



**Department of Medical Education**  
**Government of Kerala**

Anil Raj KK Prebudar R Priya Chandran Sabitha Rose Jacob Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal S R Jishnu Krishnan Viswanathan Bilal Anuja Aravind Rahul Ravindran C Priya Chandran Sabitha Rose Jacob Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Bilal Anuja Aravind Rahul Ravindran C Priya Chandran Sabitha Rose Jacob Rajan Khobragade Harsha Das Praveen M Anil Raj KK Prebudar R Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Jishnu Krishnan Viswanathan nil Raj KK Prebudar R Priya Chandran Sabitha Rose Jacob Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Jishnu Krishnan Viswanathan Bilal Anuja Aravind Rahul Ravindran C Priya Chandran Sabitha Rose Jacob Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Bilal Anuja



Praveen M Sreevidya Anuja U Ramiz Raja A Harsha Das Praveen M Anil Raj KK Prebudar R Harsha Das  
Praveen M Ramiz Raja A Harsha Das Praveen M Anil Raj KK Prebudar R Harsha Das Praveen M Sreevidya  
Anuja U Ramiz Raja A Bilal SR Jishnu Krishnan Praveen M Sreevidya Anuja U Ravindran C Priya Chandran  
Sabitha Rose Jacob Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Bilal Anuja Aravind  
Rahul Ravindran C Priya Chandran Sabitha Rose Jacob Harsha Das Praveen M Anil Raj KK Prebudar R  
Harsha Das Praveen M Sreevidya Anuja U Ramiz Raja A Bilal SR Jishnu Krishnan Praveen M Sreevidya A



KERALA.HEALTH

# **Govt. Medical College Manjeri**



## **Pandemic Management Plan 2026**

**KERALA.HEALTH**



## 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 the 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  
Government of Kerala





## Contributors:

|    |                        |                                                                 |            |                              |
|----|------------------------|-----------------------------------------------------------------|------------|------------------------------|
| 1  | Dr Anil Raj KK         | Principal                                                       | 70122 6826 | govtmcmanjeri@gmail.com      |
| 2  | Dr. Prebudas. R        | Superintendent - GMCH                                           | 94958 7322 | gmchmanjeri@gmail.com        |
| 3  | Dr. Priya Chandran     | Professor & HoD , Community Medicine                            | 94473 7230 | commedgmcmmanjeri@gmail.com  |
| 4  | Dr. Sabitha Rose Jacob | Assistant Professor, Community Medicine                         | 94959 9792 | sabitha1020@gmail.com        |
| 5  | Dr. Harsha Das         | RMO- GMCH                                                       | 82815 1353 | gmchmanjeri@gmail.com        |
| 6  | Dr Praveen M           | Professor & HOD General Medicine                                | 9895571182 | gmcmmedicinedept@gmail.com   |
| 7  | Mrs Sreevidya          | SNO                                                             | 8281973278 | gmchmanjeri@gmail.com        |
| 8  | Dr Anuja U             | Special Officer, DME                                            | 9447411642 | specialofficerdme@gmail.com  |
| 9  | Dr Ramiz Raja A        | Assistant Professor, Community Medicine, GMC Thiruvananthapuram | 9746056040 | ramiz1raja@gmail.com         |
| 10 | Dr Bilal S R           | Assistant Professor, Community Medicine, GMC Thiruvananthapuram | 7907559946 | bigbilalsr13@gmail.com       |
| 11 | Dr Jishnu Krishnan     | Senior Resident Community Medicine, GMC Thiruvananthapuram      | 7025067514 | jishnukrishnan2015@gmail.com |



## Contents

|                                                               |    |
|---------------------------------------------------------------|----|
| Purpose of the Document                                       | 11 |
| Abbreviations                                                 | 12 |
| 1 Introduction                                                | 13 |
| 2 Governance & Command Structure                              | 14 |
| 3 Situation Analysis and Resource Mapping                     | 17 |
| 4 Graduated Response Framework (Three- Tier Model)            | 21 |
| 5 Operational Standard Operating Procedures (SOPs)            | 24 |
| 6 Specialised Services                                        | 29 |
| 7 Logistics and Ancillary Services                            | 31 |
| 8 Communication, Monitoring & Research                        | 34 |
| 9 Recovery and De-escalation                                  | 36 |
| 10 Index of Standard Operating Procedures (SOPs) & Guidelines | 38 |



## **Purpose of the document**

Malappuram district, the most populous in Kerala, has a population exceeding 4 million (projected close to 5 million), with high density and larger average household size, creating conditions conducive to rapid transmission of infectious diseases. The district experiences a consistently high patient load across all levels of care, with government institutions bearing the major share due to affordability, accessibility, and wider service coverage. During the COVID-19 pandemic (2020–2021), Malappuram contributed a significant proportion of the state's caseload, reporting over 5 lakh cumulative cases. Tertiary care teaching institutions in the district functioned as the backbone of pandemic response by providing dedicated COVID wards, oxygen-supported beds, and ICU care, while also serving as apex referral centers for peripheral facilities, supporting laboratory testing, surveillance, and training of healthcare personnel.

