



May 2026

PANDEMIC MANAGEMENT PLAN **Govt Medical College Ernakulam**



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Govt. Medical College Ernakulam



Pandemic Management Plan 2026

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Message



Kerala Health has consistently recognised that pandemic preparedness is no longer a standalone activity limited to the health sector, but an essential component of public safety, governance resilience, and sustainable development. The experiences of NIPAH outbreaks, COVID-19 pandemic, emerging zoonotic threats, climate-sensitive diseases, and increasing global interconnectedness have clearly demonstrated that future public health emergencies require continuous preparedness, rapid response systems, and strong institutional coordination. In this context, the preparation of comprehensive Pandemic Preparedness Plans by the Department of Health and Family Welfare marks an important landmark towards strengthening Kerala's health security framework.

Today, pandemic management plans must be viewed through the broader lens of the One Health approach, which recognises the interconnectedness of human health, animal health, environmental systems, and ecological balance. Emerging infections are increasingly influenced by environmental degradation, climate variability, urbanisation, migration, and changing human-animal interactions. Therefore, effective preparedness requires coordinated action not only from the Health and Family Welfare Department, but also from departments including Animal Husbandry, Forests, Local Self Government, Disaster Management, Revenue, Education, Transport, Police, Water Resources, and Civil Supplies. Such interdepartmental convergence is critical for surveillance, risk communication, outbreak containment, logistics management, and continuity of essential services during emergencies.

Kerala has always demonstrated exemplary leadership in responding to public health challenges through timely action, scientific decision-making, community participation, and decentralised governance. The integration of pandemic management with disaster management systems further strengthens our capacity to respond to multiple emergencies simultaneously, including outbreaks occurring during floods, heat waves, or other natural disasters. The development of structured protocols, surveillance mechanisms, escalation frameworks, surge planning systems, infection prevention strategies, and institutional coordination models reflects the state's commitment to building a resilient and future-ready health system.

I am informed that Keralam is the only state where the pandemic preparedness plans have been prepared to such a depth right from the Panchayath level to District

and at institutional level upto Medical Colleges. I place on record my sincere appreciation to all those who worked on this endeavour. The dedication, technical expertise, and coordinated efforts demonstrated by the state and district teams are truly commendable. I am confident that these plans will further strengthen Kerala's capacity to effectively prevent, detect, and respond to future public health emergencies while ensuring the safety and wellbeing of our people.

Shri. K Muraleedharan

Minister for Health and Family Welfare and Devasom,
Government of Kerala



Foreword

Kerala Health has been taking efforts to strengthen the Medical Education. Out of various initiatives such as documentation on Medical College developments giving all the details, preparation of Fact Sheets of DME and MCH giving information regarding the outputs and outcomes, Standard treatment protocol, standardization of the units in the Medical Colleges, one more initiative was taken regarding preparedness for health emergencies such as communicable diseases which could transform into an epidemic/ pandemic. COVID has taught us many lessons. But the moot question is, “What learnings have we taken away from the Pandemic, and its aftermath?” Have we understood those learnings and worked on developing the systems for future scenarios?

And now, I say with immense pride that through Kerala Health, every Medical College has excellent pandemic management plans in place.

This preparation of pandemic management plans started with the thought of “What new systems do we need to develop across the State?” The Director of Medical Education and senior Doctors from Community Medicine and other Departments took up the challenge of preparation of plans. An elaborate process was followed by conducting state level meetings. Dr Aravind was asked to prepare a template for the Medical Colleges Plans. That template was validated in the state meeting and shared to all the Government Medical Colleges in the State. After that step, a workshop was conducted at Ernakulam Medical College involving all the teams from Medical Colleges as well as from Apex Cancer Centres. Post this workshop, all the institutions took a series of meetings at their level and completed this commendable work.

It is noteworthy to mention here that after Alappuzha, Thrissur also prepared a comprehensive Pandemic management Plan and Festival management Plan. Unfortunately, during this year's Thrissur Pooram preparations, there was a massive fire accident, but the Thrissur MCH team put the Management Protocol in practice and in a short span of time within 8 minutes, they took care of the fire disaster victims and provided exemplary services. While they were handling the incident, thanks to timely preparation and awareness, they were handling hundreds of emergencies not relating to the disaster during that period. This has clearly demonstrated to all that well-prepared planning and capacity building is the key to mitigating problems.

The Kerala Health program has to keep up with changing times, and so, along with the aforementioned initiatives, we discussed with the Digital University of Kerala

(DuK) to develop Kerala Pandemic Management System. This system envisages end-to-end solution for pandemic management. This will make things easy for the functionaries in the health institutions as well as the field functionaries to update the information. Once the pandemic management plans and Festival management plans are done, the teams will begin developing plans for calamities, other disasters and major accidents.

We are also planning mock drills so as to build the capacities of various teams. This way all the Medical Colleges teams will be well trained to manage any eventuality.

I am confident that all Medical Colleges shall institutionalize updating of plans on a yearly basis, skill building, analysis of any emergency handled and based on the analysis do modifications in the plans. This way it will be a dynamic plan of the Medical College.

For any Health System it is very important to have a system to handle any health emergency, and it is with sense of pride one can say that with the coordinated team work, this huge work was done in exemplary way. It also demonstrates that with shared vision and having 'thinking teams' at state, institution and field level can work on many challenges and deliver results. Therefore, these officers who worked on this project hands-on are mentioned right on the cover page! It is a big achievement for the Kerala Health to lay the foundation of Pandemic Management upon which further developments can be easily done.

I wholeheartedly appreciate the work done by one and all for preparing Pandemic Management Plans.

I am confident that all our Medical Colleges will become centre of excellence and earn recognition for their works. I wish all the success for the future endeavours.

Dr Rajan Khobragade IAS

Additional Chief Secretary
Health & Family Welfare and
AYUSH Department
Govt of Kerala.



Message

The health system of Kerala is defined by a mindset of proactive vigilance, a compassionate attitude toward the most vulnerable, and a historic legacy of resilience in the face of public health crises. Our motto for preparedness is simple: to be prepared and proactive is to safeguard the stability and prosperity of our people. This Pandemic Preparedness Plan is not just a technical manual; it is a shared commitment fuelled by the lessons learned from our past encounters with Nipah and COVID-19. These experiences have taught us that rapid mobilization and early detection are our most effective tools in preventing a public health emergency of international concern.

We have designed this strategy to be agile, moving from routine care to emergency surge levels based on real-time data such as ICU occupancy, staff availability, and disease epidemiology. By utilizing advanced diagnostic tools and regional surveillance cells, we aim to identify threats early, ensuring that life-saving interventions begin the moment a patient reaches our doors. Central to this plan is the safety of our workforce; we are committed to providing the training, equipment, and psychological support necessary to prevent burnout and ensure no healthcare worker faces these challenges alone.

