6.7 Doing research in Health EDRM

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6.7.1 Learning objectives

To understand key factors to consider when doing research in health emergency and disaster risk management (Health EDRM) and be able to:

1. Outline the main purpose of doing research in Health EDRM.
2. Explain various aspects that influence the choice of the topic to investigate, and the characteristics that this topic must have.
3. Discuss the contrasts between the approaches of systemic disaster risk with those of the environmental approach to health associated with biological risks.
4. Explain the importance of the Theory of Change and an Evidence-based Research Strategy, and why they can be complementary to research in Health EDRM.

6.7.2 Introduction

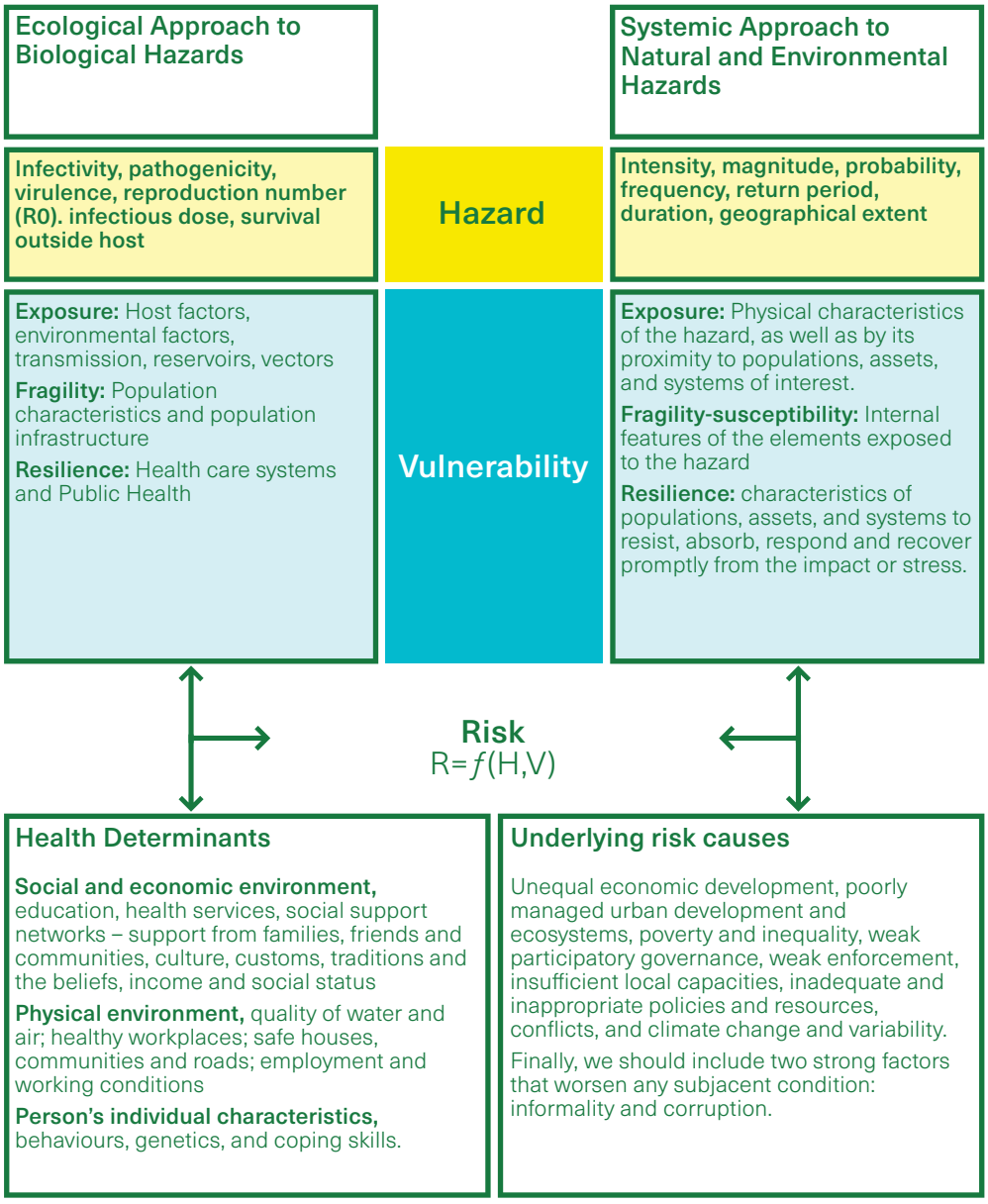
Conducting research in Health EDRM presents unique and diverse opportunities, given the complexities of the concepts of health, risks and disasters described throughout this book. The main purpose of Health EDRM research is to generate high quality knowledge that can be used to promote, restore and maintain the health status and health equity of individuals and communities exposed to disaster risk, or during and after emergency or disaster situations.

