


# Resilient Hospitals

inter-regional guidance for strengthening resilience to health emergencies and disasters in health facilities

# **Resilient Hospitals**: An inter-regional guidance on strengthening resilience to health emergencies and disasters in health facilities



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# Acronyms

| | |
|---|---|
| *4CI* | Communication, Cooperation, Coordination, Collaboration, and Intelligence |
| *AAR* | After Action Review |
| *CAP* | Corrective Action Plan |
| *COVID* | Coronavirus Disease |
| *HEDRM* | Health Emergency and Disaster Risk Management |
| *EMT* | Emergency Medical Team |
| *EMS* | Emergency Medical Services |
| *EMRO* | Eastern Mediterranean Regional Office |
| *GGHH* | Global Green and Healthy Hospitals |
| *HEOC* | Hospital Emergency Operations Center |
| *HICS* | Hospital Incident Command System |
| *HIMS* | Hospital Information Management System |
| *HIMT* | Hospital Incident Management Team |
| *HSI* | Hospital Safety Index |
| *IAP* | Incident Action Plan |
| *IC* | Incident Commander |
| *ICT* | Information Communication Technology |
| *IPC* | Infection Prevention and Control |
| *JAS* | Job Action Sheet |
| *PAHO* | Pan American Health Organization |
| *PIO* | Public Information Officer |
| *RCCE* | Risk Communication and Community Engagement |
| *UNDRR* | United Nations Office of Disaster Risk Reduction |
| *WHO* | World Health Organization |

# Acknowledgements

The guidance is the result of an inter-regional collaboration between the World Health Organization Regional Office for the Eastern Mediterranean and the Regional Office for the Americas (Pan American Health Organization). This document is among the outputs of the cross-departmental collaboration between the Universal Health Coverage/Health Systems, Health Emergencies, and Healthier Populations departments at the WHO Regional Office for the Eastern Mediterranean (WHO/EMRO), and the WHO Health Emergencies Program at the Pan American Health Organization (WHO/PAHO).
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This document was peer-reviewed and enriched by the technical expertise of WHO colleagues from WHO/EMRO: Rana Hajjeh, Awad Mataria, Richard Brennan, Maha ElAdawy, Hala Sakr, Ali Ardalan, Osman ElMahal, Jehan AlBadri, Ghada AlKayyali (WHO Jordan), Munia Abu El Hawa (WHO Occupied Palestine Territories), as well as colleagues from WHO/PAHO Juan Carlos Sánchez, Enrique Pérez Gutiérrez, Amalia Del Riego, Felipe Cruz Vega, Daniel de Jesús, Mauricio Cerpa, along with Hermes Cortés, Martín Acosta, Lorenzo Barraza, Reynaldo Holder, Solange Mora, Alejandro Santander, and Carolina Pineda who provided valuable technical input in the development of the accompanying STAR-H toolkit. Thanks to colleagues from WHO HQ: Jonathan Abrahams, Lee Wallis, Ann Lise Guisset, Mazen AlMalkwai, Rasha Nusr, Redda Seifeldin, and Elena Villalobos Prats.

Feedback was also incorporated by the multidisciplinary professionals who participated in various technical meetings, such as the Expert Consultation on Hospital Resilience in 2022, including: Heba Ali, Griffith University (Australia), Hamid RezaKhankeh, University of Social Welfare and Rehabilitation Sciences (Iran), Ayoko Honda, Hitotsubashi University (Japan), Jamal Melhem, Jordan University Hospital (Jordan), Ali Alsaad, Almaqased Hospital (Jordan), Roger Hamoush, Roumieh Governmental Hospital (Lebanon), Qasem AlSalmi, Royal Hospital (Oman), Shagufta Hassan, Aga Khan University Hospital (Pakistan), Dr Saeed Sarahneh, AlIstishari Hoyal Hospital Ramallah (Palestine), Theodoro Herbosa, University of the Philippines (the Philippines), Nebil Achour, Anglia Ruskin University (United Kingdom), Richard Greenhill, Texas Tech University (United States of America),

A special thanks is given to the Asian Disaster Preparedness Center for their technical contribution to this document and their support in capacity building the national hospital resilience mentors who facilitated its piloting, and to the WHO Collaborative Center for Resilient Health Services at the Mexican Social Security Institute.

# Introduction

In both emergency and routine times, hospitals and health facilities are critical community institutions and a central beacon of hope for people seeking health services[1]. Hospital systems represent a significant investment in the countries including the private sector. In many countries, hospitals and hospital systems comprise up to 70% of the government health budget and are a symbol of social well-being and security of the population[2].

In the aftermath of the COVID-19 pandemic, intensified by the increasing frequency and impacts of disasters and emergencies, ranging from infectious disease outbreaks to climate-related disasters, to mass casualty incidents, there is an unparalleled impetus on resilience. Global evidence and literature on hospital resilience remains nascent and divergent; scholars have synthesized a conceptual framework as a starting point to aid in the operationalization of these dynamic and ever-evolving concepts[3].

Resilience can be broadly described as the capacity to absorb, adapt, transform, and recover from various unexpected shocks[4]. Applied to hospital disaster risk management, this translates to the ability of the hospital or health facility to endure a hazard impact, be they natural or human-induced including biological hazards, that threaten to disrupt the facility's routine services, while maintaining critical health service functions and recovering from its original state. In addition, hospitals learn from previous experiences to reduce disaster risks and improve future responses.

**When crisis strikes, hospitals save lives. A resilient hospital must maintain its function, and protect investments, to provide the necessary continuous life-saving essential health services to its community, while leaving no-one behind.** Improving hospital resilience is not only necessary to improve access to healthcare during emergencies, but it also further reduces vulnerabilities, challenge inequalities, and contributes to Universal Health Coverage (UHC), global health security, disaster risk reduction, climate adaptation and mitigation, sustainability, and health equity[5].

Recognizing the dynamic nature of hospital resilience and the diversity and severity of disasters which health facilities face, hospitals are continuously transforming, adapting, and learning to maintain their functionality and provide quality and uninterrupted critical life-saving services to the most affected.
Hospitals are often simultaneously in different phases of the disaster risk management cycle as in preparing for and responding to multiple and various hazards. Strengthening hospitals' capacities for preparedness, response and recovery is essential for mitigating the consequences of hazards.
However, this is easier said than done in the current challenges and contextual realizations of healthcare operations; implementing such undertakings require capacities, resources, and significant staff time before an emergency strikes. Hospital emergency and disaster risk management often compete with routine hospital work and priorities, stretching hospitals' resources further, resulting in less attention given to risk reduction and preparedness activities.

Furthermore, this guidance emphasizes how key actions can be integrated into routine hospital operational systems, functions, and services that will strengthen how hospitals prepare for, respond to, recover from, and build back better from the impacts of multiple hazards, including epidemics and pandemics.

[1] EMHJ Editorial April 2023
[2] Comprehensive Safe Hospitals Framework, WHO 2015
[3] What is hospital resilience? Frontiers paper and EMHJ report publication
[4] EMHJ editorial: https://applications.emro.who.int/EMHJ/V29/04/1020-3397-2023-2904-229-231-eng.pdf
[5] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full

## Purpose and Intended User

This hospital resilience operational guideline aims to provide simple and practical recommendations that will enhance hospital resilience throughout all phases of disaster risk management before, during, and after an emergency or disaster.

This guidance should be used by hospital managers, heads of hospital departments, members of the hospital emergency management committees including support services and administration, and finance and health authorities responsible for planning and coordinating health emergency and disaster risk management in any health facilities.

## What is Hospital Resilience?

Building on the extensive research and contributions by WHO/EMRO and WHO/PAHO, the following conceptualizations will give context and common language to enable the operationalization outlined in this guidance.

In May 2022, an expert consultation hosted by WHO/EMRO brought together multidisciplinary leading global and regional policymakers, hospital managers, academics, and representatives of WHO, to validate a draft framework for hospital resilience and discuss interventions for operationalization and evaluation[6]. This framework (Figure 1) served as a starting point for future discussions on strengthening hospital resilience. It defines hospital resilience using 6 components (6S), 4 capacities, outcome and impacts.

This conceptual framework consists of three concentric layers (showing the components and capacities) and an arrow showing the primary outcome and impacts. At the center, the figure shows a hospital with its 6 components. The hospital is embedded within health systems and community resilience (inner/white circle). The second layer (orange circle) shows that hospital resilience manifests throughout all the four (often overlapping) stages of the health emergency and disaster risk management (HEDRM) cycle, prevention, preparedness, response, and recovery (PPRR), led by a risk-informed and all-hazard approach. The third layer (blue circle) shows the four primary resilience capacities occurring through the HEDRM cycle.



[6] https://applications.emro.who.int/EMHJ/V29/01/1020-3397-2023-2901-73-74-eng.pdf?ua=1

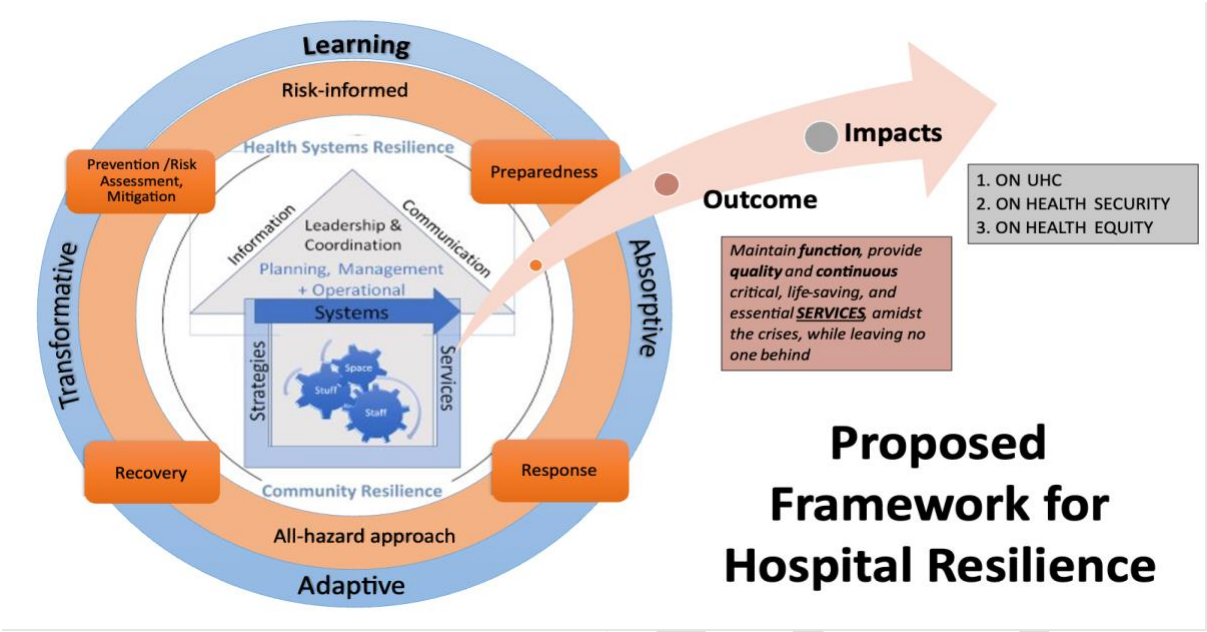



*Figure 1: Proposed Conceptual Framework for Hospital Resilience (Khalil et al, 2022)*

## 1. Outcome and impacts:

The primary outcome of resilient hospitals is *services continuity: the maintenance of hospital functions to save lives.* **Resilient hospitals must maintain functions as they provide high-quality and continuous critical, life-saving, and essential services, amidst crises, while leaving no one behind[7].**

Within this frame, best performing hospitals adapt to continue delivering high-quality and people-centred health services adapting to various challenges including but not limited to disasters, changing context, health system shortcomings and internal hospital deficiencies which they face. Furthermore, resilient hospitals ensure the delivery of integrated people-centred health services (IPCHS). Through this, resilient hospitals contribute to building stronger health systems, healthy communities, and sustainable development: IPCHS offer universal access, social equity and financial protection within a primary healthcare-led approach and are therefore critical to the attainment various Sustainable Development Goals (SDGs).

**Strengthening hospital resilience ultimately helps improve access to healthcare, reduce vulnerabilities and challenge inequalities, further contributing to the advancement of Universal Health Coverage (UHC), global health security, disaster risk reduction, climate adaptation and mitigation, sustainability, and health equity[8].**

## 2. Capacities, Components, Context:

The interdependence of six components (1) space, 2) stuff, 3) staff, 4) systems, 5) strategies, and 6) services) influences hospital resilience. Resilient hospitals must 1) absorb, 2) adapt, 3) transform, and 4) learn, utilizing all these capacities, sometimes simultaneously, through the overlapping prevention, preparedness, response, and recovery (PPRR) stages, within a risk-informed and all-hazard approach[9].

[7] https://applications.emro.who.int/EMHJ/V29/04/1020-3397-2023-2904-229-231-eng.pdf
[8] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full
[9] https://applications.emro.who.int/EMHJ/V29/01/1020-3397-2023-2901-73-74-eng.pdf?ua=1

**Capacities:**

Combining the most frequently cited definitions from the empirical literature, the capacities of resilient hospitals are summarized below:

- **Absorptive**: resist or withstanding the unforeseen shock of the emergency or impact of the disaster without loss of function,
- **Adaptive**: respond or can use alternate reserves or processes to maintain essential functions and meet immediate and acute community needs (ensure continuity of efficient, safe, high-quality, and person-centered health services),
- **Transformative**: recover from the disruption *rapidly* and at a sensible cost and reduce vulnerability to risk and improve readiness for future emergencies
- **Learning**: Reflect and review past actions and their effectiveness to inform future actions, question assumptions, challenge and change existing learning structures. Learning is bolded in the framework to highlight the cross-cutting nature of this capacity across the PPRR cycle as well as through the absorptive, adaptive, and responsive capacities.

**These capacities are not static but rather are dynamic and should improve continuously occur over time.**

**Components**:

With SERVICES as the primary outcome, the interventions listed in guidance span the remaining 5 components across the HEDRM cycle:

***1.Space:***

In this model, 'space' encompasses both structural and non-structural components mentioned in the Hospital Safety Index. This includes: the safety structural and architectural integrity of the physical building, its critical infrastructural and alternative back-up systems (i.e. power, water and sewage, HVAC, fuel, gas, hazardous waste management, and fire protection), and the quality and functionality of its medical equipment.

***2. Staff:***

Hospital managers described health workers as their most valuable resource; resilient hospitals rely on multidisciplinary teams. The availability, distribution, safety of health workers, along with their psychological resilience, their satisfaction and motivation, and attitude towards the disaster and the hospitals' preparedness and response is critical to hospital's resilience.

Across the literature, the ability to surge staff and redistribute health workers according to hospital needs was critical to hospital resilience. Further to this, the resilience of health workers is crucial and related to hospitals resilience. When considering the resilience of human resources, it is important to consider their 'emotional capacities (e.g., empathy, motivation, and stress management); cognitive capacities (e.g. creativity, leadership and decision-making) and finally, their 'epistemic' capacities (e.g. knowledge or technical competencies)'

***3. Stuff:***

This component includes finance, logistics, and supply chain management. One of the most critical issues related to hospitals resilience, especially in the Region's LMICs, was finance and its implications on staffing, logistics, and supplies. The availability of emergency or flexible funding to

ensure swift resource mobilization of resources, logistics and supplies management is necessary for hospital resilience. Resilient hospitals are financially resilient and can procure and mobilize the necessary resources to ensure service and business continuity.

***4. Systems:***

To highlight its importance, the 'roof of the hospital' captures the ***systems*** component. In this model, we include leadership and coordination, communication and information systems, and risk communication and community engagement as part of 'systems'. These ***systems*** bridge between **strategies** (in-theory) and **services** (in-praxis). The **systems** component is among the most critical as it enables and coordinates the *planning, management, and operationalization* of other components such as **staff, space, stuff, and strategies, to deliver safe and continuous services** within the various stages of PPRR.

Strengthening hospital's soft resilience requires building hospital manager's capacities in adaptive leadership, planning, and emergency management. This enables creating and actualizing adaptable and risk-informed strategies, protocols, and procedures; scaling communication and community engagement; optimizing use of data, evidence, and information; managing logistics, supplies, and finance; and motivating the hospital workforce to ensure functionality and continuity of lifesaving, essential and quality services during emergencies.

***5. Strategies:***

Resilient hospitals require strategies for mitigating and assessing vulnerabilities and risks, comprehensive and proactive all-hazard preparedness, response, and recovery plans, including plans for surge capacity and services continuity during emergencies. Specific standard operating procedures (SOPs) related to various operations are needed to implement these strategies, to ensure business continuity, functionality, and criterial operations.

***Context***:

Notably, the resilience of hospitals during times of crisis is influenced by several broader health system factors, including health system capacity, governance, financing, information, workforce, and infrastructure. These factors are interconnected and must work together to ensure that hospitals can effectively respond to emergencies and maintain the delivery of essential healthcare services. **Strengthening hospital resilience is intricately embedded within the contexts and considerations applied to improving national disaster, health systems, and community resilience to various types of hazards.**[10] It is essential to consider that the key actions proposed in the operational matrix are guided by national policies, guidelines, and standards from national actors like the ministries of Health, Finance, Planning, Environment, Economic Development, Local Government Authorities, and agencies for Disaster Management, alike including compliance to established building codes and fire safety standards.

## 3. Attributes:

According to scholars, there are numerous and varying attributes associated with health systems resilience and fewer associated with hospital resilience[11]. The conceptualizations above are complementary and build upon the SMART hospital initiative, concepts, and toolkits, piloted and implemented in the Caribbean over the last decade. According to the 2017 SMART hospitals toolkit,

[10] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full
[11] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full

hospitals are **SMART** when they are both safe and green. Further to this, according to PAHO's latest initiative, a resilient hospital is a safe, smart/sustainable, and inclusive facility that is flexible and adaptable to transform and learn, through mitigation, preparedness, response, and recovery, within a multi-hazard approach and based on a strategic risk assessment [12].

Informed by the conceptual framework (Figure 1) and resilient hospitals initiative goals outlined above, the following four attributes will guide this operational guidance, as outlined in Figure 2. Resilient hospitals must be:

1. Safe and sustainable
2. Inclusive (aspiring for equity)
3. Agile (flexible and adaptable)
4. Continuously learning

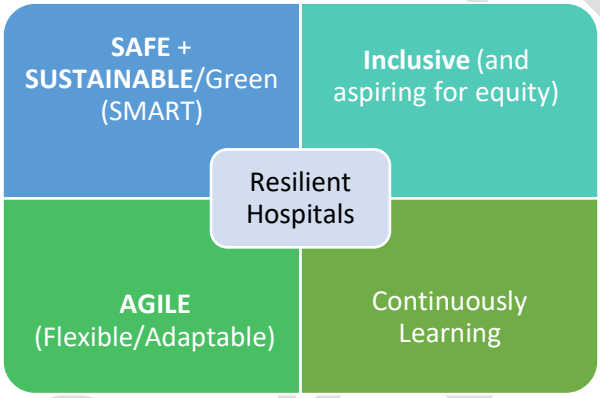



*Figure 2: Attributes of Resilient Hospitals adapted from Resilient Hospital Initiative 2023*

Resilient hospitals must be ***safe*** which requires ensuring hospital's structural and nonstructural resistance along with agility to rearrange the space to enable them to be more ***inclusive***, to ensure no one is left behind. Resilient hospitals must also have ***flexible, adaptable, and learning*** staff, finance, logistics, and supply chains (stuff), strategies and leadership and coordination, community engagement, along with communication, information, and monitoring and evaluation systems, to rapidly transform past experiences to recover from new shocks.

**Linking hospital resilience attributes, capacities, and components**

The below section outlines the structure of this guidance and links the resilient hospitals attributes, capacities, and operational matrix components.

In this guidance, the **SPACE** component encompasses the *structural or constructive elements* (specifically the load-bearing elements of the hospital building) as well as the *nonstructural or infrastructural elements* (including the non-load bearing elements like architecture, equipment, lifelines, etc...). **The starting point of a resilient hospital is its *SAFETY*;** whereby hospital's SPACE component is operational to sustain multi-hazard emergencies. Hospital's *SAFETY, or its constructive and nonstructural resistance*, are usually referred to as the hospital's *hard resilience.* Other attributes related to accessibility of hospitals (disability-inclusivity), environmental sustainability, and infrastructural agility are highly dependent on the resilience of the SPACE component and hospital safety. **Hospital's SAFETY is often traditionally associated with the absorptive capacity.**

[12] https://www.paho.org/en/news/14-4-2023-paho-makes-progress-13-countries-its-hospitals-resilient-health-emergencies-and

Further to this, as part of ensuring hospital's safety ~~and resilience~~ requires considerations to ensure hospitals are accessible and responsive to the needs of their populations without leaving anyone behind. **In efforts to be more INCLUSIVE, resilient hospitals must aspire towards health equity**, considering an intersectional lens not only within their service deliver to their target populations but also in their internal operations, whether in routine or emergency times. Utilizing gender-transformative approaches to strengthening hospital, health systems, community, and disaster resilience are necessary to ensure inclusive and equitable services delivery; this lens integrates an awareness and application of the social determinants and power inequalities which inhibit hospital users to access health services equitably especially during emergencies[13]. Notably, the literature on gender-mainstreaming HEDRM along with resources on diversity, equity, and inclusive in hospital operations are limited and further research is required for operationalization. Due to paucity of evidence at this time, this guidance will only focus on disability-inclusivity; however we encourage hospital managers and emergency coordinators to collaborate and co-design interventions with their communities, considering the needs of marginalized groups within target populations.

On the other hand, hospital's *FUNCTIONALITY***,** alternatively noted as *soft or operational resilience*, involves the components needed to ensure health services continue to be delivered during emergencies and disasters including: **SYSTEMS**, (including leadership and coordination, community engagement, communication, information, and learning), **STRATEGIES**, (including p*olicies and plans, including diversity, equity, and inclusion),* **STUFF** (financial and material resources, including supplies), and **STAFF** (human resources). This requires *flexibility and adaptability* from hospital leadership to coordinate, relocate, and surge the various components.

Strengthening hospital resilience further ensures that hospitals are **SUSTAINABLE (both environmentally and financially).** Beyond simply ensuring that hospitals are **green** and **climate-conscious**, building resilient hospitals ensures that hospitals are actively mitigating their contributions to climate disasters and other hazards**. Fiscal sustainability** was highlighted as a critical component in ensuring hospital resilience; resilient hospitals must protect investments and sustainably mobilize resources to maintain their functions.

Hospitals' functionality or its *soft resilience* is characterized by the ***AGILITY*** *and* ***LEARNING*** of all the above components throughout the various overlapping stages of the HEDRM. These attributes are often associated with **adaptive, transformative, and learning capacities.**

## 4. Operationalizing Hospital Resilience Guidance Structure:

Complementing the above framework, four questions were adapted to inform the operationalization of hospital resilience[14][15]:

1. Hospital resilience **for what?** Outlining the primary outcome of hospital resilience and its impacts mentioned above. *The hospital resilience attributes must be considered in its evaluation.*
2. Hospital resilience **to what?** Highlighting the systematic, risk-informed and all-hazard approach to strengthening resilience to different types of hazards, as informed by WHO's integrated approach to HEDRM
3. Hospital resilience **through what?** Mainstreaming HEDRM in routine hospital operations, integrating lessons learned from acute events, and building absorptive, adaptive,

[13] https://conflictandhealth.biomedcentral.com/articles/10.1186/s13031-022-00439-z
[14] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full
[15] https://applications.emro.who.int/EMHJ/V29/04/1020-3397-2023-2904-229-231-eng.pdf

transformative, and learning capacities, to ensure resilience before, during, and after an emergency or disaster.

4. Hospital resilience **of what?** Strengthening the resilience of a hospital's (or system's) components or its parts contributes to the resilience of the whole.

**In pragmatically operationalizing hospital resilience, this guidance and operational matrix interlink the "through what" and "of what" describing specific interventions for each component, throughout the HEDRM's cycle.**

Cognizant of the overlapping PPRR stages within the HEDRM particularly within multi-hazard approaches to disaster risk management, as well as the dynamic nature of resilience capacities, it was difficult to structure this guidance and matrix. For the purpose of simplicity, and as informed by various WHO guidelines on health systems resilience and health emergencies, this guideline divides the HEDRM into three: 1) BEFORE, 2) DURING, AND 3) AFTER the emergency or disaster.

| | ROUTINE HOSPITAL OPERATIONS (BEFORE EMERGENCY AND/OR DISASTER) | | | DURING EMERGENCY AND/OR DISASTER | POST EMERGENCY AND/OR DISASTER |
|---|---|---|---|---|---|
| | Risk Assessment & Planning | Risk Reduction (Prevention & Mitigation) | Preparedness | Emergency Response | Recovery (*Early Recovery*- short-term/ST, *Rehabilitation*- short-medium-term/MT, *Reconstruction* (medium-long-term/LT) |
| OBJECTIVES | **Identify** potential hazard, vulnerabilities and **prioritize** risks that can disrupt normal hospital operations | Prevent new or increased risks and eliminate or mitigate existing ones and mainstream HEDRM in regular hospital operations | Develop capacities to respond to and recover from the impact of hazards | Manage actual risks to the hospital which cannot be effectively reduced | Return to normal hospital operations and build back better including learning lessons for continuous capacity development |
| Linkages with National Level (Policies, Guidelines and Strategies) | National coordination mechanisms, guidelines, strategies, and standards for health system strengthening and health security *(e.g. Ministry of Health, Disaster Management Agency, Environmental Protection Agency, National Building Code /Fire Safety, Ministry of Finance, Planning, Economic Development Agency, etc.)* | | | | |
| KEY OUTCOMES: SERVICES | Save lives by maintaining function(s) and providing quality (safe, effective, patient-centered, timely, efficient, equitable) and continuous critical and essential services, amidst the crises, while leaving no one behind. | | | | |

Source: Hospital Resilience Operational Matrix (WHO EMRO | Summary report on the expert consultation on hospital resilience in the Eastern Mediterranean Region | Volume 29 issue 1 | EMHJ volume 29 2023)

### 1. BEFORE: Routine Hospital Operations Phase

This phase is divided into three: Risk Assessment and Planning, Risk Reduction, and Preparedness, each encompassing key actions **before** the emergency and/or disaster.