Even in the height of a pandemic, our mission to provide essential care for mothers, children, and emergency cases will not waver. Through seamless coordination with district authorities and the private sector, we are building a networked response that maximizes resources for the benefit of every citizen. I am deeply grateful to the faculty and staff whose expertise shaped this document, and I am confident that by following these protocols, we will continue to lead with competence and compassion.

Dr. K. V. Viswanathan

Director of Medical Education
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Purpose of the Document

The primary purpose of this Pandemic Preparedness Plan is to establish a robust, scalable, and evidence-based operational framework for the Government Medical College, Ernakulam, to effectively detect, contain, and manage emerging infectious disease outbreaks. By outlining a Graduated Response Framework, this document aims to ensure the seamless transition of hospital operations from conventional care to crisis standards, minimising morbidity and mortality while safeguarding healthcare workers and the community. It serves as a centralised directive to synchronise multidisciplinary efforts, integrating clinical excellence, advanced diagnostics, and rigorous infection prevention with district-level administrative coordination. Ultimately, this plan is designed to provide institutional resilience, ensuring that even under extreme resource scarcity, the facility can provide equitable, high-quality care and maintain critical public health functions.

Key Components Addressed in this Purpose

Operational Readiness: Moving from "Blue Skies" (routine) to "Grey Skies" (crisis) without administrative delay.

Safety & Protection: Explicitly mentioning the protection of the "Human Resource Pool" (your faculty, residents, and staff).

Definitions

- **Dual-Track System**

- This system minimises the risk of nosocomial transmission by ensuring complete physical and operational separation between infectious and non-infectious patient flows.
- Dedicated staff teams are assigned to each track to avoid cross-deployment and reduce contamination risk.
- Signage, physical barriers, and security personnel are deployed at entry points to strictly enforce track segregation.
- Screening protocols, including symptom checks and exposure history, are conducted at the entry of the Pandemic Track to ensure early identification and containment.

Color-Coded Zoning

- Movement between zones is strictly regulated, with controlled access points and mandatory PPE requirements based on zone classification.
- Each zone has designated healthcare workers, equipment, and waste disposal systems to prevent inter-zone contamination.
- Transition areas (donning/doffing zones) are strategically placed between zones to ensure safe PPE handling.
- Environmental cleaning protocols vary by zone, with Red Zones requiring the highest frequency and level of disinfection.

Red Channel Protocol

- The Red Channel is activated prior to patient movement, with prior intimation to all relevant departments to ensure preparedness.
- Healthcare personnel involved in transport must wear full PPE, including N95 masks, face shields, gowns, and gloves.
- Non-essential staff and patient movement are temporarily restricted during Red Channel use to maintain isolation integrity.
- After transport, a defined downtime is observed following disinfection to ensure adequate contact time for the disinfectant.

Abbreviations

ACH	Air Changes per Hour.
AIIR	Airborne Infection Isolation Rooms
BMW	Biomedical Waste.
CIAL	Cochin International Airport.
DHS	Directorate of Health Services.
DME	Directorate of Medical Education.
ETO	Ethylene Oxide.
GMCE	Government Medical College Ernakulam.
HICC	Hospital Infection Control Committee
ICS	Incident Command System.
IDSP	Integrated Disease Surveillance Programme.
IHIP	Integrated Health Information Platform.
ILI/SARI	Influenza-Like Illness / Severe Acute Respiratory Infection.
IPC	Infection Prevention and Control..
KMSCL	Kerala Medical Services Corporation Ltd.
LMO	Liquid Medical Oxygen
NCD	Non-Communicable Disease.
OMU	Outbreak Monitoring Unit..
OT	Operation Theatre.
PHEIC	Public Health Emergency of International Concern.
PPE	Personal Protective Equipment
PRO	Public Relations Officer.
PSA	Pressure Swing Adsorption
PUI	Persons Under Investigation
RAT	Rapid Antigen Tests.
SOP	Standard Operating Procedure.

1. Introduction & Contextual Analysis

Government Medical College Ernakulam (GMCE) serves as a critical tertiary-care anchor and the premier public health teaching institution for Central Kerala. As a high-volume referral centre with extensive inpatient, outpatient, and emergency departments, GMCE bears a unique responsibility: it must function as a high-fidelity clinical hub while simultaneously acting as the primary defence against regional health threats. This document establishes a robust, scalable, and evidence-based **Pandemic Preparedness Plan** designed to ensure institutional resilience during infectious disease outbreaks.

1.1 Background & Purpose

The emergence of novel and re-emerging pathogens requires an agile, pre-defined operational strategy. The purpose of this framework is to facilitate a **rapid response within the first week of a surge** to prevent a localised outbreak from escalating into a Public Health Emergency of International Concern (PHEIC). By synchronising clinical protocols, resource mapping, and intersectoral coordination, GMCE aims to maintain a standard of care that minimises mortality while protecting its most valuable asset—its healthcare workforce.

1.2 Institutional Geography & Connectivity

GMCE's strategic location in **Kalamassery** places it at the epicentre of Kerala's industrial and transit corridor.

- **Transit Hub Proximity:** The institution is situated near major national highways, the Kochi Metro, and is within a short radius of the **Cochin International Airport (CIAL)** and major railway terminals.
- **Strategic Access:** Its wide-road accessibility allows for the rapid deployment of "Red Channel" patient transport and large-scale logistics (such as Liquid Medical Oxygen tankers) without the bottlenecks typical of urban centres.

1.3 District-Specific Risk Profile

The planning for GMCE is dictated by the unique epidemiological and environmental hazards of Ernakulam District:

- **Climate & Natural Hazards:** Frequent flooding events in the Periyar basin heighten the risk of waterborne and vector-borne diseases.

- **Endemic Trends:** Central Kerala shows persistent trends in **Leptospirosis, Dengue, and Scrub Typhus**, requiring the facility to maintain a constant baseline for infectious disease management.
- **Migrant Labour & Urban Density:** As an industrial hub, Ernakulam hosts a significant "floating" migrant population. This influx creates challenges for contact tracing and increases vulnerability to respiratory pathogens and vaccine-preventable diseases.

1.4 Scope & Objectives

This plan covers the entire institutional ecosystem—from the Outpatient Triage to the Critical Care "Oxygen War Room." The primary objectives are:

1. **Early Warning & Surveillance:** Utilising the **Outbreak Monitoring Unit (OMU)** and multiplex PCR platforms for rapid pathogen identification.
2. **Intersectoral Synergy:** Formalising communication channels with the **Directorate of Medical Education (DME)**, the **Directorate of Health Services (DHS)**, and the **District Collectorate**.
3. **Graduated Response:** Implementing a three-tier escalation model (Conventional, Contingency, Crisis) that adapts to disease epidemiology and resource availability.
4. **Mortality Mitigation:** Ensuring the continuity of critical care through a specialised Institutional Medical Board and dedicated infectious disease blocks.

