HOSPITAL SAFETY MANAUAL

Zone4Solutions

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PREFACE

Hospitals play a critical role in providing communities with essential medical care during all types of disasters. The overall aim of hospital safety is to mainstream disaster prevention, mitigation, preparedness, and response activities into the health sector in our country, with a specific focus on hospitals; such that hospitals are not just better prepared but fully functional immediately after disasters and can respond without any delay to the medical requirements of the affected community.

Given the increasing occurrence of multi-hazard emergencies due to enhanced risks and vulnerabilities in the Southeast Asian Regional Countries in general and India in particular, the expectation of the community from the health sector to meet the emergency health needs has been gradually increasing. Disaster experience in the last few years in the region has shown that they also simultaneously destroy health facilities, besides other infrastructures. There are many examples of health infrastructures from sophisticated hospitals to small but vital health centres that have suffered this fate.

Further, Indian Prime Minister Shri Narendra Modi has outlined a 10-point agenda for efforts towards disaster risk reduction, in an address he delivered at the Asian Ministerial Conference on Disaster Risk Reduction held in New Delhi in 2016. However, points 1 and 8 emphasise that "All development sectors must imbibe the principles of disaster risk management and Build on local capacity and initiative" respectively.

Each hospital must strengthen its capacity to provide specific services as required after any disaster. This is not only to provide safety to in-house patients but also to provide relief and medical services to the disaster-affected victims. Therefore, **a** Hospital Disaster Management plan is one such document that each hospital must develop based on the National Hospital Safety Guidelines, 2015 (National Disaster Management Authority), to assess its strengths and weaknesses as a service provider so that the resilience of the hospital as a whole may be enhanced.

Zone4Soultions being one of the prominent organizations working in the subject field of disaster management and hospital safety. This manual has been designed resources provided during different consultations with our various hospital authorities and experts of different states and backgrounds. The manual is designed to help the relevant stakeholders the to identify hazards, risks the hospital is facing or might face and its capacity to mitigate the impacts of the hazard. It will be necessary that the users of this manual understand the hospital safety and disaster management concepts and put them in use suitably under their local conditions under the guidance of a qualified Disaster Management Expert. Users are also encouraged to share their feedback and comments on how to improve the manual for the future.

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INTRODUCTION

DISASTERS: A BRIEF

Disasters are catastrophic events that cause widespread damage and suffering in communities. They can take various forms, ranging from natural disasters such as earthquakes, hurricanes, floods, and wildfires to human-made disasters like industrial accidents, nuclear incidents, and acts of terrorism.
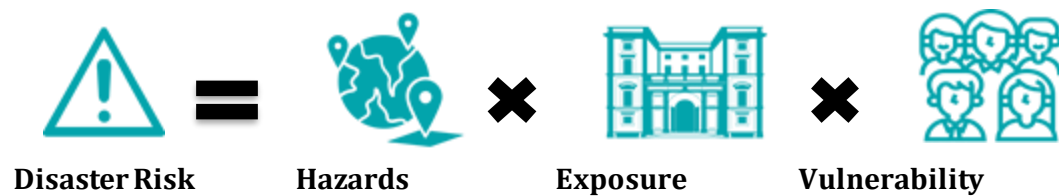
The Impact of Disasters

- **Loss of Life and Injury:** Disasters can cause significant loss of life and injuries. Earthquakes, for example, can collapse buildings and infrastructure, trapping people under debris. Floods can sweep away entire communities, and wildfires can lead to casualties and respiratory issues from smoke inhalation.
- **Economic Losses:** Disasters can cause severe economic disruptions, leading to financial losses, unemployment, and reduced productivity. The ripple effects include damaged infrastructure, disrupted supply chains, and increased government spending on relief efforts. Understanding the economic impacts helps in devising strategies for resilience and recovery.
- **Social Disruptions**: Disasters can cause significant social disruptions, including displacement, loss of lives, psychological trauma, and strained community relationships. The ripple effects extend to increased social inequality, strained healthcare systems, and changes in cultural norms. Understanding the social impacts helps in fostering resilience and promoting social cohesion.
- **Environmental Damage:** Disasters have profound environmental consequences, such as habitat destruction, pollution, and loss of biodiversity. The ripple effects include long-term ecosystem disruption, water and air contamination, and increased vulnerability to future hazards. Recognizing the environmental impacts is essential for sustainable disaster management.
- **Psychological and Emotional Trauma**: Disasters can leave deep psychological scars on survivors, witnessing the loss of life, property, and stability. Post-traumatic stress disorder (PTSD) and other mental health issues are common in disaster-stricken areas.

DISASTER RISK

Disaster risk refers to the potential for a natural or human-made hazard to cause harm to vulnerable communities, leading to the loss of life, damage to property, and disruption of livelihoods. It encompasses the probability of a hazardous event occurring and the vulnerability of individuals and infrastructure to its impact. Disaster risk is influenced by various factors, including geological, climatic, socio-economic, and environmental elements. Understanding and assessing disaster risk are crucial for developing effective strategies to reduce the impact of disasters and enhance community resilience.

Components of Disaster Risk

Disaster Risk   **Hazards**   **Exposure**   **Vulnerability**

Hazard: The potential source of harm or adverse health effects on a person, group, or community. It can be natural (e.g., earthquake, flood, hurricane) or human-made (e.g., industrial accidents, nuclear incidents).

Exposure: The presence of people, infrastructure, or assets in hazard-prone areas, susceptible to the potential impact of a disaster.

Vulnerability: The characteristics and circumstances of a community or system that make it susceptible to the damaging effects of a hazard. This includes social, economic, and physical vulnerabilities.

Capacity: The ability of individuals, communities, organizations, and systems to anticipate, respond to, cope with, and recover from the effects of a disaster. This includes having trained personnel, well-defined emergency response plans, and access to necessary resources and equipment. The ability to mobilize quickly and efficiently can save lives and mitigate the impact of a disaster. Capacity building is not a one-time effort but an ongoing process that requires collaboration among various stakeholders.

DISASTER MANAGEMENT

Disaster Management refers to the process of planning, organizing, and coordinating resources and efforts to prevent or mitigate the impact of disasters and effectively respond to them when they occur. It involves various phases, each playing a crucial role in reducing disaster risk and assisting affected communities.

Phases of Disaster Management

- *Mitigation:* This phase focuses on activities and measures taken to reduce the risk of disasters occurring or minimize their impact. It includes hazard mapping, building codes and regulations, public awareness campaigns, and environmental conservation efforts. Learning from the disaster experience and applying lessons to reduce future risks and improve disaster management strategies is also part of this.
- *Preparedness:* Preparedness involves developing plans, training personnel, and conducting drills to ensure that communities and response agencies are ready to handle potential disasters. This phase includes creating evacuation plans, stockpiling emergency supplies, and establishing early warning systems.
- *Response:* When a disaster occurs, the response phase entails the immediate actions taken to address the situation. This includes search and rescue operations, providing medical assistance, distributing aid, and coordinating resources to meet immediate needs.

- *Recovery:* After the initial response, the recovery phase focuses on restoring and rebuilding communities and infrastructure. It involves activities to support affected individuals, restore essential services, and rehabilitate the environment.

Disasters, whether natural or man-made, have the potential to cause widespread devastation, disrupting normal life and severely impacting various aspects of society. Such events, as observed in instances like the COVID-19 Pandemic (2020), Kerala Floods (2018, 2019), AMRI Hospital Fire in Kolkata (2011), Uttarakhand Flash Floods (2013), Indian Ocean Tsunami (2004), and the Bhopal Gas Tragedy (1984), can overwhelm healthcare systems, posing significant challenges to health facilities and critical infrastructures.

Health facilities, being at the forefront of disaster response, face numerous challenges during such crises. The primary issue is the disruption of healthcare services, leading to an increased demand for medical care and resources. Influxes of patients with injuries and acute medical conditions strain existing capacities and personnel, while damage to the physical infrastructure further limits the ability to provide essential services. Additionally, the psychological toll on healthcare workers is substantial, as they grapple with stress and emotional strain in the aftermath of disasters.

Recognizing the escalating frequency and intensity of disasters, it is crucial to enhance the preparedness and resilience of health facilities. Comprehensive disaster management plans are essential in this regard, providing structured protocols and procedures for an organized response during crises. These plans include risk assessments, vulnerability analyses, and hazard mapping to identify potential threats and prepare accordingly. Emphasis is placed on resource allocation, surge capacity, and staff training to equip healthcare workers with the necessary skills for handling disaster situations. Coordination with external agencies and stakeholders is also highlighted to facilitate collaboration and effective resource utilization.

Disaster Preparedness Planning

Immediate Response

Conducting Risk Assessments

Establishing Communication Systems

Early Warning and Surveillance

24x7 Emergency Care Services

Surge Capacity

Evacuation and Sheltering

Mental Health Support

Post-Disaster Recovery

Contributing to Community Recovery

Documenation and Information Managment

Figure 1: The key roles of health facilities in disaster preparedness and response

To strengthen disaster preparedness, health facilities should implement various strategies. The foundation lies in conducting risk assessments and vulnerability analyses to gain insights into specific hazards and vulnerabilities unique to each facility's location. Additionally, enhancing

infrastructure resilience and redundancy can minimize disruptions, enabling the continuity of critical services. In India, several frameworks and guidelines aim to ensure hospital disaster safety and strengthen healthcare facility preparedness for emergencies.

National Policy on Disaster Management 2009

The National Policy on Disaster Management outlines a comprehensive framework for effective disaster preparedness, response, recovery, and mitigation. It emphasizes a multi-disciplinary and community-centric approach to enhance the nation's resilience in the face of natural or man-made disasters.

National Disaster Management Guidelines - Hospital Safety, 2016 (NDMA)

It provides comprehensive guidance on various aspects, including risk assessment, contingency planning, training, resource management, and collaboration with other stakeholders.

National Building Code of India 2016 Part – IV "Fire & Life Safety, 2017

Various state governments in India have fire safety and building codes that hospitals must comply with to ensure fire safety and structural integrity during disasters.

National Disaster Management Plan (NDMP), 2019 - Health Chapter

NDMP includes a dedicated chapter on health, outlining the roles and responsibilities of healthcare facilities, including hospitals, in disaster management. It provides a framework for healthcare preparedness, response, and recovery during emergencies.