The first and most important objective and step is **Risk Assessment to inform Planning[16]. Hospital resilience begins with strategic risk assessment whereby hospitals assess multiple potential hazards and vulnerabilities and prioritize the risks which must be managed to avoid disruption to hospital operations.** Risk assessment must be integrated within routine hospital operations as hospitals must continuously update and adapt their resilience plans as informed by regular multi-hazards risk assessments[17].

Secondly, **risk reduction** whereby hospitals must prospectively manage risks, through *forward-looking management* (***prevention*** of new or increased risks) and *corrective management* (***mitigation***, reduction, or elimination of existing risks)[18]. Guided by a risk-informed and all hazard approach, hospitals must focus on institutionalizing risk reduction and readiness plans within routine hospital operations, while ensuring safety, agility, inclusivity, and learning.

[16] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full
[17] https://applications.emro.who.int/EMHJ/V29/04/1020-3397-2023-2904-229-231-eng.pdf
[18] https://iris.paho.org/bitstream/handle/10665.2/57956/9789275125588_eng.pdf?sequence=1&isAllowed=y

Thirdly, **preparedness** interventions are focused on developing and strengthening hospital's capacities to respond and recover from the impacts of multiple hazards. Guided by the HEDRM and STAR-H frameworks, preparedness marks the beginning of *compensatory risk management*, which follows through the recovery stage, whereby the goal is to strengthen the resilience to residual risks which cannot be effectively reduced.

2. **DURING**: Response Phase

During the **response**, interventions and key actions focus on saving lives, protecting property, and ensuring that actions are taken to stabilize and control the incident as it progresses. *Compensatory risk managemen*t extends through the response phase with the primary objective being to manage the actual risks which the hospital cannot effectively reduce prospectively[19]. The ability of the hospital and its systems to mobilize timely and coordinated response during emergencies depends on the capacities developed during the preparedness phase. During this stage, hospitals focus on interventions which anticipate a hazard impact, activate systems, and apply strategies developed utilizing the collective knowledge and skills of hospital personnel to perform agreed roles and responsibilities supported by appropriate resources.

3. **AFTER**: Recovery Phase

This phase is divided into two: recovery and learning.

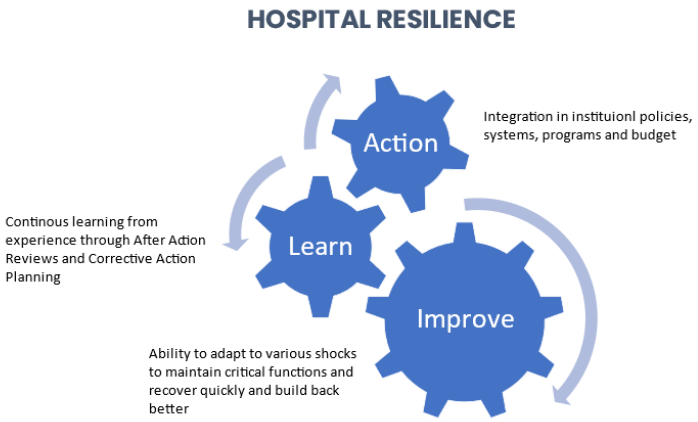
The **recovery** stages includes short-, medium-, and long-term interventions, initiated respectively in early recovery, rehabilitation, and reconstruction of damage facilities so that the hospital can transition from the emergency and return to normal hospital operations. Building on the compensatory risk management of the preparedness and response stages, interventions and key actions in this phase focus on reactivating and strengthening essential health services and facility operations from the transition of emergency response back to routine and improved operations[20]. These include but are not limited to cleaning and repairs of facilities, return of normal hospital functions and services including ensuring that staff are in the right state of physical and mental condition to return to normal work routine duty and function after the emergency.

Secondly, related to **learning**: **Hospital resilience is a result of a continuous process of learning** exemplified by tangible improvements in reducing disaster risks and increasing the capacities of hospitals over time. This phase also highlights the importance of identifying lessons and implementing corrective actions through After-Action Reviews (AAR) and corrective action planning.

Hospital resilience results from a perpetual practice as illustrated in Figure 2 of identifying lessons and implementing corrective actions, the operational matrix highlights the importance of After Action Reviews (AAR) and corrective action planning. Hospital resilience is a result of a continuous process of learning exemplified by tangible improvements in reducing disaster risks and increasing the capacities of hospitals over time.

**Figure 2: Lessons Learned Process**

[19] https://iris.paho.org/bitstream/handle/10665.2/57956/9789275125588_eng.pdf?sequence=1&isAllowed=y
[20] https://iris.paho.org/bitstream/handle/10665.2/57956/9789275125588_eng.pdf?sequence=1&isAllowed=y




**The operational matrix and guidance are therefore organized into three sections:**
**1) BEFORE, 2) DURING, AND 3) AFTER the emergency or disaster, each containing key actions or interventions for each of the 5 components, in the following order:**
**1) SPACE, 2) SYSTEMS, 3) STRATEGIES, 4) STUFF, AND 5) STAFF.**

**The recommendations outlined in this guidance are informed by established WHO tools and resources, linked in the document for ease of access.**

## Hospital Resilience Operational Matrix

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*Insert 2-page matrix here*

# 1 BEFORE: Routine Hospital Operations

This section describes key suggested actions *before* emergency strikes. This phase is divided into three: Risk Assessment and Planning, Risk Reduction, and Preparedness, each encompassing key actions **before** the emergency and/or disaster.

The first step of hospital resilience and health emergency and disaster risk management (HEDRM) is strategic risk assessment and planning[21]. **During this pre-emergency phase, hospitals utilize their learning, absorptive, and adaptive capacities to identify, prioritize, prevent and mitigate risks which can disrupt their operations; they must carefully plan how interventions can be mainstreamed as part of the routine hospital activities and not treated as a separate or additional staff responsibility.**

A comprehensive and sound risk assessment is the starting point which enables hospitals to have prioritized and contextualized interventions[22]. *Planning* follows to operationalize the identified interventions in routine hospital systems and processes. *Risk reduction* activities must be mainstreamed as an integral part of the hospitals' risk management and development agendas to ensure that existing risks are mitigated and that no new risks are developed as a result of the facility's advancement and growth. Similarly, as part of the pre-incident phase, *preparedness* measures are planned with appropriate resources to support their implementation to develop capacities and capabilities to respond and recover effectively from the impact of hazards. This marks the beginning of the compensatory risk management phase.

## 1.1 Strategic Risk Assessment and Planning

Hospitals must utilize regular **strategic risk assessment**, including hazard, vulnerability, and capacity assessments, to inform planning. The interplay between hazards, vulnerabilities and capacities is dynamic and constantly evolving. Therefore, as risks changes over time, hospitals need to continuously monitor the evolving risk landscape, assess, identify, and prioritize risks to determine any changes that requires adaptation of preparedness to maintain readiness to respond.

**As a continuous process, the hospital should plan for repeating risk assessments and prioritize risks to keep updated the systems and plans required to managed disaster risks as part of the continuous learning lesson to enhance capacities in HEDRM. It includes the required capacities of the hospital to address new and emerging disaster risks.**

During this stage, hospitals would benefit from ensuring they have strong leadership and management systems in place, for both normal and emergency times. as well as a clear and structured coordination mechanism with local authorities, including but not limited to: neighboring hospital networks, Ministry of Health, Disaster Management Agency, Environmental Protection Agency, National Building Code / Fire Safety, Ministry of Finance, Planning, Economic Development Agency, etc.). In coordination with these various structures, it is important for hospitals to have up-to-date community needs assessments, including special considerations for vulnerable groups.

> **Risk** is defined as the probability of harmful consequences — death, injuries, damaged property, lost livelihoods, disrupted economic activity, and environmental damage are some of the potential impacts as a result of the interactions between natural or human-induced hazards and vulnerable conditions present in the hospitals including its ability to mobilize a

[21] https://www.frontiersin.org/articles/10.3389/fpubh.2022.1009400/full
[22] https://iris.paho.org/bitstream/handle/10665.2/57956/9789275125588_eng.pdf?sequence=1&isAllowed=y

timely and effective emergency response.[23] Before planning starts, a hospital manager needs to understand the various hazards that might disrupt hospital services and their potential consequences, both internal to the hospital and the surrounding community that the hospital serves.

**Risk assessment** is a process to determine the nature and extent of such risk by analyzing hazards and evaluating existing conditions of vulnerability that together could potentially harm people, damage property, disrupt services, and affect livelihoods and the environment on which they depend. Risk assessment, therefore, is an integral part of the decision and policy-making processes and requires close collaboration among various parts of society. Conducting a risk assessment of hospitals requires coordination and engagement of subject matter experts related to engineering, architecture, safety, and disaster management. This includes when there is a previous assessment done by local authorities, which the hospital can use to facilitate its own evaluation.

**Hazards and vulnerability maps** on specific geographical locations where the hospital and the local communities are located can be referred to and are valuable references available in local disaster management authorities or disaster management information management systems. In addition, information on local communities is beneficial to anticipate potential response needs that the hospital needs to prepare for, especially if there are specific requirements to address specific needs of the vulnerable population. This includes information on response capacities of local organizations (e.g., fire and rescue department, civil defense, local health department, ambulance service, etc.), which can support hospital response during emergencies.

### Why conduct a risk assessment?

The following is essential information that the hospital needs to consider and analyze.

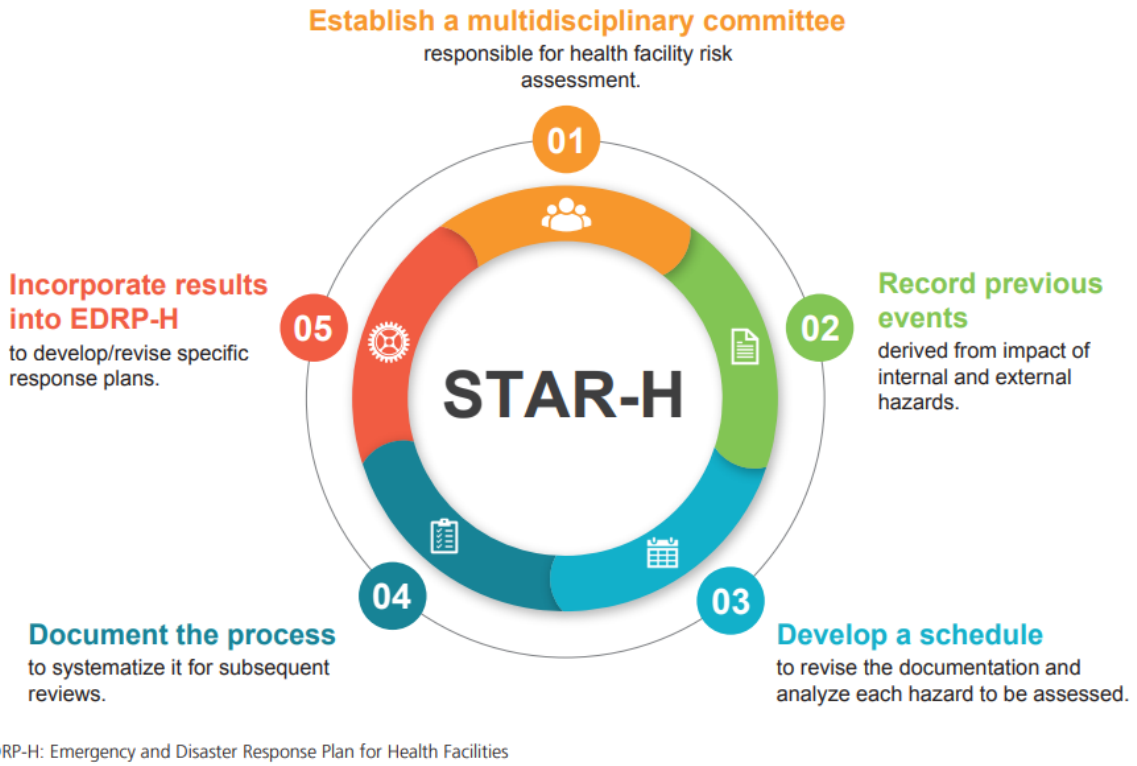
- Identify potential hazards (natural, biological, technological, and societal) and the likelihood that they can affect the hospital (internal emergency) and the local community (external crisis) or a combination of both.
- Look for vulnerabilities or weaknesses that would make the hospital assets (structural, nonstructural, emergency management systems) more susceptible to the effects of hazard.
- Analyze potential consequences of hazard impact to people, property (structural and nonstructural), services, livelihood, and environment in the hospital and the community.
- Identify current capacities to manage the impact of hazards. It involves ability of the hospital for routine hospitals operations and during emergency situations, leadership, management and coordination mechanism with local authorities and other stakeholders. In addition, capacities to support the needs of the affected communities including the vulnerable groups.

**How to conduct a hospital-level risk assessment for strategic planning?**

**WHO's STAR-H (Strategic Toolkit for Assessing Risks in Health Facilities)** outlines a simple five-stepped approach, as outlined by the figure below. "The STAR-H tool generates a report that includes hazard-specific risk scores, as well as general recommendations for using them appropriately. It includes four dimensions of assessment: (A) likelihood of the hazard occurring, (B) severity of impact on the lives of the occupants, the health facility and the facility's operations, (C) vulnerability, and (D) coping capacity."[24]

[23] Glossary of Heath Emergency and Disaster Risk Management, WHO 2020
[24] 9789275125588_eng.pdf (paho.org)

FIGURE 2 **STAR-H implementation cycle**




EDRP-H: Emergency and Disaster Response Plan for Health Facilities

## 1.2 Risk Assessment Tools

- **STAR-H Strategic Toolkit for Assessing Risks in Health Facilities (2023)**: **https://iris.paho.org/bitstream/handle/10665.2/57956/9789275125588_eng.pdf?sequence=1&isAllowed=y**
- Community health needs assessment : an introductory guide for the family health nurse in Europe (who.int)
- Community Health Needs Assessment | The Johns Hopkins Hospital Community Health (hopkinsmedicine.org)

## 1.3 Risk Reduction (Prevention and Mitigation)

**The risk reduction phase emphasizes mainstreaming disaster risk reduction in the hospital's development planning processes and strengthening routine operational activities towards ensuring hospital's safety, agility, inclusivity, and learning.** This means looking critically at each program, activity, and project that is being planned, not only from the perspective of improving hospital operations, but also as an opportunity to reduce the existing disaster risks minimizing its potential contribution to creating disasters and increasing its capacity to respond to and recover from the impacts of hazards. During this stage, hospitals are prospectively managing risks through *both forward-looking (prevention) and corrective (mitigation) risk management approaches*.

> **Disaster risk reduction** is the concept and practice of reducing disaster risks through systematic efforts to analyze and reduce the causal factors of disasters. Its interventions aim to prevent new and reduce existing disaster risks and manage residual risk, all of which contribute to strengthening resilience and achieving sustainable development.

Mitigation and prevention efforts aim to reduce the potential damage and suffering that disasters can cause. While disaster risk management cannot prevent disasters, it can prevent them from becoming compounded as a result of neglecting causal factors and manageable risks. **Mitigation** specifically refers to actions taken that can lessen the severity of a disaster's impact. The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. While certain disaster risks cannot be eliminated, **prevention** aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed. Investing in measures that prevent hazards can greatly reduce the burden of disasters.

The following provides recommended actions for each of the hospital resilience components as part of the routine hospital operations.

**SPACE**

*Including structural (constructive) and non- structural (infrastructural) elements*

In the face of disasters, most problems usually result from the lack of hospital's structural and non-structural safety, their structural and infrastructural resilience. Nevertheless, it is crucial for hospital managers not only to consider disaster risk reduction interventions related to these elements but further consider the environmental implications of hospitals—**striving not only for hospital to be safe but also green[25] (environmentally) and financially sustainable, in addition to inclusive**.

Concerning hospital's **safety**, the following needs to be considered:

### 1.3.1 Structural Mitigation

The design and construction of new hospitals must consider risk information on possible hazards and vulnerabilities of the building. This will enable the incorporation of mitigation measures in the design stage to strengthen the structure to withstand the effects of the hazard.

As for existing hospital buildings wherein risk information has not been considered in its building design and construction, some possible mitigation measures can be done below:

- Retrofitting of the building to strengthen its existing structure to make it hazard (seismic) resistant.
- Firewalls reduce the potential for fire to spread uncontrollably across different hospital areas. This will facilitate hospital evacuation or making a decision to stay and defend in place.
- Floodwalls as a barrier to temporarily contain the runoff water from the river or other waterways, which may rise to exceptional levels during seasonal or extreme weather events.

### 1.3.2 Non-Structural Mitigation

Damage to non-structural elements can severely paralyze the hospital's operation, even when the structure of the building remains undamaged. This includes all non-load-bearing features in the building, like exterior and partition walls, windows, ceilings, elevators, mechanical and electrical equipment, lighting systems, furniture, and others. In addition, the cost implication of such damage can be enormous, given that the structure of the building only represents between 15% and 20% of the total

[25] 9789275119396_eng.pdf (paho.org)

cost of the hospital. Therefore, breakdown in hospital services because of damaged nonstructural elements can be significant and costly.

After identifying a vulnerable non-structural element that can be damaged and significantly affect the functionality of hospital services or the loss of human lives of occupants, appropriate actions should be taken to reduce or eliminate the danger. For example, the "6R" non-structural mitigation measures can be used[26] [27]:

- **Remove:** this might be the best option in most cases. However, this can be a hazardous material that can spill and should be stored outside the hospital premises.
- **Relocation:** would reduce danger in most cases. An example is a weighty object on top of a shelf that could fall and seriously injure someone. Relocating it to a floor-level rack will reduce the risk of endangering some.
- **Restrain:** restricting the movement of particular objects like oxygen cylinders and electrical generators to prevent further damage or injuring people.
- **Reinforce:** strengthening existing elements like unreinforced walls or vents using wire mesh and filling with cement.
- **Replace** substitution with something that does not represent a danger. An example is the use of heavy tiles roof that makes the building heavy but more susceptible to movement during an earthquake. A solution would be to switch to a light and safer roof.
- **Redundancy:** plan for alternate sources of critical non-structural elements in the hospital, especially lifelines involving power, water, communications, HVAC, fuel, gas, waste management, etc.

### 1.3.3 Infrastructural Accessibility and Agility

People with disabilities experience significant health inequalities compared to those without disabilities. According to the World Report on Disability (2011), about 15% of the world's population lives with some form of disability, of whom 2-4% experience significant difficulties in functioning[28]. This situation is exacerbated during emergencies where people with disabilities are two to four times more likely to be injured or die in disasters due to inadequate community-wide planning and access to emergency and disaster assistance.

Barriers faced by people with disabilities include physically inaccessible health spaces within the hospital premises, communication barriers, and lack of awareness and training of professionals. Therefore, providing support and awareness of the unique needs of people with disabilities improves health equity and inclusivity of the health system. It is also important to consider visible and invisible disabilities, including but not limited to: hearing, physical, intellectual, psychosocial, visual, among others[29]. The following are possible interventions to support people with disabilities within a resilient and inclusive hospital:

- space for wheelchairs and open space close to the front desk with adequate floor space to move around
- wide doorways so that wheelchairs and mobility scooters can pass
- use of assistive technology like touch screens
- easily accessible switches and handles (e.g., lights, elevator, doors)

[26] Course Briefs (adpc.net)
[27] Principles of disaster mitigation in health facilities (paho.org)
[28] World Report on Disability (who.int)
[29] Ingridh-Eng.pdf

- visual notifications for people who are deaf and oral notifications for those who are blind (e.g., audio-visual fire alarms)
- accessible and easily understandable signages
- access ramps
- handrails

Hospitals should also consider allocating spaces where people with disabilities can be properly treated and supported in time of crisis. This would entail converting existing space to facilitate providing such assistance by the healthcare facility as part of the plan.

**In strengthening hospital's resilience, hospitals should prioritize safety, environmental and fiscal sustainability, and inclusivity[30].**

When disaster strikes, it destroys development gains from many years of work and financial investment. Damage to hospital facilities and expensive equipment considerably set back economic development advances of hospitals that will take significant time and resources to recover. Moreso, deficits in development create disaster risks. Equally, unplanned development, such as such as building new structures on old or existing ones or procuring and placing heavy diagnostic equipment on floors that are not designed to support that extra weight, create new disaster risks, particularly when they are not risk-informed. Unplanned expansion of facilities tends to replace soil and vegetation with impervious surfaces such as roof tops and asphalt that used to soak into the ground flowing directly into rivers and streams or the local sewage system. In the absence of proper planning, the potential for flood damage is greatly increased when, through lack of awareness or disregard for the potential danger, unsuitable development takes place in areas that are already subject to flooding. As development improves the ability of the hospital to provide more services to more people, if not planned well and does not consider its risk implication, such development activities increase vulnerabilities for the hospital and will be counterproductive in the end[31]. Ultimately, hospital managers should aim to build SMART hospitals as outlined by the ideals in the box below:

**SMART HOSPITALS = SAFE + GREEN**

(SMART HOSPITALS TOOLKIT, 2017)

a) Protects the lives of patients and health workers;
b) Reduces damage to the hospital infrastructure and equipment as well as the surrounding environment;
c) Continues to function as part of the health network, providing services under emergency conditions to those affected by a disaster;
d) Uses scarce resources more efficiently, thereby generating cost savings;
e) Improves their strategies to adjust to and cope better with future hazards and climate change.

**Hospitals would benefit from using three essential *SMART hospital tools[32]:***

[30] PAHO makes progress in 13 countries with its "Hospitals Resilient to Health Emergencies and Disasters" initiative - PAHO/WHO | Pan American Health Organization

[31] https://www.nzdl.org/cgi-bin/library.cgi?e=d-00000-00---off-0aedl--00-0----0-10-0---0---0direct-10---4-------0-1l--11-en-50---20-about---00-0-1-00-0-0-11-1-0utfZz-8-00&cl=CL1.1&d=HASH01f48d904007865370d1f485.4&gt=1

[32] 9789275119396_eng.pdf (paho.org)

Firstly, *using the Hospital Safety Index (HSI) tool*, hospital managers are able to determine the probability of a hospital maintaining its function during an emergency, focusing mostly on structural and nonstructural indicators as well as some functional factors.

Secondly, using the *Baseline Assessment (BAT) tool*, hospital managers to collect baseline information to guide decision-making on retrofitting. This tool complements the HSI and Green-Checklist, and consists of six sections including: energy and water consumption; indoor environmental quality (IEQ); building components; an occupant survey; and land use (local zoning regulations)[33].

Thirdly, using *the Green Checklist*, hospitals are able to identify priority interventions to minimize their contributions to climate change, such as conserving resources, cutting costs, increasing operational efficiency, and reducing carbon emissions.

In addition to this, hospital could also utilize the ***WHO guidance for climate resilient and environmentally sustainable health care facilities,*** which outlines interventions on four areas: (1) the health workforce; (2) water, sanitation, hygiene and health care waste management; (3) sustainable energy services; and (4) Infrastructure, technologies and products[34].

Finally, hospitals must also ensure resilience through ensuring that readiness plans are inclusive of persons with disabilities, using the ***Disability Inclusion in Hospital Disaster Risk Management (INGRID-H) tool*****.** This tool provides an evaluation of the measure of disability-inclusivity according to five areas: (1) visibility of persons with disabilities; (2) participation of persons with disabilities; (3) universal access; (4) response capacities developed; and (5) hospital emergency and disaster response plan.

## STRATEGIES

*Policies, Plans, and Coordination, including diversity, equity, and inclusion*

A clear strategic direction is critical to strengthen the hospital's institutional oversight in achieving its goals and objectives. A strategy integrating routine organizational activities, utilizing and allocating its limited resources within the organizational environment, is essential, in mainstreaming risk reduction in development. It contains the blueprint of an organization's decisions that show its objectives and goals, key policies, and plans for achieving these goals. The following are essential elements of strategies in contributing to hospital disaster resilience:

- Policies should include roles and responsibilities of all public, private, and civil society stakeholders across the components of all-hazards hospital disaster risk management strategy and include those responsible for planning and coordination, IHR (2005), surveillance and early warning, emergency preparedness and response, recovery, and health services.
- The findings from risk assessment should inform the planning of reducing risks and capacity development, exercises, and reviews, especially those conducted for multisectoral all- hazards disaster risk management involving local authorities and organizations. There should be coherence and continuity between the plans of different levels and jurisdictions.
- The hospital disaster risk management coordination mechanism and dedicated units/persons should be established to ensure appropriate coordination across the

[33] https://www.paho.org/en/documents/smart-hospitals-baseline-assessment-tool-workbook
[34] WHO guidance for climate resilient and environmentally sustainable health care facilities

hospital departments, other area network hospitals, the local health authority, and other sectors.

- Diversity, equity, and inclusion in hospital policies, plans, and programs should be mainstreamed to improve coping capacities and lessen the adverse impacts of hazards on vulnerable community populations.

### 1.3.4 Hospital Accreditation System

In most countries, the hospital accreditation system and licensing are a vital aspect of ensuring quality and patient safety implemented by health care organizations to assess their performance concerning established standards and implement continuous improvement.

