinfected after each use. Therefore, it is useful to reduce the equipment in the patient compartment to the essentials. Currently, WHO recommends using 70% ethyl alcohol to disinfect small areas between uses, such as reusable dedicated equipment (e.g. thermometers) and sodium hypochlorite at 0.1% (equivalent to 1000 parts per million [ppm]) for disinfecting surfaces; however, disinfection with a minimum concentration of 0.5% (5000 ppm) sodium hypochlorite (bleach) is strongly recommended. Disinfection should preferably be done near the triage area, so the ambulance is immediately available. Waste should be handled as infectious medical waste and can be handed over at the triage area after handing over the patient.

Facilities with particular capacities (such as critical care, obstetrics, etc.) should be identified during initiation of coordination, and clear referral criteria should be delineated for all staff. Referral of a patient is always a medical decision.

After screening

Patients meeting the case definition of COVID-19 proceed to the triage area.

6.2 Triage point

Triage is an acuity-based sorting of patients best done with a standardized, validated triage tool, such as the Integrated Interagency Triage Tool (*7*).

Triage set-up

The triage area (*see example in Fig. 6.2*) should be properly equipped with correct distancing measures and PPE for staff; no patient should enter the triage area without a mask, received at the entrance. The figure shows two entrances, where one is used for patients that have already received their laboratory result confirming infection. They do not need to go through the screening station.

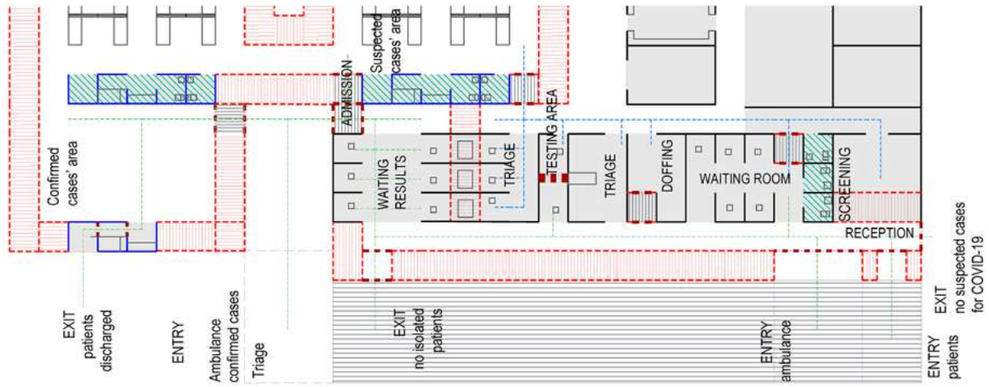
After triage, patients can be categorized by disease severity and clinical syndromes and admitted to the appropriate modular area.

Patient identification/administration

Upon arrival in the facility, every patient should be identified with a unique identifier and full name, which should both be written on a bracelet and follow the patient throughout their journey in the facility. The identifier and the patient's name should be on each document, sample and item allocated to the patient.

A whiteboard (physical or electronic) should be provided in every section of the facility and in a central place, so there is a track of which patient is where in the facility.

Fig. 6.2 *Triage layout in the proposed centre*



6.3 After screening and triage

1. Patients are referred to the "suspected cases" area until their laboratory result is known, when they:
   fulfil the case definition of suspected or probable case
   AND
   are too sick to self-isolate.
2. Patients who do not fulfil the case definition are sent home or referred to appropriate relevant care (primary care provider, telemedicine, or referral facility for other acute needs).
3. Patients who fulfil the case definition may be instructed to stay isolated in the facility or referred elsewhere according to local protocol. If testing is conducted at the facility, they should be admitted and isolated in a health facility or community facility as long as resources allow. If this is not possible, they need to remain in home isolation. If negative, they can resume their normal activities. The destination of the patient should be determined based on classification of disease severity: mild, moderate, severe or critical, to ensure appropriate care is provided.

6.4 Patient documentation

Every patient needs to have a record, containing the unique identifier and name of the patient and the notes of their disease status and progress, results of laboratory tests and other examinations, treatment, etc. Since there are several different lay-outs and set-ups in use, no particular set of documents is promoted here. Attention needs to be placed on the IPC measures related to the patient documentation. The file should not travel from a contaminated zone to a clean area. Options are to keep the file on the clean-side and communicate observations for each patient "over the fence" to a colleague who takes the notes. Electronic options may also be possible but require significant investment.

Informed consent should be requested when possible for all invasive procedures. A system should be put in place to report adverse events and near misses.

On discharge, or at referral, the patient has the right to receive a report about their stay in the facility. This is not only for information but also to ensure continuity of care when needed. A death certificate should be issued when a patient passes away, according to local protocol.

Every facility should contribute to a reporting system implemented by health authorities. This is important for following up activities in the facility, for epidemiological follow-up in the region and for follow-up of contacts and implementing actions in cooperation with other pillars of the outbreak response. The patient documentation should allow easy collection of the required data in a structured way.

6.5 Laboratory assessment

Polymerase chain reaction (PCR) for COVID-19

When resources allow, all suspected cases should be tested using a molecular test (PCR). Based on clinical judgment, clinicians may opt to order a test for the COVID-19 virus in a patient who does not strictly meet the case definition, for example, if there is acute respiratory illness among a cluster of health workers or severe acute respiratory infection or pneumonia in families, workplaces or social networks (*8*).

For mobile patients who are not significantly sick and require no admission, the sampling can be done in the triage area. Wherever possible, the patient (suspected case) should wait in the suspected cases' area until the laboratory result is known.

Patients who need to be admitted can be tested either at triage or in the suspected cases' area. Patients should always be instructed not to get in close contact with each other and to wear their mask when moving with other people. Patients requiring critical care should be referred immediately to an area or facility with critical care capacity and testing performed there.

Specimens to be collected

At a minimum, the following respiratory material should be collected:

- upper respiratory specimens: nasopharyngeal and oropharyngeal swab or wash in ambulatory patients; and/or
- lower respiratory specimens: sputum (if produced) and/or endotracheal aspirate or bronchoalveolar lavage in patients with more severe respiratory disease who are too sick to self-isolate. (Note the high risk of aerosolization; adhere strictly to IPC procedures, including airborne precautions).

Specific infection prevention and control measures when collecting and handling laboratory specimens

All specimens collected for laboratory investigations should be regarded as potentially infectious. Health workers who collect, handle or transport any clinical specimens should adhere rigorously to the following standard precaution measures and biosafety practices, to minimize the possibility of exposure to pathogens (*9*):

- ensure that health workers who collect specimens use appropriate PPE (i.e. eye protection, a medical mask, a long-sleeved gown, gloves). If the specimen is collected with an aerosol-generating procedure, personnel should wear a particulate respirator that is at least as protective as a NIOSH-certified N95, an EU standard FFP2, or an equivalent;
- ensure that all personnel who transport specimens are trained in safe handling practices and spill-decontamination procedures;
- place specimens for transport in leakproof specimen bags (i.e. secondary containers) that have a separate sealable pocket for the specimen (i.e. a plastic biohazard specimen bag), with the patient's label on the specimen container (i.e. the primary container), and a clearly written laboratory request form;
- ensure that laboratories in health-care facilities adhere to appropriate biosafety practices and transport requirements, according to the type of organism being handled;
- deliver all specimens by hand whenever possible. DO NOT use pneumatic-tube systems to transport specimens; and
- document clearly each patient's full name, date of birth and suspected COVID-19 of potential concern on the laboratory request form. Notify the laboratory as soon as possible that the specimen is being transported.

Other laboratory tests

During the patient's stay in the facility, there will be other tests required for further diagnosis and follow-up. While the capacities for testing at each facility will be different, the general principles remain the same. Everything should be done to ensure the safety of the patient (by e.g. correct identification of each sample), health worker (by e.g. taking measures to avoid needlestick injury or cross-infection), other staff members (by safe transport of contaminated samples) and laboratory staff (e.g. correct packing of samples and safe work environment, efficient waste-collection mechanisms etc.). Point-of-care testing can be considered for some tests when resources and training are available.

Laboratory tests to be considered available in the facility (*10*) include, but are not limited to:

- blood cultures;
- malaria/dengue/chikungunya;
- other respiratory viruses;
- blood gases;
- haematology and biochemistry;
- liver and kidney function; and
- lactate.

6.6 Referral systems

As already explained, patients will be referred to and from the facility. A system needs to be organized for this, including the contact details of all relevant facilities and their capacities, transport methods, criteria for referral, documentation to be completed, etc. Receiving facilities should be contacted in advance, to ensure they have the capacity and resources to take care of the patient, and patients clearly need to consent to referral, which is always based on a medical decision.

6.7 Admission/discharge criteria

Admission

It is good practice to clearly define which patients can be admitted in each zone of the facility and which patients should be discharged. This can be done using clinical parameters, but the resources needed should also be considered. In countries where access or provision of a higher level of care is difficult, palliative care could be considered.

Discharge

Discharge of COVID-19 patients can be considered if a patient shows clinical improvement and two negative PCR results with a 24-hour interval between the samples. In the presence of two negative results, but with additional clinical requirements, the patient can be referred to a non-COVID hospital or health facility for the continuation of care. A discharge note should be handed over to the patient.

If laboratory tests are not readily available, discharge can be considered after resolution of symptoms and 14 days more of isolation (in a facility or at home). See WHO guidance (*11*).

Admission packages

It is advised to provide an admission package to each patient upon admission to the facility. Items to be included could be (but are not limited to) a blanket, clothing, slippers, a cup, soap, towel and toothbrush. All these items should be for personal use and, if possible, identified with the patient's unique identifier.

Bed capacity and allocation overview

The larger the facility is, the more complicated it is to keep an overview of which patient is admitted on which ward and who has responsibility during a certain shift. Assigning specific call-signs or mobile numbers to a specific caregiver responsible for a set of patients or a certain ward can be an option for keeping this overview.

A large board with all the wards and beds listed can allow recording of the unique identifier of each patient in a specific bed, which then ensures an overview is kept of each patient's location. Regular checking to see if this is still correct is essential.

This method also allows a fast overview of bed-occupancy and empty beds if there is a request for referral or a new admission presenting at the triage area.

6.8 Suspected cases' area

Patients are admitted in the suspected cases' area until the laboratory result is known. This area should be staffed with sufficient staff numbers, as patients may also be quite sick here. Oxygen provision and initial medical care may need to be initiated here. Equipment needs to be at hand to provide qualitative and dignified care, as well as to intervene in emergencies. Four beds (for example) in a suspected cases' area of 20 beds could be equipped and staffed for ICU-level care for those patients requiring critical care who have no confirmed laboratory result.

Patient education

It is important to explain to the patient how long the average waiting time for the test result is in the specific setting, as this might take significant amounts of time.

Patients should be educated about the importance of their isolation. Breaches in isolation should be well documented and followed up, as this can mean close contact between one suspected patient and another.

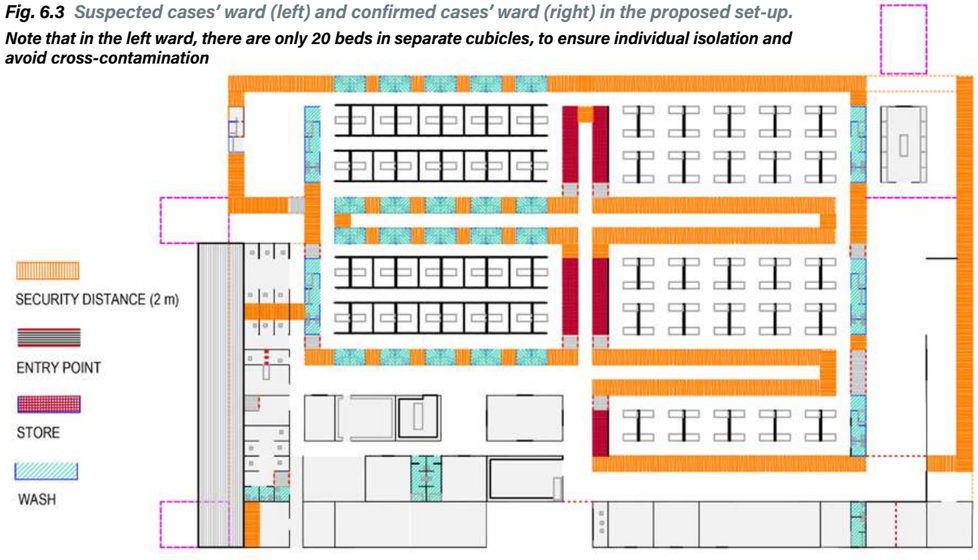
Patients should also receive guidance on hand hygiene and respiratory hygiene (covering the mouth and nose when coughing or sneezing, using paper towel or an elbow and use of a mask whenever they need to or are instructed to leave their room).

Specific infection prevention and control measures in the suspected cases' area

Until their laboratory result is known, patients should be treated in individual isolation to avoid cross-contamination (*see Fig. 6.3*). This means staff will have to don and doff PPE and ensure hand hygiene between every patient in the suspected cases' area. The safest and easiest way to guarantee this is by using individual rooms or cubicles with individual donning and doffing areas, but at a minimum there should be sufficient distance between patient cubicles, in line with WHO IPC recommendations (*9, 12*). With regard to the safe access to toilet facilities on the suspected cases' ward, two potential approaches could be taken, either having dedicated cleaning staff who will disinfect the bathroom after each use (high demand for staff and PPE), or providing individual commode toilets in separated cabins for each patient (*see below*).

All patients in this area should already be wearing a surgical mask when moving out of their individual room, as long as it is tolerated, and if no oxygen therapy is required.

***Fig. 6.3** Suspected cases' ward (left) and confirmed cases' ward (right) in the proposed set-up.*
Note that in the left ward, there are only 20 beds in separate cubicles, to ensure individual isolation and avoid cross-contamination



WaSH: water, sanitation and hygiene.

6.9 Step-down ward

Admission

A COVID-19 step-down ward provides a dedicated inpatient area, where patients recovering from COVID-19 who are not ready for or able to be discharged will be cared for, for an interim period. Step-down wards have a different staffing composition to acute medical wards; they have a rehabilitative focus and aim to help patients address the physical, respiratory, cognitive, swallowing and psychological impairments that may be experienced following severe COVID-19 (*see Fig. 6.4*). It is important to note that in this context, "step down" refers to a facility for post-acute, rehabilitation-focused care, not acute step down from critical care/mechanical ventilation. Step-down wards are not intended for acutely unwell patients or for patients who are immediately post critical care (i.e. this is not a high-dependency unit), nor are they an alternative to palliative care/patients who are not for escalation.

Fig. 6.4 *Rehabilitation in a community facility: overview of input*

Acute wards	ICU	Step down
» Mobilization and supportive respiratory techniques » Assessment: rehabilitation needs and discharge readiness » Discharge facilitation	» Optimization oxygenation » Secretion management » Mobilization	» Comprehensive rehab • Mobility • Respiration • ADL • Cognition • Swallowing/speech • Psychosocial » Discharge planning

ADL: activities of daily living; **ICU**: intensive care unit.

The objectives of the step down ward are to:

- prepare patients for discharge through nursing care, rehabilitation and discharge planning; and
- relieve medical wards of patients who do not have acute medical needs.

6.10 Training

Staff recruited to work in the facility should receive training on several topics. Since this is a long list and the numbers of available workforce are low, the advice is to start recruiting as early as possible, even before building the facility, and to start training staff as soon as possible. Examples of training to be provided include, but are not limited to:

- IPC – standard precautions, use of PPE in the context of COVID-19 (donning and doffing);
- staff behaviour in an outbreak setting: hand hygiene, respiratory hygiene;
- COVID-19 (disease symptoms, diagnosis, treatment, admission criteria, discharge criteria, etc.);
- screening and triage;
- early recognition and initial approach to the management of the acutely ill patient;
- staff, supplies and equipment and patient flow (low risk, high risk, suspected, confirmed cases);
- emergency interventions (resuscitation, alerting emergency team, etc.);
- self-care (monitoring own health, what to do if I get sick, my rights and duties, etc.);
- psychological first aid (or equivalent);
- use of equipment (oxygen concentrator, monitoring equipment, saturation, continuous positive airway pressure], etc.)
- documentation; and
- triage.

6.11 Staff health monitoring

Staff working in the facility are the most valuable resource. It is extremely important to monitor their health and to intervene as early as possible (*13*). Addressing staff health issues helps the individual health worker and prevents spread of disease in the health-care community and thus major outbreak among health workforces.

It is advised to measure the temperature of every staff member on entering and leaving the workplace, as well as monitoring for respiratory and other symptoms. Every staff member should wear a mask from the time they enter the facility, to reduce the risk of virus transmission between staff. Staff should be motivated on a regular basis to report if they notice symptoms for themselves or colleagues. Health workers should have free access to testing and health care (general health care as well as COVID-19-related care), including insurance and continued payment during sick leave, to promote seeking advice early when they feel unwell. Interventions should be put in place to prevent stigmatization of health workers who are working in the response in the communities, as well as for those becoming sick among their colleagues.

Absences from work should be monitored and followed up, to make sure that staff not showing up for their shift are not hiding away while being sick.

The need for psychosocial support should be assessed and group sessions organized on a regular basis. Case-by-case need for individual support should be assessed and offered when needed. Measures for accidental exposure should be in place.

6.12 Psychosocial support

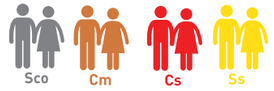
Being sick and being isolated is a huge burden on the psychological well-being of a patient. The uncertainty of a new and unknown disease is a stress factor. The fact that there is no contact possible with loved ones, as visitors are not allowed, makes it even harder to bear. The first action to undertake is to inform the patient repeatedly about the evolution of their disease and the prognosis. Patients should have access to their mobile phones, so they can maintain contact. The proposed electric plan provides electric plugs at each bed for charging purposes. If possible, wireless internet could be provided as well.

For patients who are not severely sick, entertainment can be planned for. Psychosocial support staff can also be included in the staffing schedule (see earlier). Examples can be movie evenings, information sessions, play sessions with children, etc. IPC measures need to be kept in mind strictly for patients with suspected COVID-19, so the risk of cross-infection is avoided. A lot of these activities can be organized even without entering the high-risk zone. The proposed plans have a patient relaxation area where mobile patients with confirmed COVID-19 can relax or activities can be organized.

7. Clinical modules

The following summary tables are structured in line with the main patient typologies described throughout this document. They provide details regarding the main characteristics and special considerations of each ward, and following the main “4S” approach (staff, supplies and equipment, structure, systems).

COVID-19: Screening and triage



Descriptor

Provides a dedicated area for safe initial screening and triage of the patients with symptoms of COVID-19.

Key characteristics

All health facilities, no matter the configuration, should introduce a screening and triage station at the entrance of the facility. The screening point will be the entrance point and identify those patients that fulfil the case definition of COVID-19. The triage will be the area where, according to the triage system chosen at the facility level, the acuity level of the patient will be defined. The area will have a reception area waiting room with independent cabins, and a sample area to collect testing.

Special considerations

- The screening and triage areas should consider adequately the flow between the different spaces to avoid crossing pathways.
- Screening and triage should be available 24/7 and staffed according to the needs, avoiding excessive waiting times and crowding.
- Patients wash hands at the entrance and every patient fitting the case definition should be provided a mask.
- Visitors should not be allowed to accompany the patient into the facility.
- Staff should wear a mask at all times and appropriate PPE when physically interacting with patients.
- Patients should be identified by bracelet and assigned a unique identifier. All patients, samples and documents should be identified by full name and the unique identifier.
- The triage area and facilities should be cleaned and disinfected after each patient use.

For description of patient types, see Fig. 1.1 *(see page 10)*

STAFF	
AVERAGE STAFF NUMBER: » 17 FTE nurses (4 nurses per shift) for the screening and triage management; additional staff and profiles can be added as required (e.g. medical doctors) or staffing numbers can be expanded to overcome the busier periods » Rapid response team can be called in for critical patients » Security guards » Cleaners and helpers as required **INDICATIVE ROLES:** » **Screening:** identify those patients fitting the case definition	» **Triage:** assign the acuity level to each patient according to the chosen triage system » **Sampling:** take a laboratory sample for testing for COVID-19 » **Cleaning:** clean and disinfect a specific area after use by each individual patient **STAFF SKILLS AND COMPETENCIES:** » The staff at the screening area should be trained and updated regularly on eventual changes of the case definitions » The triage personnel should have specific training in application of a standardized, validated triage tool
SUPPLIES AND EQUIPMENT	
EMERGENCY EQUIPMENT: » Stretchers » Set of emergency equipment **LABORATORY SAMPLING EQUIPMENT:** » Equipment for taking samples in a safe way	**PPE:** » Masks for staff and patients » Gloves » Eye protection » Gown » Hand-hygiene stations » Full PPE for physical interaction with patients
STRUCTURE	
FACILITIES: » Reception area, with patients' /companions' orientations » A screening place » 6 waiting room cabins (2 m × 2 m) » Triage place » A testing area » An admissions area	**SPACE NEEDED:** » Variable, but usually 240 m^2 and additional 240 m^2 with an additional waiting area **DESIGN CONSIDERATIONS:** » One-way flow
SYSTEMS	
PATIENT DOCUMENTATION: » Patient record and unique identifiers (bracelets) **OXYGEN SYSTEM:** » Set of emergency equipment **AIRFLOW VENTILATION SYSTEM:** » Natural ventilation » 60 L/s/patient **WATER:** » Water supply at lavatories » Handwashing facilities at entrance of the facility **WASTE MANAGEMENT:** » All waste bins considered as potentially infectious waste	**SANITATION:** » 2 accessible bathrooms (male and female) for the use of the patients **HYGIENE AND ENVIRONMENTAL CLEANING:** » Intensive regular cleaning of waiting areas » Dedicated cleaners for toilets after each use **ELECTRICITY AND LIGHTING:** » Power requirements will vary, depending on the electromedical devices, computers and printers connected » All areas should be well lit

FTE: full-time equivalent; **PPE:** personal protective equipment.

COVID-19: Isolation of contacts and mild suspected cases WARD 20 beds

Sco
Ss

Descriptor

Provides individually isolated accommodation and basic services for people who have been in contact with confirmed patients in those settings where home isolation is not possible, or for mildly sick patients with suspected COVID-19.