2. Governance & command structure

2.1 Hospital Incident Command System (PPRC)

GMCE follows a structured PPRC model to ensure coordinated decision-making. Incident Command System (ICS).

Table 1: GMCE Hospital Incident Command Structure

Role	Key Responsibilities	Assigned Person	Deputy
Incident Commander	Overall leadership, intersectoral coordination	Medical Superintendent	RMO
Operations Lead	Clinical services, wards, ICUs, triage	Professor & Head – General Medicine	Professor of Anesthesiology/Pulmonology
Logistics Lead	Oxygen, PPE, equipment, transport	Deputy Medical Superintendent	ARMO
Planning Lead	Surge forecasting, bed expansion	Professor & Head – Community Medicine	RPEID cell Coordinator
Finance Lead	Emergency procurement, budgeting	Accounts Officer	Senior Accounts Assistant

2.2 Multidisciplinary Team

1. HOD Medicine (General Medicine / Internal Medicine)

- **Operations Lead:** Serves as the Operations Lead within the Hospital Incident Command System.
- **Clinical & Logistical Oversight:** Responsible for overseeing clinical services, wards, ICUs, triage, oxygen, PPE, equipment, and transport.
- **Surge Management:** Tasked with surge forecasting and executing bed expansion plans.

- **Committee Membership:** Serves as a core member of the standing Hospital Pandemic Committee / Institutional Medical Board and the Multidisciplinary Team.

2. HOD Microbiology

- **Committee Membership:** Acts as a core member of the Hospital Pandemic Committee / Institutional Medical Board and the Multidisciplinary Team.
- **Departmental Role:** The Microbiology department is specifically responsible for managing testing protocols and overseeing infection control measures during a pandemic.

3. HOD Community Medicine (SPM)

- **Planning Lead:** Serves as the Planning Lead within the Hospital Incident Command System.
- **Committee Membership:** Core member of the standing Hospital Pandemic Committee / Institutional Medical Board.
- **Departmental Role:** The department oversees overarching control activities, epidemiological surveillance, and reporting.

4. HICC (Hospital Infection Control Committee)

- **Operational Status:** Maintained as a strictly functional committee to support institutional preparedness.
- **Governance:** Integrated as a key component of the Multidisciplinary Team to guide infection prevention and control strategies.

5. Nursing Superintendent

- **Committee Membership:** Represents the nursing staff as a member of the Hospital Pandemic Committee / Institutional Medical Board and the Multidisciplinary Team.

6. Biomedical Engineer

- **Governance Integration:** Included as a vital member of the Multidisciplinary Team under the governance and command structure to manage technical and equipment needs.

7. Oxygen War Room Management

- **Governance Integration:** Functions as part of the Multidisciplinary Team.
- **Core Responsibilities:** Specifically responsible for real-time oxygen mapping and the continuous enhancement of oxygen reserve capacity.

8. PRO (Public Relations Officer)

- **Governance Integration:** Appointed as a member of the Multidisciplinary Team to handle communications and external messaging.

2.3 Pandemic Outbreak Unit/ Hospital Pandemic Committee

Chairperson	Principal,
Vice chair	Medical Superintendent
RPEID coordniator	Associate Professor, Community Medicine
Member	Professor & HOD, Community Medicine
Member	Professor & HOD, General Medicine
Member	Professor & HOD, Microbiology
Member	Professor & HOD, Peadiatrics
Member	Professor & HOD, Pulmonology
Member	Professor & HOD, Neurology
Member	Professor & HOD, Nephrology
Member	Principal,
Member	Medical Superintendent
Member	Associate Professor, Community Medicine

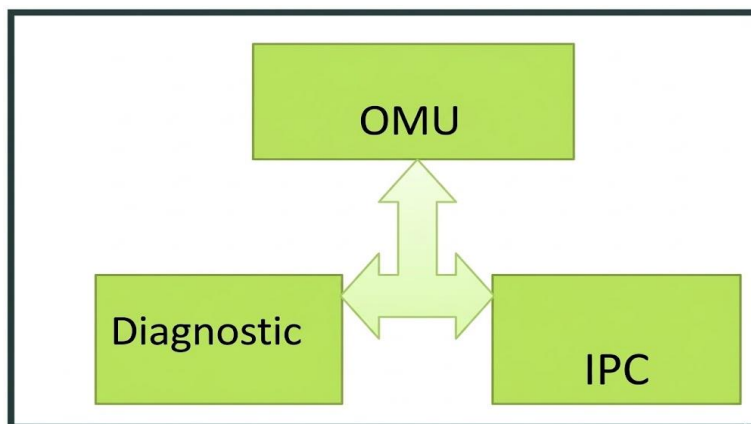
OMU focuses on

- A. Creation of a framework for identification of Emerging / Re-emerging infections at the earliest so as to institute optimal IPC measures without delay.
- B. Development of effective Triaging facilities in the casual to optimize IPC measures with regard to standard and Transmission based precautions.
- C. Creation of a framework for rapid diagnosis through the platform of Multiplex PCR to identify emerging infections at the earliest so as to ensure implementation of IPC measures at the earliest.
- D. Creation of a framework to select deaths due to unidentified infections for pathological autopsy for diagnostic purpose.

These patients should be evaluated in detail. If the diagnosis cannot be ascertained by routine investigations done to rule out Tropical fever syndromes [leptospirosis, scrub typhus, dengue, malaria, H1N1 etc] and expected community acquired infectious syndromes, OMU has to be alerted especially if there is history of

- 1. Zoonotic contact.
- 2. Clustering of cases in the family/locality.
- 3. Travel to forest areas /outside state.
- 4. Fever death without a diagnosis

The OMU has two responsibilities-Diagnosing emerging infections at the earliest and second to institute appropriate Infection Prevention and control measures at the earliest



Alert levels at times of disease outbreaks

- Clinical alert
- OMU alert
- Isolation and IPC measures
- Multiplex PCR platform
- Alert withdrawn

2.4. Institutional Medical Board

The **Institutional Medical Board / Hospital Pandemic Committee** serves as the apex clinical decision-making body during pandemics.