National Accreditation Board for Hospitals & Healthcare Providers (NABH) Standards, 2020

NABH, an autonomous body under the Quality Council of India, sets accreditation standards for hospitals. Disaster preparedness and response are integral components of NABH standards, requiring hospitals to have well-defined plans, training, and resources in place for managing emergencies.

Hospital Safety Index, (WHO-SEARO), 2015

The HSI does provide guidelines and tools related to hospital safety, emergency preparedness, and disaster response. These materials are often designed to help healthcare facilities enhance their ability to respond to emergencies and ensure the safety of patients, staff, and the community.

COVID-19 Guidelines for Hospitals, 2020

Amid the COVID-19 pandemic, the Ministry of Health and Family Welfare issued specific guidelines for hospitals to manage and respond to the pandemic effectively. These guidelines covered various aspects, such as infection prevention and control, patient management, and resource allocation during the pandemic.

Indian Public Health Standards (IPHS), 2022

IPHS for hospitals, by the Ministry of Health and Family Welfare, lays down norms and guidelines for essential healthcare services, including disaster management. It outlines measures to ensure that hospitals are adequately prepared to handle emergencies and provide effective medical care during disasters.

HOSPITAL SAFETY

The need for hospital safety is of paramount importance for several compelling reasons. Hospitals are critical healthcare institutions that play a central role in treating patients, saving lives, and supporting communities during emergencies and routine medical situations. Thus, hospitals need hospital disaster management for multi-hazards to effectively respond to and mitigate the impacts of various natural and man-made disasters. Multi-hazards, such as earthquakes, floods, cyclones, wildfires, industrial accidents, and disease outbreaks, pose unique challenges to healthcare facilities.

➢ Hospitals must be prepared to handle the sudden influx of patients during emergencies, ensuring timely and adequate medical attention for the affected individuals.

➢ Disasters can damage healthcare infrastructure, disrupt essential services, and strain resources. Hospital disaster management plans are essential to identify vulnerabilities, strengthen infrastructure, and optimize resource allocation to maintain operational continuity during crises.

➢ Disasters often require a coordinated response involving multiple agencies and stakeholders. Hospital disaster management facilitates effective communication, collaboration, and coordination among healthcare institutions, government agencies, and community organizations.

By integrating multi-hazard preparedness into their operations, hospitals can enhance their resilience, protect staff and patients, and ensure a swift and efficient response to diverse and unpredictable emergencies. The key reasons that underscore the need for hospital safety are:

Patient Safety	Healthcare Worker Safety	Emergency Preparedness	Infection Control
Facility Safety	Medication Safety	Psychological Safety	Community Resilience

In conclusion, hospital safety is fundamental to delivering quality healthcare services, protecting patients, healthcare workers, and visitors, and ensuring the smooth functioning of healthcare systems. By investing in safety measures, hospitals can create a secure environment for patients to receive treatment, maintain the well-being of healthcare workers, and instill confidence in the community's healthcare infrastructure. Hospital safety is a collective responsibility that requires continuous efforts, training, and vigilance to adapt to changing circumstances and challenges in the healthcare landscape.

CONCEPT OF SAFE HOSPITAL

The Pan American Health Organization (PAHO) and the World Health Organization (WHO) have defined a **"Safe Hospital"** as a healthcare facility that is designed, constructed, maintained, and managed in a way that reduces its vulnerability to internal emergencies and external hazards through efficient and effective delivery of healthcare services during and after emergencies or disasters. All personnel must be aware of the risks associated with their work and be adequately trained to handle them. The hospital must have effective plans in place to respond quickly and effectively to any emergency. Finally, the hospital must have access to necessary supplies and equipment to ensure the safety of patients and staff. Thus, the concept of a Safe Hospital encompasses a wide range of measures and considerations to ensure that healthcare facilities can continue to function and provide essential medical care post-disaster. These measures may include:

Legal and Institutional Incorporation at the hospital level:

- Collaborate with decision-makers to incorporate the safe hospital program into ministries of health, relevant institutions, and subregional integration organizations.
- Involve various sectors (water, power, finance, disaster response committees, media, etc.) in joint technical and outreach activities to strengthen disaster resilience efforts.
- Enhance knowledge and understanding of disaster risk reduction measures within the healthcare sector.

Vulnerability Reduction:

- Conduct functional diagnoses of the health facility to identify vulnerabilities and prioritize components for risk reduction.
- Ensure the availability of essential resources to facilitate hospitals' disaster response capabilities.
- Develop a Hospital Disaster Management Plan.

Workforce Training:

Provide training to the healthcare workforce and professionals of the hospital to enhance the response capacity of the health facility during disasters.

Model Safe Hospitals and Knowledge Sharing:

- Establish themselves as "model" safe hospitals that exemplify the best practices of DRR and hospital safety
- Document and share experiences and lessons learned.

HOSPITAL DISASTER MANAGEMENT PLANNING

A well-informed hospital staff, including doctors, nurses, and administrative personnel, serves as the first line of defence in ensuring the resilience and continuity of healthcare services during disasters, highlighting the critical importance of awareness in hospital disaster preparedness and safety. The strategy employs a top-down, multi-hazard approach, emphasizing the involvement of top management in making key decisions related to structural and non-structural safety measures.

PRE-DISASTER PLANNING

Pre-disaster planning is a critical phase that lays the groundwork for a hospital's ability to effectively manage and respond to emergencies. This involves the initiation of comprehensive preparedness measures well in advance of any potential disaster. The pre-disaster phase primarily involves the assessment and formulation of plans. These plans are then presented in a suitable forum for approval.

1. Preparation of Hospital Disaster Management Plan

The hospital's disaster plan should be documented, and copies of this manual should be accessible in all areas of the hospital.

2. Staff Education and Training

Educate and train staff members on the hospital's disaster and emergency manual. Regular training sessions, including drills, should be conducted during this phase.

3. Managing Psychological Impact of Emergencies and Disasters

It is crucial to recognize the importance of psychological care and stress management as integral components of disaster preparedness and response.

4. Hospital Emergency Operation Centre (HEOC)

It serves as the central command and control hub during emergencies, facilitating coordinated response efforts, communication, resource allocation, and decision-making.

5. Formation of Hospital Disaster Management Committee (HDMC)

Establishment of a committee dedicated to disaster management within the hospital.

6. Initiation of Central Command Structure (Incident Command System)

Implementation of an organized command structure for efficient incident management.

7. Preparation of Job Action Sheet

Creation of a job action sheet outlining specific roles and responsibilities during a disaster.

8. Plan Activation of Different Areas of Hospital

Activation plans for various hospital areas based on the nature and extent of the disaster.

9. Increase Bed Capacity in Emergencies

Strategies for expanding bed capacity to accommodate a surge in patients during emergencies.

10. Planning of Public Information and Liaison

Develop strategies for disseminating public information and maintaining effective liaison.

11. Planning for Security of Hospitals in Emergency Situations

Formulation of security plans to safeguard hospital premises during emergencies.

12. Logistics Planning

Detailed planning for various logistics aspects, including communications, transportation, stores, personnel, and financial considerations.

HOSPITAL DISASTER MANAGEMENT COMMITTEE

The composition of the Disaster Management Committee is designed to ensure a holistic and well-rounded approach to emergency preparedness. Representatives from hospital administration, clinical departments, ancillary services, nursing, finance, engineering, and public relations come together to form this collaborative body. This diverse representation recognizes the multifaceted nature of healthcare institutions and acknowledges that an effective response to emergencies requires input from all relevant stakeholders. The hospital administration plays a pivotal role in steering the committee, typically led by the Director, Principal, Dean, or Medical Superintendent. Members from the Hospital Management Board contribute their insights and strategic direction.

Who should be on the committee?

- The Director/Principal/Dean/Head of Institution/Medical Superintendent.
- Member/Members from the Hospital Management Board.
- The Chiefs/Heads of various clinical departments supporting the emergency services; e.g., Casualty and Emergency Services, Orthopedics, General Surgery, Medicine, Neurosurgery (if present), Cardiothoracic Surgery (if present), Anesthesia.
- The Chiefs/Heads of various Ancillary Departments E.G., Radio-Diagnosis, Transfusion Medicine/Blood Bank, Laboratory Services/Pathology, and Forensic Medicine.
- The Chief Nursing Superintendent/Matron.
- The Finance Department.
- The Stores and Supplies Department.
- The hospital engineering department.
- The Public Relations and Liaison Office.
- The Security Services of the Hospital.
- The Sanitation Department.
- Hospital Kitchen/Dietary Services.
- The Social Welfare Department (if present).
- Hospital Unions

In addition to clinical and ancillary departments, non-clinical departments are integral to the committee's composition. The inclusion of the Chief Nursing Superintendent/Matron, the Finance Department, the Stores and Supplies Department, the hospital engineering department, and the Public Relations and Liaison Officer ensures a comprehensive understanding of the hospital's resources, capabilities, and potential challenges during emergencies.

This collaborative and multidisciplinary approach ensures that pre-disaster planning addresses various aspects of emergency management, including medical, logistical, financial, and communication-related considerations. The committee's collective expertise allows for a well-informed and coordinated response to diverse emergency scenarios, contributing to the hospital's overall resilience and ability to safeguard both patients and staff during challenging circumstances.

HAZARD RISK VULNERABILITY ASSESSMENT

A Hazard Risk Vulnerability Assessment (HRVA) is a critical process to develop a comprehensive disaster management plan. This assessment systematically identifies and evaluates potential hazards, risks, and vulnerabilities that could impact the hospital's ability to provide services during emergencies. The HRVA involves a thorough analysis of both natural and man-made hazards, considering their likelihood and potential consequences.

During the HRVA, the hospital needs to assess the direct and indirect effects of identified hazards on various aspects of its operations, infrastructure, and functionality. By understanding the specific risks associated with each hazard, the hospital can tailor their disaster management plan to address the most significant threats they are likely to face. The HRVA also serves as a foundation for determining the potential demands on emergency services and other resources that may arise during a crisis.

When conducting a HRVA several factors must be considered to comprehensively assess the potential impact of various hazards on a hospital. In evaluating the **probability of a hazard** occurrence, factors such as known risks, historical data, and manufacturer/vendor statistics play a pivotal role. Understanding the likelihood of a hazard is crucial for effective preparedness planning.

The **response capabilities** of a hospital are equally significant, encompassing factors such as the time required to marshal an on-scene response, the scope of response capability, and historical evaluations of response success. These considerations help in gauging the hospital's ability to react promptly and efficiently to different types of emergencies.