This chapter has been organized around five questions: What? How? Where? When? and Who? Each is important to conducting research in the field, highlighting issues described in more details in other chapters of this book. 'What?' refers to the choice of research topic (Section 3); 'How?' refers to the approach or strategy to be used as well as the methodologies and technologies to be followed (Section 4); 'Where?' raises the question of the geographical scope and coverage of the study;' When?' covers the considerations of time in the study; and 'Who?' helps to identify the target audience, the research team, and other actors directly or indirectly involved in the study.

6.7.3 The research topic – what?

Choosing the topic to investigate is conditioned by aspects such as curiosity, health needs, research gaps, benefits or opportunities that arise. The selected topic must be feasible, interesting, novel, ethical, and relevant *(1)*. Selecting the topic means answering the question of what to investigate. To visualize possible research topics, Figure. 6.71 contrasts an ecological approach to risks to health associated with biological hazards with the systemic approach, drawing on concepts of hazard, vulnerability and risk.

Figure 6.7.1. Ecological approach to biological hazards *(2).*



This visualization highlights convergences and specificities in the two approaches, creating a rich analysis framework that can be used to select topics, relationships, factors and contexts that can be considered in Health EDRM research.

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6.7.4 Approach or strategy – how?

Two approaches in particular facilitate the approach to the problem to be solved: the Theory of Change (Chapter 4.10) and the Evidence-based Research Strategy (Chapter 3.6). The Theory of Change is an approach aimed at planning and evaluating social change interventions, going beyond the association between an intervention and its outcome, looking for ways to acquire knowledge about causation, context and assumptions *(3)*. The Theory of Change allows problems to be associated with goals, identifying trajectories, domains of change, fundamental elements to define what should be evaluated, focus on key information, and prioritize what really needs to be known and why.

The Evidence-based Research Strategy is the systematic use of previous research to inform a new study so that it answers key questions about effectiveness, efficiency, accessibility and sustainability *(4)*. Sarmiento *(5)* identifies seven stages for the design of an evidence-based research strategy:

i. identify relevant interventions
ii. prepare evaluation questions
iii. select evidence sources and implement a search strategy
iv. appraise evidence and identify gaps
v. create and implement evaluation design
vi. apply the evidence
vii. evaluate the evidence application.

Case Study 6.7.1 shows how an evidence-based research strategy was used by WHO to establish the state-of-the-art guidelines for risk communication for public health emergencies.

Case study 6.7.1
Communicating risk in public health emergencies: A WHO guideline for emergency risk communication policy and practice

Recent public health emergencies, such as the Ebola virus disease outbreak in West Africa (2014–2016) and the emergence of the Zika virus syndrome in 2015–2016, have highlighted major challenges and gaps in how risk is communicated during epidemics and other health emergencies. The challenges include the rapid transformation in communications technology, the widespread use and increasingly powerful influence of digital media and its impact on 'traditional' media (newspapers, radio and television), resulting in changes in how people access and trust health information. Existing gaps include considerations of context – the social, economic, political and cultural factors influencing people's perception of risk and their risk-reduction behaviours.

Although there were already principles, good practices and training in the area of emergency risk communication, there was no comprehensive evidence-based WHO guidance on this topic. In 2015, WHO prepared comprehensive evidence-based guidance on how risk communication should be practiced in crisis, emergencies and disasters *(6)*. The guidance also provides the best approaches for strengthening emergency risk communication capacity and sustaining this for potential health emergencies.

These guidelines were preceded by the definition of twelve research questions, covering trust and community participation, integrating emergency risk communications into health and emergency response systems, and emergency risk communication practices. These questions were developed in terms of potential searches, using the SPICE Framework (Setting, Perspective, phenomenon of Interest, Comparison, Evaluation of impact) and were used to guide systematic reviews of the existing literature by different institutions.

The Theory of Change and the Evidence-based Research Strategy approaches are not mutually exclusive. They complement each other, particularly when multiple interventions need to be assessed for effectiveness, efficiency and sustainability. In some cases, studies on Health EDRM require more process-oriented and short-term results, in which the actors involved use common methods such as case studies, lessons learned and good practices. Studies using these methods have some analytical limitations, remaining descriptive at best, and few reach the level of theoretical, indicative or causal analysis *(7)*.