The pandemic highlighted critical gaps and priorities, including the need for rapid surge capacity expansion (beds, ICUs, oxygen infrastructure), structured triage and patient flow systems, and uninterrupted supply chains for essential drugs, PPE, and consumables. It also emphasized the importance of workforce preparedness through training, rotation, and psychosocial support, as well as strong integration between hospital services and public health systems for surveillance, contact tracing, and data-driven decision-making. Effective risk communication, community engagement, and the use of digital platforms for real-time monitoring emerged as key enablers of response. These experiences underline the necessity of a comprehensive pandemic preparedness plan to ensure timely, coordinated, and scalable response, optimize resource utilization under high burden, maintain continuity of essential services, and strengthen the institution's role as a regional center for outbreak management.

The purpose of this Pandemic Preparedness Plan is to establish a comprehensive, scalable, and evidence-based framework for prevention, early detection, triage, clinical management, and containment of infectious disease outbreaks, ensuring optimal utilization of resources and safeguarding public health in a high-burden district like Malappuram.



## Definitions and abbreviations

|       |                                            |
|-------|--------------------------------------------|
| PPRC  | Pandemic Preparedness & Response Committee |
| RMO   | Resident Medical Officer                   |
| OMU   | Outbreak Monitoring Unit                   |
| SOP   | Standard Operating Procedure               |
| LMO   | Liquid Medical Oxygen                      |
| ICU   | Intensive Care Unit                        |
| NIV   | Non Invasive Ventilation                   |
| HFNC  | High Flow Nasal Cannula                    |
| HICC  | Hospital Infection Control Committee       |
| IPC   | Infection Prevention and Control           |
| HEPA  | High Efficiency Particulate Air            |
| CSLTC | COVID Second Line Treatment Centre         |
| CSC   | Crisis Standards of Care                   |
| IHIP  | Integrated Health Information Platform     |
| ILI   | Influenza Like Illness                     |
| SARI  | Severe Acute Respiratory Infections        |
| AIIR  | Airborne Infection Isolation Room          |
| ACH   | Air Changes per Hour                       |
| HVAC  | Heating, Ventilation and Air conditioning  |

## 1. Introduction

### 1.1 Background & Purpose

Pandemics pose a significant threat to public health, healthcare systems, and medical education. Government Medical College, Manjeri (GMC Manjeri), as a tertiary care teaching hospital and academic institution catering to 44 lakh population, has a critical role in prevention, preparedness, response, and recovery during pandemics. In this era of emerging and re-emerging infections, pandemic preparedness is very essential, not only as a treatment facility, but also as a training, co-ordination and surveillance hub during pandemics.

The purpose of this Pandemic Preparedness Plan is to: - Ensure early detection and effective response to pandemics - Protect patients, healthcare workers, students, and staff - Maintain essential healthcare and academic services in a limited resource setting - Coordinate with different departments at district, state, and national health levels.

### 1.2 Institutional Geography

#### Government Medical College Manjeri

- **Proximity to city centre:** Located within Manjeri municipality; ~2–5 minutes from Manjeri town centre and bus stand.
- **Rail connectivity:** Nearest station – Angadipuram (~18–22 km); major railhead – Kozhikode (~45–50 km).
- **Air connectivity:** Calicut International Airport (Karipur) ~22–25 km (~45 minutes).
- **Road accessibility:** Excellent; well-connected by state highways with frequent KSRTC and private bus services, and easy availability of autos/taxis.

### 1.3 District-Specific Risk Profile

Having a high proportion of persons working in the Middle east and a large number of Umrah pilgrims to Saudi Arabia and migrant population poses another risk as evidenced by occurrence of Mpox cases. Additionally, the particular ecological conditions, favors recurrent Nipah outbreaks.

