

Chapter 5

Health in a Disasters goal

The health imperative for disaster risk management: a discussion of key issues in the context of the global consultations on disaster risk reduction in the post-2015 development agenda¹

Executive summary

Protecting human health is a key imperative in action to manage disaster-related risks and reduce the impacts of all hazards on communities. Many different hazards, such as natural and technological disasters, epidemic diseases and conflicts, have the potential to have substantial consequences for people's health and well-being, and the functioning of health systems and societies at large. Improved health outcomes in emergency and disaster risk management is best obtained from multi-sectoral action by health systems and other sectors working together with all communities at risk of emergencies and disasters. Such collaboration helps reduce health consequences, particularly deaths, injuries, illnesses and disabilities. Building health system resilience and health sector capacities for emergency and disaster risk management, particularly at community level, is essential to effective multi-sectoral DRM, which also supports sustainable development.

Clear objectives for human health aspects of DRM, including monitoring and reporting with targeted health outcome indicators, is fundamental to measuring the impact of hazards on communities and to measuring the effectiveness of DRM measures implemented by all sectors. In preparation for the post-2015 development agenda, a wide range of indicators to address the health dimensions of DRM has been suggested. Indicators should take account of baseline health status, health service coverage and health systems functioning as well as those that specifically measure health consequences and health emergency and disaster risk management implementation. In considering which indicators have most traction and value, preference should be given, as far as possible, to data that are already collected and reported on a regular basis by countries, WHO and other bodies, including the World Bank. These include indicators related to health outcomes, national health emergency risk management programmes, safer hospital programmes (UNISDR, 2011a) and implementation of the International Health Regulations (IHR 2005) (WHO, 2008c). General descriptions of possible targets have been proposed that are aligned with above-mentioned indicators.

Further consultations with WHO Member States and partners are required on targets and indicators

on health aspects of the disaster theme, as well as on the advocacy for disaster-related indicators to be considered in consultations on health goals for the post-2015 development agenda.

5.1 Introduction

Protecting human health is a key imperative for reducing risks to communities from all types of hazards, including those that lead to emergencies and to disasters when they are on a scale that overwhelms the local capacities. Moreover, they can result in substantial consequences for health, including deaths, injuries, diseases, disabilities, psychosocial problems and other effects, such as damage to health facilities and disruption to the delivery of health services over extended periods. The adverse health effects from hazards can be avoided or reduced by the application of a wide range of risk management measures by health and other sectors working together with people who are at risk of these events. Health emergency and disaster risk management refers to the systematic analysis and management of health risks, posed by emergencies and disasters, through a combination of (i) hazard and vulnerability reduction to prevent and mitigate risks; (ii) preparedness; (iii) response; and (iv) recovery measures. It follows that human health outcomes, including mortality, injury, illness and disability, are fundamental to measuring the impact of disasters on communities and to measuring the effectiveness of DRM measures implemented by all sectors in communities and countries, and supported by regional and international entities.

Related to the issue of health within the broader disaster risk management theme, is that of health within the post-2015 development agenda (Global Thematic Consultation on Health, 2013). A recent draft report provides a summary of the main themes, messages and recommendations that have emerged from the global consultations held from September 2012 to January 2013 (ibid.). Various health goals have been proposed for inclusion in the post-2015 framework, with most discussion centring on: (i) maximising healthy life expectancy; (ii) universal health coverage; and (iii) a set of MDG-like health goals. The draft report also shows how health is linked to other thematic consultations, including disasters,

conflict and fragility; water; food and nutrition security; education; and energy. Further dialogue is required on linking the thematic areas of health and disasters, and on advocacy for disaster-related dimensions to be addressed in the consultations on the health theme for the post-2015 development agenda.

The aim of this chapter on the health imperative for DRM is to present key issues on health aspects of disaster risk management and to discuss possible indicators for consideration in the global consultations on DRR for the post-2015 development agenda.

5.2 Framing the discussion

The scope of this paper is influenced by approaches and principles that are informing the development by WHO and partners of a framework on emergency and disaster risk management for health and the discipline of health systems management. The framework is based on risk management, all-hazards, multi-sectoral, multidisciplinary, sustainable development and community-centred approaches, and on the application of ethical, humanitarian and human rights principles.

The framework refocuses actions by all sectors on managing risks rather than events to achieve better health outcomes for those facing the risk of emergencies and disasters. All measures or treatments that contribute to the management of risk are considered, including those aimed at hazard prevention, vulnerability reduction, building individual and community resilience, preparedness, response and recovery. There are many other capacities that are needed to support the implementation of risk treatments, including policies and legislation, financial resources, planning and coordination mechanisms, a competent health workforce, risk assessments, information management, risk communication, technical guidance on good practice, research and effective monitoring, evaluation and reporting.

All hazards - natural, biological and epidemic-related, technological hazards and conflict and other societal related-, should be considered within the scope of the theme of disasters as they all have the potential to cause significant health

consequences and overwhelm local capacities. Not only are hazards often linked together, as seen in the March 2011 east Japan tsunami (triggered by a large earthquake M9) and the subsequent Fukushima nuclear accident, but also there are many common elements in managing the risks regardless of the hazard. The capacity of the health and other sectors must be enhanced to manage all types of hazards, which may have widespread effects for communities, including not just health.

