

Chapter 43

COMPLEX EMERGENCIES

TRUEMAN W. SHARP, MD, MPH

INTRODUCTION

CRITICAL HEALTH INFORMATION IN COMPLEX EMERGENCIES

- Principal Tools
- Rapid Assessments
- Targeted Surveys and Special Studies
- Surveillance
- Crude Mortality Rate
- Nutritional Surveys

PRINCIPAL CAUSES OF MORBIDITY AND MORTALITY

TEN CRITICAL EMERGENCY RELIEF MEASURES

- Rapidly Assess the Health Status of the Affected Population
- Establish Disease Surveillance and a Health Information System
- Immunize Against Measles and Provide Vitamin A in Situations of Food Shortage
- Institute Diarrhea Control Programs
- Provide Elementary Sanitation and Clean Water
- Provide Adequate Shelter, Clothes, and Blankets
- Ensure Food Supplies Are Adequate and Reach Intended Recipients
- Establish Appropriate Curative Services
- Organize Human Resources
- Coordinate Activities of All Local Authorities and Relief Agencies

PRISONERS OF WAR AND OTHER DETAINEES

SUMMARY

T.W. Sharp, Captain, Medical Corps, US Navy; Officer in Charge, US Naval Medical Research Unit 3, PSC452, Box 5000, FPOAE 69835-0007

INTRODUCTION

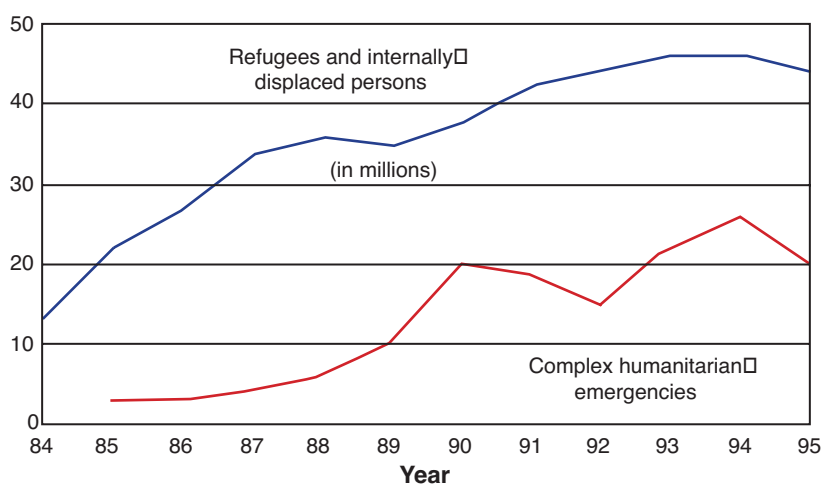
In the post–Cold War era, much of the world’s population is deeply affected by armed conflicts and their closely related complex humanitarian emergencies (see Chapter 41, *The Challenge of Humanitarian Assistance in the Aftermath of Disasters*). Through the first half of the 1990s, over 30 armed conflicts raged.^{1,2} Primarily as a result of this armed violence and its consequences—famine, destruction, population displacement, epidemic diseases—complex humanitarian emergencies occurred in 23 countries, including Somalia, Rwanda, Bosnia and Herzegovina, Liberia, Sudan, Mozambique, and Afghanistan.³ Because of these situations, almost 1% of the world’s population, approximately 41.5 million people, were either refugees or displaced from their homes (Figure 43-1). Many millions more had not fled their homes but were also profoundly affected by these crises.⁴

Each complex emergency is unique, with its own causes and dynamics; however, many of these situations follow a somewhat predictable sequence of events.⁵ A brief review of the evolution of a complex emergency will give a sense of many of these disasters. The place is usually a developing nation with many fundamental problems, including widespread poverty and a politically repressive, corrupt, and tenuous government. Political instability, the persecution of certain minorities, and human rights abuses lead to unrest and violent insurrection against the government. Further repression in turn

breeds more violence and the development of a well-armed anti-government faction, often more than one. Escalating armed confrontation leads to extensive damage to social infrastructure, economic collapse, and deterioration of medical services. This is followed by population displacement as people seek safety and food. The medical treatment facilities that survive are typically understaffed and undersupplied and are overwhelmed by trauma victims. Preventive programs and routine medical care may cease to exist, which leads to extensive communicable disease outbreaks. In extreme cases, such as in Somalia and Liberia, that part of the economy involved in producing, transporting, and marketing food is totally destroyed, which causes severe food shortages and their devastating consequences. Widespread human rights abuses and callous manipulation of international relief efforts occur, which exacerbates the conflict. Schools, police, courts, and other basic institutions of society may cease to function altogether. Violence and a vicious anarchy reign. The international community often recognizes these situations and attempts to intervene only once they have reached an advanced stage.

Between 1990 and 1997, the US military was involved in complex emergencies in northern Iraq, Somalia, Rwanda, Haiti, and Bosnia and Herzegovina. The military in the post–Cold War world is likely to continue to become engaged in places where conflicts and complex emergencies occur—this will

Fig. 43-1. Complex Emergencies, Refugees and Internally Displaced Persons, 1983-1995. There have always been complex humanitarian emergencies but in the late 1980s and early 1990s, the number of these emergencies increased markedly worldwide. Concomitantly, there was a rapid rise in the number of refugees and internally displaced persons, almost all of whom were victims of complex humanitarian emergencies. Intervening in post–Cold War emergencies of this type has been extremely difficult because of the almost intractable political, economic, social, legal, logistical, and security issues involved and because the large numbers of refugees and internally displaced persons have severely strained limited humanitarian relief resources. Data sources: (1) Office of Foreign Disaster Assistance. *Annual Report FY 1995*. Washington, DC: US Agency for International Development, 1996: 10 and (2) the United States Mission to the United Nations. *Global Humanitarian Emergencies*, 1996. New York: United States Mission to the United Nations, 1996: 5.



probably be unavoidable.^{6,7} The specific roles the military will play in these missions and to what extent the military will engage in humanitarian assistance missions in the post–Cold War era are not clear (see also Chapter 45, *The International Humanitarian Response System and the US Military*).^{8–11} The diversity of missions in the 1990s shows that those missions can assume many different forms, from providing security to providing emergency medical care.

Preventive medicine personnel who become involved in complex emergencies are entering dangerous and confusing territory. It is a formidable challenge to understand what the mission is, who is in charge, what plans have been made, what resources are available, what the scope of responsibilities is, and who are the many other organizations involved. When military medicine has been called on to provide health services directly to civilian populations in complex emergencies, preventive medicine has usually played a pivotal role because so much of the relief revolves around public health concerns. Even in operations in which military forces do not provide direct medical services, preventive medicine has been relevant because whatever the military does is likely to have significant repercussions on the overall relief effort and public health. If, for example, the military is tasked to provide only logistical support to international relief agencies, military commanders still need advice on the scope of the disaster, public health consequences, relief priorities, relief procedures, and other public health–related matters to make sound decisions.

CRITICAL HEALTH INFORMATION IN COMPLEX EMERGENCIES

One of the most important roles for military preventive medicine in complex emergencies is to interpret the essential public health data that characterize the crisis and to use that information to help establish and guide the most appropriate relief measures. Conducting effective relief operations without timely, reliable, accurate, and integrated health information is extremely difficult, if not impossible. The history of disaster medicine has innumerable examples of well-intentioned but inefficient, inappropriate, and counterproductive relief efforts undertaken in the absence of good information.^{27,28}

Gathering and using information in the setting of a complex emergency is a formidable task. Complex emergencies are dangerous, confused, and chaotic; good data are rarely readily accessible. Collecting sound epidemiologic data presents many methodological and logistical challenges.^{29–31} Collecting information requires dedicated resources, but com-

This chapter provides a three-part framework for understanding and coping with the public health aspects of complex emergencies. The first section describes the critical information needed to make effective health interventions and how this information can be obtained. The second describes the principal causes of morbidity and mortality in complex emergencies. The third lists the ten most important basic relief priorities.

