

## PART IV

# Working Together to Improve Global Health



# Natural Disasters and Complex Humanitarian Emergencies

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## LEARNING OBJECTIVES

By the end of this chapter the reader will be able to:

- Describe several types of disasters that impact human health
  - Discuss the health effects of natural disasters and complex humanitarian emergencies
  - Review how those health impacts vary by age, sex, location, and type of disaster
  - Describe key measures that can be taken to mitigate the health impacts of natural disasters and complex humanitarian emergencies
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## VIGNETTES

Javad lived in the Pakistani province of Kashmir when the earthquake hit. All the buildings in his village were destroyed. Hundreds of people in the village were killed, mostly a result of being buried in the rubble. Many other people were badly injured from rubble falling on them. Their injuries were overwhelmingly orthopedic in nature. As the earthquake destroyed the village, it also destroyed wells, a health center, and roads leading to and from the village. Javad feared that many of those injured would soon die.

Samuel was living in the Eastern part of Sierra Leone when the war started. He did all that he could to protect his family, but it was not enough. In the first year of the conflict, as he and his family were getting ready to flee, a band of armed men stormed the village. As Samuel had heard they would do, they used machetes to kill or take limbs off of many village people. They also raped a large number of women. In addition, they kidnapped some of the children, in hopes of making them into sex slaves or soldiers.

As the civil war spread in Rwanda, Sarah and her family fled across the border to what was fast becoming a large refugee camp in Zaire, later called the Democratic Republic of Congo. Although the camp workers did what they could to help the refugees, the circumstances at the camp were not good. There was little shelter, water, or food. In addition, a cholera epidemic went through the camp not long after Sarah's arrival there. It hit the camp especially hard and led to a large number of deaths.

A number of international organizations rushed staff to refugee camps, just across the border from intense fighting. Some of the agencies involved had long experience doing such work and had clear guidelines for their staff concerning relief efforts. Other agencies, however, were not so experienced in this work. They brought to the camps medicine that was not appropriate for the health conditions they found and food to which the local people were completely unaccustomed. Although it would have been most efficient if all of the aid agencies worked together, they did not. Many of them had their own way of working and wanted the local government to do it their way.

## THE IMPORTANCE OF NATURAL DISASTERS AND COMPLEX EMERGENCIES TO GLOBAL HEALTH

Complex emergencies and natural disasters have a significant impact on global health. They can lead to increased death, illness, and disability and the economic costs of their health impacts can also be very large. Measures can be taken in cost-effective ways, however, to reduce the costs of disasters and conflicts and to address the major health problems that relate to them. These measures would be most effective if

those involved in disaster relief would work together according to agreed standards that focused on the most important priorities for action.

This chapter will review the relationships between natural disasters and health and complex humanitarian emergencies (CHEs) and health. The chapter will begin by introducing you to some key concepts and definitions that relate to these topics. The chapter will then review the incidence of natural disasters and CHEs. Following that, the chapter will review their main health impacts. Lastly, the chapter will examine measures that can be taken to prevent and address some of their effects on health in cost-effective ways.

## KEY TERMS

Understanding the health impacts of natural disasters and complex humanitarian emergencies requires an intro-

duction to several terms and concepts that are examined briefly here.

A disaster is “any occurrence that causes damage, ecological destruction, loss of human lives, or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community area.”<sup>1</sup> Another way to think of this would be as “an occurrence, either natural or man made, that causes human suffering and creates human needs that victims cannot alleviate without assistance.”<sup>2</sup> Some disasters are natural. These include, for example, the results of floods, volcanoes, and earthquakes. Some, however, are man-made, such as the cloud of poisonous gas that rained over the town of Bhopal, India in 1984, as a result of an industrial accident. Some disasters are rapid-onset, such as an earthquake, while others are slow-onset, such as a drought or famine. Although the long-term effects of these natural and man-made disasters can be substantial, they are often characterized by an initial event and then its aftereffects. Some examples of recent natural disasters that caused a significant loss of life are listed in Table 14-1.

In response to the large number of civil conflicts that have taken place, the term “complex emergency” or “complex humanitarian emergency” has been established. A complex emergency can be defined as a “complex, multi-party, intra-state conflict resulting in a humanitarian disaster which might constitute multi-dimensional risks or threats to regional and international security. Frequently within such conflicts, state institutions collapse, law and order break down, banditry and chaos prevail, and portions of the civilian population migrate.”<sup>3</sup> CHEs have also been described as: “situations affecting large civilian populations which usually involve a combination of factors, including war or civil strife, food shortages, and population displacement, resulting in significant excess mortality.”<sup>4</sup>

Such emergencies include war and civil conflict. They usually affect large numbers of people and often include severe impacts on the availability of food, water, and shelter. Linked to these phenomena and the displacement of people that often go with them, complex humanitarian emergencies usually result in considerable excess mortality, compared to what would be the case without such an emergency.<sup>5</sup> Some of the better known complex humanitarian emergencies are listed in Table 14-2.

Complex emergencies create “refugees.” “Under international law, a refugee is a person who is outside his/her country of nationality or habitual residence; has a well-founded fear of persecution because of his/her race, religion, nationality, membership in a particular social group or political

**TABLE 14-1** Selected Natural Disasters, 2004 and 2005

### 2004

March—Typhoon Gafilo, with 160 mile per hour winds, kills 295 people in Madagascar

May—Flooding and mudslides from heavy rains in the Dominican Republic and Haiti kill 3,000 people

June—Monsoon floods in Bangladesh, India, and Nepal leave more than 5 million people homeless and kill 1,800

December—Tsunamis after a 9.0 magnitude earthquake kill more than 225,000 people in India, Indonesia, Sri Lanka, and Thailand

### 2005

February—Flooding from snow and rain killed 460 people in Pakistan with thousands of people missing.

March—An 8.7 magnitude earthquake in Indonesia killed more than 1,300 people

July—The heaviest rains in Indian history killed more than 1,000 people

July—Famine stemming from drought and locusts put more than 3.6 million people at risk of starvation in Niger

August—Hurricane Katrina kills 1,800 people in the United States

October—Rains from Hurricane Stan killed more than 2,000 people in Central America and caused many people to evacuate their homes

Source: Data from Infoplease, World Disasters—2004 and 2005 Disasters. Available at: <http://www.infoplease.com/ipa/A0001437.html>. Accessed February 25, 2007.

opinion; and is unable or unwilling to avail himself/herself of the protection of that country, or to return there, for fear of persecution. They are a subgroup of the broader category of displaced persons.<sup>6</sup> It is important to note that there are a number of international conventions that define refugees and that accord them rights according to international law, as well. Table 14-3 notes a number of countries with significant refugee populations and the countries they fled. A United Nations Agency, the United Nations High Commissioner for Refugees (UNHCR), is responsible for protecting the rights of refugees.

