Child Health in Complex Emergencies

William J. Moss, Meenakshi Ramakrishnan, Dory Storms, Anne Henderson Siegle, William M. Weiss, and Lulu Muhe, Roundtable on the Demography of Forced Migrations, Program on Forced Migration and Health, Mailman School of Public Health Columbia University, National Research Council

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Roundtable on the Demography of Forced Migration
Committee on Population

and
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Preface

In response to the need for more research on displaced persons, the Committee on Population developed the Roundtable on the Demography of Forced Migration in 1999. This activity, which is supported by the Andrew W. Mellon Foundation, provides a forum in which a diverse group of experts can discuss the state of knowledge about demographic structures and processes among people who are displaced by war and political violence, famine, natural disasters, or government projects or programs that destroy their homes and communities. The roundtable includes representatives from operational agencies, with long-standing field and administrative experience. It includes researchers and scientists with both applied and scholarly expertise in medicine, demography, and epidemiology. The group also includes representatives from government, international organizations, donors, universities, and nongovernmental organizations.

The roundtable is organized to be as inclusive as possible of relevant expertise and to provide occasions for substantive sharing to increase knowledge for all participants, with a view toward developing cumulative facts to inform policy and programs in complex humanitarian emergencies. To this aim, the roundtable has held annual workshops on a variety of topics, including mortality patterns in complex emergencies, demographic assessment techniques in emergency settings, and research ethics among conflict-affected and displaced populations.

Another role for the roundtable is to serve as a promoter of the best research in the field. The field is rich in practitioners but is lacking a coher-

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ent body of research. Therefore, the roundtable and the Program on Forced Migration and Health at the Mailman School of Public Health of Columbia University have established a monograph series to promote research on various aspects of the demography of forced migration. These occasional monographs are individually authored documents presented to the roundtable and any recommendations or conclusions are solely attributable to the authors. It is hoped these monographs will result in the formulation of newer and more scientifically sound public health practices and policies and will identify areas in which new research is needed to guide the development of forced migration policy.

This monograph has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making the published monograph as accurate and as sound as possible. The review comments and draft manuscript remain confidential.

Ronald J. Waldman of Columbia University served as review coordinator for this report. We wish to thank the following individuals for their participation in the review of this report: Christopher Schwabe, health and public finance economist at Medical Care Development International; and Steven Hansch of the Institute for the Study of International Migration, Georgetown University.

Although the individuals listed above provided constructive comments and suggestions, it must be emphasized that responsibility for this monograph rests entirely with the authors.

At the request of the Department of Child and Adolescent Health and Development of the World Health Organization (WHO), the Center for International Emergency, Disaster and Refugee Studies (renamed the Center for Refugee and Disaster Response) at the Johns Hopkins Bloomberg School of Public Health convened a multidisciplinary team to review child health in complex emergencies. The purpose was to conduct a situational analysis of child health activities in preparation for an interagency consultation meeting sponsored by WHO and UNICEF. The consultation meeting was held October 21-22, 2003, in Geneva, Switzerland. Participants reviewed the findings of the report, made recommendations, and identified research needs. This monograph builds on that report and incorporates results from the interagency meeting.

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ration between the Roundtable on the Demography of Forced Migration of the National Academies and the Program on Forced Migration and Health at the Mailman School of Public Health at Columbia University. We thank the Andrew W. Mellon Foundation for its continued support of the work of the roundtable and the program at Columbia. A special thanks is due Carolyn Makinson of the Mellon Foundation for her enthusiasm and significant expertise in the field of forced migration, which she has shared with the roundtable, and for her help in facilitating partnerships such as this.

Most of all, we are grateful to the authors of this monograph. We hope that this publication contributes to both better policy and better practice in the field.

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OVERVIEW

Addressing the health needs of children in complex emergencies is critical to the success of relief efforts and requires coordinated and effective interventions. However, little systematic work has been undertaken to evaluate such care. To address this need, this monograph presents a review of the published literature in this area, providing background on the burden of disease, the major causes of morbidity and mortality, and the evidence base for effective interventions. It also describes surveys of nongovernmental organizations (NGOs) and international agencies providing care to children in complex emergencies, which were conducted to identify guidelines commonly used to provide such care and assesses the content and limitations of these guidelines. A more in-depth survey of several organizations was also conducted to assess obstacles to this kind of care.

On the basis of the survey findings and the review of the published literature, the working group recommended that evidence-based, locally adapted guidelines to address the curative and preventive care of children in complex emergencies and health systems planning should be adopted by ministries of health and supported by the World Health Organization (WHO) and UNICEF. The guidelines should target, as much as possible, the different levels of health care workers providing care to children to ensure appropriate, effective, and uniform care in a variety of situations. Specific examples of areas for further research and guideline development are presented.

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This monograph is not intended to be an exhaustive and definitive assessment of child health in complex emergencies. The topic is much too vast and complex, and different individuals and institutions will have incompatible perspectives. Rather, we aim to provide a starting point for discussion and debate on how to improve the care of children in these settings.

CARE OF CHILDREN IN COMPLEX EMERGENCIES

Addressing the health needs of children in complex emergencies is critical to the success of relief efforts and requires coordinated and effective interventions. The major causes of childhood morbidity and mortality in complex emergencies are similar to nonemergency settings: diarrheal diseases, acute respiratory tract infection, measles, malaria, and malnutrition. However, the severity and magnitude of these diseases are often exacerbated by conflict or disaster, necessitating rapid assessment and treatment of large numbers of severely ill children. Disease surveillance systems must be rapidly established, particularly for diseases known to cause outbreaks with high case fatality, such as measles, cholera, shigellosis, and meningococcal disease.

Guidelines are necessary but not sufficient to ensure optimal care. Guidelines define the standard and scope of curative and preventive care, often guide training and needs assessment efforts, and are an important component of preparedness planning. In scope, guidelines can address curative aspects of disease diagnosis and treatment in ill children, preventive health interventions for the individual and community, and development and oversight of health systems. Each of these levels of care, from the individual child to the national level of health system planning, is important to the care of children in complex emergencies. However, many conditions must be in place for guidelines to be used effectively, including properly trained and supervised health care workers, adequate and appropriate drug supplies, knowledge of local epidemiology and appropriate health-seeking behavior, accessible health care facilities, functioning referral systems, and sufficient funding.

Consideration of the broader context in which guidelines are used in complex emergencies is necessary to ensure their effectiveness. The type of emergency, whether an armed conflict, famine, or natural disaster, and the phase of the emergency determine specific health risks and demand responses sufficiently flexible to adapt to these risks. The health needs of

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refugee children may not be the same as those of internally displaced and internally stranded children. Children differ in their baseline health, nutritional status, and risk of exposure to communicable diseases prior to the onset of an emergency, and these local differences persist for the duration of the emergency and into the postemergency phase. Human rights and gender issues also must be considered in developing and implementing guidelines for the care of children in complex emergencies, as discrimination by gender and ethnicity may adversely affect the care of some children.

Finally, the general nature of complex emergencies is evolving from short-term emergencies in refugee camps to prolonged emergencies in large geographic areas, and thus the approach to the care and needs of children also must change (Salama, Spiegel, Talley, and Waldman, 2004). Guidelines for the care of children in complex emergencies should be revised and updated on the basis of field experience and the increasing body of evidence for the care of children in resource-constrained settings.

METHODOLOGY

Although its importance is recognized, little systematic work has been undertaken to evaluate the care of children in complex emergencies. Such a process must begin with an understanding of what is known about these problems and how well existing guidelines address them. Only then can recommendations be made to improve the care of children in these settings. To address these goals, we first conducted a review of the published literature to establish the burden of disease and the major causes of morbidity and mortality, as well as to review the effectiveness of interventions. We then surveyed nongovernmental organizations (NGOs) providing care to children in complex emergencies to identify the guidelines commonly used for the care of children and their limitations. More in-depth surveys of organizations working in Angola, Afghanistan, and the Democratic Republic of the Congo were conducted to assess obstacles to the care of children in specific emergency settings. On the basis of these findings, we identify the limitations of existing guidelines, make recommendations to improve these guidelines, and identify research needs for the further development of evidence-based guidelines for the care of children in complex emergencies.

Complex emergency is defined broadly for the purpose of this review and refers to a situation of armed conflict, population displacement, or food insecurity—or a combination—with an associated increase in mortal-

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ity and malnutrition. Child health during the acute phase of an emergency is emphasized, while recognizing important needs in the postemergency setting. The health of children younger than age 10 is addressed and encompasses primary health care, preventive care, and mental health as well as case management. Maternal health and the health of older children and adolescents are not a focus of this review. Recommendations addressing various levels of health intervention are considered: curative care at the level of the individual child, preventive care at the individual and community levels, and health systems planning at the community and national levels.

Our review of the published literature on the causes of morbidity and mortality in children in complex emergencies is based on a search of the English language literature using the PubMed database and multiple combinations of search terms related to child health and complex emergencies, including "complex emergency," "disaster," "refugee," and "war" with "child health" in combination with terms for specific diseases (e.g., "measles," "malaria," "micronutrient"). Our summary is not intended to be an exhaustive review of this very large body of literature and focuses on articles published in the past 20 years. Furthermore, review of the published literature is necessarily limited, because only a small proportion of the collective experience in caring for children in complex emergencies is published. For some childhood diseases, such as pneumonia, knowledge of etiology, diagnosis, treatment, and prevention are extrapolated from stable situations and have not been explicitly studied in complex emergencies. In addition, many organizations and health care workers do not have the time, resources, or incentives to publish their experiences. Nevertheless, this review highlights the broad range of conditions to be addressed by comprehensive guidelines for the care of children in complex emergencies.

To further assess care and better understand how well existing guidelines address child health issues, we conducted surveys in 2003 of a convenience sample of international relief agencies involved in child health in complex emergencies, focusing on guidelines used for the care of children in complex emergencies (Appendix A). The first survey instrument was designed to elicit an overview of the child health activities in which different organizations are engaged, the guidelines used by these organizations to provide care to children in complex emergencies, and some of the limitations of these guidelines. Surveys were usually conducted by telephone or

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email with a single individual at the organization's central office. This approach had the advantage of providing an overview of the NGO's activities, but it was limited, in some cases, by lack of detailed knowledge in all areas of the survey. Some organizations distributed the questionnaire so that individuals with specific expertise could respond. These survey results also are limited by the fact that many organizations function differently in different settings and the broad results gleaned from these surveys do not capture these differences.

Because of the vastly different nature of complex emergencies in different settings, we conducted a second survey in 2003 to explore in-depth case studies of organizations working in three key countries: Afghanistan, Angola, and the Democratic Republic of the Congo (Appendix A). These countries represent different stages in the progression of humanitarian crises and have different political and social contexts that shape the challenges to providing care to children in complex emergencies. We generated a list of NGOs working in these countries. As many of these NGOs had been contacted for the first survey, the initial survey respondent was consulted to identify a country-specific contact person. All the surveys were sent by email to the country contacts in the field. Four NGOs responded from the Democratic Republic of the Congo, five from Afghanistan, and three from Angola (Appendix A). Information was collected on important practical issues, such as obstacles to providing care, personnel and resource needs, performance monitoring, and the roles of the ministry of health and WHO. In addition, WHO circulated the second survey instrument to field offices in nine countries. UNICEF representatives responded from Burundi, the Democratic Republic of the Congo, Malawi, Sri Lanka, and the West and Central African Regional Office. In Iraq, a representative of the ministry of health responded. In Kosovo, India, and Zimbabwe, WHO representatives responded (Appendix A).