One entry point to integrate disaster risk management in regular hospital operations is to include essential emergency and disaster management elements in the accreditation system. An example is complying with standards in the international and/or national hospital accreditation system on emergency and disaster management. Notably, in learning from the COVID-19 pandemic, the Joint Commission revised its standards and requirements for emergency management as part of hospital's accreditation[35]. Similarly, the Ministries of Health responsible in (re)licensing hospital operations of both private and public hospitals should include elements of emergency management within accreditation requirements.

### 1.3.5 Multi-Disciplinary Disaster Management Committee

The identification and establishment of a multidisciplinary HEDRM committee is a critical intervention across all literature and WHO guidance on emergency and disaster management, including recent reviews of successful responses to the COVID-19 pandemic[36]. This committee is charged with developing processes, policies, and procedures, conducting staff education, and securing necessary resources to ensure a prompt, coordinated and effective response of the hospital to all emergencies. The committee is responsible for all facets of the emergency operations plan, including the incorporation of simulation exercises and After Action Reviews intended to examine the response while identifying opportunities for improvement.

### 1.3.6 Business Development Plans of Hospitals

A resilient hospital maintains its function when a crisis hits; this requires a readiness for resource generation and reallocation to ensure financial sustainability and continuity of business and services [37]. Hospitals' organizational evolution requires continuously improving and expanding operations to meet the demand of the community they serve. This includes planning to construct a new building, upgrade equipment, use technology, expand health services, or recruit additional staff 38. Business continuity plans need to be risk-informed and included in the planning process to align with risk-reduction goals.

### 1.3.7 Routine hospital operations incl. emergency and support services

Optimizing hospital functionality and efficiency during routine times is essential to ensuring readiness and resilience. During an emergency response, the resources mobilized are the same as those used during regular operations. Before emergencies strike, it is crucial for hospitals to establish robust operational procedures in managing

[35] https://www.jointcommission.org/-/media/tjc/documents/standards/r3-reports/final-r3-report-emergency-management.pdf
[36] Preparedness policy paper EMRO and WHO HQ HEDRM
[37] WHO-WHE-CPI-2018.60-eng.pdf
[38] Health service continuity planning for public health emergencies: a handbook for health facilities (who.int)

trauma and infectious disease patients in the Emergency Unit, including patient reception, triage, assessment, decontamination, isolation, casualty care, and coordination with other departments to secure the availability of medicines, medical supplies, triage tags, and equipment to meet increased demands.

Additionally, the role of non-medical support services is equally essential, including but not limited to administration and finance, engineering and maintenance, housekeeping, security, and dietary, and laboratory, radiology, blood bank, pharmacy, and central supply are critical for hospitals to remain operational. Hospitals would benefit from integrating and strengthening support and allied health services within routine operations which can be easily adjusted to meet the demand of emergencies.

### 1.3.8 Green Hospital Operations

Health care is on the front lines of climate change bearing the costs of increased illnesses, differences in disease prevalence, and the health impacts of more frequent extreme weather events. At the same time, health care operations contribute significantly to climate change as hospitals generate significant environmental health impacts both upstream and downstream from service delivery through the natural resources and products they consume and the waste they generate. Some recommendations to decarbonize hospital operations are outlined in the box below.

### 1.3.9 Capacity Development Plans

Human resources (HR), both clinical and non-clinical staff, are an integral component to hospital operations. Capacity development is a continuous process whereby people and the hospital as an organization apply, strengthen, create, adapt, and maintain capacity over time to achieve its developmental goals. To sustain and appropriately use such capabilities at the right time and situation, disaster risk management competencies must be built as an integral part of the hospital staff capacity development plans implemented by HR department[39]. Capacity development activities such training, seminars, exercises, and learning exchanges should include HEDRM competencies. This includes operationalizing regular functions related to supply chain, facility management, financial management, and information management, which are also critical during emergencies.



[39] policy-brief-strengthening-human-resources-for-health-to-respond-to-covid19-and-other-emerging-pandemics-in-the-caribbean (1).pdf

**Decarbonizing hospital operations:**

The Global Green and Healthy Hospital (GGHH) is a global network of more than 70 countries that advocates green and healthy hospitals. It promotes how hospitals reduce their environmental impact and ultimately eliminate their contribution to the disease burden. Some key actions to decarbonize hospital operations are the following:

- Foster the development of a hospital or system-wide multi-disciplinary sustainability task force, supported by the hospital management. The task force helps ensure that environmental health and sustainability plans are implemented in the whole of hospital and applied to all departments.
- Develop institution-wide chemicals and materials policy and protocols to protect the patient, worker, community health, and the environment while helping drive society-wide demand for alternatives.
- Segregate waste at the source and initiate recycling for non-hazardous wastes
- Health facilities can cut waste and greenhouse gas emissions through composting, recycling (including anesthetic gases), better purchasing (minimizing packaging, using reusable rather than disposable products, and buying recycled products), and minimizing waste transport (local treatment and disposal)
- Reduce greenhouse gas emissions and energy costs over time by using alternative forms of clean and renewable energy such as solar and wind energy, and biofuels
- Implement water conservation strategies: install efficient faucets and toilets. routinely check plumbing and pipes to prevent leaks, eliminate seal and cooling water on medical air compression and vacuum pumps, and retrofit refrigeration systems
- Consider harvesting rainwater and/or recycling water for process water use
- Implement on-site wastewater treatment technologies when no local service is available

The interventions mentioned above do not only contribute to reducing the carbon footprint of hospital operations but also support the ability of the hospital to continue functioning during and after a disaster by ensuring the essential lifelines have alternate sources like power, water and even support waste management in case the primary source fails or got damaged by a hazard impact.

**SYSTEMS**

*Leadership and Coordination, Information Management, Risk Communication, and Community Engagement, including Monitoring & Evaluation, Accountability, and Learning*

As discussed in the previous section, a solid and robust functioning of routine hospital services through well-trained staff supported by well-established policies, plans, procedures, and standards significantly contributes to services continuity during emergencies and ultimately, resilience. Similarly, strengthening hospital's soft resilience, particularly its systems, during routine times is critical to enabling an effective response.

### 1.3.10 Risk Communication and Community Engagement

Risk communication and community engagement (RCCE) is fundamental to HEDRM. Not only does effective communication improve hospital operations, efficiency, and culture during routine operations; it is the cornerstone of effective emergency management. Effective communication should target hospital staff, patients, visitors, and the wider community to provide information to help people make the best possible decisions for their safety, health, and well-being.

During normal hospital operations, various risks exist inside the hospital, including but not limited to: fire safety, security, patient safety, infection prevention and control, chemical safety, etc. Communication efforts can be supported by the hospital public relations team in collaboration with technical/clinical departments. The following are some actions to consider to integrate RCCE within routine hospital operations:

- Reinforce safety messages through posters, flyers, and information campaigns using appropriate language according to context.
- Use the opportunity of national/international day celebrations to reinforce safety messages (e.g., fire safety month, International Disaster Risk Reduction Day, International Patient Safety Day, International Nurses Day, Earth Day, etc…Complete list of international Days can be found at https://www.un.org/en/observances/list-days-weeks)
- Use of technology like websites and social media to reinforce communication. This platform can also be helpful for quickly gathering feedback from the audience so that messaging can be adjusted.
- Counteract infodemic by disseminating verified information and key messages from trusted sources (health authorities, WHO, etc) and respond to misinformation debunking harmful myths related to the health emergency.
- Many different types of communities are susceptible to the effects of health misinformation. Vulnerable groups (e.g. migrants, minority communities, hard-to-reach populations) are especially at risk due to limited access to credible and accurate information sources. This can diminish access to and uptake of health care, which may already be limited. Identify these vulnerable groups and use appropriate strategies, messaging and communication tools to address people with special needs (e.g. People with disabilities, minority groups)
- Establish linkages with local media and engage in routine public relations activities as part of Corporate Social Responsibility

**Principles of Effective RCCE**

- Some fundamental principles of why risk communication is an effective tool before, during, and after emergencies will help communicators design effective and appropriate communication tools and strategies.
- Perceptions of risk, rather than a technical risk assessment, motivate people's actions. Perceptions of risk are usually emotion-based and influenced by local and cultural factors.
- People understand according to their own experiences and background. Therefore, risk communication must be contextual.
- People often display "herd behavior" and follow leaders in an emergency. Therefore, engaging the right leaders and influencers in a community is essential.
- Behavioral change to take action for a health intervention is a process. It requires multiple ways of communication, repeated strategically numerous times from various sources.
- In an emergency, people are in a state of fear and do not always think rationally. Thus, risk communication needs to appeal to the heart and instinct.

### 1.3.11 Hospital Information Management System

Information systems facilitate the planning, management, and delivery of health care services and hospital operations, such as integrated patient care, hospital's business and legal functions, staffing and human resource management, supply chain management, among others. The data available from the system may be collated, analyzed, and used for strategic or project management and research, including during an emergency; thus, having a robust hospital information management system can significantly support the risk reduction, preparedness, response, and recovery activities of the hospital. For instance, important data sets like patient census, bed availability, staff capacities, resources, building blueprints, and facility maps are crucial information to make a timely decision, especially during a crisis.

The Hospital Information System should be capable of sharing patient data with other network hospitals to enable continuity of care via the Telemedicine approach or other means. The information can similarly contribute to the national health and disaster management database by providing information for health promotion, disease prevention, early detection efforts, planning, resource allocation, epidemiology, etc., at local, sub-national, and national levels. It should also be able to provide information to systems belonging to third-party institutions, e.g., external agencies like the Drug Safety Council, Registration Department, Road Safety Council, the Police, Emergency Services, Insurance companies, and many others.

In the absence of Hospital Information Management Software, an alternate is the use of the District Health Information Software 2 (DHIS2) as modular web based open-source health management data platform that can aggregate statistical data collection, validation, analysis, management, and presentation.

## STUFF

*Finance, logistics, supply chain management, and sustainability*

This section links to the overall significance of mainstreaming HEDRM in routine hospital operations specifically strengthening routine management of equipment and supplies. It would enable critical services and functions to be strengthened and quickly adapt how it operates during a crisis preventing unnecessary disruption to the flow of critical hospital resources. It includes having the flexibility to reallocate limited material resources where its most needed to meet the demands of patient surge. The following are some key actions in **Strengthening Routine Management of Equipment and Supplies:**

### 1.3.12 Preventive Maintenance Program

A preventive maintenance program is an essential part of successful facility management. It keeps equipment operating efficiently, increases the safety of employees, and helps avoid extensive and costly repairs down the road. In addition, the hospital can save financially as remedial maintenance costs three to four times compared to preventive maintenance. The program can be implemented by using preventive maintenance software or through manual means. The key is having an established system to monitor and schedule maintenance activities to enhance productivity and ensure that hospital assets functions when its most needed.

The hospital can consider the following actions for preventive maintenance of machines, facility infrastructure, and network/data systems:

- Ensure that machinery is clear of debris before and after every shift
- Routinely check all machinery belts, fluid levels, and filters and replace them as needed.
- Calibrate machines regularly
- Inspect structural building elements at least once a year
- Comprehensively check and repair building systems (electrical, plumbing, network) at least once a year
- Examine fire detectors twice a year and remain in compliance with local regulations
- Confirm that safety and caution areas are sufficiently marked
- Regularly review and identify your network security (e.g. virus, malware)
- Ensure that employees comply with safe practices such as password security and good email practices (avoiding phishing schemes, etc.).
- Change Wi-Fi and other network passwords at least twice a year.

**Advantages of Preventive Maintenance Programs:**

- Keep operational disruption to a minimum as scheduled maintenance can be planned and less disrupt the hospitals' daily operations.
- It prevents unplanned downtime, which leads to idle employees, a halt in operation, and missed deadlines and targets.
- Keeps machines in good working condition with regular part replacement, fluid and oil changes, and quality inspections
- Equipment running efficiently saves on energy and power cost
- Extends the life cycle of equipment and increases the performance
- Promotes safe working conditions as routine checks uncover any hazards and prevent unsafe working conditions, leading to fewer on-the-job injuries and accidents

### 1.3.13 Supply Chain, Inventory and Procurement Logistics

Logistics is a vital element in the supply chain; it requires design, planning, and execution activities that enable purchasing, inventory management, and replenishment of goods and services surrounding medical services to patients. Keeping the supply chain moving efficiently, affordably, and proactively helps deliver positive patient outcomes by equipping patients and providers with the medicines and equipment required.

The ability to easily track, trace, and audit hospital inventory from product to patient could save a life as it facilitates quick action and prompt decision-making processes to mobilize resources to support emergency response. In addition, a well-functioning logistics system and robust supply chain regularly enables the hospital to limit unnecessary delays and inefficiencies. Some key action to strengthen hospital supply chain and logistics are provided below:

- Implement a centralized purchasing system to optimize inventory control and oversight.
- Utilize vendor-managed inventories with barcode scanners removes the need for keying in orders and making urgent calls for stock
- Have a secure and accurate digital system to ensure your records are correct so staff can focus on patients, not paperwork

### 1.3.14 Healthcare Financial Management

The primary role of financial management in healthcare organizations is to manage money and risk in a way that helps ensure hospitals are able to efficiently provide healthcare services to all their patients. The ability of the hospital to access available reserves and disburse properly to address the needs of the emergency is critical to ensure that the flow of supplies and services are not interrupted.

During non-emergency times, finance departments are responsible for routine bookkeeping duties, such as fulfilling purchase orders for equipment or supplies, finalizing sales of merchandise and services, maintaining receipts from purchases for the business, and managing payments. The finance department is also responsible for negotiating contracts with service providers and contractors, running payroll, and maintaining cash reserves for unexpected or unplanned expenses. All these financial functions are critical during emergencies wherein having a strong foundation and good financial practices and standards facilitates quick and timely action including decision making processes in time if emergencies.

## STAFF

*Human Resources*

Human Resources are the most valuable in any organization. This is one of the critical management functions concerned with hiring, motivating, and maintaining the workforce in an organization. Human resource management deals with employee issues such as hiring, training, development, compensation, motivation and retention, communication, administration. Integrating HEDRM in routine hospital HR development is crucial for enhancing the capacity of healthcare workers to prepare for and respond to disasters. The goal is to ensure that healthcare workers are equipped with the necessary knowledge and skills to effectively prepare for and respond to disasters, ultimately improving the quality of care and reducing the impact of disasters on communities.

### 1.3.15 Integration of HEDRM in Routine Human Resources Development Strategies, Plan & Programs

Integrating HEDRM in routine human resource development strategy, plans, and programs in hospitals requires a combination of assessment, training development, incorporation into job descriptions, creation of working groups, partnerships, and evaluation and update. Below are key actions to facilitate the integration of HEDRM in human resource development:

- Assess existing capacity: Conduct an assessment of the knowledge, skills, and attitudes of healthcare workers related to HEDRM to identify gaps and opportunities for improvement.
- Mapping, monitoring, and maintaining employee capacities and skills
- Develop HEDRM training programs: Develop and implement training programs that integrate HEDRM into the routine training and development of healthcare workers. These programs should include a range of topics, such as disaster preparedness, response, and recovery, risk communication, and psychosocial support.
- Inclusion of HEDRM related competencies in staff job descriptions and performance evaluations to ensure that they have the necessary knowledge and skills to perform their roles in emergencies. In this way, it can be monitored, targets identified, and evaluated. Accomplishments in related qualities can be the basis of awards, incentives, and promotions.
- Keep staff contacts directory regularly updated. Contacts list can be used in call tree exercises in recalling staff and mobilizing key staff of the hospital incident management team.
- Encourage the employee to pursue professional growth related to HEDRM by establishing training program targets and plans as part of performance management and professional development of staff.
- Include roles and responsibilities of staff related to HEDRM in the orientation and training of new staff.
- Create HEDRM working groups: Create working groups or committees that include healthcare workers from different departments to oversee the integration of HEDRM into human resource development.
- Develop partnerships: Establish partnerships with HEDRM experts and organizations to provide technical support and guidance for the development and implementation of HEDRM training programs.
- Evaluate and update: Regularly evaluate the effectiveness of HEDRM training programs and update them based on feedback and changing needs and circumstances.

## 1.4 Risk Reduction Tools

- Hospital Safety Index: https://iris.paho.org/handle/10665.2/51448
- SMART Hospital Toolkit: 9789275119396_eng.pdf (paho.org)
- Baseline Assessment Tool: smartHospitals-BATworkbook.pdf
- Green Checklist for SMART Facilities: greenchecklist-smarthospitals.xlsx (live.com)
- *WHO guidance for climate resilient and environmentally sustainable health care facilities:* WHO Guidance for Climate Resilient and Environmentally Sustainable Health Care Facilities | Global Heat Health Information Network (ghhin.org)
- *Checklists to assess vulnerabilities in health care facilities in the context of climate change*, WHO 2021: https://apps.who.int/iris/handle/10665/340656
- INGRID-H: Ingridh-Eng.pdf
- Global Green and Healthy Hospital Sustainability Action Guidelines: https://greenhospitals.org/guidance-documents

- Health service continuity planning for public health emergencies: a handbook for health facilities (who.int)
- WHO guidance for business continuity planning WHO-WHE-CPI-2018.60-eng.pdf
- Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response: covid19-rcce-guidance-final-brand.pdf
- Managing the COVID-19 Infodemic. WHO 2020: https://www.who.int/publications/i/item/9789240010314
- Public Communication for Disaster Risk Reduction, UNISDR 2017: https://www.undrr.org/publication/public-communication-disaster-risk-reduction
- "Standards for Health Promoting Hospitals and Health Services", International network of Health Promoting Hospitals and Health Services, 2020, page 14-16: https://www.hphnet.org/wp-content/uploads/2020/12/2020-HPH-Standards.pdf
- Principles of Disaster Mitigation in Heath Facilities, PAHO 2000: https://iris.paho.org/handle/10665.2/817
- Disaster Mitigation For Health Facilities: Guidelines for Vulnerability Appraisal and Reduction in the Caribbean, PAHO 2000: https://iris.paho.org/handle/10665.2/34316
- Protecting new health facilities from natural disasters: guidelines for the promotion of disaster mitigation, PAHO 2003: https://iris.paho.org/handle/10665.2/761

## 1.5 Preparedness

Emergencies and disasters can create a variety of consequences as hazards impact the hospital. Therefore, preparing before a crisis is essential in ensuring that the proper knowledge and skills are built to safely respond to and recover when an emergency occurs.

**Preparedness is carried out to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response through sustained recovery. Preparedness is based on a risk assessment to determine hazards and potential consequences the hospital might encounter that could disrupt its routine services.**

Preparedness allows hospitals to respond quickly and appropriately, reducing unnecessary deaths, injuries, and suffering. This way, it lessens the impact of a hazard and/or threat and contributes to resilience. Capacities are built around linkages with early warning systems and include such activities as response planning, resourcing, coordination, partnership, evacuation, risk communication, training, and exercises. These must be supported by formal institutional, legal, and budgetary capacities.

**Preparedness vs. Readiness**
Recognizing the continuum and frequent overlap between the HEDRM stages, as whereby, according to some definitions, readiness may encapsulate the long-term preparedness actions, for the purposes of this report, preparedness and readiness will be used interchangeably.

UNDDR defined **preparedness** as "the knowledge and capacities developed by governments, professional response and recovery organizations, communities, and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent, or current hazard events or conditions".

**Readiness**, as defined by WHO, is "the interface between longer-term preparedness actions and immediate response to emergencies; whereby interventions aim to build, improve, and

sustain the operational capabilities to respond to risks and ensure sustained capacities. The aim is to maintain a state of readiness to respond to emergencies and disasters in a timely and effective manner."[40]

## SPACE

*Including structural (constructive) and non- structural (infrastructural) elements*

### 1.5.1 Space organization for operationalizing response:

During response operations, vital operational functions need to be activated and operated in specific pre-identified locations in the hospital. This includes the flexibility of the hospital to be able to convert existing facilities or spaces to meet the demands of the emergency. The following actions can be considered:

- Pre-identify critical operational areas in the hospital plans and maps, including establishing appropriate arrangements to support its functions (e.g., patient reception and triage area, sectionalized treatment areas according to priority, evacuation/safe area, decontamination area, hospital Emergency Operating Center (EOC), alternative care sites, etc.)
- Identify operational areas using signages, color markings, or symbols, including arrows, to guide patient flow during mass casualty response.
- Identify facilities or spaces that can be converted to expand hospitals' capacity for mass care (e.g., corridors/lobby for treatment, open spaces, gymnasium or auditorium as alternative care sites, conference room as hospital EOC). This includes "Step Down Facilities" and the necessary provisions and human resources to operate it safely. Please refer to Section III: Post Emergency Strategies for more information.
- Make necessary arrangements to support the operationalization of response functional areas (e.g., source of water and arrangement for its runoff, including available PPEs in decontamination area; triage tags/ribbons and PPEs in triage area; communication equipment, maps, and charts in hospital EOC
- Patient cohorting by grouping patients based on their risk of infection or whether they have tested positive for a certain disease during an outbreak. This can be through the use of separate wards or specific buildings during infectious disease outbreaks to reduce the spread of the disease.[41] During chorting, is important that appropriate and separate areas are allocated for family members and visitors including assigning hospital liaison and establishing regular communication to provide status of updates of infected patients.

## STRATEGIES

*Policies, Plans, and Coordination, including diversity, equity, and inclusion*

### 1.5.2 Emergency Preparedness Program

Implementing preparedness activities is not merely having a plan but a program with an established work plan, budget, and dedicated person responsible for its implementation and monitoring all year round. This emergency preparedness program structures several key planning considerations in developing a response and recovery plan:

- Response and recovery plans should be risk-informed and based on a sound risk assessment process. Furthermore, it should be developed in a participatory and

[40] https://www.who.int/our-work/health-emergencies

[41] Minimum Requirements for infection preventionand control programmes, WHO 2019

consultative manner, engaging vital internal departments to promote ownership and external organizations like local DM authority, local public health, Fire Department, Red Cross/Red Crescent National Society, Police, and others.

- Hospitals need to be aware of the demographics (e.g., elderly, women, children, People with Disabilities) of the population in the hospital catchment area, including community risks that will be the basis of developing capacities for a response. Local census, surveys or administrative records from local authorities or public health centers are possible sources of demographic data that hospitals can utilize for planning purposes.
- Hospital plans should be linked with local or area network plans and national strategic plans.
- A plan is a written documentation of a chosen option to be implemented. It describes who does what, how, where, and when in detail. The Ministry of Health has a normative role in providing a policy, guidelines and standard framework for hospitals to follow in developing their plans. This promotes the synergy of hospital plans in the country and promote interoperability during response when plans are activated.
- Plans are living documents that require constant updating as the level of details in plans are out of date as soon as they are written. They also need to be revised every time they are used reflecting on learning from exercises or responding to a real-life emergency. Lesson learned should be documented and shared in different learning and knowledge management platforms like conferences and other experience sharing events including in hospital networks at all levels. Please refer to Section IV After Action Review and Lessons Learned Process for more information.

The development of the hospital response plan must utilize **a multi-hazard approach**. This will enable the hospital to expand its capacity to deal with various hazards by strengthening its **core emergency response functions** like incident management, risk communication, information management, coordination, logistics, and supply and service continuity. In addition, **specific arrangements** can be added to detail response actions to manage particular issues. Considerations are provided below:

### 1.5.3 Service Continuity Planning

The first step is identifying critical services in the hospital that should remain functional in the immediate aftermath of a disaster. This will enable the hospital to prioritize resources from other services to support and augment the operations of critical hospital functions like emergency unit, surgery, laboratory, etc. Examples of non-essential services that can be delayed or closed are outpatient departments and elective surgeries. The final decision can be determined after assessing the response needs and the resources needed to mobilize.

During large scale disaster response, alternative care sites should also be considered in case hospitals face challenges in operating their main care facilities, either due to a large number of patients like the pandemic or inability to operate because of damaged facilities sustained from a hazard impact. Alternative care sites should be identified and planned wherein decision trigger points when this should be activated, setting up the facilities, staff requirements including moving patients to the new location.

Another aspect of hospital service continuity is access to information and data. As most hospital information management systems have transitioned to electronic format, backup systems and data security are critical to minimize administrative and clinical disruption.

### 1.5.4 All-Hazards Hospital Emergency Response Plan

**An all-hazards emergency response plan** is a comprehensive document that outlines a hospital's response and recovery procedures for various emergencies or disasters. It is designed to address various types of hazards.

An all-hazards emergency response plan aims to establish a systematic and coordinated approach to mitigate, respond to, and recover from emergencies. It provides guidance and instructions for key personnel on their roles and responsibilities and outlines communication protocols, resource management procedures, evacuation plans, incident assessment, and decision-making strategies.

Here are the steps involved in the planning process:

1. Establish a Planning Committee: Form a multidisciplinary planning committee consisting of representatives from various hospital departments, including administration, clinical services, emergency management, security, facilities, IT, and communications. This committee will lead the planning process.
2. Conduct a Hazard Identification and Risk Assessment: Identify potential hazards and risks that the hospital may encounter, such as from natural hazards (e.g., earthquakes, hurricanes), technological hazards (e.g., power outages, hazardous material spills), biological hazards (e.g., pandemics, infectious disease outbreaks), and societal hazards (e.g., transport accident, mass gathering, active shooter incidents). Assess the likelihood and potential impact of each hazard to prioritize planning efforts.
3. Determine Essential Functions: Identify the essential functions of the hospital that need to be maintained during emergencies. These may include patient care, communications, resource management, utilities, security, etc. Prioritize these functions based on criticality to patient safety and the ability to support the hospital's mission.
4. Develop Emergency Response Procedures: Develop standardized emergency response procedures for each identified hazard. These procedures should include clear and concise instructions for actions to be taken by staff at various levels. Address key areas such as incident assessment and reporting, patient management, communications, evacuation, resource management, staff roles and responsibilities, and coordination with external agencies.
5. Establish an Incident Management System (IMS): Implement an Incident Management System, a standardized structure for managing emergencies. Designate an Incident Commander who will be responsible for overall coordination and decision-making during emergencies. Establish command staff positions, such as Operations, Planning, Logistics, and Finance/Administration, to ensure efficient management of resources and personnel.
6. Create an Emergency Operations Center (EOC): Designate a physical location as the Emergency Operations Center. The EOC serves as the central command and coordination hub during emergencies. Equip the EOC with necessary communication tools, information systems, and resource management capabilities. Determine the staffing requirements and protocols for activating the EOC. An existing conference room can be converted as an EOC as an option.
7. Coordinate with External Partners: Establish partnerships and formalize agreements with external entities, including local emergency management agencies, neighboring hospitals, public health departments, and first responders. Collaborate on planning, resource sharing, information exchange, and mutual aid agreements. Ensure clear lines of communication and coordination during emergencies.
8. Train and Educate Staff: Conduct regular training and education sessions to familiarize hospital staff with the emergency response plan, their roles and responsibilities, and

relevant procedures. Provide training on incident management, emergency communication, first aid, and other relevant topics. Ensure staff members are aware of their roles within the Incident Management System.