Composition

- **Chairperson:** Medical Superintendent
- **Members:**
 - HOD – General Medicine
 - HOD – Pulmonology
 - HOD – Anaesthesiology
 - HOD – Microbiology
 - HOD – Community Medicine
 - Nursing Superintendent

Core Functions

1. Clinical Governance

- Approval of treatment protocols
- Standardisation of clinical pathways
- ICU and ventilator allocation policies

2. Patient Management Policies

- Admission and discharge criteria
- Referral and back-referral guidelines

- Ethical triage during surge situations

3. Resource Allocation

- Prioritisation of ICU beds, oxygen, ventilators
- Staff deployment strategies

4. Monitoring & Review

- Daily review of:
 - Caseload
 - Bed occupancy
 - Oxygen consumption
 - Staffing status

5. Coordination

- Liaison with:
 - District administration
 - State health authorities

3. Situation Analysis and Resource Mapping

3.1 Infrastructure audit

Total Wards (Including Pay wards)	15
Total Allotted Bed	600
Total functioning Bed	650
Total No of ICU's	8
Total ICU Beds	95
Total Number of single rooms	20
Total Ventilators	96
Total Oxygen Beds	404
Total Beds in super specialty	Super specialty block under construction
Total Casualty Bed	22

3.2 Human Resource Pool

Mapping of sanctioned vs. present staff (Professors to temporary staff) and a three-tiered staffing plan (core, reserve, volunteer).

Sl No	Category	Sanctioned	Present	Gaps	Mobilization Strategy
1	Faculty (Clinical)	189	167	22	Call back from leave; redeploy from non-critical depts.
2	Residents (SR/ Academic JR/ NAJR)				Recruit additional temporary doctors through HDS/schemes.
3	Nursing Staff (Permanent)	176	175	1	Shift-based duty (6-8 hr shifts); cancel all leave.
4	Nursing Staff (Contract)				Recruitment of emergency temporary nursing staff.
5	ICU/Transplant Trained Nurses	125			Prioritize for Level 3 (Crisis) ICU surge.
6	Nursing Assistants	39			Deploy for high-touch surface cleaning and food delivery.
7	Hospital Attendants (Gr 1 & 2)	28			Training on 1% hypochlorite use and trolley disinfection.

8	Kudumbasree / Cleaning Staff	96			Focus on waste management and environmental cleaning.
9	Ancillary (Lab, Rad, Pharm)	56			Maintain a standby duty roster for 24/7 coverage.
10	Security	73	65	8	Lead "Red Channel" movement and patient data entry.
11	Volunteer / Reserve Pool				Identify retired HCWs and those in non-clinical roles.

3.3 Existing Capacity (Baseline)

20-bedded Isolation ICU

8 ventilators (baseline)

Total ventilators: 96

BIPAP: 115

NIV facility in wards

Majority beds oxygen-supported

4. Graduated Response Framework (Three -Tier Model)

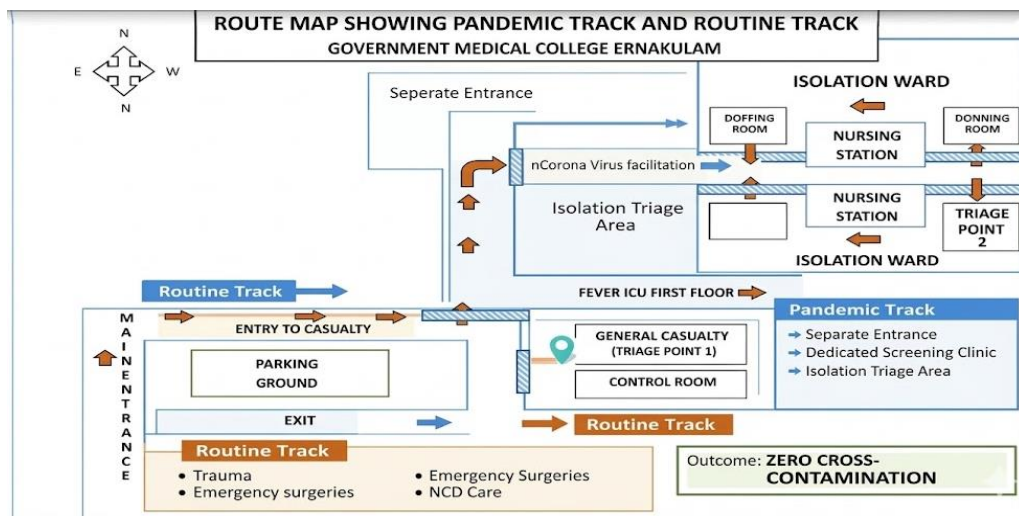
4.1 Surge Levels: Capacity and Workforce Escalation Plan

The hospital implements a 3 -tier surge response system (Level 1 to Level 3) to manage increasing patient load during public health emergencies. Each level is defined by bed occupancy, ICU utilisation, oxygen demand, and workforce scaling. The approach ensures a gradual, structured escalation while maintaining patient safety and infection control.

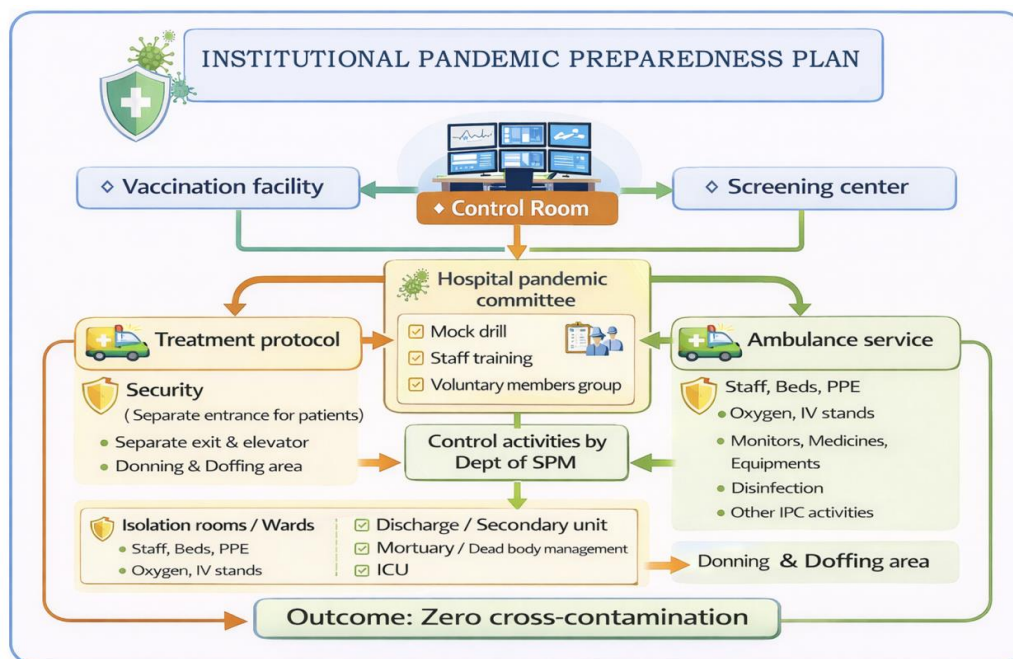
Surge Levels & Resource Management Matrix

Resource Category	Level 1 - Conventional (Best Case)	Level 2 – Contingency (Moderate Case)	Level 3 – Crisis (Worst Case)
Bed Strength	Baseline to 30–50% capacity; 1 Pandemic ward active.	50–70% capacity up to 500 beds; 8 pandemic wards active.	>500 beds; extreme surge in confirmed admissions.
ICU Capacity	Baseline ICU admission levels; <60% occupied, Oxygen stable.	70–90% occupied; Oxygen demand rising.	>90% occupied (System Overwhelmed); Oxygen critical.
Doctors	Routine roster + 20–25% reserve; 1-2 deployed in 2 shifts.	8-16 deployed in 2 shifts; implement shift-based duties (6–8 hours).	Crisis staffing; recruit temporary staff; redeploy non-clinical/academic staff.
Nurses & Assistants	Routine roster + 20–25% reserve; 4–8 deployed in 3 shifts.	32–64 deployed in 3 shifts; scales up to 126–168 utilizing a task-shifting model.	Crisis staffing; implement float pools or tiered staffing models; utilize students.