The discipline of emergency and disaster risk management has many conceptual challenges that affect the scope of the discourse and the application of a standardised approach to all aspects of measurement. These challenges are associated with:

- The imprecision of the definitions and absence of a logical framework linking key terms, such as vulnerability, risk and risks, disasters, risk reduction, risk management and resilience;
- Descriptions of the scale of the potential or real impact of hazards on communities, from events that can be managed with routine arrangements (including health care), to emergencies and disasters that may require non-routine measures in health and other sectors, such as construction to higher standards and mass casualty management systems;
- Defining the range of hazards that could be considered in the scope of a discussion of disasters;
- The attribution of impacts to specific hazards, events and disasters, which may span hours, days, years or even decades;
- Defining the population at risk; and
- Delineating the range of measures for reducing risks posed by hazards across the risk management continuum from prevention and preparedness to response and recovery, as well as enabling capacities such as policies and legislation, risk assessments and human resource management.

While some of these issues are explored in this and other chapters, there is a need for further analysis and consultations on these key issues in order to advance policy, practice and measurement considerations for the disaster theme of the post-2015 development agenda.

5.3

Managing the risks to human health from hazards, emergencies and disasters

Impacts of Hazards on health

Natural, biological, technological and societal hazards put the health of vulnerable populations at risk and have the potential to cause significant harm to public health. Examples of these hazards include:

- **Natural:** earthquakes, landslides, tsunamis, cyclones/hurricanes, floods, droughts or extreme temperatures, forest fires;
- **Biological:** epidemic disease in humans, plants or animals, pandemic diseases, infestations of pests;
- **Technological:** building fires, structural collapses, chemical substances, radiological agents, transportation crashes; and
- **Societal:** conflict, stampedes, acts of terrorism.

Hazards may affect health directly or through the disruption of health systems, facilities and services, leaving many without access to health care in times of emergency. The pattern of health impacts varies among different hazards. These impacts may occur at various stages of a disaster event, including the immediate and direct consequences, as well as secondary consequences such as food shortages and damage to basic infrastructure such as water supplies and safe shelter, which are essential for health. The impact of hazards and their consequences may disrupt primary health care services, disease surveillance systems and the care of people with chronic conditions. Displaced populations may also be exposed to increased risks of communicable disease due to overcrowding and unsanitary conditions in evacuation shelters and camp settings. Furthermore, when there is damage to hospitals and other health care facilities or health workers are killed or injured, or leave the disaster affected areas owing to insecurity and violence, the delivery of health services can be seriously

affected in the immediate response, and possibly for many years. International consensus views disasters as barriers to progress on the health-related MDGs, as they often set back hard-earned development gains in health and other sectors.

The disruption of economic, social and governmental mechanisms may halt or hinder appropriate preparedness, response and recovery. The consequences from hazards may exacerbate systems that were previously failing or systems that are critical to seeking and providing health care (e.g. roads, power supply, water supply). A multi-sectoral approach to DRM is critical to assure that both direct and indirect risks to health have been addressed.

There is a wide range of human health effects associated with the impact of hazards on communities:

- Increased number of deaths and injuries;
- Population displacement;
- Missing persons;
- New cases of disease (e.g. respiratory diseases, diarrhoeal diseases);
- New cases of disability;
- Increased number of cases of psychological and social behavioural disorders;
- Possible food shortages and nutritional deficiencies;
- Illness or injury among response personnel; and
- Disruption to routine care for non-communicable disease (NCD) conditions such as chronic diseases (Keim MJ. and Abrahams J., 2012)

Annually between 2000 and 2009, an average of some 270 million people were affected by disasters from natural and technological hazards.³ Over 1.1 million deaths were recorded in 4,130 large-scale disasters from natural hazards (UNISDR, 2012). The incidence of natural disasters has been increasing and climate change will contribute to an increase in the risk of extreme weather events for millions of individuals, their homes, their communities and the infrastructure that supports them.

The International Federation of the Red Cross and Red Crescent Societies (IFRC) has estimated that between 1998 and 2007, there were nearly 3,200 technological disasters, with approximately

100,000 people killed and nearly 2 million people affected (WHO, 2009b).

Epidemic diseases and other biological hazards are ever present. Major outbreaks related to new and re-emerging infectious diseases such as SARS, influenza (H1N1 and H5N1) and cholera have occurred during the past few decades with devastating effects on human health. Climate change is also expected to increase risk of water-borne and vector-borne diseases in both rural and urban areas.⁴

Complex emergencies, including conflict, continue to affect tens of millions of people, causing internal and external displacement of people. In 2010, there were an estimated total of 27 million persons who remained internally displaced by armed conflict across the world.