Some of the people who flee or are forced to migrate during a disaster or complex humanitarian emergency leave their homes but stay in the country in which they were liv-

ing. These are called internally displaced people (IDP). These are more formally defined as “someone who has been forced to leave their home for reasons such as religious or political persecution or war, but has not crossed an international border.”<sup>7</sup> The term is a subset of the more general “displaced person.” There is no legal definition of internally displaced person, as there is for refugee, but the thumbnail rule is that “if the person in question would be eligible for refugee status if he or she crossed an international border then the IDP label is applicable.”<sup>7</sup> Table 14-4 shows selected examples of countries with large numbers of internally displaced persons. It is important to note that the legal status of IDPs is not as well defined as that for refugees.<sup>8</sup> It is also important to understand that, unlike the case for refugees, no agency or organization is responsible for IDPs. Rather, their own government is responsible for them, but that government is often part of the problem that these people are fleeing.

One of the indicators of significance of the health impact of a complex humanitarian emergency is the “crude mortality rate.” This is the proportion of people who die from a population at risk, over a specified period of time.<sup>9</sup> For addressing CHEs, the crude mortality rate is generally expressed per 10,000 population, per day. The extent to which diseases might spread in a refugee camp depend partly on the “attack rate” of a disease, which is “the proportion of an exposed

**TABLE 14-2** Selected Complex Humanitarian Emergencies of Importance

Angola—A civil war lasted 27 years and ended in 2002.
Armenia/Azerbaijan—Conflict between the two countries, has created almost 250,000 refugees and 600,000 IDPs.
Bosnia and Herzegovina—Between 1992 and 1994, war with various parts of the former Yugoslavia, led to more than 100,000 deaths and 1.8 million people displaced.
Burma—Government offensives against a number of ethnic groups have gone on for more than 20 years and produced between 500,000 and 1,000,000 IDPs.
Democratic Republic of the Congo—Fighting since the mid-1990’s between government forces and rebels, have led to more than 2 million displaced people.
Liberia—Civil war from 1990-2004 led to almost 500,000 IDPs and more than 125,000 refugees in Guinea alone.
Nepal—Conflict between the government forces and maolist rebels from 1996 to 2006 has led to 100,000 to 200,000 IDPs.
Rwanda—More than 800,000 people were killed in the 1994 genocide, which also produced more than 2 million refugees who fled to Burundi, what is now the Democratic Republic of Congo, Tanzania, and Uganda
Sudan—Internal conflicts since the 1980’s—including a war with groups in the South and genocide against people in the Darfur region have displaced 5-6 million people.
Uganda—Rebellion by the Lord’s Resistance Army in the North for almost 20 years has led to between 1 and 2 million displaced people.

Source: Data from: CIA—The World Fact Book. Available at: <http://www.cia.gov/cia/publications/factbook/>. Accessed February 25, 2007.

**TABLE 14-3** Internally Displaced People—Selected Countries of Importance, 2006

Country	Number of IDPs
Sudan	5,300,000–6,200,000
Colombia	2,900,000–3,400,000
Congo, Democratic Republic of	2,330,000
India	600,000
Burma	550,000–1,000,000
Azerbaijan	528,000
Ivory Coast	500,000–800,000
Indonesia	500,000
Liberia	464,000
Algeria	400,000–600,000
Somalia	400,000
Russia	339,000
Bosnia and Herzegovina	309,000

Source: Data from: CIA, The World Fact Book. Field Listing Refugees and internally displaced people. <http://www.cia.gov/cia/publications/factbook/fields/2194.html>. Accessed October 8, 2006.

**TABLE 14-4** Selected Refugee Populations and Source of Refugees, 2006

Country	Number of Refugees	Source Countries
Jordan	1,828,000	Palestinian Refugees
Iran	1,040,000	Afghanistan, Iraq
Gaza Strip	990,000	Palestinian Refugees
Pakistan	960,000	Afghanistan
West Bank	700,000	Palestinian Refugees
Tanzania	597,000	Burundi, Democratic Republic of the Congo
Syria	446,000	Palestinian Refugees, Iraq
Lebanon	404,000	Palestinian Refugees
China	350,000	Vietnam, North Korea
Serbia	275,000	Croatia, Bosnia and Herzegovina
Uganda	258,000	Sudan, Rwanda, Democratic Republic of the Congo
Chad	255,000	Sudan, Central African Republic
Armenia	235,000	Azerbaijan
Kenya	229,000	Somalia, Ethiopia, Sudan
India	157,000	Tibet/China, Sri Lanka, Afghanistan
Zambia	151,000	Angola, Democratic Republic of the Congo, Rwanda
Guinea	141,000	Liberia, Sierra Leone, Ivory Coast
Sudan	139,000	Eritrea, Chad, Uganda, Ethiopia
Ethiopia	125,000	Sudan, Somalia, Eritrea
Thailand	121,000	Myanmar
Nepal	105,000	Bhutan

Source: Data from: CIA, The World Fact Book. Field Listing Refugees and internally displaced people. <http://www.cia.gov/cia/publications/factbook/fields/2194.html>. Accessed October 8, 2006.

population at risk who become infected or develop clinical illness during a defined period of time.”<sup>3</sup> Finally, it is important to understand “case fatality rate,” which is “the number of deaths from a specific disease in a given period, per 100 episodes of the disease in the same period.”<sup>10</sup>

### THE CHARACTERISTICS OF NATURAL DISASTERS

There are several types of natural disasters. Some of these are related to the weather, including droughts, hurricanes, typhoons, cyclones, and heavy rains. Tsunamis, like the one that occurred in 2004, can also cause extreme devastation, injuries, and death. In addition, earthquakes and volcanoes can have important impacts on the health of various communities. Despite the exceptional nature of the 2004 tsunami and the deaths associated with that, among the natural disasters it is earthquakes that generally kill the most people.