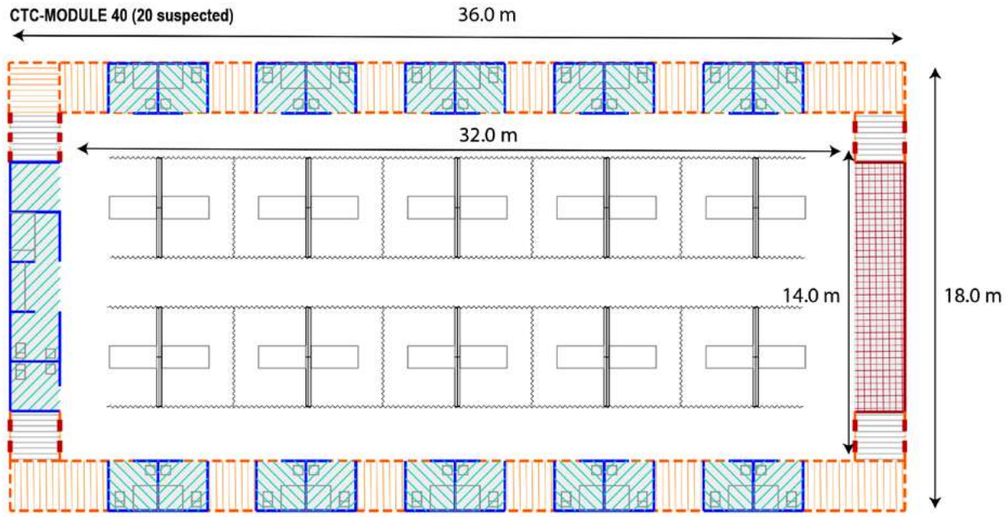
Key characteristics

In certain environments, it might be difficult for contacts or mildly sick patients at home. This might, for example, be the case in settings where larger families are living together in small, one-room houses or in very remote areas. The facility will then provide possibilities for individual isolation, where basic services such as hygiene, food and basic health care are foreseen. This means that these residents will have individual cubicles with individual sanitary facilities and showers. Staffing levels will be lower, since these patients are expected to be relatively healthy and able to take care of themselves. A permanent presence of a medical doctor and a nurse should be considered, to ensure follow-up of the health of the current residents, emergency situations and care for chronic conditions.

Special considerations

- There should be individual cubicles with individual sanitary installations.
- Residents leaving the cubicle should be wearing a mask and handwashing facilities should be widely available and their use promoted.
- Patients should be well-informed and educated about COVID-19, and the measures they need to keep in place to prevent cross-contamination.
- Staff should use new PPE for every patient contact; there is no cohorted care in these areas.
- Equipment used should be properly cleaned between each patient.
- Permanent presence of health staff should be provided. The rapid response team can be used to staff a health post to follow up on development of symptoms, serve in emergencies or ensure treatment for chronic conditions.
- Food, water and psychosocial support should be provided.
- Patients should be offered the possibility to have contact with relatives, for example, by use of their mobile phone.
- In a 20-bed ward for suspected cases, it is advised to allocate, for example, four beds for care for those patients that require high-level care but do not yet have a laboratory-confirmed result.

For description of patient types, see Fig. 1.1 *(see page 10)*



FTE: full-time equivalent; HEPA: high-efficiency particulate air; ICU: intensive care unit; WaSH: water, sanitation and hygiene; IPC: infection prevention and control; IV: intravenous; PPE: personal protective equipment.

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- Health care can be provided from a health post that is staffed by members of the rapid response team
- 1 ICU nurse in every shift for every 2 ICU beds if implemented

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the cleaners/helpers
- **Cleaners and helpers**: keep the ward clean and serve food and other services
- **Rapid response team:** provide a health post

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Rapid response team skilled in basic health care and emergency care

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed
- All required ICU equipment for ICU beds if implemented

PPE:

- Masks for staff and patients
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations
- Sufficient numbers of PPE needed since these patients are isolated individually

PATIENT OBSERVATION:

- Thermometer to be provided to each individual patient for self-monitoring and/or to the health post responsible for follow-up on all the patients
- Full set of vital sign monitoring equipment at the health post, to be cleaned properly between each use

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for chronic conditions
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:

- Ward with individual cubicles and private sanitation and showers

BED CAPACITY:

- 20 beds, of which, for example, 4 are ICU beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual cubicles with three potential configurations
- See Web Annex 3 for detailed Information

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:

- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:

- Natural ventilation
- 60 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each toilet cubicle

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available for each bed

SANITATION:

- 20 accessible bathrooms (male and female) for the individual use of the patients, or 2 gender-separated bathrooms with dedicated cleaners who will clean and disinfect after each use

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward
- Intensive terminal cleaning of bed and toilet
- Dedicated cleaners for toilets after each use

ELECTRICITY AND LIGHTING:

- Wall sockets for all cubicles
- Hallways, toilets and showers should be well lit

COVID-19: Mild and moderate confirmed cases WARD 40 beds

Cm

Descriptor

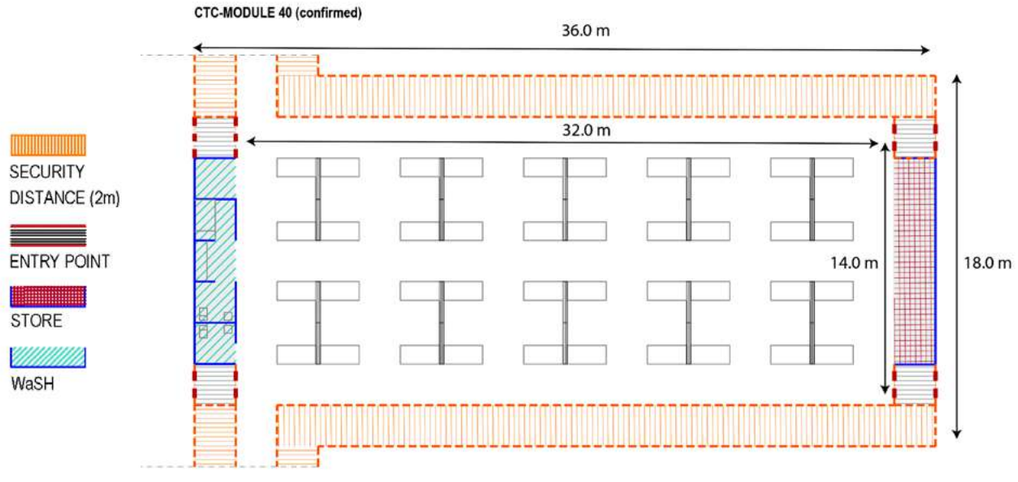
Provides cohorted care for patients who are mildly or moderately sick and have received a positive laboratory result.

Key characteristics

These wards provide care in cohorts for 40 patients. There is no need for isolation at the individual level, since all these patients have confirmed COVID-19. Therefore, sanitary facilities can also be shared. Since these patients are not very dependent on medical care, staffing requirements are medium.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- Mild and moderately sick patients will require some nursing care, for example, for distribution of medication, oxygen therapy and patient observations.
- Oxygen therapy could be initiated for moderately sick patients and then should be guided by oxygen saturation.
- The medical doctor of the rapid response team can provide medical supervision for these patients.



For description of patient types, see Fig. 1.1 (*see page 10*) **WaSH:** water, sanitation and hygiene.

STAFF

AVERAGE STAFF NUMBER:
- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 8.5 FTE nurses and 8.5 FTE nurse assistants (2 each per shift)
- Medical supervision can be provided from a health post that is staffed by member of the rapid response team

INDICATIVE ROLES:
- **Head nurse:** organize the ward, e.g. discharges and admissions, referrals; supervise the cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **Rapid response team:** provide medical supervision

STAFF SKILLS AND COMPETENCIES:
- Good knowledge of IPC and cleaning practices
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:
- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed

PPE:
- Mask
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations

PATIENT OBSERVATION:
- Sufficient sets of monitoring equipment (blood pressure cuffs, clock/watch with second hand, oxygen saturation monitors)

ADMINISTRATIVE EQUIPMENT AND FURNITURE:
- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:
- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:
- Ward with shared toilets and showers
- Access to a relaxation area/rest area could be provided (e.g. movie shown or games to play)
- Crash room at triage
- Sterilization area
- Morgue

BED CAPACITY:
- 40 beds

SPACE NEEDED:
- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:
- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:
- Patient record

REFERRAL SYSTEM:
- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:
- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:
- Natural ventilation
- 60 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:
- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:
- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:
- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:
- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:
- Wall sockets for all bed panels
- If X-rays are portable, there should be dedicated power outlets for them
- Hallways, toilets and showers should be well lit

COVID-19: Severe confirmed cases WARD 40 beds

Cs

Descriptor

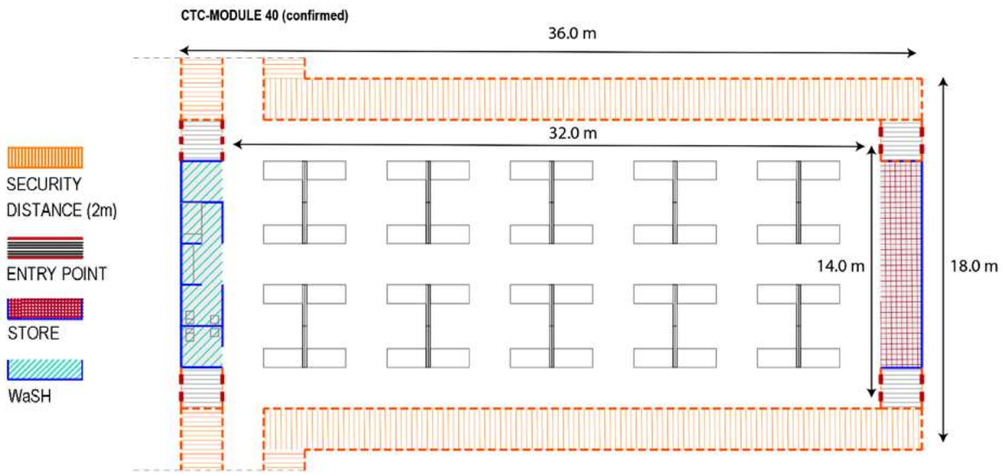
Provides cohorted care for patients who are severely sick and have received a positive laboratory result.

Key characteristics

These wards provide care in cohorts for 40 patients. There is no need for isolation at the individual level, since all these patients have confirmed COVID-19. Therefore, sanitary facilities can also be shared. Since these patients are severely sick, higher medical staffing levels are required.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- Severely sick patients will have high demands in nursing and medical care.
- Oxygen therapy is likely to be required for all patients and then should be guided by oxygen saturation.
- In a facility that has no dedicated ICU, it is advised to allocate, for example, four beds for care for those patients who require critical care.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 21 FTE nurses (1 for every 8 patients in every shift) and 17 FTE nurse assistants (1 each for every 8 patients per shift during the day, 2 per ward during the night)
- 1 ICU nurse in every shift for every 2 ICU beds if implemented
- 8.5 FTE respiratory physiotherapists (or national equivalent)
- 1.5 FTE occupational therapists (or national equivalent)

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the nurses, nurse assistants and cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **Ward doctor:** ensure medical supervision of the patients
- **Rapid response team:** provide emergency care in case of deteriorating patient
- **Physiotherapist** (or national equivalent)**:** perform respiratory interventions and mobilization
- **Occupational therapist** (or national equivalent)**:** perform cognitive and functional assessment

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care
- Rehabilitation professionals skilled in general medical and pulmonary rehabilitation (for physiotherapists and occupational therapists

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available on the ward (ambu-bag)
- Specialized emergency equipment provided by the rapid response team in case needed
- All required ICU equipment for ICU beds if implemented

PPE:

- Mask
- Eye protection
- Hand-hygiene stations
- Gloves
- Gown

PATIENT OBSERVATION:

- Sufficient sets of monitoring equipment (blood pressure cuffs, clock/watch with second hand, oxygen saturation monitors)

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Chair and bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision
- Medication and consumables for emergency care: full set of emergency equipment available for the rapid response team (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, medication)

STRUCTURE

FACILITIES:

- Ward with shared toilets and showers
- Sterilization area
- Morgue

BED CAPACITY:

- 40 beds, of which, for example, 4 ICU are beds if there is no dedicated ICU in the facility

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of symptomatic contacts for testing and for suspected patients receiving positive test results
- A referral system should also be available for patients whose medical condition deteriorates

OXYGEN SYSTEM:

- Oxygen only needed at the health post and in the emergency equipment

AIRFLOW VENTILATION SYSTEM:

- Natural/hybrid mechanical ventilation
- 160 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:

- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:

- Wall sockets for all bed panels
- If X-rays are portable, there should be dedicated power outlets for them
- Hallways, toilets and showers should be well lit

COVID-19: Critical confirmed cases WARD 40 beds

Cc

Descriptor

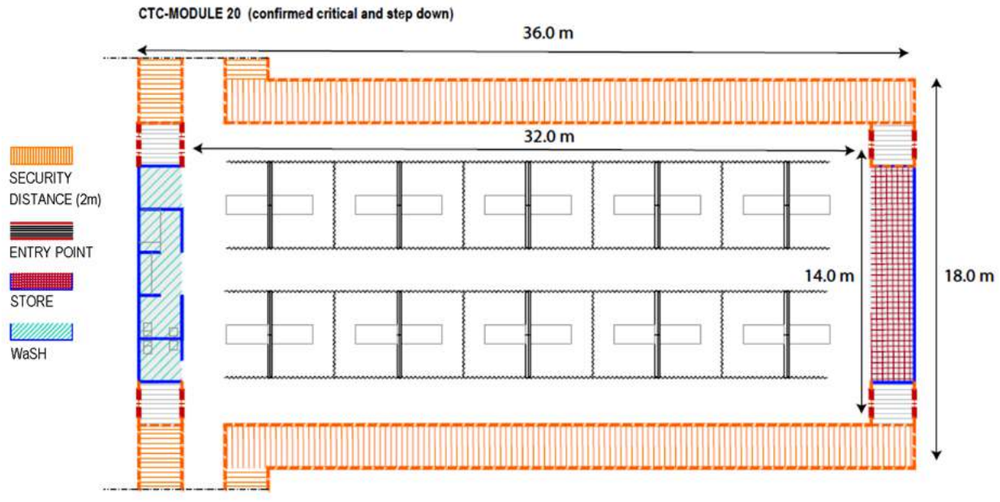
Provides a dedicated ICU area where treatment of critical cases can be provided.

Key characteristics

Critical cases are admitted in a ward area with preferably fewer beds to ensure enough working space around each bed. These patients will require artificial ventilation and invasive monitoring and, therefore, staffing level requirements (in both numbers and qualifications) will be very high.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- There are very high requirements in specialized staff.
- Requirements in sanitation will be lower, as these patients are bed-bound.
- There will be high needs in specialized equipment, medicines and consumables.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- 1 head nurse and sufficient helpers/cleaners/IPC/WASH officers (e.g. 8.5 FTE)
- 42 FTE nurses (1 for every 2 patients in every shift) and 8.5 FTE nurse assistants (2 per shift)
- 8.5 FTE ICU doctors (2 per shift)
- 8.5 FTE respiratory physiotherapists (or national equivalents)
- 1 FTE speech and language therapist (or national equivalent)

INDICATIVE ROLES:

- **Head nurse:** organize the ward, for example, discharges and admissions, referrals; supervise the nurses, nurse assistants and cleaners/helpers
- **Cleaners and helpers:** keep the ward clean
- **Nurses:** distribute medicines, provide oxygen, assure adequate observations of the patients
- **Nurse assistants:** serve food and other services
- **ICU doctor:** ensure medical supervision of the patients
- **Rapid response team:** provide emergency care in case of a deteriorating patient
- **Physiotherapist:** perform specialist respiratory interventions and early mobilization
- **Speech and language therapist:** perform swallowing assessment and interventions (conducted once patients have de-escalated to other wards)

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices
- Nurses and doctors skilled in intensive care observation and management
- Rapid response team skilled in basic health care and emergency care
- **Physiotherapist:** skills in specialist respiratory interventions
- **Speech and language therapy:** skills in post-ICU assessment and intervention

SUPPLIES AND EQUIPMENT

EMERGENCY EQUIPMENT:

- Basic resuscitation equipment available at each bed (ambu-bag).
- Specialized emergency equipment available at key places in the ward (multiple sets)

PPE:

- Mask (N95 if aerosol-generating procedures are performed)
- Gloves
- Eye protection
- Gown
- Hand-hygiene stations

PATIENT OBSERVATION:

- Intensive care continuous monitoring equipment

ADMINISTRATIVE EQUIPMENT AND FURNITURE:

- Bed for each patient
- All equipment and furniture to be easy to clean
- Patient records, stationery and furniture for staff to work efficiently

MEDICATION AND CONSUMABLES:

- Medication and consumables to ensure care for acute and chronic conditions
- Equipment for oxygen provision, including ventilators
- Suction unit at each bed
- Multiple sets of medication and consumables for emergency care: full set of emergency equipment available at key places in the ward (defibrillator, suction unit, IV access, intubation and bag-valve ventilation, emergency medications)
- Continuous infusion pumps for medications

STRUCTURE

FACILITIES:

- Ward with sufficient space around each bed
- Crash room at triage
- Sterilization area
- Morgue

BED CAPACITY:

- 20 beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
  - Supplementary modules of 648 m^2 external dimensions
  - See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens

SYSTEMS

PATIENT DOCUMENTATION:

- Patient record

REFERRAL SYSTEM:

- Good and rapid access for referral of recovering patients who can move back to a ward for severe patients or step-down area

OXYGEN SYSTEM:

- Oxygen and ventilator available for every bed

AIRFLOW VENTILATION SYSTEM:

- Natural/hybrid mechanical ventilation
- 160 L/s/patient
- Supported by portable ventilation HEPA filter systems

WATER:

- Water supply at lavatories
- Handwashing facilities at each shared toilet

WASTE MANAGEMENT:

- All waste bins considered as potentially infectious waste
- Bin available bins for each bed

SANITATION:

- 2 accessible gender-separated bathrooms (toilet and shower) for use by the patients

HYGIENE AND ENVIRONMENTAL CLEANING:

- Intensive regular cleaning on ward and toilets
- Intensive terminal cleaning of bed

ELECTRICITY AND LIGHTING:

- Several wall sockets for all cubicles
- Hallways, toilets and showers should be well lit

COVID-19: Step down cases WARD 20 beds

Sd

Descriptor

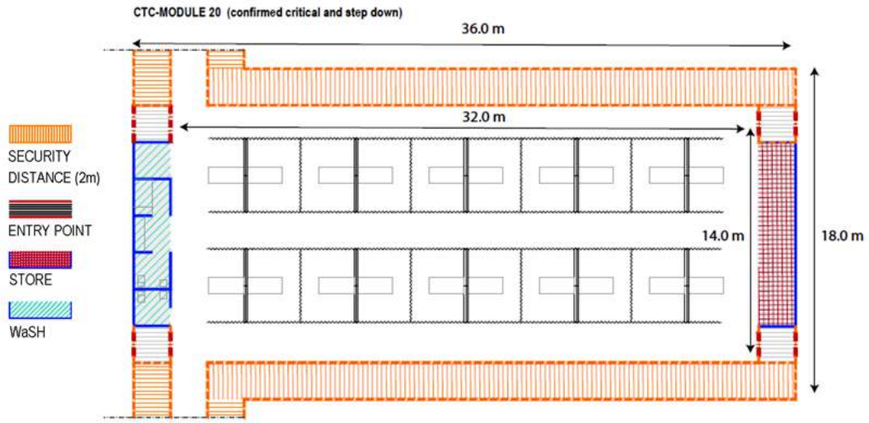
Provides a dedicated inpatient area where patients recovering from severe COVID-19, who are not ready for or able to be discharged, will receive rehabilitation and nursing support for an interim period.

Key characteristics

In centres where severe and ICU cases are being managed, it is essential to consider a dedicated inpatient area where recovering severe cases will be cared for for an interim period. This may be known as a "step down area". Recovering severe cases are likely to present with ongoing challenges that will delay safe discharge, including post-intensive care syndrome, and may require some ongoing respiratory support, but they will also require lower medical and nursing staffing ratios than severe cases. It is common for patients with severe COVID-19, especially those who have been mechanically ventilated, to experience substantial weakness and functional decline. When this is the case, some patients may require a period of inpatient recovery in a step-down ward before being discharged home. These wards provide care in cohorts of 20 patients (10 per gender), with a dedicated space left open for rehabilitation activities. These wards are designed for COVID-19-positive patients; therefore, there is no need for isolation at the individual level and sanitation facilities can be shared. These patients are no longer severely sick, so lower medical staffing levels are required, while rehabilitation staffing levels are higher. Permanent nursing presence in the ward is still required.

Special considerations

- Staff should wear PPE at all times when working in the ward.
- There will be lower needs in medicines and consumables, although it should be expected that patients are likely to require dressings for pressure areas.
- Permanent presence of health staff should be provided.
- Most patients will require some nursing care, for example, for distribution of medication, mobility assistance and patient observations.
- The medical doctor of the mild-moderate ward can provide medical care to these patients.
- Equipment used should be properly cleaned between each patient.
- Patients should be encouraged to have contact with relatives, for example, by use of their mobile phone.
- Separate step-down areas for (recovering) COVID-negative patients should be considered.



WaSH: water, sanitation and hygiene. For description of patient types, see Fig. 1.1 (*see page 10*)

STAFF

AVERAGE STAFF NUMBER:

- Medical, nursing and support staffing based on mild/moderate ward cover
- 10 FTE rehabilitation professionals with the suggested composition of (where locally applicable): 3 FTE physiotherapists (2 per shift); 3 FTE occupational therapists (2 per shift); 1 FTE speech and language therapist; and 1 FTE psychologist

NOTE: rehabilitation professionals are not required to work overnight in step down.

INDICATIVE ROLES:

- **Physiotherapist** (or national equivalent)**:** functional rehabilitation, graded exercise, basic respiratory interventions, and balance training
- **Occupational therapist** (or national equivalent)**:** cognitive assessment and intervention, occupational based exercise, activity of daily living retraining, discharge planning
- **Speech and language therapist** (or national equivalent)**:** swallowing assessment and intervention, speech assessment and retraining
- **Psychologist** (or national equivalent)**:** counselling and other psychological techniques

STAFF SKILLS AND COMPETENCIES:

- Good knowledge of IPC and cleaning practices; psychological first aid
- Nurses skilled in patient observation and oxygen therapy
- Rapid response team skilled in basic health care and emergency care in post-ICU
- Swallowing assessment and rehabilitation (for speech and language therapists); Trauma counselling (for psychologists)

SUPPLIES AND EQUIPMENT

PPE:

- Adequate PPE for staff

REHABILITATION-SPECIFIC EQUIPMENT:

- 4× tables and 10 basic chairs for table-based activities and meals
- 4× inpatient wheelchairs
- 4× pulpit/gutter frames
- 8× four-wheel walkers/walking frames
- Elastic exercise bands of varying resistance, or 4 sets of free weights (or locally manufactured equivalent) for basic strengthening
- Over toilet-frame (1 per toilet) and/or 2 portable commodes
- Shower chair with back and armrests (1 per shower)
- Equipment for basic food preparation/assembly (not for cooking)
- Table-based games, for example, cards, board games, puzzles
- Access to supportive discharge equipment (a small number of walking frames and wheelchairs) is desirable

STRUCTURE

FACILITIES:

- Ward area with shared toilets and showers
- Small rehabilitation/relaxation space

BED CAPACITY:

- 20 beds

SPACE NEEDED:

- 448 m^2 internal dimensions, considering safety distances
- Supplementary modules of 648 m^2 external dimensions
- See detailed bill of quantities in Web Annex 4 and Excel bill of quantities tools

DESIGN CONSIDERATIONS:

- Individual beds separated by panels and safety distance in a cohorted area, with privacy screens
- Divide the bed portion of the ward in two for single-gender use (10 beds each side)

SYSTEMS

REFERRAL SYSTEM:

- Good and rapid access for referral of patients from mild-severe wards (patients should not be referred directly from ICU/critical care)
- Ensure clear referral criteria are established

CONSIDER THE FOLLOWING FOR EACH PATIENT:

- Has significantly reduced function from baseline and is not suitable for discharge (considering support available at home)
- Is medically stable
- Is able to actively participate in rehabilitation
- Has established referral links with local outpatient and community-based rehabilitation services for follow-up

All the other items listed in previous tables are also required: Oxygen system, Airflow ventilation system, Water, Waste management, Sanitation, Hygiene and environmental cleaning, Electricity and lighting,

FTE: full-time equivalent; **HEPA:** high-efficiency particulate air; **ICU:** intensive care unit; **IPC:** infection prevention and control; **IV:** intravenous; **PPE:** personal protective equipment.