On the basis of the survey responses, we evaluated several comprehensive guidelines for the care of children in complex emergencies as well as specific guidelines focusing on a single disease or aspect of child health. This review enabled us to identify gaps and limitations of the currently used guidelines. The monograph concludes with our recommendations to improve the care of children in complex emergencies and suggests areas that require further research.

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REVIEW OF THE PUBLISHED LITERATURE

Burden of Childhood Disease

The highest mortality rates in refugee populations often are in children younger than age 5 (Morbidity and Mortality Weekly Report, 1992; Toole and Waldman, 1997). Although mortality rates are highest in infants less than one year of age, the relative increase in mortality is probably highest in older children (Morbidity and Mortality Weekly Report, 1992; Toole and Waldman, 1990). Child mortality rates often are highest during the acute or early phase of a complex emergency (Toole and Waldman, 1988). One frequently cited example of the high mortality rate among children was among Kurdish refugees at the Turkey-Iraq border during 1991: 63 percent of all deaths were children younger than age 5, although this age group constituted only 18 percent of the population (Morbidity and Mortality Weekly Report, 1992; Toole and Waldman, 1997).

Numerous other examples support the conclusion that a high proportion of deaths in complex emergencies are children. A review of child mortality in refugee camps in Thailand, Somalia, and Sudan in the early 1980s reported a mortality rate more than twice as high in children younger than age 5 (32.6 per 10,000 children per day) than the overall crude mortality rate (Toole and Waldman, 1990). In the early 1980s in a Burmese refugee camp in Bangladesh, most deaths occurred among infants (640 per 1,000 per year) and children (357 per 1,000 per year) (Khan and Munshi, 1983). The overall mortality among Ethiopian refugees in Sudan in February 1985 was 8.9 per 10,000 persons per day, but it was 22 per 10,000 per day for children younger than age 5 (Shears, Berry, Murphy, and Nabil, 1987). Among refugees in Honduras between 1984 and 1987, deaths in infants accounted for 42 percent of all deaths, and deaths of children younger than age 5 accounted for 54 percent of all deaths (Desenclos et al., 1990). A survey conducted during the 1991 Kurdish refugee crisis found that two-thirds of all deaths were children younger than age 5, and half were infants younger than 1 year (Yip and Sharp, 1993). The Gulf war and trade sanctions were estimated to have caused a three-fold increase in mortality among Iraqi children younger than age 5, resulting in an excess mortality of 46,900 children between January and August 1991 (Ascherio et al., 1992). During the 1992 famine in Somalia, 74 percent of children younger than age 5 living in displaced person camps were estimated to have died over several months (Moore et al., 1993). Among Rwandan and

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Burundian refugees in eastern Zaire in 1996, 54 percent of all deaths were among children younger than age 5; the daily mortality rate was as high as 12.5 per 10,000 children younger than age 5 per day (Nabeth, Vasset, Guerin, Doppler, and Tectonidis, 1997).

However, in some settings, older children and adults suffer mortality rates comparable to or exceeding those of young children. Such excess mortality in older children and adults is most likely following outbreaks of cholera or dysentery or when armed conflict results in many civilian casualties (Paquet and van Soest, 1994; Spiegel and Salama, 2000). Among Rwandan refugees in Zaire, the crude mortality rate for children younger than age 5 was lower than the overall crude mortality rate (Paquet and van Soest, 1994). Ninety percent of all deaths were due to cholera, dysentery, or other diarrheal diseases, and the proportion of diarrhea-related deaths was lower in children younger than age 5 than in the rest of the population. In developed countries, where infectious diseases and malnutrition are less likely to be significant contributors to mortality, war-related trauma and chronic diseases cause a significant proportion of deaths. In a study of displaced and resident populations in Kabul, Afghanistan, in 1993, the most common causes of death in children younger than age 5 were measles, diarrhea, and acute respiratory tract infections (Gessner, 1994). However, the most common causes of death in all age groups were gunshot wounds and other war-related trauma. A survey of Kosovar Albanians in 1999 found higher mortality rates in men over age 15 than in children younger than age 15 (Spiegel and Salama, 2000).

Major Causes of Morbidity and Mortality

In stable situations, resource-poor countries have fairly consistent proportions of under-5 mortality attributable to pneumonia and diarrhea (about 20 percent each), but the proportions of deaths due to malaria, AIDS, and neonatal causes vary greatly from region to region and country to country (Black, Morris, and Bryce, 2003). Knowledge of the baseline burden of morbidity and mortality for children at a country level is important for comparison during a complex emergency and for predicting specific diseases to be targeted as the emergency evolves.

During the early phase of an emergency, the most common causes of death are diarrheal diseases, acute respiratory infections, measles, malaria, and severe malnutrition (Toole and Waldman, 1997), the same major causes of death in countries with the highest child mortality rates. There is no

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evidence that the major causes of childhood morbidity and mortality in complex emergencies have changed significantly in the past decade. For example, in 1999, 80 percent of the deaths of Congolese children younger than age 5 in Lugufu camp in Tanzania were due to malaria, diarrhea, and pneumonia (Talley, Spiegel, and Girgis, 2001. However, in addition to diarrhea, pneumonia, measles, and malaria, outbreaks of other infectious diseases can contribute substantially to childhood morbidity and mortality in complex emergencies. Examples include outbreaks of poliomyelitis in Angola in 1999 (Valente et al., 2002), pertussis (World Health Organization, 2003) and leishmaniasis in Afghanistan (Ahmad, 2002; Rowland, Munir, Durrani, Noyes, and Reyburn, 1999b); meningococcal meningitis in Sudanese refugee camps in 1994 (Santaniello-Newton and Hunter, 2000), and typhoid fever in Bosnia and Herzegovina during 1992-1993 (Bradaric et al., 1996). In some settings, injuries may contribute to excess mortality in children. For example, the age-adjusted mortality rates for both diarrhea and injuries increased in Iraqi children after the onset of the first Gulf war (Ascherio et al., 1992).

Malnutrition and micronutrient deficiencies contribute substantially to child morbidity and mortality in complex emergencies (Morbidity and Mortality Weekly Report, 1992; Toole and Waldman, 1993, 1997). A nutritional assessment survey of children in the Democratic People's Republic of North Korea, conducted by the World Food Programme in August 1997, found a prevalence of acute malnutrition as high as 33 percent in some regions of the country (Katona-Apte and Mokdad, 1998). Wasting was estimated to have contributed to 72 percent of all deaths among children younger than age 5 during a famine in Ethiopia in 2000 (Salama et al., 2001). However, not all complex emergencies are associated with high prevalence rates of malnutrition. For example, a survey of Bosnian children in 1993 found no evidence of malnutrition after the first year of war (Robertson et al., 1995). A nutritional survey of Liberian refugee children in 1990 found the prevalence of acute malnutrition to be similar to rates reported for African populations in noncrisis situations (Morbidity and Mortality Weekly Report, 1991).

Special Considerations in Complex Emergencies

Some complex emergencies are associated with large numbers of unaccompanied children (Sapir, 1993), and the special needs of these children have been addressed in several publications (Ressler, Boothby, and

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Steinbock, 1988; Williamson and Moser, 1988; UNICEF/United Nations High Commissioner for Refugees, 1994). Although unaccompanied minors often are older children, in some situations, such as the Korean war and the Nigerian civil war, many were abandoned infants (Sapir, 1993). Extremely high mortality rates were documented in 1994 among unaccompanied Rwandan refugee children after their arrival in Goma, Zaire (Dowell et al., 1995). Most deaths (85 percent) occurred more than two days after arrival at the centers, suggesting that early and appropriate care could have significantly reduced mortality. There is some evidence that foster care is an effective strategy to protect unaccompanied children during the acute phase of an emergency. In one study based on the 1994 Rwandan refugee crisis, weight gain and rates of illness were similar between foster children and children of the same age accompanied by their parents (Duerr, Posner, and Gilbert, 2003).

Demobilized child soldiers are another special population in some complex emergencies. The use of child soldiers arises from the "triad of anarchic civil war, light-weight weaponry, and drug or alcohol addiction" (Pearn, 2003, p. 169). The 1998 Statute of the International Criminal Court defined as a war crime the use of children younger than age 15 as soldiers. An estimated 120,000 to 200,000 child soldiers are engaged in conflicts in Africa (Albertyn, Bickler, van As, Millar, and Rode, 2003). Child soldiers are prone to several long-term consequences. As a result of their lost childhood, child soldiers are hard to rehabilitate and reengage in school. Early victimization and exposure to violence lead to "desocialization and dehumanization" and contribute to posttraumatic stress disorder (Pearn, 2003, p. 170).

In complex emergencies, as in nonemergency situations, people may seek care outside the formal health sector. Traditional healers may be important providers of care, especially when the health care system has collapsed or is nonexistent. However, few published studies have addressed the role of traditional healers in providing care during complex emergencies. In one study, understanding traditional Khmer health beliefs was found to be important in providing care to Cambodian refugee children (Rosenberg and Givens, 1986).

Acute Phase of Complex Emergencies

The acute phase of an emergency is defined by the crude mortality rate and persists as long as that rate is at least double the baseline mortality rate.

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In sub-Saharan Africa, this threshold is set at one death per 10,000 persons per day (Toole and Waldman, 1990). For emergencies in other parts of the world, where data are available on preemergency mortality rates, these local baseline figures should be used to define the acute phase of a complex emergency (Salama et al., 2004).

In the acute phase, coordination among international, United Nations, and local agencies is critical to successful relief efforts. An external study commissioned by the Office for the Coordination of Humanitarian Affairs in the UN Secretariat found that a lack of clear terms of reference, guidance on responsibilities, reporting requirements, and consultation lines led to recurring problems in the provision of care during complex emergencies (Reindorp and Wiles, 2003). Binding principles of engagement, standardized indicators as part of a minimum, essential data set, and health-sector area-activity summaries are strategies to strengthen coordination and standardization of practice among different agencies in a complex emergency (Bradt and Drummond, 2003).

Postemergency Phase

Many of the major causes of child morbidity and mortality in the acute phase of an emergency persist into the postemergency phase. Nevertheless, when children have remained in refugee camps for prolonged periods, child mortality may be lower in the refugee population than among neighboring, resident children. In a retrospective study of 51 postemergency camps in seven countries from 1998 to 2000, the average under-5 mortality rate was 0.9 deaths per month per 1,000 children. Lower under-5 mortality rates were associated with camps that were older, were furthest from the area of conflict, had higher per capita ratios of local health care workers, had a greater per capita water supply, and had lower incidence of diarrheal disease (Spiegel, Sheik, Gotway-Crawford, and Salama, 2002). In another retrospective study conducted between 1998 and 2000 of refugees and internally displaced persons living in 52 camps in 7 countries, neonatal mortality rates and the proportion of low-birthweight infants were lower in the camps than in the host countries (Hynes, Sheik, Wilson, and Spiegel, 2002). The neonatal mortality rate among Afghan refugees in Pakistan between 1998 and 2000 (25 per 1,000 live births) was significantly lower than the neonatal mortality rate in Afghanistan (121 per 1,000 live births) (Bartlett et al., 2002). Infant mortality and under-5 mortality rates tended to be lower among Palestinian refugees between 1998 and 2000 compared with

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their nonrefugee counterparts, and rates were also comparable or lower among refugees living in camps compared with those not in camps (Khawaja, 2004). The mortality rate for resident children in Prabis, Guinea-Bissau, in 1998 was 4.5 times higher than for refugee children (Aaby et al., 1999). The prevalence of acute malnutrition was higher among children in rural nonrefugee populations in the eastern Democratic Republic of the Congo in 1995 than among refugee children (Porignon et al., 2000). The annual risk of tuberculosis among 8-year-old boys living in refugee camps in Afghanistan in 1985 was lower than the annual risk reported in a national survey (Spinaci et al., 1989).