It appears that the number of natural disasters is increasing, affecting larger numbers of people, causing more economic losses than earlier, but causing proportionately

fewer deaths than before. In addition, the biggest relative impact of natural disasters is in developing countries. More than 90 percent of the deaths from these disasters occur in low- and middle-income countries.<sup>11</sup> The relative impact of natural disasters on the poor, of course, is greater than on the better-off, because the share of the poorer people’s total assets that are lost in these disasters is greater than that lost by higher-income people. Moreover, the poor are often the most vulnerable to losses from natural disasters, because they often live in places at risk from such disasters or have housing that cannot withstand such shocks.<sup>12</sup>

Natural disasters can cause significant harm to infrastructure, such as water supply and sewage systems, that are needed for safe water and sanitation, and roads that may be needed to transport people requiring health care. Natural disasters can also damage the health infrastructure itself, such as hospitals, health centers, and health clinics. People can die directly as a result of the natural disaster, such as from falling rubble during an earthquake or drowning during a

flood. However, they may also die as an indirect result of the disaster, because of epidemics linked to the lack of safe water or sanitation, food, or access to health services.<sup>12</sup> In addition, people affected by the disaster could wind up living in camps, which themselves pose a range of health hazards.

## THE CHARACTERISTICS OF COMPLEX EMERGENCIES

Over the ten-year period from 1975 to 1985, there were on average about five complex emergencies per year, according to the International Committee of the Red Cross. However, it is estimated that at the end of the 1990s there were about 40 such emergencies per year in countries in which more than 300 million people live.<sup>8</sup> It is also estimated that in 2001 there were more than 14 million refugees and more than 20 million internally displaced people in the world.<sup>13</sup> Although natural disasters have been associated with considerable death and economic loss, the impact of complex emergencies on health over the last decade has been considerably greater than that of natural disasters.

Complex humanitarian emergencies have a number of features that particularly relate to their health impacts. First, these emergencies often go on for long periods of time. The strife in Sudan, for example, has gone on for more than a decade.<sup>14</sup> In addition, these emergencies are increasingly civil wars, as in Bosnia, Liberia, Sierra Leone, Rwanda, and the Democratic Republic of Congo. As a result of the nature of the conflict, it is quite common that one or more of the groups that are fighting will not allow humanitarian assistance to be provided to other groups. In fact, humanitarian workers have increasingly been the targets of those who are fighting, despite what should be their protected status.

During complex emergencies, combatants often intentionally target civilians, as well, for displacement, injury, and death. Many fighters also engage in systematic abuse of human rights, including torture, sexual abuse, and rape “as a weapon of war,” as discussed in Chapter 9. Those same fighters often intentionally destroy health facilities. Given the nature of some of the fighting and its impact on civilians, large numbers of people have been displaced by some of these conflicts, as noted above. Sometimes they choose to flee, but sometimes they are forced to flee.<sup>15</sup>

Unfortunately, these are not the only characteristics of complex humanitarian emergencies. The disruption of society often leads to food shortages. Besides the loss of some health facilities, it is also common that the publicly supported health system may break down entirely, as it did, for example, in the civil war in Liberia. Damage may also be done to water supply and sanitation systems.<sup>16</sup> In El Salvador,

for example, the shortage of safe drinking water for the poor was seen as a significant health threat.<sup>14</sup>

It is important to understand that the migration of large numbers of people, some of whom will live in camps, brings with it a number of problems, as well. Migrants carry diseases with them, sometimes into areas that did not previously have that disease. When Ethiopian refugees who were living in Sudan returned home, for example, they brought malaria from Sudan. Diseases can also spread faster among refugee populations than they would normally, given the large number of people living in crowded conditions, often without appropriate hygiene and sanitation. In addition, large numbers of migrants, sometimes suddenly, need care from health systems that were weak before and which may now be almost nonexistent, after suffering the effects of civil conflict. Finally, one should note that many factions in civil conflicts use landmines and their health effects on individuals can be devastating.<sup>14</sup>

## THE HEALTH BURDEN OF NATURAL DISASTERS

In the 1990s, about 62,000 people per year died on average during natural disasters. There are very few data available on the morbidity and disability associated with natural disasters. The direct and indirect health effects of natural disasters depend on the type of disaster. Earthquakes can kill many people quickly. In addition, they can cause substantial number of injuries in a very short period of time. In the longer term, earthquake survivors face increased risks of permanent orthopedic disabilities, mental health problems, and possibly an increase in the rates of heart disease and other chronic disease. The indirect effect of earthquakes on health depends on the severity and location of the earthquake and the extent to which it damages infrastructure and forces people out of their homes.<sup>17</sup>

In the popular imagination, people are thought to die from the lava flows of volcanoes. In fact, this is rarely the case. About 90 percent of the deaths from volcanoes are due to mud and ash or from floods on denuded hillsides affected by the volcano.<sup>18</sup> In addition, volcanoes can harm health by displacing people, rendering water supplies unsafe, and causing mental health problems among the affected population.<sup>18</sup>

Tsunamis take most of their victims immediately by drowning and cause relatively few injuries, compared to the number of deaths.<sup>18</sup> In storms and flooding, most fatalities occur from drowning and few deaths result from trauma or wind-blown objects. These flood-related events generally lead to an increase in diarrheal disease, respiratory infections, and skin diseases. Most of these problems that relate to natural disasters are relatively short-lived, except for drought-related

famine. Epidemics do not often spring up as a result of them, also except in drought-related famine and when health systems are completely destroyed for long periods of time.

There are few data on the distribution by age and sex of morbidity, disability, and death related to natural disasters. It appears, however, that being very old, very young, or very sick makes one more vulnerable to disasters in which one has to flee for survival. These groups were disproportionately affected by the 1970 tidal wave in Bangladesh and the 2004 Tsunami in Asia. Whether men or women suffer the effects of a natural disaster may depend on when and where it occurs and be most related to the kind of work men or women are doing. Women, however, face considerable risks in the aftermath of natural disasters, if housing has been harmed and people are living in camps, as will be discussed further later.<sup>12</sup>

## THE HEALTH EFFECTS OF COMPLEX HUMANITARIAN EMERGENCIES

The burden of illness, disability and death related to complex humanitarian emergencies is large and probably underestimated, given the difficulties of collecting such data. Some of the effects of these CHEs are direct. It has been estimated for, example, that between 320,000 and 420,000 people are killed each year as a direct result of these CHEs.<sup>8</sup> In addition, it is estimated that between 500,000 and 1 million deaths resulted from trauma during the genocide in Rwanda in 1994.<sup>19</sup> It is thought that about 4 to 13 percent of the deaths during CHEs in Northern Iraq, Somalia, and the Democratic Republic of the Congo were the direct result of trauma.