9. Test and Exercise the Plan: Regularly conduct exercises and drills to test the effectiveness of the emergency response plan. This may involve tabletop exercises, functional exercises, or full-scale simulations. Evaluate the response, identify strengths and areas for improvement, and revise the plan accordingly. Engage external partners and agencies in joint exercises to enhance coordination and interoperability.
10. Maintain and Update the Plan: Review and update the emergency plan at least annually or whenever significant changes occur in the hospital's infrastructure, operations, or regulations. Stay informed about emerging threats and evolving best practices in emergency management. Continuously improve the plan based on lessons learned from real incidents, exercises, and feedback from staff and external partners.

### 1.5.5 Hospital Incident Management Team (HIMT)

The **Hospital Incident Management Team (HIMT)** is a group of individuals responsible for managing and coordinating the response to emergencies or incidents within the hospital setting. The HIMT is typically activated during significant events that require a coordinated and structured approach to emergency management.

| Functions of a HIMT | Key Elements to Establish a HIMT: |
|---|---|
| • **Incident Command:** The IMT establishes a clear command structure, designating an Incident Commander who takes overall responsibility for managing the incident response. The Incident Commander provides strategic direction and decision-making.<br>• **Coordination and Communication:** The IMT ensures effective coordination and communication among various departments, staff, and external agencies involved in the emergency response. They facilitate the flow of information, establish communication channels, and ensure timely and accurate dissemination of information.<br>• **Resource Management:** The IMT assesses resource needs, identifies available resources, and coordinates their allocation and utilization. This includes personnel, equipment, supplies, and facilities required for the response. The IMT may also establish systems for resource tracking, procurement, and logistical support.<br>• **Incident Assessment and Situational Awareness:** The IMT gathers and analyzes information to assess the incident's impact, scope, and evolving needs. They maintain situational awareness by monitoring the incident's progression, evaluating hazards, and anticipating potential challenges or changes in the situation.<br>• **Planning and Operations:** The IMT develops incident action plans, strategies, and operational procedures based on incident assessment and | • **Leadership and Roles:** Define clear roles, responsibilities, and reporting relationships for IMT members. Ensure that the Incident Commander and key section chiefs are designated and trained.<br>• **Organizational Structure:** Establish an organizational chart that reflects the IMT structure and defines reporting lines and communication flows.<br>• **Standard Operating Procedures:** Develop standard operating procedures (SOPs) for the IMT, outlining protocols for incident activation, communication, decision-making, resource management, and coordination.<br>• **Communication Systems:** Establish reliable communication systems, including alternatives like use of messenger.<br>• **Training and Preparedness**: Provide training to IMT members on incident management principles, emergency procedures, roles, and responsibilities. Conduct regular drills, exercises, and simulations to enhance preparedness and ensure effective coordination among team members.<br>• **Activation and Response**: Activate the IMT in response to significant incidents, following established protocols and criteria. Assemble the team, conduct initial briefings, and ensure a smooth transition into the incident response mode. |

| | |
|---|---|
| objectives. They oversee the implementation of response actions, manage incident-specific operational periods, and adapt plans as needed.<br>• **Safety and Security:** The IMT ensures the safety and security of patients, staff, and visitors during the incident. They implement measures to mitigate risks, address security concerns, and establish protocols for managing access, traffic control, and other safety-related aspects. | • **Incident Action Planning**: Develop incident action plans that outline response objectives, strategies, and specific tasks to be carried out. Establish operational periods, assign responsibilities, and coordinate activities within the IMT and with other response entities.<br>• **Documentation and Reporting:** Maintain accurate records of incident-related activities, decisions, and resource utilization. Prepare situation reports, incident status updates, and other necessary documentation for internal and external stakeholders.<br>• **Coordination with External Partners:** Establish effective communication and coordination with external agencies, including local emergency management organizations, public health departments, law enforcement, and other healthcare facilities. Foster partnerships, mutual aid agreements, and information sharing to enhance overall response capabilities. |

### 1.5.6 Hospital Command Center or EOC

The **hospital command center, or Hospital Emergency Operations Center (H-EOC)**, or Hospital Command Post, is a centralized location within a healthcare facility where key personnel and resources are coordinated and managed during emergencies or major incidents. It serves as the central hub for communication, decision-making, and resource allocation, ensuring an organized and effective response. The following is an overview of the functions and key elements of a hospital command center:

| Functions of a H-EOC | Key Elements of a H-EOC |
|---|---|
| • **Incident Management and Coordination:** The command center facilitates the overall management and coordination of the hospital's response to emergencies. It ensures that all departments and personnel are working together, following established protocols and procedures.<br>• **Situational Awareness:** The command center maintains a real-time understanding of the incident and the hospital's operational status. It gathers and analyzes information from various sources, monitors the incident's progression, and assesses the impact on the facility.<br>• **Decision-Making and Policy Development:** The command center supports decision-making by providing timely and accurate information to leadership and stakeholders. It assists in developing policies, procedures, and guidelines specific to the incident, ensuring a consistent and cohesive response. | • **Physical Space:** The command center requires a designated physical space within the hospital that can accommodate necessary personnel, communication systems, information displays, and resource management tools. The space should be secure, accessible, and equipped with essential technology and infrastructure.<br>• **Incident Management Team:** The command center is staffed by key personnel, including incident management team members, department heads, administrative leaders, and subject matter experts. Each role should have clearly defined responsibilities and reporting structures.<br>• **Communication Systems:** Reliable communication systems are essential for the command center. This may include telephones, radios, internet access, computer networks, and other internal and external communication tools. |

- **Resource Management:** The command center assesses resource needs and availability within the hospital, including personnel, supplies, equipment, and facilities. It coordinates the allocation and utilization of resources, ensuring they are directed to areas of highest priority.
- **Communication and Information Management:** The command center establishes and maintains communication channels internally within the hospital and externally with relevant stakeholders and agencies. It ensures the timely and accurate flow of information, facilitates coordination, and provides updates to key personnel and stakeholders.
- **Coordination with External Partners:** The command center interfaces with external organizations, such as emergency management agencies, public health departments, and other healthcare facilities. It shares information, coordinates mutual aid support, and collaborates on the broader emergency response efforts.
- **Patient Tracking and Management:** The command center oversees the tracking and management of patients throughout the facility. It ensures that patients are appropriately triaged, treated, and transferred as necessary while maintaining an accurate patient status and location record.
- **Continuity of Operations:** The command center helps maintain essential hospital functions and services during emergencies. It assesses and addresses operational impacts, establishes contingency plans, and coordinates the resumption of normal operations after the incident.

- **Information Management Tools**: The command center requires information gathering, analysis, and dissemination tools. This includes computer systems, displays, incident management software, and information-sharing platforms.
- **Resource Tracking and Management:** The command center should have systems in place to track and manage hospital resources, including personnel, supplies, equipment, and beds. This may involve resource tracking software, inventory management systems, and communication channels with various departments.
- **Standard Operating Procedures (SOPs):** The command center should have documented SOPs that outline its functions, roles, and responsibilities. These SOPs should be regularly reviewed, updated, and communicated to personnel.
- **Backup Systems and Redundancy:** To ensure continuous operations, the command center should have backup power, redundant communication systems, and contingency plans

### 1.5.7 Mass Casualty and Fatality Management

**Mass Casualty Management:** The plan builds on the ability of the Emergency Unit to manage trauma victims routinely, including during non-disaster mass casualty incidents like transport and industrial accidents. During large-scale disasters, hospitals must cooperate with other partners as part of a comprehensive system involving stakeholders from local authorities, response organizations, and other hospitals.

Coordination between the stakeholders is critical as in such a mass casualty scenario, resources are limited to meet the demand of the response, thus requiring strategies to prioritize the allocation of resources to where it is more needed to save more lives. This starts at the impact area by first responders, controlled transport of patients so as not to overwhelm one single hospital, and management of patients in the hospital coordinated with different hospital services/departments, including secondary transportation of patients to other hospitals for continuity of care. The following are critical interventions that the hospital should build its capacity and address in response plans.

- A mechanism for managing the incident in the hospital linked to local and national Incident Management structures and systems. Command, control, coordination, and

communication functions are led by the Hospital Incident Management Team operating in the designated hospital EOC.

- Arrangements for receiving patients, mass casualty triage, and mass care led by the Emergency Unit coordinated with the different hospital services like laboratory, radiology, surgery, critical care units, and wards.
- Plans how other non-medical hospital services support response.
    - Engineering/Maintenance to ensure uninterrupted hospital lifelines to support operations of critical areas like power, water, HVAC, and communications, including waste management, significantly if local service providers are affected. The unit also plays a role in setting up alternative care sites, hospital EOC and rest facilities for an extended stay of staff, including clearing debris.
    - Administration and Finance arrangements to quickly access cash reserves required for emergency procurement of goods and services, including establishing mutual aid agreements with vendors. Hospital administration should be prepared how critical information related to patient census, bed capacity, resource list both material and staff, etc. can be shared to the Incident Management Team to facilitate decision making for response actions. They are also play a role in documentation and maintaining records related to procurement and contracting which will be an important analysis during the After Action Review process.
    - Security to ensure controlled access and egress to critical areas to prevent overcrowding, provide a safe working environment for hospital staff and ensure smooth traffic flow of vehicles and people inside and surrounding the hospital. The unit also coordinates with local law enforcement units for support when required.
      Dietary Department ensures the adequacy of food supplies for patients and staff especially during extended response operations.

**Mass Fatality:** Managing many dead bodies in hospitals is an added challenge that puts strain on the hospital's limited resources, considering that most have inadequate or nonexistent plans to manage mass fatalities. Most facilities generally have limited morgue space, so additional surge capacity must be identified in advance. Arrangements for refrigerated storage trucks, refrigerator space, and other alternatives should be addressed with socially and culturally sensitive plans. In such incidents, hospitals should coordinate their plans with local authorities and response organizations so that transporting dead bodies to hospitals can be minimized and managed onsite for hospitals to focus their efforts and resources on life-saving medical care.

**Patient Decontamination:** Hospitals must be able to identify and decontaminate patients who have been exposed to hazardous materials that pose a threat to the patient's health and the safety of the facility. Hospitals need to establish arrangements to conduct decontamination procedures outside the emergency department with ample water supply by trained and protected staff with appropriate PPEs. Consideration should be given to patient privacy, managing patient valuables and clothes, and handling weapons brought into the hospital.

**Communication** failure has often been identified as a predictable consequence of disaster response. Therefore, hospitals must examine internal communications systems (staff and patients) and with external agencies. Multiple layers of redundancy are essential to deal with expected communication challenges. They include two-way radios, public address systems, mobile phones, SMS, and dedicated phone lines in the emergency operations center. In addition, a backup system uses runners who carry messages.

### 1.5.8 Communicable Disease Outbreak Plan

**Infectious Disease Outbreak** can potentially overwhelm a hospital's capacity to deliver regular healthcare services. Human and material resources, including hospital space and medicines, may not be adequate to meet the demand, particularly in the case of an epidemic lasting several weeks or months or years in the case of the COVID-19 pandemic. An epidemic or pandemic requires a health facility to alter its priorities and adapt its work routines to mount a coordinated, systemic response to a rapidly evolving, potentially complex situation. In other cases, emergencies will not halt, like earthquakes, floods, and other mass casualty incidents from accidents that the hospital needs to manage on top of the disease outbreak. As epidemics and pandemics widely impact other sectors' ability to continue their services and their related socio-economic to the broader community, this complicates the scenario further for hospitals looking at specific implication to its staff, external service providers especially hospital lifelines and supply of critical medical supplies including other services like transportation and banking.

Hospitals need to consider their readiness to cope with the influx of patients and increased need for healthcare services in times of crisis. They should prioritize and implement actions specified in their emergency preparedness plans for biological threats, specifically threats that may cause severe acute respiratory illness, to identify suspected cases, limit transmission within the facility and provide specialized medical care. This includes activating protocols and procedures in safe physical spaces emphasizing isolation measures, education, and training of personnel in the use of Personal Protective Equipment (PPE), patient management, sample collection and handling, and handling and disposal of hazardous biological wastes.

Hospitals must have the following during an infectious disease outbreak as a slow onset emergency.

- Hospital Surveillance system
- Updated case definition from the Ministry of Health
- Triage protocol for disease outbreak
- Available PPEs and trained staff on using it
- Arrangements at the emergency unit to isolate suspected patients
- Established referral pathways, both internal and external
- Activation of the HIMS with IPC as part of the HIMT

**Considerations to enhance hospital readiness for outbreak emergencies:**

- **Leadership and Hospital Incident Management System:** Good leadership and a well-functioning hospital incident management team are essential for effectively administering emergency operations. Because many hospitals and facilities already have crisis management and emergency preparedness plans, it is suggested that hospitals adapt these plans to the core requirements for both the response to the outbreak and maintenance of the hospital's routine, essential health services.
- **Coordination and communication.** Accurate communication and timely coordination are necessary to ensure that risk analyses and decision-making are informed by data and effective collaboration, cooperation, and confidence among all hospital staff and stakeholders. This component includes communication and coordination within the hospital and links with local and national authorities, including communities and primary health care services.
- **Surveillance and information management.** Surveillance of infectious diseases is a fundamental activity needed to monitor and control the outbreak, especially in hospitals and long-term care facilities. Hospital information management complements surveillance and is crucial to raising public awareness about surveillance, the associated risks the emergency poses to people's health, and the measures required to reduce these risks and respond to the crisis.
- **Risk communication and community engagement.** Ensuring effective risk communication and community engagement will help limit or stop the spread of rumors about the outbreak. In addition, it can be used to convey accurate and clear information about the disease.
- **Surge capacity (Human Resources/Bed Capacity/Equipment/Supplies).** The goal of responses to this component is to enable the hospital to expand its ability to manage a sudden or rapidly progressive surge in demand for services created by an emergency. For example, a disease outbreak may cause a rapid and sustained increase in demand. This includes members of Emergency Medical Team (EMT)[1] that are part of the hospital workforce (e.g. doctors, nurses) that extend medical care to the affected population coming from other countries or from other parts of the country not affected by crisis.
- **Continuity of essential support services.** While the outbreak evolves and requires rapid scale-up of emergency preparedness and operational readiness, there are also existing needs for important medical and surgical care that routinely require a hospital's attention to ensure service continuity
- **Patient management.** Patient management includes admission or referral, triage, diagnosis, treatment, patient flow, tracking, discharge, and follow-up, as well as management of support services, pharmacy services, and logistics and supply functions.
- **Rapid identification and diagnosis.** The quick identification and laboratory diagnosis of cases will ensure a logical and practical chain of events during case management. In addition, laboratory services must be provided to support the hospital's preparedness, operational readiness, and response activities, such as surveillance, infection prevention and control (IPC), and patient management; all of these must be accomplished in a timely and efficient manner.
- **Infection prevention and control (IPC).** IPC program is critical to minimize the transmission risk and break the transmission chain to hospital staff, close contacts, visitors, and other healthy patients/or residents in long-term care facilities who are being cared for in a hospital with long-term care services or extended-term care facility.
- **Occupational health, mental health, and psychosocial support.** Occupational health, mental health, and psychosocial support services are required to reduce the adverse psychological and social impacts of the disease on hospital patients and staff and members of the affected community.

### 1.5.9 Community Engagement

As presented in the previous section, various systems need to be in place that hospitals need to build their capacity to operate and mobilize required resources to support response activities. One crucial aspect is the hospital's role in developing community preparedness. Emergencies and disasters put significant strain on the hospital's limited resources and broader local response system. One major challenge is the immediate on-scene control of a chaotic disaster, and communication is often problematic when faced with multiple casualties. Usually, patients will be transported by people already at the scene to the nearest hospital using any vehicles without any interventions or communication to the receiving hospital. This quickly overwhelms the capacity of the nearest hospital and leaves other nearby facilities with ability and personnel underutilized. Therefore, hospital plans must have linkages with community plans to create synergies and understand how emergency response can be initiated efficiently. It includes jointly engaging representatives of vulnerable groups to plan the best option to support during a crisis.

One approach is for hospitals to consider engaging in community preparedness by developing basic response skills of community first responders. This will support the hospital in managing mass casualty incidents wherein community first responders can provide first aid and triage so that critical patients can be sorted out and prioritized to be transported to the right hospital. This will reduce vital time to save lives and prioritize critical patients requiring immediate medical care. Similarly, as first responders initiate patient prioritization on the scene, unnecessarily overwhelming a hospital can be prevented. Such community outreach can be further strengthened through planning, simulation exercises, and after-action reviews.

### 1.5.10 Risk Communication

**Risk communication** has been an effective strategy in mitigating the impact of disasters wherein the public and the affected community are equal partners in exchanging information, advice, and opinions between experts or officials to influence appropriate actions. Risk communication forms the link to the public and works to convince vulnerable communities to act to reduce the risk in an emergency, considering their needs, perceptions, traditions, and cultures.

A plan for working with the media will be needed. It is not recommended that media personnel be permitted access to a hospital during a disaster. Instead, they should be provided regular, factual updates on activities and the facility's status at a predetermined meeting place. As part of the HIMT, a Public Information Officer (PIO) is assigned to lead communication efforts under the supervision of the hospital incident commander, whose responsibilities include:

- Establish a designated media staging and media briefing area located away from the HEOC and patient care activity areas.
- Contact external Public Information Officers (PIOs) from the community and local authorities to ascertain and collaborate on developing public information and media messages and ensure consistent and collaborative messaging.
- Develop public information and media messages to be reviewed and approved by the Incident Commander before release to the news media and the public.
- Develop regular information and status update messages to keep hospital personnel, patients, and visitors informed of the incident, community, and hospital status.

Tips for developing risk communication messages:

- **Develop goals and key messages.** People often fail to communicate effectively because they lack clear communication goals and key messages to support them. Setting such goals and identifying support messages are decisions that should be made before issuing any public comment and are especially important in a crisis—the WHO and Ministry of Health, usually provides technical guidance on critical messages.
- **Identify Audience.** Essential to keep in mind that for communication purposes, the general public does not exist as a unit but rather as a combination of sub-groups. For effective communication in general, it is vital to identify or segment and target the sub-groups (e.g., at-risk population, influencers, or decision-makers, indirectly not affected population but have a stake in the emergency)
- **Test Messages**. A message that works for you won't necessarily work for your audience. Testing helps you examine your assumptions about what will work and why. It helps you learn more about the target audience you communicate with. Testing will provide evidence that communications are working or how to adjust them. It's a necessary process that saves time and money by not wasting efforts on ineffective communications.
- **Channels and Tools**. Communication messages and channels must be tailored to the target population, even when the message content is essentially the same and must be trusted by the target population (e.g., social media, community boards, broadcast media, community leaders, influencers)
- **Monitoring**. The purpose is to determine whether you are reaching the intended target audience and that the messages are understood, including deliberate behavior changes that have taken place. Ways of checking can be through monitoring epidemiological trends, media, social media, key informant interviews, and surveys. Monitoring also is critical in

### 1.5.11 Reinforce Preparedness to Operationalize Emergency Systems

Having suitable systems and plans in place due to the consultative planning process is an initial step to establishing the appropriate arrangements to initiate response activities. To strengthen the operationalization of the system, the following actions need to be considered:

- Integrate into training programs to develop the capacity of staff, including in using equipment.
- Conduct orientation sessions for key stakeholders, including their role in the system (e.g., local authority, local health department, other hospitals, fire department.
- Test arrangements through a simulation exercise and make revisions as required. Hospitals are encouraged to drill individual units—frequently and during nights and weekends—and then build up to full-scale, functional exercises involving the management of moulage "casualties." Community participation is critical to identify elements that work or that need improvement.
- Conduct operational research to improve systems and procedures.

**STUFF**

*Finance, logistics, supply chain management, and sustainability*

### 1.5.12 Stock and inventory management of emergency medicines and supplies

**Medical inventory** is critical in hospital operations that requires immediate access when needed. This requires the hospital to have accurate knowledge of current stock levels and its specific location. Hospital inventory management systems need to be robust but flexible at

the same time as a learning from the experience from the COVID-19 pandemic. Inventory management processes need to have a record of the process that the inventory makes from delivery through to usage including data related to its usage. The following are recommended to ensure that hospital stocks and inventory management system contributes to preparedness:

- Assess the vulnerabilities key supply chain infrastructure (e.g. transportation routes, bridges, seaports, airports, etc.) that can disrupt supply and develop supply chain contingency plans to minimize its impacts.
- Keep central inventory
- items list accurate and maintain adequate stock levels. This will help hospitals employ demand driven procurement, identify trends and predict future needs.
- Manage expiry dates and recall preventing wastage and unnecessary financial loss
- Identify alternates stock items or inventory from new vendors.
- Establish buffer inventory to avoid stock running out.
- Develop emergency procedures for ordering, communication, control, security, and reporting
-

### 1.5.13 Procurement and management of emergency medicines and supplies

Overall, an effective emergency procurement procedure requires a combination of pre-planning, flexibility, speed, transparency, risk management, and coordination. This ensures that hospitals have the necessary stock of emergency medicines and supplies to cater to the increased demand during surges to ensure that patients receive timely and adequate care.
Effective procurement systems also enable hospitals to optimize resources and avoid duplication of efforts, which can lead to cost savings. This is particularly important during disasters when resources are limited. Emergency procurement procedures are critical for ensuring that necessary goods and services are quickly acquired to help those affected by the crisis The following are key considerations to enhance readiness of hospitals during emergencies:

- Hospitals should consider having dedicated disaster supplies and arrangements for rapid resupply in the event of a disaster. Disaster response will rapidly deplete critical administrative and clinical supplies. Conducting regular audits will help with the determination of the adequacy of stock. In addition, disaster supplies can be rotated into the daily-use stream to ensure the cache does not expire.
- Pre-defined criteria and thresholds: A clear and well-defined criteria for emergency procurement and thresholds for different procurement methods should be established beforehand to ensure that the procurement process is transparent and consistent.
- Flexibility: The emergency procurement procedures should be flexible enough to adapt to the changing needs and circumstances of the situation. This includes the ability to change procurement thresholds and methods, and to consider alternative sources of goods and services.
- The procurement office must pre-establish potential sourcing contracts for items typically used in a declared emergency. This will provide arrangements for vendors to deliver needed items and provide services during emergencies quickly
- Develop emergency procurement procedures that will condense the process to save time. This includes appropriating available budgets that can be quickly accessed for emergency procurement and procurement procedures should be designed to expedite the procurement process. This can include reducing the number of steps required, expediting
- Develop critical emergency equipment and supplies list. Monitor its regular status and establish contingency arrangements where and how such items can be sourced out.
- Transparency and accountability: Emergency procurement procedures must be transparent, accountable and auditable. This includes clear documentation of the

procurement process, open communication, and regular reporting on procurement activities.

- Emergency procurement procedures should include risk management strategies to ensure that goods and services are acquired safely and efficiently. This includes assessing and mitigating risks associated with the procurement process, such as fraud, corruption, and safety risks.
- Coordination and communication: Effective coordination and communication between all parties involved in the procurement process is essential. This includes coordination with other disaster response agencies, local authorities, and community groups.

### 1.5.14 Establish Vendor and Service Agreements

Establishing vendor and service agreements for emergency preparedness requires a combination of needs assessment, vendor selection, SLA development, contract negotiation, performance monitoring, risk management, and regular review and update. The goal is to ensure that the necessary goods and services are available during an emergency and that vendors are held accountable for meeting the agreed-upon standards. The following are some key elements to establish such agreements:

- **Needs assessment:** Conduct a needs assessment to identify the types of goods and services that will be needed during an emergency.
- **Vendor selection:** Select vendors that can provide the necessary goods and services during an emergency, taking into account their availability, reliability, and cost-effectiveness.
- **Service level agreements:** Develop service level agreements (SLAs) that define the scope of work, deliverables, timelines, and quality standards for each vendor.
- **Contract negotiation:** Negotiate contracts with vendors that include terms and conditions, such as pricing, payment terms, performance metrics, and dispute resolution mechanisms.
- **Performance monitoring:** Establish a system for monitoring vendor performance and ensuring that they are meeting the SLAs and contractual obligations.
- **Risk management:** Develop a risk management plan that includes contingency plans for supply chain disruptions, vendor failure, and other unforeseen events.
- **Regular review and update:** Regularly review and update vendor and service agreements based on changing needs and circumstances, as well as feedback from stakeholders

### 1.5.15 Emergency flexible and sustainable finance mechanism:

Establishing emergency flexible and sustainable finance mechanisms prior to disaster response is critical for ensuring that funds are available to support emergency response efforts. Effectiveness in financing during emergency response depends not only on the availability of funding but also on the way funds are allocated and spent. The goal is to ensure that funding is available to support emergency response activities and that it is used in an efficient and effective manner to save lives and alleviate suffering. Hospitals should consider the following recommendation to improve readiness:

- **Resource mapping:** Identify potential sources of funding, including government grants, private donations, international aid and access to available funds internally.
- **Budget development:** Develop a budget that outlines the costs associated with emergency response activities.
- **Funding strategies:** Develop strategies for securing funding, such as grant applications, corporate sponsorships, and fundraising events. Establish emergency fund and procedures for fast-track spending modalities to accelerate disbursement accompanied by sound financial management and accountability.
- **Partnerships**: Establish partnerships with other organizations, including government agencies, non-profits, and private sector entities, to leverage resources and funding.