This chapter provides only a basic framework because responding to complex emergencies can seem as complex as the emergency itself. The details of program implementation and the specifics of clinical management of common disease problems, such as malnutrition, malaria, and diarrheal diseases, are beyond the scope of this chapter. Many other important dimensions of complex emergencies—political, social, cultural, and economic—are also beyond this chapter’s purview. Other chapters in this book and other published resources discuss these topics in detail.^{12–21} Excellent practical guides on public health needs in complex emergencies have been published by the Centers for Disease Control and Prevention (CDC), the International Committee of the Red Cross (ICRC), and *Medicins sans Frontières*.^{5,13–15} Also of note, military publications address doctrine and operational aspects of humanitarian assistance operations.^{22–24} Institutions such as the Centers for Naval Analysis in Alexandria, Va, and the US Army Peace Institute in Carlisle Barracks, Penn, also have published a number of relevant reports on humanitarian assistance and, specifically, the role of the military in it.^{25,26}

manders and key decision makers may view data collection as an unnecessary luxury and a waste of limited assets. Once data are obtained, they must be analyzed, sometimes in austere field conditions. Then, and this is very important, timely information and recommendations must be disseminated to decision makers in a format that they can understand and use.³²

Principal Tools

The principal methods of gathering data in complex emergencies are obtaining available background health data and then conducting rapid assessments, targeted surveys, standardized surveillance, and special investigations. While the basic underlying principles of collecting and using data are well described in many articles and textbooks, unique techniques and procedures have been

developed for disasters and complex emergencies.²⁸

Background data on a population in crisis, and on the areas to which it has migrated, are useful to interpret the current health situation and to plan appropriate relief interventions. For example, a population that has had prolonged food scarcity before a crisis may have little capacity to cope with sudden food deprivation. Or a population from a nonmalarious area moving into an endemic area, as has occurred in refugee crises in southeast Asia, will probably have many cases of malaria. Knowing this background should focus relief planning accordingly.

Background data are available from many sources (Table 43-1). The CDC, the World Health Organization (WHO), the United Nations (UN) Children's Fund, and the World Bank are examples of governmental organizations with information describing immunization status, nutrition status, endemic diseases, and other basic health parameters of affected populations. Various US Government agencies, such as the Central Intelligence Agency and the State Department, also have materials on other countries that are relevant to health.³³ Local governments, refugee leaders, and local health care

TABLE 43-1

VARIOUS SOURCES OF BACKGROUND DATA AND INFORMATION ON DISASTERS, CONFLICT, AND COMPLEX EMERGENCIES*

Agency	Telephone Number and Internet Address
US Agency for International Development	(202) 647-4000; http://www.info.usaid.gov
Bureau for Humanitarian Response and the Office for Foreign Disaster Assistance	(202) 647-8924; http://www.info.usaid.gov/hum_response/
OFDA Field Operations Guide for Disaster Assessment and Response	http://www.info.usaid.gov/hum_response/ofda/fog/foghme.htm
Centers for Disease Control and Prevention	(404) 639-3311; http://www.cdc.gov
CDC International Emergency and Refugee Health Unit	(770) 488-1033
Federal Emergency Management Agency	(202) 647-8924; http://www.fema.gov/
US Committee for Refugees	(202) 347-3507; http://www.refugees.org
Interaction	(202) 667-8227; http://www.interaction.org/ia/
Armed Forces Medical Intelligence Center Bulletin Board	(301) 619-7574; (800) 325-0195 (sysop 3883)
United Nations	(212) 963-1234; http://www.un.org
UN Children's Fund	(212) 326-7000; http://www.unicef.org
UN Development Program	(212) 963-1234; http://www.undp.org
UN High Commissioner for Refugees	(212) 963-6200; http://www.unhcr.ch
UN Office for the Coordination of Humanitarian Affairs (ReliefWeb)	(212) 963-6821; http://www.reliefweb.int/
World Health Organization	41-22-791-2111; http://www.who.ch
International Committee of the Red Cross	(212) 599-6021; http://www.icrc.org
CIA Publications and Handbooks	http://www.odci.gov/cia/publications/pubs.html
The Carter Center	(404) 331-3900; http://www.emory.edu/CARTER_CENTER
Project Ploughshares	(519) 888-6541; http://watserv1.uwaterloo.ca/~plough/
Center for Excellence in Disaster Management and Humanitarian Assistance [†]	(808) 433-7035; http://coe.tamc.amedd.army.mil/

* This is not a comprehensive list but has most major resources. Other resources can be found through links on the Internet. The ReliefWeb in the UN Department of Humanitarian Affairs allows access to much useful data, such as the *World Factbook*, country-specific immunization coverage, and other health statistics.

[†] This sight has an excellent source: "Disaster-related Web pages."

providers can sometimes provide much valuable information. Many nongovernmental organizations, particularly those that specialize in long-term infrastructure building, also have data on countries where they work. Often data can be found in published medical literature.

Within the military, the Armed Forces Medical Intelligence Center can be a particularly valuable resource. Its CD-ROM, "Medical Environmental Disease Intelligence and Countermeasures," reviews in detail the health situation in almost every country in the world.³⁴ The military intelligence community is also a good resource for information on political conditions, culture, local militaries, and other issues relevant to understanding health conditions.³⁵

Despite these many resources, however, background health data can require substantial effort to obtain, and often there is not much time. Background health information, particularly for areas in the developing world, is likely to be fragmented,

outdated, or incomplete. Also, refugees and displaced persons may come from marginalized groups, which are not well characterized and may have worse health status than general statistics would indicate. Thus, applying background data in the conditions of a complex emergency may be problematic.

Rapid Assessments

Most relief agencies conduct rapid health assessments before intervening in a crisis. Rapid assessments characterize the emergency needs of the situation quickly but accurately, ensure that the type of assistance provided will be appropriate, alert the international community to the severity of the situation, and enable relief to be targeted to the most vulnerable populations.³⁶ The types of information typically collected in a rapid assessment are shown in Exhibit 43-1. Although background information

EXHIBIT 43-1

BASIC INFORMATION NEEDED IN A RAPID HEALTH ASSESSMENT*

Background Information: usual population demographics, normal health status, immunization coverage, indigenous diseases, usual diet and food situation, maps

Population Profile: current size of population, location, age and sex distribution, household organization and size

Health Situation: rates and causes of morbidity and mortality by age and sex, crude mortality rate

Food Availability and Nutritional Status: available food supplies (indigenous and external), accessibility, evidence of acute malnutrition or micronutrient deficiencies

Water: current use, availability, local sources

Shelter and Fuel: availability, sources

Environmental Conditions: climate, terrain, disease vectors, waste disposal

Local Infrastructure: airports, seaports, roads, communications, electricity, trucking, warehousing

Local Belief and Customs: health beliefs, food preferences, sanitary habits

Other Responders: indigenous capacities, external groups present, organization of relief efforts, services being provided

Political Situation: reasons for crisis, historical factors, host-nation position, external influences, underlying ethnic and cultural issues, underlying resource issues

Security Situation: armed factions, level of banditry, availability of weaponry

*For more details on information to be collected and on methodologies of conducting rapid assessments, please consult these references: Centers for Disease Control and Prevention. *Famine-affected, refugee, and displaced populations: recommendations for public health issues*. MMWR. 1992;41(RR-13); United Nations High Commissioner for Refugees. *Handbook for Emergencies*. Geneva: UNHCR; 1982; Office of Foreign Disaster Assistance. *Field Operations Guide for Disaster Assessment and Response*. Version 2.0. Washington, DC: US Agency for International Development; 1994 (also available on the Internet, see Table 43-1); Toole MJ. The rapid assessment of health problems in refugee and displaced populations. *Med Global Surveillance*. 1994;1:200-207.

can be helpful, there is no substitute for “examining the patient” directly. In recent years, the rapid assessment has been recognized as a distinct type of study with unique methodologies. In a rapid assessment of Kampuchean refugees in Thailand³⁹ conducted within 2 weeks of their arrival, malnutrition and malaria were identified as major health problems. This information was not anticipated. It proved to be essential in characterizing the nature and extent of health problems in this population and helped refocus relief efforts toward these issues. There are many examples in the literature of the use of rapid health assessments, as well as examples of misguided relief efforts when they were not conducted.^{14(p23–25),28,37–39}

Teams exist in the military specifically to assess disaster situations, such as the Humanitarian Assistance Survey Teams at some major US military commands. Ad hoc assessment teams can also be constructed, as in the Kurdish refugee crisis in northern Iraq in 1991: a medical team from US European Command and units from the US Army Special Operations Command performed health assessments of the Kurds.⁴⁰ In Operation Sea Angel in Bangladesh in 1993, the military collaborated with other agencies,

principally a Disaster Assistance Response Team from the US Office of Foreign Disaster Assistance, to obtain information on the damage caused by a cyclone.⁴¹ In a complex emergency, many other assessments are likely to be conducted, so finding and using the results of surveys conducted by others can be an efficient way of obtaining needed information. Practical matters such as team composition, communications, travel arrangements, and language barriers are critical concerns.^{20,36}

Targeted Surveys and Special Studies

Targeted surveys and special studies usually follow initial, rapid assessments. These investigations delve into issues for which more detailed information is needed. Figure 43-2 illustrates typical causes of mortality in refugee situations for which more detailed information would be useful in designing effective interventions. Typical areas of more-intensive investigation are nutritional status, immunization coverage, disease outbreaks, and rates and causes of morbidity and mortality. Surveys and special studies benefit from more focus and time than is possible with a rapid assessment. However, the