Other illness, disability, and death, however, come about as an indirect result of the emergencies. These stem from malnutrition, the lack of safe water and sanitation, shortages of food, and breakdowns in health services. They are exacerbated by the crowded and difficult circumstances in which people have to live when they are displaced. One estimate, for example, suggested that almost 1.7 million people more died in a 22-month period of conflict in the Democratic Republic of the Congo, than would have died in a “normal” 22-month period in that country.<sup>8</sup>

The burden of deaths related to wars is also hard to estimate. Another estimate suggests that about 200,000 people died in war in 2001 in low- and middle-income countries. Just over 10 percent of these deaths occurred in the South Asia Region. Almost 70 percent of these deaths, however, took place in Sub-Saharan Africa.<sup>20</sup> About 6.5 million DALYs were lost in 2001 due to war in low- and middle-income countries. That was about one-third as much as was lost due to other forms of violence. It was about two-thirds as much

as the number of DALYs lost from all sexually transmitted diseases and about the same as those lost due to maternal sepsis or breast cancer.<sup>20</sup> Other estimates suggest that between 1975 and 1989 more than five million people died in civil conflicts.<sup>21</sup> In terms of deaths from CHEs, some of the most severely affected countries in the last two decades have been the Democratic Republic of Congo, Afghanistan, Burundi, and Angola.<sup>8</sup>

The data on the breakdown of deaths by age in CHEs suggests that child mortality rates early in the CHE are two to three times the rates of adults but that they slowly decline to those of the rest of the population. The data on deaths by sex are limited.<sup>22</sup> About 20 percent of the non-fatal injuries in the Bosnian conflict were among children. Almost 50 percent of the deaths in the Democratic Republic of Congo were among women and children younger than 15 years of age.<sup>19</sup> UNICEF estimates that more than 1.5 million children have been killed in war since 1980.<sup>23</sup> In European conflicts, the overwhelming majority of those who died have been men between 19 and 50 years of age.<sup>19</sup>

### Causes of Death in CHEs

In the early stages of dealing with large numbers of displaced people in CHEs, most deaths occur from diarrheal diseases, respiratory infections, measles, or malaria.<sup>19, 24</sup> Generally, diarrheal diseases are the most common cause of death in refugee situations. Major epidemics of cholera occurred in refugee camps in Malawi, Nepal, and Bangladesh, among others, and the case fatality rates from cholera have ranged from 3 to 30 percent in settings such as these. Dysentery, which refers to severe diarrhea caused by an infection in the intestine, has also commonly occurred in such situations over the last 15 years, including in camps in Malawi, Nepal, Bangladesh, and Tanzania. The case fatality rate for dysentery has been highest among the very old and very young, in whom it reaches about 10 percent.<sup>19, 24</sup> In one of the most significant humanitarian crises in the last few decades, tens of thousands of Rwandan refugees poured into the Democratic Republic of the Congo during the genocide in Rwanda. Between July and August 1994, 90 percent of the deaths among the refugees in Goma, Democratic Republic of the Congo were from cholera spread by the contamination of a lake from which the refugees got their water.<sup>19, 24</sup>

Measles has also been a major killer in camps for displaced persons. This is especially significant in populations that are malnourished and have not been immunized against measles. As you learned in Chapter 10, the risk of a child dying of measles is increased substantially if the child is Vitamin A deficient, as would be the case for many refugees.

Up to 30 percent of the children who get measles in these situations may die from it.<sup>24</sup>

Malaria is also a significant contributor to death in refugee camps. This is especially the case when refugees move from countries in which there is relatively little malaria to places in which it is endemic. The risk of malaria in such cases is highest in Sub-Saharan Africa and a few parts of Asia.<sup>24, 25</sup> Acute respiratory infections are also major causes of death in refugee camps. This is to be expected because the camps are crowded, housing is inadequate, and refugees could remain in the camps for many years. Although less common than the problems noted previously, there have also been outbreaks of meningitis in some refugee camps in areas in which that disease is prevalent, such as Malawi, Ethiopia, and Burundi. These outbreaks have generally been contained by mass immunization, as it became clear that there was a risk of epidemic.<sup>26</sup> However, an outbreak in Sudan in 1999 led to almost 2,400 deaths.<sup>25</sup> Outbreaks of hepatitis E have occurred in Somalia, Ethiopia, and Kenya. These led to high case fatality rates among pregnant women, in particular.<sup>26</sup>

The populations that are affected by CHEs are generally poor and not well nourished, and nutritional issues are always of grave concern during CHEs, when there may also be problems of food scarcity. In addition, the relationship of infection and malnutrition also poses risks to displaced populations. In CHEs in Sub-Saharan Africa, the rates of acute protein-energy malnutrition during at least the early period of a CHE have been very high, particularly among young children. Reported rates of such malnutrition varied from around 12 percent among internally displaced Liberians<sup>27</sup> to as high as 80 percent among internally displaced Somalis.<sup>25</sup> In CHEs in Bosnia and Tajikistan, the elderly were the group that was the worst affected by acute protein-energy malnutrition.<sup>25</sup>

The underlying nutritional status of the refugees or internally displaced people is often poor and micronutrient deficiencies can also be very important in CHEs. Vitamin A deficiency can be very important among these populations, given their low stores of vitamin A, the fact that some of the diseases most prevalent in camps, such as measles, further deplete the stores they have of vitamin A, and the fact that food rations in camps have historically been deficient in vitamin A. There have also been epidemics of pellagra, which is a deficiency of niacin that causes diarrhea, dermatitis, and mental disorders. One such case affected more than 18,000 Mozambican refugees in Malawi, whose rations in the camp were deficient in niacin. Scurvy, from a lack of Vitamin C, has also occurred in a number of settings, such as Ethiopia, Somalia, and Sudan. Iron deficiency anemia has also been

a problem in some camps and affects primarily women of childbearing age and young children. It appears that women and children who are in the camps without a male adult are at particular risk of not getting enough food in camps and of suffering acute protein-energy malnutrition and micronutrient deficiencies.<sup>24</sup>

### Violence Against Women in CHEs

As discussed in Chapter 9 on women's health, the security conditions during CHEs put women at considerable risk of sexual violence. Rape may be used as a "weapon of war." In addition, the chaos and economic distresses of conflict situations place women at risk of sexual violence and sometimes force them to "trade" sex for food or money, what people call "survival sex." Such women are often very young.