Diarrheal Disease, Cholera, and Shigella Dysentery

Diarrheal disease is a common cause of child morbidity and mortality in complex emergencies and in some settings results in extremely high mortality rates. A cross-sectional survey of children in mountain camps along the Turkey-Iraq border during the 1991 Kurdish refugee crisis documented high rates of acute malnutrition and diarrhea (Yip and Sharp, 1993). The mortality rate for children under age 5 was 15.3 per 1,000 children per month over an 8-week period, and diarrheal disease and associated malnutrition were estimated to have caused 75 percent of all deaths of children younger than age 5.

Outbreaks of cholera have been reported frequently in complex emergencies (Hatch, Waldman, Lungu, and Piri, 1994; Morbidity and Mortality Weekly Report, 1998; Moren et al., 1991; Siddique et al., 1995; Swerdlow et al., 1997). A study of risk factors for cholera during an epidemic in a Mozambican refugee population in Malawi in 1988 found an increased risk associated with an increasing number of children younger than age 5 in the household, suggesting that young children may have played a role in cholera transmission (Hatch et al., 1994). Another study of Mozambican refugees in Malawi described the epidemiology of cholera over a three-month period in 1990 (Swerdlow et al., 1997). Mortality was highest for children younger than age 4 (relative risk of 4.5, CI = 2.6-7.9), and most deaths occurred within 24 hours of hospital admission. The authors suggest that improved access to care for children and increased use of oral rehydration therapy could have decreased child mortality. However, rapid provision of intravenous fluid therapy is necessary to significantly reduce the mortality rate in severely dehydrated children with cholera.

Few published studies have evaluated preventive or treatment mea-

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sures aimed at reducing child morbidity and mortality due to diarrheal diseases in complex emergencies, although the importance of clean water, appropriate sanitation, and adequate rehydration is established. After a program to distribute soap in a Malawi refugee camp for Mozambican refugees in 1993, the presence of soap in the household was associated with 27 percent fewer episodes of diarrhea compared with households in which no soap was present (Peterson, Roberts, Toole, and Peterson, 1998). In the same camps, prevention of household contamination of water by means of a covered container and spout in 1993 resulted in a 31 percent reduction in diarrheal disease in children younger than age 5 (Roberts et al., 2001). A field trial among Afghan refugee children found that wheat-based oral rehydration solution was as effective as WHO glucose–oral rehydration salts for home therapy of uncomplicated diarrhea (Murphy, Bari, Molla, Zaidi, and Hirschman, 1996).

The desirability and cost-effectiveness of cholera vaccination in complex emergencies have been assessed and debated (Naficy et al., 1998; Murray, McFarland, and Waldman, 1998; Sack, 1998; Waldman, 1998). A trial of a two-dose oral cholera vaccine among Sudanese refugees in Uganda in 1997 concluded that mass vaccination was feasible as a preemptive strategy when conducted in conjunction with other control and treatment strategies, but the cost of the vaccine was a major obstacle to widespread use (Legros et al., 1999). Local production of new oral cholera vaccines may make vaccination cost-effective in complex emergencies.

Ciprofloxacin was used to treat children with dysentery due to type 1 *Shigella dysenteriae* during an epidemic in Rwandan refugees in Goma, Zaire, in 1994 (Laureillard, Paquet, and Malvy, 1998). Although expensive, the use of ciprofloxacin at the Médecins Sans Frontières (MSF) Center was justified by the fact that the epidemic strain was resistant to the antibiotics available from public health authorities. Clinical efficacy was 86 percent in 285 patients. A 5-day course of ciprofloxacin was provided by MSF to treat patients during an outbreak of *Shigella dysenteriae* type 1 in Sierra Leone in 1999 and 2000 (Guerin et al., 2003). The case fatality rate was significantly lower in high-risk patients (0.9 percent) treated with ciprofloxacin compared with the overall case fatality rate (3.1 percent). A multicenter study conducted in nonemergency settings between 1996 and 2000 showed that a 3-day course of ciprofloxacin was as effective as the standard 5-day course in children with dysentery due to *Shigella dysenteriae* type 1 (Dysentery Study Group, 2002). The shorter course may be more affordable and practical in complex emergencies.

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Acute Respiratory Tract Infections

Few studies of acute respiratory tract infection in children during complex emergencies have been published, although such infections have been shown to be major causes of child morbidity and mortality in complex emergencies (Connolly et al., 2004). The diagnosis, management, and prevention of respiratory tract infections in children in complex emergencies are based on evidence derived from stable situations. Routine childhood vaccinations (e.g., against measles, diphtheria, and pertussis) and vitamin A supplementation may prevent morbidity and mortality from acute respiratory tract infections in children in complex emergencies.

Measles

Measles has been a major cause of child morbidity and mortality in refugee camps and internally displaced populations, and further contributes to childhood deaths by exacerbating malnutrition and vitamin A deficiency (Toole, Skeketee, Waldman, and Nieburg, 1989; Toole and Waldman, 1997). Many deaths attributed to diarrhea and pneumonia also may be associated with measles. Measles case fatality rates in children in complex emergencies have been as high as 20-30 percent (Porter, Gastellu-Etchegorry, Navarre, Lungu, and Moren, 1990; Shears and Lusty, 1987). During a famine in Ethiopia in 2000, measles alone or in combination with wasting accounted for 22 percent of 159 deaths among children younger than age 5, and 17 percent of 72 deaths among children ages 5 to 14 (Salama et al., 2001). In 2004, measles case fatality rates of 14 to 17 percent were reported in West and North Darfur, respectively (Morbidity and Mortality Weekly Report, 2004).

Progress in global control has made outbreaks of measles less likely in some regions, although measles outbreaks can occur in refugee and internally displaced populations with low levels of immunity or in which high vaccination coverage is not maintained. For example, from 2000-2001, an outbreak of measles occurred in Tanzanian refugee camps, probably transmitted from a measles epidemic in Burundi and made possible by inadequate immunization of new arrivals to the refugee camp (Kamugisha, Cairns, and Akim, 2003). In northern Uganda in 2003, a measles outbreak contributed to the doubling of the under-5 mortality rate (Nathan, Tatay, Piola, Lake, and Brown, 2004).

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Malaria

The epidemiology and control of malaria in refugee camps and complex emergencies were recently reviewed (National Research Council, 2003; Rowland and Nosten, 2001). In the National Research Council's *Malaria Control During Mass Population Movements and Natural Disasters,* clinical, preventive, community, and health system considerations for malaria control and treatment are discussed. Malaria control in complex emergencies is part of WHO's Roll Back Malaria initiative, and its handbook *Malaria Control in Complex Emergencies* is available. WHO also has established a Roll Back Malaria Complex Emergency Technical Support Network that works in partnership with NGOs, donor agencies, and countries. The Technical Support Network collaborated with national authorities in East Timor after 1999, where the lack of overall coordination and planning for the transition from the acute emergency to the postemergency phase compromised the sustainability and accountability of the malaria control program (Kolaczinski and Webster, 2003).

As in stable situations, prevention of infection with insecticide-treated bed nets, along with case diagnosis and treatment, is important to reduce child morbidity and mortality from malaria. High prevalence rates of drug-resistant *Plasmodium falciparum* malaria in refugee populations were reported in several studies (Guthmann, Cetre, and Suzan, 1996; Lienhardt, Ghebray, and Candolfi, 1989; Wolday, Kilbreab, Bukenya, and Hodes, 1995). In 2002, the compliance rate for artemisinin-based combination therapy was found to be 39 percent among children younger than age 5 with the confirmed diagnosis of uncomplicated falciparum malaria in a Zambian refugee camp (Depoortere et al., 2005). The efficacy of treatment with sulfadoxine/pyrimethamine and artesunate was 84 percent for uncomplicated falciparum malaria, and the effectiveness was 63 percent among children younger than age 5 (Depoortere et al., 2005).

Several studies reported results of intervention trials to prevent malaria in refugee populations. Indoor residual spraying with malathion in refugee camps in eastern Sudan in 1997 was associated with reduced mortality but not with a reduction in the incidence of clinical malaria (Charlwood et al., 2001). In a cross-sectional community-based population survey conducted in 2002 in Ugandan camps for internally displaced persons, children younger than age 5 using PermaNet, an insecticide-treated net, were 33 percent less likely to have malarial parasitemia; however, this finding did not reach statistical significance (Spencer et al., 2004).

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A randomized trial of permethrin-treated *chadors* (head coverings) and topsheets in Afghanistan conducted in 1996 found that the intervention reduced the odds of an episode of malaria by 64 percent in children younger than age 10, at a cost of US $0.17 per person protected (Rowland et al., 1999a). A study of deltamethrin-treated plastic tarpaulins in an Afghan refugee camps demonstrated that the impregnated tarpaulins could effectively kill mosquitoes for prolonged periods (Graham et al., 2002). The authors suggest that widespread use of insecticide-impregnated tarpaulins in refugee camps could greatly reduce the vectoral capacity and thus reduce the incidence of malaria. In nonemergency settings, insecticide-impregnated nets have been shown to have a 17 percent protective efficacy in preventing child mortality, and they are considered highly effective in reducing childhood morbidity and mortality from malaria (Lengeler, 2005). Personal use of DEET-containing lotion reduced the odds of being infected by *P. falciparum* by 56 percent but had no effect on *P. vivax* infections in persons ages 5 to 20 in a Pakastani refugee camp in 1999 and 2000 (Rowland et al., 2004). Individual use of repellant lotions may be beneficial for short-term use in some situations but should be compared with the benefits and costs of insecticide-impregnated tarpaulins and bed nets.

Meningococcal Disease

Large outbreaks of meningococcal disease and meningitis have been described in refugee populations, with high attack rates and case fatality ratios in children and young adults (Haelterman et al., 1996; Heyman et al., 1998; Moore, Toole, Nieburg, Waldman, and Broome, 1990; Santaniello-Newton and Hunter, 2000). A latex agglutination test for *Neisseria meningitides* was found to be superior to Gram stain and as effective as culture in identifying the causative agent in an Israeli field hospital in Goma, Zaire (Heyman et al., 1998).

Tuberculosis

Complex emergencies can disrupt tuberculosis control programs and facilitate the transmission of *Mycobacterium tuberculosis* by exacerbating crowded living conditions and poor nutritional status (Barr and Menzies, 1994; Porter and Kessler, 1995; Sutter and Haefliger, 1990). These same factors can contribute to the rapid transmission of multidrug-resistant

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strains in refugee settings (Githui et al., 2000; Ibrahim and Laaser, 2002). High rates of tuberculosis in adults are associated with transmission to children. However, in part because of the difficulties in diagnosing tuberculosis in children, few published data exist on the prevalence or treatment of childhood tuberculosis in complex emergencies. Highlighting the potential burden of tuberculosis in children in complex emergencies, the average annual risk of infection among internally displaced persons in Tbilisi, Republic of Georgia, in 1999 was highest in children younger than age 10 (5 percent) (Weinstock et al., 2001).

