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Background: Health EDRM and research

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1.2.1 Introduction

Over recent decades, a number of risk drivers – including unplanned urbanization, unmitigated climate change, weak health systems and conflicts – have resulted in increased risks of emergencies and disasters *(1)*. The impacts of emergencies and disasters on human health have also become more severe, in part due to the role played by increasing exposure and vulnerability, such as poverty, people living in risk-prone areas, and changes in the social dynamics and age profiles of communities. The toll taken by emergencies and disasters on people's health is profound, often persisting well after the headlines fade. Between 2008 and 2017, disasters caused by natural hazards affected an average of nearly 200 million people a year, caused nearly 70 000 deaths annually and led to economic losses of more than US$160 billion annually *(2)*. Many tens of millions more are affected by conflict *(3)*. Some emergencies and disasters are large, and become national, regional or even global crises – these range from cyclones and drought, to conflicts and major disease outbreaks. However, more localized emergencies – such as traffic crashes, landslides and fires – can also be devastating in their collective costs to human lives, livelihood and health.

Too often, health emergencies and disasters set back a country's development, sometimes for decades, jeopardizing universal health coverage (UHC) along with the country's other development agendas. They shatter the aspirations of children and adults, destroying the communities they live in or call home. Health emergencies and disasters can overwhelm health systems and decimate the economies that fund them. The various actors in health and other sectors who are engaged in trying to prevent hazardous events and their health effects and then stopping them from becoming emergencies or disasters – by preparing for their occurrence,

responding to and recovering from them, must be able to access and use research to inform their decision making, and where uncertainties remain, they must be able to resolve these uncertainties by facilitating new research.

In 2015, the Third UN World Conference on Disaster Risk Reduction established the Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework), a global agreement that introduced a framework for action to enhance the resilience of communities, and of health and social systems. The Sendai Framework, which includes more than 30 references to health issues specifically, includes health in its goal of "the substantial reduction of disaster risk and losses in lives, livelihoods and health " *(4–5)*. It also emphasizes the importance of improving the scientific evidence base in order to advance health emergency and disaster risk management (Health EDRM). Reducing the health risks and consequences of emergencies and disasters is one of the most pressing priorities, and is central to achieving the "triple billion" goals of WHO's 13th General Programme of Work, in which WHO aims to ensure that by 2023, one billion more people benefit from UHC, one billion more people have better protection from health emergencies, and one billion more people enjoy better health and well-being *(6)*.

1.2.2 WHO Health EDRM Framework

The WHO Health EDRM Framework, published in August 2019, is a substantial response to this challenge of managing the health risks of emergencies and disasters across the world *(7)*. It emphasizes the critical importance of prevention, preparedness and readiness, together with response and recovery, to save lives and protect health. It also emphasizes the need to work together, because Health EDRM is never the work of one sector or agency alone. It shows how the entire health system and the whole-of-society can and must be fundamental in all these efforts. The Health EDRM Framework also details the clear need for communities to be in the driving seat. Although emergencies affect everyone, those whose situations and circumstances render them the most vulnerable are disproportionately affected (see Chapters 2.5 and 3.2). The needs and rights of the poorest, as well as of women, children, people with disabilities, older persons, migrants, refugees and displaced persons, and people with chronic diseases and other underlying health conditions, must therefore be at the centre of the efforts made.

Reducing the health risks and consequences of emergencies is vital to local, national and global health security and to building the resilience of communities, countries and health systems. Sound risk management is essential in order to safeguard the development and implementation of the SDGs, including the pathway to UHC, the Sendai Framework, the International Health Regulations (IHR) (2005), the Paris Agreement on Climate Change and other related global, regional and national frameworks.

The Health EDRM Framework does not replace these other frameworks, but rather serves as a bridge across them, striving for stronger coherence between them. The Health EDRM Framework builds on past achievements, good practices and the trends evident in health and multi-sectoral

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emergency and disaster risk management practices worldwide; it brings together local, national and international work on humanitarian action, epidemic preparedness and response, disaster management and health systems strengthening into a common and inclusive approach.