The data on sexual violence against women during CHEs are not good. However, some recent data suggest that the rates of violence against women are very high in these circumstances. A survey carried out in East Timor indicated that 23 percent of the women surveyed after the crisis there reported that they had been sexually assaulted. Fifteen percent of the women in Kosovo who were surveyed reported sexual violence against them during the conflict period. It is estimated that between 50,000 and 64,000 women in Sierra Leone were sexually assaulted during the conflict there, and 25 percent of Azerbaijani women reported sexual violence against them during a three-month period in 2000.<sup>28</sup>

### Mental Health

Those who study CHEs agree that they are associated with a range of social and psychological shocks to affected people, due to changes in their way of living, their loss of livelihoods, damaged social networks, and physical and mental harm to them, their families, and their friends. Nonetheless, there is considerable disagreement among those working with CHEs about the validity of defining the impact on people affected by CHEs through the framework of a "Western" medical model of mental health.<sup>29, 30</sup>

Some studies have focused on post-traumatic stress disorder (PTSD) and shown rates of prevalence for PTSD among adults that ranged from 4.6 percent among Burmese refugees in Thailand to 37.2 percent among Cambodian refugees in Thailand. The rate of post-traumatic stress disorder is about 1 percent in the population of the United States. Similar studies showed rates of depression in Bosnian refugees of 39 percent, Burmese refugees of almost 42 percent, and Cambodian refugees of almost 68 percent. By comparison, one estimate of the baseline rate of depression in the U.S. population is 6.4 percent.<sup>31</sup>

Other studies have looked at the mental health impacts of CHEs on children and the extent to which they suffer from both post-traumatic stress and depression. The studies that have been done on such populations have been small ones that cannot be used to draw major conclusions on this question. However, they suggest that children who have been through conflict situations do suffer from high rates of both PTSD and depression. A survey of 170 adolescent Cambodian refugees, for example, indicated that almost 27 percent of them suffered from PTSD. A survey of 147 Bosnian children refugees suggested that almost 26 percent of them suffered from depression.<sup>32</sup>

It should be noted, however, that a number of those involved with the mental health impacts of CHEs believe that the stress placed by some on PTSD is not valid. Rather, they believe that while a small minority of those affected may need psychotropic medication, the most important issue is to help people as rapidly as possible to rebuild their lives and their social networks. This requires a variety of forms of social assistance and help in reuniting families, finding families a place to live, rebuilding social networks, and restoring livelihoods.<sup>22, 29, 30</sup>

## ADDRESSING THE HEALTH EFFECTS OF NATURAL DISASTERS

The health effects of rapid-onset natural disasters occur in phases, starting with the immediate impact of the event and then continuing for some time until displaced people can be resettled. It is very important that the health situation be assessed immediately after the disaster has occurred. This assessment will set the basis for the initial relief effort. At the same time, care must begin of those injured in the disaster. Once the immediate trauma cases are taken care of, relief workers and health service providers can turn their attention to other injured people who are in need of early care and treatment. This would include urgent psychological problems. In the earliest stages of the disaster, some important public health functions also need to be carried out, including the establishment of continuous disease surveillance among the affected populations and provision of water, shelter, and food.<sup>18</sup>

Many countries do not have all of the resources needed to cope with the health impacts of the disaster, and they will depend on assistance from other countries to address their health problems. Unfortunately, there have been many instances when such help was poorly coordinated and did not effectively match the conditions on the ground. It has become clear over time, however, that to be most helpful in addressing the impact of natural disasters, external assistance will have to:

- Include all of the external partners
- Be based on a cooperative relationship among the partners
- Have partners working in ways that are complementary to each other
- Be evidence-based and transparent
- Involve the affected communities<sup>33</sup>

In some respects, it is easier to predict places that are at risk of natural disasters than it is to predict where CHEs will occur. There are certain countries that are vulnerable to earthquakes, volcanoes, hurricanes and typhoons, and flooding during major rains. In this light, much can be done to prepare for natural disasters and to reduce their health impact. Disaster preparedness plans can be formulated to:

- Identify vulnerabilities
- Develop scenarios of what might happen and its likelihood
- Outline the role that different actors will play in the event of an emergency
- Train first responders and managers to deal with such emergencies<sup>34</sup>

It is also possible when constructing water systems and hospitals, for example, to take measures that will make them less vulnerable to damage during natural disasters.

Given the way that the health impacts of natural disasters unfurl, what would be the most cost-effective ways for external partners to help in addressing the disaster? There are at least several lessons that have emerged on this front. First, although many countries send search and rescue teams to assist the victims of natural disasters, the efforts of such teams are not cost-effective. Most people who are freed from the rubble of an earthquake, for example, are saved by people in their own community immediately after the event. By the time foreign search and rescue teams arrive, most victims of falling rubble will already have been saved or will be dead. It cost about \$500,000 for the United States search and rescue team to carry out its work after an earthquake in Armenia in 1988, but they were only able to save two people.<sup>35</sup>

It is also common that countries will send field hospitals to disaster areas. The cost of each hospital is about \$1 million, and they generally arrive two to five days after the initial event. Unfortunately, by the time they arrive, they are of little value in addressing the most urgent trauma cases. It appears to be more cost-effective to have fewer field hospitals but to have a few that will remain in place for some time, in addition to building some temporary but durable buildings that can also serve as hospitals.<sup>35</sup>

Countries send different kinds of goods to disaster-affected places. Unfortunately, these goods can be inappropriate to the needs of the problem. This has often been the case, for example, for drugs. Better results occur when the impacted country clearly indicates what it needs and other countries send only those goods. Large camps of tents are often established after natural disasters, this is generally also not a cost-effective approach to helping the affected community to rebuild. Providing cash or building materials to affected families allows them to rebuild as quickly as possible, in a manner in line with their cultural preferences. The lack of income, even beyond the cost of rebuilding their home, can be a major impediment to the reconstruction of affected areas. Although it must be managed carefully to avoid abuse, cash assistance to families appears to be a cost-effective way of helping communities rebuild.<sup>35</sup>

## ADDRESSING THE HEALTH EFFECTS OF COMPLEX HUMANITARIAN EMERGENCIES

It is difficult to take measures that can prevent complex humanitarian emergencies from occurring and harming human health because these emergencies so often relate to civil conflict. Thus, the key to avoiding such problems lies in the political realm and in the avoidance of conflict, rather than by taking measures that are directly health related. “Primary prevention in such circumstances, therefore, means stopping the violence.”<sup>36</sup>

However, if such conflicts continue to occur, are there measures of “secondary prevention” that can be taken, to detect health related problems as early as possible and take actions to mitigate them? To a large extent, the early warning systems that exist for natural disasters do not exist for political disasters. Although some groups do carry out analyses of political vulnerability in countries, corruption, and the risk of political instability, these analyses are not used to prepare contingency plans for civil conflict.