Human impact is a critical aspect, involving an assessment of the **potential and capabilities** for staff and patient fatalities or injuries. This evaluation guides the development of strategies for ensuring the safety and well-being of both healthcare professionals and patients during crises.

Infrastructural impact considerations extend to the financial implications of a hazard, including the cost to replace, set up temporary replacements, and repair affected areas. **Business impact** analysis covers various facets such as business interruption, employee accessibility, contractual obligations, legal consequences, disruption of critical supplies, and interruption of product distribution.

Preparedness is contingent on factors like the status of current plans, training levels, insurance coverage, availability of backup systems, and leveraging community resources. Internal resources involve evaluating the types and volumes of supplies on hand, staff availability, and coordination with Mobile Operating Bases (MOBs).

External resources come into play with considerations like the types of agreements with community agencies, coordination with local and state agencies, collaboration with proximal healthcare facilities, the hospital networking. Addressing these multifaceted considerations holistically ensures a comprehensive hazard vulnerability analysis, enabling hospital to fortify their resilience and responsiveness to a spectrum of potential hazard risks.

PREPARATION OF HOSPITAL DISASTER MANAGEMENT PLAN

The principles underlying a Hospital Disaster Management Plan (HDMP) are crucial for its effectiveness and successful implementation.

- First and foremost, the plan should exhibit predictability through a clear and well-defined chain of management.
- Simplicity is key, requiring operational functionality to ensure ease of implementation.
- Flexibility is embedded in the plan through the incorporation of organizational charts, allowing adaptability to various forms and dimensions of different disasters.
- Conciseness is emphasized, demanding a clear definition of authority to avoid confusion during critical situations.
- Moreover, the plan must be comprehensive, extending its compatibility to various hospitals and encompassing a network of healthcare facilities. It should go beyond the confines of individual hospitals, considering inter-hospital transfer policies for a synchronized response in the face of a disaster.
- Adaptability is a critical aspect, acknowledging that standard procedures alone are insufficient without room for flexibility and adjustments based on the evolving circumstances.

Anticipating worst-case scenarios is a fundamental principle, urging planners to consider the most challenging circumstances in their preparation. Furthermore, a hospital cannot operate in isolation during disasters; thus, the plan should seamlessly integrate with regional, district, taluka, and block-level plans for comprehensive and coordinated implementation.

Finally, provisions must be made for vulnerable groups, such as children, women, the elderly, and disabled persons, to prevent them from being disproportionately affected during evacuations. Ensuring efficient and swift evacuations for these groups is essential, emphasizing clear priorities in the disaster management plan.

HOSPITAL EMERGENCY OPERATION CENTRE (HEOC)

Establishing a Hospital Emergency Operations Centre (HEOC) is a crucial component of disaster preparedness and response planning. The HEOC serves as a centralized command and control hub to coordinate and manage hospital activities during emergencies or disasters. The decision to set up an external, independent HEOC reflects a forward-looking approach to enhance the hospital's capacity to respond effectively to complex and large-scale emergencies. This long-term strategy involves dedicating a separate facility, likely located away from the main hospital building, to house the HEOC. The HEOC shall have the following facilities and amenities:

- Manual for the HEOC
- Communication sets –telephones, fixed lines, telephone sets, phones, mobiles, and wireless communication sets.
- Maps – City and Hospital
- Television
- Computers with Internet and printers
- Photocopy machines
- Contact numbers of key persons, both internal and external (Annex XXX), should be kept in the HEOC.
- Provision for male/female toilets and restrooms with adequate facilities
- Whiteboard with marker pens
- Back-up generator
- Pantry items
- Seating area for at least six members

The activation and delineation of different areas within a hospital during a disaster are strategic measures that play a pivotal role in fortifying the overall emergency response capabilities of the healthcare facility. This comprehensive approach, meticulously outlined by the Disaster Management Committee under the guidance of the Operations Chief, serves as a cornerstone for effective disaster preparedness and response. The following elaborates on the significance of this structured plan:

- **Systematic and Targeted Response:** The delineation of various zones within the hospital ensures a systematic and targeted response to different facets of a disaster. Each designated area has a specific purpose, allowing medical personnel to focus on their assigned tasks and respond swiftly to the unique needs of patients based on their acuity.
- **Rapid Triage and Priority Care:** A designated Reception Area facilitates the rapid triage of patients, streamlining the process of assessing and categorizing individuals based on the severity of their conditions. This prioritization allows for immediate attention to critical cases, ensuring that resources are directed where they are most urgently needed.
- **Enhanced Coordination and Communication:** Clear zones and roles established within the hospital enable enhanced coordination and communication among healthcare professionals. The delineation of responsibilities ensures a well-organized and cohesive response, minimizing confusion and promoting efficient collaboration during a crisis.
- **Optimized Resource Allocation:** Different areas are designated for specific functions, allowing for the optimal allocation of resources such as medical personnel, equipment, and supplies. This targeted resource distribution is critical in ensuring that essential interventions are promptly delivered, maximizing the impact of available resources.
- **Flexibility and Adaptability:** The plan's structure provides a level of flexibility and adaptability to the dynamic nature of disasters. By delineating areas based on functions and priorities, the hospital can quickly adapt its operations to the evolving needs of the emergency, ensuring a nimble and responsive approach to the crisis at hand.
- **Surge Capacity Planning:** Activation of various areas within the hospital is integral to surge capacity planning. This involves preparing for a sudden influx of patients, ensuring that the facility can expand its capacity to accommodate the increased demand for medical services without compromising the quality of care.
- **Ethical and Legal Compliance:** The plan takes into account ethical considerations and legal standards. It ensures that patient confidentiality is maintained, the dignity of the deceased is respected, and all activities adhere to established protocols. This compliance is essential for upholding the hospital's ethical obligations and legal responsibilities.
- **Streamlined Mortuary Management:** The organization of the mortuary, including the allocation of specific areas for holding bodies, is crucial for the dignified and orderly management of the deceased. This aspect of the plan ensures that even in the face of a disaster, the hospital can handle mortal remains with respect and sensitivity.

MASS CASUALTY EVENT (MCE) MANAGEMENT

A mass casualty event can be defined as a situation in which the number of casualties exceeds the resources available for immediate and routine medical response. In the context of disasters or emergencies, mass casualty incidents may overwhelm the capacity of local healthcare systems to provide timely and adequate care to all affected individuals. The term is often associated with events that result in a large number of injured or ill individuals requiring medical attention simultaneously. Increased geological and hydrological events, population explosion, poverty, and uncontrollable urbanization are resulting in disasters with mass casualty potential.
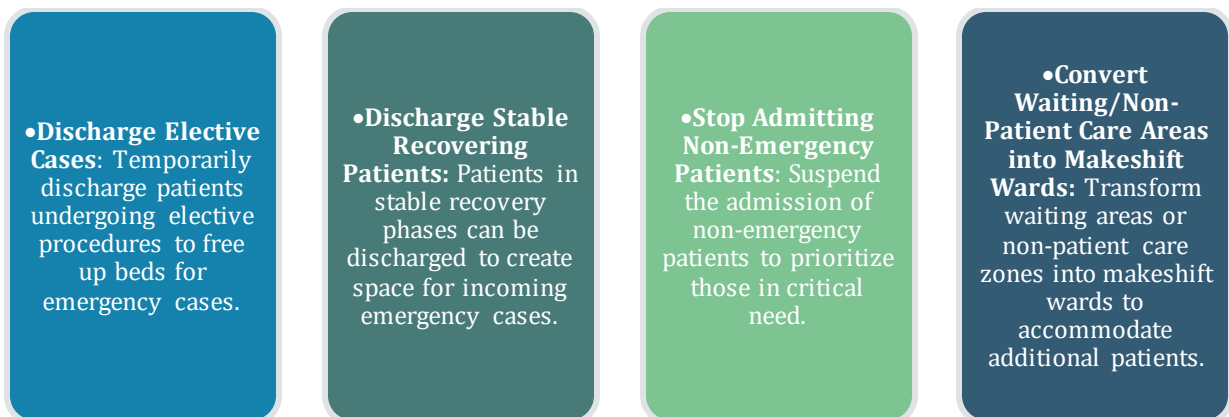
Mass casualty management at the hospital level is a critical aspect of emergency preparedness, requiring a systematic and coordinated approach to effectively handle a large influx of patients during emergencies or disasters. The key components for on-site mass casualty management include:

1. **One-Site Mass Casualty Management**: On-site mass casualty management involves the deployment of a systematic and coordinated approach to handle a large number of patients at the site of an incident. This approach is critical for providing immediate medical care before patients are transported to hospitals. It includes the establishment of on-site triage areas, medical treatment points, and coordination with emergency services.

2. **SOPs for On-Site Mass Casualty Management of Victims**: Standard Operating Procedures (SOPs) outline specific steps and protocols for on-site mass casualty management that should be developed by the hospitals. This should be part of HDMP. These SOPs detail the roles and responsibilities of healthcare providers, the triage process, medical interventions, communication strategies, and coordination with other emergency response entities.

3. **Create Emergency Medical Response for On-Site MCEs like Mobile Hospital Units:** In anticipation of mass casualty events (MCE), hospital should establish Emergency Medical Response teams equipped with mobile hospital units. These units can be deployable to the site of the incident, providing immediate medical care, triage, and stabilization before patient transport to the hospital under the guidance of police services. Hospital mobile units enhance the hospital's reach and responsiveness during emergencies.

4. **Triage**: Triage is a crucial aspect of mass casualty management, involving the rapid assessment and prioritization of patients based on the severity of their injuries or medical conditions. Triage ensures that limited resources are allocated efficiently, focusing on those who require immediate attention.

5. **Stockpile of Medical Supplies and Transportation for Surge Capacity:** The hospital must maintain a stockpile of medical supplies and establish transportation protocols to rapidly increase surge capacity during mass casualty incidents. This includes having sufficient quantities of essential medications, medical equipment, and consumables readily available. Coordination with emergency services ensures timely transportation of patients to appropriate healthcare facilities.

6. **Develop Standardized Protocol for Emergency Procurement**: Establishing standardized protocols for emergency procurement allows hospital to quickly acquire additional medical supplies and equipment during a mass casualty incident. Replay protocols outline the restocking and replacement procedures, ensuring the ongoing availability of resources.