8

8. Operational support

8.1 Communication

Patient to relatives

As discussed in Section 4.11, patients in a COVID-19 ward should have access to a mobile phone and/or internet to stay in contact with their relatives. If this is not possible, or the patient is too sick to contact relatives, contact details of a central contact point should be given to relatives or vice versa, so the medical doctor or other staff member can keep contact with relatives of the patients.

Patient to staff

If the patient needs support from a nurse, there should be a system to call for assistance. This can be a sophisticated bedside call system or a simple bell.

Staff internal

Different systems are possible for staff to keep contact with each other in the facility. While staff members should not be allowed to take their mobile phones inside the potentially contaminated zones, specific mobile phones could be provided for use in these zones (and stay in there). Other options are the use of VHF radio or other radio communication systems or landlines. This is highly recommended during the construction phase.

Rapid response team

A priority communication line should be available to alert the rapid response team in case a patient deteriorates and specialized assistance is needed. For this option too, radio or mobile phone could be an option.

Communication with other health-care facilities

It is advised to have a rapid system for referring patients to other facilities or to accept referrals from other facilities. The mobile phone is the best option for this, but the number needs to be assigned to the right person and handed over at shift change. This person should have an overview on the availability of resources (beds, staff, specialized equipment) for the specific patient.

8.2 Decentralized stocks and restocking

In a large facility, experience has shown that it is extremely useful to establish standard lists of consumables and medications that should be available in the wards. Every ward serving the same category of patients should use the same list.

Once a standard list (with the name of each item and required minimum and maximum stock) is established, this can be used to stock the decentralized stores in each ward to the maximum level on opening the ward. Later the list can be used as an order list to restock the wards, for example, twice per week, once the minimum stock has been reached for a specific item. The minimum stock should always be sufficient to last until the next restocking moment.

The pharmacy and warehouse can use these ordering lists to deliver the items to each ward. Attention must be given to the fact that an item that has been handed out to a specific ward can never move to a "cleaner" zone any more (e.g. not from the confirmed patients' area to the suspected patients' area, or not back outside of the patient zones from any non-patient area).

8.3 Food distribution

To avoid big logistical challenges and risks for cross-infection, the best way to provide food will probably be to use reusable plates and cutlery; in the case of disposable plates and cutlery, it is important to be aware of the high volume of daily waste to be dealt with. Systems for distribution of food and drinking water and collection of leftovers and waste need to be well in place, respecting the one-way flow (from the clean/safe side to the more contaminated zones). Meals for patients could be introduced in to the high-risk area by the side walls of the central corridors, via a specific wall closet fitted with compartments for safe transfer.

8.4 Oxygen system

Oxygen in the temporary facility could be supplied in four different ways: oxygen cylinders, oxygen concentrators, an oxygen generator supply system, or liquid oxygen tanks connected to an oxygen supply system. See WHO guidance on *Oxygen sources and distribution for COVID-19 treatment centres* (*1*) for more details on oxygen supply and distribution. For a correct calculation, regardless of the chosen system, the high oxygen consumption of a COVID-19 patient must be taken into consideration. It is also necessary to provide oxygen supply for the treatment area for suspected cases.

- **Oxygen cylinders:** these are suitable for short-term missions and a relatively small hospital (limited number of beds).
  - *Advantages:* easy to deploy, personal cylinder per bed/operating room
  - *Disadvantages:* logistics are more complicated, difficult to take on aircraft, requires refilling, and puts great emphasis on safety in storage and use
- **Oxygen concentrators:** these are suitable for a small-medium size hospital.
  - *Advantages:* easy to deploy, one oxygen concentrator per bed/per 2 beds, some models could be connected to an accessory device to the oxygen concentrator that enables refilling of custom portable oxygen cylinders
  - *Disadvantages:* difficult market availability for large numbers, requires continuous power supply

» **Oxygen plant connected to an oxygen supply system:** suitable for long-term facilities, and for a medium-large size hospital.
- *Advantages:* gives logistical independence, does not require refilling
- *Disadvantages:* heavy, demanding special layout. High demand for electricity supply is a critical element for a pressure swing adsorption (PSA) oxygen plant. Deployment takes time and requires trained personnel for repair, operation and supervision 24/7. Can be damaged and therefore requires the backing of oxygen cylinders

» **Liquid oxygen tanks connected to an oxygen supply system:** suitable for long-term facilities, and for a medium-large size hospital
- *Advantages:* gives logistical independence, could be set up in more semi-permanent structures
- *Disadvantages:* needs refilling or replacement of the tank (if the oxygen tank is set up in a truck). Deployment takes time and requires trained personnel for repair, operation and supervision 24/7. Liquid oxygen needs to be converted into gas through vaporization, adding complexity to the process Can be damaged and therefore requires the backing of oxygen cylinders

The selected option depends on the country's own resources and skills. In this document, oxygen concentrators are proposed as the first-phase option while a more suitable system is set up (*2*).

All areas where patients with severe acute respiratory infection are cared for should be equipped with pulse oximeters, functioning oxygen systems and disposable, single-use, oxygen-delivering interfaces (nasal cannula, nasal prongs, simple face mask and mask with reservoir bag).

8.5 Airflow ventilation system

To help prevent airborne and droplet infections in health-care facilities, adequate ventilation in necessary in all patient-care areas (*3*). The design and set up of a COVID-19 facility in community settings must take fluctuations in ventilation rate and predominant wind direction into account. When natural ventilation alone cannot satisfy the recommended ventilation requirements, alternative ventilation systems should be considered. Hybrid (mixed-mode) natural ventilation, for example, should be used, or if that is not enough, mechanical ventilation.

Noting that in low-resource settings with the use of contingency facilities (e.g. outdoor isolation tents open to the wind), when the prevailing wind direction and average velocity may be used, the design of natural ventilation for infection control should consider the worst-case situation – that is, when the wind is absent, and where supplementary mechanical ventilation may be needed. It is also important to consider that large openings in natural ventilation without any protection increase the risk of security breaches and the spread of vector-borne diseases. Purpose-designed barred windows and semi-transparent mosquito meshes can be used in these situations. If the COVID-19 community facility will surge to care for ICU patients, then adequate ventilation must be put into place. See the recently released manual from the Severe Acute Respiratory Infections Treatment Centre for more information (*2*).

8.6 Water

Water supply – **quality**

The most likely scenario is that the facility will have access to existing water supply systems that will be functional; however, residual chlorine testing should be performed regularly and corrective measures taken if needed. If there is no water supply system, conventional, centralized water-treatment methods that utilize filtration and disinfection via chlorination should be used to inactivate COVID-19.

Systematic disinfection should be ensured by proper chlorination of all water supplied, with monitoring. For more information, see the WHO publication, *Essential environmental health standards in health care* (*4*). For effective centralized disinfection, there should be a residual concentration of free chlorine of ≥0.5 mg/L after at least 30 min contact time at pH < 8.0. A chlorine residual should be maintained throughout the distribution system.

Factors for proper monitoring of water quality include turbidity, free residual chlorine (FRC) concentration and pH. For more detailed information, see *The Sphere handbook: humanitarian charter and minimum standards in humanitarian response* (*5*).

Any COVID-19 treatment centre in a temporary facility should be able to test and monitor the quality and safety of their treated water, and this includes an ability to analyse the raw water in order to optimize water treatment; if turbidity is higher than 5 NTU (nephelometric turbidity units), it is important to change the source or pre-treat. In case of doubt and/or if possible, rapid tests should be used and/or laboratory analysis performed for chemical compounds (*6*). If changes appear after preparation of chlorine solutions (colour, smell, etc.), analysis should be carried out.

Water supply – **quantity**

Effective functioning of a health-care facility, and the ability to prevent the spread of infections, relies on a sufficient and reliable supply of water through estimations of minimum and peak demand. This should include supply for all staff, patients, procedures and potential visitors and should include other water demands, for example, water for pour/flush latrines, water for sterilizers, water for cleaning facilities and water for producing disinfecting solutions. Large quantities of water are required for cleaning/decontamination procedures, laundry, drinking and personal hygiene (including hand hygiene). Water consumption depends more on the number of staff and size of the centre than on the number of patients.

Estimation of water quantity requirement, based on two scenarios: [1]

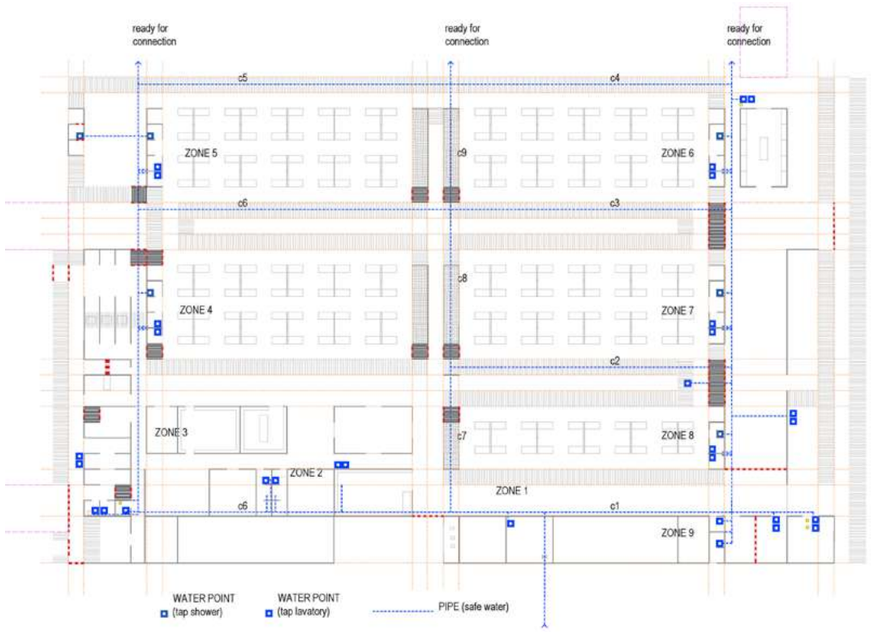
1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff: around 20 000 L/day; 40 000 L storage capacity required
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff: varound 56 0000 L/day; 112 000 L storage capacity required

Water supply – **distribution**

The most likely scenario is that the facility will have access to existing water supply systems that will be functional but when setting up the facility it must have, as a minimum, water access points at each toilet area, within each clinical work area, and at shower, waste-management, laundry and food-preparation points (*see Fig. 8.1*). All equipment in contact with water or chlorine solutions must be made of plastic, to avoid damage. Several fundamental parameters must be considered when designing the network that will supply water to the hospital:

- a ring-based rather than reticular layout should be implemented – this allows even pressure distribution throughout the facility; the possibility of doing repairs at any point of the system without compromising the water supply; circulation of water in cold weather conditions, to avoid freezing; and, in case of high retention time, the ability to recirculate for further chlorination;
- at all times the hospital and facilities in the operational support area must have a supply system that covers the needs at times of both peak and low demand;
- sufficient pressure should be provided by pumps, ensuring that patients, health and support staff receive the water they need at all water supply points:
  - pressure should be maintained between 1 bar and 3 bar (10 m and 30 m of water column);
  - water velocity in the pipeline should be kept between 0.5 m/s and 2 m/s at peak consumption; and
- residual chlorination should be ensured, so that between 0.2 mg/L and 0.5 mg/L (or parts per million [ppm]) is maintained at all water supply points.

Fig. 8.1 *Proposed design for the water supply network for the Model M (100 m × 80 m) 160 moderately ill inpatients + 20 specific inpatient profile area beds*



WaSH: water, sanitation and hygiene.

8.7 Waste management

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. All staff who handle health-care waste should wear appropriate PPE (that is, 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: a summary* (*7*) and *Overview of technologies for the treatment of infectious and sharp waste from health care facilities* (*8*).

Waste-**management plan**

The waste management plan should detail the supplies needed, including PPE, sharps containers, waste bins and bags, cleaning supplies and the type and capacity of waste-treatment technology or off-site treatment arrangements with public or private bodies. In planning supplies, it is important to calculate the usage of consumables and restocking needs. Finally, the plan should consider weather conditions and protection of waste from rain to avoid run-off. The division of a simple clear waste-management plan will help to structure the daily waste-management activities for the COVID-19 community facility from the outset. This should include a brief descriptor of the responsibilities of all team members, specialist assigned roles and an outline of the daily waste routine, which should all help to control the build-up of waste and reduce it where possible. 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.

Waste **generation**

In emergency situations like outbreaks of infectious diseases, the volume of waste rises quickly and needs to be considered in the selection of waste-treatment technologies. Owing to the elevated numbers of PPE used, the COVID-19 community facility should plan for an increase of containment capacity as waste generation is likely to be increased.

Waste **segregation**

All health-care waste produced during the care of COVID-19 patients should be considered as infectious waste. The four major categories of health-care waste recommended for organizing segregation and separate storage, collection, and disposal are:

- sharps (needles, scalpels, etc.), which may be infectious or not;
- infectious waste (anatomical waste, pathological waste, dressings, used syringes, used single-use gloves, used disposable PPE, all health-care waste during the care of COVID-19 patients, except sharps);
- general waste (paper, packaging, etc.); and
- hazardous waste (expired drugs, laboratory reagents, radioactive waste, insecticides, etc.).

Estimation of health-care waste-management requirement, based on two scenarios:[1]

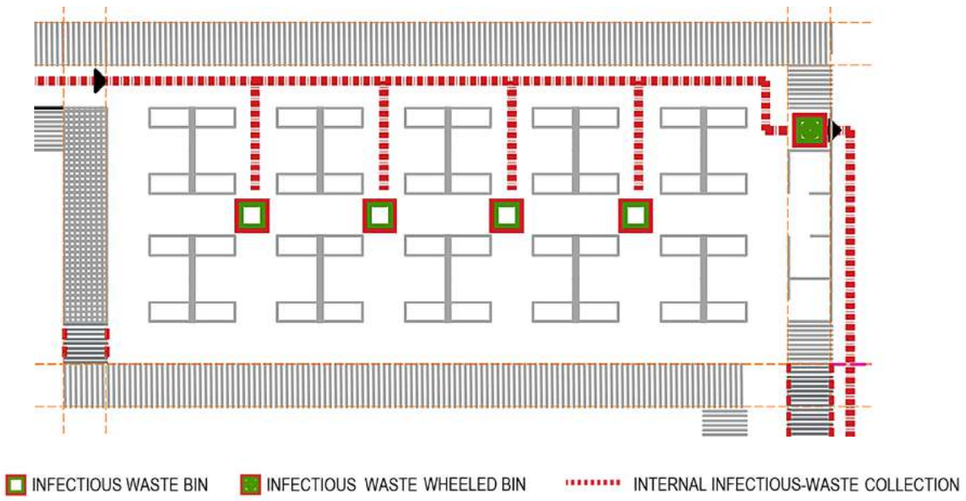
1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   - **General waste:** 2 kg/patient /day = 360 kg/day
   - **Sharps:** 0.1 kg/ patient/day = 18 kg/day
   - **Infectious waste:** 0.4 kg/patient /day – 72 kg/day
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   - **General waste:** 2 kg/patient/day = 1000 kg/day
   - **Sharps:** 0.1 kg/patient/day = 50 kg/day
   - **Infectious waste:** 0.4 kg/patient/day = 200 kg/day

Functional colour-coded and/or clearly labelled waste bins in close proximity to all waste-generation points should be made available; such containers should not be more than three-quarters full, and should be leak-proof with a lid and pedal opening and be clearly labelled (i.e. easily distinguishable according to a colour, label or symbol). Single-use PPE should be placed in waste bins (such as 220 L barrels) at the entrance to the doffing area.

Waste **collection**

Waste-collection routes are designed to minimize contact of waste-management staff with the high-risk area (*see Fig. 8.2*). Clinical staff entering the wards would be responsible for replacing bags that are three-quarters full for empty ones and depositing the three-quarters-full bags in the wheeled bin on the external side. Different collection routes for suspected and confirmed patients should be coordinated with PPE renewal and disinfection of collection containers.

Fig. 8.2 *Proposed collection mechanism for inpatient wards*



Collection will be made by waste-management staff and wheeled containers should be directed to the waste-management area (*see Fig. 8.3*). It is essential to implement stringent waste-handling precautions, using full PPE, based on the recommendations provided in *Rational use of personal protective equipment for coronavirus disease* (COVID-19) (*9*).

Fig. 8.3 *Proposed collection mechanism for the community facility by type of waste*

Waste **treatment**

Waste should be dealt with onsite or as close as possible to where it is generated, and should be separated (combustible/recyclable). In some cases, waste may be treated offsite. If so, there should be a means to confirm it is treated safely once removed from the facility premises.

Estimation of containment capacity requirement, based on two scenarios:[1]

1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   a minimum containment capacity for infectious waste of 720 l every 2 days
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   a minimum containment capacity for infectious waste of 2000 litres for every two days

Regarding treatment of infectious waste as per WHO guidelines (*8*), non-incineration technologies are the preferred option, that is, steam-based technologies (autoclaves, microwaves), dry-heat technologies or chemical-based technologies (such as ozone treatment and alkaline hydrolysis). If incineration technology is used, an incinerator for the treatment of infectious and sharp waste should be functional and of a sufficient capacity (if designed for infectious waste and not just general waste).

Specific design requirements must be followed, such as using bricks/refractory bricks and mortar rather than common building bricks, to withstand the temperatures needed for these incinerators (greater than 800 °C). For complete burning, a dual-chamber incinerator is needed that reaches temperatures above 800 °C and 1100 °C, respectively. If dual incinerators are not available and there is an immediate need for public health protection, small-scale incinerators may be used. This involves a compromise between the environmental impacts from controlled combustion and an overriding need to protect public health if the only alternative is indiscriminate dumping.

Estimation of the minimum capacity of waste-treatment technology, based on two scenarios[2]

1. Model M (100 m × 80 m): 160 moderately ill inpatients + 20 SIPA beds + 60 staff:
   a minimum treatment capacity for infectious waste of 8 kg/h, assuming 10 working hours
2. Model XL (180 m × 100 m): 480 moderately ill inpatients + 20 SIPA beds + 140 staff:
   a minimum treatment capacity for infectious waste of 20 kg/h, assuming 10 working hours

Waste- **management area**

The waste-management area should be considered as a normal health-care facility waste zone. A cleaning and disinfection point, temporary waste storage, organic pit, sharp pit and incinerator with ash pit should be planned (*7, 10*).

8.8 Sanitation

Wastewater

All wastewater coming from patients' showers, sinks, handwashing points and laundry should be properly treated before infiltration. 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 avoid possible exposure in the case of overflow. Means should be made available for safely disposing of greywater or water from washing PPE, surfaces and floors.

The recommended technology for the proposed layout is illustrated in Fig. 8.4. All handwashing stations, showers and emptying/filling basins for cleaning should be connected to a gravity-fed grease trap with the possibility of performing treatment in those stations that are being used by infectious patients. The last stage would be a pumping station connecting to the existing sewage systems, infiltration trenches, soakaway pit or temporary containment storage, such as flexible greywater tanks.

Fig. 8.4 *Proposed collection mechanism for wastewater*

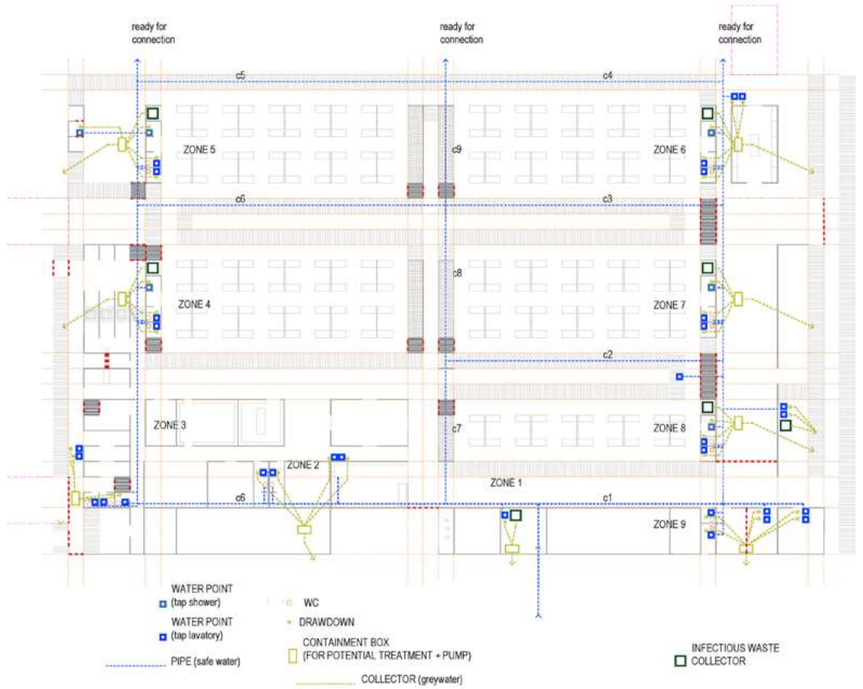
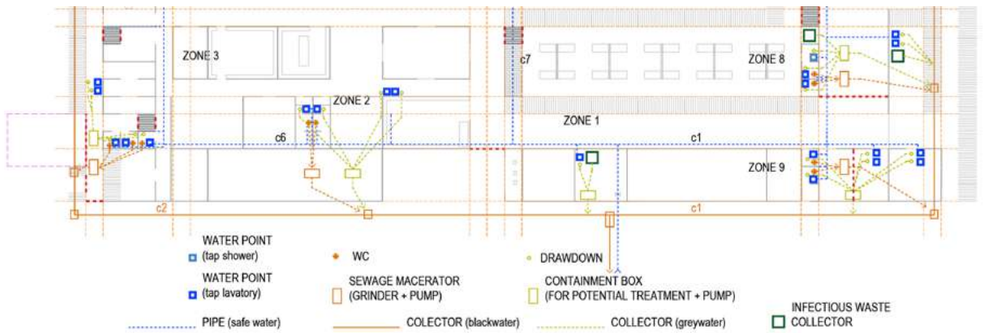


Fig. 8.5 *Proposed collection mechanism for faecal sludge and greywater*



Excreta disposal

People with suspected or confirmed COVID-19 should be provided with a 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. Furthermore, and consistent with existing guidance, staff and health workers should have toilet facilities that are separate from those used by all patients.