## 2. Governance & Command Structure

### 2.1 Pandemic Preparedness & Response Committee (PPRC)

Leadership roles for the Principal and Medical Superintendent to ensure **rapid, coordinated, and accountable decision-making** during pandemics through a centralized governance structure.

| Role                      | Key responsibility                              | Assigned person                     | Deputy                                                                    |
|---------------------------|-------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------|
| <b>Incident Commander</b> | Overall leadership, inter sectoral coordination | Principal ,Medical Superintendent   | RMO, casualty superintendent                                              |
| <b>Operations Lead</b>    | Clinical services, wards, ICUs, triage          | Professor & Head General Medicine   | Professor Anesthesiology/pulmonology                                      |
| <b>Logistics Lead</b>     | Oxygen, PPE, equipment, transport               | Medical Superintendent              | Deputy Medical Superintendent, RMO, Nursing Supt and store Superintendent |
| <b>Planning Lead</b>      | Surge forecasting, bed expansion                | Professor & Head Community Medicine | RPEID cell Coordinator                                                    |
| <b>Finance Lead</b>       | Emergency procurement, budgeting                | Accounts Officer                    | Senior Accounts Assistant<br>Lay secretary                                |

### 2.2 Multidisciplinary Team

Roles for HODs (Medicine, Microbiology, etc.), HICC, Nursing Superintendent, Biomedical Engineering, Oxygen War Room Management and PRO.

| Designation          | Pandemic role                                                                    | Nature of duty                                                                  |
|----------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>HOD/Professor</b> | Supervision and oversight                                                        | On call                                                                         |
| <b>HICC</b>          | Trainings and monitoring of infection control practices, staff health monitoring | Arrange trainings for all category of staff, Assess and manage logistic status. |

|                               |                                                                                                       |                                                                      |
|-------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
|                               | Biomedical waste management                                                                           | Screening and reporting of staff with symptoms                       |
| <b>Nursing supdt</b>          | Supervision of supporting staff and inventory of logistics                                            | Duty roster preparation Staff welfare                                |
| <b>Biomedical engineering</b> | Repair and maintenance of essential equipment                                                         | Checklist wise management                                            |
| <b>War room management</b>    | Oxygen /ICU Bed and ventilator availability<br>Patient tracking<br>Consumption forecasting for oxygen | Daily audit of:<br>Liquid Medical Oxygen (LMO)<br>Cylinder manifolds |
| <b>PRO</b>                    | Communication and dissemination                                                                       | Arrangement for review meetings ,IEC                                 |

### 2.3 Outbreak Monitoring Unit (OMU)

Specialized cell for identifying emerging/re- emerging infections, triaging, and multiplex PCR diagnostic platforms.

**ORDER NO. GMCNJ/298/2026-E1 (2) DATED:05-03-2026**

| <b>.Sl.No</b> | <b>Name</b>                | <b>Designation</b>               | <b>Position in the Committee</b> |
|---------------|----------------------------|----------------------------------|----------------------------------|
| 1             | Dr Prebhudas R             | Superintendent                   | Convener                         |
| 2             | Dr. Praveen M              | Professor in General Medicine    | Member                           |
| 3             | Dr Raji T K                | Professor in Microbiology        | Member                           |
| 4             | Dr Vijayakumar M           | Professor in Paediatrics         | Member                           |
| 5             | Dr Sheik Shakeer Hussain S | Professor in Forensic Medicine   | Member                           |
| 6             | Dr Sheima R Das            | Professor in Pathology           | Member                           |
| 7             | Dr Priya Chandran          | Professor in Community Medicine  | Member                           |
| 8             | Dr Sabitha Rose            | Assistant Professor in Community | Member                           |

|    |                    |                                  |        |
|----|--------------------|----------------------------------|--------|
|    | Jacob              | Medicine                         |        |
| 9  | Dr Harsha T Valoor | Assistant Professor in Neurology | Member |
| 10 | Aswathi Gopal      | Chief Nursing Officer            | Member |

## **2.4 Institutional Medical Board**

Oversight for clinical treatment protocols and discharge /back referral policies for those on isolation and on treatment.

### 3. Situational Analysis & Resource Mapping

#### 3.1 Infrastructure Audit

Comparison of existing vs. required IP/OP blocks, negative pressure rooms, and dedicated infectious disease blocks.

|                                 |                                                |
|---------------------------------|------------------------------------------------|
| Total Ward-21                   |                                                |
| Total Allotted Bed-556          | Bed strength [Yellow zone]-8                   |
| Total functioning bed-501       | Bed strength [Green zone]-6                    |
| Total No of ICUs-8              | Bed strength [Red zone]-12                     |
| Total ICU bed-70                | Bed strength [Black zone]-Trolley space,3 beds |
| Total number of single rooms-30 |                                                |

| Domain                                    | Existing Infrastructure (What We Have)                      | Identified Gaps                   | Action Required                                                                          |
|-------------------------------------------|-------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------|
| <b>Hospital Buildings</b>                 | No Separate OP & IP blocks                                  | No fully earmarked pandemic block | Earmark Ward 11& 12 exclusively during pandemics<br>Pay ward rooms for non sick patients |
| <b>Inpatient Beds</b>                     | 556 total beds (21 wards functional + pay wards (30 rooms)) | Limited surge isolation beds      | Convert Ward 12 into full isolation ward                                                 |
| <b>Dedicated infectious disease block</b> | 3 bedded cubicle                                            | No single rooms                   | Negative pressure rooms are to be built                                                  |
| <b>Ambulances</b>                         | 3 ambulances (1 ICU ambulance)                              | Limited during surge              | Networking with district ambulance services                                              |