7. **Hospital Networking**: Collaboration and networking with other hospitals, both within and outside the region will enhance the overall capacity to manage mass casualty incidents. Sharing resources, expertise, and information facilitates a more coordinated and effective response.

8. **Blood Transfusion Services and Blood Safety**: Ensuring the availability of blood transfusion services is crucial during mass casualty incidents. Hospital should have SOPs for the rapid mobilization of blood supplies, including coordination with blood banks, donation drives, and measures to maintain blood safety standards.

9. **Develop SOPs for**
   - CBRN Casualties: SOPs for Chemical, Biological, Radiological, and Nuclear (CBRN) casualties are essential for handling incidents involving hazardous materials. This includes protocols for the identification, decontamination, and treatment of individuals exposed to CBRN agents. SOPs should detail protective measures for healthcare providers, the use of specialized equipment, and coordination with external agencies for hazard assessment.
   - Trauma and Burns: SOPs for trauma and burns management are critical for providing effective and standardized care to patients with severe injuries. These protocols cover the initial assessment, triage, and stabilization of trauma and burn victims. They also outline procedures for wound care, pain management, and coordination with surgical teams. Special attention is given to the unique challenges associated with managing burn injuries, including fluid resuscitation and infection prevention.
   - Dead Bodies, and Mortuary Services: SOPs for handling dead bodies and mortuary services are essential for maintaining dignity, ensuring legal compliance, and managing the logistical aspects of mass casualties. These SOPs cover the proper identification, documentation, and storage of deceased individuals. Protocols also address communication with families, forensic considerations, and coordination with authorities. Additionally, the SOPs outline procedures for managing large numbers of deceased individuals during mass casualty incidents.

BED CAPACITY MANAGEMENT/SURGE CAPACITY

In times of emergencies, the need to increase bed capacity becomes imperative for admitting newly arriving patients requiring definitive treatment. Several strategies can be employed for this purpose:

•**Discharge Elective Cases**: Temporarily discharge patients undergoing elective procedures to free up beds for emergency cases.	•**Discharge Stable Recovering Patients:** Patients in stable recovery phases can be discharged to create space for incoming emergency cases.	•**Stop Admitting Non-Emergency Patients**: Suspend the admission of non-emergency patients to prioritize those in critical need.	•**Convert Waiting/Non-Patient Care Areas into Makeshift Wards:** Transform waiting areas or non-patient care zones into makeshift wards to accommodate additional patients.

Surge capacity denotes a healthcare service's ability to expand beyond its typical operational limits to meet an increased demand for clinical care during a disaster. Hospitals are mandated to assess their surge capacity allowing for the expansion, and contraction of the disaster response structure based on the incident's type and size. The primary objectives of planning for surge capacity encompass conducting a situation assessment, collecting, evaluating, and disseminating

information, and developing status information. To ensure the practicality of estimated surge capacity in real-time scenarios, hospitals and healthcare facilities should:

- Estimate Expected Increase in Demand: Predict the surge in demand for hospital services and calculate the maximum required capacity.
- Identify Methods for Capacity Expansion: Determine strategies to augment hospital inpatient/outpatient capacity.
- Outsource Care or Shift Patients: Contemplate outsourcing care or transferring non-critical patients to alternative sites to augment capacity.
- Designate Care Areas for Overflow: Allocate specific areas to accommodate patient overflow.
- Verify Patient Transportation Resources: Confirm the availability of vehicles and resources for patient transportation.
- Establish Inter-Facility Patient Transfer Mechanisms: Develop mechanisms for transferring patients between facilities.
- Address Gaps in Critical Medical Care: Identify potential gaps in the provision of critical medical care and coordinate with neighboring and network hospitals.
- Identify Additional Patient Care Units: Identify sites that can be converted into additional patient care units.
- Prioritize/Cancel Non-Essential Services: Adjust priorities and, when necessary, cancel non-essential services.
- Adapt Admission and Discharge Criteria: Modify hospital admission and discharge criteria based on available treatment capacity and demand.
- Designate Temporary Morgue Area: Designate a specific area for use as a temporary morgue and formulate a contingency plan for post-mortem procedures.
- Establish Disaster Store/Stockpile Protocols: Develop protocols for maintaining a special disaster store/stockpile.
- Designate Official for Communication: Appoint an official for information and communication with attending family members

PLANNING OF PUBLIC INFORMATION AND LIAISON

In the era of mass and multimedia, the effective management of public information is crucial during emergencies. A designated individual from the hospital should be appointed for regular media/press briefings. Establishing a media room within the hospital ensures controlled access for media personnel, facilitating the dissemination of accurate and timely information, thus minimizing speculation, and reducing stress on hospital staff.

PLANNING FOR SECURITY OF HOSPITALS IN EMERGENCY SITUATIONS

Hospital security plays a pivotal role during emergencies, managing not only patient influx but also overseeing the orderly functioning of the facility. It is recommended to maintain security arrangements even in non-disaster phases. Security personnel should collaborate with local law enforcement, directing traffic, protecting key installations, and controlling access to ensure the safety of hospital personnel, patients, and visitors.

LOGISTICS PLANNING

Logistics planning involves coordinating various ancillary services to ensure seamless hospital operations during emergencies. This includes planning for communication networks,

transportation services, store management, personnel mobilization, and financial considerations. The Logistics Chief assumes a central role in overseeing these aspects, ensuring the hospital's readiness to address diverse logistical challenges.

- *Personnel Planning – Medical and Non-Medical*

Personnel planning encompasses medical and non-medical staff mobilization during emergencies. Duty rosters, standby staff arrangements, and mobilization of additional personnel, including volunteers and reserved staff, are crucial components. Preparedness is enhanced through the development of a community-wide concept of "reserve staff," identifying individuals who can immediately contribute to hospital functions during incidents.

- *Financial Planning*

Collaboration with financial advisors is integral to the disaster planning process. Close association with financial experts ensures cost-effective strategies, preventing unnecessary and repeated expenditures, and promoting efficient financial management during emergencies.

- *Operations Planning*

Activated by the incident commander, operations planning involves alerting in charge of various hospital areas. These in-charges, in turn, notify and mobilize staff, including medical, nursing, and other personnel, to their designated areas. The readiness of reserved staff, not on duty, is also ensured for immediate deployment as needed.

This comprehensive approach to disaster preparedness and management encompasses multiple facets, ranging from logistical considerations to personnel mobilization and financial planning, all aimed at ensuring an efficient and coordinated hospital response during emergencies.

STAFF EDUCATION AND TRAINING

Upon finalizing the HDMP, the subsequent step is the education and training of hospital staff regarding the plan and their specific roles in the event of a disaster. The participation of diverse categories of health staff underscores their pivotal role in effective disaster management. Hence, it becomes paramount to equip all staff members with the requisite managerial and technical skills essential for the systematic and efficient management of unforeseen disasters. The gravity of their roles mandates a thorough understanding of the plan's protocols and an adeptness in applying managerial and technical skills in real-time crises. In conformity with established standards, the training initiative aims to foster a collective sense of preparedness among the staff, fostering a culture of resilience and responsiveness. This also creates a common language and understanding among the staff to minimize chaos and facilitate an organized response.

- Drills: Regular disaster drills are essential for testing the hospital's emergency response plan, serving as learning opportunities to identify specific weaknesses and strengthen disaster preparedness continually. Hospital evacuation planning drills simulate partial evacuation or non-evacuation scenarios, helping identify priorities and areas needing immediate attention in case the hospital becomes a victim of a disaster.
- A Table Top Exercise, designed as a paper drill, demonstrates working and communication relationships within the disaster organizational plan. It is intended for administrators, managers, and personnel who may assume officer roles during plan activation.
- Continuous revisions of the HDMP are essential, drawing insights from regular disaster drills to refine the plan, address deficiencies, and enhance overall preparedness. Ongoing staff education ensures members remain updated on disaster response protocols, contributing to readiness and adaptability in dynamic emergencies.

MANAGING PSYCHOLOGICAL IMPACT OF EMERGENCIES AND DISASTERS

Hospital disaster management plans usually focus on physical preparedness and medical responses but often forget about the mental well-being of healthcare workers, especially doctors and nurses. Doctors and nurses deal with unique stresses like a high number of patients, life-and-death decisions, and exposure to traumatic events. Stress can affect their performance, potentially impacting patient care and overall disaster response effectiveness. Training programs can equip healthcare professionals with tools to handle stress, make informed decisions, and provide compassionate care. Besides managing their stress, healthcare workers must also be ready to offer psychosocial support to patients during emergencies.

To effectively address the psychological aspects of emergencies, hospitals must prioritize the training of their staff. This training should encompass a range of topics, including:

- Understanding the psychological impact of emergencies and disasters,
- Developing empathy and effective communication skills,
- Identifying signs of stress, trauma, and mental health issues,
- Implementing psychological first aid techniques, and
- Creating a supportive work environment for staff.

Training programs should be comprehensive, incorporating both theoretical knowledge and practical skills. Interactive workshops, simulations, and case studies can enhance the effectiveness of training, allowing staff to apply their knowledge in realistic scenarios. Furthermore, collaboration with mental health professionals and experts in disaster response can enrich the training experience and provide valuable insights. Integrating this training into regular education schedules, using simulations, and collaborating with mental health professionals, is essential. Regular evaluation and updates ensure that doctors and nurses stay prepared for the psychological aspects of disasters. By prioritizing the mental well-being of healthcare professionals, hospitals can improve overall resilience and contribute to community recovery.

Beyond training sessions, hospitals should foster a culture of psychological resilience. This involves ongoing support, access to counseling services, and the implementation of strategies to mitigate stress in the workplace. By creating an environment that prioritizes mental health, hospitals can empower their staff to cope effectively during emergencies and disasters.

TRIAGE

The triage process within a hospital involves fundamental components: sorting patients, prioritizing their care based on the severity of illnesses or injuries, and optimizing the rationing of resources to direct them to those most likely to benefit. Originally designed to achieve the greatest good for the greatest number in mass casualty incidents, the concept of triage has evolved to identify priorities for patient care in emergency departments and surge situations where resources are generally abundant, with rare employment for resource rationing.

In the hospital setting during a mass casualty incident, triage unfolds across various stages as patients move from prehospital management to definitive care in operating rooms or intensive care units (ICUs). Triage is categorized into primary, secondary, and tertiary levels, each tailored to the specific characteristics of environment, safety, resource constraints, treatment options, and decision specificity.