WHO recommends the use of standard, well-maintained plumbing (*7*), such as sealed bathroom drains, and backflow valves on sprayers and taps, to prevent aerosolized faecal matter from entering the plumbing or ventilation system (*11*), together with standard wastewater treatment (*12*).

The recommended technology for the proposed layout, illustrated in Fig. 8.5, consists of individual prefabricated cubicles with pour-flush technology, which will create a hydraulic seal avoiding odours and flies; this would be connected to a macerator (shredding and pumping) type that will pump the sewage out to the existing sewage systems.

If health-care facilities are connected to sewers, a risk assessment should be conducted to confirm that wastewater is contained within the system (i.e. the system does not leak), prior to 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 (*13*), with critical control points prioritized for mitigation.

Excreta should be retained in impermeable storage containers and left for as long as feasibly possible, to allow for a reduction in virus levels before moving the containers off-site for additional treatment or safe disposal, or both. A two-tank system with parallel tanks would help to 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.

Fig. 8.6 illustrates the proposed sanitation system for a Model M facility.

Handling of faeces

It is critical to conduct hand hygiene when there is suspected or direct contact with faeces (soap and water is preferred after handling exposures to bodily fluids; if not available, use 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 COVID-19 cases, respectively. In all health-care settings, including those with suspected or confirmed COVID-19 cases, faeces must be treated as a biohazard and handled as little as possible. Anyone handling faeces should follow WHO guidelines (*14*) and use PPE instructions for COVID-19 (*9*) to prevent exposure, including boots, apron, long-sleeved gown, thick gloves, mask 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.

Fig. 8.6 *Proposed sanitation system for Model M (100 m × 80 m) 160 moderately ill inpatients + 20 specific inpatient profile area beds + 60 staff*

Workers should be properly trained in how to put on, use and remove PPE, so that these protective barriers are maintained and not breached (*15*). 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 the manufacturer's instructions, and peracetic or peroxyacetic acid at a concentration of 500–2000 mg/L (*16*).

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 this will 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. PPE (that is, boots, apron, long-sleeved gown, thick gloves, mask 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 Section 8.9,* Cleaning procedures).

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. 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 per 10 parts of waste.

8.9 Hygiene and environmental cleaning

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" (*17*). If hands are not visibly dirty, the preferred method is to perform hand hygiene with an alcohol-based hand rub for 20–30 s, using the appropriate technique (*18*). When hands are visibly dirty, they should be washed with soap and water for 40–60 s, using the appropriate technique (*19*). Hand hygiene should be performed at all five moments, as well as before putting on PPE and after removing it or 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 (*14*). 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 (*20*). However, if other options are not available or feasible, using chlorinated water for handwashing can be an interim solution. All efforts should be made to procure soap and water and/or alcohol-based hand rub, as these are the two recommended and validated practices.

Functional hand-hygiene facilities should be present for all health workers at all points of care and in areas where PPE is put on and 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. In all suspected and confirmed patient areas, there should ideally be hand-hygiene points at all cubicles (or at least strategically placed), to allow for hand-hygiene.

Cleaning procedures

Existing recommended cleaning and disinfection procedures for health-care facilities should be followed consistently and correctly (*21*). Laundry should be done and surfaces in all environments in which COVID-19 cases receive care (e.g. treatment units, community care centres) should be cleaned at least twice a day (regular cleaning) and when a patient is discharged (terminal cleaning) (*21*). Moreover, particular attention must be paid to cleaning and sanitizing surfaces with the aim of constantly reducing the viral load across 24 hours. 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); and
- sodium hypochlorite at 0.1% (equivalent to 1000 ppm) for at least 1 minute of contact time for disinfecting surfaces.

Procedures for spills of COVID-19 patient blood/fluids

If there are spills of patient blood or fluids from a COVID-19 patient, the area should then be cleaned and disinfected (with, for example, 0.5% chlorine-containing disinfecting solution), following published guidance on cleaning and disinfection procedures for spilled body fluids (*22*).

Staff should perform hand hygiene after exposure to blood or body fluids and after removing PPE.

8.10 Laundry

All individuals dealing with soiled bedding, towels and clothes from patients with COVID-19 infection should wear appropriate PPE before touching it, including boots, apron, long-sleeved gown, thick gloves, mask and goggles or a face shield.

Soiled linen should be placed in clearly labelled, leak-proof bags or containers, after carefully removing any solid excrement and putting it in a covered bucket to be disposed of in a toilet or latrine. Machine washing with warm water at 60–90 °C and 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 linen soaked in 0.05% chlorine-containing disinfecting solution for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linen allowed to dry fully in sunlight.

If excreta are on surfaces (such as linen or the floor), they should be carefully removed with towels and safely disposed of immediately, 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 linen.

The area should then be cleaned and disinfected (with, for example, 0.5% chlorine-containing dis-infecting solution), following published guidance on cleaning and disinfection procedures for spilled body fluids (*22*).

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 (i.e. nitrile or latex) and gowns should be discarded after each use and not reused; hand hygiene should be performed after PPE is removed.

8.11 Management of dead bodies

To date, there is no evidence of persons having become infected from exposure to the bodies of persons who have died from COVID-19. The safety and well-being of everyone who tends to bodies should be the first priority. Before attending to a body, people should ensure that the necessary supplies for hand hygiene and PPE are available.

- The dignity of the dead, their cultural and religious traditions, and their families should be respected and protected throughout.
- It is important to ensure that personnel who interact with the body (health or mortuary staff) apply standard precautions, including hand hygiene, before and after interaction with the body and the environment; and use appropriate PPE according to the level of interaction with the body, including a gown and gloves. If there is a risk of splashes from the body fluids or secretions, personnel should use facial protection, including the use of face shield or goggles and medical mask.
- The body should be prepared for transfer, including removal of all lines, catheters and other tubes.
- Any body fluids leaking from orifices should be contained.
- Both the movement and handling of the body should be kept to a minimum.
- The body should be wrapped in cloth and transferred as soon as possible to the mortuary area.
  - There is no need to disinfect the body before transfer to the mortuary area.
  - Body bags are not necessary, although they may be used for other reasons (e.g. excessive leakage of body fluid leakage) (*23*).

8.12 Fire safety system

As in all health facilities, a system should be in place to prevent fire (e.g. no smoking) and to alert and contain if there is a fire (siren, smoke detectors, carbon monoxide detectors, bell, fire extinguishers, fire blankets, hoses), as well as an evacuation procedure if the fire cannot be contained (first from the zone where the fire actually is to another zone and, if needed, outside of the facility). Everything possible should be done to prevent mixing of suspected and confirmed patients (e.g. separate evacuation zones), but of course saving lives is the most important action in case of fire.

Staff should be trained on using the fire safety system, and contacts with the local fire department should be initiated early on, including informing the fire department on IPC measures in place.

These basic indications should always be followed:

- fire training is given to the personnel, especially to the security and maintenance personnel;
- the telephone number of the fire service is put in a visible position;
- the evacuation route is signposted;
- ABC[1] 6 kg powder extinguishers are sited in wards, stores and offices; and
- 6 kg carbon dioxide extinguishers are sited in the area of the generators and electrical boards.

8.13 Electricity and illumination

Sufficient and safe power supply and lighting for clinical care and support services is a key component for fulfilling all needs for this type of set-up where clinical care teams and facilities require reliable power and lighting (*see Fig. 8.7*). The electric system should be made available for:

- general illumination, around the perimeter and in the main paths;
- specific illumination (cable 2 × 1.5 mm)
  - in beds
  - in rooms; and
- Sockets and point for electricity (3G2.5 mm^2)
  - in beds for patient's use;
  - for medical equipment: oxygen, X-ray, fridge, laboratory.

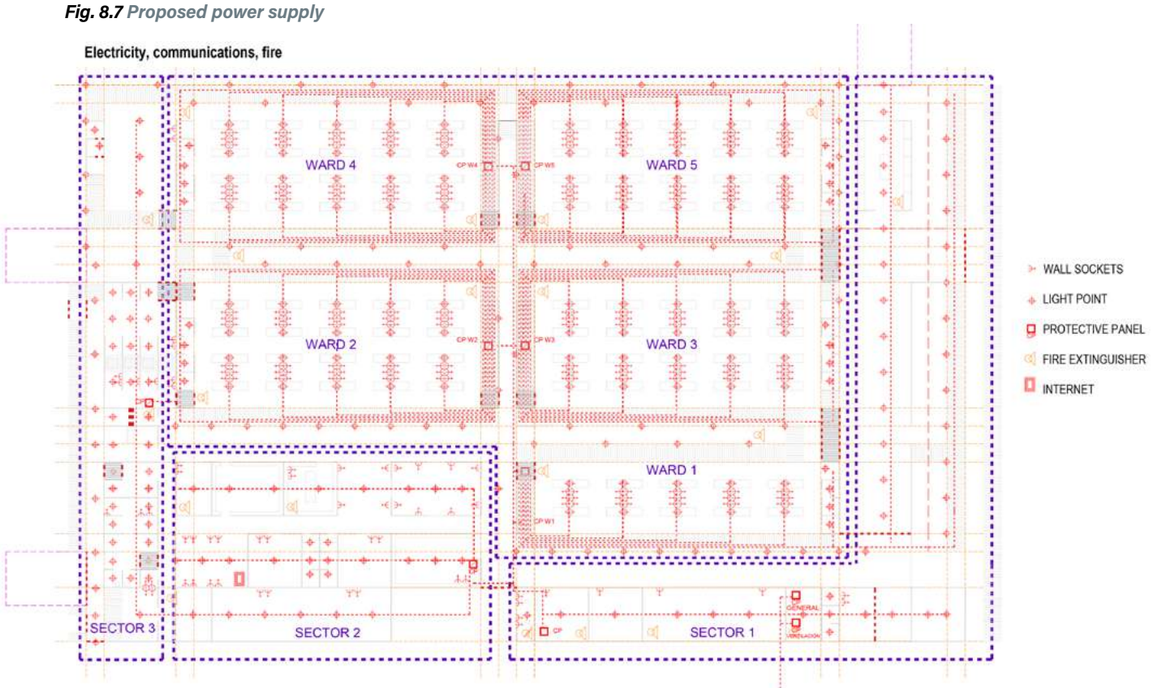
All circuits and electrical cabling and boards must be rated for their intended use and should be installed and certified for use by a qualified electrician in the site, with regular maintenance checks performed (using similar routines as per normal health clinic electrical equipment in their country). The recommended set-up for wiring[2] where there are no underground pass ways would be an aerial installation, with cables following the security area paths to avoid contact with anyone in the facility.

Generators can produce noise that can interfere with patients' rest and the centre's communication. A quiet generator model should be chosen, or, if not, a location should be chosen to avoid possible annoyance. If the supply is by means of the local power supply network, generators should be installed as an auxiliary system. A 50-kVA generator is needed as back-up.

Generators and electrical boards should be centralized, to facilitate their control. The different circuits should be independent, especially those specific to the high-risk area, which should have independent power and lighting circuits.

The high-risk area should be lit from the low-risk area where possible, and its switching should always be controlled from the low-risk area. All dimensioning is made available for the 180-bed model. The use of LED lamps for the exterior is recommended. The electrical system should be aerial but if it goes underground, it should be protected. Attempts should be made to adapt the lighting in the patient area so that it is sufficient during the night, but also guarantees an atmosphere that is suitable for rest and privacy.

***Fig. 8.7** Proposed power supply*



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9	[1] *In this document, suspected and probable cases will be treated as one category.*
12	[1] *The WHO Regional Office for Europe has developed a suite of complementary surge calculators (2), including two for health workforces. All tools use the same base clinical attack rate ranges and classify the health workforce using International Labour Organization International Standard Classification of Occupations codes (3), but their outputs are intentionally different due to their primary focus.* [2] *WHO has developed another complementary surge calculator that provides specific, focused outputs, including detailed quantifications of equipment and consumables (4).*
16	[1] *per 20 inpatients (separated for men, women, children and health workers).*
45	[1] *A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:* *A. face-to-face contact with a probable or confirmed case within 1 m and for more than 15 min;* *B. direct physical contact with a probable or confirmed case;* *C. direct care for a patient with probable or confirmed COVID-19 without using proper PPE; or* *D. other situations as indicated in local risk assessments.*
48	[1] *A contact is a person who experienced any one of the following exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case:* *A. face-to-face contact with a probable or confirmed case within 1 m and for more than 15 min;* *B. direct physical contact with a probable or confirmed case;* *C. direct care for a patient with probable or confirmed COVID-19 without using proper PPE; or* *D. other situations as indicated in local risk assessments.*
73	[1] *See detailed calculations and assumptions in Web Annex 5.*
75	[1] *See detailed calculations and assumptions in Web Annex 5.*
77	[1] *See detailed calculations and assumptions in Web Annex 5.*
78	[2] *See detailed calculations and assumptions in Web Annex 5.*
85	[1] *ABC dry powder extinguisher is a multi-purpose extinguisher suitable for use on Class A, B and C fires involving combustible solids, flammable liquids and gases.* [2] *See Web Annex 3 for detailed electrical layout.*

reference

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PAGE	
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PAGE	
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COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

1

WEB ANNEX

Analysis tool for construction of COVID-19 community facilities and treatment centres

World Health Organization

Context

- [ ] To obtain information on the characteristics of pre-existing health infrastructures
- [ ] To choose a location with appropriate characteristics
- [ ] Good access and communications
- [ ] To guarantee good access to the infrastructures
- [ ] To understand the physical characteristics of the environment
- [ ] To obtain information about the socio-cultural characteristics of the location

WHO reference no.:

Areas of analysis

1. Functional-spatial analysis

Area 1 Triage/admission and registration area

- [ ] Entry
- [ ] Reception
- [ ] Waiting room
- [ ] Crash room
- [ ] Triage
- [ ] Sample area
- [ ] Admission
- [ ] Waiting for results room
- [ ] Exit
- [ ] Bathrooms

Area 2 Technical area

Clinical

- [ ] Entry for staff
- [ ] Office
- [ ] Personal access
- [ ] Changing room
- [ ] Store PPE
- [ ] Storage scrubs
- [ ] Bathrooms
- [ ] Rest/leisure, staff
- [ ] Coordination area
- [ ] Meeting point
- [ ] Laboratory
- [ ] Pharmacy
- [ ] Donning room
- [ ] Changing rooms male/female

Operational support

- [ ] Technical room
- [ ] Water supply
- [ ] Equipment warehouse
- [ ] Electricity area
- [ ] Laundry
- [ ] Drying area
- [ ] Sterilization
- [ ] Doffing area
- [ ] Waste area 1
- [ ] Waste area 2
- [ ] Rest area
- [ ] Mortuary store
- [ ] Transfer of deceased patients
- [ ] Visitors' and relatives' area
- [ ] Waste management area
- [ ] Sterilization room
- [ ] Bathroom

Area 3 Wards

Inpatient area (Module of 40 beds)

- [ ] Entrance
- [ ] Wards
- [ ] Water modules
- [ ] Storage modules
- [ ] Rest area for patients
- [ ] Exit, staff with PPE
- [ ] Doffing area
- [ ] Bathrooms
- [ ] Exit, not admitted patients

Area 3 Wards - *continued*

High supervision (Module of 20 beds)

- ☐ Wards
- ☐ Crash room
- ☐ Discharge shower
- ☐ Bathrooms

Area 4 Other complementary areas

- ☐ Resting areas for staff
- ☐ Kitchen
- ☐ Living room
- ☐ Parking
- ☐ Visitors' area
- ☐ Warehouse, external
- ☐ Control and security points

Access and routes: entrances, exits, paths and zones

- ☐ Vehicle access: ambulances, logistics, personnel, visitors
- ☐ Footpaths: patients, staff, visitors
- ☐ Equipment path: contaminated/ uncontaminated
- ☐ Waste path
- ☐ Signage

2. Technical programme

Inspection of technical infrastructure

- ☐ Structural system
- ☐ Construction system
- ☐ Electricity and lighting system
- ☐ Fire prevention and extinguishing system
- ☐ Telecommunications system
- ☐ Medical equipment
- ☐ Laboratory equipment
- ☐ Oxygen system
- ☐ Furniture

- ☐ Water system
  - ☐ storage
  - ☐ treatment
  - ☐ distribution system
  - ☐ water points

- [ ] Sanitation and hygiene system
  - [ ] WC
  - [ ] showers
  - [ ] drainage greywater
  - [ ] drainage blackwater
- [ ] Waste management
  - [ ] general waste
  - [ ] infectious waste
  - [ ] sharp waste
  - [ ] treatment technology

3. Implementation needs

- [ ] Physical and technical definition (drawings and documentation)
- [ ] Human resources
- [ ] Materials, resources and tools
- [ ] Timeline
- [ ] Budget
- [ ] Conservation and maintenance programme

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

WEB ANNEX

Criteria for the reuse of the spaces

World Health Organization

WHO reference no.:

Spaces for reuse as COVID-19 community facilities and treatment centres

<table>
<tr><td>Location</td><td colspan="2">» Strategic location, close to or well connected with the health system.
» Strategic location in relation to urban hubs.
» Communications: accessible for pedestrians and vehicles.
» Roads and perimeters appropriate for ambulances and trucks.
» Connection with public transport.
» Distant from other crowded places (markets, schools, etc.)</td></tr>
<tr><td>Relevant characteristics</td><td>» Flexibility: capacity to adapt the space for different uses.
» Wide spaces: large spaces (wide with high ceilings) without obstacles.
» Accessibility: entries, circuits and spaces accessible for population.
» IPC-friendly.
» Parking: areas for vehicles or logistic uses.
» Storage: areas to store materials safely and in good condition (dry, clean), including medical, logistic and technical equipment.</td><td>» Comfort: Places with comfortable areas to work, offices, rooms, outdoor spaces.
» Privacy: Possible areas for private activities (meetings, rest, psychological support, etc.).
» Roofing: Consider whether the space is covered or could be.
» Floor: Suitable floor covering to allow cleaning, disinfection and maintenance.
» Materials: The surfaces can be easily cleaned and disinfected.
» Support areas and services: laundry, kitchen, security, maintenance, etc.</td></tr>
<tr><td>Facilities</td><td>» Consider the state of existing facilities for the following:
• water (quantity and quality)
• sanitation: drainage grey- and blackwater
• toilets and showers
• electricity and illumination
• communication
• area for waste management
• fire system
• air conditioning
• security.</td><td>» Possibilities to install new facilities: WCs, showers, kitchen, etc.
» Consider installing other systems: medical equipment (oxygen, X-ray machines, call for nurses)
» Consider increasing the existing facilities: waste management, electricity, fire safety system, etc.</td></tr>
<tr><td>Comfort level</td><td colspan="2">» Consider the control and improvement of:
• ventilation system (natural and forced)
• air flow
• temperature
• humidity
• illumination
• noise levels.</td></tr>
<tr><td>Others</td><td colspan="2">» Impact of the use of the building in the medium and long term.
» Capacity to adapt systems and dismantle them without damage to the building.
» Capacity to provide accommodation for staff if needed.
» Human resources: companies or assembly teams to assemble and disassemble the facilities, laundry service, catering service, security service, etc.
» Community acceptance.</td></tr>
</table>

Possible locations and their main characteristics

	ADVANTAGES	DISADVANTAGES
Exhibition halls, congress venues, events spaces	Communication Logistics Extra support services	Potential difficulties with adding new systems or facilities
Sports pavilions	Location Communication	Size may be insufficient
Stadiums, sports fields	Size IPC friendly	Lack of roof Floor not appropriate
Hotels, resorts	Comfort Extra support services	No visual control for the staff Not IPC friendly Potential difficulties with logistics
Warehouses	Big space Easily adaptable Easy to install facilities	Location Lack of comfort
Airports and ports	Big size Good communications Extra support services	Location

Possible locations and their main characteristics

	LOCATION	SIZE	PHYSICAL CHARACTERISTICS	FLEXIBILITY	FACILITIES	IPC FRIENDLY	LOGISTICS CHARACTERISTICS	COMFORT
Exhibition halls, congress venues, event spaces								
Sports pavilions								
Stadiums, sports fields								
Hotels, resorts								
Warehouses								
Airports and ports								

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

3

WEB ANNEX

Detailed plans

World Health Organization

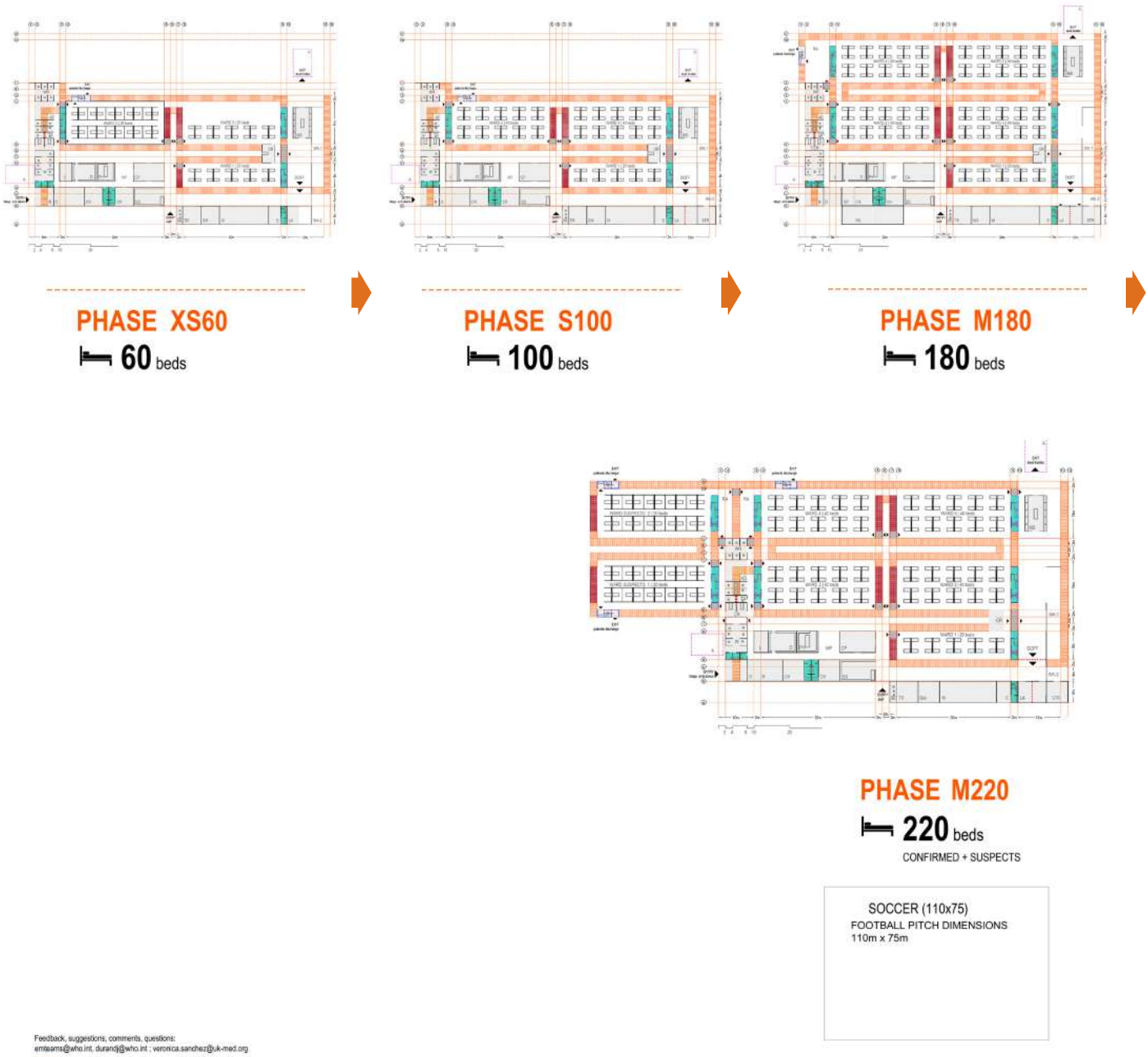
For further information, suggestions or comments on the plans included in this document, contact emteams@who.int