Attendees	Routine roster + IPC refresher training; 4-8 deployed in 3 shifts.	32 to 84 deployed; increased cleaning frequency and 24x7 sanitation teams.	Crisis staffing; broad deployment across non-traditional patient care areas.
Security	Identify pandemic access team; entry-exit control (6-8/day).	Zonal security (10-12/day); restricted access and isolation guards.	Full deployment + police support; secure makeshift wards.



The hospital adopts a multi-level surge response framework (Level 1 to Level 3) to systematically scale infrastructure, workforce, and critical care services during increasing patient load. Each level is defined by bed occupancy, ICU utilisation, oxygen demand, and staffing requirements.



Infrastructure Capacity – Escalation Plan

Escalation Phase	Area	Space	Current /Baseline	Expansion Target-20m sq per head
Level 1 - Conventional (Best Case) <i>Goal: Maintain standard of care</i>	Isolation complex		10 patients	
	A ward	9698 ft ²	25 patients	35-40 patients
	K ward	10785 ft ²	35 patients	35-40 patients
Level 2 - Contingency (Moderate Case)	CCRC	GF – 9100 sq ft ² 1 st floor-8100 ft ² 2 nd floor -8100 ft ² 3 rd floor-8100 ft ²		GF: 40 patients 1 st –3 rd floor: 35 patients each

Level 3 - Crisis (Worst Case)	Superspeciality block has spaces which will be ready to occupy with in few months time, since under construction the exact space cannot be assessed.			
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Human Resources & Welfare

Staffing Strategy

1. Pandemic Team
2. Routine Clinical Activity
3. Back-up Team
 - Mandatory rest or quarantine periods

Staff	Current Availability	Expansion Plan
Staff Nurse	251	6 nurses needed in a ward for 3 shifts – max 40 patients; $7 \times 6 = 42$
Nursing Assistant	39	6 nursing assistants needed; $7 \times 6 = 42$
Cleaning Staff / Attenders	164	3 in a ward; $7 \times 3 = 21$
Security	73 (23 in 1 batch)	Total young = 30

Identified Workforce Gap

A critical gap in human resources has been identified during surge conditions:

- Doctors: Additional requirement of approximately 25 personnel
- Staff Nurses: Additional requirement of approximately 50 personnel
- Attenders: Additional requirement of approximately 20 personnel

- Cleaning Staff: Additional requirement of approximately 20 personnel

Addressing this gap is essential to ensure continuity of care, infection control, and operational efficiency during peak surge periods.

Overall Strategy

- The surge response is dynamic, phased, and data-driven, based on real-time monitoring of bed occupancy, ICU load, and oxygen demand.
- Early escalation is prioritised to prevent system overload and ensure preparedness.
- Ensures continuity of non-pandemic essential healthcare services alongside surge management.
- Emphasises staff safety, infection control, and efficient utilisation of available resources at every level.

5. Operational Standard Operating Procedures (SOP's)

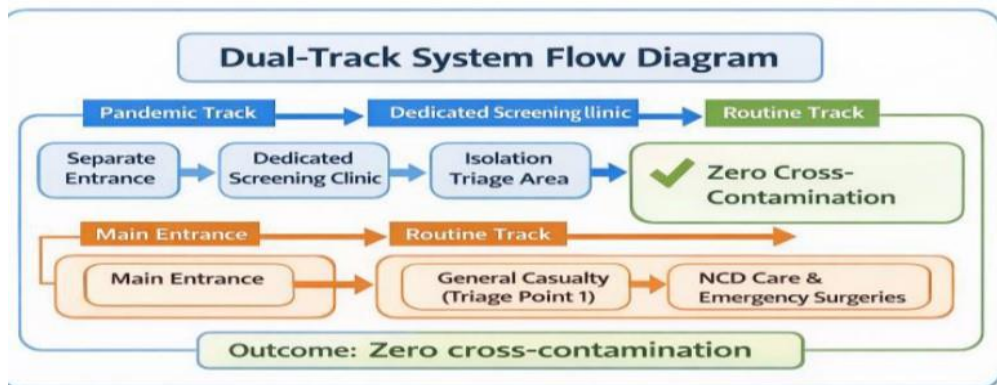
5.1 Triage and Red channel Protocol

- **Zoning (Color Coding)**

Zone	Description
Red Zone	Confirmed cases – ICUs & isolation wards
Yellow Zone	Suspected cases (PUI)
Green Zone	others

- Negative pressure / high -ventilation ensured where feasible.

Dual Track System Flow Diagram



Zoning Strategy (Colour-Coded System)

The hospital adopts a **colour-coded zoning system** to ensure strict infection prevention and control by physically separating patients based on their infection status. This system minimises cross-contamination and enables efficient allocation of resources and staff.

- **Red Zone:**

This zone is designated for **confirmed infectious cases**, including patients admitted in **isolation wards and ICUs**. It operates under the highest level of infection control precautions, including full PPE usage, restricted access, and

frequent environmental disinfection. Only authorized and trained personnel are allowed entry.

- **Yellow Zone:**

This zone is allocated for **suspected cases or Patients Under Investigation (PUIs)**. Patients awaiting diagnostic confirmation are managed here with appropriate precautions. Staff use intermediate-level PPE, and patient movement is strictly controlled until diagnosis is confirmed.

- **Green Zone:**

This zone is reserved for **non-infectious patients**, including routine outpatient, inpatient, trauma, and NCD care. Standard precautions are followed, and strict measures are taken to prevent exposure from higher-risk zones.

- **Environmental and Engineering Controls:**

Wherever feasible, **negative pressure rooms or high-ventilation systems** are ensured, particularly in Red and Yellow Zones, to reduce airborne transmission risk. Airflow management, adequate spacing, and regular air exchange are maintained as per infection control guidelines.