In the 1980s, successful tuberculosis treatment programs were reported in refugee populations (Miles and Maat, 1984; Rieder, 1985; Sukrakanchana-Trikham, Pucchal, Rigal, and Rieder, 1992). More recent programs have demonstrated ingenuity in response to the changing nature of complex emergencies. MSF began a seven-month tuberculosis treatment program in Sudan in 1994 and has used such strategies as a "runaway bag" with a one-month supply of combination tablets, prearranged locations for reuniting staff and patients if an evacuation is necessary, and a two-month, on-site reserve of medicines (Hehenkamp, 2003). Patient compliance with this program was extremely high. In modeling the benefits and risks of varying levels of patient compliance during complex emergencies, benefits outweighed risks of treatment if 75 percent of patients with tuberculosis received at least four months of treatment (Biot, Chandramohan, and Porter, 2003).

HIV Infection and AIDS

A report on the impact of war on children states that during the "past five years, HIV/AIDS has changed the landscape of conflict for children more than any other factor" (Machel, 2001, p. 41). Whether a particular conflict results in enhanced HIV-1 transmission depends on the complex interplay of individual and social factors (Spiegel, 2004). Conflict may fuel the HIV-1 epidemic by worsening poverty, enhancing the transmission of sexually transmitted diseases to and from military personnel through rape and commercial sex, the recruitment of orphaned children into the sex industry, the increased risk of transactional sex as a means of survival, and the increase in risky behaviors that result from a breakdown of communities. These may be countered, however, by factors that tend to reduce HIV-1 transmission during conflict, including the reduced mobility and accessi-

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bility of populations and improved health and social services in refugee camps. Additional key factors in HIV-1 epidemiology during conflict include the HIV-1 prevalence in the refugees' area of origin, the host population's HIV-1 prevalence, the duration of the conflict, and the degree of intermingling of refugee and host populations (Spiegel, 2004).

Little has been published on the prevention or treatment of HIV-1 infection among children in complex emergencies, particularly in view of the obstacles to providing long-term care. One study examining the policy considerations of infant feeding and HIV-1 in complex emergencies states that formula feeding of infants should be considered only if there is voluntary counseling and testing for HIV-1, the mother is HIV-1 seropositive, and there is an adequate supply of clean water and formula, facilities for formula preparation, counseling and education to support caregivers, and informed choice (Leyenaar, 2004). No published studies have examined the feasibility of preventing maternal-infant HIV-1 transmission in complex emergencies, and the Inter-Agency Standing Committee reference group for HIV/AIDS deems this intervention nonessential in emergency settings (Inter-Agency Standing Committee, 2003).

Other Communicable Diseases

Examination of stool specimens for intestinal parasites in Barawan Somali refugees in Kenya in 1997 found a prevalence rate of 51 percent in children younger than age 15 (Morbidity and Mortality Weekly Report, 1998). Scabies was found in 77 percent of children younger than age 5 and in 86 percent of children ages 5-9 in a displacement camp in Sierra Leone (Terry, Kanjah, Sahr, and Kortequee, 2001). A total of 10 percent of 1,051 Kosovar refugees entering the United States were infested with head lice (Manjrekar, Partridge, Korman, Barwick, and Juranek, 2000). Outbreaks of hepatitis A (Kaic, Borcic, Ljubicic, Brkic, and Mihaljevic, 2001) and hepatitis E viruses (Toole and Waldman, 1997) have been reported among refugees. An outbreak of hepatitis A among children in a refugee camp in Croatia in 1999 and 2000 was controlled in part through immunization of seronegative children with hepatitis A vaccine (Kaic et al., 2001). Two outbreaks of typhoid fever were reported in 1992 and 1993 in association with the war in Bosnia and Herzegovina (Bradaric et al., 1996). A large outbreak of pertussis among children was reported in Afghanistan in 2003 (World Health Organization, 2003).

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Malnutrition and Therapeutic Feeding

Globally, malnutrition is an underlying cause of 53 percent of all deaths among children younger than age 5 (Bryce et al., 2005). Malnutrition and micronutrient deficiencies contribute substantially to child morbidity and mortality in complex emergencies (Morbidity and Mortality Weekly Report, 1992; Toole, 1992; Toole and Waldman, 1997). The median prevalence of acute malnutrition, defined as weight-for-height two standard deviations below the reference mean or less than 80 percent of the reference median, among children younger than age 5 in internally displaced and conflict-affected populations between 1988 and 1995 was 31 percent among 11 surveys; it was as high as 80 percent in the Sudan in 1993 (Toole and Waldman, 1997). More recent surveys have found similar high prevalence rates of acute malnutrition in children in complex emergencies (Salama et al., 2001). In 2004 in South Darfur, Sudan, under-5 malnutrition rates ranged from 10.7 to 23.6 percent in three regions surveyed (Grandesso, Sanderson, Kruijt, Koene, and Brown, 2004). Although much of the published literature focuses on severe malnutrition, mild to moderate malnutrition is likely to be a significant underlying cause of death in children in complex emergencies, as it is in nonemergency situations.

Several published studies demonstrated the effectiveness of supplementary and therapeutic feeding programs in complex emergencies. More recently, a program for the outpatient care of severely malnourished Ethiopian children was evaluated from 2000 to 2001 (Collins and Sadler, 2002), as inpatient care in a therapeutic feeding center was not available to these children. The recovery, default, and mortality rates for children treated as outpatients were acceptable, although rates of weight gain and time to discharge were slow. A health center–based supplementary feeding program in Guinea-Bissau during a period of war from 1998 to 1999 seems to have helped stabilize and subsequently decrease the prevalence of malnourished children. The coverage of this supplementary feeding program was 74 percent, the compliance rate was 89 percent, and the median time to recovery was 48 days (Nielsen, Valentiner-Branth, Martins, Cabral, and Aaby, 2004).

Micronutrient Deficiencies

Micronutrient deficiencies are common in refugee and displaced populations (Toole, 1992; Weise Prinzo and de Benoist, 2002). Deficiencies found in children in nonrefugee settings, such as iron and vitamin A defi-

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ciencies, often are more common and severe in refugee or displaced children in part as a result of diseases such as malaria and chronic diarrhea. In addition, uncommon micronutrient deficiencies, such as scurvy (vitamin C deficiency), pellagra (niacin and/or tryptophan deficiency), and beriberi (thiamine deficiency), may affect large populations in complex emergencies (Weise Prinzo and de Benoist, 2002). Micronutrient deficiencies, as well as the overall nutritional state, can impact the early development of children and thus have lifelong consequences.

Two-thirds of Palestinian children living in refugee camps were found to be anemic in a nutrition survey conducted in 1990 (Hassan, Sullivan, Yip, and Woodruff, 1997). The prevalence of anemia among displaced and nondisplaced children in 2001 in Azerbaijan was similar (Morbidity and Mortality Weekly Report, 2004). For both displaced and nondisplaced Azerbaijani children, the prevalence of anemia decreased with age and was significantly higher for those whose mothers were anemic. A randomized, double-blind trial comparing several regimens for the treatment of moderate anemia was conducted in 1998 among refugee children in Tanzania (Tomashek, Woodruff, Gotway, Bloland, and Mbaruku, 2001). All children were treated for malaria and helminth infections, followed by 12 weeks of thrice-weekly oral iron and folic acid. Children were randomized to receive different antimalarial regimens. The mean hemoglobin concentration for all children increased from 6.6 to 10.2 gm/dL; however, the group of children who received supplements of vitamins A and C were more likely to achieve normal iron stores.

Vitamin A supplementation for refugee children has long been recognized as an important public health intervention (Nieburg, Waldman, Leavell, Sommer, and DeMaeyer, 1988). Outbreaks of scurvy have been described in complex emergencies (Desenclos et al., 1989; Seaman and Rivers, 1989), most recently in Afghanistan (Ahmad, 2002). Although children can be affected, scurvy most commonly occurs in adults and is most severe in pregnant women. Pellagra also has been described in refugee and internally displaced populations. A large outbreak of pellagra occurred in 1990 among Mozambican refugees in Malawi, with more than 18,000 cases (6 percent of the refugee population) reported after distribution of groundnuts (peanuts) was stopped (Malfait et al., 1993). However, as with scurvy, pellagra is most severe in pregnant women and is rare in young children (Weise Prinzo and de Benoist, 2002). Angular stomatitis, a manifestation of riboflavin deficiency, was found in one-quarter of adolescent Bhutanese refugees in Nepal in 1999 (Blanck et al., 2002).

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Interventions to address micronutrient deficiencies in complex emergencies include vitamin A supplementation, fortification of food aid commodities, and provision of micronutrient-rich foods including iodized salt (Young, Borrel, Holland, and Salama, 2004). Nonfood strategies should be incorporated as early as possible in the response to an emergency to avoid the "food-first bias" in programming. These include home gardening, livestock and veterinary programs, market interventions, microcredit, and food or cash for work programs (Young et al., 2004).

Neonatal Health

Neonatal health has received scant attention in complex emergencies, in part because of the high mortality rates in older children and adults and perhaps a sense that little can be done to reduce neonatal mortality in emergencies. Particular risks to neonates in complex emergencies include low birthweight due to maternal anemia or poor nutrition, hypothermia due to lack of shelter or blankets, and maternal stress from social disruption (Al Gasseer, Dresden, Keeney, and Warren, 2004). Neonatal deaths made up 38 percent of all child deaths in the developing world in 2000 (Lawn, Cousens, and Zupan, 2005) and contribute significantly to child mortality in complex emergencies. A survey of pregnancy outcomes among Burundian refugees in Tanzania in 1998 found that neonatal and maternal deaths accounted for 16 percent of all deaths during the study period (Jamieson et al., 2000). The neonatal mortality rate was 29.3 per 1,000 live births, and 22 percent of all live births were low birthweight. In a study of Afghan refugees in Pakistan in 1999 and 2000, neonatal mortality accounted for 19 percent of all deaths and was the single largest cause of death given (Bartlett et al., 2002).

As with older children, the greatest risk to neonates is in the acute phase of emergencies, and neonatal survival rates in chronic refugee settings can be better than that in the surrounding communities. A survey conducted in 1998 by the United Nations High Commissioner for Refugees (UNHCR) within eight refugee settings found that neonatal mortality rates and maternal deaths were lower than for the host population and home countries of the refugees (Bitar, 2000). Among Afghan refugees in Pakistan from 1999 to 2000, in the study cited above, the neonatal mortality rate was 25 per 1,000 live births compared with 121 per 1,000 in Afghanistan (Bartlett et al., 2002). In 10 refugee camps in Tanzania in 1998, the neonatal mortality rate ranged from 1 to 8 per 1,000 live births. The

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Tanzanian camps had been in existence approximately two years and provided a range of services for pregnant women and newborn care, including one camp that had the capability of performing Cesarean sections (United Nations High Commissioner for Refugees, 1998).