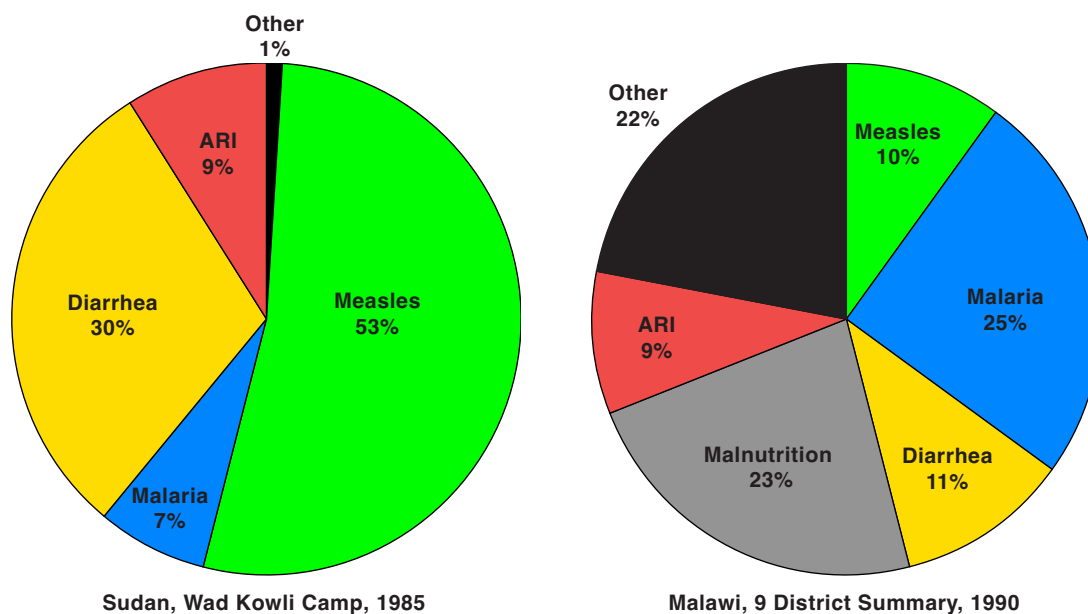


Fig. 43-2. Causes of Mortality in Refugee Situations. These two pie graphs show common profiles of mortality in displaced populations during complex humanitarian emergencies. Common and usually preventable communicable diseases typically predominate, and young children are usually the most affected. Of note, the principal causes of death in Malawi were malnutrition and malaria, whereas in the Sudan measles and diarrhea predominated. This illustrates that while the same culprits may be important in many crises, their relative contributions can be very different. These types of data must be collected to characterize the causes of morbidity and mortality accurately, and relief efforts should be based on this information. Adapted from: Centers for Disease Control and Prevention. Famine-affected, refugee and displaced populations: recommendations for public health issues. *MMWR*. 1992;41:8–9.

WEEKLY SURVEILLANCE REPORTING FORM

Site: _____ From: ____/____/____ To: ____/____/____

I. Population

- A. Total population at beginning of week: _____
- B. Births: _____ Deaths: _____
- C. Arrivals: _____ Departures: _____
- D. Total populations at end of week: _____
- E. Total Population < 5 years of age: _____

II. Mortality

Reported cause of death	0-4 Years		5 + Years		Total
	Males	Females	Males	Females	
Diarrheal disease					
Respiratory disease					
Malnutrition					
Measles					
Malaria					
Other/unknown					
Total					
Total < 5 years	XXXXXXXXXXXXXXXXXXXX				

AVERAGE TOTAL MORTALITY RATE _____

(Deaths/10,000 Total Population/day averaged for week)

AVERAGE UNDER-FIVE MORTALITY RATE _____

(Deaths/10,000 Under-fives/day averaged for week)

III. Morbidity

Primary Symptoms/Diagnosis	0-4 Years		5 + Years		Total
	Males	Females	Males	Females	
Diarrhea/dehydration					
Fever with cough					
Fever with chills/malaria					
Measles					
Trauma					
Suspected hepatitis					
Suspected cholera					
Suspected meningitis					
Other/unknown					
Total					

IV. Comments

need to collect epidemiologically sound data must still be balanced against the need to have information quickly. As with rapid assessments, a body of methods has evolved to support the unique requirements of surveys in disaster settings. For example, the 30-cluster survey, which is a technique first used in the smallpox eradication campaign to conduct rapid and valid population sampling, is a commonly used technique that allows a team to collect accurate data on a large population in just a few days.

There are also many examples of surveys and special studies in the literature.^{14,28,36,42,43} For example, a retrospective, population-based household survey⁴³ conducted in Kabul, Afghanistan, documented very high death rates in a population devastated by civil war. War trauma and various preventable infectious diseases (eg, measles, diarrhea, acute respiratory infection) were shown to be the main causes of death. Basic public health measures and actions to stop hostilities were shown to be the most urgent health needs. In the Kurdish refugee crisis⁴² and in Somalia,⁴⁴⁻⁴⁷ US military preventive medicine personnel worked closely with civilian agencies to conduct nutritional surveys, mortality surveys, and investigations of malaria, hepatitis, and dysentery in civilian groups. The results documented causes of morbidity and mortality and were used to refine relief efforts.

Surveillance

Establishing regular, standardized surveillance is a critical component of a health information system in a complex emergency. Whereas rapid assessments and surveys usually focus on a specific point in time, surveillance allows the ongoing, real-time monitoring of critical health parameters. Disease conditions for which surveillance is conducted in complex emergencies are shown in a typical weekly surveillance form (Figure 43-3). Surveillance has contributed substantially to relief efforts in a number of complex emergencies.^{14,28,48} For example, a basic surveillance system was established by inter-

national relief workers helping Bhutanese refugees in Nepal. This system enabled health workers to identify and manage outbreaks of malaria, dysentery, Japanese encephalitis, and measles.⁴⁸ In northern Iraq and Bangladesh, the US military contributed to efforts to establish and maintain surveillance systems.^{40,41} The information derived from surveillance enabled decision makers to focus on documented problems rather than on hearsay. During the Kurdish refugee crisis, rampant diarrhea, which was by far the predominant cause of mortality, was initially unrecognized. Once identified, civilian and military officials concentrated on providing oral rehydration salts and other more-appropriate relief supplies.^{40,42}

Conducting surveillance in conditions of armed conflict is particularly difficult.²⁹⁻³¹ Efforts in Lebanon and the former Yugoslavia suggest that surveillance during conflict is best accomplished by rebuilding and supporting indigenous capabilities rather than attempting to impose a new external system.²⁹⁻³¹

Crude Mortality Rate

To gauge and follow the health status of a population affected by a complex emergency, certain basic indicators are commonly used. The crude mortality rate (CMR) is often cited as the most specific indicator of the health status of a population.^{14,36} A CMR not only indicates the current health state of a population but also provides a baseline against which the effectiveness of relief programs can be measured.

The CMR is usually expressed as the number of deaths per 10,000 population per day. In a developing country, the usual baseline CMR is 0.4-0.6/10,000 per day. A CMR greater than 1 is considered elevated and greater than 2 is an emergency situation calling for urgent relief action.^{14,36} Table 43-2 shows CMRs from some recent complex emergencies.

Depending on the circumstances, the CMR can be estimated from rapid assessments, surveys, special investigations, or routine surveillance. To esti-

Fig. 43-3. A Weekly Surveillance Reporting Form for Refugees or Displaced Persons in a Complex Humanitarian Emergency. Surveillance is a critical aspect of dealing with a complex humanitarian emergency. Reliable data are needed to monitor the public health vital signs of the affected population so that health problems are rapidly identified and appropriate relief measures implemented. Every situation demands the collection of different data in a somewhat different way at different time intervals. This form, however, provides a useful template for collecting information on most of the health outcomes of importance in the acute phases of a disaster during which people have been displaced. In a disaster situation, the desire for detailed data must be balanced against the need for an information collection system that provides what is really needed in a simple, straightforward, and practical way. Source: Centers for Disease Control and Prevention. *Famine-affected, refugee and displaced populations: recommendations for public health issues.* MMWR. 1992;41:42-3.