Health consequences of disasters also are typically greater in countries and communities with the least resources and where health status is already compromised by malnutrition or other factors. For instance:

- Over 1.5 billion people live in countries affected by repeated cycles of political and criminal violence and fragility (World Bank, 2011b). According to the Uppsala Conflict Database, there were 37 on-going conflicts worldwide in 2011⁵.
- Societal disruption can lead to excessive deaths from violence, infectious diseases, malnutrition and complications from untreated chronic disease.
- Of the 20 countries with the highest childhood mortality rates in the world (UNICEF, 2011a), at least 15 have experienced civil conflicts over the past two decades. Similarly, 9 out of the 10 countries with the highest ratios of maternal mortality have recently experienced conflict (World Bank, 2011b).
- Two and half billion people are without access to improved sanitation – including over a billion who lack any sanitation facilities.⁶ Lack of sustainable and acceptable infrastructure increases the risk of water-borne disease. For example, in Africa, 115 people die every hour from diseases linked to poor sanitation and contaminated water. These situations are exacerbated in times of disaster and degradation or elimination of pre-existing systems⁷

- Hunger and malnutrition are in fact the number one risk to the health worldwide — greater than AIDS, malaria and tuberculosis combined. Undernutrition contributes to 2.6 million deaths of children under five each year – one third of the global total (UNICEF, 2011b). The vast majority of hungry people (98%) live in developing countries, where almost 15% of the population is undernourished (WFP, 2011).
- Among the key causes of hunger are natural disasters, conflict, poverty, poor agricultural infrastructure and over-exploitation of the environment (WFP, 2011).

Vulnerabilities that modify health risks

Risks can be described in terms of hazards, people's vulnerabilities to hazards and the resources and capacities available to manage the related risks (Dfid, 2006). While the attention in DRM may naturally fall on the hazards, in many situations it is not the hazard that leads to a disaster, but the vulnerability and inability of the population to anticipate, cope with, respond to and recover from its effects. Human vulnerability entails a complex mix of issues that includes social, economic, health and cultural factors, which affect the level of exposure to a hazard and individual susceptibilities. It is this interaction between the hazards to which a community is exposed and the vulnerabilities and capacities of that community that will determine the ultimate impact of the disaster. "Risk" is the measurement of this interaction.

Key risk factors that can increase human vulnerability and can therefore increase the risk disaster-related morbidity and mortality include (Thomalla, F., 2006):

- Low income;
- Low socioeconomic status;
- Lack of home ownership;
- Single-parent family;
- Age: older than 65 years;
- Age: younger than 5 years;
- Female sex;
- Chronic illness;
- Disability;

- Nutritional status
- Immunisation status; and
- Social isolation or exclusion.

A major reason for vulnerability is the proximity of people to hazards. Recent demographic trends, coupled with unsustainable development and urbanisation, place more people at risk. By 2040, the global population is expected to have increased by 2 billion: from 6.9 billion in 2010, to 7.7 billion in 2020, and to 8.9 billion in 2040. The vast majority (95%) of this increase will result from population growth in less developed countries, which will increase from 5.7 billion in 2010 to 6.4 billion in 2020, and to 7.6 billion in 2040 (Government Office for Science, 2012). In the past 30 years, the proportion of people living in flood-prone river basins has increased by 114%, while the proportion of people living on cyclone-exposed coastlines has grown by 192%. Over half of the world's large cities (2-15 million people) are highly vulnerable to seismic activity (UNISDR, 2011b). Development practice must be risk sensitive and take into account emergency and disaster risk management, including the implications for human health.

The burden of disasters falls disproportionately on vulnerable populations, namely, the poor, ethnic minorities, old people and people with disabilities. Worldwide, the loss of life from climate-related disasters is far higher among the less developed nations than it is in developed nations. Within each nation, including developed nations, poor people are the most affected (IPCC, 2007). Evidence suggests democracies and nations with less income inequality suffer fewer deaths from emergencies and disasters, indicating that political and governance change may be an important indicator of future risk (Kahn M. 2005). Reducing poverty is an essential component of reducing vulnerability to hazards. High-risk populations must be prioritised in targeted efforts to mitigate human vulnerability to hazards.

In many types of disasters and conflicts, women and girls face risks related to sexual assault and other forms of violence while health status and cultural traditions may hamper their ability to protect themselves (e.g. pregnancy, type of clothing, care-taker roles etc.) or to access health services. Thus, reporting on the health indicators for DRM needs to be differentiated to take account of variance in vulnerabilities, resilience and

response capacities related to not only gender but also socioeconomic factors, such as age, disability, mobility, social isolation, culture and ethnicity.

Three specific areas of vulnerability to disaster impacts from a health perspective are summarised below.

Non-communicable diseases

NCDs are the leading cause of death globally, with roughly three-quarters of all NCD-related deaths occurring to aged populations (over 60) (WHO, 2011a). Cardiovascular disease, cancer, respiratory diseases and diabetes account for 80% of all NCD-related deaths. While NCDs affect all age groups and all regions, NCDs do not affect all populations equally.

The main problem from disasters for people with NCDs is that disasters can result in an acute cessation and disruption of therapy, due to a lack of access to drugs and/or health services, e.g. renal dialysis. Such an acute cessation can lead to life-threatening complications of the diseases, e.g. acute-on-chronic renal failure, diabetic crisis, stroke, myocardial infarct, and acute respiratory distress.

As the global population of individuals over 60 years continues to grow, it is essential to take a comprehensive approach to NCD prevention, diagnosis and management (WHO, 2008a). Early and ongoing cost-effective interventions aimed at the prevention and/or mitigation of the effects of NCDs should occur throughout the life course. Health professionals should be trained in identifying and diagnosing NCDs in their earliest stages (WHO, 2011a). Ensuring those that have NCDs are maintained on a course of therapy that effectively controls the disease will make them more resilient when the disaster occurs. Appropriate management and follow-up care is essential to minimise mortality and morbidity from NCDs and to decreasing economic burdens on individuals and family units, especially when social and health systems and services can be disrupted following disasters.