Although improvements in facility-based care to manage obstetric emergencies and neonatal illness are important, community and home-based care can significantly reduce neonatal mortality (Hafeez, Riaz, Shah, Pervaiz, and Southall, 2004). Evidence-based packages of interventions to improve pregnancy outcomes and neonatal survival in stable situations have been presented (Darmstadt et al., 2005). These interventions include a family-care package to promote effective neonatal care practices that could be adapted to complex emergencies, including clean cord care, prevention of hypothermia, early breastfeeding, and prompt recognition of danger signs.

Trauma

Pediatric trauma is common during and following armed conflicts and natural disasters. The best documented pediatric injuries associated with conflicts are those due to land mines (Chaloner, 1996; Coupland and Korver, 1991; Jeffrey, 1996; Kakar, Bassani, Romer, and Gunn, 1996; Machel, 2001; Pearn, 1996). The risk of injury can persist long after the end of active conflict. Children and civilians are at risk of injuries from land mines in at least 26 countries (Pearn, 2003). In Afghanistan in the early 1990s, 25 percent of injuries due to antipersonnel mines were in children less than 16 years of age (Jeffrey, 1996). Other types of pediatric trauma reported during conflicts or in refugee camps include bomb-blast injuries among Kurdish refugee children (Haddock and Pollok, 1992), hand grenade injuries in a refugee camp on the Thailand-Cambodian border (Coupland, 1993), burns in Vietnamese children in refugee camps in Hong Kong (Chan and King, 2000), and injuries due to explosions and projectiles in children in Bosnia and Herzegovnia (Jandric, 2001). Crush injuries were reported in Turkish children following an earthquake in 1999 (Iskit et al., 2001). Although torture of children is uncommon, 10 Kashmiri boys ages 5 to 14 in a refugee camp were reported to have been victims of torture in 1994 (Petersen and Wandall, 1995). An increase in road traffic accidents involving child pedestrians was reported following the humanitarian response to the crisis in Rwanda (Pearn, 1996). Children accustomed to receiving small handouts of food and sweets from passing vehicles would run

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into the roads. Following the large influx of vehicles as part of relief efforts, more children were evaluated for injuries from road traffic accidents than from land mines or interpersonal violence after the genocide stopped in July 1994.

Mental Health

The mental health of children in complex emergencies, particularly following armed conflicts (McCloskey and Southwick, 1996; Plunkett and Southall, 1998; Southall and Carballo, 1996; Southall and Abassi, 1998), has been the focus of published studies. Many recent studies were conducted in European cities and countries, such as Bosnia and Herzegovina (Dybdahl, 2001, Papageorgiou et al., 2000; Smith, Perrin, Yule, and Rabe-Hesketh, 2001; Smith, Perrin, Yule, Hacam, and Stuvland, 2002; Stein, Comer, Gardner, and Kelleher, 1999; Yule, 2000), Sarajevo (Allwood, Bell-Dolan, and Husain, 2002; Husain et al., 1998), and Croatia (Kuterovac, Dyregrov, and Stuvland, 1994); others assessed the mental health of refugee children seeking asylum in developed countries (Fazel and Stein, 2002; Hodes, 1998; Lock, Southwick, McCloskey, and Fernandez-Esquer, 1996; Montgomery, 1998; Rothe, Lewis, Castillo-Matos, Martinez, and Martinez, 2002). Most studies concluded that children exposed to the violence of armed conflict or the harsh living conditions of refugee camps have high rates of serious psychiatric problems (Fazel and Stein, 2002; Hodes 1998, Lock et al., 1996, Montgomery 1998; Southall and Abassi, 1998). Although the majority of studies report high rates of posttraumatic stress disorder, other mental health problems, such as depression and anxiety, may affect larger numbers of children and contribute more to long-term psychological burden (M.L. Belfer, personal communication; Thabet, Abed, and Vostanis, 2004). For example, 21.5 percent of children in the Gaza Strip in 1995 were reported to have significant anxiety disorders (Thabet and Vostanis, 1998). Regressive or aggressive tendencies are other examples of the long-term consequences of early exposure to violence in childhood (Pearn, 2003).

Few studies have assessed the mental health of refugee or internally displaced children who are not exiled, particularly in regions outside Europe. In a Sudanese refugee camp in northern Uganda, 20 percent of 56 children were assessed to have chronic posttraumatic stress disorder (Peltzer, 1999). In contrast, a study of 58 Guatemalan Mayan Indian children living in refugee camps in Mexico found little evidence of psychological trauma

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(Miller, 1996). The authors suggest "there is a resilience among the children that appears to reflect a fundamental capacity for survival and recuperation in their families and in the broader community in which they live" (Miller, 1996). A similar conclusion was drawn from a one-year follow-up study of 10 Bosnian adolescent refugees, in whom rates of posttraumatic stress disorder diminished over the follow-up period and after resettlement in the United States (Becker, Weine, Vojvoda, and McGlashan, 1999). Others agree that the psychological consequences of war on children may not be permanent and irreparable, and that family and community support can mitigate the psychological trauma they suffered (Summerfield, 1998). However, a 12-year follow-up study of 27 Khmer adolescents resettled in the United States found that the symptoms of posttraumatic stress disorder persisted and can develop years after cessation of trauma (Sack, Him, and Dickason, 1999).

CURRENT PRACTICES AND CHALLENGES IN CARE

While the published literature provides important information on the care of children in complex emergencies, reports from the field provide important details on the realities of providing this kind of care. Based on two surveys, one an overview of activities and the other of country-specific activities, which were completed by NGO and UNICEF respondents, common themes emerged as key issues for the provision of care to children in complex emergencies. Many of the NGOs surveyed provide direct clinical care to children in complex emergencies. Examples include MSF, Médecins du Monde, MERLIN, Save the Children, the International Medical Corps, the International Rescue Committee, and the International Committee of the Red Cross. Other organizations work with local partners to provide care to children. CARE International, for example, does not directly provide clinical care but assists other NGOs or ministries of health in providing such care. Catholic Relief Services also does not provide clinical care but focuses on community-oriented preventive and public health activities and supports local partners in these activities. Several other organizations surveyed are less directly involved in the care of children in complex emergencies. World Relief provides support for the building and maintenance of clinics, usually run by ministries of health. Mercy Corps attempts to improve the use of health services through community mobilization and behavior change.

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Health Care Providers

Various types of health care providers are responsible for child health activities in complex emergencies. In many situations, nurses and clinical officers provide much of the clinical care to children. Some humanitarian organizations employ doctors, but most organizations also recognize the importance of training community health workers and volunteers in complex emergencies. Africare trained volunteers in Angola to assist with vaccination activities, and the International Federation of the Red Cross regularly trains community health workers. Almost all organizations reported the need for more qualified workers to care for children in complex emergencies. The level of health worker functioning in primary clinics varies. Nurses are the primary care providers in health centers in the Democratic Republic of the Congo, Iraq, and Zimbabwe. In Angola, Burundi, and Iraq, nurse equivalents and nurse's aides were identified as the main providers of care for children. Midwives or traditional birth attendants were noted as common providers in Sri Lanka and Angola. Community health workers serve an important role in Angola, the Democratic Republic of the Congo, Sri Lanka, Malawi, and Central and West Africa. In Afghanistan, one respondent reported that most health centers had doctors, whereas another reported that the majority of care is provided by nurses. Doctors were noted to be important providers of care to children in Iraq and Kosovo.

As a result of the diversity of health care workers at or below the level of nurses, clinical guidelines for the care of children in complex emergencies need to target personnel with nursing backgrounds and lower level health workers. Most organizations mentioned the need to translate guidelines into local languages and to make them more concise and transportable. One organization surveyed noted that the nutritional guidelines, for example, should be simplified so that they are suitable for health care workers in emergency settings with little or no background in nutrition. Five respondents also commented that guidelines should be integrated to address the most common pediatric diseases.

The most important factors limiting the quality of care provided to children in complex emergencies is the need for appropriate training on clinical management of common pediatric diseases, as well as administrative and communication skills. In addition to the training of new health workers, several groups reported the need for refresher courses. Importantly, case management of pediatric diseases was the training need most frequently reported. One respondent specifically recommended training in the use of

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essential drugs and rational prescribing practices. Four respondents mentioned the need for training in the integrated management of childhood illness.

Other identified training needs for health care workers include water and sanitation, midwifery, proper infant feeding practices, mental health care, and provision of preventive services. In Afghanistan, one group responded that "training needs differ at different levels. . . . At present (training) is in an ad hoc manner." On-the-job training was mentioned as a mechanism to train health care workers during a complex emergency. Other groups reported the need to improve supervision and implement quality control at the level of the health center. Training to enable health care workers to organize immunization campaigns and set up isolation or quarantine areas in the field also was noted as an important need. Enhancing communication and counseling skills of health workers is an area of need that can improve direct patient care and provide a tool for social mobilization.

Health Education and Promotion

Some organizations provide health education and health promotion as part of their child health activities in complex emergencies. Action Contra la Faim, Africare, and World Vision, for example, provide health education on disease prevention and personal hygiene. The International Federation of the Red Cross establishes volunteer health information teams that provide health education to the community and conduct disease surveillance, analogous to the community health agents trained by Africare. World Vision provides preventive services, such as promotion of breastfeeding, and care through mobile outreach teams as well as at fixed health centers.

Most organizations reported conducting community mobilization. Commonly, community health workers are engaged in surveillance. In the Democratic Republic of the Congo, the Ministry of Health trains *relais communautaires*, and in Afghanistan traditional birth attendants report neonatal mortality. Mullahs, village organizations, and volunteers are other examples of groups involved in community mobilization and education. In Angola, home visitors provide health education. A few countries reported limited community health activities, including Kosovo, Sri Lanka, and Central and West Africa.

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Surveillance

Many organizations reported some mechanism for surveillance. World Vision collects data on proportional morbidity and mortality at health facilities when alternative surveillance mechanisms are not in place. Africare establishes village health committees and enlists volunteer community health agents to report clusters of unusual diseases. The International Federation of the Red Cross provides a software package to its emergency response units to establish surveillance systems.

Performance Measures

Organizations reported collecting data on basic indicators, such as morbidity, crude mortality rates, and case fatality rates that are compiled and reported, usually on a monthly basis. Process indicators used by different groups included the percentage of children younger than age 5 with access to services (Democratic Republic of the Congo), attendance rate at clinics (Angola), staff ratio per 100 new contacts (Angola), average hospital length of stay (Angola) and the bed occupancy rate (Angola). In Afghanistan, clinic staff were observed and given feedback; however, this method of performance monitoring is dependent on the quality of the supervising staff. Output indicators included the percentage of cases adequately managed at facility and family levels (Democratic Republic of the Congo), the percentage of children immunized (Democratic Republic of the Congo, Iraq, and Sri Lanka), and the percentage of households with access to potable water and adequate sanitation (Democratic Republic of the Congo).

Role of Ministries of Health

According to many survey respondents, the ministries of health play an important role in coordinating NGO activities. Lack of coordination between NGOs and national and international agencies was an issue raised by four in-country respondents. Poor coordination was most apparent when government health services were weak. According to one respondent, this lack of coordination resulted in the inadequate monitoring and evaluation of programs as well as the limited application of evidence-based practices and integrated clinical guidelines. Another impact of poor coordination, according to a group in Afghanistan, was the lack of a systematic process for establishing community-based services.

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In some countries, ministry of health offices at the provincial or district level were responsible for monthly coordination meetings. In addition to coordination and planning of activities, the ministry of health should be responsible for setting policy, establishing minimum standards for services, and adapting training materials to ensure the provision of quality care across health centers. Other organizations reported that the ministry of health should work with NGOs in establishing priorities for the provision of health care. Participation of the ministry of health in surveillance activities helps identify needs and set priorities.