Dual-Track System: Patient Flow Strategy

The hospital implements a **Dual-Track System** to ensure complete segregation of infectious and non-infectious patient pathways from the point of entry to final care delivery. This system is critical in preventing hospital-acquired infections during outbreaks.

Pandemic Track

- Patients with **suspected or confirmed infection** enter through a **separate, dedicated entrance**.
- They are directed to a **Dedicated Screening Clinic**, where initial evaluation and risk assessment are performed.
- Based on clinical findings, patients are moved to an **Isolation Triage Area** for further management and categorization.
- This track operates independently with dedicated staff, equipment, and transport pathways.

Routine Track

- All **non-pandemic patients** enter through the **main hospital entrance**.
- They are directed to **General Casualty (Triage Point 1)** for routine triage and assessment.
- Patients are then managed in regular hospital services, including **NCD care, emergency surgeries, and general inpatient care**.

Key Outcome

- The strict separation of Pandemic and Routine Tracks ensures **zero cross-contamination between patient groups**.
- Dedicated staffing, infrastructure, and movement pathways further reinforce infection control and patient safety.

Overall Significance

- Integrates **zoning and patient flow systems** for comprehensive infection control.
- Enhances **early identification, isolation, and management** of infectious cases.
- Protects **healthcare workers and non-infected patients** from exposure.
- Ensures **continuity of essential healthcare services** even during pandemic conditions.

5.2 Patient Care Equipment

Dedicated equipment usage and proper sterilization protocols are followed based on the SOP developed by the HICC of GMCE. Heat-stable equipment is autoclaved, heat-sensitive ones by ETO and surfaces by 1% Hypochlorite solution. At most care is taken to prevent hospital-acquired infections.

5.3 Infection Prevention and Control (IPC)

We are training all staff, including our undergraduate and postgraduate students, in the Prevention and Control (IPC) Protocol

Dual-Track System: Facility entry must be strictly bifurcated. The "Pandemic Track" leads directly to a dedicated screening clinic and an isolation triage area. The "Routine Track" channels trauma, surgical, and NCD patients through the main entrance.

Colour-Coded Zoning: Clinical areas are strictly demarcated. Red Zones are designated for confirmed cases in ICUs and isolation wards; Yellow Zones for suspected cases or Persons Under Investigation (PUIs); and Green Zones for routine, non-pandemic care.

Red Channel Protocol: Movement of infected patients within the facility requires a dedicated "Red Channel." This mandates the blocking of specific elevators and the immediate post-transit disinfection of lifts and stretchers with a 1% sodium hypochlorite solution.

Surface Disinfection: A strict two-hourly cleaning schedule is mandated for all high-touch surfaces (e.g., switches, door handles) using a 1% sodium hypochlorite solution. Medical and patient care equipment will be disinfected with a 0.5% hypochlorite solution.

5.4. Engineering and Environmental Controls

To mitigate airborne and fomite transmission, targeted infrastructure modifications and rigorous sanitation schedules are required.

Ventilation Standards: Airborne Infection Isolation Rooms (AIIRs) and designated negative pressure wards to achieve a minimum of 12 Air Changes per Hour (ACH) by blocking return air vents are ready in the newly built super speciality block.

5.5 Make-shift Isolation Enclosures

Isolation room complex (2 wards) with donning/doffing conversion of A Ward and K Ward for the purpose. Utilisation of CCRC facilities is the plan in case of a Pandemic situation. The newly built Super speciality block can also be used in case of a surge.

5.6 COVID/ Pandemic Operation Theatre (OT) Modifications

Re-circulatory HVAC systems in designated pandemic OTs can be converted to 100% once-through systems, equipped with independent exhaust blowers to prevent viral recirculation during emergency surgeries.

6. Specialised service guidelines

6.1 Dialysis Units:

Maintaining uninterrupted dialysis services is critical during a pandemic. To prevent healthcare-associated infections within this vulnerable patient population, strict protocols will be enforced:

Testing Strategy: Implementation of a mandatory 10-day testing cycle for all routine dialysis patients. Rapid Antigen Tests (RAT) will be utilized for quick screening prior to initiating dialysis sessions.

Patient Segregation & Equipment: Dedicated tubings will be strictly used for pandemic-positive patients to prevent cross-contamination.

Surface Disinfection: Dialysis stations, including chairs, machines, and high-touch surfaces, will undergo rigorous disinfection between every patient shift using the standardized hospital protocol.

Staff PPE Requirements: Healthcare workers in the dialysis unit will be instructed to wear appropriate risk-stratified Personal Protective Equipment, with a mandatory requirement for face shields during patient care and machine handling

6.2 Management of the deceased

The handling of deceased patients requires the utmost dignity, coupled with rigorous infection control measures to protect healthcare workers and relatives.

- **Handling Protocols:** Mortuary and ward staff must adhere to Standard Precautions at all times when handling remains.
- **Infection Control Preparation:** All orifices must be securely plugged to prevent the leakage of infectious bodily fluids.
- **Body Bag Disinfection:** The deceased must be placed in a leak-proof body bag. The exterior of the body bag must be thoroughly disinfected with a 1% hypochlorite solution prior to transfer to the mortuary or release to the family.
- **Family Counselling:** The pandemic inevitably causes severe emotional distress. The psychological support team and designated staff must provide

compassionate counselling to the bereaved families, explaining the necessity of the infection control protocols while helping them manage anxiety and grief.

6.3 Maternal & Child Health

Maternal and child health services must remain uninterrupted, but the operational flow requires modification to account for pandemic exposure.

- Admission and Transfer Rules: Clear, specific admission and transfer pathways will be established for scenarios where both the mother and child require admission. This includes defining whether the neonate rooms-in with a positive mother in a dedicated isolation obstetric ward or is transferred to a suspect/isolation neonatal unit, depending on the clinical severity and infection status of both patients

7. Logistics and Ancillary Services

7.1 Supply Chain Management

In a pandemic, consumption rates for critical items skyrocket unpredictably. Therefore, manual stock-taking is insufficient.

- **Automated Tracking & KMSCL Coordination:** The hospital will utilise automated, real-time inventory systems to track (DDMS) the burn rates of essential supplies. This data will be continuously synced with the Kerala Medical Services Corporation Ltd (KMSCL) to ensure a steady, state-backed supply chain.
- **Buffer Stocks:** The institution will maintain a strict 30-day buffer stock of critical consumables, including antivirals, steroids, broad-spectrum antibiotics, and Personal Protective Equipment (PPE).

7.2 Linen & Laundry

Contaminated hospital linen is a major vector for fomite transmission. The volume of infected linen during a surge requires specialised handling to protect sanitation workers.