Old age

In the context of disasters and emergencies, careful consideration should be given to the ageing population. Recent data suggest increased vulnerability for ageing populations, especially those in LICs and MICs. Physical weakness, comorbidities and isolation can all make the ageing population increasingly vulnerable before,

during and after an emergency or disaster (The Sphere Project, 2011). The ageing population is also often among the poorest in developing countries, and neglected in disaster preparedness and response. Moreover, communication messages are often inappropriate or not targeted at the ageing population, increasing gaps in care, treatment and management.

Disability

It is estimated 15% of the global population lives with some form of disability (WHO, 2011b). People with disabilities are disproportionately affected by and experience particularly high rates of mortality and morbidity in emergencies and disasters (ACFID, 2005). People with disabilities are more vulnerable than people without disabilities owing to poorer health, lower education achievements, less economic participation and higher rates of unemployment, which leads to worse health and social outcomes (WHO, 2011b). Women with disabilities and older people in particular experience more discrimination and exclusion than other people with disabilities (Handicap International, 2008). Emergencies increase the vulnerability of people with disabilities, as they may be less able to escape from hazards and lose devices including hearing aids and medications. People with visual, hearing and intellectual impairments and severe mental health conditions may be unprepared for events that lead to emergencies. When a community is forced to evacuate, people with disabilities may be left behind (ACFID, 2005; Atlas Alliance, 2011, WHO, 2005a), and the capacity of care-givers and care settings may be reduced during and after an emergency.

In an emergency, people with difficulties functioning may also have greater difficulty accessing basic needs including food, water, shelter, latrines and health care services (Atlas Alliance, 2011; WHO, 2005a). Furthermore, emergencies also create a new generation of people with disabilities owing to injuries, poor basic surgical and medical care, emergency-induced mental health and psychological problems, abandonment and breakdown in support structures and preventive health care (Oosters 2005; WHO, 2005a).

People with disabilities are often not identified in communities in assessments before, during and after emergencies. Lack of disaggregated data and of systematic identification of people with disabilities results in lack of access to vulnerability

reduction and preparedness measures, and failure to receive a range of services, including food, water, shelter and clothing – before, during and after emergencies (ACFID, 2005; Handicap International, 2005; Harris and Enfield 2003; WHO, 2005a; 2005b). Disability is a multi-sectoral issue and therefore, within the context of emergency risk management, health professionals need to coordinate with a range of sectors in order to increase the effectiveness of disability-related actions, and influence the overall health outcomes of people with disabilities.

5.4 Health in a multi-sectoral approach to disaster risk management

The dialogues on the post-2015 development agenda, including the Rio+20 Conference, have highlighted the need for a more integrated approach to DRM. Health system resilience and capacity for emergency and disaster risk management are essential to effective multi-sectoral disaster management – regardless of whether the disaster owes to a natural hazard, an environmental incident, a disease threat, armed conflict or some combination of factors. In terms of prevention and preparedness, the HFA places emphasis on more comprehensive risk assessment and more resilient and prepared communities. Emergency response and recovery requires coordination and early action with particular attention to environmental health (including water and sanitation), food aid/nutrition, shelter and health care services for trauma, communicable diseases, non-communicable diseases; mental health; maternal and neonatal health; sexual and reproductive health; and basic health.

In order for the health of the population to be protected during and after a disaster, wider determinants of health such as water, sanitation, nutrition and security also need to be adequately addressed through multi-sectoral collaboration and action. Essential infrastructure such as communications, logistics, energy and water supplies and emergency services need to be protected through the work of multi-sectoral partnerships to ensure the continuity of health services.

Progress has been made at global, regional, national and community levels, but the capacity of countries in the health sector for emergency and disaster risk management remains extremely variable⁸.

A global assessment of national health sector emergency preparedness and response was conducted by WHO in 2007 and gathered information from 62 participating countries (WHO, 2008b). The majority of countries in each region had experienced an emergency or disaster in the past five years. This demonstrates the vital importance of effective national health emergency preparedness and response programmes in all countries. Most countries (85%) reported the existence of a national emergency preparedness and response policy. Although two-thirds of countries reported the presence of national, multidisciplinary health emergency preparedness and response plans, only half of those countries reported that such plans were developed by a formal committee, were based on vulnerability assessment or were linked to the multi-sectoral plan. Up to 50% of countries have no budget allocation to sustain the health emergency preparedness and response planning function.

Emergency preparedness and response programmes do not include a training and capacity-building component in more than one-third of countries. In countries with existing emergency preparedness and response training courses, only half reported that such training is based on training needs analyses and competency standards. Just under two-thirds (63%) reported the presence of guidelines in health emergency preparedness and response. Less than half (44%) reported using audits to assess the effectiveness of emergency preparedness and response programmes. Nevertheless, a number of countries at high risk of hazards, such as Bangladesh, Cuba, Indonesia, Mozambique, the Philippines and Turkey, have strengthened their capacities for health emergency and DRM; in some countries, the health sector has led initiatives developing multi-sectoral approaches to DRM⁹.