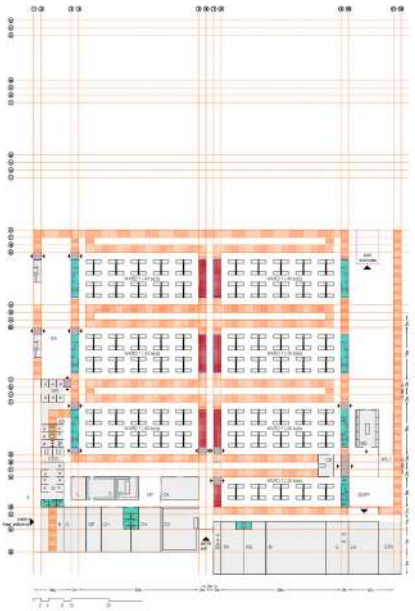
WHO reference no.:

Contents

Fig. A3.1

Scaling up plan – strategy from S to XL





PHASE L260

260 beds

PHASE L340

340 beds

PHASE XL420

420 beds

STADIUM (180x100)

STADIUM FIELD DIMENSION
180 m x 100 m

PHASE XL500

500 beds

Fig. A3.2

Alternative plan – layout for 100 beds

Feedback, suggestions, comments, questions:
emtasms@who.int, durandj@who.int ; veronica.sanchez@uk-med.org

World Health Organization EMT UK-MED

A AMBULANCES
AD ADMISSION
CP COORDINATION POINT
CH CHANGING ROOM
CR CRASH ROOM
D DONNING
DF DOFFING
E ELECTRICITY
EW EQUIPMENT WAREHOUSE
L LABORATORY
LA LAUNDRY
MO MORGUE
MP MEETING POINT
O OFFICE
PH PHARMACY
R RECEPTION
RA REST AREA PATIENTS
RL REST/LEISURE STAFF
T TRIAGE
TA TESTING AREA
TR TECHNICAL ROOM
S STORAGE
SE SECURITY POINT
SS STORAGE SCRUBS
STR STERILIZATION ROOM
SP STORE PPE
W WAITING ROOM
WR WAITING RESULTS
WA WASTE AREA
WC WC
WS WATER SUPPLY

SECURITY DISTANCE (2 m)
ENTRY POINT
STORE
WASH

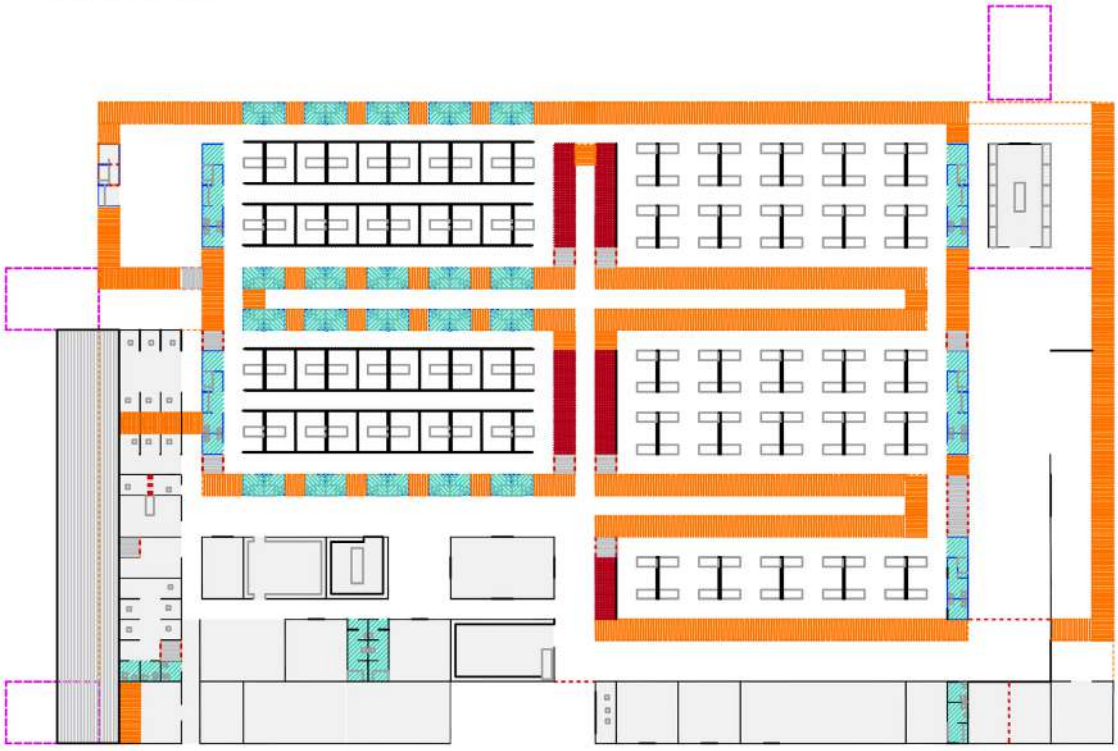
CTC-S100

CTC_S100 (SMALL SIZE)
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400 - 1/600

Fig. A3.3

Alternative plan – layout for 180 beds

CTC-M180-90s



CTC-M180-40s+100c

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A AMBULANCES
AD ADMISSION
CP COORDINATION POINT
CH CHANGING ROOM
CR CRASH ROOM
D DONNING
DF DOFFING
E ELECTRICITY
EW EQUIPMENT WAREHOUSE
L LABORATORY
LA LAUNDRY
MO MORGUE
MP MEETING POINT
O OFFICE
PH PHARMACY
R RECEPTION
RA REST AREA PATIENTS
RL REST/LEISURE STAFF
T TRIAGE
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S STORAGE
SE SECURITY POINT
SS STORAGE SCRUBS
STR STERILIZATION ROOM
SP STORE PPE
W WAITING ROOM
WR WAITING RESULTS
WA WASTE AREA
WC WC
WS WATER SUPPLY

SECURITY DISTANCE (2 m)
ENTRY POINT
STORE
WASH

CTC-M180

CTC_M180 (SMALL SIZE)
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400 - 1/600

Fig. A3.4

Alternative plan – layout for 260 beds (suspected area and confirmed area)

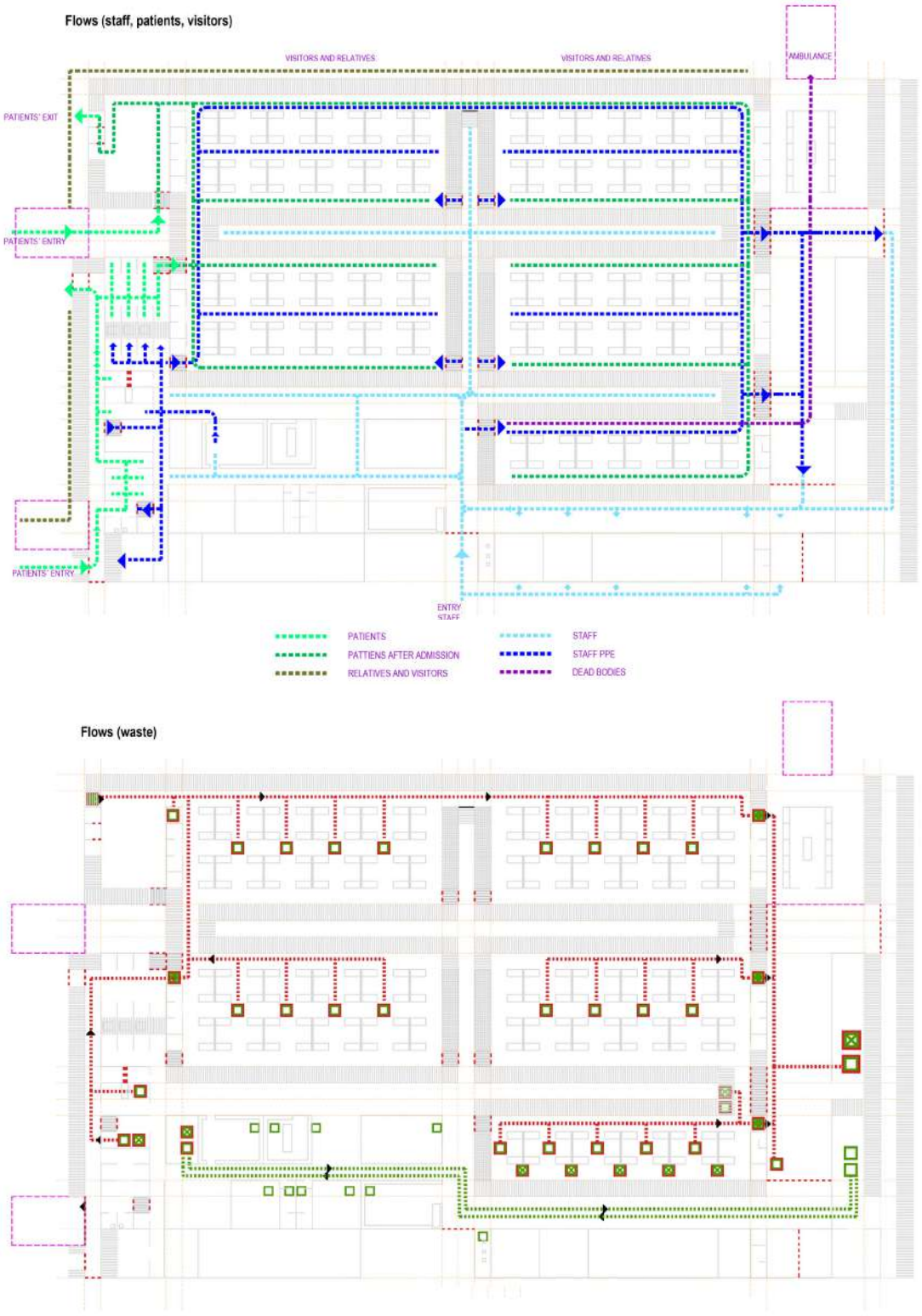

CTC-L260-260c
ENTRY patients
EXIT no suspected cases of COVID-19
ENTRY ambulance
waiting shadow area
EXIT no isolated patients
ENTRY Ambulance confirmed cases Triage
EXIT patients discharged
EXIT patients discharged
SCREENING
W
DF
T
TA
WR
AD
RA
O
R/L
SP
CH
CH
L
D
PH
MP
CA
SS
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
ENTRY staff
SE
TR
WS
M
E
LA
WARD 1 | 20 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
WARD 1 | 40 beds
DOFF
WA-2
WA-1
DOFF
DOFF
DOFF
MS
EXIT dead bodies

Fig. A3.5

Alternative plan – layout for 500 beds

Fig. A3.6

Plan of layout showing patient and staff flows



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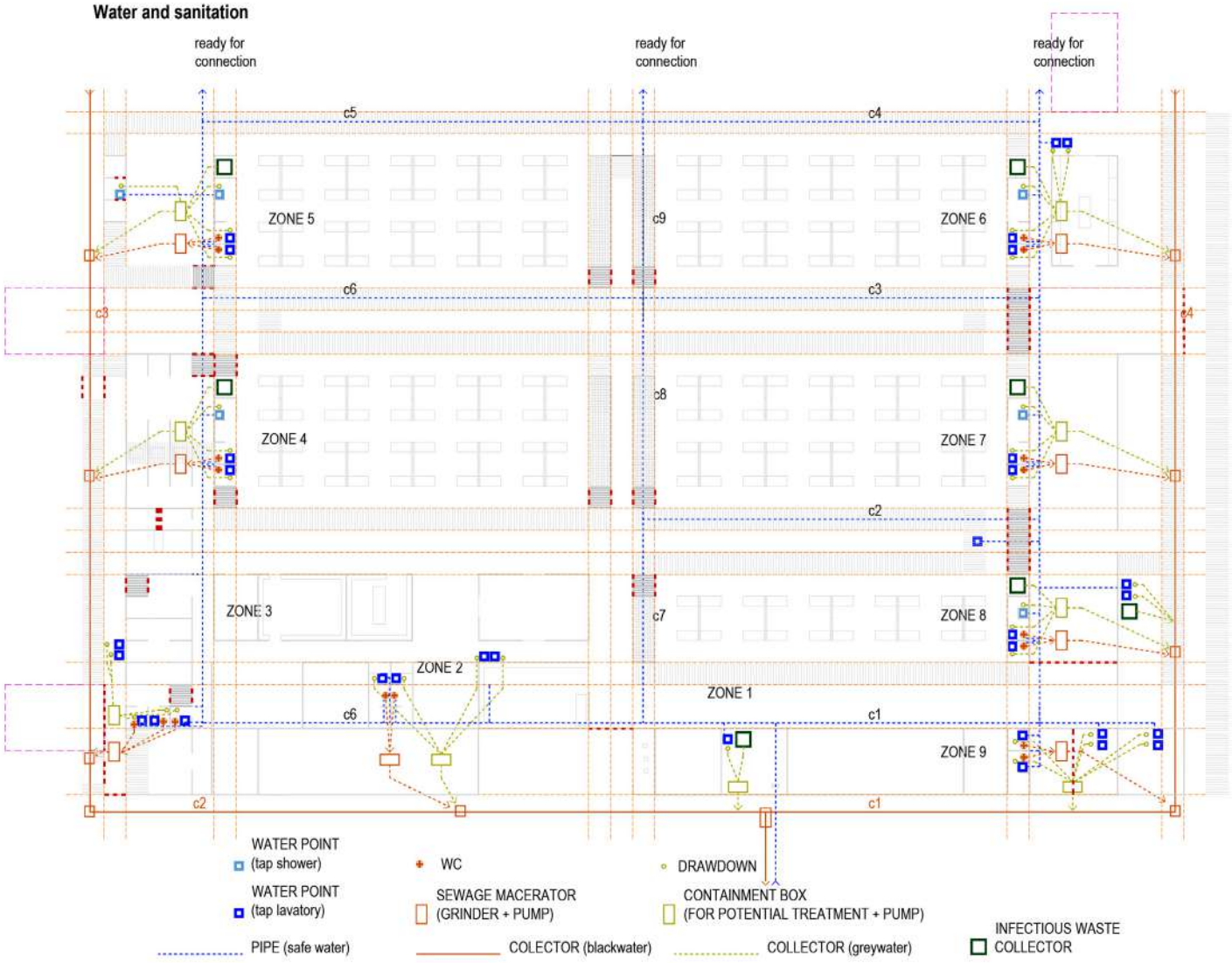
F2-FLOWS

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/500

Fig. A3.7

Plan of facilities



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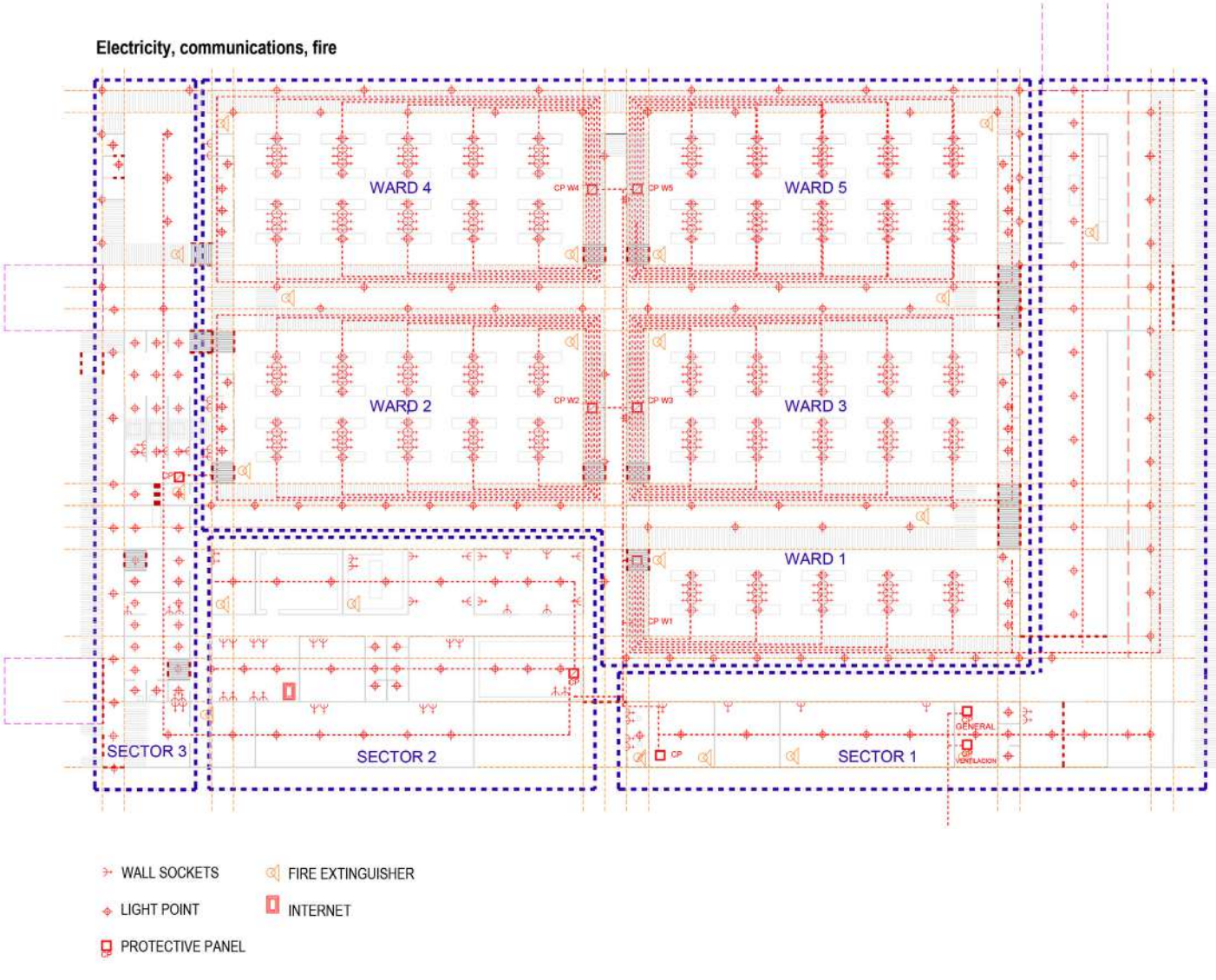
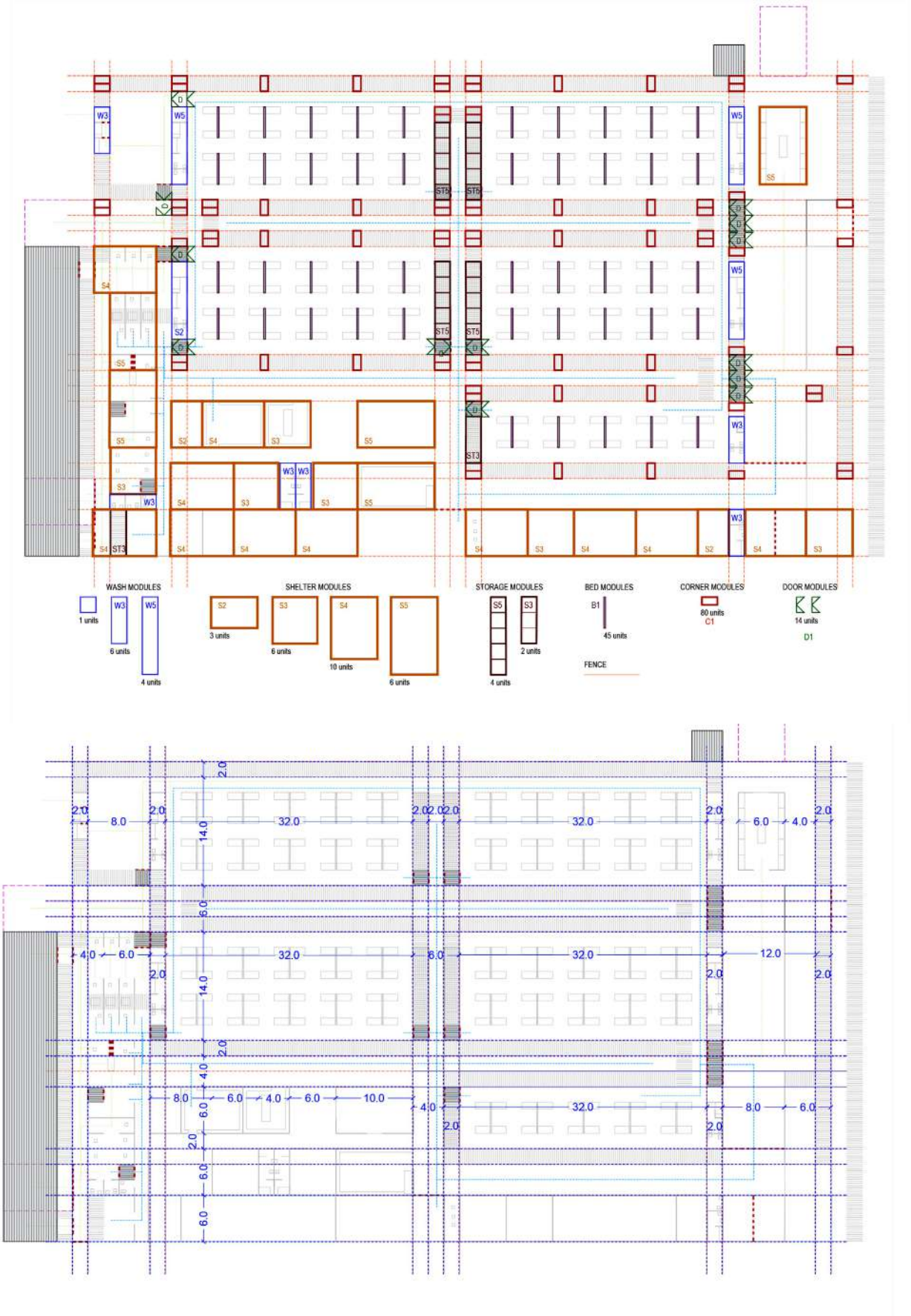


F1-FACILITIES

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/500

Fig. A3.8

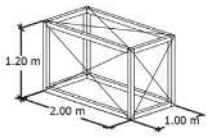
Plan of structures



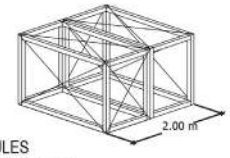
CORNER MODULES
fences support, lighting support, storage....