Case studies in health can have different approaches and are widely used in Health EDRM. In fact, there are numerous studies that have become important references for academia, institutions and practitioners. A case study is a research strategy and an empirical inquiry that investigates a phenomenon within its real-life context. There are four different types of case studies: illustrative, exploratory, cumulative, and critical. Illustrative case studies are considered descriptive and are designed to elucidate a particular situation. Exploratory case studies are used to identify research questions and methods for complex study. Cumulative case studies correspond to a compilation of case studies already completed on a

specific topic. Finally, case studies of critical cases are used to understand what happened with a single event or challenge *(8)*.

Lessons learned

Lessons learned can be defined as knowledge or understanding gained through experience or reflection on a process. This experience or process can be positive or negative. In order to be relevant and useful, 'lessons learned' must be:

- Applicable, because they have actual or potential impact on operations or processes.
- Valid, because they are based on facts.
- Significant, because they identify processes or decisions that reduce or eliminate failures or reinforce positive outcomes.

Lessons learned help to (i) identify success factors (effectiveness, efficiency, sustainability); (ii) identify gaps (shortcomings) in policies, strategies, programmes, projects, processes, methods and techniques; (iii) identify and solve problems through new courses of action; and (iv) improve decision making and serve as a model for other interventions.

Case Study 6.7.2 shows the application of the lessons learned methodology on the health response after the 2010 earthquake in Haiti.

Case study 6.7.2
Health Response to the Earthquake in Haiti, January 2010: Lessons to be learned for the next massive sudden-onset disaster

After the January 2010 earthquake in Haiti, the Pan American Health Organization/WHO prepared a report about the health effects of the earthquake and the effectiveness of national and international health relief efforts *(9)*. The magnitude 7.0 earthquake had a devastating impact, leaving more than 220 000 dead, over 300 000 injured and 1.3 million forced into temporary shelters. This catastrophic outcome was the result of both socioeconomic and seismic factors: the vulnerability of Haitian housing and construction, the shallow hypocentre of the earthquake, and its proximity to the country's most important urban centre. Rural areas in the West and South-East departments were also badly affected.

The report indicates that Haitians themselves responded swiftly and effectively, saving many lives before foreign help could arrive. However, the domestic response was severely limited by the destruction of the country's capital and the impact on government staff and facilities. The international community responded quickly and with solidarity, including not only the traditional donor nations, but practically all the Latin American and Caribbean countries. Unfortunately, the response showed the same chaotic tendency as in past disasters: insufficient information, improvised decisions not based on evidence, and a marked lack of sector coordination. The health emergency and disaster risk management problems recorded in previous events were repeated and even amplified in Haiti. The humanitarian community could not put into practice the lessons learned, and that is why the subtitle of report says: "Lessons to be learned for the next massive sudden-onset disaster."

Good practices

Good practices can be defined as efficient solutions to solve or tackle a problem. These practices have been validated through extensive use, obtaining positive outcomes in various contexts, which are confirmed by evaluations. In short, 'good practices' are those that:

- have been implemented with proven effectiveness
- can be replicated and applied in different contexts achieving similar results
- have met or exceeded the expected objectives and have delivered the expected outputs
- are sustainable over time.

6.7.5 Geographical scope, scale, and coverage – where?

An indispensable aspect to consider when planning Health EDRM research in the field is the geographical scope and the coverage that is intended to be achieved. Territory and health are intrinsically linked. The spatial context affects the configuration of environmental risks, as well as influencing other health effects. Social, built and natural environments affect health and well-being in ways that are directly relevant to health research. The geographical scope, scale and coverage sought in a health study should be directly related to the available resources, as well as the expected specificity and depth.

A study about underlying risk factors of local communities in Chile *(10)* illustrates a type of research on risk factors (Chapter 3.2) or social determinants of health with a particular focus on disaster risk. The study includes 60 municipalities (20% of total municipalities in Chile), encompasses 41 variables grouped in four categories: governance, territorial planning, socio-economic and demographic conditions, and climate change and natural resources. Using a multicriteria statistical processing method, the study captured the different features that shape vulnerability and guide effective disaster risk management at the local level. Studies such as this one reflect the importance of identifying and measuring the physical attributes of the territory at different scales, as well as the qualitative attributes, such as poverty and governance, that contribute decisively to constructing the vulnerability of individuals and communities.