Health care systems provide core capacities for DRM for health. Some countries affected by disasters have limited basic health services and infrastructure, which in itself hugely compounds the challenges of disaster response. Countries with well-developed systems are often much more resilient and better prepared for disasters.

Primary health care (PHC) focuses on basic services to improve health status (e.g. vaccinations, nutrition, maternal care, treatment of simple ailments), which in turn builds community resilience and provides the foundation for responding to emergencies (WHO, 2011c). Policies and strategies focusing on PHC can contribute to decreasing vulnerability and preparing households, communities and health systems for disasters. Following a disaster, focus is often given to acute care needs and specialist interventions; while important, it is usually simple ailments, and chronic and pre-existing conditions that prove the largest burden of disease. Moreover, when not addressed properly, pre-existing and chronic conditions may have significant and multiplicative economic and societal consequences.

Community-based actions are at the front line of protecting health in emergencies because:

- Local knowledge of local risks is used to address the actual needs of the community.
- Local actions prevent risks at the source, by avoiding exposure to local hazards.
- A prepared, active and well-organised community can reduce risks and the impact of emergencies.
- Many lives can be saved in the first hours after an emergency through community response before external help arrives (WHO et al., 2011).

Hospitals and health infrastructure: health systems are composed of public, private and non-governmental facilities that work together to serve the community; these include hospitals, PHC centres, laboratories, pharmacies and blood banks. Safe hospital programmes ensure health facilities are safely built to withstand hazards, remaining operational in emergencies (WHO, 2011d).

Developing adaptable and resilient health care systems

- Surge capacity: health care systems need to prepare to cope with large numbers of patients. This may require mobilising staff around the country to aid affected areas.
- Flexibility in health care systems: flexibility to deliver different functions is an essential component of health care delivery. This may mean temporarily reducing some services (e.g. elective surgery) in order to expand others (e.g. outpatient services, emergency surgery).

Business continuity planning: plans to maintain the continuity of health sector operations include identifying priority services, mechanisms for response coordination and communicating with staff and partner organisations¹⁰.

The International Health Regulations

The 194 Member States of WHO have agreed and bound themselves to a set of regulations with the purposes of preventing and controlling the international spread of adverse public health events. While the IHR are not focussed on disasters there is a very considerable congruence and synergy between the IHR commitments of both countries and WHO and a number of aspects of disaster risk management. One of the key obligations of States Parties to the IHR is to develop and maintain national core capacities for the detection, investigation, response and reporting of public health events within their territories. Analysis of these capacities has resulted in the identification of main areas of work;

- National legislation, policy and financing
- Coordination and NFP (National IHR Focal Point) Communications
- Surveillance
- Response
- Preparedness
- Risk communication
- Human resources
- Laboratory

In line with the scope of the Regulations these capacities are to cover a range of public health hazards including; infectious (biological); chemical and radiological. Additional capacities are also required in certain designated point of entry (international ports, airports and ground crossings). The existence of these capacities not only plays an important role in preventing and controlling the international spread of disease but will also contribute to the preparedness for and response to natural and other disasters occurring in the country. (WHO, 2012)

5.5 Health indicators for measuring health consequences and progress on emergency and disaster risk management for health

Resilient health programmes and services, infrastructure and dedicated health sector capacities for health emergency and disaster risk management can enhance the effectiveness of multi-sectoral DRM while simultaneously supporting wider sustainability objectives (e.g. renewable energy solutions are used to strengthen resilience of health facilities and maintain their operational capacity in emergencies). In the context of DRM, public health programmes (such as good coverage of vaccination, nutrition, reproductive health, basic PHC, and chronic diseases management services) build capacities and resilience of individuals and communities to risks, to reduce the consequences and fully recover. Identifying health-relevant 'indicators' of effective DRM in the context of sustainable development can help provide a more robust approach to disaster management overall.

These indicators should explicitly recognise health outcomes as essential measures of the effects of hazards on communities and the effectiveness of disaster management measures in health and other sectors collectively. Indicators should highlight the role of health systems in contributing to overall health resilience and also capacities and performance focused on health emergency and DRM.

In summary, the health dimensions of DRM that might need to be considered cover the following issues:

- Hazard effects on human health (e.g. deaths, injuries, illness, disability, malnutrition);
- Improving the availability and accessibility of data of health outcomes which are collected and reported by countries;
- Development of the national capacities required under for the IHR (2005) (WHO, 2008);¹¹

- Development and implementation of national all-hazards health emergency and disaster risk management programmes, capacity assessments and risk assessments;
- Inclusion of health in multi-sectoral DRM policies, platforms, risk assessments and programmes;
- Inclusion of health impact assessments in land use and other development planning at all levels;
- Disease surveillance systems with early warning functions;
- All-hazards emergency response and recovery planning, coordination mechanisms and exercises;
- Health resources available for DRM, including health facilities, hospital beds and the health workforce;
- Health workforce development for emergency and disaster risk management;
- Assessment of safer, prepared and resilient health care facilities, as well as implementation of measures to improve levels of safety, security and preparedness;
- Access to and usage of sustainable energy and water supplies by health facilities;
- Health services coverage, including vaccination coverage, births assisted by skilled attendants, water supply and core public health programmes to specific communities such as for malaria, tuberculosis and HIV; and
- Community resilience.