TABLE 43-2

CRUDE MORTALITY RATES IN SELECTED REFUGEE AND DISPLACED POPULATIONS, 1990-1994

Country of Origin	Country of Asylum	Year	CMR
Liberia	Internally displaced	1990	2.4
Iraq (northern provinces)	Internally displaced	1991	4.2
Somalia	Kenya	1992	7.4
Somalia	Internally displaced	1992	17.0
Burma (Myanmar)	Bangladesh	1992	1.6
Sudan	Internally displaced	1993	7.6
Burundi	Rwanda	1993	3.0
Rwanda	Burundi	1994	9.0
Rwanda	Zaire	1994	59-94

CMR: crude mortality rates

Data Sources: (1) Defense Intelligence Agency. *Bosnia Country Handbook*. Washington, DC: DIA; 1996, (2) Centers for Disease Control and Prevention. *Famine-affected, refugee, and displaced populations: recommendations for public health issues*. MMWR. 1992;41(RR-13):23-25, and (3) Smith CR. *Angels from the Sea: Relief Operations in Bangladesh, 1991*. Washington, DC: History and Museums Division, Headquarters, US Marine Corps; 1995: 9-27.

mate the CMR, a reasonable estimate of a denominator is needed. As was found in Goma, Zaire, however, obtaining an estimate of population size can be very difficult. Despite much attention to this issue, in that crisis the denominator was ultimately judged to be within the range of 500,000 to 800,000 persons; a more precise estimate was not possible.⁴⁹

Many different techniques are used to estimate population size, most relying on some kind of simple sampling scheme.^{13,14,17,18} Population estimates can be highly politicized as displaced populations and some relief groups may have an interest in larger numbers while some governments may promote smaller estimates. Some within and outside the military have suggested that the powerful technology of the US military intelligence community and other military technologies, such as satellite imagery, may be of great value in locating and accurately counting displaced populations. These clearly could have an important role in some situations.

Obtaining the numerator, the number of deaths, can be a problem as well. Techniques used for counting deaths in a crisis include counting new plots in graveyards, counting burial shrouds sold, and interviewing local religious leaders and civil authorities. In some situations, the number of deaths may be very hard to quantify. For example, families that receive a food ration for every family member may be very reluctant to report a death. (Often food ra-

tions will be continued in order to encourage reporting.) In some cultures, individuals may be very reluctant to report deaths to outside authorities for religious or cultural reasons. In the chaos of Goma, Zaire, where there was no way to dig graves in the volcanic rock, epidemiologists were able to quantify death rates by counting the bodies left by the roadside.⁴⁹ This is one example of how methods can be devised on the scene to collect data.

Nutritional Surveys

Another important focus of information collection in an emergency is nutritional data, specifically evidence of acute malnutrition or acute micronutrient deficiencies. In the nutritional survey, anthropomorphic measures of a random sample of children between 6 months and 5 years of age (the most vulnerable group) are taken to assess the nutritional state of the population overall. Either weight-for-height is measured or a mid-upper arm circumference (MUAC) is taken (see Chapter 47, Nutritional Assessment and Nutritional Needs of Refugee or Displaced Populations).

The nutritional status of the population is typically expressed as the prevalence of wasting in the children measured, as determined by low weight-for-height or small MUAC. A prevalence of wasting of greater than 8% is considered severe and of

greater than 10% is critical.⁵⁰ The percentage of children with edema, which indicates severe malnutrition, can also be a useful indicator. Indicators of specific micronutrient deficiencies, such as xerophthalmia from vitamin A deficiency, can be important as well. Considerable literature is available on nutritional surveys and the specific methods used to conduct them.^{13,14,42,50} Part of the Epi Info⁵¹ software package is a nutrition module that allows rapid data entry and analysis.

While many humanitarian workers focus on nutritional surveys in the emergency phase of a crisis, the occurrence of malnutrition is the result of what are usually complex and long-standing food problems. Techniques exist to evaluate food production, availability, accessibility, security, stores, markets, and distribution;^{13,14,50} these techniques can also provide critical information for relief efforts and may predict a food crisis before malnutrition becomes apparent.

An Effective Health Information System

Obtaining data is only half of the battle. Data must be translated into usable information and disseminated to those who need to know.^{13,14,32} Information is powerful only if it is used effectively. A commander or a regional supervisor, for example, may need only key statistics that bear on a major programmatic decision. A survey that shows that a low percentage of persons in a particular camp are immunized against measles supports a decision to devote resources to an emergency immunization campaign. Reports going back to headquarters in Washington, DC, should stress items of interest to senior commanders. A graphical representation of escalating crude mortality rates in certain regions may provide the basis for redirecting support or perhaps even redefining the mission. Care providers on the front lines of a crisis may be interested in simple graphs showing recent trends in local febrile illness, such as a sudden increase in malaria, so they can develop local treatment protocols.

A successful health information system requires substantial proactive effort and, sometimes, clever marketing to use and disseminate information effectively. Exhibit 43-2 lists the steps in developing a health information system. Of note is that a health information system is dynamic and must be tailored for the situation. A sound system includes the ongoing evaluation of the system itself to ensure that it is effective and meeting the needs of the decision makers.

As a rule, information should be carefully scrutinized in a complex emergency. Data of poor quality or obtained by questionable methods are often readily available, and they can easily be misinterpreted and misused. For example, if a clinic reports that 25% of children are malnourished based on the self-selected clinic population and this was interpreted as the extent of malnutrition in the population overall, a highly skewed view of the situation would result.

Boss and colleagues⁵² reviewed 23 surveys conducted in Somalia between 1991 and 1993. A wide diversity of methods and reporting procedures was used. Despite much effort to obtain needed information in this crisis, the differences in study objectives, designs, parameters measured, methods of measurement, definitions, and analyses prevented decision makers from making the most effective use of the data. Those conducting surveys in complex emergencies should define clear study objectives, use standard sampling and data collection methods, and ensure precise, written documentation of objectives, methods, and results.

EXHIBIT 43-2

STEPS IN DEVELOPMENT OF AN EFFECTIVE HEALTH INFORMATION SYSTEM

1. Assign primary responsibilities for coordinating and operating the health information system (HIS)
2. Define HIS objectives
3. Identify specific data to be collected and measures to be used
4. Establish chains of information transmission
5. Develop case definitions
6. Develop data collection forms
7. Train personnel and field-test system
8. Develop methods of data entry and analysis
9. Develop feedback mechanisms
10. Evaluate regularly and adapt HIS as needed

Data source: Centers for Disease Control and Prevention. *Famine-affected, refugee, and displaced populations: recommendations for public health issues. MMWR. 1992;41(RR-13).*

The findings of field studies will have to be carefully explained to decision makers and the media, all of whom may not readily understand the meaning of the data collected and the data's limitations. In southern Sudan, where security problems prevented access by relief workers to the population at large, nutrition and mortality assessments were intrinsically biased because they could only be conducted in areas where food was being distributed. Inappropriate use of this information led to misunderstandings of the relief needs and to misreporting of the situation.³⁶

Ideally, an information system is an integrated and coordinated effort. Responsibilities for report-

ing, analyzing, and disseminating data should be clear. This can be hard to accomplish in the chaos of complex emergencies. In relief efforts in Goma, Zaire, the UN High Commissioner for Refugees successfully established an integrated health information system involving many other agencies and the coalition military forces.⁴⁹ Similarly, in Bosnia and Herzegovina, the WHO worked closely with other agencies and with indigenous persons to collect and use health information.³¹ These unprecedented efforts in complex emergencies led to a much better understanding of morbidity and mortality patterns and thus to improved decision making about relief efforts.

PRINCIPAL CAUSES OF MORBIDITY AND MORTALITY

Much work has been done to elucidate the causes of death and dying in both the combatants and the civilian victims of complex emergencies. The combatants in situations of armed conflict often experience very high rates of injury and death because of the type of fighting going on, the weapons available, and the lack of medical care to treat the wounded.⁵³

In some complex emergencies, however, the preponderance of morbidity and mortality (up to 90% of deaths) occurs in civilians.⁵⁴⁻⁵⁶ This is the result of many complex and interrelated factors, including violence, destruction of the food economy, destruction of the health system, population displacement, poverty, and infectious disease. In some refugee camps in Somalia (1991 and 1992), for example, an estimated 74% of children younger than 5 years of age died.⁵⁷ This was the result of malnutrition, communicable disease, and other problems stemming from the ongoing violence.⁵⁸

The ICRC, which provides much of the casualty care in complex emergencies, has published information on the subject of the war-wounded and their management.^{13,59} Dealing with war trauma is beyond the scope of this textbook, but preventive medicine personnel should consider that violence and trauma are an important aspect of complex emergencies. Indeed, in some complex emergencies, violence has been the greatest threat to the public health.^{43,53-56,60,61}

Civilians may find themselves in the way of the fighting, but in some complex emergencies, intentional human rights violations and outright genocide are the most important causes of violent death. In the former Yugoslavia, as many as 250,000 civilians were killed in the late 1980s and early 1990s;

many were targets of warring factions.⁶⁰ In Rwanda, perhaps as many as a million people were killed by violence in civil disturbances and massacres in 1994.⁴⁹ In Cambodia in the late 1970s, an estimated 4 million to 6 million people died under the Khmer Rouge regime; most of the deaths were from violent causes.⁶² Land mines are an enormous cause of morbidity and mortality among civilians during and after many complex emergencies⁶³ (see Chapter 41, *The Challenge of Humanitarian Assistance in the Aftermath of Natural Disasters*).