- Primary Triage: Conducted in the hospital's immediate environment, often performed by paramedics using straightforward and swift criteria. Primary triage decisions are pivotal for urgent patient interventions, such as intubation, within a secure setting, laying the groundwork for subsequent triage levels.
- Secondary Triage: Typically executed by emergency physicians or surgeons upon a patient's arrival at the hospital. It prioritizes patients for initial interventions, emphasizing critical initial ABC (airway, breathing, circulation) interventions rather than comprehensive resuscitation. Secondary triage serves as a precursor to subsequent definitive care assignments.
- Tertiary Triage: Undertaken by surgeons or intensivists, particularly pertinent for critical care physicians. Tertiary triage involves measuring physiologic parameters and conducting a structured physical examination, concentrating on definitive critical care management to optimize resource utilization for the most critical patients.

The utilization of triage for resource rationing is contemplated when the hospital system is overwhelmed and resources are inadequate to meet the demand. Critical care resources, including ventilators, medications, monitors, and trained personnel, may become depleted during a disaster. Specific protocols should be established to guide resource allocation, ensuring the greatest benefit for the greatest number of patients.

ED Triage: Daily prioritization of patient assessment and treatment in the emergency department based on medical need, with resources generally not rationed.

Inpatient Triage: Daily allocation of resources in various hospital settings, such as ICUs, medical imaging, surgery, and outpatient areas, based on medical criteria, with resources rarely rationed.

Incident Triage: Prioritization of evacuation and treatment in multiple casualty incidents, stressing local resources without overwhelming them, and where resources are rarely rationed.

Military Triage: Reflects original triage concepts, used in hospitals during events that may strain resources but not necessarily overwhelm them, with rationing considered when the supply is threatened.

Over-triage and Under-triage: Effective hospital triage requires a delicate balance between over-triage and under-triage. Under-triage, occurring when the severity of a patient's condition is not promptly recognized, may result in delayed treatment. Over-triage, while minimizing under-triage, could decrease overall survival rates by depleting resources and disrupting efficient patient flow.

Figure 2: Common Types of Triages in Hospital Settings

Triage accuracy within the hospital depends on the reliability of protocols and their application by healthcare providers, emphasizing the dynamic nature of the process to correct instances of under-triage and over-triage. Triage serves as the initial point of contact between hospital personnel and incoming patients during emergencies. Key personnel and roles in this area include:

- Registration Officer
- Triage Doctors/Nurses
- Emergency Room/Casualty Staff
- Stretchers/Trolley Bearers

In the triage area, initial registration and triage assessments take place. Triage criteria specific to disasters are applied, with patients color-coded based on the urgency of treatment:

a) ONE - Immediate Resuscitation (RED): Patients requiring urgent and immediate resuscitation.
b) TWO - Potentially Life-Threatening Injuries (YELLOW): Patients with injuries that have the potential to be life-threatening.
c) THREE - Walking Wounded (GREEN): Patients with minor injuries who can walk and wait for treatment.
d) FOUR - Dead (BLACK/WHITE): Deceased Patients.

Colour Tag	On Scene		Hospital Care		Assign department
	Priority for evacuation	Medical needs	Priority	Conditions	
Red	1st	Immediate care	1st	Life-threatening	
Yellow	2nd	Need care, injuries not life-threatening	2nd	Urgent	
Green	3rd	Minor injuries	3rd	Delayed	
Black	Not a priority	Dead	Last	Dead	

The Triage Area is a critical component of the hospital's emergency response, ensuring efficient and prioritized care for incoming patients based on the severity of their conditions. For the effective implementation of triage, each hospital or healthcare facility should adhere to the following guidelines:

- Designate an Experienced Triage Officer: Appoint a qualified and experienced individual to serve as the triage officer, responsible for overseeing all triage operations.
- Ensure Secure and Well-Lit Reception Areas: Guarantee that areas designated for receiving and waiting patients are secure, well-lit, and equipped with sufficient workspace and backup power.
- Proximity to Essential Resources: Position the triage area near essential personnel, medical supplies, and key care services. Identify entrances and exit routes for efficient movement.
- Identify Contingency Sites: Identify contingency sites for the receipt and triage of mass casualty victims. Additionally, designate alternate waiting areas for ambulatory wounded patients.
- Establish Mass-Casualty Triage Protocol: Develop and establish a mass-casualty triage protocol based on factors such as the severity of the condition, survivability, and the capacity of the hospital to manage the influx of patients.
- Clear Patient Identification Method: Implement a clear and effective method for identifying triaged patients to ensure organized and efficient management.
- Ensure Adequate Supply of Triage Tags: Maintain a sufficient supply of triage tags to facilitate the categorization and identification of patients during the triage process.
- Operationalize Admission and Discharge Protocols: Operationalize protocols for hospital admission, discharge, referral, and access to operating theatres when the disaster plan is activated. This ensures a streamlined process, facilitating the smooth flow of patients through the healthcare facility.

DURING DISASTER

Recognizing and categorizing different levels of emergencies is a crucial aspect of effective disaster preparedness and response. Each level of emergency requires a specific and tailored response to ensure the effective allocation of resources, communication, and coordination. The Incident Command System (ICS), as mentioned earlier, is a flexible and scalable framework that can adapt to different levels of emergencies, providing a structured approach for managing incidents of varying complexities.

Hospitals can encounter both internal emergencies, which are confined to the facility itself, and external disasters, which involve larger community or regional impacts. Internal disasters might include fires, hazardous material exposures, and utility failures, while external disasters encompass events like earthquakes, mass casualty incidents, or epidemics. In this light, it is important to understand the following three scenarios that can affect a hospital's functioning:

Level I- Community in the region is affected, hospital unaffected: Hospitals play a crucial role in disaster response during these scenarios. They may experience a sudden influx of patients seeking medical attention due to the larger disaster. Adequate preparedness and response mechanisms are essential to avoid overwhelming the hospital facility—for instance, heavy rainfall, flood, landslide, or building fire.

Level II- The community outside the hospital premises is unaffected, however, the hospital is affected: These scenarios result from internal emergencies within hospitals. Effective response involves evacuating and transferring critical patients to other networked hospitals. Hospital administration, staff, and the surrounding community need to be well-prepared and respond swiftly—for instance, hospital fires, hazardous material exposures, and utility failures.

Level III- Community and Hospital, both are affected: Hospitals face compounded challenges during disaster situations. They must address both the existing demand for their resources and the increased demand due to community-wide disasters. Hospitals could also contend with the loss of essential services, such as water supply, electricity, and medical gases, as well as reduced staffing per patient—for instance, high-magnitude earthquakes, tsunamis, and cyclones.

Incident Command System - ICS:

The manual strongly advocates for the adoption of a unified command system, specifically the Incident Command System (ICS). This system is designed to streamline communication and control during emergencies, offering a structured chain of command. The ICS's flexible organization charts enable adaptive responses to specific emergency scenarios. Despite potential resistance to hierarchical command structures, the manual emphasizes the critical importance of respecting this hierarchy during emergencies. This approach aims to prevent chaos and guarantee an organized response, ensuring that every individual understands their role and responsibilities within the broader framework.
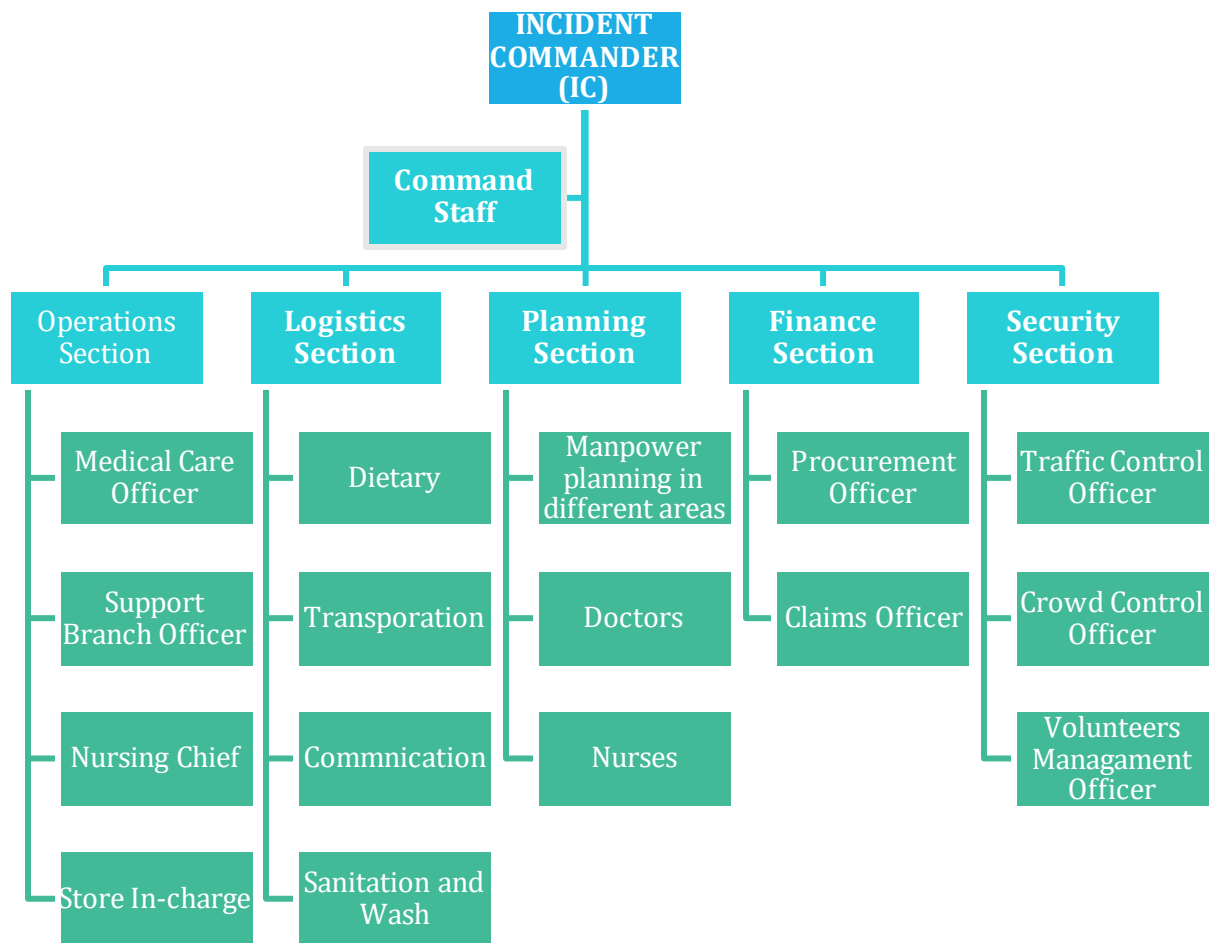
Figure 3: The Model Incident Command Structure for a hospital

Note

- The structure is flexible and can be adapted based on the size and nature of the disaster.
- Additional roles and responsibilities may be assigned depending on the specific requirements of the incident.