### 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     | <b>Faculty Total</b>                              | 130        | 115     | 15   | Call back from leave; redeploy from non-critical depts.   |
|       | <b>Clinical</b>                                   | 80         | 67      | 13   |                                                           |
| 2     | <b>Residents (SR/<br/>Academic JR/<br/>NAJR)</b>  | 110        | 108     | 2    | Recruit additional temporary doctors through HDS/schemes. |
| 3     | <b>Nursing Staff<br/>(Permanent)(DHS)</b>         | 111        | 108     | 3    | Shift-based duty (6-8 hr shifts); cancel all leave.       |
| 4     | <b>Nursing Staff<br/>(Contract)</b>               | 170        | 131     | 39   | Recruitment of emergency temporary nursing staff.         |
| 5     | <b>ICU/Transplant<br/>Trained Nurses</b>          | 5          | 5       | 0    | Prioritize for Level 3 (Crisis) ICU surge.                |
| 6     | <b>Nursing Assistants</b>                         | 30         | 28      | 2    | Deploy for high-touch surface cleaning and food delivery. |
| 7     | <b>Hospital<br/>Attendants (Gr 1 &amp;<br/>2)</b> | 80         | 68      | 12   | Training on 1% hypochlorite use and trolley disinfection. |

| Sl No | Category                        | Sanctioned | Present | Gaps | Mobilization Strategy                                  |
|-------|---------------------------------|------------|---------|------|--------------------------------------------------------|
| 8     | Kudumbasree /<br>Cleaning Staff | 65         | 65      | 0    | Focus on waste management and environmental cleaning.  |
| 9     | Ancillary (Lab,<br>Rad, Pharm)  | 71         | 71      | 0    | Maintain a standby duty roster for 24/7 coverage.      |
| 10    | Security &<br>Transport Staff   | 43         | 43      | 0    | Lead "Red Channel" movement and patient data entry.    |
| 11    | Volunteer /<br>Reserve Pool     | 30         | 30      | 0    | Identify retired HCWs and those in non-clinical roles. |

### 3.3 Equipment & Logistics

Inventory for ventilators, HFNCs, oxygen beds, LMO capacity (KL), and PPE buffer stocks.

|                                       |
|---------------------------------------|
| Total ventilators-119 (71 functional) |
| Total oxygen beds- 520                |
| LMO-10 KL                             |
| Oxygen generator plant-2000L/mt       |
| D type cylinder-272                   |
| B type cylinder-315                   |
| HFNC-9                                |



| Category                | Current Status (Available)      | Gaps Identified                                                            | Action Required                                        |
|-------------------------|---------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Ventilators</b>      | Total 119                       | Only 71 functional                                                         | Repair & AMC activation for non-functional ventilators |
| <b>ICU Beds</b>         | 70 beds (5 ICUs functional)     | Limited surge ICU capacity                                                 | Operationalize all ICUs and create surge ICU           |
| <b>Patient Monitors</b> | 60 available                    | Some are non functional due to missing ECG leads & SpO <sub>2</sub> probes | Procure accessories to make all monitors functional    |
| <b>Infusion Pumps</b>   | 60 available                    | Insufficient during surge                                                  | Additional procurement / redistribution                |
| <b>Syringe Pumps</b>    | 65 available                    | Limited for ICU surge                                                      | Procure additional units                               |
| <b>NIV Units</b>        | 2 disposable NIV                | Limited for prolonged surge                                                | Buffer stock planning                                  |
| <b>Portable X-ray</b>   | 4 functional unit               | Limited coverage during surge                                              | Plan shared use / additional unit                      |
| <b>ECG Machines</b>     | 10 available                    | Limited for pandemic wards                                                 | Redistribution or additional procurement               |
| <b>Pulse Oximeters</b>  | 70 multipara 3 finger oximeters | Inadequate for screening & wards                                           | Procure additional oximeters                           |
| <b>Ambu Bags</b>        | Available                       | Insufficient for surge                                                     | Procure additional units                               |
| <b>Ambulances</b>       | 3 ambulances (1 ICU ambulance)  | Insufficient for surge referrals                                           | Networking with district ambulance services            |
| <b>PPE Kits</b>         | Limited stock                   | Insufficient for surge                                                     | Emergency procurement & buffer stock                   |
| <b>N95 Masks</b>        | Limited stock                   | Insufficient for surge                                                     | Immediate procurement                                  |

## 4. Graduated Response Framework (Three-Tier Model)

### 4.1 Escalation Triggers

Defined by disease epidemiology (Ro), ICU occupancy, bed availability, and staff absenteeism.