Understanding the causes of violence and how they can be prevented is a major public health concern. Preventive medicine personnel could become involved in planning health services and allocating limited health resources. For example, the ICRC, using an epidemiologic approach to casualty management, has reevaluated how it provides surgical care in situations of conflict and how the effectiveness of providing surgical services compares to other health interventions.^{64,65}

Aside from violence, the principal causes of death among refugees and displaced persons have been childhood diseases, such as the primarily preventable communicable diseases measles, diarrheal disease, acute respiratory infection, and malaria.^{14,66-70} Other infectious diseases, such as meningococcal meningitis, are occasionally important. Protein energy malnutrition and specific micronutrient deficiencies have been critical cofactors of mortality in many crises.⁷¹⁻⁷³ Figure 43-2 shows typical causes of death in two refugee situations. In many crises, certain groups have been more vulnerable. Excess mortality in complex emergencies is typically greatest in the 1- to 14-year-old age groups and in women.^{14,66,67}

TEN CRITICAL EMERGENCY RELIEF MEASURES

Although every complex emergency is different and the relative priority of emergency health interventions varies, there is a fundamental core of urgent relief measures. The ten essential emergency relief measures discussed below are adapted from a report of a WHO conference.⁷⁴ During this meeting, a group of experienced relief experts decided on the key priorities in providing emergency relief for refugees and displaced persons, excluding measures to contain violence. The measures are not listed in any particular order because their relative importance will change depending on the situation. It is unusual, however, for another measure to crack into this core group during the emergency phase of a relief operation.

Rapidly Assess the Health Status of the Affected Population

Effective relief depends on characterizing the situation with timely and sound public health data.

Establish Disease Surveillance and a Health Information System

The ongoing monitoring of important diseases and the use of this information for public health action is critical in designing and running effective relief efforts.

Immunize Against Measles and Provide Vitamin A in Situations of Food Shortage

Measles in children has been shown repeatedly to be a major, and often the most important, cause of death in refugees and displaced persons. Measles outbreaks can be explosive and have caused thousands of deaths in just a few weeks. Studies among refugees show that large measles outbreaks can occur even if vaccine coverage rates exceed 80%. Therefore, measles immunization campaigns must be accorded the highest priority.⁷⁵ They should not be delayed until measles cases are reported or until other vaccines become available. Measles deaths occur primarily in young children, but children as old as 14 to 15 years have been affected.^{66-73,75}

The most common nutritional deficiency in refugee and displaced populations is lack of vitamin A.^{72,76} Deficiency of this vitamin has been shown to be an important cause of mortality in measles cases and of mortality from all causes. Vitamin A supple-

mentation is cheap and easy. Thus, mass administration of vitamin A at the same time as measles vaccination can be an important adjunct intervention to reduce the consequences of measles infection, particularly in malnourished populations.

In selected situations, vaccination against diphtheria, pertussis, tetanus, polio, tuberculosis, meningococcal meningitis, or cholera may be appropriate. But rarely, if ever, will these interventions be as important as immunization against measles. These other immunizations usually become considerations after the emergency phase has passed.^{14,67-74,76}

The US military has a number of logistic capabilities to assist in emergency vaccination campaigns. Military commanders must be careful, however, not to support unnecessary campaigns, as has been done in the past,⁷⁷ or fail to support needed programs in a timely fashion. In northern Iraq, an urgent measles vaccination campaign for the Kurds was delayed unnecessarily.⁴⁰ Also commanders must realize that although US service members receive many vaccinations, few in the armed forces have much experience with the technical aspects of mounting an emergency vaccine campaign in the field in another population. Furthermore, the military may not have critical supplies readily available, such as pediatric vaccine formulations or equipment for an extended cold chain.⁹

Institute Diarrhea Control Programs

Diarrheal diseases are often a principal cause of morbidity and mortality in complex emergencies.^{13,14,66,68-71,78} Common pathogens such as rotavirus and *E coli* are often important causes of diarrhea outbreaks, but *Vibrio cholera* and drug-resistant *Shigella* species have also caused devastating outbreaks. Prevention of all types of diarrhea involves providing good sanitation, clean water, and adequate personal hygiene. Simple emergency measures to prevent diarrhea include organizing chlorination brigades, isolating defecation fields, and providing soap.^{79,80} Simple measures such as providing soap are inexpensive and can substantially reduce person-to-person disease transmission.

In some situations, though, and particularly in the emergency phases of a relief effort, preventive measures may not be feasible or effective. The critical intervention in coping with diarrheal disease then becomes preventing mortality through effective case management. Sound case management of

diarrheal disease, even in cholera epidemics, can reduce case fatality rates to less than 1%.^{79,80}

Effective case management of diarrhea is based primarily on providing fluid replacement through aggressive oral rehydration therapy. Intravenous fluid replacement and antibiotics are used selectively and according to protocols relevant to the situation. While these concepts are easy to understand, experience has shown that effective diarrhea treatment programs require substantial organization and numerous personnel with experience and training. In northern Iraq in 1991, for example, the abundance of rehydration salts and enthusiastic medical providers was not enough in the absence of effectively run rehydration centers.⁴² Effective case management of cholera and dysentery was also problematic in Rwanda in 1994.⁴⁹

Choosing an appropriate antimicrobial to treat cases during diarrhea outbreaks can be difficult. In Rwanda, *Shigella dysenteriae*, which was causing a devastating outbreak, demonstrated extensive resistance to the commonly available antimicrobials.⁴⁹ The US military had a large stockpile of ciprofloxacin, to which the bacteria were shown to be highly sensitive. Many relief groups, however, did not want an expensive and "high-tech" drug to become widely used, in part because ciprofloxacin resistance might develop. Ultimately, the US military collaborated with relief agencies to use ciprofloxacin in a controlled manner under agreed upon protocols.

An important component of diarrhea control programs is developing community outreach programs to seek out cases that may not present to treatment facilities. Education of the community, particularly mothers, on the use of oral rehydration therapy, the importance of continuing breast feeding, and the importance of personal hygiene is also a priority. Active case finding, surveillance, and outbreak investigation are essential in determining the causes of the outbreak.

While medical personnel deployed on military missions certainly may participate in diarrhea control programs, military commanders and care providers must appreciate that the approach to diarrhea management in a complex disaster is different from the approach that would be followed in the military setting. Military care providers may not have the necessary training or supplies, such as oral rehydration salts, to treat large numbers of diarrhea cases effectively.

Provide Elementary Sanitation and Clean Water

Many of the diseases that occur in the setting of a complex emergency are to a great extent the consequence of poor environmental conditions. Water

is often in short supply and of poor quality. There are limited means to dispose of waste. Vectors of communicable diseases may be prevalent. The means for basic personal hygiene may be lacking.^{13,14,79-82}

Addressing these environmental health issues, particularly providing potable water, usually is a very high priority. Water needs are frequently underestimated. Only 3 to 5 L of potable water per day must be consumed for short-term survival, but people need at least 15 to 20 L per day for cooking, cleaning, medical care, and, sometimes, important ritual purposes. In some situations, such as when people are active in a hot environment, water needs are even greater. Medical facilities require much more water, usually at least 100 L per patient per day.⁸¹

Environmental issues are often very difficult to resolve because they require considerable resources and technical expertise. Providing potable water to a group of refugees, for example, may require experienced engineers who can locate the best sources of water, whether from the ground, the surface, or a spring. Expertise, such as how to construct a proper well and select the appropriate pump, is needed to access the source. The characteristics of a water distribution system are important because they can greatly influence the way water is accessed and therefore used; if people have a difficult time obtaining water, they will use it sparingly.⁸³ Assessing and maintaining water quality is a critical aspect of a water program.⁸⁴ Local water may be a limited resource and local political considerations may be critical in its access and use. Cultural considerations can also be important factors in how water is accessed and used by the local population.⁸⁵

The technical skills and other considerations in waste disposal, vector control, and personal hygiene can be equally complex. Some relief organizations focus on environmental health issues but most do not. The technical challenges and lack of donor appeal of environmental issues remain major problems.

The military clearly has resources and expertise in environmental health; environmental health officers, entomologists, and other preventive medicine specialists have made many contributions to relief efforts in the past. In 1994 in Goma, Zaire, for example, US forces helped provide and distribute clean water. What is appropriate for supporting US service members, though, may not be appropriate for a humanitarian emergency. Some relief officials were critical of military efforts in Rwanda that relied on more technically difficult and slow purification techniques (primarily the reverse osmosis water purification unit) rather than simpler and more expedient chlorination techniques. Some of-

officials argued that using chlorine and teaching refugees to use it themselves would have been more effective.