- **Flexibility**: Ensure that the finance mechanism is flexible enough to respond to changing needs and circumstances, such as the scale and severity of the disaster, and the emergence of new threats. Establish flexible procurement rules that will enable the hospital to negotiate directly with suppliers, lifting the time and due-diligence constraints on opening of bids and minimum number of candidates and making advance payments.
- **Sustainability**: Develop a sustainable finance mechanism that can be used over the long-term, including strategies for maintaining funding and attracting new sources of support.
- **Accountability**: Establish a system and procedures for tracking and reporting on the use of funds, including regular audits and performance evaluations. Establish clear emergency spending authorization levels as part of the hospital response plan.
- **Timeliness**: Establish processes and procedures to ensure timely access to funds during a disaster response. Consult with national and local authorities regarding reimbursement regulations and requirements and ensure required documentation is prepared according to guidance.

## STAFF

*Human Resources*

### 1.5.16 Develop staff competencies of application of response protocols, plans and roles

Developing hospital staff competencies to effectively apply emergency response protocols, plans, and roles as part of preparedness requires a systematic and comprehensive approach. The goal is to ensure that hospital staff are equipped with the necessary knowledge and skills to effectively respond to emergencies and mitigate the impact on patients and the community. The following are key actions to reinforce the preparedness of staff in managing emergencies:

- **Assess training needs:** Conduct an assessment of the knowledge, skills, and abilities of hospital staff related to emergency response protocols, plans, and roles to identify gaps and areas that need improvement.
- **Develop training programs:** Develop and implement training programs that are tailored to the specific needs and roles of hospital staff. These programs should cover a range of topics, such as emergency response plans and procedures, incident command systems, triage and patient management, communication protocols, and personal protective equipment.
- **Establish an annual exercise program** where staff are incentivized to participate, supported by hospital policy directives. Such activities will enable the staff to review and provide the opportunity to practice the expected tasks during emergencies as hands-on training to allow hospital staff to practice applying emergency response protocols and roles in a realistic setting. The exercise program has multiple types of exercises, starting with simple discussion-based exercises or tabletop exercises from different units or functions according to the hospital response plan, then plan a more detailed full-scale or functional exercise at the end of the year to put combine all response s functions. Hospitals are also encouraged to participate in community exercises with local authorities, response organizations, and other area network hospitals to practice and test local area plans and arrangements.
- **Reinforce training with regular refreshers:** Provide regular refresher training to ensure that hospital staff maintain their competencies and knowledge of emergency response protocols and roles.
- **Develop roles and responsibilities** of staff during emergencies. When assigning a task, it is recommended to put the position and not the staff's name as the position remains, but the person changes because of staff rotation or attrition.

- **Incorporate emergency response into performance evaluations**: Incorporate emergency response competencies into job descriptions and performance evaluations for hospital staff, to ensure that they are accountable for their roles and responsibilities during emergencies.
- **Develop Job Action Sheets (JAS)** as a quick reference guide for staff on their specific task during emergencies. The JAS should contain the staff's primary mission, the supervisor they are reporting to, immediate task (0-2 hrs.), intermediate task (2-12 hrs.), extended response task (over 12 hrs.), and demobilization. The same JAS can be a reference document during debriefing and After Action Review (AAR) to learn from the experience and improve when needed.
- **Foster a culture of preparedness:** Foster a culture of preparedness throughout the hospital, through ongoing communication and engagement with staff, patients, and community partners. This can include activities such as awareness campaigns, community outreach, and partnerships with local emergency management agencies.

### 1.5.17 Establish system to mobilize human resource for response

Establishing an effective system to mobilize and notify human resources before and during the plan activation for disaster response requires a systematic and comprehensive approach. It requires a combination of planning, training, staffing, partnerships, resources, and evaluation. By taking these key elements into consideration, hospitals can ensure that they have the necessary human resources to respond to disasters and provide quality care to patients. The following actions are recommended to facilitate staff mobilization:

- **Develop a human resource management plan** that outlines the roles and responsibilities of staff during disasters, identifies the skills and competencies needed, and establishes protocols for mobilizing and managing staff.
- **Create a staffing matrix** that outlines the number and types of staff needed for different types and levels of disasters. The staffing matrix should consider factors such as the number of patients, the severity of injuries, and the availability of resources.
- **Establish a call-down system** that allows hospital staff to be notified and mobilized quickly during emergencies. The call-down system should include protocols for contacting staff, verifying their availability, and deploying them to the appropriate locations.
- **Keep updated staff contacts directory**: Assign a person responsible for updating contact information regularly, including members of the Hospital Incident Management Team and focal persons of local organizations like EOC, public health, fire department, police, civil defense, etc.
- **Establish a staff notification system and procedures**: This can be in the form of SMS, pagers, or making announcements using the hospital public address system codes.
- **Develop transportation arrangements** on how to recall staff who are off duty
- **Provide facilities for staff working on extended hours and those who cannot return home because of the disaster**: This includes food, refreshments, and rest facilities. In some cases, staff family also requires evacuation, which the hospital should consider supporting to facilitate recalling staff back to work. Related to this, training programs should include family preparedness, enhancing staff resilience and their ability to report back to work when needed.
- **Consider providing incentives for staff** who are recalled back to work during emergencies and those working for extended times. This can be in the form of allowances, overtime pay, insurance, or paid leave after the crisis, including issuing commendations/certificates for their exemplary services that can be included in staff performance records for future promotion and salary adjustments.
- **Develop partnerships** with other healthcare organizations and emergency management agencies to share resources and expertise during disasters. This can include mutual aid agreements, pre-arranged contracts, and cross-training programs.

- **Ensure adequate resources**: Ensure that adequate resources are available to support the mobilization of staff during disasters. This can include supplies, equipment, and transportation.
- **Evaluate and improve the system**: Regularly evaluate and improve the system to ensure that it is effective and efficient. This can include reviewing staffing matrices, conducting after-action reviews, and updating training programs and protocols.

**Role of Volunteers:**

Working with volunteers during emergencies is a good source of additional human resources to augment hospitals, but this requires planning as when this is not well organized, this can lead to more challenges than help. Lessons from past disasters draw volunteers who wish to assist, a phenomenon known as "convergent volunteerism," in which unexpected and uninvited healthcare workers arrive and want to render assistance. Unfortunately, well-intentioned, inexperienced volunteers unfamiliar with the hospital response system usually add to the confusion or even hamper operations if not managed well—some critical considerations in engaging volunteers in the hospital.

- The hospital can organize a volunteer pool that can be pre-accredited, defining when and how they will be used and the specific task they are expected to perform. This will enable the hospital to engage volunteers in preparedness activities like training and exercises.
- Plans should be in place related to credentialing medical volunteers to ensure volunteer qualifications align with the assigned task related to the practice of medicine in the country. Volunteers from medical universities and colleges are a good source of volunteers, primarily if the hospital is affiliated with one.
- Identify preferred order of volunteers' preference (e.g., staff from affiliated facilities, followed by partner facilities, then national medical volunteers, then spontaneous volunteer professionals)
- Define how appropriate volunteers will be identified and requested
- Establish credentialing process and assignment of task
- Develop arrangements for how volunteers will be supervised and evaluated as part of an organization's emergency response plan.

**Emergency Medical Team (EMT) Initiative:**

Learning from the experience of the International Search and Rescue Advisory Group (INSARAG) standardized classification and accreditation of response teams, the EMT initiative was established to support the surge capacity of countries through the rapid and coordinated mobilization of national and international medical teams caused by disasters, outbreaks, and other emergencies. Accredited EMT teams are composed of health professionals, including doctors, nurses, paramedics, support workers, logisticians, who treat patients affected by an emergency or disaster.

Table 1: WHO Classifications of EMTs[42]

| TYPE | DESCRIPTION | CAPACITY | MIN. LENGTH OF DEPLOYMENT |
|---|---|---|---|
| 1 Mobile | Mobile outpatient teams: teams to access the smallest communities in remote areas. | > 50 outpatients a day | 2 weeks |
| 1 Fixed | Outpatient facilities with or without tented structure | > 100 outpatients a day | 2 weeks |
| 2 | Inpatient facilities with surgery. | > 100 outpatients and 20 inpatients<br>7 major or 15 minor operations a day | 3 weeks |

[42] Classification and Minimum Standards for Emergency Medical Teams (WHO 2021) https://www.who.int/publications/i/item/9789240029330

| | | | |
|---|---|---|---|
| 3 | Referral leave care, inpatient facilities, surgery and high dependency. | > 100 outpatients and 40 inpatients, including 4–6 intensive care beds<br>15 major and 30 minor operations a day | 4–6 weeks |
| Specialized Care Teams | Teams that can join local facilities or EMTs to provide supplementary specialist care. | Variable | Variable |

Capacities are developed in terms of standardized operational procedures to guide the EMTs response activities. Once a team pass the classification process, they can join the WHO registry of internationally deployable teams. Similarly, local teams from host countries will be able to seamlessly integrate with foreign EMTs and work together cooperatively. This ensures quality standardized emergency care is delivered and a well-coordinated medical response are deployed improving health outcomes for the affected population.

## 1.6 Preparedness Tools:

- Hospital Disaster Preparedness Self-Assessment Tool, The American College of Emergency Physicians (ACEP):https://www.calhospitalprepare.org/post/hospital-disaster-preparedness-self-assessment-tool
- Health Emergency and Disaster Preparedness Index: https://iris.paho.org/handle/10665.2/51450
- Rapid hospital readiness checklist: Interim Guidance, WHO 2020: https://www.who.int/publications/i/item/WHO-2019-nCoV-hospital-readiness-checklist-2020.1
- Hospital Preparedness Assessment Tool for Violence: https://www.campusvirtualsp.org/es/curso/herramienta-de-evaluacion-de-la-preparacion-hospitalaria-frente-la-violencia-2020
- Incident Command System for SCI-H Hospitals: https://www.campusvirtualsp.org/es/curso/sistema-de-comando-de-incidentes-para-hospitales-sci-h-2021
- Toolkit: Country Preparedness for Health Emergencies and Disasters: https://www.paho.org/es/emergencias-salud/preparacion-paises-para-emergencias-salud-rsi/caja-herramientas-preparacion
- DRR and Preparedness (compiling resources on ISH2, INGRID-H STAR-H, IPED and STAR): https://drrandpreparedness.org/drr-app/public/login
- Mass casualty management systems : strategies and guidelines for building health sector capacity, WHO2017: https://apps.who.int/iris/handle/10665/43804
- WHO Service Availability and Readiness Assessment (SARA) | Reference Manual, Version 2.2 (2021): https://www.who.int/data/data-collection-tools/service-availability-and-readiness-assessment-(sara)
- Guide: Mass casualty preparedness and response in emergency units, WHO Academy, 2022 https://reliefweb.int/report/world/guide-mass-casualty-preparedness-and-response-emergency-units
- Management of Dead Bodies after Disasters: A Field Manual for First Responders, ICRC, WHO, IFRC 2020: https://www.who.int/publications/i/item/management-of-dead-bodies-after-disasters
- Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response, WHO 2020: https://www.who.int/publications/i/item/risk-communication-and-community-engagement-(rcce)-action-plan-guidance
- The COVID-19 risk communication package for healthcare facilities, WHO-WPRO 2020 http://apps.who.int/iris/handle/10665/331140?search-result=true&query=The+COVID-19+risk+communication+package+for+healthcare+facilities&current-scope=10665%2F137517&rpp=10&sort_by=score&order=desc
- WHO COVID-19 Essential Supplies Forecasting Tool (COVID-ESFT) v4.1, WHO 2022 https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential_forecasting-2022.1

# 2 DURING: Response Phase

Hospitals play a critical role in providing disaster-affected communities with essential medical care during all types of disasters and emergencies. Response interventions focus on saving lives, protecting property and investments, and controlling/stabilizing the impacts of the incident as it progresses. **During the response stage, encompassing hospital's *compensatory risk management*, hospitals are likely utilizing all four of their resilience capacities to: absorb the residual risks which could not be effectively reduced, adapt to provide high-quality and continuous health services likely surging existing resources, while continuing to transform and learn to recover and resume normal function in a timely manner.**

**Quick Guide in initiating the hospital emergency response**

1. Activate the hospital's Emergency Response Plan (ERP) and implement the Hospital Incident Management System.
2. Open the Hospital Emergency Operations Center (EOC)
3. Quickly gather, verify, and validate critical information related to the incident, status of hospital systems, and capacity for operations
4. Establish incident objectives to provide direction and establish priorities
5. Assign Hospital Incident Management Team (HIMT) positions based on the most qualified personnel available
6. Develop strategies and tactics: the general plan and actions that will be taken to accomplish objectives
7. Estimate and assign resource requirements based on ongoing situational assessments
8. Initiate appropriate community alerts and notifications
9. Establish communications and response links with appropriate local response partners
10. Conduct operational briefing to share the Incident Action Plan (IAP) and execute plan and monitor progress
11. Reassess effectiveness of strategies and tactics in the IAP. As new information becomes available, adjust action plan, resource allocation and priorities.

Depending on their scope and nature, disasters and emergencies can lead to a surge in demand that can overwhelm the functional capacity and safety of hospitals and the healthcare system. Any incident that causes loss or damage of infrastructure or patient surges, such as disasters from natural hazards, biological hazards, radiological and chemical contamination, explosion, or violence, often requires a multijurisdictional, multisectoral and multifunctional response and recovery efforts, which must include the provision of health care. Without appropriate emergency planning, local health systems can quickly become overwhelmed in attempting to provide care during a crisis. Limited resources, a surge in demand for medical services, and the disruption of communication and supply lines create a significant barrier to the provision of health care. An interruption of standard communications, external support services, or supply delivery during a disaster can disrupt essential hospital operations. Even a small, unexpected increase in patient admission can overwhelm a hospital beyond its functional reserve. Staff attrition and limited critical equipment and supplies can reduce access to needed care and occupational safety. Even for a well-prepared hospital, coping with the consequences of a disaster is a complex challenge. Amid these challenges and demands, the systematic implementation of priority actions can help facilitate a timely and effective hospital-based response.

## SPACE

*Including structural (constructive) and non- structural (infrastructural) elements*

### 2.1.1 Damage assessment and repurposing hospital space

**Damage Assessment:**

Hazards that directly impact the hospital might have an immediate concern affecting the structural integrity and non-structural elements, specifically in earthquakes, floods, cyclones,

fires, or explosions. In such cases, the hospital needs to have arrangements to rapidly determine the impact by conducting a rapid damage assessment of the hospital facilities. This is a process of determining the nature and extent of damage resulting from a hazard impact and will provide critical information that will facilitate identifying response priorities of the hospital. It is important to note that all actions presented in this section will have a preparedness component to perform the task efficiently with needed protocols and assigned tasks to individuals. The following key steps are recommended immediately upon activation of the response plan and the Hospital Incident Management System.

- All unit heads should rapidly assess the damage and functionality of critical infrastructure elements in their work area using a standard form or checklist.
- Assessment should include information on the status of HVAC, power, and lighting, telecommunications, water supply, medical gas, sanitation, road (internal and immediate vicinity), including the need for external assistance
- Send assessment reports to the designated lead in the Hospital Incident Management Team (HIMT) through the agreed method. Usually, in the HIMT structure, this is reported to the Infrastructure Branch Director, led by the engineering department unit head under the Operations Section Chief.
- Assessment reports are collated and discussed in the HIMT to determine priorities as part of the Incident Action Plan (IAP).

**Flexibility to expand, use and repurpose available spaces:**
Maximizing available space in the hospital is critical to accommodate the increased demand for patient care. Therefore, the hospital should be able to convert existing areas like corridors, lobby, gymnasium, auditorium, and conference rooms as per the situation's needs.

**STRATEGIES**

*Policies, Plans, and Coordination, including diversity, equity, and inclusion*

### 2.1.2 Monitor Early Warning Information

Access to an early warning system is critical to preparing for impending hazard impact. The following are sources of early warning information:

- Disease surveillance system from the Ministry of Health or the hospital
- Meteorological department for storms, floods, and drought
- National Disaster Management Agency
- Local authorities
- Local news media
- Local Emergency Operations Center

**Hospitals may receive three types of notifications directly through a central dispatch (e.g. law enforcement, emergency medical services (EMS), local health department, or the local emergency management authority)**

- **Advisory** indicates no system response is needed but the potential for a response exists.
- **Alert** indicates a response is likely or imminent and should prompt an elevated level of response readiness.
- **Activation** indicates a response is required.

Most of the time, hospitals receive little or no warnings of incidents; these usually include media reports. In situations wherein there is no warning, like earthquakes, flash floods, landslides, or explosions, if the hospital is directly affected, the hospital must be ready to immediately mobilize a response to manage issues inside the hospital like fire, injuries, evacuation, damage structure, and equipment, etc.

### 2.1.3 Activation of the Hospital All Hazards Response Plan

The activation and implementation of the response plan start with the early warning information and pre-identified triggers, which are most likely to disrupt normal hospital operations. The following are key recommendations for the timely activation and mobilization of hospital response during emergencies:

- Clearly define and establish response triggers that will enable early recognition and quick mobilization of appropriate response resources (e.g. number of potential casualties, magnitude of the emergency, hazardous materials, terrorist activity)
- Develop tiered activation levels of response. Each level should clearly define the parameters (e.g. impact on the hospital, hospital services needed, logistics requirement)
- The hospital should be able to mobilize response 24/7, even on weekends and holidays.
- A responsible person who can authorize the response plan's activation determined by their position (e.g., senior medical officer on duty, hospital manager, or emergency unit head) should be identified as part of the plan.
- Activate the opening of the Hospital Emergency Operations Center

The table below is an example of the **Hospital Response Activation Matrix**[43]. It's important that the information specifically the parameters need to be based on individual hospital capacity when adapting a similar structure.



[43] Classification and Minimum Standards for Emergency Medical Teams (WHO 2021) https://www.who.int/publications/i/item/9789240029330

| ACTIVATION LEVEL | DEFINITION / PARAMETERS | AUTHORITY TO ACTIVATE | NOTIFICATION |
|---|---|---|---|
| **1**<br>**ALERT / NOTIFICATION** | Information received indicating a situation or event that will have an actual or potential unusual impact on facility operations | Administrator on Duty (Business Hours) / Nursing Supervisor (all other times) | • Administrator on Call<br>• Emergency Unit Charge Nurse<br>• Emergency Management Coordinator<br>• Environmental Services Supervisor<br>• Facilities Engineering Supervisor<br>• Health System or Network EOC<br>• Nursing Office<br>• Safety Officer<br>• Security Supervisor<br>• Telecommunications<br>• Other departments/ units/managers as conditions warrant<br>• Local government/ public safety/ public health / EOC (if services, support, or information needed) |
| **2**<br>**Minor Impact** | An actual situation or event that is having a **minor** unusual impact on facility operations<br>**Emergency Unit (EU) & Clinical Factors**<br>• 10 actual patients, or 3 major trauma patients<br>• Greater than 4 hours EU waiting time<br>• Greater than 50 percent above normal over 8 hours EU patient census<br>• 1-10 patients admitted above licensed bed count (in patient census)<br>• Greater than 4 hours EU waiting time<br>**Logistical Factors**<br>• Physical plant or utility disruption that is limited, contained, and/or has a minor impact on operations (e.g., a partial system failure; failure of a non-mission-critical system)<br>• 15 percent of staff not available for duty<br>• Actual or projected supply shortage of non-critical items, or 48 hours supply remaining of critical items<br>• Need for horizontal evacuation of patients/visitors/staff from an area of a building | Incident Commander | • Administrator on Call<br>• Emergency Department Charge Nurse<br>• Emergency Management Coordinator<br>• Environmental Services Supervisor<br>• Facilities Engineering Supervisor<br>• Health System or Network EOC<br>• Nursing Office<br>• Safety Officer<br>• Security Supervisor<br>• Telecommunications<br>• Other departments/ units/managers as conditions warrant<br>• Local government/ public safety/ public health / EOC (if services, support, or information needed) |
| **3**<br>**Moderate Impact** | An actual situation or event that is having a **moderate** unusual impact on facility operations<br>**Emergency Unit & Clinical Factors**<br>• 20 actual patients, or 5 major trauma patients<br>• Greater than 8 hours EU waiting time<br>• Greater than 100 percent above normal over 8 hours EU patient census<br>• 11-30 patients admitted above licensed bed count (in patient census)<br>**Logistical Factors**<br>• Physical plant or utility disruption affecting a major or mission-critical area or system, or affecting general operations<br>• 25 percent of staff not available for duty<br>• Actual or projected supply shortage of critical items, or 24 hours supply remaining of critical items<br>• Need for vertical evacuation of patients/visitors/staff from one floor of a building<br>• Event lasting greater than 8 hours | Incident Commander | • Administrator on Call<br>• Emergency Department Charge Nurse<br>• Emergency Management Coordinator<br>• Environmental Services Supervisor<br>• Facilities Engineering Supervisor<br>• Health System or Network EOC<br>• Nursing Office<br>• Safety Officer<br>• Security Supervisor<br>• Telecommunications<br>• Other departments/ units/managers as conditions warrant<br>• Local government/ public safety/ public health / EOC (if services, support, or information needed) |
| **4**<br>**Major Impact** | An actual situation or event that is having a **major** unusual impact on facility operations<br>**Emergency Unit & Clinical Factors**<br>• 50 actual patients<br>• Greater than 12 hours EU waiting time<br>• Greater than 200 percent above normal over 8 hours patient census<br>• 31-50 patients admitted above licensed bed count (in patient census)<br>**Logistical Factors**<br>• Physical plant or utility disruption affecting multiple areas or systems<br>• 40 percent of staff not available for duty<br>• Critical shortage of essential items<br>• Complete evacuation of a patient care building<br>• event lasting greater than 24 hours | Incident Commander, in consultation with hospital CEO | • Administrator on Call<br>• Emergency Department Charge Nurse<br>• Emergency Management Coordinator<br>• Environmental Services Supervisor<br>• Facilities Engineering Supervisor<br>• Health System or Network EOC<br>• Nursing Office<br>• Safety Officer<br>• Security Supervisor<br>• Telecommunications<br>• Other departments/ units/managers as conditions warrant<br>• Local government/ public safety/ public health / EOC (if services, support, or information needed) |

### 2.1.4 Infection Prevention and Control

Increasingly, hospital surveillance systems are used to discover infectious disease outbreaks. Suspicious data trends can lead hospital managers, IPC Team and the hospital DM Committee to investigate and make appropriate notifications according to IHR reporting guidelines.

Infection prevention and control (IPC) practices play a key role in reducing infectious disease outbreak especially in health care facility setting. Standard precautions for infection prevention and control should be included in every hospital program led by a designated focal point. Hospitals should have IPC guidelines for the following:

- Hand hygiene
- Use of personal protective equipment
- Safe use and disposal of sharps
- Decontamination of medical devices and patient care equipment
- Triage of infectious patients
- Reprocessing of reusable medical equipment and instruments
- Routine environmental cleaning
- Respiratory hygiene and cough etiquette
- Aseptic non-touch technique
- Effective waste management
- Appropriate handling of linen
- Health care worker protection (e.g. at least post-exposure prophylaxis, vaccinations)

### 2.1.5 Rapid Needs Assessment

**A rapid assessment** is conducted immediately by the incident commander after the onset of a disaster to locally assess the affected areas in the hospital and the need for a response. This needs assessment provides an overview of the operational environment for prioritizing the necessary response actions, resources, and impacts.

A rapid needs assessment undertaken in the immediate postimpact period will focus on lifeline needs and prevention of impact-related mortality. The required supplies, equipment, and medicines depend on the emergency's nature and the hospital's response to address its impact. It's important to take note that rapid assessment is conducted as a comprehensively by the incident commander and not separately for each component.

**SYSTEMS**

*Leadership and Coordination, Information Management, Risk Communication, and Community Engagement, including Monitoring & Evaluation, Accountability, and Learning*

### 2.1.6 Hospital Incident Management System

The activation of the response plan will trigger the Hospital Incident Management System[44] (HIMS), which is the core function for command, control, coordination, and communication to mobilize the collective response of the hospital. Upon activation, the

***The following are guide questions for conducting a rapid assessment of needs***

- *What is the emergency? What is the hazard involved?*
- *Is there a safety and security concern for the hospital? (e.g., hazardous materials, violence)*
- *Is the situation stabilized, or can it expand?*
- *What is the impact on the hospital facility? (e.g., damage, injuries, disruption)*
- *How many patients are expected to arrive? These are just estimates based on the hazard and pattern of injury to the affected population (e.g., an earthquake creates a high volume of trauma patients, but the arrival of patients might be delayed due to blocked roads, except that the first wave of patients are walking wounded or have minor injuries transported by bystanders without any medical interventions)*
- *What resources are required to manage the emergency? Is it available, or does it require external support?*

*In addition to these, hospitals must also prepare arrangements*

- *Manage the influx of family members by establishing a family coordination center/room to manage their concerns while maintaining controlled access to the critical hospital areas.*
- *Arrange how visiting VIPs will be managed so as not to disrupt emergency operations.*

Hospital Incident Management Team (HIMT) will start working at the designated H-EOC. The following are critical actions upon activation of the HIMS:

- Incident Commander assigns the task to members of the HIMT.
- HIMT and critical hospital staff review Job Action Sheets as a guide to initiate response and report to a designated area of assignment to start operations
- Conduct Rapid Damage and Needs Assessment
- Update information on available hospital resources (human and materials resources, bed space, and ability to increase based on surge)
- Develop an incident action plan and communicate with the local EOC or field command post.
- Prepare to receive patients and conduct triage using an established protocol
- Update HIMT on the status of the response and adjust IAP accordingly
- Document response actions, including communications made internally and externally
- Manage external support agencies through the Liaison Officer
- Safety officers monitor safety issues in the response operations and provide advice to mitigate problems

**Incident Action Planning Process**

The incident action planning process and Incident Action Plan (IAP) are central to emergency response. The incident action planning process helps synchronize operations and ensure that they support incident objectives.