### 4.2 Tier 1 – Conventional (Best Case)

Standard facility standards, minor staff adjustments, and full maintenance of elective services.

**Operational Goal:** Maintain standard of care without dilution of expertise while maximizing routine elective services.

| Trigger Points                                                                                | Institutional Action Points                                                                                                         |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cases:</b> No confirmed local cases OR sporadic imported cases without local transmission. | <b>Surveillance:</b> Activate ILI/SARI screening at entry points and mandatory IHIP reporting.                                      |
| <b>Admission:</b> Baseline hospital and ICU admission levels.                                 | <b>Infrastructure:</b> Identify "Red Channel" entry points and start planning for expansion of oxygen beds and ICUs by <b>20%</b> . |
| <b>Staffing:</b> Absenteeism <10%.                                                            | <b>Training:</b> Conduct refresher training on IPC, PPE donning/doffing, and simulation mock drills.                                |
| <b>Logistics:</b> PPE and drug supply days >30.                                               | <b>Logistics:</b> Assess and enhance centralized/decentralized Liquid Medical Oxygen (LMO) to full reserve capacity.                |

### 4.3 Tier 2 – Contingency (Moderate Case)

**Containment** Activation of surge annexes, prioritizing/pausing electives, and adaptive staffing.

**Operational Goal:** Adapt space, staff, and supplies to maintain care functionally equivalent to standard care.

| Trigger Points                                                                                                  | Institutional Action Points                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cases:</b> Confirmed local transmission and rising suspected cases in OP/IP departments.                     | <b>Hospital Reorganization:</b> Activate surge annexes (e.g., Ward 11/12 or Paywards) and create barricaded triage areas.                                                                                |
| <b>ICU Occupancy:</b> 70–90%.                                                                                   | <b>Clinical Operations:</b> dedicate all beds in MICU . Regulate non-pandemic care and <b>pause/reduce non-urgent elective surgeries.</b>                                                                |
| <b>District Load:</b> Hospital admissions due to the pandemic reaching <b>10%</b> of total district admissions. | <b>HR Strategy:</b> Implement shift-based duties (6–8 hours) and deploy float pools or tiered staffing models. To meet the surge of staff nurse and lab technicians deploy from peripheral institutions. |
| <b>Logistics:</b> PPE supply days 7–29; ventilator/O2 constraints beginning.                                    | <b>Logistics:</b> Fill 100% of oxygen reserve capacity and look for potential sources of capacity enhancement.                                                                                           |

#### 4.4 Tier 3 – Crisis (Worst Case)

Activation of Crisis Standards of Care (CSC), extreme resource scarcity, and use of non-traditional spaces.

**Operational Goal:** Maximize population benefit under extreme resource scarcity; activation of Crisis Standards of Care (CSC).

| Trigger Points                                                                                       | Institutional Action Points                                                                                                   |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Cases:</b> Surge in confirmed admissions; OP load crosses the threshold level.                    | <b>OP/IP Reorganization:</b> Stop general OP services; convert waiting or non-patient areas into makeshift wards.             |
| <b>ICU Occupancy:</b> >90% (System Overwhelmed).                                                     | <b>Critical Care:</b> Activate earmarked pandemic beds in private institutions for government-referred patients.              |
| <b>District Load:</b> Pandemic admissions reaching 25% of total hospital admissions in the district. | <b>Services:</b> Switch to <b>emergency non-pandemic care only</b> ; discharge all stable/recovering patients.                |
| <b>Staffing:</b> Absenteeism >20%.                                                                   | <b>HR Strategy:</b> Large-scale recruitment of temporary staff; redeployment of non-clinical/academic staff to clinical work. |
| <b>Logistics:</b> PPE supply <7 days; spare ventilator capacity <10%.                                | <b>Networking:</b> Full district ICU pooling and activation of field hospitals/CSLTCs.                                        |