Provide Adequate Shelter, Clothes, and Blankets

Shelter is a basic human need. The provision of the basic means to be protected from the elements—sun, rain, and cold—is a high priority. The WHO recommends that each person in a refugee camp have at least 30 m² of total area, with 3.5 m² of that for housing.⁸⁶ Also, in populations with nutritional deficits, substantial energy can be expended simply in trying to keep warm. So some have argued that in certain situations distributing shelter, clothes, and blankets may be more economical than distributing food.⁸⁷

As with environmental interventions, there is a substantial body of knowledge that deals with the technical considerations of emergency housing.^{13,20,86,87} The selection of the specific sites for shelter, the layout of camps, and the type of materials used in construction are all important issues. Camps constructed in poor locations and with inadequate design can accelerate communicable disease transmission. Other factors to consider are the local availability of materials, the economic level of development of the population, the social habits, the local customs, and the political context.

The decision to provide shelter can have significant long-term consequences. Simple shelters provided on an emergency basis may unintentionally evolve into a permanent camp and end up attracting more refugees to the site. Many of these issues may become *faits accomplis* before reasoned decisions can be made by relief officials. Refugees are often forced by circumstances into poor locations that would never have been chosen by relief workers who had been given the opportunity to make decisions based on health and safety.

In sum, military officials must be cautious when providing housing. Although materials may be available and shelter may be a high-priority issue, tents or other such items should not be reflexively supplied if they are unnecessary or inappropriate for the situation.

Ensure Food Supplies Are Adequate and Reach Intended Recipients

One of the hallmarks of complex emergencies is a shortage of food. Thus, providing at least 2,000 kcal per day per person is an essential priority in emergency situations. While it is often uncertain how many people actually die of starvation during

complex emergencies,⁸⁷ acute malnutrition has been shown to be a critical underlying cause of much morbidity and mortality.^{13,14,17–20,50,73} There are many ways of providing emergency food relief. General food rations can be distributed widely to the population, perhaps in exchange for work or school attendance. General food rations consist of nutritionally balanced basic commodities that are appropriate to the situation and culture. Selective or supplemental feeding programs target food for certain high-risk persons, such as malnourished children, tuberculosis patients, or lactating mothers. This food may be distributed as rations to take home or can be provided at feeding centers, such as “soup kitchens.” Therapeutic or rehabilitative feeding can be provided for significantly malnourished persons as a medical intervention and is usually given on an inpatient basis through assisted eating, nasal-gastric tube, or intravenous line.

The mechanics of managing food distribution and feeding programs are often complex. For example, an intensive rehabilitative program for severely malnourished children must have mechanisms to identify patients in the affected population. To some extent, patients may be self-referred, but often they must be proactively sought through clinic referrals and community outreach workers. Protocols and procedures must be developed to screen patients and determine who is eligible. Refeeding is labor-intensive and requires care providers with training and experience.⁵⁰ Patients typically have other aggravating illnesses and infections, such as malaria, that can complicate refeeding efforts. After discharge, follow-up programs must exist to prevent relapse. Sometimes family interventions are needed to counteract the social context that was a factor in the malnutrition. For example, in some cultures one child may be singled out to be deprived so that the other children may survive. The management of other food distribution programs can be complicated also and requires technical skills and experience.

Food programs have not always been successful, due in part to formidable problems of logistics, security, and distribution. Food aid can be highly politicized and food relief misused. Food supplies must be nutritionally balanced and culturally appropriate, and there has been much debate about the appropriate number of calories and the best content of food rations. Remarkably, micronutrient deficiencies have occurred in populations relying on donated food.⁷²

The causes of food shortages are complex and may involve disruption of harvests, collapse of markets, lack of distribution systems, manipulation of food supplies by warring factions, and many

other factors. Thus, an emergency feeding campaign must not only provide food urgently and effectively, but also begin to address the root problems of the crisis. Supplying seeds and agricultural implements may, in the long run, be as important as supplying emergency food.

There are a number of agencies that specialize in managing the “food pipeline” to emergency situations: the procurement, processing, shipping, and storing of bulk food. The World Food Programme is the principal international agency. In the United States, some of the principal agencies include Care, Catholic Relief Services, World Vision, and Feed the Children. On the scene of an emergency, other agencies, such as the ICRC and private volunteer organizations, often assume responsibility for actually distributing food and for administering feeding programs.

Military relief providers should be sensitive to the many facets and complexities of food relief. The US military has used the Meal, Ready to Eat (MRE) on occasion for emergency food relief, sometimes by dropping them from the air into inaccessible areas. While MREs may be better than nothing in an extreme crisis, they are a highly imperfect solution.⁹ Humanitarian MREs have been developed that are designed to be culturally appropriate and nutritionally balanced for almost any population (see Chapter 47, Nutritional Assessment and Nutritional Needs of Refugee or Displaced Populations). These could have a limited but very important niche in military relief efforts.

Establish Appropriate Curative Services

Establishing curative medical services that follow standard treatment protocols, are based on essential drug lists, and provide basic coverage to the community as a whole are usually a high priority in complex emergencies. Providing acute medical care is one of the most visible and understandable aspects of a relief operation, and experience has shown that many external medical providers are willing to volunteer in an emergency. In fact, one of the hallmarks of emergency relief is the dispatch of medical teams from developed countries to treat sick victims. However, what medical care is actually needed should be carefully considered before providing curative services; noble intentions may not necessarily translate into effective action.

Substantial experience shows that medical care in emergency situations should be based on simple standardized protocols. The WHO and other organizations have developed basic, easily adaptable, field-tested protocols for managing diarrheal dis-

ease, respiratory infection, febrile illness, and other common problems.^{13,14,18,79,80,89} Underlying these basic protocols are basic essential drug and supply lists.⁹⁰

Using standard protocols and basic supplies assures that the care provided will be appropriate and allows the most efficient use of limited resources. Following basic protocols enables physician assistants, nurses, and community health workers to provide effective medical care without time-consuming and overly technical interventions. This allows care to be delivered that is appropriate for the population and the same level of care to be sustained after the military and other outside relief workers depart. The management of relief supplies has been a very difficult problem in many disaster efforts; using essential drug and supply lists helps assure that logistic resources are devoted to needed items.

Medical providers must be prepared to treat the conditions they will face. Volunteer providers from sophisticated hospitals in developed nations may not be well trained in dealing with the common problems of refugees or in using basic protocols and techniques appropriate to the situation. They may be called on to use drugs and techniques that are no longer used in their countries. In many emergencies, field hospitals or specialty teams have been deployed when basic primary care that reaches a large number of the population was what was needed.^{27,28}

Military medical teams are highly capable and rapidly deployable to isolated and austere locations. Military medicine certainly has much to offer in times of crisis^{11,91}; however, military medicine may not be well prepared or well supplied to handle some emergency situations. A battalion aid station, for example, that is designed primarily to stabilize trauma cases in US combat troops and evacuate them is poorly equipped, staffed, and supplied to handle diarrhea and respiratory illness in children or other common problems of displaced persons. Medical teams deployed to complex emergencies may have to be staffed and supplied quite differently than when they are supporting military operations.^{9,92} Training medical personnel before they arrive in the field on the management of common health problems may be necessary.

Organize Human Resources

Community health experts are essential in assuring that medical care in an emergency is truly community-based and oriented toward primary care.^{13,18,85} While it is easy to focus on clinics and hospitals, community health workers are the means

by which health services actually reach much of the population. An effort should be made to ensure there is one community health expert for every 1,000 individuals in the target population.

Relief will only be effective if it is based on the needs and idiosyncrasies of the local cultures. Outside relief personnel may know little about local food preferences, sanitary mores, social customs, indigenous medical practices, and other such issues. A food program, for example, that provides culturally inappropriate commodities will not succeed. Community health experts will have insights into these matters that can profoundly effect the delivery of health services.

The access that community health experts have to the community can be critical. They are essential in communicating with local leaders, who play a central role in the success or failure of relief programs. If local leaders do not support an urgent measles vaccination program, for example, few people will participate. There can be many barriers to seeking medical care in an emergency, some practical and some cultural. Community health experts are often able to locate those in need. In northern Iraq, severely malnourished and dehydrated children were sometimes kept in a dark corner of their shelter and were not brought into the clinic unless the community health expert actively sought them out.⁴²

Those from outside the affected population who are providing relief may tend to see aid recipients as helpless victims, but disaster-affected populations have a wealth of human resources. In fact, those affected by disasters are usually very anxious to help themselves and only lack the means. Community health experts are the key to mobilizing indigenous resources into relief efforts. The US military needs to understand these issues and what relief agencies are trying to achieve with community health experts.

Coordinate Activities of Local Authorities and Relief Agencies

A hallmark of a complex emergency is the complex response. Many agencies and organizations—governmental and private, civilian and military, indigenous and external—become involved. Without effective cooperation and coordination, time, energy, money, supplies, and most importantly lives may be lost. This extremely important issue is covered in detail in Chapters 41, *The Challenge of Humanitarian Assistance in the Aftermath of Disasters*; 45, *The International Humanitarian Response System and the US Military*; and 46 *Domestic Disaster Response: FEMA and Other Governmental Organizations*.