Role of the World Health Organization

Several groups reported that an important role of WHO is to support the activities of the ministry of health or to assume this role when no functional government is present. Many groups would like to see WHO provide technical assistance to the ministry of health in the areas of surveillance and coordination. Other methods of technical assistance are to train ministry of health staff, for example, as in the establishment of a central epidemiological unit in Afghanistan. The need to provide technical expertise in the establishment or expansion of health information systems also was raised by two groups in the Democratic Republic of the Congo. Training in laboratory service provision and clinical protocols was also a desired role for WHO. Other groups saw a more active role for WHO. For example, in India, WHO contributed expertise to the rapid assessment conducted after the Gujarat earthquake. Several groups in the Democratic Republic of the Congo reported that WHO should participate in coordination meetings.

Challenges

Many of the obstacles to the provision of health care in complex emergencies were due to limited access to care, according to survey respondents. Many dimensions of this problem were described, some of which are not unique to complex emergencies. These include cultural factors, such as traditional beliefs about illness, and delays in appropriate health care seeking by parents. In Afghanistan, three of the five groups reported barriers posed by low educational levels among women. One respondent noted that the low status of women hinders their potential to be decision makers in an emergency situation. Limited physical access, due to the remoteness of

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health care facilities, was another important obstacle. Many respondents described a disrupted or deficient infrastructure for the provision of health services, with poor referral and transportation systems for both patients and medical supplies.

Lack of security restricts access to health care and is a major obstacle in countries experiencing armed conflict. Lack of security was most commonly cited among respondents from the Democratic Republic of the Congo but was also mentioned by respondents from Burundi, Iraq, Sri Lanka, Zimbabwe, and the Central and Western African Regional Office of UNICEF. Continuing violence makes vulnerable populations inaccessible to relief workers and endangers the safety of these workers. One respondent from Angola described the difficulties of providing routine immunization services in rebel-controlled areas.

Many organizations in all countries surveyed described resource limitations, particularly drugs and medical supplies. Inappropriate donation of drugs and infant formula was another factor noted by several respondents. Facing the pressure of limited resources, program coordinators often were required to make difficult decisions and, according to one respondent, the "special needs of a young infant or a child . . . are overshadowed by 'basic needs' of people."

GUIDELINES FOR CARE

Although a few organizations, such as MSF and World Vision, have developed guidelines for the care of children in complex emergencies, most organizations use existing WHO, UNICEF, and ministry of health guidelines, many of which were developed for stable situations. Comprehensive guidelines for the care of children in complex emergencies were reviewed using a checklist and the results summarized in Appendix B. Integrated management of childhood illness (IMCI) guidelines also were reviewed using the same tool. Existing guidelines are used for the diagnosis and management of cholera, shigellosis, and meningococcal meningitis; management of severe dehydration, severe malnutrition, and micronutrient deficiencies; counseling on infant feeding; and case management and immunization against measles. In addition, organizations rely on existing WHO, UNICEF, and ministry of health guidelines to provide preventive care, including prevention of neonatal tetanus and malaria, routine childhood vaccination, promotion of breastfeeding, and routine vitamin A supplementation. Some organizations attempt to integrate nutritional

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management with routine child health activities, for example, promotion of early and exclusive breastfeeding and encouragement of appropriate weaning foods.

Comprehensive Guidelines

One of the key references for clinical management of pediatric disease is WHO's *Management of the Child with a Serious Infection or Severe Malnutrition* (World Health Organization, 2000a). These guidelines cover the most common serious illnesses affecting children over the age of 7 days. The guidelines target doctors, senior nurses, and other senior health workers who care for children at the first-level referral center. The manual is written to complement the IMCI guidelines and is based on a similar disease classification. The manual also specifically calls for communication and feedback to the referring community health worker to help strengthen the community and health center referral base. Detailed clinical management guidelines are provided for some of the major causes of child mortality, including measles, malaria, pneumonia, and diarrhea (with guidelines for cholera and dysentery). Unlike the other guidelines reviewed, the WHO manual deals with the diagnosis and treatment of persistent diarrhea (lasting more than 14 days). The WHO manual also is the only source reviewed that deals with emergency resuscitation algorithms. National guidelines supported by ministries of health are cited in the management of uncomplicated malaria, tuberculosis, and prophylaxis of opportunistic infections among HIV-infected children.

The MSF *Clinical Guidelines* (1999, 2005) is an example of comprehensive clinical guidelines developed for use in complex emergencies. These guidelines are used by organizations other than MSF and address all age groups, with applicable pediatric dosages given separately for the medicines listed. The clinical guidelines are targeted to medical professionals, specifically physicians and well-trained nurses working in field dispensaries and hospitals. The MSF guidelines specifically address each of the major causes of death in children in complex emergencies: measles case management and immunization; prevention, diagnosis, and treatment of malaria; diagnosis and case management of pneumonia; diagnosis and case management of diarrheal diseases, including cholera and dysentery; and management of severe malnutrition. In addition to MSF's own guidelines, reference is made to the WHO guidelines for the management of children with malaria, pneumonia, and diarrhea (including home management). Severe disease

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(malaria and pneumonia) is specifically addressed, and hospital referral is recommended in some cases. Nutritional supplementation is included as part of case management for children with dysentery and pneumonia, but not watery diarrhea. MSF has specific *Nutrition Guidelines* for the assessment of nutritional problems and the implementation of nutritional programs in complex emergencies.

In addition, the MSF guidelines address the diagnosis and management of many other diseases of children in complex emergencies, specifically meningitis, mild and severe anemia, micronutrient deficiencies (vitamin A deficiency, pellagra, and scurvy), skin diseases (e.g., scabies), eye diseases (e.g., vitamin A deficiency, conjunctivitis, trachoma), and burns. The diagnosis of HIV-1 infection and the prevention of opportunistic infections are addressed and have been expanded in the fifth edition. The diagnosis and management of tuberculosis in children are addressed only under specific circumstances, with guidelines specific to the national tuberculosis control program of the ministry of health. There is an additional MSF handbook on tuberculosis. Not addressed in the MSF *Clinical Guidelines* are the diagnosis and management of persistent diarrhea, diseases of the neonate, and trauma apart from burns. Sexual abuse is discussed in general without specific reference to children. While the fifth edition of the *Clinical Guidelines* includes more discussion of mental health, the focus is on adults. Routine childhood immunizations are not specifically addressed in either edition of the *Clinical Guidelines,* and promotion of breastfeeding is briefly mentioned.

The MSF *Clinical Guidelines* discuss active case finding and home visits but do not have a community-based component for health education, disease surveillance, or case management. These guidelines address surveillance for crude mortality and measles and provide some sample reports and simple case definitions for epidemiological purposes. Several disease-specific guidelines require the use of laboratory tests, including blood smears for malaria, microscopic examination of cerebral spinal fluid, detection of pathogenic bacteria (*Shigella dysenteriae*) in stool specimens, and blood typing for transfusions.

Helping the Children: A Practical Handbook for Complex Humanitarian Emergencies is written for medical volunteers who are not child health specialists and is endorsed by the American Academy of Pediatrics (Mandalakas, Torjesen, and Olness, 1999). The strength of these guidelines is in briefly addressing preventive and public health measures, although they are not comprehensive clinical guidelines. For example, the manage-

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ment of children with malaria or pneumonia is not addressed, and the handbook discusses the management of diarrhea, cholera, dysentery, and meningitis only briefly. The handbook emphasizes many less common diseases that are unlikely to be major causes of morbidity or mortality in complex emergencies. For example, when presented with a child with cough and tachypnea, the reader is reminded to think of meliodosis, hydatid cyst, or the pulmonary phase of nematode migration. The handbook is more appropriate in addressing mental health problems, the promotion of breastfeeding, and routine childhood immunizations.

Comprehensive guidelines exist that focus on preventive health care at the individual and community level and thus have a public health emphasis. MSF's *Refugee Health: An Approach to Emergency Situations* (Médecins sans Frontières, 1997) is targeted to public health officials and planners with a high level of expertise. However, integration of case management and preventive measures at the individual patient level is best done in IMCI guidelines. These guidelines address the care of children from 1 week to age 5 and are targeted to nurses and clinical officers at first-level health facilities. From a preventive standpoint, IMCI includes promotion of breastfeeding, routine childhood immunizations, and routine vitamin A supplementation. More recently, clinical guidelines in IMCI have been expanded to include the care of HIV-infected children and newborns. IMCI guidelines do not include nutritional supplementation as part of case management for pneumonia and diarrhea, and they do not specifically address tuberculosis, skin diseases, eye diseases, trauma, burns, child and sexual abuse, emergency resuscitation, or mental health problems. Disease surveillance is not part of IMCI. However, IMCI guidelines do include a less well-developed community and family component that emphasizes health education.

Save the Children has instituted a *Children and War Field Guide Series* to provide practical guidance for program planners in each of six content areas: education in emergencies, youth, separated children, child soldiers, sexual and gender-based violence, and psychosocial care and support. This series addresses a broad array of issues and perspectives, including social, cultural, and educational factors that contribute to children's health and development. A comprehensive approach to addressing the issue of separated and unaccompanied children is presented in the *Inter-Agency Guiding Principles on Unaccompanied and Separated Children* (International Committee of the Red Cross, United Nations High Commissioner for Refugees, UNICEF, World Vision International, and Save the Children, 2004). These

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guidelines set up a framework to protect rights and identify the special needs of this vulnerable population of children.

The most comprehensive guideline for health systems planning in complex emergencies is the *Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response* (Sphere Project, 2004). The Sphere Project was not designed to provide clinical care guidelines but to serve as a set of minimum standards for delivering health care during complex emergencies. The focus is on initial assessment standards, coordination among different levels of the health care infrastructure, management of human resources, health information systems, and disease control for all ages. Importantly, the Sphere Project supports capacity building at the local level and participation of the community in the design, implementation, and monitoring of health care programs.

The Sphere Project details several interventions to minimize disease due to several of the major causes of child mortality in complex emergencies, including measles and malaria. There is also a section on programmatic considerations in the management and prevention of HIV/AIDS. Standard case management protocols and essential drug lists are mentioned as important for the clinical coordination of care; however, protocols for specific diseases are not detailed. The ministry of health is designated the lead in the health sector response whenever possible. IMCI is referred to as a guideline to use "where possible" in countries for which it has been adapted. The need for surveillance systems is emphasized, and a key indictor is an under-5 mortality rate of less than twice the baseline rate or less than 2 per 10,000 persons per day. Sample surveillance forms are provided.

Disease-Specific Guidelines

In addition to these comprehensive guidelines, disease-specific guidelines developed by WHO, UNICEF, and various NGOs are applicable to children in complex emergencies. One example is *Infant Feeding in Emergencies* (World Health Organization, UNICEF, LINKAGES, IBFAN, and ENN, 2001). These guidelines on infant feeding target all levels of emergency relief staff caring for women and children at health and nutrition centers. The guidelines are intended for use in natural disasters as well as complex humanitarian emergencies in developed and developing countries. For decision makers, the guidelines include practical steps in developing policies, training staff, and assessing and monitoring interventions. Promotion of breastfeeding is emphasized, and surveillance for breastfeeding

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prevalence using qualitative and quantitative measures is discussed. Appropriate policies on and steps for use of breast milk substitutes are provided.