C1

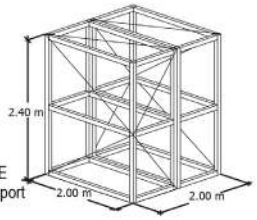
WOODEN VERSION
- Wooden profiles 80 x 80 mm
- Steel cable diagonals with turnbuckles



BASIC MODULE

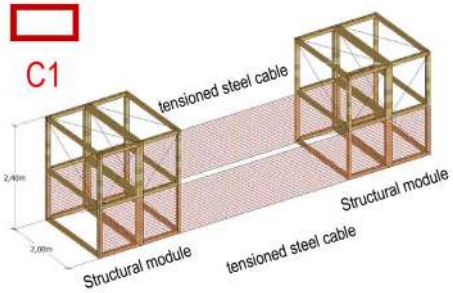


2 x BASIC MODULES
shaping the structural module



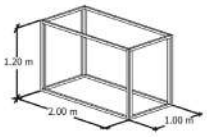
HIGH MODULE
for lighting support

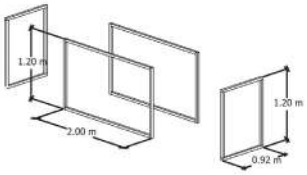
C1



C1

STEEL VERSION
- Steel profiles 40 x 40 mm
- Frames made of welded profiles, screwed together



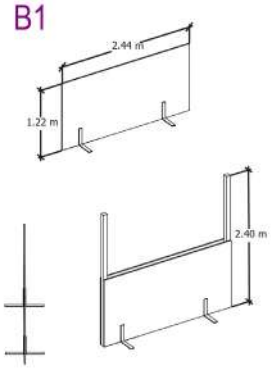


BED PANELS: support for facilities

- OSB panel of standard dimensions (1.22 x 2.44 m), 20 mm thick
- Metal angles 30 x 30 cm, 40 cm from the end of the panel.

DOUBLE HEADBOARD with high profiles
with hoops on the top to receive
electrical cables

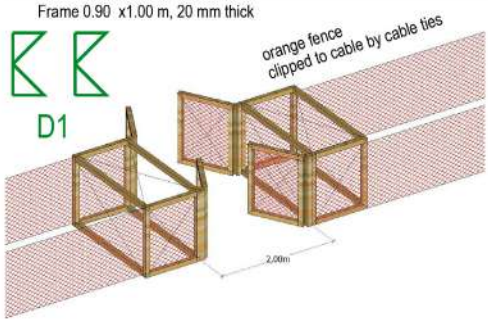
B1



DOORS

Frame 0.90 x1.00 m, 20 mm thick

D1



Feedback, suggestions, comments, questions:
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World Health Organization EMT UK-MED

C1-STRUCTURE

CTC_L180
COVID-19 TEMPORARY CENTRE
IN COMMUNITY FACILITIES
Version_05_20200412
e. 1/400

Fig. A3.9

Detailed view of ward modules

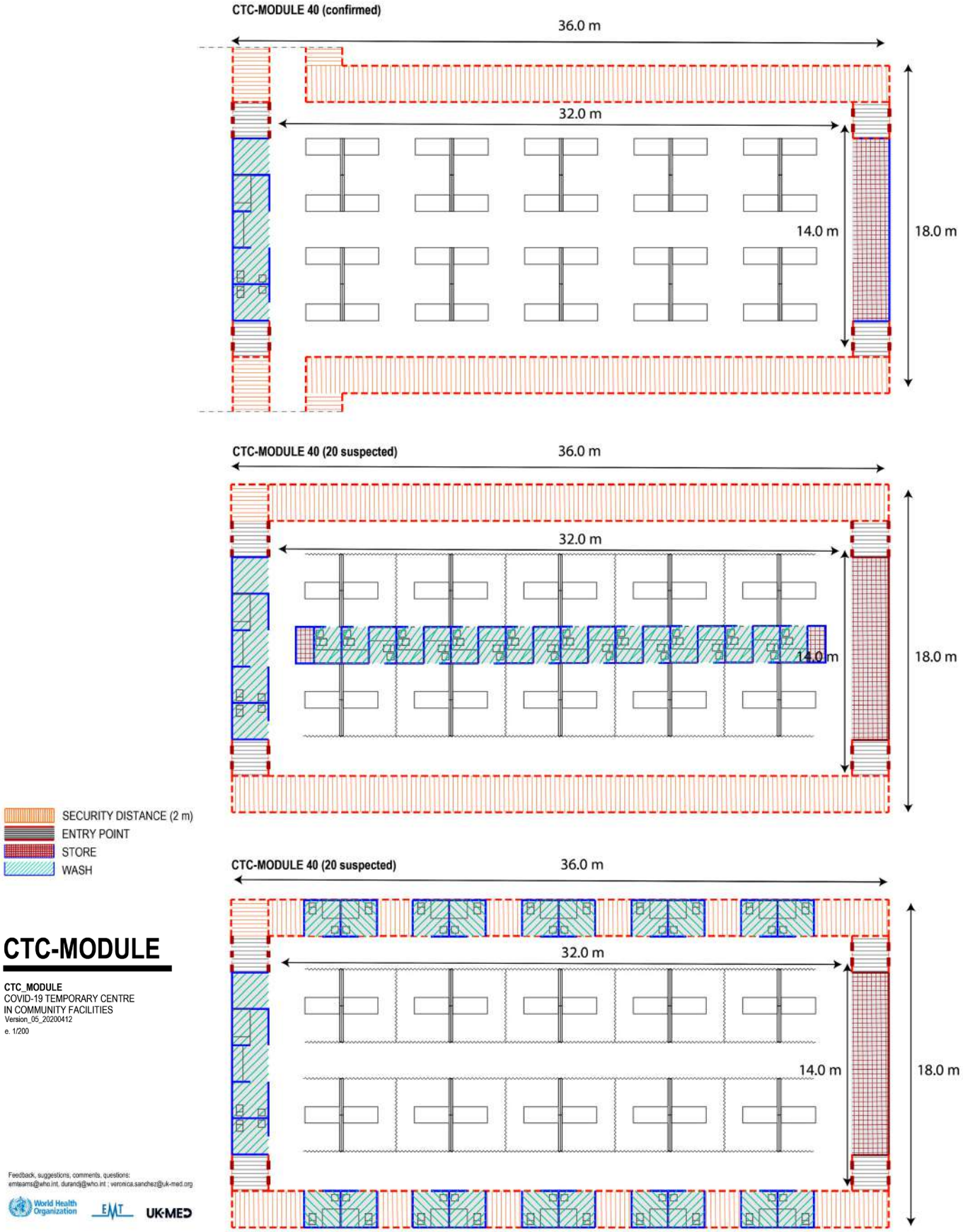
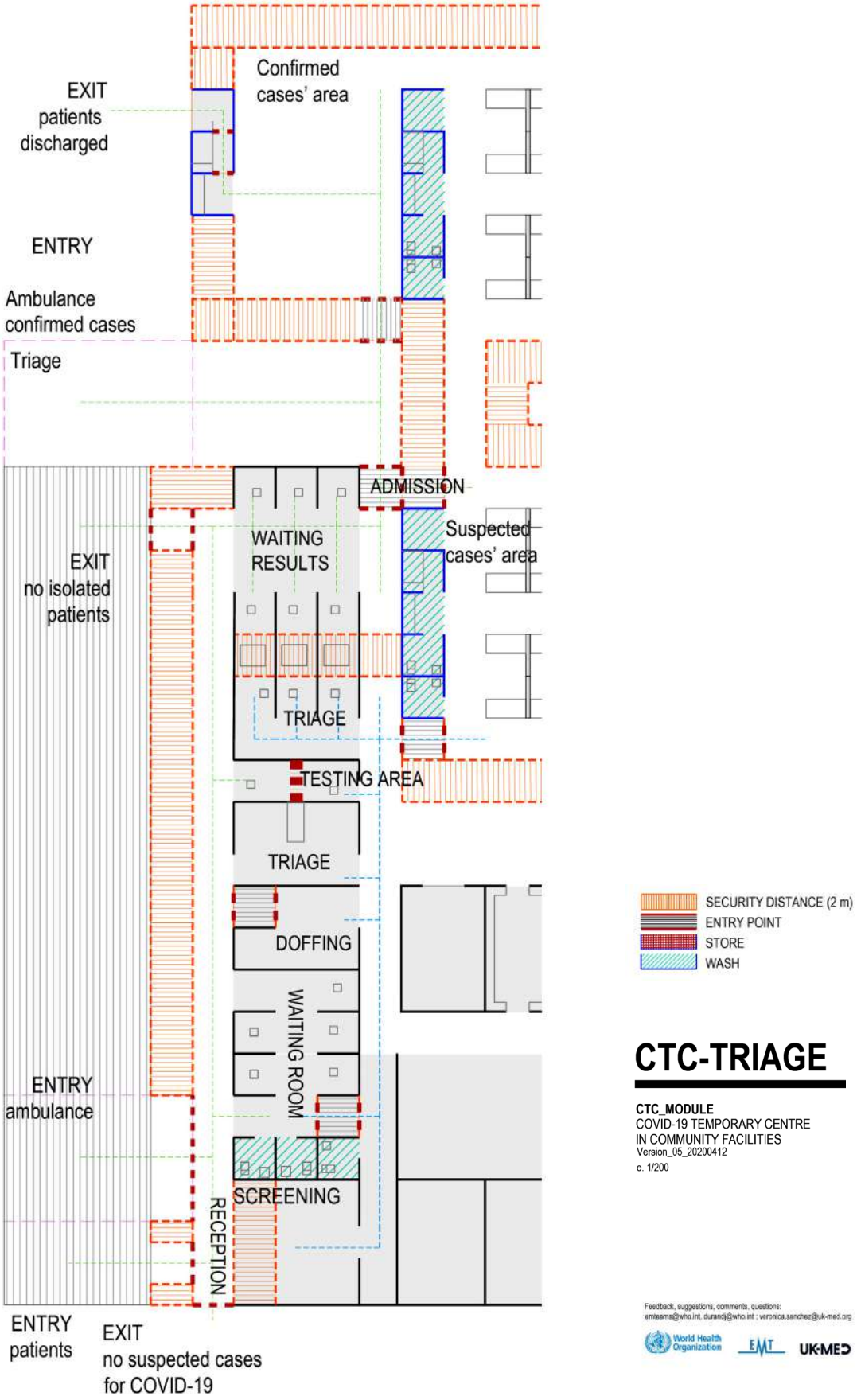


Fig. A3.10

Detailed view of screening and triage



COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

4

WEB ANNEX

Bill of quantities

World Health Organization

WHO reference no.:

Source: *This publication: COVID-19 community facilities and treatment centres*

C1. STRUCTURES

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Structure water modules W3 (2 m × 6 m × 2.40 m)	pieces	5	6	7	8	9	10
Structure water modules W5 (2 m × 10 m × 2.40 m)	pieces	2	4	6	8	10	12
Structure shelter modules Sh2 (6 m × 4 m × 2.40 m)	pieces	3	3	3	3	3	3
Structure shelter modules Sh3 (6 m × 6 m × 2.40 m)	pieces	6	6	6	6	6	6
Structure shelter modules Sh4 (6 m × 8 m × 2.40 m)	pieces	7	8	9	10	11	12
Structure shelter modules Sh5 (6 m × 10 m)	pieces	6	6	6	6	6	6
Structure storage module St3 (2 m × 6 m × 1.20 m)	pieces	2	2	2	2	2	2
Structure storage module St5 (2 m × 10 m × 1.20 m)	pieces	3	4	5	6	7	8
Structure doors module (2 m × 1.2 m – 2 units)	pieces	8	10	12	14	16	18
Structure corner module (2 m × 1.2 m × 1 m)	pieces	28	80	132	184	236	288
Structure beds module (1.2 m × 2.4 m × 0,10 m)	pieces	25	45	65	85	105	125
Fence	m	600	1,000	1,400	1,800	2,200	2,600
Floor (not considered – to build in existing facility)	m^2	5,000	7,000	10,000	12,000	14,000	16,000
Roofing (not considered – to build in existing facility)	m^2	0	0	0	0	0	0

F1. SANITATION

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
WC cubicles superstructure (gender-appropriate)	pieces	5	6	7	8	9	10
Plastic or resin latrine slabs 1.20 × 1.80	pieces	12	16	20	24	28	32
P-Trap adaptor	pieces	12	16	20	24	28	32
Commode toilet seat	pieces	12	16	20	24	28	32

F1. SANITATION *continued*		**Model S 100 beds**	**Model L 180 beds**	**Model L 260 beds**	**Model L 340 beds**	**Model XL 420 beds**	**Model XL 500 beds**
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Flexible irrigation hose 3/4" with nozzle	pieces	12	16	20	24	28	32
Teflon	rolls	30	40	50	60	70	80
Basin	pieces	5	7	9	11	13	15
Grease trap	pieces	8	10	12	14	16	18
Grey water pump	pieces	8	10	12	14	16	18
Shower (1 × 20 persons)	pieces	10	14	18	22	26	30
Macerator	pieces	7	9	11	13	15	17
32 mm flexible grey PVC pipe	lineal metres	240	300	360	420	480	540
32 mm PVC gate valve	pieces	10	12	14	16	18	20
32 mm PVC tee	pieces	16	20	24	28	32	36
PVC glue	tubes	14	18	22	26	30	34
90 mm rigid PVC pipe	lineal metres	150	210	270	330	390	450
90 mm rigid PVC wye (Y) connection		4	8	12	16	20	24

F1. WATER DISTRIBUTION NETWORK		**Model S 100 beds**	**Model L 180 beds**	**Model L 260 beds**	**Model L 340 beds**	**Model XL 420 beds**	**Model XL 500 beds**
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
High-density polyethylene (HDPE) pipe 25 mm	m	336	560	784	1,008	1,232	1,456
Tee 25 mm	pieces	22	32	42	52	62	72
Elbow 25 mm	pieces	2	4	6	8	10	12
Gate valves 25 mm	pieces	28	40	52	64	76	88
Water supply points connections	connections	22	28	34	40	46	52
PVC reducer 1"× 3/4"	pieces	22	28	34	40	46	52
PVC pressure tubing 3/4 "	pieces	22	28	34	40	46	52
PVC ball valves 3/4 "	pieces	22	28	34	40	46	52

F1. WATER DISTRIBUTION NETWORK *continued*		Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Elbow action taps 3/4 "	pieces	22	28	34	40	46	52
Sink	pieces	10	16	22	28	34	40
PVC valve, tank outlet 1 1/2"	pieces	4	10	16	22	28	34
Tanks HDPE 5000 L	pieces	4	10	16	22	28	34
Red plastic paint (5 kg)	pieces	3	4	5	6	7	8
Yellow plastic paint (5 kg)	pieces	3	4	5	6	7	8
Green plastic paint (5 kg)	pieces	3	4	5	6	7	8
Teflon	rolls	100	120	140	160	180	200

F2. ELECTRICITY

		Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
ITEM	Units	Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Generator 250 KVA	pieces	1	1	1	1	1	11
Protective electrical panels	pieces	8	9	10	11	12	13
Earthing system	pieces	1	1	1	1	1	45
Cable 2 × 1.5 mm	m	2,770	3,000	3,230	3,460	3,690	3,920
Cable 3G2.5 mm	m	4,680	5,000	5,320	5,640	5,960	6,280
Cable 5G6 mm	m	200	200	200	200	200	200
Cable 5G16 mm	m	500	500	500	500	500	500
Cable 4 × 25 mm	pieces	50	50	50	50	50	50
Staples for cable (100-unit box)	pieces	23	25	27	29	31	33
Connection boxes	pieces	138	150	162	174	186	198
Connection plugs	pieces	138	150	162	174	186	198
Wall sockets	m	560	620	680	740	800	860
LED lights 10W		120	160	200	240	280	320
Metal tray for cable conduction		160	200	240	280	320	360

F2. TELECOMS

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Radio system	pieces	1	1	1	1	1	1
Internet system	pieces	1	1	1	1	1	1

F2. FIRE SAFETY

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Extinguishers CO_2 6 kg	pieces	18	22	26	30	34	38
Extinguishers ABC powder 6 kg	pieces	2	2	2	2	2	2

F2. VENTILATION

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Individual ventilators		100	180	260	260	420	500
Portable high efficiency particulate air (HEPA) filtration units		3	5	7	7	11	13

F4. WASTE MANAGEMENT

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Pedal opening bins 30 L (infectious waste)	pieces	22	30	38	46	54	62
Biohazard bags	pieces	1,500	2,000	2,500	3,000	3,500	4,000
IPC box 3 L (sharp waste)	pieces	8	10	12	14	16	18
IPC bins 30 L (general waste)	pieces	9	10	11	12	13	14
IPC wheeled bins 120 L (3 colours)	pieces	3	3	3	3	3	3
IPC bucket for disinfection 120 L	pieces	2	2	2	2	2	2
Pressure washer	pieces	1	1	1	1	1	1

F4. HYGIENE AND ENVIRONMENTAL CLEANING

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Liquid soap dispensers	pieces	10	16	22	28	34	40
Liquid soap	pieces	70	90	110	130	150	170
Alcohol-based hand rub	pieces	60	108	156	204	252	300
Chlorine, NaDCC 65%	pieces	40	60	80	100	120	140
IPC bucket for laundry 120 L	pieces	8	12	16	20	24	28
IPC bucket for washing 15 L	pieces	6	10	14	18	22	26
IPC sprayers 10 L	pieces	3	4	5	6	7	8
IPC body bags	pieces	10	40	70	100	130	160
IPC mops	pieces	4	6	8	10	12	14

F4. EQUIPMENT AND FURNITURE

ITEM	Units	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Total qty	Total qty	Total qty	Total qty	Total qty	Total qty
Medical equipment, X-ray	pieces	2	2	2	2	2	2
Furniture, tables	pieces	6	8	10	12	14	16
Furniture, chairs	pieces	40	50	60	70	80	90
Furniture, mirrors	pieces	19	21	23	25	27	29
Furniture, clocks	pieces	8	10	12	14	16	18
Furniture, benches	pieces	6	6	6	6	6	6
Furniture, shelves	pieces	12	12	12	12	12	12
Furniture, beds	pieces	102	182	262	342	422	502
Signage	pieces	36	40	44	48	52	56

F2. TELECOMS

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Structure, water modules W1 (2 m × 1.5 m × 2.40 m)		20	0	4
Structure, water modules W3 (2 m × 6 m × 2.40 m)	pieces	1	1	0
Structure, water modules W5 (2 m × 10 m × 2.40 m)	pieces	0	0	4
Structure, shelter modules Sh2 (6 m × 4 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh3 (6 m × 6 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh4 (6 m × 8 m × 2.40 m)	pieces	0	0	6
Structure, shelter modules Sh5 (6 m × 10 m)	pieces	0	0	2
Structure, storage module St3 (2 m × 6 m × 1.20 m)	pieces	0	0	2
Structure, storage module St5 (2 m × 10 m × 1.20 m)	pieces	1	1	6
Structure, doors module (2 m × 1.2 m – 2 units)	pieces	2	2	-24
Structure, corner module (2 m × 1.2 m × 1 m)	pieces	14	14	5
Structure, beds module (1.2 m × 2.4 m × 0.10 m)	pieces	10	10	200
Fence	m	220	220	3,000
Floor (not considered – to build in existing facility)	m^2	648	648	3,000
Roofing (not considered – to build in existing facility)	m^2	648	648	0

SIPA, specific inpatient profile area.