6.7.6 Time considerations – when?

Cross-sectional studies analyse the situation or conditions at a given time (for example, a study on the health impact of the population exposed to the violent eruption of a volcano), while longitudinal studies or cohort studies follow the same sample of people over time (for example, a study on the evolution of the population health conditions chronically exposed to volcanic activity). Another view of the time factor in health research can be observed when addressing aspects associated with different stages of emergency and disaster management: before, during, or after an adverse event. It could also include studies in prospective risk management as a

particular consideration of time in the study. In this case, stochastic modelling methods are used to explore possible future scenarios, which may or may not have statistics or historical records (for example, epidemics generated by unknown germs, technological accidents, and cyber-attacks).

Other less frequent approaches to the time factor in research include retrospective studies which look backward and examine exposures to suspected risk or protection factors in relation to an outcome that is established at the start of the study (for example, a retrospective study of acute health effects due to volcanic ash exposure during a volcanic eruption).

6.7.7 Study stakeholders – who?

The stakeholders of a study include the target audience, the research team, partners, alliances and people and institutions who might be involved in the design and implementation of the study.

Research in Health EDRM generates scenarios conducive to the performance of interdisciplinary groups, as well as alliances between different research groups. According to WHO *(1)*, health research traditionally contemplates the involvement of three categories of sciences:

- biomedical sciences (such as biological, medical and clinical research, and the generation of biomedical products)
- population sciences (such as epidemiology, demography and socio-behavioural)
- health policy sciences (such as research in health policy, health systems and services, and population health).

In Health EDRM, other science categories have a clear role, particularly those associated with natural hazards: earth sciences (such as geology, meteorology, oceanography, and astronomy). The scope of the research ranges from biomedical research, epidemiological studies, health services research, perception and behaviour studies, community assessments and social, cultural, environmental and economic risk factors that directly affect health.

Case Study 6.7.3 describes a study on climate variability and climate change, and its effects on human health *(11)*. It illustrates how research can influence practice or policy.

Case Study 6.7.3
The impacts of climate change on human health in the USA *(11)*

This extensive study is the result of the work of several interdisciplinary teams composed of more than 100 experts from eight US Federal agencies (including employees, contractors, and affiliates). It was subject to a rigorous peer review process by public and scientific experts inside and outside government, including a special committee of the US National Academies of Sciences, Engineering and Medicine.

The study investigated how climate change is already affecting human health and the changes that may occur in the future. The objective is to provide a comprehensive, evidence-based and, when possible, quantitative estimate of the health impacts related to climate change observed and projected in the USA.

The report does assess scientific literature describing the role of adaptive capacity in creating, moderating, or exacerbating vulnerability to health impacts where appropriate. The report also cites analyses that include modelling parameters that make certain assumptions about emissions pathways or adaptive capacity in order to project climate impacts on human health. This scientific assessment of impacts helps build the integrated knowledge base needed to understand, predict, and respond to these changes, and it may help inform mitigation or adaptation decisions and other strategies in the public health arena.

According to the study, as the climate continues to change, the risks to human health will grow, worsening existing health hazards resulting in new public health challenges (for example, increases in human exposure; excessive heat; more frequent, severe or longer-lasting extreme weather events; degraded air quality; foodborne, waterborne, and vector-borne diseases). Some special populations of concern, such as children, the elderly, outdoor workers and those living in disadvantaged communities, will be more vulnerable.

The document not only seeks to inform public health officials and professionals in the health sector, but also aims to reach out to urban planners, disaster risk and emergency managers, decision makers, as well as others within and outside the government who are interested in better understanding the risks that climate change presents to human health.

6.7.8 Conclusions

Overall, research in Health EDRM has to take an interdisciplinary approach, integrating the natural, social, and health sciences to look at as many direct and indirect factors as affect health. Existing frameworks and theories can guide the process to anticipate, understand, and formulate a conceptual construct geared to the formalized design and development of field research, especially to answer the five questions (what, how, where, when, and who) when planning the study. Choosing which research approach to implement depends on many things, including the local risk and health factors, available resources, applicability and allotted time. It is also important to consider how the research will be presented afterwards such as publications, policy briefs, and dissemination back to the research community.

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6.7.9 Key messages

- **The main purpose of Health EDRM research is to generate high quality knowledge that can be used to promote, restore and maintain the health status and health equity of individuals and communities exposed to disaster risk, or during and after emergency or disaster situations.**
- **Health EDRM research requires an interdisciplinary vision.**
- **The ecological approach to health and systemic disaster risk approach generate a broad space for research in disaster risk management and health emergencies.**
- **The Theory of Change and the Evidence-based Research Strategy complement each other, particularly when multiple interventions need to be assessed for effectiveness, efficiency and sustainability.**

6.7.10 Further reading

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