- **Handling & Transport:** Infected linen will be placed directly into leak-proof containers at the point of care.
- **Waste Reduction:** Staff will explicitly avoid "double-bagging" linen; this practice unnecessarily increases waste volume and adds redundant steps that actually increase handling risks.
- **Facility Engineering:** The laundry processing areas will be maintained under negative pressure (This will be feasible only after the super speciality block becomes fully functional) This engineering control will help prevent the aerosolization of viral particles into adjacent corridors when contaminated linen is agitated during sorting and loading.

7.3 Biomedical Waste (BMW) Management

Pandemic wards generate massive quantities of highly infectious waste that must be strictly segregated from routine hospital waste.

- **Containment:** All pandemic-related infectious waste will be disposed of in double-layered yellow bags to prevent accidental tears, punctures, or leaks during transit.
- **Identification & Transport:** This waste will feature dedicated "X Waste" labelling to ensure immediate visual identification by sanitation staff. It will be moved through the facility using dedicated transport pathways to avoid clean zones.
- **Auditing:** Separate record-keeping for pandemic waste will be made mandatory. This allows the administration to accurately audit waste generation volumes, ensure regulatory compliance, and prevent the pilferage or mishandling of hazardous materials.

7.4 Support Services

A hospital cannot function in isolation during a crisis; it requires community integration and robust psychological scaffolding.

- **Dietary Coordination:** Managing the dietary needs of hundreds of isolated patients is a herculean task. GMCE will coordinate directly with Kalamassery Municipality and other NGO's to ensure the timely and hygienic provision of patient meals.
- **Psychological Support:** The Psychiatry department will be instructed to operate a dedicated Mental Health Cell. This team will be tasked with providing stress management and counselling to prevent severe burnout among frontline workers, as well as offering vital grief and anxiety counselling for patients and their families.
- **Social Work:** Medical social work teams will be deployed to assist with patient communication, bystander management, and safe discharge planning back into the community.

8. Communication, Monitoring & Research

8.1 Surveillance Systems

Department of Community Medicine will spearhead the integration of real-time hospital data with national and state platforms, including the Integrated Health Information Platform (IHIP), the Integrated Disease Surveillance Programme (IDSP), and ICMR databases. To anticipate surge capacity needs and pre-emptively adjust to local outbreak dynamics, the institution will utilise AI-assisted epidemiologic modelling. Furthermore, the hospital will actively update the e-Health Kerala portal to ensure the transparent, digital tracking of bed availability and patient movement. The control room of GMCE will be the nodal point for communication purposes.

8.2 Media & Risk Communication

To prevent misinformation and maintain public trust during a crisis, GMC Ernakulam will appoint a single, designated spokesperson (Nodal officer based on the nature of the Pandemic) to handle all external communications. Accurate, verified status reports will be issued systematically from pre-designated locations to provide consistent updates to the media and the public. Simultaneously, the institution will deploy targeted multilingual risk communication—utilising signage in Malayalam and English /Hindi to educate the community on vital infection prevention protocols, such as cough etiquette and hand hygiene.

8.3 Control Room Operations

The dedicated 24x7 Hospital Control Room will serve as the central operational nerve centre. This unit will meticulously coordinate incoming patient arrivals, manage ambulance workflows, and facilitate inter-hospital referrals to strategically decongest emergency services. Beyond patient flow, the control room will oversee the dynamic management of complex staff duty rosters and coordinate the daily review meetings of the Hospital Pandemic Committee to rapidly adapt to evolving resource demands.

8.4 Research Collaboration

Leveraging its status as a premier teaching and medical research institution, GMC Ernakulam will actively engage in rigorous, real-time research collaboration. Clinical departments will participate in vital clinical trials and conduct comprehensive outcome

analyses to continuously refine evidence-based treatment guidelines and protocols. Additionally, recognizing the complex, interconnected nature of emerging infectious diseases, the institution will coordinate closely with veterinary and environmental science sectors to strengthen a comprehensive public health response.

9. Recovery and De-escalation

9.1 Discharge & Back Referral

As the pandemic curve flattens and patient loads stabilise, GMC Ernakulam will activate a strategic de-escalation protocol to systematically decongest our highly specialised tertiary care facilities. The 24x7 Hospital Control Room will meticulously coordinate inter-hospital back-referrals. Once patients bypass the acute phase and are downgraded to mild or moderate clinical status, they will be systematically shifted to designated secondary units, such as Aluva Taluk hospital or GH Ernakulam. This criteria-based discharge and transfer mechanism will help safely transit the hospital back to routine operations, ensuring our critical care beds, emergency services, and specialist faculty are freed up to resume delayed elective procedures and non-communicable disease (NCD) care.

9.2 Financial Plan

To guarantee rapid resource mobilization and avoid bureaucratic delays during a crisis, GMC Ernakulam will establish a dedicated emergency response fund governed by the Hospital Incident Command System. Our targeted financial plan estimates a comprehensive budget of 400.28 Lakhs (approximately 4.0 Crore) to sustain operations. This budget will be strictly apportioned across critical operational domains: 83.00 Lakhs will be secured for essential drugs and consumables, 78.18 Lakhs for emergency manpower deployment, and 71.10 Lakhs for Personal Protective Equipment (PPE). Further allocations will include 55.00 Lakhs for infrastructure scaling, 45.00 Lakhs for diagnostics, 21.00 Lakhs for infection control, and 12.00 Lakhs for critical staff training and welfare. A contingency reserve of 35.00 Lakhs will be maintained to absorb unpredictable, sudden surge demands.

9.3 After-Action Reviews

Institutional resilience relies on iterative learning. Following the de-escalation of a pandemic wave, the Hospital Pandemic Committee will pivot from daily operational reviews to conducting comprehensive after-action policy audits and post-pandemic evaluations. These rigorous quarterly preparedness audits will objectively analyze the institution's response against predefined key performance indicators. The evaluation metrics will explicitly track ICU surge activation time, peak bed occupancy rates, PPE

stock adequacy, oxygen consumption trends, and crucially, staff infection rates. By identifying both systemic strengths and operational gaps, these reviews will ensure that all empirical lessons learned are immediately translated into updated Standard Operating Procedures (SOPs), continuously fortifying GMC Ernakulam against future public health threats.

10. Index of Standard Operating Procedures (SOPs) & Guidelines

This section serves as the central repository for all mandatory protocols at GMCE. Adherence to these SOPs is required across all clinical, administrative, and support departments during a pandemic surge.