PRISONERS OF WAR AND OTHER DETAINEES

Enemy prisoners of war, retained persons, and civilian internees are protected under international humanitarian law, the Law of War, and the US military's Uniformed Code of Military Justice.⁹³⁻⁹⁷ They state that all persons captured, detained, interned, or otherwise held in armed conflicts must receive humanitarian care and treatment. The stress of combat or other factors never justifies inhumane actions.

From a preventive medicine point of view, all detained persons must be provided with sanitary living conditions, food, water, and access to necessary medical care. Preventive medicine personnel are likely to be involved in planning for detained persons and assuring that these basic conditions are met. The Persian Gulf War is a recent example of this type of preventive medicine involvement; during and after the ground war, preventive medicine personnel were largely responsible for managing

thousands of Iraqi prisoners. Of additional note is that sick and wounded detainees are eligible for repatriation to their home country or neutral territory. Also, detained medical personnel must be granted facilities and the means to provide medical care to fellow detainees. Preventive medicine personnel may therefore have to work with detained providers to medically screen new arrivals, contain disease outbreaks, run vaccination campaigns, or provide other medical services.

The ICRC has special responsibilities in regard to detained persons. The ICRC regularly conducts missions all over the world to assess, monitor, and assist war prisoners and other detained persons. Under international humanitarian law, representatives from the ICRC have the right to be closely involved in any activities the military undertakes involving detained persons, and they exercise that right.

SUMMARY

Complex humanitarian emergencies are a tragic but inescapable part of our world. US military forces will continue to be involved in at least some of these

crises. Whatever the specific mission, preventive medicine personnel have the potential to play a major role in shaping both military and overall re-

lief efforts through understanding and interpreting critical health information for commanders.

Most experience to date in complex emergencies comes from crises in the developing world, principally Africa. At the time of this writing, major complex emergencies are ongoing or pending in very different environments. The crisis in the former Yugoslavia has focused attention on trauma and human rights abuses as public health issues. The severe food shortages and declining health situation in North Korea may lead to a complex emergency in a more developed country in which, because of

the repressive political regime, people stay at home and do not become displaced. This may lead to different patterns of morbidity and mortality and the need for different intervention strategies. The continued massive influx of persons into cities throughout the world and the extensive environmental damage in former Iron Curtain countries are other factors that could put a different face on future complex emergencies. Thus, while the principles enumerated above will remain important, preventive medicine personnel dealing with future complex emergencies will have to understand and cope with the unforeseen.

REFERENCES

1. Sivard RL. *World Military and Social Expenditures* 1996. Washington, DC: World Priorities; 1996: 7.
2. Stockholm International Peace Research Institute. *Yearbook* 1996. Uppsala, Sweden: Uppsala University; 1996: 15–22.
3. United States Mission to the United Nations. *Global Humanitarian Emergencies*, 1996. New York: United States Mission to the United Nations; 1996.
4. US Committee for Refugees. *World Refugee Survey* 1996. Washington, DC: Immigration and Refugee Services of America; 1996: 4–7.
5. Toole MJ. Complex emergencies: refugee and other populations. In: Noji E, ed. *The Public Health Consequences of Disasters*. New York: Oxford University Press, 1996: 419–442.
6. Committee on the Navy and Marine Corps in Regional Conflict in the 21st Century. *The Navy and Marine Corps in Regional Conflict in the 21st Century*. Washington, DC: National Academy Press; 1996: 27–39.
7. Marine Corps Intelligence Activity. *Threats in Transition, Marine Corps Mid-Range Threat Estimates 1995–2005*. Quantico, Va: MCIA; 1995.
8. Burkle FM Jr, Frost DS, Greco SB, Peterson HV, Lillibridge SR. Strategic disaster preparedness and response: implications for military medicine under joint command. *Mil Med*. 1996;161:442–447.
9. Sharp TW, Yip R, Malone JD. US military forces and emergency international humanitarian assistance: observations and recommendations from three recent missions. *JAMA*. 1994;272:386–390.
10. Sharp TW, Malone JD, Bouchard JF. Humanitarian assistance from the sea. *Proceedings of the U.S. Naval Institute*. 1995;121:70–75.
11. Gaydos JC, Luz GA. Military participation in emergency humanitarian assistance. *Disasters*. 1994;18:48–57.
12. United Nations High Commissioner for Refugees. *A UNHCR Handbook for the Military on Humanitarian Operations*. Geneva: UNHCR; 1994.
13. Perrin P. *Handbook on War and Public Health*. Geneva: International Committee of the Red Cross; 1996.
14. Centers for Disease Control and Prevention. Famine-affected, refugee, and displaced populations: recommendations for public health issues. *MMWR*. 1992;41(RR-13).
15. Mediciens sans Frontieres. *Refugee Health: An Approach to Emergency Situations*. London: MacMillan; 1997.

16. United Nations Children's Fund. *Children in War: A Guide to the Provision of Services*. New York: Oxford University Press; 1992.
17. United Nations High Commissioner for Refugees. *Handbook for Emergencies*. Geneva: UNHCR; 1982.
18. Sandler RH, Jones TC, eds. *Medical Care of Refugees*. New York: Oxford University Press; 1987.
19. Desenclos JC, ed. *Clinical Guidelines, Diagnostic and Treatment Manual*. Paris: Medecins sans Frontieres; 1990.
20. Office of Foreign Disaster Assistance. *Field Operations Guide for Disaster Assessment and Response*. Version 2.0. Washington, DC: US Agency for International Development; 1994. (Also available on the Internet, see Table 43-1), Various Sources of Background Data and Information on Disasters, Conflict, and Complex Emergencies.
21. Lillibridge SR, Sharp TW. Public health issues in disasters. In: Last JM, Wallace RB, eds. *Maxcy-Rosenau-Last Public Health and Preventive Medicine*. 14th ed. Norwalk, Conn: Appleton and Lange; 1997: 1171–1175.
22. *Joint Task Force Commanders Handbook for Peace Operations*. Ft. Monroe, Va: Joint Warfighting Center; 1995.
23. *Expeditionary Forces Conducting Humanitarian Assistance Missions*. Norfolk, Va: Surface Warfare Development Group; 1995. Fleet Marine Force Operational Handbook OH 1–24.
24. *Multi-service Procedures for Foreign Humanitarian Assistance Operations*. Langley Field, Va: US Atlantic Command Air-Land-Sea Application Center; 1994.
25. Lamon KP. *Training and Education Requirements for Humanitarian Assistance Operations*. Alexandria, Va: Center for Naval Analysis; 1996.
26. Dworken JT. *Military Relations with Humanitarian Relief Organizations: Observations from Restore Hope*. Alexandria, Va: Center for Naval Analysis; 1993.
27. Seaman J. Disaster epidemiology: or why most international disaster relief is ineffective. *Injury*. 1990;21(1):5–8.
28. Noji EK. Disaster epidemiology. *Emerg Med Clin North Am*. 1996;14:289–300.
29. Armenian HK. In wartime: options for epidemiology. *Am J Epidemiol*. 1986;124:28–32.
30. Armenian HK. Perceptions from epidemiologic research in an endemic war. *Soc Sci Med*. 1989;28:643–647.
31. Weinberg J, Simmonds S. Public health, epidemiology and war. *Soc Sci Med*. 1995;40:1663–1669.
32. Gregg MB. Communicating epidemiologic findings. In: Gregg MB, ed. *Field Epidemiology*. New York: Oxford University Press; 1996: 130–151.
33. Central Intelligence Agency. *World Factbook 1996*. Washington, DC: CIA, Office of Public and Agency Information; 1996. (Also available on the Internet, see Table 43-1), Various Sources of Background Data and Information on Disasters, Conflict, and Complex Emergencies.
34. Armed Forces Medical Intelligence Command. *Medical Environmental Disease Intelligence and Countermeasures*. Fort Detrick, Md: AFMIC; 1996. CD-ROM disk.
35. Defense Intelligence Agency. *Bosnia Country Handbook*. Washington, DC: DIA; 1996.
36. Toole MJ. The rapid assessment of health problems in refugee and displaced populations. *Med Global Surveillance*. 1994;1:200–207.
37. Lillibridge SR, Noji EK, Burkle FM Jr. Disaster assessment: the emergency health evaluation of a population affected by a disaster. *Ann Emerg Med*. 1993;22:1715–1720.