Many countries have strengthened their capacities to reduce the health risks and consequences of emergencies and disasters by implementing multi-hazard disaster risk management, the IHR (2005) and health systems strengthening. Nonetheless, many communities remain highly vulnerable to a wide range of hazards. Fragmented approaches to the management of risks associated with different types of hazards – including an over-emphasis on reacting to events, instead of preventing them and preparing properly in order to be ready for response – as well as gaps in coordination both within health systems, and between health and other sectors, have hindered the ability of communities and countries to achieve optimal development outcomes, including for public health. The Health EDRM Framework is intended to help resolve such issues by providing a common language and a comprehensive approach that can be adapted and applied by all the actors – in health and other sectors – working to reduce the health risks and consequences of emergencies and disasters.

The Health EDRM Framework also focuses on improving health outcomes and well-being for communities at risk in different contexts, including in fragile settings, and low- and high-resource settings. It places emphasis on assessment, communication and risk reduction across the continuum of prevention, preparedness, readiness, response and recovery. This will help build the resilience of communities, countries and health systems.

Health EDRM is derived from the disciplines of risk management, emergency management, epidemic preparedness and response, as well as health systems strengthening, and draws on the expertise and field experience of many of those who contributed to the development of the Framework. It is fully consistent with and helps to align policies and actions for health security, disaster risk reduction, humanitarian action, climate change and sustainable development. Effective implementation of Health EDRM is therefore critical to achieving UHC in all country contexts.

Health EDRM aims to transform the policy, practice and culture with respect to the management of emergencies and disasters; the change in approach it brings is summarized in Table 1.2.1.

Table 1.2.1 Summary of change in approach through Health EDRM *(7)*

From	To
Event-based →	**Risk-based**
Reactive →	**Proactive**
Single-hazard →	**All-hazard**
Hazard-focus →	**Vulnerability and capacity focus**
Single agency →	**Whole-of-society**
Separate responsibility →	**Shared responsibility of health systems**
Response-focus →	**Risk management**
Planning for communities →	**Planning with communities**

1.2.3 The Health ERDM Framework: Vision and Expected Outcome

The vision of Health EDRM is the "highest possible standard of health and well-being for all people who are at risk of emergencies, and stronger community and country resilience, health security, universal health coverage and sustainable development" *(7)*.

The expected outcome of Health EDRM is that "countries and communities have stronger capacities and systems across health and other sectors resulting in the reduction of the health risks and consequences associated with all types of emergencies and disasters" *(7)*.

Health EDRM is founded on the following set of core principles and approaches that guide policy and practice *(7)*:

- risk-based approach
- comprehensive emergency management (across prevention, preparedness, readiness, response and recovery)
- all-hazards approach
- inclusive, people- and community-centered approach
- multi-sectoral and multidisciplinary collaboration
- whole-of-health system-based and
- ethical considerations

Health EDRM comprises a set of functions and components that are drawn from multi-sectoral emergency and disaster management, capacities for implementing the IHR (2005), health system building blocks and good practices from regions, countries and communities *(7)*. The Health EDRM Framework focuses mainly on the health sector, noting the need for collaboration with many other sectors that make substantial contributions to reducing health risks and consequences.

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Health EDRM functions are organized under the following components *(7)*:

Policies, strategies and legislation: Defines the structures, roles and responsibilities of governments and other actors for Health EDRM; includes strategies for strengthening Health EDRM capacities.

Planning and coordination: Emphasizes effective coordination mechanisms for planning and operations for Health EDRM.

Human resources: Includes planning for staffing, education and training across the spectrum of Health EDRM capacities at all levels, and the occupational health and safety of personnel.

Financial resources: Supports implementation of Health EDRM activities, capacity development and contingency funding for emergency response and recovery.

Information and knowledge management: Includes risk assessment, surveillance, early warning, information management, technical guidance and research. This recognizes the need for these capacities to be strengthened to support risk/needs assessments, disease surveillance and other early warning systems, and public communications with the aim of ensuring that "the right information gets to the right people (including communities, practitioners and decision makers) at the right time" and the role of research in supporting the evolution of evidence, knowledge and practice and the development of new interventions and innovative risk management measures.