10.1 Clinical & Triage Protocols

- **Dual Stream Triage:** GMCE strictly enforces a Dual-Track System to segregate ILI/SARI cases from general patients. The pandemic track utilizes a separate entrance leading to a dedicated screening clinic and isolation triage area, while the routine track handles general casualties, trauma, and NCD care. This ensures a zero cross-contamination environment.
- **Red Channel Protocol:** This protocol dictates the step-by-step movement of COVID/pandemic-positive patients through the facility. It mandates the temporary blocking of designated lifts and requires tight coordination with hospital security to clear pathways. Any transport equipment (lifts, trolleys) used in the Red Channel must be immediately disinfected with a 1% hypochlorite solution.
- **Patient Admission & ID Banding:** Mandatory identification banding is required for all admitted patients. Furthermore, detailed registration of all bystanders and their vehicle details must be collected at the point of entry to facilitate potential contact tracing and restrict unauthorized movement.
- **Testing Strategy:** To protect highly vulnerable populations, a strict 10-day testing cycle is implemented for routine dialysis patients. Rapid Antigen Tests (RAT) are utilized for immediate triage screening, supported by GMCE's 24x7 RT-PCR and VRDL diagnostic laboratories.

10.2 Infection Prevention & Control (IPC)

- **Donning & Doffing:** Mandatory refresher training on correct donning and doffing techniques is required for all staff levels, extending beyond clinical personnel to include housekeeping, drivers, and sanitation workers. These procedures must occur in clearly demarcated, dedicated donning and doffing areas.

- **Hand Hygiene & Cough Etiquette:** All personnel must rigidly follow the WHO "5 Moments of Hand Hygiene". Standardised practices for hand hygiene and respiratory/cough etiquette must be enforced in accordance with the Institutional IPC Manual.
- **Environmental Cleaning:** A highly aggressive sanitation schedule will be observed. High-touch surfaces (such as light switches, door handles, and railings) will undergo two-hourly cleaning utilising a 1% sodium hypochlorite solution. Medical equipment with a 0.5% hypochlorite solution for decontamination.
- **Patient Equipment Reprocessing:** Sterilisation protocols are strictly categorised by material tolerance. Heat-sensitive items will be reprocessed using ETO (Ethylene Oxide) or Sterrad systems, whereas heat-stable instruments will undergo standard Autoclave sterilization.

10.3 Engineering & Infrastructure SOPs

- **AIIR Conversion:** To rapidly create Airborne Infection Isolation Rooms (AIIR), engineering staff will follow guidelines to physically block return air vents and adjust exhaust systems to achieve a minimum of 12 Air Changes per Hour (ACH).
- **Operation Theatre (OT) Modification:** Standard OTs with re-circulatory HVAC systems will be converted to 100% once-through systems prior to conducting surgeries on pandemic patients. This requires the installation of independent exhaust blowers to safely vent contaminated air will be possible in the newly constructed super speciality block.
- **Makeshift Enclosures:** In the event of a severe surge requiring capacity beyond the existing isolation complex and surge wards, temporary cubicles will be erected. These structures will be equipped with localised HEPA filtration units to maintain negative pressure and prevent aerosol leakage.

10.4 Logistics & Waste Management

- **Biomedical Waste (BMW):** GMCE mandates strict adherence to Biomedical Waste Management rules. Infectious waste will be secured in double-layered yellow bags to prevent punctures or leaks. These bags require specific "X Waste" labeling for immediate identification and must be moved through the hospital via dedicated transport pathways.

- **Linen & Laundry:** Contaminated patient linen will be deposited directly into leak-proof containers. To streamline processing and reduce unnecessary infectious waste volume, the protocol explicitly prohibits the double-bagging of linen.
- **Oxygen War Room:** A dedicated Oxygen Manager oversees the real-time mapping of oxygen consumption across the 13 KL Liquid Medical Oxygen plant, the 600-liter PSA plant, and emergency manifolds. The war room will be responsible for daily audits and coordinating reserve capacity enhancement before critical shortages occur.

10.5 Specialized & Support Service Guidelines

- **Dialysis Unit SOP:** The nephrology/dialysis unit will utilize dedicated machine tubing's exclusively for positive patients to prevent cross-infection. Furthermore, face shields will be made a mandatory component of the PPE ensemble for all staff operating in this unit.
- **Management of the Deceased:** Mortuary and ward staff should be made to employ Standard Precautions when handling deceased pandemic patients. Protocols mandate the secure plugging of all orifices and the thorough disinfection of the exterior of leak-proof body bags using a 1% hypochlorite solution.
- **Psychological Support:** Recognising the severe mental toll of a pandemic, the Psychiatry department and a dedicated Mental Health Cell will provide active counselling. This support will be designed to manage burnout and anxiety among frontline staff, as well as offer critical grief counselling for patients' families.
- **Food & Dietary Services:** To ensure the dietary needs of a surging inpatient population are met without overwhelming internal kitchens, the hospital will establish robust coordination with Kalamassry Municipality and NGO's for the timely procurement and delivery of patient meals.
- **Maternal & Child Health SOP:** While ensuring uninterrupted maternal care, specific admission, isolation, and transfer rules will dictate the flow of care if both a mother and her child are admitted, detailing whether rooming-in is permitted or separation into specialised suspect neonatal units is required.

Index of Annexures

All the major institutions shall keep the following Annexures with all details ready at their respective institution level. The SoPs shall be updated / modified as per the research and information available regarding the respective pathogens..

1. Triage and Red channel protocol
2. Patient transport protocol during pandemics
3. SOP for Patient care equipment
4. SOP Hand hygiene
5. SOP Cough etiquette
6. Personal safety measures and PPE use
7. SOP for environmental cleaning
8. Environmental and Engineering controls
9. SOP for Makeshift Isolation enclosures
10. SOP for pandemic operation theatre
11. Guidelines for Dialysis units
12. Protocol for handling of deceased
13. Guideline on dead body management in context of COVID 19
14. SOP for Safe Linen Use
15. Biomedical Waste Management [BMW] Protocols in Isolation wards:
16. Medical Board Constitution
17. SOP for transporting a Suspect/ Confirmed case
18. CPCB Guidelines – Biomedical Waste Management
19. Mapping of laboratories
20. Infection Prevention and Control Manual-GMCH

Contact Details

Name of college	Contact Points	Contact Number
GMC Trivandrum	Information counter	4712528225
	General enquiry	4712528083
	Duty PRO	8281529159
GMC Kollam	Control Room	4742575050
GMC Konni	Control Room	4682344888
GMC Alappuzha	Control Room	4772281000
	Duty PRO	8281002947
GMC Kottayam	Control Room	9188528533
GMC Idukki	Casualty	04862232444
	Control Room	4862232555
GMC Ernakulam	Control Room	04842754000 04842751001 8075774769
	Duty PRO-	9778082825
GMC Thrissur	Control Room	04872472002 8075011853
	Duty PRO-	9383400082
GMC Manjeri	Control Room	8078253515
GMC Kozhikode	Control Room	4952350349
	Duty PRO-	9497669040
	IMCH Control room	4952350395
GMC Wayanad	Duty PRO-	8129428785
GMC Kannur	Control Room	04972882200, 8078041358
	General enquiry-	4972882100
	Duty PRO-	04972882390 9048600970
GMC Kasaragod	Control Room	8289908320