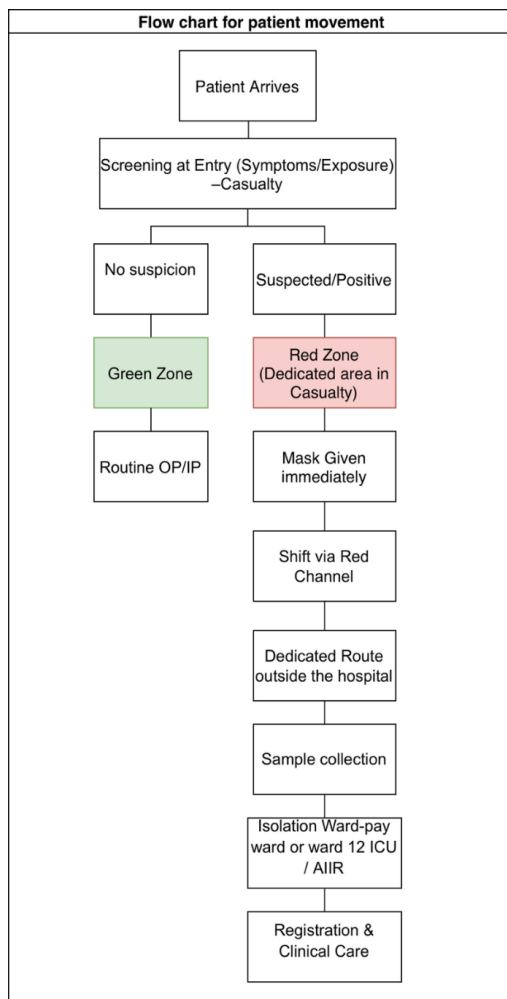
## 5. Operational Standard Operating Procedures (SOPs)

**5.1 Triage & Red Channel Protocol:** Dual-stream triage (Green/Red zones), dedicated transport routes, and lift/trolley disinfection with 1% hypochlorite.



- **Entry Screening**
  - Establish triage desk at casualty
  - Screen for ILI/SARI symptoms, travel/contact history
- **Dual Stream System**
  - Green Zone: Non-infectious patients and or (not epidemiologically linked)
  - Red Zone: Suspected/confirmed infectious cases
- **Patient Flow**
  - Dedicated pathways (Red Channel) with:
    - Pre-defined corridors (outside the hospital )
    - Lift restriction during transfer

- Security-controlled movement
- **Transport Protocol**
  - Use dedicated trolley/wheelchair
  - Disinfect with **1% sodium hypochlorite after each use**
- **Isolation**
  - Immediate placement in AIIR (Airborne Infection Isolation Room) or designated holding area in the casualty



WHO emphasizes **early identification, isolation, and source control** as primary IPC measures

## 5.2 Patient Care Equipment SOP

**Standard: Avoid cross-contamination**

- **Dedicated Equipment**
  - BP apparatus, stethoscope, pulse oximeter per patient (if possible)
- **Reprocessing Protocol**
  - Heat-stable: Autoclaving
  - Heat-sensitive: ETO / Plasma sterilization
- **Disinfection**
  - 70% alcohol for small equipment
  - 1% hypochlorite for surfaces
- **PPE for Reprocessing Staff**
  - Gloves + gown + mask + eye protection
- **Documentation**
  - Logbook for sterilization cycles

## 5.3 Infection Prevention & Control (IPC)

**Core principle: Standard + Transmission-based precautions**

- **Hand Hygiene**
  - WHO “5 Moments”
  - Alcohol-based hand rub ( $\geq 70\%$ ) or soap-water
- **PPE Use**
  - Risk-based PPE (mask, N95, gown, gloves, face shield)

- **Donning & Doffing**
  - Separate areas with posters
  - Buddy system supervision
- **Respiratory Hygiene**
  - Masking for symptomatic patients
  - Cough etiquette enforcement
- **Healthcare Worker Safety**
  - Exposure reporting system
  - Periodic testing (during outbreaks)

**Donning:**

Hand Hygiene → Gown → Mask/N95 → Goggles/Face Shield → Gloves

**Doffing:**

Gloves → Hand Hygiene → Gown → Hand Hygiene → Face Shield/Goggles → Mask → Hand Hygiene  
IPC is a **multi-layered approach including standard precautions, PPE, and occupational safety**

**5.4 Environmental & Engineering Controls**

Two OT s are equipped with HEPA filter ,, and negative pressure maintained in PICU and paediatric HDU

HEPA filtration, negative pressure maintenance and 12 Air Changes per Hour (ACH) for AIIRs.

- **Ventilation**
  - AIIR with:
    - Negative pressure ( $\geq 2.5$  Pa)
    - $\geq 12$  ACH
- **HEPA Filtration**



- For high-risk zones (ICU, isolation wards)
- **Airflow Direction**
  - Clean → contaminated zones
- **Surface Cleaning**
  - High-touch surfaces: every 2 hours
- **Zoning**
  - Clear demarcation: clean, semi-clean, contaminated

### 5.5 Makeshift Isolation Enclosures

Temporary cubicles/tents in surge situations with localized negative pressure.