Although not specific to children, several guidelines address reproductive health care in complex emergencies. *Reproductive Health in Refugee Settings: An Inter-Agency Field Manual* (United Nations High Commissioner for Refugees/United Nations Population Fund, 1995) addresses the reproductive health issues of women and adolescents. A minimal initial service package is presented that includes management and prevention of sexual abuse. *Reproductive Health During Conflict and Displacement: A Guide for Programme Managers* (World Health Organization, 2000b) focuses on women of reproductive age, briefly mentioning children, men, and boys as targets of sexual abuse.

The Inter-Agency Standing Committee reference group for HIV/AIDS in emergency settings presents a hierarchical approach to standards of HIV/AIDS care and prevention (Inter-Agency Standing Committee, 2003). These guidelines are designed as a resource for multisectoral planning for HIV/AIDS care and prevention and target program planners in all emergency settings, regardless of the underlying HIV prevalence. Initial minimum services must be in place before more resource-intensive, comprehensive services, such as prevention of mother-to-child transmission or long-term antiretroviral therapy, should be provided. When antiretroviral therapy is provided, treatment should be provided in conjunction with National AIDS Control Programs and follow host country protocols.

Tuberculosis Control in Refugee Situations: An Inter-Agency Field Manual is designed for field managers and provides guidelines for the implementation, monitoring, and evaluation of tuberculosis control programs in refugee situations (World Health Organization and United Nations High Commissioner for Refugees, 1997). The manual states that tuberculosis control is not a priority in the immediate, acute phase of the emergency and should not commence until death rates are below 1 per 10,000 persons per day, basic needs are being met, and essential clinical services are in place. Additional criteria for the development of a tuberculosis control program are that the security situation is stable and the camp population is likely to be present for at least six months. The section on management briefly identifies diagnostic considerations specific to children.

Guidelines developed for nonemergency settings could be modified for use in complex emergencies. Initiatives to improve neonatal survival have been undertaken by Save the Children and CARE. *Care of the Newborn Reference Manual* was developed to train health workers in the best

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practices to care for newborns in developing countries (Beck, Ganges, Goldman, and Long, 2004). This manual covers practical skills, such as newborn examination and resuscitation, as well as health promotion and education issues, including counseling families on birth spacing, newborn care, and breastfeeding. The manual includes drug dosages and equipment checklists for newborn care. CARE, in conjunction with the Centers for Disease Control and Prevention, produced *The Healthy Newborn: A Reference Manual for Program Managers,* which targets health systems issues and program managers to facilitate the systematic implementation of evidence-based standards in newborn care (Lawn, McCarthy, and Ross, 2001). This manual describes the development of a newborn health management information system to provide the data to direct program and health planning decisions. It applies a continuous quality improvement methodology to analyze data, identify problems, select interventions, and evaluate outcomes for the design and monitoring of programs.

Limitations of Existing Guidelines

Despite the strengths of existing manuals, all of the guidelines needed for the care of children in complex emergencies are not located in a single source, and the majority target higher level health care workers and program planners. Many of the guidelines reviewed are designed for audiences with more medical and public health expertise than is commonly found in complex emergencies. Many guidelines need to be simplified and streamlined.

On the basis of the initial survey, organizations providing clinical care to children in complex emergencies were least likely to have formal guidelines on the prevention and management of neonatal illness, the diagnosis and management of children with HIV-1 infection, active case finding and treatment of tuberculosis in children, pediatric trauma (e.g., burns, sexual abuse), emergency resuscitation, and the diagnosis and management of mental health problems in children. Services for the diagnosis and management of mental health problems in caretakers were more commonly reported than those for children. However, Action Contra la Faim has piloted programs to address the mental health of infants and mothers in nutrition centers in Afghanistan and Sudan. Two organizations stated that tuberculosis control efforts in emergency situations were not part of their activities because the duration of therapy exceeded the expected duration of relief activities. Few organizations reported having guidelines that distin-

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guish the management of severe disease (e.g., cerebral malaria, severe pneumonia, severe anemia) from the general management of childhood illness, and few reported the inclusion of nutritional support as part of case management (e.g., for diarrhea, pneumonia, and HIV). No organization reported distinct guidelines for the management of persistent diarrhea. Several organizations reported they were involved in developing guidelines for specific child health activities, including the diagnosis and management of pediatric HIV infection, physical and sexual abuse in children, and mental health problems in caretakers.

From a preventive standpoint, few guidelines incorporate nutritional support as part of case management, and promotion of breastfeeding had limited programmatic emphasis. Guidelines on community-based surveillance for measles and cholera and community-based health interventions could be strengthened.

Potential Use of Modified IMCI Guidelines

IMCI guidelines were not developed for complex emergencies and their use in complex emergencies has not been evaluated. Adapting IMCI guidelines to the acute phase of a complex emergency has several limitations, including (1) the 11-day training course is too long to be implemented during the acute phase of a complex emergency, (2) the supporting infrastructure and referral facilities are frequently not in place to manage severe disease, (3) the time required to complete a single patient encounter is too long for the high caseload seen during the acute phase of a complex emergency, (4) disease surveillance is not addressed, and (5) and laboratory support for the diagnosis of malaria, cholera, and shigellosis is not included.

Modifications to the IMCI guidelines would need to be made to make them more suited to the acute phase of complex emergencies. An attempt to simplify these guidelines was made for use in refugee camps in Tanzania (Robinson, 1998). Although the introduction of IMCI in this setting was deemed feasible, several limitations were noted. Because of high mortality within the first 24 hours of presentation, a triage system was recommended to ensure the prompt treatment of severely ill children. Reflecting the limitation of IMCI guidelines in dealing with such children, the evaluation concluded that emergency rooms should be established to manage their care.

IMCI guidelines may be enhanced when used in combination with Emergency Triage Assessment and Treatment (ETAT) guidelines. ETAT

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guidelines are designed to train health care workers to rapidly assess signs and symptoms of severe disease, including problems of airway and breathing, shock, convulsions, severe malnutrition, and severe dehydration. For each classification of severe disease, rapid resuscitation techniques are recommended. The potential usefulness of ETAT guidelines in complex emergencies is that many children present with severe disease, and rapid triage and treatment are critical for their successful management. The disadvantages of ETAT guidelines are that they require resources (e.g., oxygen) and skills (e.g., the ability to insert femoral or interosseous lines) not available in many complex emergency settings. Nevertheless, guidelines for triaging critically ill children are needed, and, as with other recommendations, the ETAT guidelines could be simplified for use by a variety of health care workers.

IMCI guidelines also have been adapted to provide care to children in complex emergencies when trained health care workers are unavailable. In southern Sudan, village volunteers and community health workers were trained to use a much simplified version of IMCI guidelines (Beltramello, Zagaria, Masiello, and Robinson, 2002). The guidelines for village volunteers, called Essential Community-based Child Health Care (ECCHC), contain algorithms for the identification and management of general danger signs, pneumonia, dehydration, and malaria by literate persons without any health training. Training requires seven days. The ECCHC package was effectively introduced into regions of southern Sudan with very limited access to health care (more than 10 hours from a health facility). Guidelines for community health care workers were developed to include algorithms for anemia, malnutrition, intestinal parasites, and dysentery. The development and validation of simplified IMCI guidelines provide an important tool for the care of children in complex emergencies in which access to trained health care workers is limited.

RECOMMENDATIONS TO IMPROVE GUIDELINES

Despite the complexities of addressing the health needs of children in emergencies, much of the burden of disease is caused by malnutrition and several infectious diseases, diseases that are common to children in many nonemergency settings and for which there exist evidence-based guidelines for prevention and treatment. This body of information and clinical experience serves as the foundation for addressing the health needs of chil-

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dren in complex emergencies. The effective management of the personnel, supplies, training, and logistics required for the optimal care of children is critical and should be part of the overall emergency management plan. Providers of care and protection to children in complex emergencies, although often overwhelmed by immediate concerns, should maintain a vision of fostering sustainable health care during the transition to the postemergency situation.

Findings

Our recommendations are based on the following findings: (1) Most organizations caring for children in complex emergencies use existing clinical guidelines rather than develop their own. (2) Health care in complex emergencies is delivered by different levels of health care workers from multiple organizations. (3) Guidelines for the prevention and management of child health problems in complex emergencies exist but need to be brought together into an accessible, comprehensive package. (4) Coordination across the many international relief organizations has been problematic, hindering the delivery of care. Furthermore, laying the foundation and planning for the transition out of the emergency phase toward a stable health system is an important component of emergency care. Our hope is that these recommendations and suggested areas of research will spur others to work toward improvements in the care of children in complex emergencies (Box 1).

Recommendations

Evidence-based, locally adapted guidelines to address treatment and preventive care of children in complex emergencies should be adopted by ministries of health, supported by WHO and UNICEF, and disseminated to international relief organizations as the best means to ensure appropriate, effective, and uniform care in most complex emergencies. The guidelines should take into consideration the unique priorities in different phases of the emergency.

The clinical and preventive guidelines should be adapted from existing clinical guidelines used for the care of children in complex emergencies and stable situations (e.g., IMCI) and should focus on the rapid reduction of mortality due to measles, malaria, diarrhea (including cholera and shigellosis), acute respiratory tract infection, and acute malnutrition. The evidence

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Box 1
Research Needs

- Development and evaluation of interventions to reduce neonatal mortality in complex emergencies.
- Development and evaluation of better tools to assess mental health problems in children that can be applied across cultures.
- Development and field testing of rapid diagnostic and antibiotic-susceptibility tests for *Vibrio cholera* and *Shigella dysenteriae.*
- Evaluation of the cost-effectiveness of short-course therapy for use in situations in which compliance and follow-up are poor. Examples include:
  short-course therapy with ciprofloxacin for *Shigella dysenteriae*
  short-course therapy with macrolides for *Vibrio cholera*
  short-course therapy for pneumonia
  single-dose therapy for malaria
- Evaluation of intermittent presumptive treatment of malaria for children in complex emergencies.

base for preventive and curative interventions in stable settings was recently reviewed, and interventions with sufficient evidence should be prioritized and adapted for use in complex emergencies (Jones et al., 2003).

In the acute phase of an emergency, it may be necessary to consider simplified triage protocols for children and simplified algorithms for less severely ill children who could be managed by the level of health worker most commonly providing care to children. The clinical guidelines also should address the management of severe disease in complex emergencies, in particular, how severely ill children should be managed in the absence of referral facilities or with referral that may require distant transport to more secure areas. In the postemergency or nonacute phase, strategies for expanding community capacity and the role of community health workers and volunteers should be recognized as they relate to such activities as community-based therapeutic care, disease monitoring, health-seeking behaviors, and environmental health. In the postacute phase, the curative guidelines should include nutritional assessment and intervention in order to address a child's overall health. The applicability of simplified, revised

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IMCI guidelines should be considered to better incorporate such preventive efforts in each visit. There should be provisions for addressing the health needs of special populations of children not addressed in normal situations, including provisions for unaccompanied children and for the mental health needs of children. International relief organizations should be a partner in the development and pretesting of the guidelines to ensure they are appropriate to the types of workers engaged in providing care to children.