Some examples of possible indicators to address these health-related dimensions of DRM were identified at the WHO Expert Consultation in preparation for the Rio+ 20 Summit in May 2012. They have been supplemented by other indicators drawn from the IHR (2005) and the Global Health Cluster and are shown in Annex D.

WHO requires further consultations with Member States and partners to determine the suitability and level of targets for the health aspects of DRM. Some general descriptions of these possible target areas are as follows:

- Percentage reductions in health impacts, including deaths, injury, illness and disability owing to hazards, in specific contexts, and noting the substantial challenges of measurement in many instances;
- Proportion of countries meeting and sustaining IHR (2005) core capacities;
- Percentage of countries with a health emergency and disaster risk management programme (including a capacity development strategy, a coordination body and regular budget);
- Percentage of countries conducting an all-hazards health emergency and disaster risk management capacity assessment at least every two years;
- Percentage of countries that have conducted an assessment of the safety and preparedness of essential health facilities; and
- Percentage of new hospitals and health facilities built to withstand local hazards.

5.6 Considerations for indicator selection

A wide range of indicators to address the health dimensions of DRM has been suggested. These indicators include health outcomes and measures of the capacities and performance of health systems generally and for managing the risks from specific hazards. In considering which indicators have most value and can be most practically collected and reported, preference should be given, as far as possible, to data that are already collected and reported on a regular basis by countries, WHO and bodies, including the World Bank. The WHO Global Health Observatory (<http://app.who.int/gho/data/view.main.160>) provides open access to a wide range of health datasets on mortality, burden of diseases, the MDGs and others, assessing the status of health and performance of health measures in a variety of contexts.

WHO collects data and provides reports on national health emergency and disaster risk management programmes, implementation of safe hospital programmes (UNISDR, 2011a) and implementation of the IHR (2005) (WHO, 2012). In terms of availability of health services during disasters, data sources are ministries of health, national health emergency management coordination committees, the Inter-Agency Standing Committee health clusters in humanitarian emergencies and global health programmes

States Parties are encouraged to monitor their progress in establishing the national capacities required under the IHR using a self-assessed monitoring tool. Data provided by countries using the tool is summarised and reported to the World Health Assembly annually. The first target for ensuring the capacities passed in June 2007 with some countries indicating that they have the capacities in place and many others requesting an extension to the target deadline. The monitoring framework is being reviewed and adapted to meet the different country status with respect to the established capacities.

The strength of health system monitoring depends on the development of baseline data that enable detection and measurement of the impact of hazards on the health of populations at risk. However, the data that are available may change before, during and after an event. Consequently, indicator selection and data collection planning should be adaptable and focused on the specific purposes of measurement.

Candidate health-related indicators that have the most potential for inclusion in the post-2015 development agenda for DRM are described below.

Hazard impacts on human health and wellbeing

- **Country disaster data on health outcomes at a national level are reported on an annual basis**

Human health indicators are essential for measuring the consequences of hazards which affect communities and for the measurement of performance of programmes by all sectors. Concerted efforts are required to ensure such data are collected and reported by national authorities. The disaster data should include the number of events, deaths, injuries, diseases, missing persons and disabilities by hazard on an annual basis (with data disaggregated by sex and age). Guidance should be provided by international agencies to ensure the data are collected and presented in a standardised way across countries. Although some countries have good systems of collection, collation and reporting of these data, most do not and substantial investment will be needed to obtain reliable global data.

- **Crude mortality rate (baseline and in emergency situations)**
- **Under-five mortality rate (baseline and in emergency situations)**

A primary goal of emergency and disaster risk management is to prevent and reduce mortality and morbidity through prevention, mitigation and preparedness measures, as well as in response and recovery. In the response to natural disasters and conflicts, mortality is the prime indicator by which to assess the impact of an emergency, the magnitude of needs and the adequacy of the emergency response (Checchi and Roberts, 2005). Crude and under-five mortality rates are used internationally to benchmark the severity of emergencies (Salama et al., 2004) and evaluate the effectiveness of assistance, usually in refugee camp settings or from intermittent surveys. Yearly national data on crude and under-five mortality may be available at global level.¹² Moreover, retrospective household surveys are occasionally used to estimate and describe patterns of mortality at local level where the emergency has occurred. However, such surveys can only occur infrequently and cannot supply the relief system's information demand in a sufficiently timely and flexible fashion. They do not provide a satisfying tracking solution.

- **Number of cases or incidence rates for selected diseases relevant to the local context**
- **Case fatality ratio for most common diseases**

Those indicators are outcome measures of the effect of an emergency, including epidemics. They are available in most countries through routine epidemiological surveillance systems or EWSS. Weekly, monthly and annual trends can be tracked and comparisons with previous years can be made.

Core capacities under the International Health Regulations (2005)

- **Countries meet and sustain IHR (2005) core capacities identified through the global monitoring framework**

Compliance with the IHRs is monitored yearly since 2008 and reported back to the World Health Assembly through monitoring by States Parties of the development of their core capacities at the national, intermediate and local community/primary response under the International Health Regulations (2005).¹³ The IHR national capacities monitoring tool includes 28 indicators covering all the capacity areas. The indicators relating to coordination, surveillance, response and preparedness are listed below:

Coordination and NFP communications

- A mechanism is established for the coordination of relevant sectors in the implementation of IHR (2005).
- IHR National Focal Point functions and operations are in place as defined by the IHR (2005).