Personnel managing the incident develop an IAP for each operational period[45]. A concise IAP template is essential to guide the initial incident management decision process and the continuing collective planning activities. The IAP is the vehicle by which leaders on an incident communicate their expectations and provide clear guidance on priority actions to those managing the incident. Similarly, the IAP is a key reference document for the After Action Review process.

The IAP provides clear direction and includes a comprehensive listing of the tactics, resources, and support needed to accomplish the objectives. The various steps in the process, executed in sequence, help ensure a comprehensive IAP. These steps support the accomplishment of objectives within a specified time. The following are key consideration in developing the IAP:

- The development of IAPs is a cyclical process based on the operational period, and personnel repeat the planning steps every operational period.
- Hospital incident Management Team develop the IAP using the best information available at the time of the Planning Meeting.

[45] The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

**Key features of an Incident Action Plan (IAP)**

- Informs incident personnel of the incident objectives for the operational period, the specific resources needed, priority actions during the operational period to achieve the objectives, and other operational information (e.g., weather, constraints, limitations, safety, etc.)
- Informs external organizations and Hospital EOC staff regarding the objectives and operational activities planned for the coming operational period
- Identifies work assignments and provides a roadmap of operations during the operational period to help individuals understand how their efforts affect the success of the operation
- Shows how specific supervisory personnel and various operational elements fit into the organization
- Often provides a schedule of the key meetings and briefings during the operational period

- Personnel should not delay planning meetings in anticipation of future information
- During the initial stage of incident management, the Incident Commander typically develops a simple plan and communicates the plan through concise oral briefings. In the beginning of an incident, the situation can be chaotic and situational awareness hard to obtain, so the Incident Commander often develops this initial plan very quickly with limited or incomplete situation information at hand.
- As the incident management effort evolves, additional lead time, staff, information systems, and technologies enable more detailed planning and cataloging of events and lessons learned.

The following are brief descriptions of the meetings and briefings that are repeated each operational cycle until the conclusion of the incident or event as part of the planning process.

- **Objectives Development/Update**: The Incident Commander (IC) establishes the incident objectives for the initial operational period. After the initial operational period, the IC reviews the incident objectives and may validate them, modify them, or develop new objectives.
- **Strategy Meeting/Command and General Staff Meeting**: After developing or revising the incident objectives, the IC meets with the Command and General Staff, and sometimes others, to discuss the incident objectives and provide direction.
- **Preparing for the Tactics Meeting**: Once the approach to achieving or working toward achieving the incident objectives is determined, the Operations Section Chief and staff prepare for the Tactics Meeting by developing tactics and determining the resources that will be applied during the operational period.
- **Tactics Meeting**: In the Tactics Meeting, key players review the proposed tactics developed by the Operations Section and conduct planning for resource assignments. The Operations Section Chief leads the Tactics Meeting, and key participants include the Logistics Section Chief, Safety Officer, a Planning representative and others invitees.
- **Preparing for the Planning Meeting**: Following the Tactics Meeting, staff collaborate to identify support needs and assign specific resources to accomplish the plan
- **Planning Meeting**: The Planning Meeting serves as a final review and approval of operational plans and resource assignments developed during and after the Tactics Meeting. At the end of the Planning Meeting, Command and General Staff confirm that they can support the plan
- **IAP Preparation and Approval**: Based on concurrence from all elements at the end of the Planning Meeting, the Incident Commander approves the plan
- **Operational Period Briefing**: Each operational period starts with an Operational Period Briefing. Incident supervisory and tactical personnel receive the IAP during the briefing. Members of the Command and General Staff present the incident objectives, review the current situation, and share information related to communications or safety. Following the Briefing, supervisors brief their assigned personnel on their respective assignments

In a situation that requires extended response operations, the HIMT needs to ensure the following:

- Prioritize key hospital areas that require to continue operating that require support, significantly if external services are disrupted
- Assess requirements of hospital services that require continuous operations and plan how they can be supported
- Activate staff recall procedure and use of volunteers
- Cancel elective surgeries and other non-essential hospital services during the response phase

### 2.1.7 Hospital Command Center

**Hospital Command Center** is an essential facility in the response where the HIMT convenes and coordinates response activities (clinical, support services, administration, and finance), prioritize resources, manages information, and ensures the safety and security of operations during a complex incident, emergency, or disaster. In addition, it facilitates the decision-making process through 4CI (*communication, cooperation, coordination, collaboration, and intelligence).*

As the Hospital EOC is not a permanent facility in the hospital and is opened when required by converting existing spaces like conference rooms, the hospital needs to determine triggers for making decisions in activating its operations as this would require essential resources to be utilized like communication equipment, IT equipment, maps, boards, etc. This needs to be defined clearly in the hospital response plan and identify the authorized person to activate its opening. Possible criteria for EOC activation include the following:

- Increase demand from the hospital to manage the emergency
- A large number of patients
- The situation requires prioritization and location of limited resources to critical areas for its continuous operations
- Requires coordinated engagement of multiple hospital departments in the response, including possible participation of external support agencies and coordination with other agency EOCs

In selecting the location and design of the HEOC, the following needs to be considered.

- **Accessibility:** The area can be easily reached from any area of the hospital 24/7 but is not in the middle of critical operations like the Emergency Unit or public access areas.
- **Flexibility:** Sufficient space to house equipment, furniture, supplies, and technology to accommodate the Hospital Incident Management Team (HIMT).
- **Sustainability:** Infrastructure support for emergency operations 24/7 without interruption, including access to emergency power circuits, outlets, lighting, computer systems, etc. including arrangements for food and water and resting area during extended period of operations.
- **Security:** Protection of the facility, occupants, communications systems and equipment, and sensitive information. Only authorized persons are allowed to enter the area.
- **Survivability:** Ability to withstand the effects of local hazards and avoidance of typical internal risk areas. In cases that the primary location is not functional, an alternate location needs to be included in the plan.
- **Interoperability:** Technological capability to exchange routine and time-sensitive information with other emergency operations centers (EOCs).

### 2.1.8 Communications and Coordination (Internal and External)

Gathering and sharing information with the hospital staff is critical to successfully managing the incident. Effective internal communication will be accomplished using the following strategies and technologies when available:

- Obtaining information from different departments collected via phone, intranet, email, or fax
- Using radios assigned to specific areas with assigned channel
- Staff completion and return of designated forms available from the intranet/internet or provided in hardcopy format
- Sending out regular situation updates, response guidance, and requests for assistance via radio, intranet/internet, hardcopy material, or face-to-face meetings
- Make arrangement for a runner system as an option to physically transmit information especially if the primary mode of communication fails.
- Involve key Command Staff and Medical-Technical specialists to help ensure that correct information is being given to the staff, dispelling and alleviate rumors or concerns. This also helps address in managing infodemic.

Keep patients and visitors properly informed. Providing insight on what happened and what is being done to address these issues can be done through the following:

- public address system announcements
- personal reassurance from the staff
- using the hospital's television channel (if available) to provide the news
- information updates strategically posted throughout the hospital
- printed material put on individual meal trays.

Communication with a number of external response partners is essential. If situations unfold without initial notification from EMS, fire, or law enforcement, they must be called when appropriate and informed of the situation and any assistance requests. Key considerations need to be taken as part of the external comminutions of the hospital.

- Periodic information sharing and joint decision-making among all hospitals receiving victims as part of the local area network. This will help maximize resources of hospitals and prevent overwhelming the capacity of small hospitals.
- When available, amateur radio from volunteer groups can also be used for communication. In some communities, local amateur radio operators are active, reliable, skillful, and possessing very dependable communication equipment. However, amateur radio, like most public safety radios, is usually not secure, and unintended recipients such as the media and the public may overhear these messages.
- Teleconferencing and video conferencing are also useful tools for hospitals
- Maintaining a regularly updated resource directory of external agencies and vendors will assist in rapidly identifying contact information
- The assigned Liaison Officer is the hospital's principal contact with all outside agencies and will often be the conduit for 2-way communication between the Hospital EOC and local EOC, including other local area coordinating centers.

**Crisis communication** describes the process of providing facts to people about an emergency beyond an organization's control that involves the organization and requires an immediate response. Confronted with the uncertainty of this situation, crisis communicators must find a way to inform and alert the staff, patients, and the public about an emergency to help people make informed decisions.

When communicating during emergencies, it is essential to present information that is simple, credible, accurate, consistent and delivered on time. The initial phase of a crisis is characterized by confusion and intense media interest. Information is usually incomplete, and the facts are sparse. An information deficit exists. Channels of communication are often disrupted. It's essential to recognize that information from the media, other organizations,

and even within response organizations may not be completely accurate. It is vital to learn as much about what happened as possible, determine the organization or agency's communication responses, and confirm the event's magnitude as quickly as possible.

In the initial phase of a crisis, you must be accurate while recognizing that not having all the facts available early will not alleviate responders from the responsibility of communicating, even if that is an honest "we don't know." Accuracy in what is released and the speed at which response officials acknowledge the event are critical at this stage.

One of the best ways to limit public anxiety and outrage in a crisis is to provide helpful information about the event and tell the public what they can do. During the initial phase of an event, response organizations and spokespersons should take steps to establish their credibility. Even when there is little information, it is still possible to communicate how the organization handles the event and when more information will be available. Commit to the public that you are in charge and control and will continue to provide new information as it becomes available.

Communication objectives during the initial phase of the emergency include rapid communication to the public and immediate communication to affected groups. These communication efforts seek to do the following:

- Convey empathy and reassurance. Reduce emotional turmoil.
- Designate crisis or hospital spokespersons and identify formal channels and methods of communication.
- Establish a general and broad-based understanding of the crisis circumstances, consequences, and anticipated outcomes based on available information.
- Adapt predeveloped messages and communication materials from health authorities and WHO
- Reduce crisis-related uncertainty as much as possible.
- Help the public understand the responsibilities of the various organizations involved in the response.
- Promote self-efficacy (explain to people that they can help themselves or reach a goal) through personal response activities and share how and where they can get more information.

Spokespersons allow the public to put a face to the act of responding to, investigating, and resolving a crisis. How a spokesperson handles public and media inquiries and what they say helps establish credibility for an organization. It also contributes to the public's transition from the crisis stage to the resolution and recovery stages

**Basic Rules of Crisis Communication**

- **Don't over-reassure:** The objective is not to alleviate but to elicit accurate, calm concern. Consider statements such as: "This is a dangerous storm, but people can take actions to limit their risk. If possible, stay home and off the streets until the storm passes and the roads clear."
- **Acknowledge uncertainty:** Offer only what you know: "The situation is developing, and we don't yet have all the facts. However, based on what we do know, we expect...."
- **Emphasize that a process is in place to learn more:** Describe that process in simple terms: "Samples are taken from each person reporting u-like symptoms. These samples are being tested now to identify the exact strain."
- **Give anticipatory guidance:** If you are aware of future adverse outcomes, let people know what to expect. For example, to foreshadow the side effects of antibiotics, you could say, "This broad-spectrum antibiotic is an effective medication, but it can cause stomach upset, including nausea and diarrhea in some people."
- **Be regretful, not defensive:** Say, "We wish that more doses of vaccine were currently available" or "We feel terrible that..." when acknowledging organizational mistakes or failures.

- **Acknowledge people's fears:** Don't tell people they shouldn't be afraid. They are scared, and they have a right to their worries. Instead, use statements like, "We understand people are concerned and afraid, and it is normal to be frightened when facing a wild reality."
- **Acknowledge the shared misery:** Some people will be less frightened than they are miserable, feeling hopeless and defeated. Acknowledge the suffering of a catastrophic event, and then help move people toward the future through positive actions. Use statements like: "Right now, with so many people in shelters, it's hard to see how things can return to normal. We are working hard to start the process of returning people to their homes."
- **Express wishes:** Say, "I wish we knew more" or "I wish our answers were more definitive."
- **Be willing to address the "what if" questions:** These are the questions that everyone is thinking about and to which they want expert answers. However, it's often impractical to fuel "what ifs" when the crisis is contained and not likely to affect large numbers of people. On the other hand, it is reasonable to answer "what ifs" if the "what ifs" could happen, and people need to be emotionally prepared for them. Use statements like, "We have considered the possibility that the situation will get worse, and we have identified additional locations for shelters."
- **Give people things to do:** In an emergency, some actions are directed at victims, those exposed, or those who have the potential to be revealed. Simple actions in an emergency will give people a sense of control and help motivate them to stay tuned to what is happening. It may also be helpful to give people a choice of actions matched to their level of concern. Give a range of responses: a minimum response, a maximum response, and a recommended middle response. Use statements like, "You may wish to cook spinach thoroughly before eating it. You may wish to avoid eating spinach. Or, you may wish to eat only prepackaged frozen spinach."
- **Ask more of people:** Perhaps the most crucial role of the spokesperson is to ask people to manage the risk and work toward solutions with you. People can tolerate considerable risk, especially voluntary risk. If you acknowledge the risk's severity and complexity and recognize people's fears, you can then ask for the best of them. A spokesperson, especially one on the ground and at personal risk, can model the appropriate behavior—not false happiness, but genuine willingness to go on with life as much as possible and make reasonable choices. Your determination to face risk will help others look for role models.

**STUFF**

*Finance, logistics, supply chain management, and sustainability*

### 2.1.9 Timely and Flexible Resource Mobilization

Timely and flexible resource mobilization is critical to enabling hospitals to rapidly respond to emergencies. By implementing these below strategies, hospitals ensure that patients receive the right medicines, medical supplies, and necessary care during emergency situations:

- **Pre-Emergency Planning:** Hospitals develop detailed plans that include inventory management systems specifically designed for medical supplies and medicines. These plans outline strategies for procuring, storing, and organizing essential medications and supplies based on potential emergency scenarios. By maintaining up-to-date inventories and understanding the specific needs of their patient population, hospitals can ensure the availability of the right medicines and supplies during emergencies.
- **Stockpiling and Just-in-Time Inventory:** Hospitals maintain strategic stockpiles of essential medicines and medical supplies to meet immediate demands during emergencies. These stockpiles are regularly monitored and replenished as needed. Hospitals also employ just-in-time inventory management techniques to keep supplies readily available without excessive overstocking, optimizing space and minimizing waste.
- **Collaborative Networks and Regional Coordination:** Hospitals participate in collaborative networks and regional coordination systems, which facilitate sharing medicines and medical supplies during emergencies. This includes coordination with local, regional, and national emergency management agencies, neighboring healthcare facilities, and community organizations. Through these networks, hospitals can request and provide assistance, share surplus resources, and ensure a more equitable distribution of medicines and supplies across the affected areas.

- **Efficient Supply Chain Management:** Hospitals establish efficient supply chain management systems to streamline the procurement, transportation, and distribution of medicines and medical supplies. This includes establishing relationships with reliable suppliers, implementing real-time tracking systems, and utilizing advanced logistics technologies. By optimizing the supply chain, hospitals can ensure the timely delivery of medicines and supplies to the frontline of emergency response.
- **Prioritization and Allocation:** During emergencies, hospitals prioritize the allocation of medicines and medical supplies based on the severity and urgency of patient needs. They may implement triage protocols to identify and categorize patients according to the level of care required. This allows hospitals to allocate resources where they are most needed, ensuring that critical medicines and supplies are provided to patients who require immediate attention.
- **Flexible Resource Redistribution**: Hospitals maintain flexibility in resource allocation by redistributing medicines and supplies within their facility or across different departments based on changing demands during emergencies. This includes shifting resources from non-urgent areas to critical care units or reassigning staff to efficiently utilize available supplies. Hospitals may also collaborate with local pharmacies and suppliers to access additional resources when necessary.
- **Continuous Monitoring and Adaptation:** Hospitals continuously monitor the usage and availability of medicines and medical supplies during emergency responses. Hospitals can quickly adapt their resource mobilization strategies by closely tracking inventory levels, usage patterns, and patient needs. This may involve adjusting procurement plans, increasing production, or identifying alternative suppliers to address any shortages or surpluses.
- **Regulatory Compliance:** Hospitals adhere to regulatory requirements and guidelines related to procuring, storing, and distributing medicines and medical supplies. Compliance with regulations ensures that the right medicines and supplies are procured from approved sources and meet quality and safety standards. This helps prevent the use of counterfeit or substandard products during emergencies.

### 2.1.10 Needs-based and Risk-adjusted standards

*For allocation, distribution, and use of supplies and medicines*

The result of the needs assessment will guide the Hospital Incident Management Team (HIMT) on what resources are needed to support the response action. If the available resources are limited compared to the demand of the emergency, the role of the HIMT is to prioritize existing resources and allocate them to meet surge needs. Establishing needs-based and risk-adjusted standards for emergencies is critical for ensuring that resources are distributed in a fair and equitable manner during a crisis. The following key actions are suggested to manage resources during response phase:

- **Needs assessment**: Conduct a comprehensive needs assessment to identify the needs of the affected population, including vulnerable groups and those at higher risk.
- **Standardization**: Develop standard criteria for assessing needs and risk, including indicators and thresholds for determining the severity of the emergency.
- **Prioritization**: Prioritize resources based on the severity of the emergency, the needs of the affected population, and the level of risk.
    - In times where resources are meager, like the experience of the COVID-19 Pandemic on the availability of PPEs, standards of its use can be modified, using risk adjustment approach, to adapt to the shortage until resource availability stabilizes. A PPE calculator developed by US-CDC can be used to estimate how long the remaining supply of PPE will last, based on the average consumption rate. Using the calculator can help your facility make order projections for future needs.

    - Mutual aid and vendor agreements can be activated by the HIMT so that supply of critical hospital supplies will not be interrupted.
- **Allocation**: Develop a transparent and equitable allocation process for distributing resources, including food, water, shelter, and medical supplies. This includes identifying the most effective means of delivery and distribution, such as through local organizations and community networks.
    - The decision on relocating resources from areas that are not essential for the response that can be taken might include space, facilities, equipment, supplies, and medical personnel.
    - Additional resources can be requested through EOCs from local authorities, public health, law enforcement, and others.
    - Close coordination with local EOCs and field command posts is critical so that proper support can be provided externally. This includes adequate distribution of patients from the field is monitored and controlled to prevent one single hospital from being overwhelmed.
    - An established Incident Management System is critical for the inter-operability of various response elements, including hospitals.
    - Allocating scarce equipment, supplies, and medicines in a way that saves the largest number of lives in contrast to the traditional focus on saving individuals
        - changing infection control standards to permit group isolation rather than single person isolation units.
        - limiting the use of ventilators to surgical situations
        - creating alternate care sites from facilities never designed to provide medical care, such as schools, churches, or hotels changing privacy and confidentially protections temporarily
- **Flexibility in adjusting standard** on the use of medical supplies like the use and reuse of common supplies and equipment, such as gloves, gowns, and masks including hospital beds.
- **Monitoring and evaluation**: Establish a system for monitoring and evaluating the effectiveness of the standards, including tracking the allocation and distribution of resources and assessing the impact on the affected population.
- **Regular review and update:** Regularly review and update the standards based on changing needs and circumstances, as well as feedback from the affected population and stakeholders.

Overall, establishing needs-based and risk-adjusted standards for emergencies requires a combination of needs and risk assessments, standardization, prioritization, allocation, monitoring and evaluation, and regular review and update. The ultimate goal is to ensure that resources are distributed fairly and effectively, with a focus on meeting the most urgent needs of the affected population.

## STAFF

*Human Resources*

Human resources play a critical role during emergencies by developing and implementing disaster preparedness plans, mobilizing, and coordinating healthcare providers, ensuring staff safety, meeting staffing needs, and ensuring continuity of care. Their contributions are essential to providing effective emergency response and ensuring that patients receive the care they need during times of crisis. Therefore, ensuring the safety and well-being of healthcare providers during emergencies is paramount so that patients receive uninterrupted care and that there is adequate follow-up care after the emergency has passed.

### 2.1.11 Support for staff safety, security, health, and welfare

Human resources are critical for hospitals in managing the increased emergency demand and maintaining essential services for existing inpatients in the hospital. Much more so during extended response operations wherein staff burnout, if not appropriately managed, can lead to increased medical errors, hospital-acquired infections, staff shortages, overall hospital inefficiencies and breakdown in operations. The following key actions are recommended to manage HR during emergencies:

- Monitor signs and symptoms of staff burnout and stress
- Provide ample rest time and rest facilities for staff by managing work times
- Safety officers under the HIMT provide a safety briefing and reminders to staff
- Ensure a safe and secured working environment for staff by monitoring safety and security issues regularly
- Maintain controlled access to critical hospital areas
- Provide immunization for staff
- Monitor and document incident related staff injuries. Provide needed support and compensation as appropriate.
- Ensure that adequate staffing levels are maintained during emergencies to prevent overworking and fatigue, which can compromise staff safety and health.
- Provide mental health support services for hospital staff and their families, including counseling, stress management, and peer support.
- Develop family support plans to ensure that the families of hospital staff are informed, prepared, and cared for during emergencies. This can include providing information on emergency response plans, communication protocols, and support services.
- Establish partnerships with local emergency management agencies and other organizations to share resources, expertise, and support during emergencies.

## 2.2 Response Tools

- Health Sector Multi-Hazard Response Framework MRM Operating Model for the Implementation of Health Emergency Response Functions: https://iris.paho.org/handle/10665.2/51498
- Multi-Hazard Response Framework: Hospital Planning for Health and Disaster Emergency Response Course: https://www.campusvirtualsp.org/es/curso/marco-de-respuesta-multiamenaza-planeamiento-hospitalario-para-la-respuesta-emergencias-en
- Emergency and Disaster Response Plan for Health Facilities (EDRP-H)
- WHO Report of the WHO global technical consultation on public health and social measures during health emergencies (2022): https://www.who.int/publications/i/item/9789240043213
- Hospital emergency response checklist, WHO-EURO 2011: https://www.who.int/publications/i/item/hospital-emergency-response-checklist
- Infection prevention and control in the context of coronavirus disease (COVID-19): A living guideline, WHO 2022 https://www.who.int/publications/i/item/WHO-2019-nCoV-ipc-guideline-2022.1
- Minimum requirements for infection prevention and control programmes https://www.who.int/publications/i/item/9789241516945
- Decontamination and reprocessing of medical devices for health care facilities: aide-memoire https://www.who.int/publications/i/item/WHO-UHL-his-IPC-2022.4
- Transmission-based precautions for the prevention and control of infections: aide-memoire https://www.who.int/publications/i/item/WHO-UhisIHS-IPC-2022.2
- Hospital Incident Command System (HICS) 2014 Guidebook, Forms, Structure, Job Action Sheets and Incident Planning Guide: https://emsa.ca.gov/disaster-medical-services-division-hospital-incident-command-system/
- Communicating risk in public health emergencies, WHO 2018: https://www.who.int/publications/i/item/9789241550208
- Everyone's business: Whole-of-society action to manage health risks and reduce socio-economic impacts of emergencies and disasters: Operational guidance (2021): https://www.who.int/publications/i/item/9789240015081
- WHO guidance on preparing for national response to health emergencies and disasters (2021): https://www.who.int/publications/i/item/9789240037182

# 3 AFTER: Recovery Phase

This section comprises two phases: ***Recovery*** and ***Learning***

Urgent actions are required to save lives during and immediately after a crisis. Similarly, time-critical interventions are needed from the start of emergency response, laying the foundations for sustainable recovery and a speedy return to normalcy. This stage includes short-term interventions for early recovery, short to medium term interventions facilitating rehabilitation, and medium to long-term interventions for reconstruction. The transition throughout these stages of recovery ideally enables hospitals to increase their readiness for the next emergency. T**he recovery stage is part of *compensatory risk management;* its primary objective is to return hospital operations to normalcy and build them back better through transformative and learning capacities.**

Notably, hospital resilience occurs cyclically whereby hospitals must learn and build upon the lessons learned from responding and recovering to previous shocks. Realizing resiliency from the impacts of hazards results from a continuous learning process and making changes to improve practices over time. The experiences provide learning opportunities that must be analyzed and applied as an integral part of a constant improvement cycle. Therefore, such learning practices must be ingrained as part of the hospital's organizational culture, entrenched in routine management and delivery of regular hospital services. It includes having a robust emergency and disaster risk management program to implement hazard prevention and mitigation interventions and developing capacities to manage the crisis through emergency preparedness activities based on contextual assessment and prioritization of risks. These interventions contribute to hospital's overall resilience and readiness.

## 3.1 Recovery:

**SPACE**

*Including structural (constructive) and non- structural (infrastructural) elements*

### 3.1.1 Recovery Activities of Hospital Facilities

In the hospital setting, recovery starts quickly as the need to return to normal operations is imperative in providing medical care to the population at large. Disaster response and recovery operations are interdependent, overlapping, and often conducted simultaneously. The assessment of community health and social service needs and the recovery resources available to meet those needs may occur during ongoing response operations. Quickly clearing debris and doing immediate repairs to damage in hospitals are examples of early recovery interventions during the response phase. This is to minimize interruption of medical services, especially to existing patients in the hospital, and return to normal hospital operations to serve the broad community of their medical needs.