ICS stands for Incident Command System, which is a comprehensive and standardized approach used to command, control, and coordinate emergency response efforts. When it comes to hospital disaster preparedness and response, ICS provides an organized structure to manage resources, personnel, and communication during crises. ICS relies on a common language and communication protocols. A clear chain of command facilitates efficient communication, and the use of standardized forms, job action sheets, and action sheets ensures that information flows seamlessly within the system. The Staff is divided into the following sections:

1. Incident Commander:
   - Take immediate charge upon receiving the first information about the disaster.
   - Assess the situation and determine the need for external assistance.
   - Decide which hospitals to call for mutual aid.
   - Review and approve financial budgets required for emergency response.
   - Communicate information to statutory bodies and stakeholders.
2. Planning:
   - Identify minimum staffing needs for operational sufficiency during emergencies.

- Develop contingency plans for food, water, and living space for hospital personnel.
- Prioritize staffing requirements and deploy accordingly.
- Recruit and train additional staff as needed.
- Establish policies for addressing the needs of ill or injured family members of staff.
- Ensure staff capacity and competency through training.
- Address psychosocial and mental health support for staff.

3. Communication Team:
- Ensure clear, accurate, and timely communication to both internal and external management.
- Establish regular communication channels with the District Incident Response System and other key stakeholders.
- Inform higher health authorities promptly in case of a biological or epidemic emergency.
- Provide information to relatives of patients and update casualty lists.
- Manage press releases in consultation with the Incident Commander.
- Keep the Incident Commander informed of all on-site developments.
- Ensure the availability of communication systems.

4. Safety & Security:
- Manage all safety and security activities.
- Prioritize security needs and identify vulnerable areas.
- Control facility access points and patient flow areas.
- Establish reliable identification mechanisms.
- Escort disaster relief medical personnel when required.
- Aid local police in law enforcement.
- Establish decontamination and isolation areas.

5. Logistics, Supply & Finance:
- Ensure logistics, supply, and finance during a disaster.
- Maintain an updated inventory of equipment, supplies, and pharmaceuticals.
- Estimate and arrange for additional supplies.
- Coordinate with authorities for continuous provision of essential medicines.
- Establish contingency agreements with vendors.
- Plan for equipment maintenance and repair.
- Define the pharmacy's role in providing pharmaceuticals.
- Implement a disaster budget protocol.
- Ensure sufficient food and shelter amenities.

6. Operations Team:
- Prepare a human and material resource plan.
- Coordinate with the planning team for personnel deployment.
- Communicate pharmaceutical stock needs to stores.
- Coordinate with logistics for patient flow.
- Handle triage and patient prioritization.
- Coordinate with housekeeping for supplies and waste disposal.
- Collaborate with security for authorized personnel entry.
- Arrange patient evacuation as needed.
- Coordinate with the rescue team for stranded patients.
- Keep logistics informed of patient conditions for visitor coordination.

Job action sheet: Job action sheets are indispensable tools within the hospital disaster management framework. They are detailed documents outlining the roles, responsibilities, and specific tasks assigned to individuals holding key positions within the incident command

structure. Each job action sheet is tailored to a specific role and serves as a quick reference guide during high-stress situations.

POST-DISASTER RECOVERY

The decision to deactivate the hospital emergency plan is crucial and should be based on a thorough assessment by the Incident Commander and other hospital administrators. Premature or delayed deactivation should be avoided, considering staff fatigue and the difficulty of reactivating the plan once declared over.

In the aftermath of a disaster, meticulous planning for recovery becomes paramount in ensuring the swift restoration of hospital operations and the well-being of patients and staff. The first crucial step involves designating an official or staff member to spearhead the oversight of hospital recovery operations. This individual plays a pivotal role in orchestrating the multifaceted recovery efforts. Additionally, establishing clear deactivation criteria is imperative to transition from emergency response to normal hospital operations systematically. A thorough post-disaster damage assessment, with a specific focus on structural integrity, provides the essential groundwork for understanding the extent of the challenges faced.

Time and resource estimation is another critical aspect, requiring a comprehensive understanding of the necessary investments for the complete repair, replacement, or retrofitting of severely damaged facilities before they can be reopened. Simultaneously, a detailed assessment of the hospital's equipment inventory post-response is essential, guiding decisions on repair or replacement as needed. The insights gained from these assessments should be consolidated into a post-response report, and submitted to the chief of the hospital and relevant stakeholders, offering a transparent account of the situation and proposed recovery strategies.

In the aftermath of the intense and demanding response phase, staff debriefing becomes a priority to address and mitigate potential post-traumatic stress disorder (PTSD) among the healthcare workforce. Recognition of the invaluable services provided by staff, volunteers, external personnel, and donors during the response and recovery stages is crucial for fostering a sense of appreciation and unity. Continuous monitoring of post-disaster health situations within the local community remains vital, ensuring that any emerging issues are promptly addressed.

A systematic approach to documenting lessons learned and implementing structural modifications to the hospital contingency plan based on these insights is integral to enhancing future disaster preparedness. Debriefing is a critical self-review process conducted by the Disaster Committee after deactivating the emergency plan. It involves assessing what went right and identifying areas for improvement. The importance of debriefing in planning cannot be overstated, as it informs future enhancements to disaster plans. The exercise aims to learn from the experience, refine response strategies, and optimize the hospital's disaster preparedness and management capabilities.

The transportation of casualties must adhere to the provisions outlined in the HDMP or be appropriately modified based on the evolving needs of the situation. Moreover, providing definitive treatment for patients according to their varied needs is central to the recovery process.

In managing patient handling during and after a disaster, clear categorization into ambulatory and admitted patients enables tailored responses. Sensitizing patients and attendants about their roles during a disaster event is a proactive measure, and raising awareness about hazards and risks through permanent displays contributes to a culture of preparedness. Emergency exit routes prominently displayed throughout the hospital premises, coupled with considerations for alarms and communication that cater to the needs of patients, attendants, and visitors, mitigate panic and chaos.

STANDARD OPERATING PROCEDURES FOR EMERGENCY MANAGEMENT

The Standard Operating Procedures (SOPs) for activating the Emergency Management Plan outline a systematic approach to respond to various levels of emergencies, categorizing them into internal, external, and combination incidents. The Incident Responder (IR) plays a pivotal role in initiating and coordinating the response efforts, with different levels indicating the severity and complexity of the emergency.

At Level I, where the incident is localized and manageable, the IR, upon receiving information, promptly informs the Head of the Emergency Department (HoD, ED) to activate emergency procedures. The ED then prepares to receive casualties, and the incident response actions are reported to the Dean cum Principal. A briefing is conducted for all section chiefs, ensuring comprehensive awareness. Moving to Level II, the focus intensifies, and the IR directs the ED to activate procedures for casualty reception. Simultaneously, the Dean cum Principal activates positions in the Incident Response System (IRS) as needed. Section chiefs report back on actions taken, and a comprehensive briefing is extended to all relevant personnel. Level III and Level IV represent more severe emergencies, requiring broader and intensified responses. The IR, at Level III, activates the emergency operation center, issues evacuation orders, and oversees the evacuation of staff and in-patients. The Incident Action Plan (IAP) is formulated in collaboration with section chiefs, ensuring a coordinated approach to emergency procedures, communication, and patient evacuation. At Level IV, the highest level of emergency, similar actions are taken, with an emphasis on setting up medical camps and operational areas in pre-identified locations. The Hospital Emergency Operation Centre (HEOC) becomes a focal point for emergency meetings and planning. The IR, section chiefs, and IRS positions work collaboratively to implement the IAP, and regular reporting mechanisms are established to keep all stakeholders informed.

EVACUATION PLANNING FOR HOSPITAL DISASTER MANAGEMENT

Evacuation planning is a critical component of comprehensive hospital disaster management, ensuring the efficient and organized relocation of patients, staff, and resources during emergencies. Hospitals, as vital hubs of healthcare delivery, must be prepared to respond effectively to various disasters such as natural calamities, pandemics, or mass casualty incidents. Evacuation planning involves a meticulous process that encompasses risk assessment, resource allocation, communication strategies, and coordination with external agencies.

The first step in evacuation planning is a thorough risk assessment to identify potential hazards and vulnerabilities specific to the hospital's location. This assessment considers factors such as geographical location, susceptibility to natural disasters, and the types of patients served by the facility. Once risks are identified, hospitals must develop tailored evacuation plans that address the unique needs of diverse patient populations, including those with mobility challenges, medical dependencies, and critical care requirements.
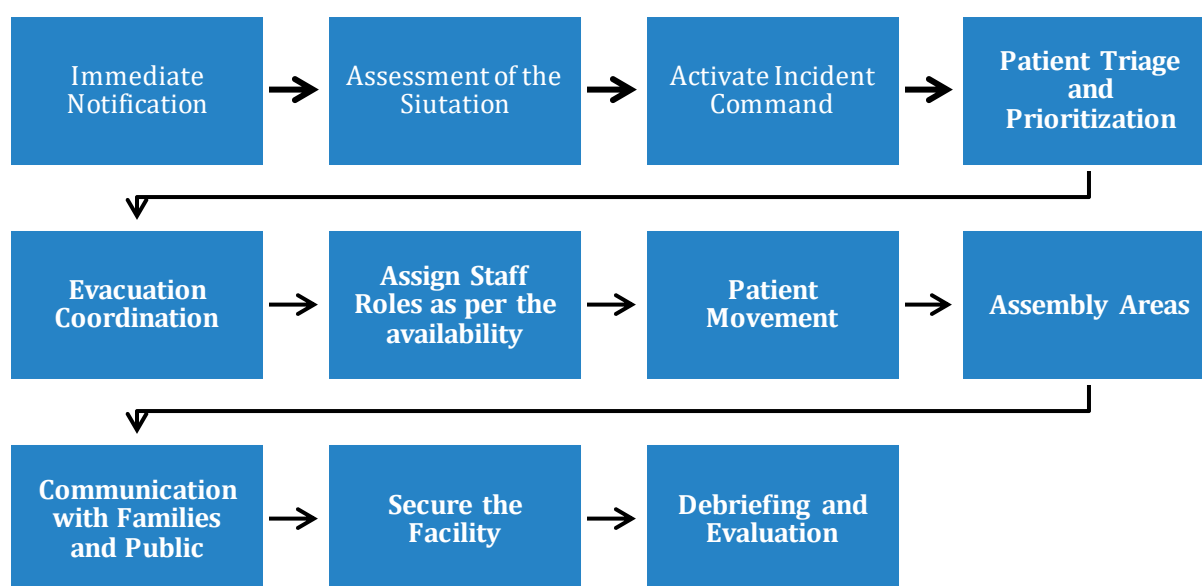
Resource allocation is a crucial aspect of evacuation planning, involving the identification of essential equipment, medical supplies, and personnel required for a safe and effective evacuation.