Risk communications: Recognizes that communicating effectively is critical for health and other sectors, government authorities, the media, and the general public.

Health infrastructure and logistics: Focuses on safe, sustainable, secure and prepared health facilities, critical infrastructure (such as water and power), and logistics and supply systems to support Health EDRM.

Health and related services: Recognizes the wide range of health-care services and related measures for Health EDRM.

Community capacities for Health EDRM: Focuses on strengthening local health workforce capacities and inclusive community-centered planning and action.

Monitoring and evaluation: Includes processes to monitor progress towards meeting Health EDRM objectives, including monitoring risks and capacities, and evaluating the implementation of strategies, related programmes and activities.

The Health EDRM Framework recognizes that information and knowledge management capacities are crucial for effective Health EDRM. This includes the ability to support risk assessments and other forms of needs assessments (Chapters 2.2 and 3.1), disease surveillance and other early warning systems (Chapter 2.4), and public communications (Chapter 4.11). It also seeks to ensure that the collection, analysis and dissemination of information is harmonized across relevant sectors. This requires good quality research, with evidence-based technical guidance to build capacity through training programmes and health systems improvements.

1.2.4 The WHO Thematic Platform for Health EDRM Research Network

In 2018, WHO established the WHO Thematic Platform for Health EDRM Research Network (Health EDRM RN) in order to promote global collaboration among academics *(6–7)*, government officials and other stakeholders so as to generate better scientific evidence to inform policy and practice for managing health risks associated with emergencies and disaster. In 2017, leaders of this emerging research network published review papers on the Sendai Framework implementation and recommendations on Health EDRM research *(8–9)*. These highlighted the critical importance of conducting research before, during and after emergencies and disasters, and not only in the acute phase. Some key themes emerged from the research network's deliberations, including:

- the need for a holistic approach to Health EDRM to ensure that physical, mental and psychosocial health and well-being are addressed;

- identifying populations at risk with specific health needs;

- standardization of needs assessments, standardization of evaluation methodologies and reporting systems for countries, communities and individual cases;

- multidisciplinary and multi-sectoral approaches; and

- a review of research for informing better policy development and implementation.

There was also recognition of the need to reflect the variety of hazards that relate to Health EDRM (Table 1.2.2).

Table 1.2.2 Truncated WHO Classification of Hazards *(7)*

Groups	Sub-groups	Examples of main types
Natural	Geophysical	Earthquake, geophysical-triggered mass movement, tsunami, volcanic activity
	Hydrological	Flood, wave action, hydrometeorological-triggered mass movement
	Meteorological	Storms, cyclones, extreme temperature
	Climatological	Drought, wildfire
	Biological	Air-, water-, and vector-borne diseases, animal and plant diseases, food-borne outbreaks, antimicrobial resistant microorganisms
	Extraterrestrial	Meteorite impact, space weather
Human-induced	Technological	Industrial hazard, structural collapse, fire, air pollution, infrastructure disruption, cybersecurity, hazardous materials (including radiological), food contamination
	Societal	Armed conflict, civil unrest, financial crisis, terrorism, chemical, biological, radiological, nuclear, and explosive weapons
Environmental	Environmental degradation	Erosion, deforestation, salinization, sea level rise, desertification, wetland loss/degradation, glacier retreat/melting

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To accelerate research in Health EDRM, WHO organized a meeting to identify key research gaps and questions, bringing together leading experts from WHO, the World Association for Disaster and Emergency Medicine (WADEM) and Japan International Cooperation Agency (JICA), and delegates to the Asia Pacific Conference on Disaster Medicine (APCDM). The meeting was organized by WHO Kobe Centre for Health Development as one of the programmes during the Asia Pacific Conference on Disaster Medicine, on 17 October 2018, in Kobe, Japan *(10)*. One of the outcomes of that meeting was recognition of the need to produce guidance on research methods for those who need to use this research, and those who might be responsible for commissioning or conducting research in the future *(11)*.