38. Tailhades M, Toole MJ. Disasters: what are the needs? How can they be assessed? *Trop Doct.* 1991;21(suppl 1):18–23.
39. Glass RI, Cates W Jr, Nieburg PN, et al. Rapid assessment of health status and preventive-medicine needs of newly arrived Kampuchean refugees, Se Kao, Thailand. *Lancet.* 1980;1:868–872.
40. Centers for Disease Control. Public health consequences of acute displacement of Iraqi citizens—March–May 1991. *MMWR.* 1991;40:443–447.
41. Smith CR. *Angels from the Sea: Relief Operations in Bangladesh, 1991.* Washington, DC: History and Museums Division, Headquarters, US Marine Corps; 1995: 9–27.
42. Yip R, Sharp TW. Acute malnutrition and high childhood mortality related to diarrhea. *JAMA.* 1993;270:587–590.
43. Gessner BD. Mortality rates, causes of death, and health status among displaced and resident populations of Kabul, Afghanistan. *JAMA.* 1994;272:383–385.
44. Sharp TW, DeFraites RF, Thornton SA, Burans JP, Wallace MR. Illness in journalists and relief workers during international relief efforts in Somalia, 1992–93. *J Travel Med.* 1995;2:70–76.
45. Sharp TW, Thornton SA, Wallace MR, et al. Diarrheal disease among military personnel during Operation Restore Hope, Somalia, 1992–1993. *Am J Trop Med Hyg.* 1995;52:188–193.
46. Wallace MR, Sharp TW, Smoak B, et al. Malaria among U.S. troops in Somalia. *Am J Med.* 1996;100:49–55.
47. Burans JP, Sharp TW, Wallace M, Longer CP, Hyams KC. The threat of hepatitis E virus in Somalia during Operation Restore Hope. *Clin Infect Dis.* 1994;18:80–83.
48. Marfin AA, Moore J, Collins C, et al. Infectious disease surveillance during emergency relief to Bhutanese refugees in Nepal. *JAMA.* 1994;272:377–381.
49. Goma Epidemiology Group. Public health impact of Rwandan refugee crisis: what happened in Goma, Zaire, in July, 1994? *Lancet.* 1995;345(8946):339–344.
50. Arbelot A, ed. *Nutrition Guidelines.* Paris: Medecins sans Frontieres; 1995.
51. *Epi Info.* Version 6.0. Atlanta: Centers for Disease Control and Prevention; 1995.
52. Boss LP, Toole MJ, Yip R. Assessments of mortality, morbidity, and nutritional status in Somalia during the 1991–1992 famine: recommendations for standardization of methods. *JAMA.* 1994;272:371–376.
53. Garfield RM, Neugut AI. Epidemiologic analysis of warfare, a historical review. *JAMA.* 1991;266:688–692.
54. Fitzsimmons DW, Whiteside AW. *Conflict, War, and Public Health.* London: Research Institute for the Study of Conflict and Terrorism; 1994. Conflict Study 276.
55. Leaning J. When the system doesn't work: Somalia 1992. In: Cahill KM, ed. *A Framework for Survival: Health, Human Rights, and Humanitarian Assistance in Conflicts and Disasters.* New York: HarperCollins; 1993:103–120.
56. Mann J, Drucker E, Terantola D, McCabe MP. Bosnia: the war against public health. *Med Global Survival.* 1994;1:130–146.
57. Moore PS, Marfin AA, Quenemoen LE, et al. Mortality rates in displaced and resident populations of central Somalia during the 1992 famine. *Lancet.* 1993;341:935–938.
58. Manoncourt S, Doppler B, Enten F, et al. Public health consequences of the civil war in Somalia, April 1992. *Lancet.* 1992;340:176–177.

59. Coupland RM, Parker PJ, Gray RC. Triage of war wounded: the experience of the International Committee of the Red Cross. *Injury*. 1992;23:507–510.
60. Toole MJ, Galson S, Brady W. Are war and public health compatible? *Lancet*. 1993;341:1193–1196.
61. Flanagan A. Somalia's death toll underlines challenges in post-cold war world. *JAMA*. 1992;268:1985–1987.
62. Shawcross W. *The Quality of Mercy*. New York: Simon and Schuster; 1984.
63. Strada G. The horror of land mines. *Sci Am*. 1996;274:40–45.
64. Coupland RC. Epidemiologic approach to surgical management of the casualties of war. *BMJ*. 1994;308:1693–1697.
65. Perrin P. Strategy for medical assistance in disaster situations. *Intl Rev Red Cross*. 1991;284:494–504.
66. Toole MJ, Waldman RJ. Prevention of excess mortality in refugee and displaced populations in developing countries. *JAMA*. 1990;263:3296–3302.
67. Toole MJ. Communicable diseases and disease control. In: Noji E, ed. *The Public Health Consequences of Disasters*. New York: Oxford University Press; 1996: 80–100.
68. Toole MJ. Communicable disease epidemiology following disasters. *Ann Emerg Med*. 1992;21:418–420.
69. Howard MJ, Brillman JC, Burkle FM Jr. Infectious disease emergencies in disasters. *Emerg Med Clin North Am*. 1996;14:413–428.
70. Aghababian RV, Teuscher J. Infectious diseases following major disasters. *Ann Emerg Med*. 1992;21:362–367.
71. Shears P. Epidemiology and infection in famine and disasters. *Epidemiol Infect*. 1991;107:241–251.
72. Toole MJ. Micronutrient deficiencies in refugees. *Lancet*. 1992;339:1214–1216.
73. Yip R. Famine. In: Noji E, ed. *The Public Health Consequences of Disasters*. New York: Oxford University Press; 1997: 305–335.
74. World Health Organization. *The Potential Role of New Cholera Vaccines in the Prevention and Control of Cholera Outbreaks during Acute Emergencies: Report of a Meeting, 13-14 Feb 1995*. Geneva: WHO; 1995: 3–5.
75. Toole MJ, Steketee RW, Waldman RJ, Nieburg PI. Measles prevention and control in emergency settings. *Bull World Health Organ*. 1989;67:381–386.
76. Nieburg P, Waldman RJ, Leavell R, Sommer A, DeMaeyer EM. Vitamin A supplementation for refugees and famine victims. *Bull World Health Organ*. 1988;66:689–697.
77. Byrd T. Disaster medicine: toward a more rational approach. *Mil Med*. 1980;145:270–273.
78. Centers for Disease Control and Prevention. Health status of displaced persons following civil war—Burundi, December 1993–January 1994. *MMWR*. 1994;43:701–703. Published erratum: *MMWR*. 1995;44:654.
79. World Health Organization. *Treatment and Prevention of Acute Diarrhea: Practical Guidelines*. 2nd ed. Geneva: WHO; 1989.
80. World Health Organization. *Guidelines for Cholera Control*. Geneva: WHO; 1992.
81. Pan American Health Organization. *Environmental Health Management after Natural Disasters*. Washington, DC: PAHO; 1982: 3–8. Scientific Publication 432.
82. Pan American Health Organization. *Emergency Vector Control after Natural Disasters*. Washington, DC: PAHO; 1982: 8–18. Scientific Publication 419.

83. Cairncross S, Feachem R, eds. *Environmental Health Engineering in the Tropics*. 2nd ed. New York: John Wiley and Sons; 1993: 111–147.
84. World Health Organization. *Guidelines for Drinking Water Quality*. 2nd ed. Geneva: WHO; 1993: 131–142.
85. Whyte A. *Guidelines for Planning Community Participation Activities in Water Supply and Sanitation Projects*. Geneva: World Health Organization; 1986.
86. World Health Organization. *Health Principles of Housing*. Geneva: WHO; 1989.
87. Rivers JPW. The nutritional biology of famine. In: Harrison GA, ed. *Famine*. London: Oxford Scientific Publications, 1988: 87–95.
88. Hansch S. *How Many People Die of Starvation in Humanitarian Emergencies?* Washington, DC: Refugee Policy Group; 1995: 9–16. Working paper.
89. World Health Organization. Clinical management of acute respiratory infections in children. *Bull World Health Organ*. 1981;59:707–716.
90. World Health Organization. *The New Emergency Health Kit*. Geneva: WHO; 1993: 1–43.
91. Coultrip R. Medical aspects of U.S. disaster relief. *Mil Med*. 1974;139:879–883.
92. Yeskey KS, Llewellyn CH, Vayer JS. Operational medicine in disasters. *Emergency Med Clin North Am*. 1996;14:429–438.
93. US Department of the Army. *Enemy Prisoners of War, Civilian Internees, Retained Personnel, and Other Detainees*. Washington, DC: DA; 1996. Army Regulation 190-8.
94. International Committee of the Red Cross. *The Geneva Conventions of 12 August 1949*. Geneva: ICRC; 1995.
95. International Committee of the Red Cross. *Protocols Additional to the Geneva Conventions of 12 August 1949*. Geneva: ICRC; 1977.
96. International Committee of the Red Cross. *International Humanitarian Law*. Geneva: ICRC; 1993.
97. Vollmar LC. Development of the laws of war as they pertain to medical units and their personnel. *Mil Med*. 1992;157:231–235.