Hospitals must establish clear protocols for the transportation of patients, ensuring that appropriate vehicles and trained personnel are available. Additionally, coordination with local emergency services, transportation providers, and neighbouring healthcare facilities is essential to facilitate smooth transitions and prevent bottlenecks during evacuations.

Communication strategies play a pivotal role in evacuation planning, as timely and accurate information dissemination is vital for ensuring the safety of patients and staff. Hospitals need robust communication systems that can reach internal and external stakeholders, including patients, families, staff, emergency responders, and the broader community. Clear evacuation instructions, designated assembly points, and methods for tracking evacuated individuals are integral components of effective communication strategies.

Collaboration with external agencies is imperative in evacuation planning to optimize available resources and enhance overall disaster response. Hospitals must engage with local emergency management agencies, public health departments, and other healthcare facilities to establish mutual aid agreements, share resources, and coordinate evacuation routes. Regular drills and training exercises involving hospital staff and external partners are essential to test the effectiveness of evacuation plans and identify areas for improvement. In any comprehensive hospital disaster management plan, the development and implementation of a robust evacuation plan are critical. This plan aims to ensure the efficient and safe evacuation of patients, staff, and visitors during emergencies or disasters that may pose a threat to the hospital's safety.

Sample Evacuation Procedures for Fire Emergency

Evacuation Sites (ES):

Evacuation Sites (ES) within hospitals are strategically designated locations where patients, staff, and other individuals can gather safely during emergencies that necessitate the evacuation of the facility. These sites play a crucial role in ensuring the orderly and efficient movement of people away from immediate danger while facilitating subsequent actions, such as medical assessments, further treatment, or relocation to alternative healthcare facilities. Each floor may also have a refugee location. It is a designated area to accommodate individuals seeking refuge during crises, such as natural disasters, mass casualty incidents, or other emergencies.

> **ES1 – Evacuation Site 1:**
> - Location: [Specify exact location details]
> - Procedures:
>   - Follow designated evacuation routes outlined in floor plans.
>   - Assemble promptly at Evacuation Site 1.
>   - Await further instructions from designated personnel.
>
> Create similar procedures for alternative locations.

Map of Evacuation Sites (ES): The hospital needs to provide a detailed map of evacuation sites, incorporating satellite imagery for precise identification.

Floor-Specific Plans:
- Develop and regularly update individual evacuation plans for each floor in every building.
- delineate explicit routes guiding individuals to designated evacuation sites.

Satellite Image:
Integrate satellite images into the evacuation site map to enhance clarity and facilitate easy identification.

Note:

- The efficacy of the evacuation procedures hinges on regular drills, training sessions, and seamless communication among staff members.
- Consistent updates and periodic reviews of the evacuation plan, including floor-specific plans and evacuation sites, are imperative to ensure accuracy and alignment with prevailing conditions.

Structural and Non-structural Mitigation in Hospitals

The imperative for both structural and non-structural hazard mitigation in hospitals arises from the inherent vulnerabilities and complexities of healthcare facilities, which serve as critical lifelines during emergencies and disasters. Healthcare facilities are often located in areas vulnerable to natural disasters, such as earthquakes, floods, and hurricanes. They are also complex structures with many people and equipment that must be protected in the event of a disaster. Therefore, it is important to identify, assess, and mitigate potential hazards to protect the lives and property of healthcare workers, patients, and visitors. Structural hazard mitigation is essential due to the unique demands imposed on hospital infrastructure, particularly in regions prone to seismic activity or other natural disasters. Reinforcing structures through measures such as seismic retrofitting and regular inspections is paramount to safeguarding the physical integrity of the facility, ensuring that it can withstand the impact of external forces and continue to provide essential medical services during crises. Earthquakes, floods, and other natural disasters can cause structural damage to hospitals, which can result in buildings collapsing or having to be evacuated. Without proper mitigation measures in place, these disasters can cause significant disruption to medical services, resulting in the loss of lives and property. For instance, the 2015 earthquake in Nepal caused extensive damage to hospitals, resulting in over 8,000 deaths due to a lack of access to medical care.

Simultaneously, non-structural hazard mitigation is equally critical, addressing the myriad challenges presented by operational vulnerabilities and everyday risks within hospital environments. Falling and fire hazards, among others, pose continuous threats to the safety of patients, staff, and visitors. Implementing measures such as slip-resistant flooring, proper lighting, and fire-resistant materials not only prevents accidents and injuries but also safeguards critical medical equipment and sensitive healthcare environments. Emergency preparedness, encompassing comprehensive plans and regular drills, ensures that hospital staff are well-equipped to respond swiftly and effectively to diverse hazards, maintaining continuity in healthcare services. These measures help to reduce the risk of accidents and injuries, which can disrupt healthcare services and harm patients. Additionally, emergency preparedness helps to ensure that hospital staff are prepared for any potential threats and can respond quickly to ensure that healthcare services are not disrupted.

In essence, the integration of structural and non-structural hazard mitigation in hospitals is a holistic strategy that acknowledges the unique nature of healthcare facilities. Beyond the immediate imperative of protecting lives and preserving critical infrastructure, these measures underscore the commitment to maintaining healthcare functionality even in the face of unforeseen challenges. By fortifying the physical structures, implementing preventative measures, and fostering a culture of preparedness, hospitals can uphold their vital role as resilient and reliable centers of care, capable of weathering the complexities of emergencies while ensuring the safety and well-being of all within their walls

Structural Hazard Mitigation:

1. **Seismic Retrofitting:** Hospitals situated in seismic-prone regions undergo seismic retrofitting, a process involving the reinforcement of the building's structure to withstand the impact of earthquakes. This may include installing base isolators, bracing systems, and other engineering enhancements to minimize structural damage during seismic

events. The objective is to ensure the safety of occupants and protect critical healthcare infrastructure from seismic forces.

2. **Regular Structural Inspections:** Routine structural inspections are conducted to identify and address potential weaknesses or deteriorations in the building. Trained engineers assess the integrity of the structure, identifying any signs of wear, corrosion, or structural compromise. Timely interventions based on inspection findings help prevent structural failures and maintain a safe healthcare environment.

3. **Building Codes Compliance:** Hospitals strictly adhere to local and international building codes and standards. Compliance ensures that the structural design and construction meet safety requirements. This includes considerations for load-bearing capacities, fire resistance, and other structural elements, contributing to the overall resilience of the hospital facility.

4. **Hazardous Material Storage:** Proper storage and handling protocols for hazardous materials within the hospital premises are implemented. This involves the establishment of designated storage areas, ensuring adequate containment measures, and implementing ventilation systems to minimize the risk of chemical spills or leaks. Compliance with regulations governing hazardous materials is paramount to prevent environmental and safety hazards.

5. **Fire-Resistant Materials:** Hospitals incorporate fire-resistant construction materials in critical areas such as patient rooms, laboratories, and storage facilities. These materials, including fire-resistant doors, walls, and ceilings, enhance the building's ability to withstand fire incidents. This is crucial for protecting both patients and critical medical equipment from the devastating impact of fires.

6. **Emergency Exits and Evacuation Routes:** Ensuring the safety of occupants during emergencies, hospitals maintain well-marked, unobstructed, and accessible emergency exits and evacuation routes. Regular drills and training exercises are conducted to familiarize hospital staff with evacuation procedures, ensuring a swift and organized response during critical situations.

Non-Structural Hazard Mitigation:

1. **Falling Hazard Prevention:** To prevent falls, hospitals implement slip-resistant flooring in areas prone to water or spills, such as bathrooms and kitchens. Handrails and grab bars are strategically placed in hallways and patient rooms to provide support, especially in areas where patients or visitors may need assistance.

2. **Lighting and Visibility:** Maintaining proper lighting in all areas is crucial for improving visibility and reducing the risk of trips and falls. Regular inspections and prompt replacement of burnt-out bulbs or malfunctioning fixtures contribute to a well-lit and safe healthcare environment.

3. **Emergency Preparedness:** Hospitals develop and regularly update comprehensive emergency preparedness plans, encompassing protocols for responding to various hazards. Regular drills ensure that hospital staff are well-trained and familiar with emergency response procedures, fostering a proactive and prepared organizational culture.

4. **Fire Hazard Mitigation:** Hospitals install and maintain fire detection and suppression systems throughout the facility. This includes the deployment of smoke detectors, fire alarms, sprinkler systems, and fire extinguishers. Regular fire safety training for all staff ensures that they are equipped to respond effectively in the event of a fire, including proper use of extinguishers and adherence to evacuation procedures.

5. **Electrical Safety:** Hospitals prioritize electrical safety by regularly inspecting and maintaining all electrical systems. This preventive measure aims to prevent electrical fires and includes checks on wiring, outlets, and electrical equipment for signs of wear or damage. Adherence to safety standards and regulations is fundamental to electrical hazard mitigation.

6. **Infection Control Measures:** Robust infection control measures are implemented to prevent the spread of diseases within the hospital. This involves the implementation of proper waste management protocols, stringent hand hygiene practices, and isolation procedures for contagious patients. The goal is to maintain a hygienic and safe healthcare environment for both patients and healthcare professionals.

7. **Security Measures:** Hospitals implement security measures to protect hospital staff, patients, and visitors. This may include the installation of surveillance systems, access control measures, and the presence of security personnel in key areas. These security measures contribute to a secure healthcare environment and safeguard against potential threats.