- Use:
  - Exhaust fans for directional airflow
  - Portable HEPA filters
- Maintain:
  - Physical separation  $\geq 1-2$  meters
- Use for:
  - Mild/moderate cases during overflow

### 5.6 Pandemic Operation Theatre (OT)

- Convert to **negative pressure OT if feasible**
- HVAC modification:
  - Disable recirculation
  - 100% fresh air system
- Dedicated OT for infectious cases
- Minimal staff entry
- Post-procedure:
  - Terminal cleaning + fumigation (as per policy)

## 6. Specialized Services

### 6.1 Dialysis Unit SOP

- Separate shifts for infected patients
- Dedicated dialysis machines/tubing
- Testing every 7–10 days (as per risk)
- Strict PPE:
  - N95 + face shield + gown
- Disinfection:
  - Machine surfaces after each session

### 6.2 Management of Deceased

#### WHO Dead Body Management Protocol

- Use **standard precautions (not aerosol-based unless indicated)**
- Steps:
  - Plug orifices
  - Wrap body in leak-proof bag
  - Disinfect bag with 1% hypochlorite
- Transport:
  - Minimal handling
- Family interaction:
  - Counseling + safe viewing guidelines

WHO: Dead body handling requires **standard precautions and safe handling protocols**

### 6.3 Maternal & Child Health SOP

#### Admission Policy

- Screen all pregnant women at entry

- Separate labor room for suspected/confirmed cases

#### Intrapartum Care

- Limit attendants
- Use PPE during delivery
- Prefer regional anesthesia where feasible

#### Postnatal Care

- Rooming-in allowed if stable
- Maintain infection control measures

#### Neonatal Care

- Early initiation of breastfeeding encouraged
- Mother to wear mask + hand hygiene
- Neonate monitoring for symptoms

#### Referral

- High-risk pregnancies → higher center with prior intimation

## **7. Logistics & ancillary services (detailed)**

### **7.1 Supply Chain Management**

Inventory System by store superintendent supervised by Hospital Superintendent.

- Real-time dashboard tracking:
  - PPE
  - Drugs
  - Oxygen
- Minimum stock levels defined (buffer for 2–4 weeks)

Procurement

- Centralized procurement through state agencies
- Emergency procurement protocol for local purchase during surge

Oxygen Management

- Daily consumption audit
- Reserve capacity planning ( $\geq 48$ –72 hours buffer)
- Oxygen “War Room” for crisis monitoring

### **7.2 Linen & Laundry**

Collection

- Use leak-proof bags
- Do not sort or shake linen

Transport

- Dedicated trolleys
- Separate routes for contaminated linen

Processing

- Wash at 60–90°C with detergent

- Chlorine-based disinfectant for heavily contaminated linen

#### Staff Safety

- Gloves + apron + mask

### 7.3 Biomedical Waste Management

#### Segregation

- At point of generation (color-coded bins)

#### Handling Infectious Waste

- Double-layered yellow bags
- Label as “COVID Waste” / “X Waste”

#### Transport

- Dedicated trolleys and routes

#### Storage

- Temporary storage in designated area
- Disposal within 24 hours

#### Documentation

- Maintain BMW register
- Compliance with Biomedical Waste Rules (India)

### 7.4 Support Services

#### Dietary Services

- Pre-packed meals
- Avoid external contamination
- Coordination with local bodies (LSGD) local restaurants

#### Psychological Support

- Counselling for:

- Patients
- Families
- Healthcare workers
- Burnout monitoring
- Toll free number to be available coordinated by Psychiatry department or in collaboration with District Mental Health Programme

Social Work Services-use existing voluntary agencies

- Patient-family communication
- Financial/social support linkage

## **8. Communication, monitoring & research (detailed)**

### **8.1 Surveillance Systems**

#### Data Integration

- IHIP: real-time case reporting
- IDSP: outbreak surveillance
- ICMR: testing data

#### Data Use

- Trend analysis
- Early warning signals
- Resource allocation

### **8.2 Media & Risk Communication**

#### Principles

- Transparency
- Timeliness
- Accuracy

#### Protocol

- Only authorized spokesperson communicates
- Daily bulletin format:
  - Admissions
  - Discharges
  - Deaths
- Avoid panic messaging

### 8.3 Control Room Operations

#### Functions

- Bed/ventilator allocation
- Patient tracking incoming and back referral
- Referral coordination transportation
- Staffing
- Duty roaster -24×7 shifts
- Dedicated nodal officer

#### Monitoring

- Daily review meetings
- Dashboard-based tracking

### 8.4 Research Collaboration

#### Clinical Research

- Participation in trials
- Observational studies

#### Ethics

- Institutional Ethics Committee approval mandatory

#### Data Management

- Secure storage
- Confidentiality maintained



## **9. Recovery & de-escalation (detailed)**

### **9.1 Discharge & Back Referral**

#### Clinical Criteria

- Stable vitals
- No oxygen requirement (or minimal)
- Improving clinical status

#### Referral Process

- Prior communication with receiving facility
- Complete documentation:
  - Case summary
  - Treatment details

