

Chapter 3.2 - Disaster Risk Factors—Hazards, Exposure and Vulnerability

Hi there, I'm Dell Saulnier from the Department of Clinical Sciences Malmö at Lund University in Sweden. Welcome to this contribution to the audio series for the WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management. Along with Amod Dixit, Ana Nunes and Virginia Murray, I authored Chapter 3.2, titled *Disaster Risk Factors – Hazards, Exposure and Vulnerability*, and, in this podcast, I'll explore the three areas of disaster risk in relation to Health EDRM. Let's begin.

The first type of risk is hazards that can cause damage. Disasters often follow hazards that negatively impact a population. Hazards can take many forms, including natural, biological, technological, and societal hazards. There are many ways to classify hazards. For instance, hazards can occur individually, sequentially, or in combination with each other. Hazards can have a short or long duration, can be severe in impact or small-scale, and can happen frequently or infrequently. The importance of these characteristics and how they translate to risk is relative to the population exposed to the hazard. For example, in 2015 an earthquake killed and injured thousands of people in Nepal largely because of weak building structures, which collapsed during the earthquake. In that case, the impact on health depended on the vulnerability of buildings in that region.

The second type of risk is exposure to the hazards. Populations must be exposed to a hazard, either directly or indirectly, to be affected by it. Direct effects are caused by the hazard itself, like drowning in flood waters or contracting an infectious disease during an outbreak. The indirect effects are the additional consequences caused by the hazard over time that can harm health, like unsafe or unhealthy living conditions, lost livelihoods, displacement, and damages to infrastructure like clean water supplies. It can be challenging for disaster researchers to measure the effects of a disaster; this is because there can be multiple indirect pathways that lead to the outcome of interest.

The final type of risk is the vulnerability of the exposed population. Vulnerability is made up of physical, social, economic, and environmental factors and is highly dependent on the context of the hazard. Vulnerability can be both a risk factor for and an outcome of disasters. For instance, poverty can put individuals at risk by forcing them to live in areas exposed to hazards, while exposure to hazards can cause poverty by interrupting people's livelihoods. Some factors can make an entire population vulnerable, like corruption, while others are specific to certain groups, like people living with a certain disease. Groups that are usually considered to have higher levels of vulnerability include women, children, the elderly, the disabled, the impoverished, migrants, ethnic and sexual minorities, and people with chronic illnesses.

Disasters are a combination of the three risk factors: hazards, exposure, and vulnerability. Finding causative factors for disaster outcomes means examining risk factors in these areas. The factors can combine in unpredictable ways, creating a complex and unique research context. The combination of risk factors has to be understood so that we are producing findings

which answer the research questions and so that we know which other disasters we can apply them to. One way to ensure this is to make sure that risks factors and outcomes are carefully defined and how they were measured is clearly explained. That can help people to understand what conclusions can be drawn from the individual study and from the overall body of evidence.

In summary, it is important for Health EDRM research to have a good understanding of the interactions between hazards, exposure, and vulnerability in relation to disasters. Thank you for listening to this brief introduction to Chapter 3.2 and we hope you will enjoy reading it. Goodbye for now.