Given the extent of conflict, however, it would be prudent if organizations, countries, and international bodies would cooperatively establish contingency plans for areas of likely conflict. It would also be prudent to stage near such areas the materials needed to address displacement and health problems that would occur if conflict breaks out. This would be similar to what is done for disaster preparedness in some places, such as those regularly exposed to hurricanes.<sup>37</sup> You read earlier that complex humanitarian emergencies are characterized by:

- Potentially massive displacement of people
- The likelihood that these displaced people will live in camps for some time

- The need in those camps for adequate shelter, safe water, sanitation, and food
- The importance of security in the camps, especially for women
- The need to address early in the crisis the potentially worst health threats, which are malnutrition, diarrhea, measles, pneumonia, and malaria
- The need to avoid other epidemic diseases, such as cholera and meningitis
- The need as one moves away from the emergency phase of a CHE to dealing with longer-term mental health issues, primary health care, TB, and some non-communicable diseases

Some of the most important measures that can be taken to address these points are discussed briefly hereafter. As you review these, it is important to keep in mind that the aim of these efforts is to establish a safe and healthy environment, treat urgent health problems and prevent epidemics, and then to address less urgent needs and establish a basis for longer-term health services among the displaced people.<sup>38</sup>

### Assessment and Surveillance

As with natural disasters, among the first things that needs to be done during the emergency phase of a CHE is to carry out an assessment of the displaced population and establish a system for disease surveillance. Such an assessment would try to immediately gather information on the number of people who are displaced, their age and sex, their ethnic and social backgrounds, and their state of health and nutrition. Although it is difficult to get this information in the chaotic moments of an emergency, it is impossible to rationally plan services for displaced people without this information.

There are a number of health indicators that guide services in CHEs and a surveillance system needs to be established at the start of the emergency phase of a CHE. Given the difficulties of the emergency, the surveillance system must be simple but still give a robust sense of the health of the affected community. Given the importance of nutrition and the likelihood that a large part of the population will be undernourished, it is essential that the weight for height of all children younger than five be checked.<sup>39</sup> It is also important to have surveillance for diseases that cause epidemics among displaced persons, such as measles, cholera, and meningitis.

In general, the daily crude mortality rate is used as an indicator of the health of the affected group and one goal is to keep that rate below 1 death per 10,000 persons in the population per day. Where the daily rate is twice the normal rate, it signifies that a public health emergency is occurring. Say, for example, that the baseline crude mortality rate for

Sub-Saharan Africa is 0.44/10,000 per day. Thus, if the rate in an affected population were to get to 0.88/10,000 per day, it would signal a public health emergency that would require urgent attention. For children younger than five years of age, the crude mortality rate for Sub-Saharan Africa is 1.14/10,000 per day. The goal in a public health emergency, therefore, would be to keep that rate below about 2.0/10,000 per day.<sup>40</sup> Death rates in a large camp are not always easy to get and sometimes people have resorted to “creative” ways of getting such data, such as daily reports by grave-diggers.

### A Safe and Healthy Environment

It is critical in camps and other situations with large numbers of displaced people that efforts be made to ensure that environmental and personal hygiene are maintained. This will be the key to avoiding the potentially serious effect of diarrheal disease. It is recommended that 15 liters of water per person per day should be provided, that people should not have to walk more than 500 meters to a water source, and that people should not have to wait more than 15 minutes to get their water when they get to a source. Of the 15 liters per day that are recommended, about 2.5 to 3 liters are considered the minimum essential for drinking and food. Another 2 to 6 liters are needed for personal hygiene and the remainder is needed for cooking.<sup>41</sup>

Providing appropriate sanitation in situations of displaced people is also very challenging. Ideally, every family would have their own toilet. This, however, is certainly impossible in the acute phase of an emergency. The goal instead is one toilet for every 20 people. These should be segregated by sex to provide the most safety to women. They should not be more than 50 meters from dwellings, but must be carefully situated to avoid contamination of water sources.<sup>41</sup>

Many of the people who have been displaced will be poor people with little education and, often, poor hygiene practices. It is very important in these circumstances that efforts be made to make the community aware of the importance of good hygiene and to see that soap is available to all families and used.

Of course, people will also need shelter. The long-term goal is to help them return as quickly as possible to their homes. In the short-term, if possible, the goal is to have families be sheltered temporarily with other families. Nonetheless, it is obvious from the tables shown earlier that many displaced people do end up living in camps, often for very long periods of time. When shelter is needed, the goal is to provide 3.5 square meters of covered area per person, with due attention paid in the construction of the shelter to

the safety of women. Whenever possible, local and culturally appropriate building materials should be used. In the short-run, the aim is to get people into covered areas. When the emergency phase has passed, the need to enhance some of the structures can be prioritized.<sup>42</sup>

### Food

It is suggested that each adult in a camp should get at least 2,000 kilocalories of energy from food per day. Food rations should be distributed by family unit, but special care has to be taken, as noted earlier, to ensure that female-headed households and children without their families get their rations. Vitamin A should be given to all children, and the most severely malnourished children may also need urgent nutrition supplementation.<sup>43</sup>

### Disease Control

As suggested earlier, “The primary goals of humanitarian response to disasters are to 1) prevent and reduce excess morbidity and mortality, and 2) promote a return to normalcy.”<sup>40</sup> Along these lines, the control of communicable diseases is one of the first priorities in the emergency phase of a disaster, especially a complex humanitarian emergency.

An important priority in the emergency phase of a complex humanitarian emergency is to prevent an epidemic of measles. This starts with vaccinating all children from six months to 15 years of age. Another important priority is to ensure that children up to five years of age get vitamin A. Systems also need to be put in place so that other epidemics that sometimes occur in these situations, such as meningitis and cholera, can be detected and then urgent measures can be taken to address them. Other priorities will include the proper management of diarrhea in children and the appropriate diagnosis and treatment for malaria, in zones where that is prevalent. Of course, health education and hygiene promotion must take place continuously to try to help families prevent the onset of these diseases in the first place.<sup>40</sup>

Unfortunately, preventing the outbreak of communicable diseases is not the only effort that needs to be taken in the emergency phase of a CHE. Measures need to be in place to handle injuries and trauma, first to stabilize people and then to refer them to where they can receive the additional medical help they need. There will almost certainly be pregnant women among the displaced people, and there will be an immediate need for some reproductive health services. This will generally have to focus on the provision of a minimum package of care that would include safe delivery kits, precautions against the transmission of HIV, and transport and referral in case of complications of pregnancy.<sup>40 44</sup>

The care of non-communicable diseases will be a lower priority in emergency situations than addressing communicable diseases. However, some psychiatric problems will require urgent attention and will need to be treated as far as possible with counseling, the continuation of medicines people were taking, and the provision of new medications, if needed. As the emergency recedes, greater attention can be paid to long-term treatment, counseling, and psychosocial support for dealing with mental health problems and the many disruptions that people have faced in their lives.<sup>31</sup> At that time, one can also turn additional attention to ensuring the appropriate medication of people with other non-communicable diseases.