In conclusion, the mitigation of structural and non-structural hazards in hospitals is a multifaceted and proactive effort that involves a combination of design, maintenance, and operational protocols. The goal is to create a secure and resilient healthcare environment that prioritizes the safety of all stakeholders and ensures the uninterrupted delivery of critical healthcare services.

APPENDIX

HOSPITAL DISASTER MANAGEMENT PLAN TEMPLATE

I. Background

The background section provides contextual information, outlining the factors that prompted the development of the Hospital Disaster Management Plan. This may include the hospital's location, historical incidents, or regulatory requirements that underscore the necessity for a comprehensive emergency response framework.

II. Objectives

Clearly defined objectives articulate the primary goals of the Hospital Disaster Management Plan. Objectives may encompass safeguarding lives, preserving critical infrastructure, maintaining healthcare services during emergencies, and fostering a resilient and adaptive healthcare system.

III. Overview of the Hospital

This section offers a snapshot of the hospital's infrastructure, capacity, and key features. Understanding the hospital's layout, special units, and critical facilities is essential for effective disaster planning and response.

Sl. No.	Existing Human Resource Capacity	Number
1	Departments	
2	Faculty Staff	
3	Other Doctors	
4	Admin/Ministerial Staff	
5	Para Medical Staff	
6	Nursing Staff	
7	Class IV	
8	Supporting Staff	
9	Nursing Teaching Staff	

IV. Types of Emergencies

An overview of potential emergencies the hospital may face, ranging from natural disasters to disease outbreaks, sets the stage for a targeted and adaptive disaster management plan. Identifying and categorizing potential emergencies enable tailored response strategies.

Hazard Vulnerability and Risk Analysis

- Hazard Profile of the district in brief and the hospital and surroundings (take the hazard map of the district from the KSDMA website or DDMP, also make a map of the hazard-prone areas around the hospital)
- Past Disaster Events (Within hospital and Mass Causality i.e. outside hospital. Collect data from the health department and Revenue)
- Vulnerability Assessment (where are the most vulnerable people)

- Rapid Visual Screening (Do an RVS for the hospital building)
- Risk Scenarios (Hospital Affected, Community Affected, Both affected)

V. Hospital Disaster Management System

1. **Hospital Disaster Management Committee:** This section outlines the composition, roles, and responsibilities of the committee tasked with overseeing the hospital's disaster management efforts. It may include key stakeholders such as administrators, medical staff, and emergency response experts.
2. **Hospital Incident Response System:** Describing the hospital's incident response system provides insight into how the facility organizes and mobilizes resources during emergencies. This includes establishing incident command, communication protocols, and resource coordination.
3. **Hospital Emergency Operation Centre:** The Emergency Operation Centre (EOC) is detailed, explaining its function as the central command hub during emergencies. This section may discuss the roles of various EOC sections, such as command, operations, planning, logistics, and finance/administration.

VI. Standard Operating Procedures

1. **Activating the Emergency Management Plan:** Outlines the criteria and procedures for activating the hospital's emergency management plan. This may involve triggers, communication protocols, and the decision-making process.
2. **Evacuation Procedures:** Details the step-by-step process for evacuating the hospital in various scenarios. This includes evacuation routes, assembly points, and roles and responsibilities of staff during evacuation.
3. **Mass Casualty Management Procedures:** Expands on procedures for handling mass casualties, including surge capacity measures to accommodate increased patient loads. Specific details are provided for patient reception, triage, and treatment procedures in operational areas.
4. **Standard Procedures for Natural Hazards in the Hospital:** This section outlines specific procedures for natural hazards commonly faced by hospitals, such as fire prevention, earthquake preparedness, response to disease outbreaks, and waste management.

VII. Annexures

- Structure of Hospital DM Committee (Included)
- Emergency response functions (during and after disaster)
- Resource Inventory
- Emergency Contact Details
- Monitoring and evaluation of the implementation
- RVS Format
- Maps

PROPOSED HOSPITAL DISASTER MANAGEMENT COMMITTEE

The following members of the hospital shall form the disaster management committee under the chairperson of the Director / Dean / Medical superintendent:

1.	Director / Dean / Medical Superintendent	
2.	Deputy Medical Superintendent	
3.	Heads of all medical departments	
4.	Head of Nursing department	
5.	Chief Medical Officer, Casualty	
6.	Public relations officer	
7.	In charge of the fire safety department	
8.	In charge of medical store/ pharmacy	
9.	In charge of the general store	
10.	In charge of infection control and Biomedical	
11.	waste management department	
12.	In charge of the quality-control department	
13.	In charge of laboratories and diagnostics department	
14.	In-charge of food & beverages/ nutrition Department	
15.	In charge of the laundry department	
16.	In charge of the central sterile supplies department	
17.	In charge of the housekeeping department	
18.	In charge of the physiotherapy department	
19.	In charge of the security department	
20.	Head of the finance department	
21.	In charge of blood bank	
22.	Executive Engineer (Civil & electrical)	
23.	In-charge of transportation	
24.	In charge of ambulance services	

**Members may be added/deleted according to the size of the hospital.

SAMPLE JOB ACTION SHEET

Role Description for Incident Responder:

The Incident Responder (IR) at the hospital is responsible for overseeing all aspects of the institution's engagement in disaster operations. The IR ensures the efficient functioning of the hospital during emergencies by being relieved of logistics, patient care, and other operational activities, enabling them to concentrate on coordinating the overall emergency response.

Reporting Structure:

Reports directly to the Incident Commander (IC)

Reporting Area:

Oversees the Hospital Incident Response and Emergency Operations

Normal Operational Periods:

- Ensure the operational status of all communication systems.
- Monitor preparedness measures, including conducting regular simulation exercises across various departments.
- Conduct two simulation exercises and one mock drill annually.
- Direct the designated disaster focal person to update the preparedness plan every six months.

During Drills/Emergencies:

- Activate the hospital Incident Respond System and take charge of organizing and directing the Emergency Operation Centre (EOC).
- Convene an initial action plan meeting with all section chiefs and initiate damage and needs assessments.
- Authorize resources as necessary or as requested by section chiefs.
- Represent the hospital in emergency meetings, response activities, and recovery meetings at the Ministry, City, and national levels.
- Undertake additional responsibilities beyond those outlined in the job action sheet, as deemed necessary.

Extended Actions:

- Approve media releases submitted by the Information and Liaison Officer.
- Conduct press conferences as required.
- Direct the development of after-action reports and disseminate them to all staff.
- Facilitate staff rest periods and relief as needed.

STANDARD WARD EVACUATION PROCEDURE

To ensure the safe and organized evacuation of patients, their relatives, and hospital staff during a disaster, protecting lives and minimizing harm.

PREPARATION

Disaster Management Committee Activation	Decision-Making	Manpower Mobilization
• The Disaster Management Committee is activated upon receiving a threat or disaster alert. • Committee members coordinate with relevant authorities and assess the severity of the situation.	• The committee, in consultation with the competent authority, decides on the necessity of total or partial evacuation. • If evacuation is deemed necessary, the committee authorizes the evacuation plan.	• Hospital staff from unaffected areas are mobilized for evacuation at short notice. • A roster of available staff is maintained for efficient deployment.

EVACUATION PROCESS

1. **Internal (Partial) Evacuation:**

Vertical Evacuation:

- Patients on lower floors move to upper floors if the lower floors are affected.
- Patients on upper floors move to lower floors in case of damage to the roof or top floor.

Horizontal Evacuation: Simultaneous evacuation on multiple floors or entire blocks in controlled situations like fire, explosion, or collapse.

2. **External (Complete) Evacuation**: Patients are transferred to predetermined suitable hospitals if the hospital is completely damaged or the threat persists.
3. **Evacuation Priorities:**
   - 1st Row: Small children, babies, and ambulatory patients not connected to machines.
   - 2nd Row: Patients using wheelchairs or walkers.
   - 3rd Row: Patients requiring stretchers for transport.
   - 4th Row: Patients in the intensive care unit.
   - 5th Row: Patients with the least probability of survival.
4. **Safe Zone Establishment:**
   - Identify an area outside the affected zone, safe from the disaster, for patients, relatives, and workers.
   - Designate this area as the safe zone.
5. **Communication and Coordination:**
   - Assign team leaders to guide the evacuation based on priorities.
   - communicate evacuation instructions using pre-determined signals.
   - Establish communication with external agencies (Fire Department, Civil Defense) for additional support.

6. **Patient Record and Document Handling:**
   - Ensure medical files, laboratory, and imaging results accompany referred patients.
   - Maintain records for accountability and future medical care.

POST-EVACUATION

Hospital Assessment

- After evacuation, assess the hospital for any sections that can be brought back into service.
- Determine if any areas are deemed safe for reoccupation.

Debriefing and Review

- Conduct a debriefing session with involved personnel to evaluate the effectiveness of the evacuation.
- Identify lessons learned and update the evacuation plan accordingly for continuous improvement.

Capacity Building for Hospital Managers

Capacity building for hospital managers in the context of disaster management involves providing them with the knowledge, skills, and tools necessary to effectively plan for, respond to, and recover from disasters. Here are some key training topics for hospital managers in the field of hospital disaster management:

1. Introduction to Hospital Disaster Management
2. Roles and Responsibilities of Hospital Managers in Disasters
3. Terminologies in Disaster Medicine
4. Hazard Vulnerability Analysis (HVA)
5. Hospital Incident Command System (HICS)
6. Standard Operation Planning (SOP)
7. Triage in Hospital Settings
8. Medical Operations in Disaster
9. Logistics and Resource Management
10. Communication Strategies
11. Psychosocial Support for Staff and Patients
12. Public Relations in Healthcare During Disasters
13. Evacuation Planning and Execution
14. Chemical and Biological Incident Preparedness
15. Radiation and Nuclear Incident Preparedness
16. Business Continuity and Recovery
17. Quality Control in Disaster Situations
18. Community Engagement and Integration
19. Tabletop Exercises and Simulation Drills
20. Lessons Learned and Continuous Improvement
21. Legal and Ethical Considerations in Hospital Disaster Management
22. International Disaster Response Standards
23. Financial Planning for Disasters
24. Technology and Innovation in Disaster Management
25. Collaboration with External Agencies
26. Crisis Communication Strategies
27. Case Studies and Scenario-Based Learning
28. Team Building and Leadership Skills
29. Continuity of Care for Special Populations
30. Documentation and Reporting During Disasters

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