Back referral hospitals identified are,district hospital Nilambur ,THQH wandoor ,THQH Areekode, and CHC Wandoor

- Safe transport arrangement

### **9.2 Financial Planning**

#### Budget Allocation

- PPE
- Infrastructure upgrades
- Human resources

#### Emergency Fund

- Dedicated contingency fund
- Rapid release mechanism

### 9.3 After-Action Review

#### Review Process

- Conduct within 2–4 weeks post-event

#### Components

- IPC compliance audit
- Mortality/morbidity analysis
- Logistics review

#### Outcome

- Identify gaps
- Revise SOPs
- Strengthen preparedness

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

### 10.1 Clinical & Triage Protocols

- **Dual Stream Triage:** Segregation of ILI/SARI cases from general patients at entry.
- **Red Channel Protocol:** Step-by-step movement of positive patients, including lift blocking and security coordination.
- **Patient Admission & ID Banding:** Mandatory ID bands and registration of bystanders/vehicle details.
- **Testing Strategy:** 10-day testing cycle for routine dialysis patients and use of Rapid Antigen Tests (RAT).
- **Discharge or back referral guidelines**

### 10.2 Infection Prevention & Control (IPC)

- **Donning & Doffing:** Mandatory refresher training for all staff levels, including housekeeping and drivers.
- **Hand Hygiene & Cough Etiquette:** Standardized practices as per the Institutional IPC Manual.
- **Environmental Cleaning:** Two-hourly cleaning of high-touch surfaces (switches, handles) with 1% hypochlorite.
- **Patient Equipment Reprocessing:** Sterilization of heat-sensitive (ETO/Sterrad) and heat-stable (Autoclave) items.

### 10.3 Engineering & Infrastructure SOPs

- **AIIR Conversion:** Guidelines for blocking return air vents and achieving 12 Air Changes per Hour (ACH).
- **Operation Theatre (OT) Modification:** Converting to 100% once-through HVAC systems for pandemic surgeries.
- **Makeshift Enclosures:** Setting up temporary cubicles or tents with localized HEPA filtration.

#### 10.4 Logistics & Waste Management

- **Biomedical Waste (BMW):** Use of double-layered yellow bags and specific "X Waste" labeling.
- **Linen & Laundry:** Protocol for leak-proof containers and avoiding double-bagging to reduce waste.
- **Oxygen War Room:** Real-time oxygen mapping and reserve capacity enhancement.

#### 10.5 Specialized & Support Service Guidelines

- **Dialysis Unit SOP:** Use of dedicated tubings for positive patients and face shield requirements.
- **Management of the Deceased:** Disinfection of body bags with 1% hypochlorite and plugging of orifices.
- **Psychological Support:** Counselling for families and staff to manage burnout and anxiety.
- **Food & Dietary Services:** Coordination with Local Self-Government Departments (LSGD) for timely patient meals.
- **Maternal and child health**

## **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                           |
|-----------------------|---------------------|------------------------------------------|
| <b>GMC Trivandrum</b> | Information counter | 4712528225                               |
|                       | General enquiry     | 4712528083                               |
|                       | Duty PRO            | 8281529159                               |
| <b>GMC Kollam</b>     | Control Room        | 4742575050                               |
| <b>GMC Konni</b>      | Control Room        | 4682344888                               |
| <b>GMC Alappuzha</b>  | Control Room        | 4772281000                               |
|                       | Duty PRO            | 8281002947                               |
| <b>GMC Kottayam</b>   | Control Room        | 9188528533                               |
| <b>GMC Idukki</b>     | Casualty            | 04862232444                              |
|                       | Control Room        | 4862232555                               |
| <b>GMC Ernakulam</b>  | Control Room        | 04842754000<br>04842751001<br>8075774769 |
|                       | Duty PRO-           | 9778082825                               |
| <b>GMC Thrissur</b>   | Control Room        | 04872472002<br>8075011853                |
|                       | Duty PRO-           | 9383400082                               |
| <b>GMC Manjeri</b>    | Control Room        | 8078253515                               |
| <b>GMC Kozhikode</b>  | Control Room        | 4952350349                               |
|                       | Duty PRO-           | 9497669040                               |
|                       | IMCH Control room   | 4952350395                               |
| <b>GMC Wayanad</b>    | Duty PRO-           | 8129428785                               |
| <b>GMC Kannur</b>     | Control Room        | 04972882200,<br>8078041358               |
|                       | General enquiry-    | 4972882100                               |
|                       | Duty PRO-           | 04972882390<br>9048600970                |
| <b>GMC Kasaragod</b>  | Control Room        | 8289908320                               |