1.2.5 WHO and research

Research and innovation are vital to WHO as a knowledge-based, normative and standard-setting organization. WHO hosts special research programmes, coordinates multi-country research, and supports research capacity development. It also benefits from over 800 WHO collaborating centres, which are institutions designated by the Director-General to carry out activities in support of WHO's international programme of work. Critical research functions have already been addressed and integrated into relevant strategic priorities: for example, research and development in support of access to and prequalification of medicines for UHC, and coordinating research for emergencies including the development of diagnostics, vaccines and therapeutics for epidemic-prone diseases. Research also forms a foundation for strategic shifts – in conjunction with diplomacy and advocacy, with normative guidance and agreements being based on the best science and evidence. WHO draws upon a wide range of disciplines, from the social sciences to implementation research, and uses its comparative advantage in respect of identifying needs and translating knowledge in order to facilitate research best conducted in research institutions.

WHO also helps to develop and scale up innovative solutions. Innovation can accelerate attainment of the SDGs and the goals in WHO's 13th General Programme of Work. WHO uses various approaches to achieve this: science and technology, and social, business or financial innovation. WHO's most effective role is as a facilitator, addressing barriers to innovation and acting as a "champion of champions" for innovation. WHO also works with partners to identify and coordinate the research, development and innovation needed to better detect, prevent and respond to new and emerging diseases and other hazards that endanger health.

1.2.6 The role of research in Health EDRM

People working in Health EDRM must face many topics about which there is uncertainty. In considering these, it is important to note that the UN General Assembly adopted the definition of disaster risk as "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" *(12)*.

Uncertainties may arise from limited knowledge, understanding, access to or application of evidence, or the lack of evidence to support decision making and action. This may include uncertainty as to how common problems are, how to reduce the risks of those problems occurring and how to alleviate them if and when they do occur – questions that can be answered through the types of research described in other chapters. Evidence, supported by good quality research, is vital to helping resolve these uncertainties. Without evidence to support their decision making, decision makers run the risk that their actions will do more harm than good.

In some cases, the necessary research may have already been done and is brought together in systematic reviews and guidelines (Chapter 2.7), which can be used to inform decision making and action. Such guidelines must be prepared using rigorous systematic methods and the methods for producing high quality guidelines are now clearly described in, for example, the WHO Handbook for Guideline Development *(13)*. In some cases, practitioners and policymakers in Health EDRM will be able to rely directly on those guidelines, with current examples including the WHO Guideline on Communicating risk in public health emergencies *(14)* and WHO Housing and health guidelines *(15)*. Such guidelines should be underpinned by systematic reviews of existing research evidence (Chapter 2.6) and those producing the guidelines might draw on the output of international organizations dedicated to the production and maintenance of these reviews, such as Cochrane, the Campbell Collaboration and the Joanna Briggs Institute, or organizations, such as Evidence Aid, that collate systematic reviews to produce collections on specific topics, such as malnutrition *(16)* (Chapter 3.7).

In some areas of Health EDRM, research has already had a substantial impact on decision making, influencing the implementation of effective interventions or the avoidance of ineffective ones, thus improving the health and well-being of individuals and populations. For instance, research brought together in systematic reviews has identified:

- the benefits of vaccination to prevent common diseases *(17)*;

- strategies to improve water quality *(18)*;

- drugs to ease pain *(19)* ways to treat wounds *(20)*; and

- the potential harms of interventions such as brief debriefing to prevent post-traumatic stress disorder (PTSD) *(21)*.

Additional examples are featured as case studies in the chapters that follow.

However, in many cases, decision makers will be faced with an absence of existing systematic reviews or a lack of relevant studies of sufficient quality *(22)*. In these cases, they may need to work with researchers, and collaborators interested in doing research, to design and conduct their own studies *(23)*. This book provides guidance on this process by outlining:

- research management processes that will lead to effective and efficient research studies;

- the value of a systematic approach to designing, conducting, reporting and using research;

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– how to ensure that research is reliable, robust and fit for purpose, and meets the priority needs of those who will use it; and

– how to implement a research plan and translate its findings in routine, day-to-day practice, policy and programme direction setting.

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