Surveillance

- Indicator based, surveillance includes an early warning function for the early detection of a public health event.
- Event based surveillance is established and functioning.

Response

- Public health emergency response mechanisms are established.
- Case management procedures are implemented for IHR relevant hazards.
- Infection prevention and control (IPC) is established at national and hospital levels.
- A programme for disinfection, decontamination and vector control is established.

Preparedness

- A Multi-hazard National Public Health Emergency Preparedness and Response Plan is developed.
- Priority public health risks and resources are mapped.

Health system capacities in multi-sectoral disaster risk management

- A national programme for all-hazards health emergency and disaster risk management with a capacity development strategy, a coordination body and regular budget is established
- An all-hazards health emergency and disaster risk management capacity assessment is conducted on a regular basis (every two years);
- Health emergency risk assessments are conducted on a regular basis (every two years);
- National-level exercises to test health emergency response plans are conducted on a regular basis; and

- **A national emergency response plan is developed as a component of a multi-sectoral emergency response plan and reviewed and updated on a regular basis.**

As noted previously, WHO conducted a global assessment of the status of national health sectors emergency preparedness and response, to which some 62 countries responded. A report was released with analysis reported by region (WHO, 2008b). Further monitoring will be conducted from 2014 onwards to support World Health Assembly Resolution 64.10 adopted in 2011: 'Strengthening national health emergency and disaster management capacities and the resilience of health systems'.

- Average population per health unit (usually PHC facilities offering general health services) by administrative unit or country (benchmark for this indicator is <10 000 people per unit)

Availability of health resources is regularly monitored and national data are available at the Global Health Observatory.¹⁴ Moreover, these data can be inferred at local level from the mapping of health facilities and population figures.

- **Coverage of measles vaccination (12-23 months)**

Yearly data on measles vaccination coverage are available at national level. These data are also widely available at local level through calculation of administrative coverage. Occasionally, measles vaccination coverage surveys are also conducted, mostly coupled with nutrition surveys.

Safer, prepared and resilient health care facilities

- Proportion of existing health care facilities in hazard-prone areas that have been assessed for levels of safety, security and preparedness
- Proportion of existing health care facilities that have increased their level of safety through structural and structural measures and/or preparedness
- Proportion of new health care facilities built and certified in compliance with national building codes and standards to withstand hazards

Table 8:
Review of possible indicators from the literature

Description	Possible indicator
Reporting of disaster data on health impacts at a national level	<ul style="list-style-type: none"> Disaster data on the number of events, deaths, injuries, diseases, missing persons, and disabilities are reported by hazard on an annual basis at national level (data disaggregated by sex and age).
Hazard impacts on human health and wellbeing	<ul style="list-style-type: none"> Crude mortality rate (baseline and in emergency situations) Under 5 mortality rate (baseline and in emergency situations)
International health regulations	<ul style="list-style-type: none"> Number of countries meeting and sustaining International Health Regulations (2005)
National health emergency and disaster risk management programmes	<ul style="list-style-type: none"> A national programme for all-hazards health emergency and disaster risk management with capacity development strategy, a coordination body and regular budget is established A national capacity assessment to inform capacity development strategies and action plans are conducted on a regular basis
Assessment of emergency and disaster-related risks	<ul style="list-style-type: none"> Health emergency risk assessments are conducted on a regular basis
All hazards emergency response planning	<ul style="list-style-type: none"> National health emergency response plan is developed as a component of multi-sectoral response plan National level exercises to test health emergency response plans are conducted on a regular basis
Health resources available for disaster risk management	<ul style="list-style-type: none"> Average population per health unit (usually primary health care facilities offering general health services) by administrative unit or country (benchmark for this indicator is <10 000 people per unit)
Safer, prepared and resilient health-care facilities	<ul style="list-style-type: none"> Proportion of existing health care facilities in hazard-prone areas that have been assessed for levels of safety, security and preparedness Proportion of existing health-care facilities which have increased their level of safety through structural and structural measures and/or preparedness Proportion of new health-care facilities built in compliance with building codes and standards to withstand hazards
Vaccination coverage	<ul style="list-style-type: none"> Coverage of measles vaccination (12 months – 23 months)
Disease surveillance	<ul style="list-style-type: none"> Indicator-based routine surveillance includes an early warning function for the detection of a public health event (i.e. a threat to public health) (IHR p33) Event based system surveillance is established (IHR p 33) Number of cases or incidence rates for selected diseases relevant to the local context Case fatality ratio for most common diseases

National hazard mapping and inventory of health facilities can be combined to identify which health facilities are in hazard-prone areas. WHO has developed a Hospital Safety Index and other tools to assess the safety and preparedness of hospitals and other health facilities which will enable countries to establish a schedule for retrofitting and improving the preparedness of the most essential and vulnerable facilities.

WHO collects data and provides reports to the Global Platform on Disaster Risk Reduction on the implementation of national safer hospital programmes. Data on safe hospitals programmes will also be collected by WHO for a global report on country capacities for health emergency and disaster risk management.