F1. SANITATION

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
WC cubicles superstructure (taking into account gender)	pieces	20	2	8
Plastic or resin latrine slabs 1.20 × 1.80	pieces	20	2	8
P-trap adaptor	pieces	20	2	8
Commode toilet seat	pieces	20	2	8
Flexible irrigation hose 3/4" with nozzle	pieces	20	2	8
Teflon	rolls	12	2	20
Basin	pieces	20	2	3
Grease trap	pieces	2	1	6
Grey water pump	pieces	1	1	6
Shower (1 × 20 persons)	pieces	20	1	6
Macerator	pieces	1	1	5
32 mm flexible grey PVC pipe	lineal metres	240	60	180
32 mm PVC gate valve	pieces	4	2	8
32 mm PVC tee	pieces	4	2	12
PVC glue	tubes	16	2	10
90 mm rigid PVC pipe	lineal metres	100	25	90
90 mm rigid PVC wye (Y) connection		18	4	0

F1. WATER DISTRIBUTION NETWORK

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
HDPE pipe 25 mm	m	140	112	112
Tee 25 mm	pieces	22	5	12
Elbow 25mm	pieces	2	2	0
Gate valves 25 mm	pieces	22	6	16
Water supply points connections	connections	22	3	16
PVC reducer 1"× 3/4"	pieces	22	3	16
PVC pressure tubing 3/4"	pieces	22	3	16

F1. WATER DISTRIBUTION NETWORK *continued*		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
PVC ball valves 3/4"	pieces	22	3	16
Elbow action taps 3/4"	pieces	22	3	16
Sink	pieces	22	3	4
PVC valve, tank outlet 1 1/2 "	pieces	0	0	-2
Tanks HDPE 5000 L	pieces	0	0	-2
Red plastic paint (5 kg)	pieces	0	0	2
Yellow plastic paint (5 kg)	pieces	0	0	2
Green plastic paint (5 kg)	pieces	0	0	2
Teflon	rolls	48	12	80

F2. ELECTRICITY

		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Generator 250 KVA	pieces	0	0	1
Protective electrical panels	pieces	1	1	7
Earthing system	pieces	0	0	1
Cable 2 × 1.5 mm	m	115	115	2,540
Cable 3G2.5 mm	m	160	160	4,360
Cable 5G6 mm	m	0	0	200
Cable 5G16 mm	m	0	0	500
Cable 4 × 25	pieces	0	0	50
Staples for cable (100-unit box)	pieces	1	1	21
Connection boxes	pieces	6	6	126
Connection plugs	pieces	6	6	126
Wall sockets	m	30	40	500
LED lights 10W	pieces	20	20	80
Metal tray for cable conduction	pieces	20	20	120

F2. TELECOM

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Radio system	pieces	0	0	1
Internet system	pieces	0	0	1

F2. FIRE SAFETY

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Extinguishers CO_2 6 kg	pieces	2	2	14
Extinguishers ABC powder 6 kg	pieces	0	0	2

F2. VENTILATION

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Individual ventilators	pieces	20	40	20
Portable HEPA filtration units	pieces	2	1	1

F4. WASTE MANAGEMENT

ITEM	Units	Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
		Total qty	Total qty	Total qty
Pedal opening bins 30 L (infectious waste)	pieces	4	4	14
Biohazard bags	pieces	250	250	1,000
IPC box 3 L (sharp waste)	pieces	2	2	6
IPC bins 30 L (general waste)	pieces	0	0	8
IPC wheeled bins 120 L (3 colours)	pieces	0	0	3
IPC bucket for disinfection 120 L	pieces	0	0	2
Pressure washer	pieces	0	0	1

F4. HYGIENE AND ENVIRONMENTAL CLEANING		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Liquid soap dispensers	pieces	20	3	4
Liquid soap	pieces	10	10	50
Alcohol-based hand rub	pieces	24	24	12
Chlorine, NaDCC 65%	pieces	10	10	20
IPC bucket for laundry 120 L	pieces	2	2	4
IPC bucket for washing 15 L	pieces	2	2	2
IPC sprayers 10 L	pieces	1	1	2
IPC body bags	pieces	10	10	20
IPC mops	pieces	1	1	2

F4. EQUIPMENT AND FURNITURE		Ward module suspected 20 beds	Ward module confirmed 20 beds	Core area +20 SIPA beds
ITEM	Units	Total qty	Total qty	Total qty
Medical equipment, X-ray	pieces	0	0	2
Furniture, tables	pieces	1	1	4
Furniture, chairs	pieces	20	5	30
Furniture, mirrors	pieces	1	1	17
Furniture, clocks	pieces	1	1	6
Furniture, benches	pieces	0	0	6
Furniture, shelves	pieces	0	0	12
Furniture, beds	pieces	20	40	22
Signage	pieces	2	2	32

A1 Module, PPE

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YMEQGLASWSI--AI	GOGGLES PROTECTIVE, wraparound, soft frame, indirect vent	300	540	780	1020	1260	1500
PEXTALCOIG---AI	ALCOHOL-BASED HAND RUB, gel, 100 mL, bottle	60	108	156	204	252	300
EWASBAGBR007 -AI	BAG BIOHAZARD, REFUSE,AUTOCLAVABLE , 30 × 50 cm, yellow	100	180	260	340	420	500
EWASYCHN5GI--AI	CHLORINE NaDCC, 45–55%, granules, 1 kg, pot	8	15	21	28	34	40
CPPEGOWI3L---AI	GOWN,AAMI level 3, nonsterile, disp., size L	540	972	1404	1836	2268	2700
CPPEGOWI3M ---AI	GOWN,AAMI level 3, nonsterile, disp., size M	630	1134	1638	2142	2646	3150
CPPEGOWI3XL--AI	GOWN,AAMI level 3, nonsterile, disp., size XL	450	810	1170	1530	1890	2250
CPPEGOWI3XXL-AI	GOWN,AAMI level 3, nonsterile, disp., size XXL	180	324	468	612	756	900
CMSUGLENILI--AI	GLOVE EXAMINATION, nitrile, size L	22,00	3,960	5,720	7,480	9,240	11,000
CMSUGLENIMI--AI	GLOVE EXAMINATION, nitrile, size M	4,200	7,560	10,920	14,280	17,640	21,000
CMSUGLENISI--AI	GLOVE EXAMINATION, nitrile, size S	4,200	7,560	10,920	14,280	17,640	21,000
CMSUGLENIXL--AI	GLOVE EXAMINATION, nitrile, size XL	1,600	2,880	4,160	5,440	6,720	8,000
CPPEMASS2RL--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size L	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASS2RM--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size M	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASS2RS--AI	MASK SURGICAL, type IIR, level 2, s.u., nonsterile, earloop, size S	1,100	1,980	2,860	3,740	4,620	5,500
CPPEMASPF205-AI	RESPIRATOR, mask, FFP2/N95, type IIR, single use, unvalved, noseclip	6,000	10,800	15,600	20,400	25,200	30,000
CPPEFSHIE002-AI	FACESHIELD,clear plastic, disp.	2,700	4,860	7,020	9,180	11,340	13,500
CMSUTHERIOI--AI	THERMOMETER, INFRARED, no contact, handheld	30	54	78	102	126	150
CINSCONTC51--AI	SAFETY BOX, needles/syringes, 5L, cardboard for incineration	40	72	104	136	168	200
OPACUN62BS1--AI	BOX, triple packaging, biological substance UN3373 + pouch	100	180	260	340	420	500
OPACUN621SI--AI	BOX, triple packaging, infectious substance UN2814	20	36	52	68	84	100
CMSUBAGB4A04-AI	BAG BODY, 8 handles, U-shaped zip, white, 400 microns, adult, 230 × 100 cm	20	36	52	68	84	100

A2.2 Personal protective equipment (PPE) and scrubs

Source: *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, WHO, March 2020*

Kit staff module, uniform × 4 shifts

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YPPESTUTROSS-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (S)	50	80	112	142	172	200
YPPESTUTROSM-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (M)	88	140	196	249	301	350
YPPESTUTROSL-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (L)	75	120	168	213	258	300
YPPESTUTROSXLAI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (XL)	38	60	84	107	129	150
OUFBOOTW38--AI	BOOTS, rubber, size (38), dark colour (green or black), pair	32	50	70	89	108	125
OUFBOOTW40--A1	BOOTS, rubber, size (40), dark colour (green or black), pair	63	100	140	178	215	250
OLIFBOOTW42--AI	BOOTS, rubber, size (42), dark colour (green or black), pair	50	80	112	142	172	200
OUFBOOTW44--AI	BOOTS, rubber, size (44), dark colour (green or black), pair	38	60	84	107	129	150
OLIFBOOTW46--A1	BOOTS, rubber, size (46),dark colour (green or black), pair	19	30	42	54	65	75

Kit nCoV hygienist staff module × 4 shifts: uniform and PPE

WHO CODE	WHO description	Model S 100 beds	Model L 180 beds	Model L 260 beds	Model L 340 beds	Model XL 420 beds	Model XL 500 beds
		Qty kit nCoV 100 patients	Qty kit nCoV 180 patients	Qty kit nCoV 260 patients	Qty kit nCoV 340 patients	Qty kit nCoV 420 patients	Qty kit nCoV 500 patients
YPPESTUTROSS-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (S)	50	80	112	142	172	200
YPPESTUTROSM-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (M)	88	140	196	249	301	350
YPPESTUTROSL-AI	SET, TUNIC + TROUSERS SURGICAL. woven, reusable, green, size (L)	75	120	168	213	258	300
YPPESTUTROSXLAI	SET, TUNIC+ TROUSERS SURGICAL. woven, reusable, green, size (XL)	38	60	84	107	129	150
OUFBOOTW38--AI	BOOTS, rubber, size (38),dark colour (green or black), pair	32	50	70	89	108	125
OUFBOOTW40--A1	BOOTS, rubber, size (40),dark colour (green or black), pair	63	100	140	178	215	250
OLIFBOOTW42--AI	BOOTS, rubber, size (42),dark colour (green or black), pair	50	80	112	142	172	200
OUFBOOTW44--AI	BOOTS, rubber, size (44), dark colour (green or black), pair	38	60	84	107	129	150
OLIFBOOTW46--A1	BOOTS, rubber, size (46),dark colour (green or black), pair	19	30	42	54	65	75
CPPEMASPF205-AI	RESPIRATOR, mask, FFP2/N95, type IIR, single use, unvalved, noseclip	48	64	80	96	112	128
YMEQGLASWSI–AI	GOGGLES PROTECTIVE, wraparound, soft frame, indirect vent	48	64	80	96	112	128
	APRON, disposable	1,440	1,920	2,400	2,880	3,360	3820
	APRON HEAVY DUTY, reusable	48	64	80	96	112	128

Kit COVID-19 – module medical equipment

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
Severe	Monitoring	Patient monitor	Equipment	MONITOR PATIENT, NIBP, w/o ECG, battery, trolley, +acc.	Per bed	1		80	80
Severe	Oxygen therapy	Pulse oximeter	Equipment	PULSE OXIMETER – FINGERTIP	Per bed	0.8		64	65
Severe	Oxygen therapy	Concentrator O^2	Equipment	CONCENTRATOR O2 10L, 230V, 50 Hz + acc.	Per bed	1		80	81
Severe	Oxygen therapy	Concentrator O^2	Accessories	(humidifier) HOSE CONNECTOR	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Accessories	HUMIDIFIER, autoclavable	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Accessories	(concentr. O2) FLOW SPLITTER paediat., 5 flowmeters 0-2L/min	Per equipment			8	9
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2.1m, 2 prongs + tube, adult	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, paediatric	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, neonate	Per case		0.05	6	6
Severe	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, adult, non-sterile, single use	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, paediatric, non-sterile, single use	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , adult	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , paediatric	Per case		0.15	18	17
Severe	Oxygen therapy	Concentrator O^2	Consumables	Catheter, nasal, 8 Fr, 40 cm, with lateral eyes, sterile, single use	Per case		0.8	92	92
Severe	Oxygen therapy	Concentrator O^2	Consumables	CONNECTOR, biconical, symmetric, ext. diam. 7–11 mm, autoclavable	Per case		1	115	114
Severe	Oxygen therapy	Concentrator O^2	Consumables	TUBE, silicone, autoclavable, int. diam. 5 mm, 25 m	Per case		2	229	229
Severe	Oxygen therapy	O_2 wall	Equipment	Flowmeter, Thorpe tube, for oxygen 0-15 L/min	Per bed	2		160	161
Severe	Oxygen therapy	CPAP, infant	Equipment	CPAP 10 machine, w/twin flowmeters	Per bed	0.01		1	1
Severe	Oxygen therapy	CPAP, adult	Equipment	CPAP unit w/nasal tubing and mask for adult	Per bed	0.08		7	6
Severe	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, MECHANICAL + collection bottles	Per centre			12	0
Severe	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam.8 mm, 10 m	Per case		0.025	3	3
Severe	Drug administration	Drop counter	Equipment	ELECTRONIC DROP COUNTER, IV fluids infu. gravity monitor, alarm, batt. AA	Per bed	1		80	81
Severe	Blood chemistry	Chemistry analyser	Equipment	CLINICAL CHEMISTRY ANALYSER	Per centre			3	0
Severe	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE for chemistry analyser (lactic acidosis and hyperlactataemia)	Per case		2	229	229
Severe	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE (metabolic status and renal function)	Per case		1	115	114
Severe	Blood Chemistry	Chemistry Analyser	Consumables	CONTROL, solution 1	Per equipment			6	0

Source: *Electro-mechanical medical equipment for NCoV case management WHE/OSL V 1.0*

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
Severe	Blood Chemistry	Chemistry analyser	Consumables	CONTROL, solution 2	Per equipment			6	0
Severe	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 3	Per equipment			6	0
Severe	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 2 mL green	Per case		2	229	229
Severe	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 4 mL green	Per case		2	229	229
ICU	Monitoring	Patient monitor	Equipment	MONITOR PATIENT, multiparamet, ECG/CAPNO/SpO2/NIBP/Temp,230V,+acc	Per bed	1		20	NA
ICU	Monitoring	Patient monitor	Consumables	(ECG) ELECTRODE GEL, bottle	Per case		0.05	3	NA
ICU	Oxygen therapy	Pulse oximeter	Equipment	PULSE OXIMETER – FINGERTIP	Per bed	0.8		16	NA
ICU	Oxygen therapy	Concentrator O^2	Equipment	CONCENTRATOR O2 10 L, 230 V, 50 Hz + acc.	Per bed	1		20	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	(humidifier) HOSE CONNECTOR 9/16	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	HUMIDIFIER, autoclavable	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Accessories	(concentrator O2) FLOW SPLITTER paediat., 5 flowmeters 0–2 L/min	Per equipment			2	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2.1 m, 2 prongs + tube, adult	Per case		0.8	35	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, paediatric	Per case		0.15	7	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	NASAL OXYGEN CANNULA, 2 prongs + tube, neonate	Per case		0.05	3	NA
ICU	Oxygen therapy	Concentrator O^2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, adult, non-sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Mask, oxygen, with connection tube, reservoir bag and valve, high-concentration, paediatric, non-sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , adult	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Venturi mask, with percent O2 lock + 2.1 m tubing , paediatric	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	Catheter, nasal, 8 Fr, 40 cm, with lateral eyes, sterile, single use	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	CONNECTOR, biconical, symmetric, ext. diam. 7–11 mm, autoclavable	Per case		1	43	NA
ICU	Oxygen therapy	Concentrator O2	Consumables	TUBE, silicone, autoclavable, int. diam. 5 mm, 25 m	Per case		2	86	NA
ICU	Oxygen therapy	O2 wall	Equipment	FLOWMETER, Thorpe tube, for oxygen 0–15 L/min	Per bed	2		40	NA
ICU	Airway management	Independent	Equipment	CRICOTHYROTOMY, SET, emergency, 6 mm, sterile, single use, w/acc.	Per centre			12	NA
ICU	Airway management	Independent	Consumables	AIRWAY, NASOPHARYNGEAL, sterile, set, single use (from Fr20 to Fr36)	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	AIRWAY, OROPHARYNGEAL, Guedel, sterile, set, single use (00, 0, 1, 2, 3, 4, 5)	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Bougie, sterile, single use, Fr15, 70cm	Per case		1	43	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Bougie, sterile, single use, Fr10, 60cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Stylet, sterile, single use, Fr14, 30 to 45 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	ENDOTRACHEAL TUBE INTRODUCER, Stylet, sterile, single use, Fr10, 30 to 45 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 2, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 2.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 3, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 3.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 4, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No.5, w/o cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 4, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 5, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 6, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 7, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No.8, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	TUBE, ENDOTRACHEAL, No. 9, w/ cuff, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 2, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 3, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LARYNGEAL MASK AIRWAY (LMA), size 4, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	COLORIMETRIC END TIDAL CO2 DETECTOR, adult, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	COLORIMETRIC END TIDAL CO2 DETECTOR, paediatric, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	SYRINGE, Luer slip, 10 mL, sterile, single use	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	LUBRICATING jelly, 5 g, box of 150	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, paediatric, 15 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, child, 19 cm	Per case		1	43	NA
ICU	Airway management	Independent	Consumables	FORCEPS, MAGILL, adult, 24 cm	Per case		1	43	NA
ICU	Airway management	Laryngoscope, adult	Equipment	LARYNGOSCOPE, fib.opt, ad/ch, diam. 28 mm, blades (Macintosh2/3/4 + Miller1), sp. bulbs	Per case			24	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Airway management	Laryngoscope, infant	Equipment	LARYNGOSCOPE, fib. opt, neonate, diam.19 mm, blades (Macintosh 0/1/2), sp. bulbs, batt.	Per centre			12	NA
ICU	Mechanical ventilation	Resuscitator, adult	Equipment	SELF-INFLATING BAG, ad./child + masks RH5 / RH2 (Ambu type)	Per centre			12	NA
ICU	Mechanical ventilation	Resuscitator, infant	Equipment	SELF-INFLATING BAG, child/neonate + masks RH2/S1 (Ambu type)	Per centre			6	NA
ICU	Mechanical ventilation	Suction device	Equipment	SUCTION BULB, for newborn, reusable, autoclavable	Per centre			6	NA
ICU	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, MECHANICAL + collection bottles	Per centre			12	NA
ICU	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam. 8 mm, 10 m	Per case		0,025	2,00	NA
ICU	Mechanical ventilation	Independent	Consumables	FILTER, HEAT AND MOISTURE EXCHANGER (HMEF), high efficiency, with connectors, adult, single use	Per case		0,8	35	NA
ICU	Mechanical ventilation	Independent	Consumables	FILTER, HEAT AND MOISTURE EXCHANGER (HMEF), high efficiency, with connectors, paediatric, single use	Per case		0,2	9	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 10 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 12 Fr, 90 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 14 Fr, 90 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 6 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	TUBE, FEEDING, NASOGASTRIC, 8 Fr, 50 cm, ENFit tip, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 1 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 10 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 2.5 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 20 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 5 mL, LDT, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	SYRINGE, FEEDING, 60 mL, ENFit, sterile, single use	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	LUBRICATING jelly, 50 g, tube	Per bed	1		20	NA
ICU	Gastro-enteral feeding	Independent	Consumables	PAD, absorbent	Per case		1	43	NA
ICU	Gastro-enteral feeding	Independent	Consumables	BASIN, KIDNEY, stainless steel, 825 mL	Per bed	1		20	NA
ICU	Gastro-enteral feeding	Independent	Consumables	STETHOSCOPE, binaural, double cup, adult/child, single use	Per bed	1		20	NA
ICU	Central line	Independent	Consumables	CENTRAL VENOUS CATHETERS KIT	Per case		1	43	NA
ICU	Central line	Independent	Consumables	Transparent adhesive plasters, washproof, 5 × 5 cm	Per case		3	129	NA
ICU	Urine collection	Independent	Consumables	Bag, collecting, urine, with outlet tap, with non-return valve, 2000 mL, adult, non-sterile, single use	Per case		1	43	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 10 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 12 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 14 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 16 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 18 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 20 Fr, sterile, single use	Per case		1	43	NA
ICU	Urine collection	Independent	Consumables	CATHETER, URETHRAL, Foley, 2-way, 8 Fr, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Compress, gauze, 10 × 10 cm, 8 to 12 ply, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Tape, surgical, hypoallergenic, 5 × 2.5 cm	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Drape, surgical, nonwoven, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, large, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, medium, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Gloves, examination, nitrile, powder-free, pair-packed, small, sterile, single use	Per case		1	43	NA
ICU	General supplies	Independent	Consumables	Antiseptic wipe with alcohol and chlorhexidine	Per case		1	43	NA
ICU	Blood Chemistry	Independent	Consumables	Arterial blood sample kits	Per case		1	43	NA
ICU	Mechanical ventilation	Patient ventilator	Equipment	VENTILATOR PATIENT, for adult, paediatric and neonate w/acc.	Per bed	0.5		10	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), ADULT, single use	Per case		0.8	35	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), PAEDIATRIC, single use	Per case		0.15	7	NA
ICU	Mechanical ventilation	Patient ventilator	Consumables	Breathing circuit (tubes/balloon/valves/mask), NEONATE, single use	Per case		0.05	3	NA
ICU	Oxygen therapy	HFNC	Equipment	High flow nasal cannula (HFNC)	Per bed	0.5		10	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, small, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, medium, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Optiflow + nasal cannula, large, pack of 20	Per case		1	43	NA
ICU	Oxygen therapy	HFNC	Consumables	Disinfection kit	Per case		0,8	35	NA
ICU	Oxygen therapy	HFNC	Consumables	Cleaning sponge stick, pack of 20	Per case		0.15	7	NA
ICU	Oxygen therapy	HFNC	Consumables	Disinfection filter, pack of 2	Per case		0.05	3	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Oxygen therapy	Suction pump	Equipment	SUCTION PUMP, ELECTRICAL, 100–230 V, 50–60 Hz	Per bed	1		20	NA
ICU	Oxygen therapy	Suction pump	Consumables	BACTERIA FILTER, unit	Per case		0.5	22	NA
ICU	Oxygen therapy	Suction pump	Consumables	TUBE, silicone, autoclavable, int. diam. 8 mm, 10 m	Per case		1	43	NA
ICU	Drug administration	Infusion pump	Equipment	INFUSION PUMP	Per bed	1		20	NA
ICU	Drug administration	Infusion pump	Consumables	(infusion pump) INFUSION LINE	Per case		2	86	NA
ICU	Drug administration	Drill	Equipment	DRILL, FOR VASCULAR ACCESS, with transport bag	Per centre			3	NA
ICU	Drug administration	Drill	Consumables	NEEDLE + STABILIZER KIT, 15 G, 15 mm, PAEDIATRIC	Per case		0.1	5	NA
ICU	Drug administr-ation	Drill	Consumables	NEEDLE + STABILIZER KIT, 15 G, 25 mm, ADULT	Per case		0.08	4	NA
ICU	Monitoring	Defibrillator	Equipment	DEFIBRILLATOR, mobile, semi-auto., multi-paramet, AC/DC, w/acc + trolley	Per centre			3	NA
ICU	Monitoring	Defibrillator	Consumables	(defibrillator) ELECTRODE PADS, adult, adhesive, disp.	Per case		0.08	4	NA
ICU	Monitoring	Defibrillator	Consumables	(defibrillator) ELECTRODE PADS, paediatric, adhesive, disp.	Per case		0.02	1	NA
ICU	Monitoring	ECG	Equipment	ELECTROCARDIOGRAPH, portable, 3 ch + ACC	Per centre			3	NA
ICU	Monitoring	ECG	Consumables	(ECG) RECORDING PAPER, pack	Per bed-day			6	NA
ICU	Monitoring	ECG	Consumables	(ECG) ELECTRODE GEL, bottle	Per case		0.01	1	NA
ICU	Diagnostic imaging	Ultrasound	Equipment	ULTRASOUND, SYSTEM, MOBILE, transducer, trolley, 220 V, w/acc.	Per centre			3	NA
ICU	Diagnostic imaging	Ultrasound	Consumables	(ultrasound transducer) CONDUCTIVE GEL, 5 L, container	Per case		0.01	1	NA
ICU	Blood chemistry	Chemistry analyser	Equipment	CLINICAL CHEMISTRY ANALYSER	Per centre			3	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE for chemistry analyser (lactic acidosis and hyperlactatemia)	Per case		2	86	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CARTRIDGE (metabolic status and renal function)	Per case		1	43	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 1	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 2	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	CONTROL, solution 3	Per equipment			6	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 2 mL green	Per case		2	86	NA
ICU	Blood chemistry	Chemistry analyser	Consumables	TUBE, VACUUM, plastic, Li-HEPARIN, 4 mL green	Per case		2	86	NA

Kit COVID-19 – module medical equipment - *continued*

Medical area	Medical purpose	Medical item	Type	Designation (EN)	Variable	Per bed	Per case	Model S 100 beds	Each increase of 80 moderate beds
ICU	Monitoring	Table, neonate	Equipment	Table, resuscitation, neonate	Per centre			6	NA
Ancillary	Drug administration	Scale, infant	Equipment	INFANT SCALE, electronic, 0–20 kg	Per centre			6	NA
Ancillary	Drug administration	Scale, adult	Equipment	SCALE, electronic, 50 g/0–200 kg	Per centre			6	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	AUTOCLAVE, 39 L, with single burner	Per centre			3	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Indicator, TST (Time, Steam, Temperature), Type 5	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Paper sheet, crepe, for sterilization, 60 g/m2, 90 × 90 cm	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Paper sheet, non-woven, for sterilization, 120 × 120 cm	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Consumables	Tape, adhesive, indicator Type 1, for steam sterilizer, 18 mm × 48 m	Per bed-day			300	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	Kerosene stove, electric heating plate	Per centre			3	NA
Ancillary	Sterilization	Autoclave, 39 L	Equipment	Timer	Per centre			3	NA

Acc, accessories; CPAP, continuous positive airway pressure; ICU, intensive care unit; int. diam., internal diameter; LDT, low-dose tip; Li-HEPARIN, lithium heparin; NA, not applicable; s.u., single use; ster., sterile; w/, with; w/o, without.