## CASE STUDIES

This chapter does not contain any case studies that have been based on careful review of the evidence about specific interventions. However, some comments follow on two CHEs of importance. One concerns the genocide in Rwanda and the plight of Rwandan refugees in Goma, in what is now the Democratic Republic of Congo. The other concerns a major earthquake that hit Pakistan in 2005. Both cases suggest some lessons for enhancing the global response to CHEs in the future.

### Rwanda

In mid-July 1994, nearly one million Rwandan Hutus tried to escape persecution from the newly established government of Rwanda that was led by the Tutsis. The border town of Goma, in what is now the Democratic Republic of Congo, situated in the North Kivu region, became the entry point for the majority of the refugees. Many of them settled on Lake Kivu.<sup>45</sup>

Almost 50,000 people died in the first month after the start of the influx, largely as a result of an epidemic of cholera, which was followed by an epidemic of bacillary dysentery. In the first 17 days of the emergency, the average crude mortality rate of Rwandans was 28.1–44.9 per 10,000 per day, compared to the 0.6 per 10,000 per day in pre-war conditions inside Rwanda. This crude mortality rate is the highest by a considerable margin over the rate found in any previous CHE. In addition, in Goma, diarrheal disease affected young children and adults alike, whereas normally young children are much more severely affected than adults.<sup>45</sup>

Humanitarian assessments began in the first week of August, three weeks after the initial flow of refugees. Rapid surveys conducted in the three refugee camps of Katala, Kibumba, and Mugunga indicated that diarrheal disease contributed to 90% of deaths, that food shortages were

prevalent, especially among female-headed households, and that acute malnutrition afflicted up to 23% of the refugees. In early August, a meningitis epidemic arose.<sup>45</sup>

The circumstances were complicated by the large numbers of people who fled to Goma in such a short period of time. In addition, the lake represented an easy source of water, but one from which disease could be spread. The soil around Goma was very rocky and it made it very difficult to construct an appropriate number of latrines. In addition, Hutu leaders were given control over distribution of relief but this did not provide for the equitable distribution of food that was hoped for.<sup>45</sup>

By early August, the response of the international community was beginning to have the desired effect, under the coordination of the UNHCR. A disease surveillance network was established. An information system was set up for the camps. Five to ten liters of safe water per day was distributed. Measles immunization was carried out, vitamin A supplements were distributed, and disease problems were attacked using standard protocols.<sup>45</sup>

Despite the exceptional efforts made by many people to deal with the crisis, the events in Goma highlighted a number of shortcomings of the response. First, there was a general lack of preparedness for dealing with this type of emergency, despite the well-known political instability of Rwanda. Second, the medical teams on the ground did not have the physical infrastructure or the experience needed for a task of this magnitude. Many of these staff, for example, were not as knowledgeable about oral rehydration as they needed to be, even though this is fundamental to treating diarrheal disease. Third, the work of the military forces that joined the effort was not integrated into the planning of the other work.<sup>45</sup>

Although the Goma crisis was exceptional in many ways, it does suggest a number of lessons for enhancing the response to CHEs in the future. These include the need to:

- Establish early warning systems for CHEs
- Prepare in advance for CHEs
- Strengthen the existing non-governmental groups with capability to respond to CHEs.

### The Earthquake in Pakistan

In early October 2005, Pakistan experienced an earthquake measuring 7.6 on the Richter scale. The epicenter was in Kashmir but the earthquake also devastated the North-West Frontier Province (NWFP). Within a matter of minutes, homes and livelihoods were destroyed, leaving over 3 million people homeless and many individuals buried under the rubble or injured by debris.<sup>46</sup>

It is estimated that 76,000 people, many of whom were children, lost their lives either from instantaneous death, such as severe head injury or internal bleeding, rapid death, such as asphyxia due to dust, or delayed death, such as wound infections. An additional 80,000 people were injured.<sup>46</sup> Moreover, 84% of the infrastructure in Kashmir, including 65% of all previously existing health care facilities, failed to withstand the seismic forces and collapsed. Thus, the immediate needs of the population included “winterized shelter, medical care, food and water and sanitation facilities.”<sup>46</sup>

To respond to the earthquake, the government of Pakistan created the Federal Relief Commission (FRC) and the Earthquake Rehabilitation and Reconstruction Authority (ERRA) that offered short- and long-term recovery efforts. Furthermore, a week after the initial earthquake, the government presented a plan for relief that included compensation for survivors. The World Bank, along with the Asian Development Bank, conducted assessments to identify vulnerable groups and areas that might hinder early recovery, such as unsanitary environments. Moreover, the South Asia Earthquake Flash Appeal (SAEFA) was created to receive donations for the recovery effort.

Doctors without Borders (MSF) was an integral part of the interventions, as it provided emergency relief within a day of the earthquake, given that MSF medical teams were already on the ground in Kashmir. These teams focused initially on hygiene promotion, distributing tents, cookware and mattresses, and treating the injured. They administered 30,000 measles vaccines and later redirected attention to rebuilding medical infrastructure. In NWFP, MSF created hospitals with beds to house patients, as well as developed medical villages that were used to treat the overwhelming number of injured.

Despite national and international efforts to mobilize an effective response, injured individuals flooded hospitals that were still intact but which did not have the personnel or the equipment to respond effectively. Thus, many patients suffered more severe secondary complications due to prolonged waiting for medical treatment, a common characteristic when earthquakes significantly affect the medical system.<sup>46, 47</sup>

Furthermore, small, remote villages remained inaccessible because of significant road damage. Given the impending winter, therefore, the Pakistani military, MSF, and UN agencies used helicopters to distribute basic relief. In addition, the government pledged the provision of tents. People inside and outside of Pakistan responded very generously with donations to help those affected by the disaster. However, many of the donations did not fit what was most needed.<sup>46</sup>

Several valuable lessons emerge from the efforts of the government and military of Pakistan and Pakistan’s foreign partners to assist in the rescue and recovery from the earthquake. First, buildings in rural areas in seismic zones should be built or designed to decrease human injury. Second, governments should analyze existing risks to their ability to rapidly respond to emergencies and prepare emergency plans in advance that take those risks into account. Third, donations of materials and supplies should be managed carefully so that they fit real needs. Lastly, NGO expertise, like that provided by MSF in Pakistan, can be very helpful in addressing natural disasters, particularly if the involved organizations already have a presence in the affected country.<sup>46, 47</sup>