As the hospital transitions to recovery, repurposed facilities are reverted to their regular use and functions. In the event of significant damage to health care infrastructure, it may be necessary to adapt or use temporary facilities to ensure continuity of care. Such strategies may include the following:

- Tent facilities or other alternative care sites may be used to meet immediate emergent care needs in the impacted community.
- Use of mobile clinics
- Temporary modular buildings can be used in the interim if major reconstruction of damaged facilities requires time to complete.
- Emergency Medical Teams (EMT) may also set-up mobile tented facilities to provide in-patient and outpatient services to support medical needs of the population integrated in local health care systems.

Other key hospital activities to consider during the recovery phase:

**Access**

- Safe access and egress are assured to/from buildings for people and supply deliveries
- Safe access and egress are assured for ambulances

**Building**

- Building(s), or parts of the building(s) in use, have been declared safe for their intended use by appropriate governmental/regulatory agencies for fire; environment (water and air quality); engineering (Life Safety Code, structural and electrical integrity, environmental controls, medical gas system); etc., as appropriate, before their use.
- Firefighting system and services available
- Appropriate plan for pest control and/or containment
- Adequate staff and resources to maintain facilities (buildings and facility equipment) currently in use.
- Adequate environmental control systems in place (Waste management, Noise, Infection Control, Radiation safety, General building safety, Water quality, Heating, Ventilation, and Air Conditioning)

**Electrical System**

- The main switchboard and utility transfer switches operational
- Fuses and breakers operational
- Transformers reviewed
- Emergency generators, backup batteries, and fuel are available for any location where patients cannot self-preservation and in other critical areas. Transfer switches in working order. Sufficient fuel for generators
- Test equipment for confirming voltage and amperage

**Facilities / Engineering**

- Cooling Plant operational (Chiller/DX/absorption unit, Pumps, Valves and controls, Cooling towers, Fan coil units)
- Heating Plant operational (Boiler system, Support systems (feedwater pumps, diesel tank, etc.), Heating system (converters, valves, etc.), Process steam (sterilizers, general building systems, etc.), Fuel tank re-filled, Fuel vendor available)
- Distribution System operational (Ductwork, including functional smoke detection/alarm capability and dampers, Piping, Valves, and controls, including functional emergency fan shutdown tied into the fire alarm system and emergency smoke purge capability, Risers, Filtration, Negative pressure (ability to maintain CDC-compliant air exchanges)
- Treatment Chemicals (Water treatment, Boiler treatment

**Waste Management System**

- System in place for trash handling (e.g., conveyors, compactors, etc.) and removal (solid and liquid)
- System in place for regulated medical and hazardous waste storage and removal

**Water System**

- Potable water for drinking, bathing, dietary service, and all planned patient services
- Distribution pumps operational
- Water towers/tanks operational
- Sewer Systems (Sanitary, Storm)

- Fire suppression (fire pumps, sprinkler risers and lines, standpipes, and water flow detection/alarm capability) operational

During the long-term recovery period, rebuilding health care facilities allows a community to establish environmentally friendly permanent facilities in which previous vulnerabilities can be addressed, making the facility and thus, the community more resilient and sustainable. The American Meteorological Society has identified three approaches which is a combination of structural, nonstructural, and functional interventions to addressing vulnerabilities while bolstering resilience and sustainability:

- Structural hardening. the use of construction elements (e.g., impact-resistant glass; waterproofing measures; backup systems for critical utilities such as electricity, heating, ventilation, and air-conditioning [HVAC], plumbing) that maximize resiliency
- Incremental adaptation. an approach to addressing operational vulnerabilities that could cause loss of function. For example, critical systems (HVAC, electricity) can be moved out of basement/ lower-level floors in flood-prone areas. Some hospitals are locating emergency departments on the second floor and parking and/or administrative offices on the ground floor. In addition, critical systems can be made redundant (e.g., multiple emergency power generators).
- Rebuilding and renovation. provide an opportunity to improve facility design features that can impact patient care and experiences (e.g., locating the emergency room, operating rooms, and radiology in proximity to one another)
- Reestablish essential primary care clinics and ensure coordination with other components of the health system
- Adopt construction standards and practices that ensure safety and continued functionality in a disaster.
- Consider opportunities to improve the sustainability of health care facilities (e.g., reduced carbon footprint, reduced water waste).

**STRATEGIES**

*Policies, Plans, and Coordination, including diversity, equity, and inclusion*

### 3.1.2 Short Term Recovery Strategies (for inclusive and continuous service delivery, IPC, and surveillance)

Short-term recovery is immediate and overlaps with response. It includes actions such as providing essential public health and safety services, restoring interrupted utility and other essential services, reestablishing transportation routes, and providing food and shelter for those displaced by the incident.

The incident management team initiates the demobilization phase that addresses the transition or return of resources—eventually, the response teams to their regular assignment, from response activities to baseline operations. Demobilization procedures are triggered as response objectives are achieved, and resources are relieved of incident responsibilities.

In the short-term following a disaster, recovery of the health care system should be focused first on ensuring that the immediate medical needs of the population are being met, which often requires:

- Guaranteeing the accessibility of urgent care centers and shelters with appropriate support for at-risk individuals including vulnerable groups
- Functioning supply chains for acquiring medicines and needed medical supplies.
- As short-term recovery continues, the focus shift to restoring emergency health care services (inpatient and outpatient) and the health care delivery infrastructure necessary for reestablishing primary care. This is especially critical for medically

vulnerable populations, such as those requiring ongoing care for chronic diseases. If immediate care is not restored promptly, a secondary surge in disaster casualties could result from exacerbating preexisting conditions.

- Apply standard precaution during vaccination delivery to protect both health workers and individuals to be vaccinated
- Monitor hospital staff sickness and establish reporting procedures of symptoms for early detection of disease

### 3.1.3 Assess Damage and Loss

The assessment of damage and loss after a disaster is critical in determining the impact of the disaster on hospitals and in guiding the response and recovery efforts. It involves evaluating the extent of damage to hospital facilities, medical equipment, and supplies, as well as the impact on hospital operations and patient care. This assessment report further provides an estimated cost of repairs and replacement required to restore hospital functionality. Moreso, it provides the necessary information for decision-making, resource allocation, and planning for the restoration of hospital operations and patient care.

The assessment of damage and loss can be conducted through a systematic process that includes the following steps:

- **Identification of affected areas**: The first step is to identify the areas that have been affected by the disaster. This includes the hospital facility, medical equipment, and supplies, as well as the surrounding infrastructure and community.
- **Rapid needs assessment:** A rapid needs assessment is conducted to determine the immediate needs of the hospital, such as medical supplies, equipment, and personnel. This assessment is critical in determining the initial response to the disaster.
- **Damage assessment:** Once immediate needs have been addressed, a detailed assessment of physical damage to hospital facilities and medical equipment, medical equipment, and supplies is conducted. This includes assessing the structural integrity of the hospital buildings, the functionality of medical equipment, and the availability of essential medical supplies. This information is crucial in determining the resources required for repair and replacement.
- **Loss assessment:** A loss assessment is conducted to determine the impact of the disaster on hospital operations, patient care, and staff. This includes loss of functionality caused by the disaster, including the impact on hospital operations and patient care, number of patients and staff affected by the disaster, as well as the impact on hospital finances and reputation.
- **Reporting and communication:** The results of the assessment are reported to hospital management, local authorities, and other stakeholders. This includes communicating the extent of damage and loss, as well as the immediate and long-term needs of the hospital such as infrastructure repairs, staff training, and disaster preparedness measures.

### 3.1.4 Use of Step Down Facility

**A step-down facility** is a medical facility that is used to transition patients who no longer require the level of care provided by a hospital but still need ongoing medical attention. After a disaster, a step-down facility can play an important role in helping to alleviate the burden on hospital resources, particularly in cases where hospitals are overwhelmed with patients who require acute care.

In the aftermath of a disaster, hospitals are often inundated with patients, and many of these patients may not require the level of care that a hospital provides. This can create a bottleneck in the healthcare system, which can delay treatment for those who need it most. By providing a step-down facility, patients who are stable but still require medical care can be moved out

of hospitals and into a more appropriate setting. This frees up beds in hospitals for those who need them the most and allows medical staff to focus their attention on the most critical cases. A step-down facility can also provide a more comfortable and less stressful environment for patients who are recovering from an injury or illness. In a step-down facility, patients can receive ongoing medical care and rehabilitation services while they recover in a less intense and more comfortable setting.

Setting up step-down facilities after disasters requires careful planning and coordination to ensure that patients receive the care they need in a safe and secure environment. Here are some key considerations in setting up the facility:

- **Location**: The facility should be located in an area that is accessible and safe for both staff and residents should be close to the hospital or medical center to which it is connected. This helps to ensure that patients can be easily transferred from the hospital to the step-down facility.
- **Staffing**: Adequate staffing is essential to ensure that the facility can operate effectively and efficiently. This includes medical personnel, security personnel, administrative staff, and volunteers.
- **Shelter**: The facility should provide safe and comfortable shelter for residents. This can include tents, trailers, or other temporary structures that can withstand adverse weather conditions.
- **Establish protocols and procedures**: Protocols and procedures should be established to ensure that patients are safely transferred from the hospital to the step-down facility, that they receive the appropriate level of care, and that their medical needs are continually assessed.
- **Food and water:** The facility should have a reliable source of clean water and food, either through a catering service or through donations from local businesses and organizations.
- **Sanitation**: The facility should have adequate sanitation facilities, including toilets, showers, and handwashing stations. Regular cleaning and disinfecting should also be carried out to maintain a clean and hygienic environment.
- **Medical care:** The facility should have basic medical facilities and personnel to provide first aid and basic medical care to residents. This can include triage services, medication dispensing, and referrals to hospitals and other medical facilities as needed.
- **Security**: The facility should have adequate security measures in place to ensure the safety of patients and staff. This includes ensuring that the facility is secure, that patients are protected from infection, and that they are provided with a safe and comfortable environment.

### 3.1.5 Rehabilitation Services

**Patient rehabilitation** is crucial for people affected by disasters, including those with disabilities and other vulnerable groups, for several reasons. It helps to restore physical function and mobility, manage chronic conditions, address mental health needs, prevent secondary health issues, and support inclusion and participation. By providing appropriate care and support, patient rehabilitation can help individuals recover and rebuild their lives after a disaster.

Emergencies may also reduce the capacity of caregivers and care settings such as residential homes to provide for and support people with disabilities. The vulnerability of children and older people with disabilities becomes even more acute during emergencies when they are separated from their families, and traditional caring mechanisms in the community such as the extended family and neighbours break down.

The rehabilitation of people affected by disasters, including people with disabilities, may require a range of interventions to address their specific needs. Some key interventions to support physical rehabilitation in this context may include:

- Provision of mobility/assistive devices: Mobility aids, such as wheelchairs, crutches, and walking frames, can help people with disabilities to move around and participate in daily activities.
- Physical therapy: Physical therapy can help to improve strength, flexibility, and mobility, and reduce pain and discomfort.
- Occupational therapy: Occupational therapy can help people with disabilities to develop the skills and strategies needed to perform daily activities and participate in work or educational settings.
- Prosthetic and orthotic services: Prosthetic and orthotic services can provide custom-made devices to replace or support lost or impaired limbs or body parts.
- Accessible infrastructure: Accessible infrastructure, such as ramps, elevators, and accessible toilets, can help people with disabilities to access buildings and public spaces.
- Allocation of appropriate space for rehabilitation services at least $12m^2$

The availability of rehabilitation services is essential for the recovery and restoration of physical function, mobility, and independence among individuals affected by disasters. However, communities with limited resources and underdeveloped rehabilitation systems are likely to experience difficulties in delivering these services during disasters. As a result, the health and well-being of people with disabilities and other vulnerable groups may be further compromised, with far-reaching consequences that can last long after the initial disaster.

Inadequate provision of rehabilitation services can delay recovery and exacerbate existing health conditions, which can ultimately lead to long-term disabilities and impairments. This situation can be particularly challenging in resource-limited settings where access to healthcare services may be already limited. As a result, it is crucial for communities to develop and strengthen their rehabilitation systems and infrastructure to ensure the provision of rehabilitation services during and after disasters. This will not only support the immediate recovery needs of individuals but also contribute to long-term rehabilitation efforts that can improve the health and well-being of the community.

**SYSTEMS**

*Leadership and Coordination, Information Management, Risk Communication, and Community Engagement, including Monitoring & Evaluation, Accountability, and Learning*

### 3.1.6 Stand Down of Response Operations

Pre-planning for demobilization and post-incident recovery allows for a collaborative understanding of necessary recovery elements and restoration processes of critical functions. Recovery objectives should include the meticulous restoration, strengthening, and revitalization of the site, surrounding infrastructures, and operations.

Disaster response operations should prioritize timely and accurate communication to department managers, critical decision makers, emergency response teams, stakeholders, vendors and contractors, and, if applicable, the public in order to accelerate recovery without duplicating efforts. Once the response is concluded, specific demobilization guidelines help facilitate a more organized and expedited return to normal operating conditions.

The demobilization process of standing down response resources in an efficient and timely manner provides considerable cost benefits.

Issues to consider for initiating demobilization in emergency management include:

- Identify triggers that will initiate demobilization procedures. This can be information advised by local authorities that all patients are all transported to the hospital. Similarly, no more patient being treated in emergency unit, and all transferred to the ward or awaiting transfer to another facility.
- The hospital Incident Commander should approve the release or demobilize of response resources prior to initializing the process
- Initiate scale down operations of Hospital EOC and eventually deactivating the facility and return of space to its normal use
- Assign personnel to identify surplus resources and probable resource release times
- Establish demobilization plan that prioritizes based on the specific incident
- Verify established decontamination procedures and necessary resources are available
- If necessary, develop/communicate a Disposal Plan for the disposal of hazardous materials or wastes, as necessary
- Identify personnel travel needs and coordinate travel arrangements, as necessary
- Plan for equipment repair, decontamination, maintenance services, and inspections, as necessary
- Consolidate documentation of response (e.g. IAP, communication logs, job action sheets, situational reports, etc.) in preparation for the after action review process
- Initialize impact assessments and post-incident reviews

### 3.1.7 Information Technology/ Medical Records

Having appropriate IT and medical records systems is crucial in disaster response and recovery. They enable efficient patient tracking, data analysis, resource management, coordination and communication, and continuity of care. Their importance cannot be overstated in ensuring that patients receive timely and appropriate care during emergencies. The following should be considered:

- Ensure that all usual internal and external systems, backup systems, clinical systems, medical information systems, and patient registration systems are functional or there is an alternate method for capturing the information
- System in place to maintain a medical record for each patient served
- Storage space to ensure security and preserve the integrity of medical records (e.g., protection from fire, environmental hazards, unauthorized access)
- Systems in place to provide medical records are readily accessible and promptly retrievable when needed
- Track vulnerable patients transferred from long-term care facilities and other institutions.

### 3.1.8 Security

**Security** is critical during emergencies in hospitals to protect patients and staff, protect hospital property, ensure continuity of care, prevent the spread of disease, and maintain public trust. Security measures are essential in ensuring that hospitals can continue providing medical care during emergencies and that patients receive the care they need in a safe and secure environment. The following should be considered.

- A system of security in place to ensure the safety of patients, visitors, and staff, including access control, securing sensitive areas, protection of staff and property from crowds, processing identification cards, locks, and keys.
- Protect hospital property during the recovery phase, such as securing medical equipment and supplies, controlling inventory, and monitoring for theft and damage.
- Maintain communication with staff, patients, and other stakeholders during the recovery phase to keep them informed of security measures and any changes to hospital operations.

- Coordinate with local law enforcement personnel to ensure a coordinated response to security threats and to receive support in securing hospital premises including conferring with security plans after disasters.

### 3.1.9 Post disaster recovery planning

**Post disaster recovery planning** is just as essential as planning for response. Ideally, recovery plans would be developed before a disaster and are implemented while response is still ongoing to support healthcare facilities and providers in returning to normal operations or establishing a new normal state. This will allow hospitals to safely continue to provide care to the community and maintain financial viability following a disaster. A hospital's return to day-to-day operations may be progressive. Planning should take into account that ramped-up methods to accommodate medical surge will be dismantled as patient care activities allow. Extra equipment, supplies, and medications will return to the pre-incident inventory levels as soon as the opportunity permits.

The following are key considerations for planning recovery activities:

- Designate a disaster recovery manager who can be the conduit for the organization's disaster recovery program.
- Develop a recovery work plan with timeframes and work vendors to assist in identifying areas that need to be rebuilt, reconfigured, and restored for full functionality.
- Conduct a cost benefit analysis to address recovery resources (e.g., is it feasible to recover waterlogged paper records?).
- Identify costs associated with recovery (e.g. staffing, supplies, temporary storage), including restoration of systems where backups are available and including estimated time to complete.
- Consolidate all information regarding damage sustained by the facility
- Consult hospital staff on the recovery plan and take opportunity to build back better to enhance hospital resilience
- Prioritize health care service delivery recovery objectives by organizational essential functions
- Maintain, modify, and demobilize healthcare workforce according to the needs of the facility
- Work with local emergency management, public health, service providers, and contractors to ensure priority restoration and reconstruction of critical building systems, transportation capability and capacity and IT and communications systems.

Recovery at its core is a partnership between the affected community, the broader community, governments, aid organizations and the private sector. As such, successful recovery is built on effective communication between these key stakeholders. Good communication is also needed to manage expectations about what the hospital can and cannot do; who is responsible within the hospital organization for leading the recovery effort; and what communities can expect in terms of recovery assistance.

**Community Engagement and Communication during Recovery:**

Affected communities during recovery phase are often overwhelmed by large volumes of information at a time when they are under stress and unable to retain information. Local officials should ensure all information communicated to the affected community is relevant. The following are key consideration when communicating during the recovery phase.

- What is happening with the recovery process?
- What support is available?
- What they need to do to qualify for such support

- What they can do if they have questions and concerns or complaints
- Information that helps individuals and communities make decisions about their future, supporting their self-recovery
- Acknowledge the impact of disasters on human wellbeing in validating people's experiences
- Manage rumors and false information, including tracking and managing rumors and false information that may cause community disunity and conflict

**STUFF**

*Finance, logistics, supply chain management, and sustainability*

Standards of care, it may not be feasible immediately to provide the same level of care as previously available. However, providing some level of care is a moral and legal imperative. Necessary to allocate scarce resources or conserve, adapt, and/or substitute some supplies to ensure that functionally equivalent or crisis care is provided, depending on the situation.

### 3.1.10 Inventory update, supplies restock, and equipment repair

The following consideration needs to be taken during the recovery:

- Equipment and supplies located inside flooded or damaged buildings, whether submerged under water, exposed to temperature extremes, smoke, fumes, etc., or not, are approved for re-use by an appropriate governmental agency before use. Approved equipment identified
- Adequate equipment and supplies onsite (including oxygen) for planned services
- Equipment is inspected and cleared for patient use before use
- A mechanism in place for replenishing supplies
- Ensure access to and availability of pharmaceuticals, including psychotropics and critical medical equipment for those with special medical needs.
- Flashlights and batteries (including radio and ventilator batteries) are available
- Ability to maintain patient care equipment that is in use.
- Adequate facilities, equipment, supplies, and appropriate staff to meet the pharmaceutical needs of patients
- Adequate equipment and facilities, including refrigeration for storage of drugs and biologicals.

### 3.1.11 Mitigate direct and indirect costs of recovery

The following considerations need to be taken to mitigate financial costs in recovery:

- Prepare necessary documentation to process insurance claims to support rehabilitation or reconstruction of damage facilities (e.g. receipts, damage assessment reports, insurance policy)
- Check warranty of equipment that provide after sales service and support to save on cost of repairs and rehabilitation
- Support staff the necessary documentation requires to facilitate social security claims, benefits, or loans
- Identify and prepare documents for post disaster recovery financial assistance from the government or grants from bilateral or multi-lateral donors and partners
- Consider providing financial aid like loans or advancing salaries to aid in the recovery process of hospital staff
- Maintain and update patient records, adapting to disaster recovery program requirements (if applicable), payroll continuity, supply chain financing, claims submission, losses covered by insurance, and legal issues.

- Work with the partners from the private sector, civils society organizations and the government in providing opportunities for providing “cash for work” for affected families of hospital staff
- Provide financial incentives like overtime pay for staff who work extended hours during response.

**STAFF**

*Human Resources*

### 3.1.12 Mental Health & Psychosocial Support

Disasters can have a significant impact on the mental health and psychosocial well-being of hospital staff, who may experience stress, anxiety, and burnout as a result of their work during a disaster. The following are some key interventions to provide mental health and psychosocial support to hospital staff as part of disaster recovery:

- **Psychological First Aid (PFA)**: PFA is an evidence-informed approach that helps people cope with the immediate aftermath of a disaster. PFA can be delivered by trained professionals or non-professionals and aims to provide practical and emotional support to those affected by a disaster.
- **Mental health screening**: Conduct mental health screenings to identify hospital staff who may be experiencing mental health issues. Screening can help identify staff who may need additional support and connect them with appropriate resources.
- **Employee Assistance Program (EAP)**: Establish an Employee Assistance Program (EAP) that provides confidential counseling services to hospital staff. EAPs can help staff cope with stress, anxiety, and other mental health issues.
- **Peer support programs**: Develop peer support programs that allow hospital staff to provide emotional support to one another. Peer support can be particularly effective in reducing stigma and providing a safe space for staff to discuss their experiences.
- **Training and education**: Provide training and education on mental health and psychosocial support to hospital staff. This can include training on stress management, coping skills, and communication strategies.
- **Resilience building programs**: Establish resilience building programs that help hospital staff develop skills and strategies to cope with stress and adversity. These programs can include mindfulness, meditation, and yoga.
- **Work-life balance**: Promote work-life balance to help hospital staff manage stress and prevent burnout. This can include flexible work schedules, time off, and access to childcare and other support services.

Overall, providing mental health and psychosocial support to hospital staff as part of disaster recovery requires a comprehensive and integrated approach that addresses the unique needs and challenges faced by hospital staff. By taking these key interventions into consideration, hospitals can support the mental health and well-being of their staff and promote a culture of resilience and recovery.

### 3.1.13 Financial and Non-Financial Incentives

Financial and non-financial incentives can play an important role in recognizing and rewarding hospital staff for their work during a disaster response. By providing incentives, hospitals can help boost staff morale, increase motivation, and promote a culture of resilience and recovery. Some possible incentives include:

| Financial incentives: | Non-financial incentives: |
|---|---|
| • **Additional pay:** Provide hospital staff with additional pay for their work during the disaster response. This can be in the form of overtime pay or hazard pay.<br>• **Performance bonuses:** Offer performance bonuses to hospital staff who demonstrated exceptional performance during the disaster response.<br>• **Grants or scholarships:** Provide grants or scholarships to hospital staff who want to further their education or training in disaster response or related fields.<br>• **Reimbursement for expenses:** Reimburse hospital staff for any expenses they incurred during the disaster response, such as transportation or lodging. | • **Public recognition:** Recognize hospital staff publicly for their efforts during the disaster response. This can be through press releases, social media posts, or other forms of recognition.<br>• **Time off:** Provide hospital staff with additional time off after the disaster response to rest and recover.<br>• **Professional development opportunities:** Offer professional development opportunities to hospital staff, such as conferences or training programs related to disaster response.<br>• **Peer recognition:** Encourage peer recognition by allowing hospital staff to nominate and recognize their colleagues for their contributions during the disaster response. |

### 3.1.14 Demobilizing Staff and Volunteers

Retaining a damaged health care facility's workforce following a disaster is critical to ensure that skilled workers will be available when the facility is again fully operational. In addition, other local health care facilities that remain operational will likely experience a surge in people seeking care due to the community's reduced capacity. Temporary transfer of displaced medical staff to such facilities can help alleviate this burden.

Demobilization plans should include procedures for debriefing staff and volunteer on operations and informing them of information that should remain confidential. In addition, if long-term operations continue and some dispensing locations remain operational, the hospital IMT should plan to rotate staff and volunteers through those areas that remain operational. Planners also should inform staff and volunteers on whether or if the hospital will compensate them for their time and how to apply to receive compensation, if available. Finally, consider establishing or requesting a psychosocial support team to speak with staff and volunteer's post-incident.

The following are key actions that can help ensure a safe and effective demobilization process:

- Before demobilization, conduct a debriefing session for hospital staff and volunteers to discuss their experiences and any lessons learned during the disaster response. It includes health debriefing on signs and symptoms to monitor and actions needed if health effects are experienced.
- Engage in a wellness check process and monitor the medical workforce's behavioral health needs.
    - Monitor staff absenteeism or even resignation during or following the incident as a result of the stress from response.

    - Complete staff medical surveillance form that can be part of staff health records
- Develop and implement a demobilization plan that outlines the steps to be taken and the timeline for demobilization. The plan should also include procedures for returning any borrowed equipment or supplies.
- Assign clear roles and responsibilities to hospital staff and volunteers for the demobilization process. This can include tasks such as packing equipment and supplies, cleaning up the hospital facility, and returning any borrowed items.
- Ensure the safety and security of hospital staff and volunteers during the demobilization process. This can include providing personal protective equipment (PPE), ensuring adequate lighting in the hospital facility, and having security personnel on site.
- Provide mental health support to hospital staff and volunteers during and after the demobilization process. This can include counseling services, peer support groups, and other resources to help manage stress and trauma.
- Conduct exit interviews with hospital staff and volunteers to gather feedback on their experience during the disaster response and the demobilization process. This feedback can be used to improve future disaster response efforts.
- Provide financial, psychological, and medical-care support for staff members who become ill or injured while on duty. Such compensation arrangements should be part of the hospital recovery plan.
- Implement strategies (e.g., incentives) designed to retain a health and medical services workforce in the affected area.
- Good retention plan to maintain personnel (e.g., transportation, meals and lodging, laundry, etc.)
- Provide appreciation as recognition (e.g. token, certificates, gathering, etc.) for hospital staff and volunteers.