A2.4 Medical drugs

Source: ECOVID-19 100 PATIENT KIT - MODULE DRUGS & Med Supplies_050320_2

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo

WHO CODE	WHO Description	Total qty
PINJADEN6A---A1	ADENOSINE, 3 mg/mL, 2 mL, amp.	15
PEXTALCO1G---A1	ALCOHOL-BASED HAND RUB, gel, 100 mL, bottle	100
PEXTALCO5S---A1	ALCOHOL-BASED HAND RUB, solution, 500 mL, bottle	50
PINJAMIO1A---A1	AMIODARONE hydrochloride, 50 mg/mL, 3 mL, amp.	15
PORLAMOC15S1-A1	AMOXICILLIN 125 mg/CLAVULANIC acid 31.25mg, eq.156.25 mg/5 mL, oral suspension, 100 mL bottle	50
PORLAMOC5T1--A1	AMOXICILLIN 500 mg/CLAVULANIC acid 125 mg, eq. 625 mg/tab, tablet	200
PORLAMOX2T---A1	AMOXICILLIN, 250 mg, tab.	200
PORLAMOX5T---A1	AMOXICILLIN, 500 mg, tab.	1000
PINJAMPI1V---A1	AMPICILLIN, 1 g, powder, vial	250
PINJAMPI5V---A1	AMPICILLIN, 500 mg, powder, vial	100
PORLASCA2T---A1	ASCORBIC acid (vitamin C), 250 mg, tab.	200
PORLATEN5T---A1	ATENOLOL, 50 mg, tab.	100
PINJATRO1A---A1	ATROPINE sulfate, 1 mg/mL, 1 mL, ampoule	20
PORLAZIT2S---A1	AZITHROMYCIN, 200 mg/5 mL, powder oral suspension, 15 mL, bottle	50
PORLAZIT2T---A1	AZITHROMYCIN, 250 mg, tab.	100
PORLAZIT5T---A1	AZITHROMYCIN, 500 mg, tab	200
PINJPENB5V---A1	BENZYLPENICILLIN, 5 MIU (3 g), powder, vial	100
PINJCALG1A1--A1	CALCIUM GLUCONATE, 100 mg/mL, 10 mL, ampoule	25
PINJCEFT25V--A1	CEFTRIAXONE sodium, 250 mg, powder, vial	200
PINJCEFT1V---A1	CEFTRIAXONE sodium, eq. 1 g base, powder for injection, vial	500
PORLCHLA5T---A1	CHLORAL HYDRATE, 500 mg, tab.	250
PEXTCHLH1C15SA1	CHLORHEXIDINE digluconate 1.5% + CETRIMIDE 15%, solution, 1000 mL, bottle	50
PORLCHLM2T---A1	CHLORPROMAZINE hydrochloride, eq. 25 mg base, tab.	100
PINJCLOX5V---A1	CLOXACILLIN sodium salt, 500 mg, powder, vial	300
PORLCLOX2C---A1	CLOXACILLIN sodium, eq. 250 mg base, caps.	100
PINJDEXA4A---A1	DEXAMETHASONE phosphate, 4 mg/mL, 1 mL, ampoule	200
PINJDEXM1A2--A1	DEXMEDETOMIDINE, 100 mcg/mL, IV, 2 mL amp.	30
PINFDEXT5N1--A1	DEXTROSE (GLUCOSE) 5%, 1 L, plastic pouch	50
PINFDEXT5N5--A1	DEXTROSE (GLUCOSE) 5%, 500 mL, plastic pouch	20

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo - *continued*

WHO CODE	WHO Description	Total qty
PORLDOXY1T---A1	DOXYCYCLINE salt, 100 mg, tab.	300
PINJEPIN1AV--A1	EPINEPHRINE (adrenaline) tartrate, eq. 1 mg/mL base, 1 mL amp. IV	100
PINJFLUM1A5--A1	FLUMAZENIL, 0.1 mg/mL, IV, 5 mL amp.	15
PINJFURO1A---A1	FUROSEMIDE, 10 mg/mL, 2 mL, ampoule	100
PORLFURO4T---A1	FUROSEMIDE, 40 mg, tab.	100
PINJGLUC5V5--A1	GLUCOSE hypertonic, 50%, 50 mL, vial	20
PORLGLYT3T---A1	GLYCERYL TRINITRATE, 0.3 mg, sublingual tab.	100
PINJGLYT5A1--A1	GLYCERYL TRINITRATE, 5 mg/mL, for infusion, 10 mL amp.	15
PINJHYDA2A---A1	HYDRALAZINE hydrochloride, 20 mg, powder, ampoule	40
PORLHYDO5T---A1	HYDROCHLOROTHIAZIDE, 50 mg, tab.	100
PINJHYDR1V---A1	HYDROCORTISONE sodium succinate, eq. 100 mg base, powder, vial	100
PORLIBUP4T---A1	IBUPROFEN, 400 mg, tab.	200
PINJLIDO1V2--A1	LIDOCAINE hydrochloride, 1%, for injection, 20 mL, vial	100
PINJMAGS5A1--A1	MAGNESIUM sulfate, 500 mg/mL, 10 mL, ampoule	40
PINJMETO5A---A1	METOCLOPRAMIDE hydrochloride, 5 mg/mL, 2 mL, amp.	500
PINJMPRO1A---A1	METOPROLOL tartrate, 1 mg/mL, IV injection, 5 mL, amp.	15
PINJMETN5SR1-A1	METRONIDAZOLE, 5 mg/mL, 100 mL, semi-rigid bot.	100
PORLMULT1T---A1	MULTIVITAMINS, tab.	200
PINJNALO4A1--A1	NALOXONE hydrochloride, 0.4 mg/mL, 1 mL, ampoule	50
PINJNORA1AV4-A1	NORADRENALINE tartrate, solution for infusion, eq. 1 mg/mL base, 4 mL, amp/vial	200
PORLNYST1S---A1	NYSTATIN, 100.000 IU/mL, oral suspension	50
PORLOMEP2CG--A1	OMEPRAZOLE, 20 mg, gastro-resistant, caps.	100
PINJOMEP4V---A1	OMEPRAZOLE, 40 mg, powder, vial	100
PINJONDA2A---A1	ONDANSETRON hydrochloride, 2 mg/mL, 2 mL, amp.	50
PORLONDA4A---A1	ONDANSETRON hydrochloride, 4 mg, tab.	200
PORLORSA2S---A1	ORAL REHYDRATION SALTS (ORS) low osmolarity, sachet 20.5 g/1L	100
PORLPARA1T---A1	PARACETAMOL (acetaminophen), 100 mg, tab.	300
PINJPARA1B5--A1	PARACETAMOL (acetaminophen), 10 mg/mL, inject, 50 mL, bottle	20
PINJPARA1I1N-A1	PARACETAMOL (acetaminophen), 10mg/mL, inject., 100 mL, plastic pouch	80

Kit COVID-19 – 100 patients/20 severe: module drugs, general cargo - *continued*

WHO CODE	WHO Description	Total qty
PORLPARA1S10-A1	PARACETAMOL (acetaminophen), 120 mg/5 mL, syrup, 100 mL, bottle	80
PORLPARA5T---A1	PARACETAMOL (acetaminophen), 500 mg, tab.	2000
PORLPHEY10T--A1	PHENYTOIN sodium, 100 mg, coated tab.	450
PINJPHEY5V5--A1	PHENYTOIN sodium, 50 mg/mL, 5 mL, vial	100
PINJPOTC1A---A1	POTASSIUM chloride, 100 mg/mL, 10 mL, amp.	100
PORLPRED5T---A1	PREDNISOLONE, 5 mg, tab.	1000
PORLRANI1T---A1	RANITIDINE, 150 mg, tab.	75
PINFRINL1N1--A1	RINGER lactate, 1L, plastic pouch	400
PINFRINL1N5--A1	RINGER lactate, 500 mL, plastic pouch	50
PORLSALB2S---A1	SALBUTAMOL sulfate, eq. 0.1mg base/puff, 200 puffs, inhaler	100
PINJSODB8A2--A1	SODIUM BICARBONATE, 8.4%, 1 mEq/mL, 20 mL amp.	10
PINFSODC9N1--A1	SODIUM chloride, 0.9%, 1L, plastic pouch	100
PINFSODC9N5--A1	SODIUM chloride, 0.9%, 500 mL, plastic pouch	25
PORLSULF4T8T-A1	SULFAMETHOXAZOLE 400 mg/TRIMETHOPRIM 80 mg, tab.	200
PORLTHIA5T---A1	THIAMINE hydrochloride (vitamin B1), 50 mg, tab.	100
PINJWATE1A1--A1	WATER for injection, 10 mL, ampoule	4000
PORLYINS2T---A1	ZINC sulfate, eq. to 20 mg zinc mineral, dispersible tab.	100
	Saline ampoules, 10 cc	
	Linezoli IV	
	Heparin LMW	
	Lacilube	

Kit COVID-19 - 100 patients/20 severe: module drugs, cold chain

WHO CODE	WHO Description	Total qty
PINJATRB1A5--A1	ATRACURIUM BESILATE, 10mg/mL, 5mL, amp. INSULIN RAPID (Actrapid), rDNA insul.,100 IU/mL, 10mL, vial SUXAMETHONIUM CHLORIDE, 50mg/mL, 2mL, amp.ADENOSINE, 3 mg/mL, 2 mL, amp.	45
PINJINSH1V1R-A1	ALCOHOL-BASED HAND RUB, gel, 100mL, bottle	25
PINJSUXA5A2--A1	ALCOHOL-BASED HAND RUB, solution, 500mL, bottle	45

Kit COVID-19 – 100 patients/20 severe: module drugs, controlled drugs

WHO CODE	WHO Description	Total qty
PORLDIAZ5T-–A1	DIAZEPAM, 5 mg, tab.	100
PINJDIAZ5A2--A1	DIAZEPAM, 5 mg/mL, 2 mL, amp.	100
PINJFENT1A-–A1	FENTANYL citrate, e.q. 0.05 mg/mL base, 2 mL, amp.	50
PINJFENT5A-–A1	FENTANYL, 0.05 mg/mL, 10mL, amp.	50
PINJHALP5A1--A1	HALOPERIDOL, 5 mg/mL, solution for injection, 1 mL, ampoule	200
PINJKETA5V---A1	KETAMINE hydrochloride, eq. 50 mg/mL base, 10 mL, vial	50
PINJMIDA5A3–A1	MIDAZOLAM, 5 mg/mL, 3mL, amp.	50
PINJMORP10A1-A1	MORPHINE sulfate, 10 mg/mL, 1 mL, amp.	100
PINJPHEN20A1-A1	PHENOBARBITAL (sodium), 200 mg/mL, 1 mL, amp.	100
PORLPHEN5T---A1	PHENOBARBITAL, 50 mg, tab.	100
PINJPROP1A-–A1	PROPOFOL, 10 mg/mL, 10 mL, amp.	100

Kit COVID-19 – 100 patients/20 severe: supplies for medicine administration

MEDICAL PURPOSE	WHO CODE	WHO Description	Total qty
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, large, non-sterile, single use	300
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, medium, non-sterile, single use	200
Injection, intravenous, infusion		Gloves, examination, nitrile, powder-free, small, non-sterile, single use	100
Injection, intravenous, infusion	CINSSETI2----A1	SET, INFUSION 'Y', Luer lock, air inlet, sterile, single use	2,000
Injection, intravenous, infusion		Infusion giving set, with air intake, with injection port, with burette, sterile, single use	200
Injection, intravenous, infusion	CINSIVCRW16–A1	IV CATHETER, retractable, 16 G (1.7 × 45 mm), wings, grey	200
Injection, intravenous, infusion	CINSIVCRW18--A1	IV CATHETER, retractable, 18 G (1.2 × 45 mm), wings, green	200
Injection, intravenous, infusion	CINSIVCRW20–A1	IV CATHETER, retractable, 20 G (1.0 × 32 mm), wings, pink	200
Injection, intravenous, infusion	CINSIVCRW22–A1	IV CATHETER, retractable, 22 G (0.8 × 25 mm), wings, blue	200
Injection, intravenous, infusion	CINSIVCRW24--A1	IV CATHETER, retractable, 24 G (0.7 × 19 mm), wings, yellow	200
Injection, intravenous, infusion	CINSSCAV21---A1	SCALP VEIN, butterfly needle, 21 G (0.8 × 19 mm), single use, sterile, green	200

Kit COVID-19 – 100 patients/20 severe: supplies for medicine administration - *continued*

MEDICAL PURPOSE	WHO CODE	WHO Description	Total qty
Injection, intravenous, infusion	CINSSCAV23-–A1	SCALP VEIN, butterfly needle, 23 G (0.6 × 19 mm), single use, sterile, blue	200
Injection, intravenous, infusion	CINSSCAV25---A1	SCALP VEIN, butterfly needle, 25 G (0.5 × 19 mm), single use, sterile, orange	200
Injection, intravenous, infusion	CINSEXTS3----A1	Stopcock, 3-way, for infusion giving set, with connection line, sterile, single use	200
Injection, intravenous, infusion		Stopper/closing cone, for IV sets, with male and female Luer lock, sterile, single use	2,000
Injection, intravenous, infusion	CINSNEED18H1-A1	NEEDLE, hypodermic, Luer, 18 G, sterile, single use, pink	200
Injection, intravenous, infusion	CINSNEED19H1-A1	NEEDLE, hypodermic, Luer, 19 G × 1.5" (1.1 × 40 mm), sterile, single use, cream	200
Injection, intravenous, infusion	CINSNEED21H1-A1	NEEDLE, hypodermic, Luer, 21 G × 1.5" (0.8 × 40 mm), sterile, single use, green	300
Injection, intravenous, infusion	CINSNEED22H1-A1	NEEDLE, hypodermic, Luer, 22 G, sterile, single use, black	200
Injection, intravenous, infusion	CINSNEED23H1-A1	NEEDLE, hypodermic, Luer, 23 G × 1"(0.6 × 25mm), sterile, single use, blue	200
Injection, intravenous, infusion	CINSSYDL20---A1	SYRINGE, Luer, 20 mL, sterile, single use	100
Injection, intravenous, infusion	CINSSYDL05---A1	SYRINGE, Luer, 5 mL, sterile, single use	1,000
Injection, intravenous, infusion	CINSSYDL02---A1	SYRINGE, Luer, 2 mL, sterile, single use	1,000
Injection, intravenous, infusion	CINSSYDL10---A1	SYRINGE, Luer, 10 mL, sterile, single use	200
Injection, intravenous, infusion	YMEQTOURR01--A1	TOURNIQUET, elastic, rubber, latex free, single use, 100 × 1.8 cm	20
Injection, intravenous, infusion	CINSCONTC51–A1	SAFETY BOX, needles/syringes, 5 L, cardboard for incineration	20
Injection, intravenous, infusion		Adhesive plasters, washproof, spot shape or 2 × 1.3 cm	2,500
Injection, intravenous, infusion		IODINE POVIDONE, 10%, solution, 1 L, bottle	8
Injection, intravenous, infusion	CDRECOTW5R---A1	COTTON WOOL, hydrophilic, 500 g, roll	20
Injection, intravenous, infusion		COMPRESS, GAUZE, 10 × 10 cm, 8 plys, 17 thr., sterile, 2 pcs	1,000
Injection, intravenous, infusion		COMPRESS, GAUZE, 10 × 20 cm, 12 plys, 17 threads, non-sterile	1,000
Injection, intravenous, infusion		FORCEPS, DRESSING, BLANK, 14.5 cm, atraumatic serration	4
Injection, intravenous, infusion		BOWL, ROUND, 100 mL, 80 × 35 mm, stainless steel	4
Injection, intravenous, infusion	CDRETAPZO2-–A1	ZINC OXIDE, TAPE, self-adhesive, 2.5 cm × 5 m, white, roll	50
Injection, intravenous, infusion		Spacer, for metered dose inhaler	20

COMMUNITY FACILITIES

for preparedness and response to COVID-19

isolation, treatment and step down of COVID-19 cases in community facilities

WEB ANNEX

Calculations

World Health Organization

WHO reference no.:

Source: *EMT technical consultants' assumptions based on standards*

A3.1.1 Water quantity calculations

WATER DEMAND ESTIMATE

Table A3.1L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff – around 20,000 litres per day*

WATER QUANTITY

There is enough water to drink, to prepare food, "to perform personal grooming and medical activities, cleaning and laundry at all times."

Use		Patients/person/ toilets	Unit	Quantity according to standard (litre/unit/day)	Standard[a]	Needed water supply (litres per day)
Drinking	Running water	180	Inpatient	60	Sphere/WHO	10,800
		60	EMT staff	40	Sphere/WHO	2,400
Other uses	Flush toilets	400	Toilet uses per day	5	Sphere	2,000
	Cleaning floors	8000	Total m^2 installations	0.2	–	1,600
	Cleaning inpatient	180	Inpatients' beds	20		3,600
	Cleaning toilets	14	Toilets	20	Sphere	280
						20,680

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

Table A3.2 XL Model *(180m × 100m) 480 moderate inpatients + 20 ICU beds + 140 staff*

WATER QUANTITY

There is enough water to drink, to prepare food, "to perform personal grooming and medical activities, cleaning and laundry at all times."

Use		Patients/person/ toilets	Unit	Quantity according to standard (litre/unit/day)	Standard[a]	Needed water supply (litres per day)
Drinking	Running water	500	Inpatient	60	Sphere/WHO	30,000
		140	EMT staff	40	Sphere/WHO	5,600
Other Uses	Flush toilets	12,00	Toilet uses per day	5	Sphere	6,000
	Cleaning floors	180,00	Total m^2 installations	0.2	–	3,600
	Cleaning inpatient	500	Inpatients' beds	20		10,000
	Cleaning toilets	50	Toilets	20	Sphere	1,000
						20,680

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

A3.1.2 Water storage capacity calculations

STORAGE CAPACITY: If there is a continuous water supply, it would be expedient to store a certain amount of water for contingency purposes.

Table A3.3 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff – 40,000 litres*

WATER STORAGE

There is enough water storage capacity for 48 hours' supply

Total water storage capacity required	39,440 litres/day	Number of storage tanks 1000 litres	40	Units
		OR		
		Number of storage tanks 2000 litres	20	Units
		OR		
		Number of storage tanks 5000 litres	8	Units

Table A3.4 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

WATER STORAGE

There is enough water storage capacity for 48 hours supply

Total water storage capacity required	112,400 litres/day	Number of storage tanks 5000 litres	23	Units
		OR		
		Number of storage tanks 10,000 litres	12	Units
		OR		
		Number of storage tanks 20,000 litres	6	Units

A3.1.3 Water distribution network calculations

Table A3.5 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Model L	Quantity	Units
Total pipe length	511.95	metres
Total tee 25 mm	32	units
Total elbow	4	units
Total gate valves	45	units
Total water supply points connections	24	connections

Table A3.6 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

Model XL	Quantity	Units
Total pipe length	1138.59	metres
Total tee 25 mm	64	units
Total elbow	12	units
Total gate valves	88	units
Total water supply points connections	48	connections

A3.2.1 Waste generation calculations

Table A3.7 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Average quantity of waste (kg/ bed/day)	Standard	Comments	kg/day
2	WHO	GENERAL WASTE 2 kg/patient/day	360
0.1	WHO	SHARPS 0.1 kg/patient/day	18
0.4	WHO	INFECTIOUS WASTE 0.4 kg/patient/day	72
			450 kg/day

Table A3.8 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds + 140 staff*

Average quantity of waste (kg/ bed/day)	Standard	Comments	kg/day
2	WHO	GENERAL WASTE 2 kg/patient/day	1000
0.1	WHO	SHARPS 0.1 kg/patient/day	50
0.4	WHO	INFECTIOUS WASTE 0.4 kg/patient /day	200
			1250 kg/day

A3.2.2 Waste containment calculations

Table A3.9 L Model *(100m × 80m) 160 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions:	**i)** maximum storage period for infectious waste should be 2 days; **ii)** The average density of the uncompacted waste is 200 kg/m^3 or 1000 litres/200 kg		
	Volume of waste/day (m^3)	Containment capacity for 2 days (m^3)	Containment capacity for 2 days (litres)
INFECTIOUS WASTE	0.36	0.72	720

Table A3.10 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions:	**i)** maximum storage period for infectious waste should be 2 days **ii)** The average density of the uncompacted waste is 200 kg/m^3 or 1000 litres/200 kg		
	Volume waste/day (m^3)	Working hours, treatment technology (hours)	Treatment capacity needed (kg/hour)
INFECTIOUS WASTE	72	10	8

Table A3.12 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

Containment needs for infectious waste			
Assumptions: 10 working hours			
	weight (kg/day)	Working hours, treatment technology (hours)	Treatment capacity needed (kg/hour)
INFECTIOUS WASTE	72	10	8

A3.3 Sanitation

A3.3.1 Sanitation facilities calculations

Table A3.13 L Model *(100 m × 80 m) 160 moderate inpatients + 20 ICU beds + 60 staff*

Estimating the demand for sanitation facilities TST

Adequate, accessible and culturally appropriate toilets and showers are available to patients, staff and caregivers.

Area	Facility	Quantity	Unit	Quantity according to standard ratio persons per facility	Standard[a]	Comments	WCs/ bathrooms needed
Triage/ reception	WC	1	Area	1	Sphere/ WHO	Separate facilities for males and females	2
	Basin	2	Area	1			2
2 modules of 40 beds (80 patients)	WC	80	Inpatient	20	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	8
	Shower	80	Inpatient	40			8
	Basin	2	Area	1			4
Module ICU 20 patients	WC	20	Inpatient	20	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	2
	Shower	20	Inpatient	40			2
	Basin	1	Area	1			1
Technical area	WC	4	Inpatient	1	Sphere/ WHO	For greater comfort, 20 people:1 toilet is suggested Separate facilities for males and females	4
	Shower	4	Inpatient	1			4
	Basin	4	Area	1		Waste management	4

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

Table A3.14 XL Model *(180 m × 100 m) 480 moderate inpatients + 20 ICU beds*

Estimating the demand for sanitation facilities TST

Adequate, accessible and culturally appropriate toilets and showers are available to patients, staff and caregivers.

Area	Facility	Quantity	Unit	Quantity according to standard ratio persons per facility	Standard[a]	Comments	WCs/ bathrooms needed
Triage/ reception	WC	1	Area	1	Sphere/ WHO	Separate facilities for males and females	2
	Basin	2	Area	1			2
6 module 80 patients	WC	80	Inpatient	20	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	24
	Shower	80	Inpatient	40			24
	Basin	2	Area	1			12
Module ICU 20 patients	WC	20	Inpatient	20	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	2
	Shower	20	Inpatient	40			2
	Basin	1	Area	1			1
Technical area	WC	4	Inpatient	1	Sphere/ WHO	Separate facilities for males and females For greater comfort, 20 people:1 toilet is suggested	4
	Shower	4	Inpatient	1			4
	Basin	4	Area	1		Waste management	4

[a] For further information on these standards see: Water and sanitation for health facility improvement tool (WASH FIT). World Health Organization and United Nations Children's Fund; 2018 (https://www.washinhcf.org/resources/); Adams J, Bartram J, Chartier Y. Essential environmental health standards in health care. Geneva: World Health Organization; 2008 (https://apps.who.int/iris/bitstream/handle/10665/43767/9789241547239_eng.pdf?sequence=1); chapter on water supply, sanitation and hygiene promotion in: The Sphere handbook. Sphere; 2018 (https://handbook.spherestandards.org/).

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