5.7 Conclusion

This chapter on the health imperative for DRM reports the key issues and indicators in the context of the global consultations on DRR for the post-2015 development agenda. Many different hazards, such as natural, technological, epidemic disease and conflict hazards, have the potential to cause substantial consequences for people's health and well-being, and the functioning of health systems and societies at large. Improved health outcomes are the result of multi-sectoral action by health systems and other sectors working together with all communities at risk of emergencies and disasters. This collaboration helps reduce health outcomes, particularly deaths, injuries, illnesses and disabilities. Building health system resilience and health sector capacities for emergency and disaster risk management, particularly at community level, is essential to effective multi-sectoral DRM, which also supports sustainable development.

Most of the proposed potential indicators are drawn from a variety of extant health sector guidance and recent consultations on indicators for the post-2015 development agenda and reflect the need to protect human health as a key imperative for action to manage disaster-related risks and reduce the impacts of all hazards on communities. They are included here to facilitate an appreciation of the range of indicators that inform monitoring and assessment of different dimensions of health. They are not a substitute for careful

identification and evaluation of desired health outcomes by countries. They must be continually reassessed as part of the process that defines health programming objectives related to health emergency and disaster risk management.

The essential discussion must be on identification and prioritisation of health objectives by countries that may or may not have directly relevant, readily obtainable and reliable indicators. The important contexts are the national and local contexts. At the country level, countries will determine the priorities for action in health emergency and disaster risk management. Consequently, in addition to direct consequences of near-term mortality, morbidity and disability from an event, the most relevant indicators are those the country has selected from its health objectives and targets. Also, in terms of emergency and disaster risk management, countries must assess the effect that health consequences have on the objectives of other sectors, such as through changes in available work force, school absenteeism, law, order and security and provision of critical infrastructure and services. Development policies need to adopt strategies for land use that do not place people's lives at risks while codes and standards are required to ensure that buildings and infrastructure, including those that support health services, are resilient to disasters. These are challenging requirements and call for cooperative country-level engagement and decision processes.

In order to improve the utility of indicators, there is a continuing need to accurately track outcomes and trends. Data on disaster impacts and outcomes need to be collected using robust systematic methodologies. In particular, global health statistics for mortality, injuries, illnesses and disability resulting from the impact of hazards need strengthening.¹⁵ Furthermore, analysis of health capacities, vulnerabilities and needs for capacity building should be strengthened in risk assessments (including the UNISDR Global Assessment Report) and economic analyses (UNISDR, 2011a). A global research strategy for disaster health would help address the deficiencies in data and evidence on disaster risks and interventions.

At community level, social factors are essential determinants of vulnerabilities and resilience to disasters. Further efforts are required to identify indicators that enable the measurement of

community resilience. These indicators should take into account that community members are connected to one another and work together so they are able to:

- Function and sustain critical systems, even under stress;
- Adapt to changes in the physical, social, or economic environment (including changes to hazards, vulnerabilities and capacities);
- Be self-reliant if external resources are limited or cut off; and
- Learn from experience to improve over time (Arbon, 2012).

A focus on DRM and health is needed by all thematic areas addressed in the post-2015 development agenda to show the linkages between health, disaster management and other aspects of sustainable development. A broader exploration of the linkages between disasters and health is required for the health theme for post-2015 development agenda, building on the references in the draft report of the Global Thematic Consultation on Health. At the same time, the inclusion of health targets and indicators in the disaster theme will ensure the global community and, particularly, national governments focus their DRM efforts on reducing the widespread risks and the health consequences of emergencies and disasters on communities worldwide.

Chapter 5 Endnotes

- 1 This chapter is based on a report on the findings of a World Health Organization (WHO) Expert Consultation on Health Indicators for Rio+20 Discussions and Decisions (17-18 May 2012) which was co-sponsored and supported by the National Institute of Environmental Health Sciences, US (http://www.who.int/entity/hia/green_economy/indicators_disasters2.pdf).
- 2 WHO contributors: Jonathan Abrahams, Sharon Akoth, Richard Brennan, David Brett-Major, Rudi Coninx, Max Hardiman, Xavier de Radigues, Claudine Prudhon and Liviu Vedrasco. WHO retains the copyright to this chapter and has granted ODI permission for its reproduction. A very special thank you to Professor Virginia Murray, Dr Angie Bone and Dr Aileen Kitching, Public Health England for their valuable input into and review of this chapter.
- 3 www.emdat.be
- 5 Uppsala Conflict Data Program. Uppsala Conflict Data Program. Available at: <http://www.pcr.uu.se/research/ucdp/>
- 6 See http://www.unicef.org/wash/index_statistics.html
- 7 See <http://www.who.int/features/factfiles/sanitation/facts/en/index2.html>
- 8 WHO/United Kingdom Health Protection Agency (2011). 'Disaster Risk Management for Health Fact Sheets: Overview'.
- 9 Ibid.
- 10 Ibid.
- 11 While IHR implementation is not a comprehensive indicator for disasters, implementation of IHR and the development of associated core capacities are a strong health sector contribution to disaster management and sustainable development.
- 12 See <http://data.worldbank.org/indicator/SH.DYN.MORT/countries>
- 13 See <http://www.who.int/ihr/checklist/en/>
- 14 See <http://apps.who.int/gho/data/node.main.506>
- 15 WHO World Health Statistics and WHO Global Burden of Disease reporting data.