The demobilization of hospital staff and volunteers after a disaster response requires careful planning, coordination, and communication. By taking these key actions, hospitals can ensure a safe and effective demobilization process that supports the well-being of their staff and volunteers.

## 3.2 After Action Review (AAR) and Lessons Learned Process

**Building back better** is the use of the recovery, rehabilitation, and reconstruction phases after a disaster to increase the resilience of institutions like hospitals through integrating disaster risk reduction measures into the restoration of physical infrastructure and systems, and into the revitalization of livelihoods, economies and the environment thus promoting sustainable development. Possible actions to consider promoting sustainability and enhance resilience in the recovery phase.

- Reconstruct damage facilities stronger compared to its pre disaster state through engineering interventions.
- Use recovery opportunities to establish redundant systems especially critical hospital lifelines using green technology.
- Sharing best practices and lesson learned from the hospitals' experience to facilitate learning and knowledge exchange.
- Update hospital policy, guidelines and procedures including practices used in routine operations based on the learnings from the incident including on preparedness to enhance readiness to respond to the next event.
- Support psychosocial recovery to strengthen mental health of staff.
- Review and adapt development projects and investments to consider possible risks based on the experience from the emergency.

**Identifying lessons** following an emergency response is essential to any emergency management procedure. These exercises aim to ensure quality improvement and strengthen preparedness and response systems based on learning from previous actions in responding to an emergency or event. In addition, systematic post-event learning will contribute to a culture of continuous improvement and can be a means of sharing innovative solutions to tackle emerging disaster risks. It contributes to promoting organizational learning and if it is institutionalized, it will transform the hospital to a learning organization. There are different forms of evaluation and learning following an emergency.

**After Action Review (AAR):**
An AAR is a qualitative review of actions taken to identify best practices, gaps, and lessons learned in response to an emergency. The AAR offers a structured approach for individuals and organizations, including hospitals, to reflect on their experiences and perceptions of the response to identify systematically and collectively what worked and what did not, why and how to improve. AAR can range from quick informal debriefing sessions with team members to more extensive workshops with broad, multisectoral participation led by facilitators. Importantly, AARs are not external evaluations of an individuals or a team's performance. They do not seek to measure performance against benchmarks or critical performance standards. Still, they are a constructive, collective learning opportunity where the relevant stakeholders involved in the preparedness for and response to the emergency under review can find common ground on improving preparedness and response capability.

During extended response operations like the COVID-19 Pandemic, regular Intra Action Reviews can be conducted during the emergency phase to adjust and improvements in managing the emergency. This can be in the form of regular debriefing that will discuss "what went well and what needs to be improved" on how the incident is managed. This can be at the hospital department-wise level and the Hospital Incident Management Team.

Once the hospital returns to normal health operations and the emergency response plan has been deactivated, or at stand down level, the HIMT can plan for an After Action Review of entire hospital response operations and develop corrective action plans to improve systems, plans, and arrangements in preparation for the subsequent emergency response.

The following are critical steps in preparing for an After Action Review (AAR)

### 3.2.1 Collect And Review Relevant Background Information

The AAR team should collect and review the background information necessary to understand the response actions that have been implemented. This will provide a common operating picture for discussion and the preparation of facilitation tools. This background information can include the national emergency response plan, contingency plans, and incident management structure. It can also have documents developed during the response, such as response plans, situational reports, operational reviews and response evaluations, media reports, debriefing notes, etc.

### 3.2.2 Develop Trigger Questions

Trigger questions guide discussions with a group or individuals and are organized according to the reviewed pillars. Questions should be open because they are mainly used to generate discussion and frame the scope of the analysis. They should be adapted to the context and expected outcomes for each function

An AAR answers four significant questions:

- What was expected to happen?

- What occurred?
- What went well, and why?
- What can be improved, and how?

An AAR is a "Discovery " of the events through people's experiences. The staff involved in the operations collectively knows what happened, but individually they may not. Use facilitation rather than lecture techniques to have the team rebuild what transpired. Recount the day's events and ask questions that promote and encourage people to fill in the blanks. In situations where you were the primary observer and decision-maker, help to fill in the blanks through your eyes and experiences. Add context and perspective where appropriate to make the situation clearer

### 3.2.3 Identification of strengths and challenges and new capacities developed

Participants will identify all the strengths and challenges identifiable in the response. By the end of the AAR, the following outputs are expected:

- Clear articulation of best practices and their impacts on the response and use of root cause analysis to identify the factors that enabled the best practices
- clear articulation of challenges faced during the response and their impacts, and use of root cause analysis to identify the limiting factors that contributed to the challenges.
- given the understanding of best practices and challenges, identification of clear actions required to embed the best practices, address the challenges, and strengthen preparedness for future responses.
- use the actions described above to elaborate explicit activities, responsible focal points, the resources needed, and timelines for implementation.

### 3.2.4 Build consensus among participants

Building consensus consists of a final summary of best practices, challenges, new capacities developed, and AAR indicators evaluated during the AAR discussions. In the debrief and working group AARs, this consensus can be achieved through plenary or group discussions. Such discussions should be held to validate results and create a sense of ownership to help ensure that corrective actions are taken. In addition, before closing, a final working group session should be carried out to integrate any additions or comments from the debriefing session.

### 3.2.5 AAR team debriefing

The AAR team debriefing aims to reflect on the overall planning, preparation, and conduct of the AAR. The debriefing can also establish the roles, responsibilities, and timelines for completing the AAR reports and other deliverables. This should occur within one week of completing the AAR.

The AAR team debriefing can be used to discuss how to improve the AAR process for the next event, considering that flexibility in undertaking an AAR allows planners to adjust and find the best model for the reviewed culture and system.
This is also an opportunity for the AAR team to discuss and finalize the executive summary for the senior management.

### 3.2.6 Hospital management debriefing

Senior management should be briefed on an AAR's outcomes, including the identified best practices and challenges and the agreed-upon follow-up actions.

This debriefing aims to gain support from the necessary authorities to mobilize the resources required to implement the identified actions. Having senior management endorsement of the outcomes also increases the likelihood and impact of learning at a broader institutional level and contributes to a culture of continuous improvement and critical analysis through AARs. Senior management can also endorse the findings and give authorization for more general results circulation.

### 3.2.7 Writing the AAR Report

The output from an After Action Review should be a written report that provides a range of recommendations based on the information gathered during the particular event.

The report writer should receive the notes from the note takers and begin to integrate them into a comprehensive final report. Most importantly, the report should include a corrective action plan for following up on actions identified during the AAR

It should be noted that the recommendations from one incident may not be appropriate for all situations, and therefore careful consideration needs to be given before implementing any recommendations.

Equally, the post-AAR follow-up will be an opportunity to see and document how implementing the AAR corrective action plan improves emergency management capacities and future response operations.

### 3.2.8 Lesson Learned Process

There will be a number, if not many, of recommendations for future action and or improvement. Some may call these lessons learned. However, if those same recommendations continue to appear in subsequent exercises or actual emergency responses, they have simply been identified and not learned. A genuine process is required for lessons to be learned and organizational change to be implemented.

Evaluation is the outcome of a review process. It encompasses the steps of objective setting, observation, hot wash, After Action Report, Corrective Action Program, and Validation. This process is commonly called “Lessons Learned.”

The outcomes from an event should be considered for future planning, training, exercising, and response operations.

Hospitals should consider creating a repository of critical challenges, best practices, and recommendations resulting from AARs, which can be easily accessed during the preparedness for and response to an emergency. Such a repository can help build institutional memory for lessons learned and provides a resource for emergency preparedness and response stakeholders. The objective of the database is to facilitate and share learning between emergencies and to apply findings to other contexts and events. Recording lessons in a central location also ensures that the same mistakes do not recur.

## 3.3 Recovery Tools

- WHO Guidance for AAR (2019): https://extranet.who.int/sph/sites/default/files/document-library/document/Content%20of%20Key%20Informant%20Interview%20Toolkit_1.pdf
- WHO After Action Review (AAR) Guidance and course: https://extranet.who.int/sph/after-action-review
- WHO Intra Action Review (IAR) Guidance and course: https://extranet.who.int/sph/intra-action-review?region=All&country=All
- Implementation guide for health systems recovery in emergencies: https://applications.emro.who.int/docs/9789290223351-eng.pdf
- Evaluation of Post-Disaster Health Facilities EHPD: https://iris.paho.org/handle/10665.2/57675
- Rapid Assessment of Post-Disaster Health Facilities: https://www.paho.org/es/documentos/herramienta-evaluacion-rapida-establecimientos-salud-eres
- Post-Disaster Health Facility Assessment: https://iris.paho.org/handle/10665.2/57675
- WHO Recovery toolkit: supporting countries to achieve health service resilience: a library of tools and resources available during the recovery period of a public health emergency (2016): https://www.who.int/publications/i/item/WHO-HIS-SDS-2016.2
- Damage Assessment and Needs Analysis in Hospitals (DANA-H)
- Minimum Technical Standards and Recommendations for Rehabilitation for EMTs. WHO, handicap International, ICRC, CBM https://apps.who.int/iris/handle/10665/252809
- Guidance Note on Disability and Emergency Risk Management for Health. WHO, UMICEF, UNISDR, CBM, IFRC, IOM https://apps.who.int/iris/bitstream/handle/10665/90369/9789241506243_eng.pdf

# GLOSSARY OF TERMS

*Source: Health and Emergency Disaster Risk Management Terminologies, WHO 2020*

### After Action Review (AAR)

After an activation, operation or exercise has been completed, a process involving a structured facilitated discussion to review what should have happened, what actually happened, and why (WHO 2015a).

### All Hazards Approach

An approach to the management of the entire spectrum of emergency risks and events based on the recognition that there are common elements and common capacities required in the management of these risks, including in the responses to virtually all emergencies.

The development of common or generic capacities that can be applied to all risks. These generic capacities are complemented by specific measures for the unique characteristics of each risk or event. Standardizing a management system to address the common elements, greater capacity is generated along with specific measures to address the unique characteristics of each event (WHO 2015a).

### Building Back Better

The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies and the environment (UNGA 2016).

### Business Continuity Plan

A document that describes how an organization will maintain and restore critical operational func- tions and services to a predetermined acceptable level in the event of an occurrence that disrupts its operational capabilities (WHO 2015a).

### Capacity

Combination of all the strengths, attributes, and resources available within an organization, community or society to manage and reduce disaster risks and strengthen resilience.

### Capacity Assessment

The process by which the capacity of a group, organization or society is reviewed against desired goals, where existing capacities are identified for maintenance or strengthening, and capacity gaps are identified for further action (UNGA 2016).

### Capacity Development

The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions.

### Climate Change

A change in the state of the climate that can be identified (for example by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer (IPCC 2012).

### Cold Debrief

A debriefing session held after a period of time has passed following an exercise or incident, in order to discuss, with the benefit of hindsight, any observations and issues that may have been overlooked during a hot wash (WHO 2015a). Also referred to “Cold Wash”

### Command

The act of managing, directing, ordering, or controlling by virtue of explicit statutory, regulatory, or delegated authority. The common short name for ‘incident command’, involving making decisions, implementing plans manage an incident, and controlling their effects (WHO 2015a).

### Coordination
Management processes to ensure integration (unity) of effort. Coordination relates primarily to resources, and operates vertically (within an organization) as a function of the authority to command, and horizontally (across organizations) as a function of the authority to control (WHO 2015a).

### Critical Systems (Hospitals)
Within a hospital, critical systems include the electrical, telecommunications, water supply, fire protection, waste management, fuel storage and medical gases and heating, ventilation, and air conditioning (HVAC) systems. The failure or disruption of critical systems can stop or impede the functioning of the hospitals (WHO 2015a).

### Decontamination
A procedure whereby health measures are taken to eliminate an infectious or toxic agent or matter on a human or animal body surface, in or on a product prepared for consumption or on other in- animate objects, including conveyances that may constitute a public health risk (WHO 2010a).

### Disability
A limitation in a functional domain that arises from the interaction between a person's intrinsic capacity, and environmental and personal factors (WHO 2011).

### Disaster
A serious disruption of the functioning of a com- munity or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.

Note: The effect of the disaster may be immediate and localized but is often widespread and can last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighboring jurisdictions, or those at the national or international levels (UNGA 2016).

### Disaster Management
The organization, planning and application of measures preparing for, responding to and recovering from disasters.

Note: Disaster management may not completely avert or eliminate the threats; it focuses on creating and implementing preparedness and other plans to decrease the impact of disasters and "build back better. Failure to create and apply a plan could lead to damage to life, assets, and lost revenue (UNGA 2016).

### Disaster Response
Actions taken directly before, during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected (UNGA 2016).

### Disaster Risk
The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.

Note: The definition of disaster risk reflects the concept of hazardous events and disasters as the outcome of continuously present conditions of risk. Disaster risk comprises different types of potential losses which are often difficult to quantify. Nevertheless, with knowledge of the prevailing hazards and the patterns of population and socioeconomic development, disaster risks can be assessed and mapped, in broad terms at least. It is important to consider the social and economic contexts in which disaster risks occur and that people do not necessarily share the same perceptions of risk and their underlying risk factors (UNGA 2016). This definition can apply to "risk" associated with hazardous events, emergencies and disasters.

### Disaster Risk Assessment

A qualitative or quantitative approach to determine the nature and extent of disaster risk by analyzing potential hazards and evaluating existing conditions of exposure and vulnerability [and capacity] that together could harm people, property, services, livelihoods, and the environment on which they depend.

Note: Disaster risk assessments include: the identification of hazards; a review of the technical characteristics of hazards such as their location, intensity, frequency, and probability; the analysis of exposure and vulnerability, including the physical, social, health, environmental and economic dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios (UNGA 2016).

### Disaster Risk Management (DRM)

The application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (UNGA 2016).

### Disaster Risk Reduction (DRR)

Activities aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development.

Note: Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans (UNGA 2016).

### Early Warning System (EWS)

An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses, and others to take timely action to reduce disaster risks in advance of hazardous events.

### Emergency

A type of event or imminent threat that produces or has the potential to produce a range of consequences, and which requires coordinated action, usually urgent and often non-routine.

### Emergency Medical Team (EMT)

Groups of health professionals (doctors, nurses, paramedics, etc.) that treat patients affected by an emergency or disaster."

### Emergency Operations Center (EOC)

The facility from which a jurisdiction or agency coordinates its response to major emergencies/ disasters (WHO 2015b).

### Emergency Response Plan

A document that describes how an agency or organization will manage its responses to emergencies of various types.

Note: It provides a description of the objectives, policy, and concept of operations for the response to an emergency; and the structure, authorities and responsibilities for a systematic, coordinated and effective response. In this context, emergency plans are agency or jurisdiction-specific, and detail the resources, capacities, and capabilities that the jurisdiction, agency or organization will employ in its response (WHO 2017a).

### Evacuation

Moving people and assets temporarily to safer places before, during or after the occurrence of a hazardous event in order to protect them.

Note: Evacuation plans refer to the arrangements established in advance to enable the moving of people and assets temporarily to safer places before, during or after the occurrence of a hazardous event. Evacuation plans may include plans for return of evacuees and options to shelter in place (UNGA 2016).

### Exercise

A form of practice, training, monitoring or evaluation of capabilities involving the description or simulation of an emergency, to which a described or simulated response is made (WHO 2017c).

Note: Exercises help determine a valid indication of future system performance under certain conditions, and to identify potential system improvements (WHO 2015b).

### Full Scale Exercise

An exercise that simulates a real event as closely as possible and is designed to evaluate the operational capability of emergency management systems in a highly stressful environment, simulating actual response conditions, including the mobilization and movement of emergency personnel, equipment and resources.

Note: The purpose of a full-scale exercise is to test/ evaluate most of the functions of an emergency plan in the most realistic manner possible. Ideally, the full-scale exercise should test and evaluate most functions of the emergency management plan or operational plan. Differing from the functional exercise (FX), a full-scale exercise typically involves multiple agencies and participants physically deployed in a field location (WHO 2017c).

### Functional Exercise

A fully-simulated, interactive exercise that tests the capability of an organization to respond to a simulated event. The exercise tests multiple functions of the organization's operational plan.

Note: The purpose of an FX is to test or validate the response capability of specific functions or departments in an organization to a situation in a time-pressured, realistic situation. A functional exercise focuses on the coordination, integration, and interaction of an organization's policies, procedures, roles and responsibilities before, during, or after the simulated event (WHO 2017c).

### Hazard

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Source of potential harm (ISO 22300:2018)

Note: This may include the latent property or the inherent capability of an agent or substance which makes it capable of causing adverse effects to people or the environment under conditions of exposure (UNGA 2016, WHO 2009).

### Health System

The people, institutions and resources, arranged together in accordance with established policies, to improve the health of the population they serve, while responding to people's legitimate expectations and protecting them against the cost of ill- health through a variety of activities whose primary intent is to improve health (WHO 2011).

### Hot Debrief

A debriefing session held immediately after an exercise or incident to identify the strengths and weaknesses of plans, policies, and procedures. Note: In a hot debrief, participants and the exercise management team provide immediate feedback or a debriefing event. Individuals share perspectives on strengths, weaknesses, and areas for improvement which are incorporated in the exercise report (WHO 2015a, WHO 2017c). Sometime referred to as "Hot Wash".

### Incident

An action, event or phenomenon which may cause loss of life or injury, property damage, social and economic disruption, and/or environmental degradation (WHO 2015b).

### Incident Action Plan (IAP)

A statement of intent that is specific to an incident or event. It details the response strategies, objectives, resources to be applied and tactical actions to be taken (WHO 2015a).

### Incident Management System (IMS)

System that defines the roles and responsibilities of personnel and the operating procedures to be used in the management of incidents (ISO 22300:2018).

### Infection Prevention and Control (IPC)

A practical and proven set of organizational and technical approaches and measures to prevent the spread of avoidable infections and antimicrobial resistance within both community and health care settings (WHO 2019c).

### Lessons Learned

Identified issues for which remedial actions may be implemented, in order to improve performance (WHO 2015a).

### Logistics

The aspect of emergency (risk) management that deals with the procurement, distribution, maintenance, replacement, and repatriation of material and human resources, including the provision of support infrastructure and services to response staff (WHO 2015a).

### Mass Casualty Incident

An event which generates more patients at one time than locally available resources can manage using routine procedures.

Note: It requires exceptional emergency arrangements and additional or extraordinary assistance (WHO 2007).

### Mental Health and Psychosocial Support

Any type of local or outside support that aims to protect or promote psychosocial wellbeing and/or prevent or treat mental disorder.

Note: Traditionally, mental health care has been used by health professionals to describe specialized interventions to treat individuals diagnosed with mental health conditions. Psychosocial support and psychosocial interventions are terms used by a broader range of workers in the emergency response field to refer to activities that support both the psychological and social health of individuals and communities as a whole rather than focusing specifically on treating mental health conditions (IASC 2007).

### Mitigation

The lessening or limitation of the adverse impacts of hazards and related disasters.

Note: The adverse impacts of hazards, in particular natural hazards, often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures include engineering techniques and hazard-resistant construction as well as improved environmental and social policies and public awareness. It should be noted that, in climate change policy, “mitigation” is defined differently, and is the term used for the reduction of greenhouse gas emissions that are the source of climate change (UNGA 2016).

### Mutual Aid Agreement

Pre-arranged understanding between two or more entities to render assistance to each other (ISO 22300:2018).

### National Disaster Management Agency

The national government agency that is responsible for coordinating disaster or emergency management policy and practice.

Note: There is no common definition for this agency or organization as the name and scope of functions varies across countries and is usually defined by national legislation or policies. Synonyms: ‘national disaster management organization’, ‘national emergency management agency’.

### Natural Hazards

Hazards that are predominantly associated with natural processes and phenomena (UNGA 2016).

### Personal Protective Equipment (PPE)

Protective clothing (gowns, gloves, boots etc.) and equipment (masks, shields, respirators, earplugs etc.) necessary to shield or isolate a person from biological, chemical, physical, sonic and thermal exposure (WHO 2015a).

### People with Disability (PWD)

Those who have long-term physical, mental, intellectual, or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others (UN 2006).

### Preparedness

The knowledge and capacities developed by governments, response, and recovery organizations, communities, and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

Note: Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response to sustained recovery. Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, the stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal, and budgetary capacities.

### Prevention

Activities and measures to avoid existing and new disaster risks.

Note: Prevention (i.e. disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts of hazardous events. While certain disaster risks cannot be eliminated, prevention aims at reducing vulnerability and exposure in such contexts where, as a result, the risk of disaster is removed. Examples include dams or embankments that eliminate flood risks, land- use regulations that do not permit any settlement in high-risk zones, seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake and immunization against vaccine-preventable diseases. Prevention measures can also be taken during or after a hazardous event or disaster to prevent secondary hazards or their consequences, such as measures to prevent the contamination of water (UNGA 2016)

### Readiness

The ability to quickly and appropriately respond when required (UNGA 2016).

Outcome of preparedness actions. It refers to the outcome of planning, allocation of resources, training, exercising, and organizing to build, sustain and improve operational capabilities based on risk assessment (SFEP WHO2017)

### Reconstruction

The medium and long-term rebuilding and sustainable restoration of resilient critical infrastructures, services, housing, facilities, and livelihoods required for the full functioning of a community, or a society affected by a disaster, aligning with the principles of sustainable development, and building and 'build back better', to avoid or reduce future disaster risk (UNGA 2016).

### Recovery

The restoring or improving of livelihoods and health, as well as economic, physical, social, cultural, and environmental assets, systems, and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk (UNGA 2016).

### Rehabilitation

The restoration of basic services and facilities for the functioning of a community or a society affected by a disaster (UNGA 2016).

The restoration of normal functioning of people and communities (WHO 2009).

A set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environments (WHO World Report on Disability)

### Resilience
The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management (UNGA 2016).

### Response
The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

Note: Disaster response is predominantly focused on immediate and short-term needs and is some- times called disaster relief. Effective, efficient, and timely response relies on disaster risk-informed preparedness measures, including the development of the response capacities of individuals, communities, organizations, countries, and the international community. The institutional elements of response often include the provision of emergency services and public assistance by public and private sectors and community sectors, as well as community and volunteer participation. “Emergency services” are a critical set of specialized agencies that have specific responsibilities in serving and protecting people and property in emergency and disaster situations. They include civil protection authorities and police and fire services, among many others. The division between the response stage and the subsequent recovery stage is not clearcut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage (UNGA 2016).

### Response Plan
Documented collection of procedures and information that is developed, compiled, and maintained in readiness for use in an incident (ISO 22300:2018).

### Retrofitting
Reinforcement or upgrading of existing structures to become more resistant and resilient to the damaging effects of hazards.

Note: Retrofitting requires consideration of the design and function of the structure, the stresses that the structure may be subject to from particular hazards or hazard scenarios and the practicality and costs of different retrofitting options. Examples of retrofitting include adding bracing to stiffen walls, reinforcing pillars, adding steel ties between walls and roofs, installing shutters on windows and improving the protection of important facilities and equipment (UNGA 2016).

### Risk
The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UNGA 2016).

### Risk Analysis
The process to comprehend the nature of risk and to determine the level of risk (ISO 22300:2018).

### Risk Assessment
The process of determining risks to be prioritized for risk management, by the combination of risk identification, risk analysis, and evaluation of the level of risk against predetermined standards, targets, risks or other criteria.

Note: Risk assessments include a review of the technical characteristics of hazards, analysis of exposures and vulnerability and evaluation of the effectiveness or prevailing coping capacities in respect of likely risk scenarios (WHO 2015b).

### Risk Communication
The interactive exchange of information and opinions concerning hazards, risks and risk-related factors (WHO 2015b). Range of communication capacities required through the prevention, preparedness, response and recovery phases of a serious public health event to encourage informed decision making, positive behavior change and the maintenance of trust (WHO 2018a).

Note: Risk communication should be a two-way interaction in which experts and non-experts exchange and negotiate perceptions relating to both scientific and community values and preferences (WHO 2009).

### Safe Hospital

A facility whose services remain accessible and functioning at maximum capacity, and with the same infrastructure before, during and immediately after the impact of emergencies and disasters (WHO 2015a).

### Situational Awareness

Being aware of and attentive to what is happening in a given environment at a particular time, with particular emphasis on the effect of changes in the environment; in effect, knowing how an incident or event is evolving (WHO 2015a).

### Surge

Sudden demand for health services in a mass casualty incident where additional capacities (in terms of the amount of personnel, equipment or supplies) and/or capabilities (in terms of specialized expertise) are required (WHO 2007).

### Surge Capacity

Ability of institutions such as clinics, hospitals, or public health laboratories to respond to increased demand for their services during a public health emergency (WHO 2015b).

### Surveillance

The systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response as necessary (WHO 2010a, WHO 2016).

### Sustainable Development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WHO 1998).

### Tabletop Exercise (TTX)

A facilitated discussion that uses a progressive simulated scenario, together with series of scripted injects, to make participants consider the impact of a potential emergency on existing plans, procedures and capacities.

Note: A tabletop exercise simulates an emergency situation in an informal, stress-free environment. A tabletop exercise is a discussion around an exercise scenario or narrative that is guided by a facilitator of an emergency situation, designed to elicit constructive discussion between participants; to identify and resolve problems; and to refine existing operational plans (WHO 2017a, WHO 2017c).

### Vulnerability

The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards (UNGA 2016).

### Vulnerable Group

Individuals who share one or several characteristics that are the basis of discrimination or adverse social, economic, cultural, political or health circumstances and that cause them to lack the means to achieve their rights or otherwise enjoy equal opportunities (ISO 22300:2018).