### **FUTURE CHALLENGES IN MEETING THE HEALTH NEEDS OF DISASTERS**

A number of critical challenges confront efforts to address the health effects of natural disasters and complex humanitarian emergencies. One such challenge for the future is how to prevent these from having such negative health impacts. It is difficult in resource-poor settings, many of which are poorly governed, to focus attention on the prevention of disasters and their impacts. Nonetheless, through better mitigation measures, such as water control, greater education of the community about how to deal with disasters, and having a disaster preparedness plan for which people are trained, it should be possible, even for very poor countries, to reduce deaths from natural disasters. If these steps are coupled with the development of standard approaches for dealing with health issues when they do arise and the forward staging of medicines, equipment, and materials near to disaster prone areas, it should be possible to reduce deaths from natural disasters, even in very low-income settings. Bangladesh, which is subject to annual flooding, has reduced the annual deaths from such floods, for example, with a series of the previously mentioned measures.<sup>48</sup>

There has been considerable progress among the international community in the establishment of common standards and protocols for responses to disasters. There remains, however, the need to enhance these further. Ideally, the organizations involved in responding to natural disasters and CHEs will:

- subscribe to a common set of norms, such as the Sphere Project
- have common protocols for dealing with key issues
- train their staff to work with those protocols
- work in close conjunction with the affected communities and local governments<sup>49</sup>

In addition, it is important that responses to disasters focus on cost-effective approaches to the provision of health care services in emergencies. We have already seen that search and rescue assistance from abroad is not cost-effective. The same is true for most field hospitals. Moreover, many agencies have provided health services in emergencies that did not focus on immediate needs and that could have waited. Morbidity and mortality can be prevented and reduced more quickly if the agencies involved in disaster relief carefully set priorities for action that would be based on the principle of cost-effectiveness analysis, taking appropriate account of concerns for social justice and equity.<sup>24, 50, 51</sup>

The continued refinement of indicators that can be used to measure performance of services in disasters will be helpful to gauging the performance of local and international relief efforts.<sup>50</sup>

## MAIN MESSAGES

Natural disasters and complex humanitarian emergencies are important causes of illness, death, and disability. They affect large numbers of people, have huge economic impact, and their aftereffects can go on for some time. Their biggest relative impact is on the poor, who are generally more vulnerable to the effects of these disasters than are better-off people. Some of these disasters are man-made. Some are slow-onset and some are rapid-onset.

Natural disasters, such as droughts, famines, hurricanes, typhoons, cyclones, and heavy rains have important health impacts. Earthquakes and volcanoes are also natural disasters with large potential effects on health. It appears that the number of natural disasters is increasing but the number of deaths from them is decreasing. More than 90 percent of deaths from natural disasters occur in low- and middle-income countries.

Some deaths are a direct result of natural disasters. However, the impact of those disasters on water supply and sanitation systems, health services, and availability of food can also, indirectly, lead to many more deaths. There are also special health problems associated with living in camps, which sometimes happen to those who survive natural disasters that displace many people from their homes.

In the late 1990s, there were about 40 CHEs each year. There are probably more than 14 million refugees in the world and more than 20 million internally displaced people. Overall, CHEs are associated with considerably larger health impacts than natural disasters. In addition, they may have an acute phase when large numbers of people flee and they generally go on for long periods of time.

Complex humanitarian emergencies have increasingly been linked to civil conflict. Like natural disasters, they also

have direct and indirect impacts on health. They not only take lives directly through war-related trauma, but also they lead to the destruction of infrastructure. The health effects of some of these conflicts have been dramatic, sometimes because civilians have been targeted by combatants. Women are especially vulnerable in CHEs to sexual violence.

In the emergency phase of a CHE when large numbers of displaced persons are coming into camps, there are a number of health risks that have to be addressed. Among the most important are diarrhea, measles, malaria, and pneumonia. Malnutrition is also of exceptional importance. Cholera epidemics can also arise and kill large numbers of people quickly.

Countries at risk can take a number of measures to mitigate vulnerability to damage from natural disasters. This could include preparing a disaster plan, building seawalls and levees, and requiring, for example, that buildings in earthquake prone areas are earthquake proof. It might also be cost-effective to strengthen other infrastructure, such as water supply systems so that they can withstand important threats.

Addressing the health impacts of a natural disaster requires that the health situation be assessed quickly and that urgent cases be handled immediately. Less urgent problems can be handled in the following days, weeks, and months. Long-term support for those psychologically affected by the disaster will also need to be provided in the medium- and long-term.

The health situation of a CHE also needs to be assessed quickly and continuously. Early attention in dealing with large numbers of displaced people must focus on the environment, shelter, water, and food. The next step is the prevention of disease outbreaks and their treatment if they do occur. Particular attention must be paid to malnutrition, measles, pneumonia, and malaria. Some immediate attention will also have to be paid to a minimum package of reproductive health services and the avoidance of HIV. As the acute phase of the emergency subsides, more attention can be paid to TB, overall primary health care, non-communicable diseases, and longer-term mental health issues.

There has been some important progress in the coordination and standardization of measures to address CHEs and natural disasters. However, there are still gaps in the preparation and training of staff in some organizations. In addition, there has been inadequate attention to the cost-effectiveness of interventions. There is now enough information about the lessons of CHEs and natural disasters that the priority actions that are needed should be clear and organizations active in relief work need to concentrate their efforts on what will prevent the most deaths, disability, and morbidity, at least cost, with due attention to concerns for social justice.

## Study Questions

1. How does the annual burden of disease from natural disasters and complex humanitarian emergencies compare with other causes of illness, death, and disability?
2. What is a disaster? A natural disaster? A complex humanitarian emergency?
3. What is an internally displaced person? A refugee? What are the differences between them?
4. What have been some of the most significant natural disasters in the last decade? How many deaths were associated with them? How did people die? How did deaths vary for different types of disasters by age and sex?
5. What countries in Sub-Saharan Africa have been the largest sources of displaced people? What countries in Sub-Saharan Africa have received the largest numbers of refugees?
6. In the early stages of a complex humanitarian emergency, what are likely to be the most significant health concerns for the refugees? How do those health concerns change over time? Who are the most affected by malnutrition, measles, pneumonia, cholera?
7. In what ways are women especially vulnerable during complex humanitarian emergencies? What problems do they face as a consequence of these vulnerabilities?
8. What are key steps that can be taken to reduce the vulnerability of certain places to the potential health threats of natural disasters?
9. What are key steps that need to be taken within the first few days of people fleeing to a refugee camp? How do those concerns change over time?
10. How can one try to ensure that relief agencies work together around a common framework and that they focus on the most cost-effective activities?

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