CONCLUSION

Unique and varied challenges to the provision of health care to children are found in complex emergencies. Health care is often delivered by multiple organizations with different types of health workers using diverse guidelines and training materials, and it is therefore less uniform than in stable situations. Ensuring comprehensive, coordinated, and appropriate care is difficult when multiple organizations and different levels of health workers are operative. In the absence of a functioning health care system, referral services and supply delivery systems are unavailable, and health workers with minimal training are often the primary providers. In such situations, training of lower level health care workers must be rapid, simple, and targeted to the diseases causing the greatest morbidity and mortality. The logistics of drug delivery and distribution are made complex by the multiple organizations involved, inadequate communication and transportation systems, and threats to security. Social and political instability may impede access to vulnerable populations of refugees or internally displaced people by health care providers or relief workers. In an affected area, the population may be in flux. Large-scale migration requires mobile resources and services that can be redirected to target populations. Social and political instabilities also pose special challenges in caring for children who are unaccompanied, forced to fight as child soldiers, or who are sexually abused.

In the face of significant and ever-changing challenges, improving and preserving the health of children in complex emergencies is the goal of many dedicated organizations and individuals. This report is a testimony to their efforts to care for children by furthering the development of comprehensive child health guidelines. Much collective experience has accumulated on which to base the development of guidelines for the care of children in complex emergencies, but much remains to be learned. Identifying specific gaps in current knowledge is intended to focus research efforts and generate discussion. While some of the research needs are dis-

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ease-specific, questions remain on the operational and organizational structure of health delivery in complex emergencies. The Sphere Project is an important step in addressing some of these operational issues by setting minimum standards. The application of IMCI guidelines or other comprehensive guidelines will involve addressing resource constraints and operational issues in various situations. Sharing lessons learned in the field on the application of clinical, preventive, and health systems guidelines will remain central to the goal of reducing morbidity and mortality among children in complex emergencies.

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Appendix A

Survey Respondents and Instruments

ORGANIZATIONS SURVEYED ON CHILD HEALTH ACTIVITIES IN COMPLEX EMERGENCIES

Action Contra la Faim
Aga Khan Foundation
Africare
American Red Cross
American Refugee Committee
CARE International
Catholic Relief Services
Christian Children's Fund
Concern Worldwide
ECHO Health Services
ICDDR-B
International Committee of the Red Cross
International Federation of the Red Cross/Red Crescent
International Medical Corps
International Rescue Committee
Médecins du Monde
MSF-Belgium
MSF-USA
Mercy Corps
MERLIN

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Samaritan's Purse
Save the Children-UK
UNICEF
World Bank
World Relief
World Vision International

RESPONDENTS FOR THE KEY COUNTRY SURVEYS

Afghanistan:
World Vision International
International Rescue Committee
Médecins sans Frontières
Aga Khan Development Network
International Federation of the Red Cross and Red Crescent Societies

Angola:
Action against Hunger
Médecins sans Frontières
Africare

Democratic Republic of the Congo:
International Medical Corps
International Rescue Committee
MERLIN
World Vision International
UNICEF

Burundi:
UNICEF

Malawi:
UNICEF

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Sri Lanka:
UNICEF

West and Central Africa Regional Office:
UNICEF

Iraq:
Ministry of Health

Kosovo:
WHO

Zimbabwe:
WHO

India:
WHO

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Survey of Child Health Activities in Complex Humanitarian Emergencies

Name of Organization_____

Contact Person	Title	Telephone	Email

Activity	Date Completed	Comments
Letter of introduction sent		
Initial contact by phone		
Key informant identified		
Survey completed		
Guidelines received		
Guidelines reviewed		

Use the following codes:

1 = written guidelines exist and are implemented in emergencies
2 = written guidelines exist but are not implemented in emergencies
3 = in emergencies, use guidelines developed by another organization (specify)
4 = address condition or issue in emergencies but do not have written guidelines
5 = do not address condition or issue in emergencies

Child Health Activity	Code	Comments
Measles in children		
measles immunization		
case management guidelines		
vitamin A therapy		
Malaria in children		
prevention of malaria in children		
diagnostic guidelines		
Rx of uncomplicated malaria		

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Rx of cerebral malaria
Rx of severe anemia 2º malaria

Pneumonia in children
diagnostic guidelines
case management guidelines
Rx of severe pneumonia
nutritional supplementation

Diarrhea in children
case management guidelines
home management guidelines
Rx of severe dehydration
nutritional management

Cholera in children
diagnostic guidelines
case management guidelines

Dysentery in children (shigella)
diagnostic guidelines
case management guidelines

Persistent diarrhea
diagnostic guidelines
case management guidelines
nutritional management

Meningitis in children
meningococcal immunization
diagnostic guidelines
case management guidelines

Tuberculosis in children
BCG vaccination
active case finding guidelines
diagnostic guidelines
case management guidelines

HIV/AIDS in children
diagnostic guidelines
disease management
prophylaxis against opportunistic infection
nutritional management

Skin diseases of children
skin diseases in general
scabies

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Eye diseases of children
- eye diseases in general
- conjunctivitis

Trauma, injuries, and abuse
- trauma management guidelines
- burn management guidelines
- child and sexual abuse

Emergency resuscitation
- airway/breathing
- rapid fluid resuscitation

Mental health
- promotion of mental health
- Dx & management in child
- Dx & management in caretaker

Malnutrition
- promotion of infant feeding
- Rx of severe malnutrition
- Rx of micronutrient deficiencies
  - pellagra (niacin deficiency)

Neonatal health
- guidelines on clean/safe delivery
- prevention of neonatal tetanus
- management of asphyxia
- management of prematurity
- management of infection

Public health
- promotion of breastfeeding
- routine childhood vaccination
- vitamin A supplementation

Surveillance
- crude mortality in children
- measles in children
- cholera in children

Tuberculosis in adults
- active case finding guidelines
- case management guidelines

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Child Health in Complex Emergencies Survey of Key Countries

1. Name of Organization_____

2. Country _____

3. Name of Contact _____

4. Position _____

5. Telephone _____

6. Email _____

7. Additional Contacts within Organization

Name	Position	Telephone	Email

8. What are the child health problems in the emergency situation in which your organization works?

9. What are the major obstacles to improving child health in complex emergencies?

10. What are the strengths of your organization in caring for children in complex emergencies?

11. Is the health infrastructure adequate to implement the child health activities (e.g., referral facilities)?

12. What levels of health care worker are the major providers of care to children?

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13. Are the human resources adequate to implement the child health activities?

14. What training is needed for staff to implement the child health activities?

15. What guidelines are used to care for children in complex emergencies? How are these guidelines disseminated and used by field staff?

16. What system of monitoring service performance exists (e.g. standard indicators)?

17. What system of surveillance exists for child health problems in complex emergencies? How is surveillance data shared with other organizations or the Ministry of Health?

18. What mechanisms exist to involve the family and community in improving child health in complex emergencies?

19. What mechanisms exist to coordinate childcare across different organizations in a complex emergency?

20. What is the role of the Ministry of Health in child health in complex emergencies?

21. What is the role of the World Health Organization in child health in complex emergencies?

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Appendix B

Summary of Comprehensive Guidelines

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Child Health Activity	MSF 5th edition	Oxfam
Measles in children		
measles immunization	2	2
case management guidelines	1	2
vitamin A therapy	1	2 & 3
Malaria in children		
prevention of malaria in children	1	2
diagnostic guidelines	1	2
Rx of uncomplicated malaria	1	3
Rx of cerebral malaria	1	3
Rx of severe anemia 2° malaria	1	-
Pneumonia in children		
diagnostic guidelines	1	2
case management guidelines	1	3
Rx of severe pneumonia	1	3
nutritional supplementation	2	-
Diarrhea in children		
case management guidelines	2 & 3	3
home management guidelines	2 & 3	3
Rx of severe dehydration	2 & 3	3
nutritional management	3	-
Cholera in children		
diagnostic guidelines	-	2
case management guidelines	2	2 & 3
Dysentery in children (shigella)		
diagnostic guidelines	2	2
case management guidelines	1	3
Persistent diarrhea		
diagnostic guidelines	-	-
case management guidelines	-	-
nutritional management	-	-
Meningitis in children		
meningococcal immunization	2	2
diagnostic guidelines	1	2
case management guidelines	1	2
Tuberculosis in children		
BCG vaccination	2	2
active case finding guidelines	-	2
diagnostic guidelines	2	2
case management guidelines	2	2

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AAP	Sphere	WHO	IMCI
1	1	2	2
2	-	1	2
2	2	1	2
-	1	-	2
-	-	1	1
-	2 & 3	1 & 3	2 & 3
-	-	1	1
-	-	1	-
-	-	1	1
-	-	-	2
-	-	1	2
-	-	1	-
2	-	1	1 & 3
2	-	1	1 & 3
-	-	1	1 & 3
-	-	1	-
2	-	1	-
-	-	2	2
2	-	1	2
-	-	1	2
-	-	1	1
-	-	1	2 & 3
-	-	1	2
2	-	-	-
2	-	1	1
2	-	1	2
2	-	2	2
-	-	2	-
2	-	1	-
-	3	1 & 3	-

continued

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Child Health Activity	MSF 5th edition	Oxfam
HIV/AIDS in children		
diagnostic guidelines	1	-
disease management	1	-
prophylaxis against opportunistic infection	1	2
nutritional management	2	-
Hepatitis		
diagnosis in children	1	-
Anemia		
mild anemia	1	2
severe anemia	1	-
Skin diseases of children		
skin diseases in general	1	-
lice	1	-
scabies	1	-
Eye diseases of children		
eye diseases in general	1	-
conjunctivitis	1	-
Trauma, injuries, and abuse		
trauma management guidelines	-	-
burn management guidelines	1	-
child and sexual abuse	2	-
Emergency resuscitation		
airway/breathing	-	-
rapid fluid resuscitation	1	3
Mental health		
promotion of mental health	1	2
Dx & management in child	-	2
Dx & management in caretaker	1	2
Malnutrition		
promotion of infant feeding	2	2
Rx of severe malnutrition	1	2
Rx of micronutrient deficiencies	1	
vitamin A deficiency	1	1
pellagra (niacin deficiency)	1	1
scurvy (vitamin C deficiency)	2	1
Neonatal health		
guidelines on clean/safe delivery	-	-
prevention of neonatal tetanus	-	-
management of asphyxia	-	-
management of prematurity	-	-
management of infection	-	-

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AAP	Sphere	WHO	IMCI
-	-	1	-
-	2	1	-
-	-	2 & 3	-
-	-	2	-
-	-	-	-
-	-	1	1
-	-	1	2
-	-	2	-
-	-	-	-
-	-	-	-
-	-	2	-
-	-	1	-
-	-	-	-
-	-	-	-
-	2	-	-
-	-	1	-
-	-	1	-
1	2	2	2
1	2	-	-
2	2	2	-
1	1	1	1
1	1	1	2
-	2	1	2
-	2	-	-
-	2	-	-
1	2	-	-
2	-	-	2
-	-	1	-
-	-	2	-
-	-	1	1

continued

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Child Health Activity	MSF 5th edition	Oxfam
Public health		
promotion of breastfeeding	2	2
routine childhood vaccination	-	2 & 3
vitamin A supplementation	-	2
Surveillance		
crude mortality in children	1	1
measles in children	1	2
cholera in children	1	2

Code: 1 = detailed guidelines, 2 = limited or brief guidelines, 3 = refer to other guidelines, - = not addressed.
Sources: MSN 5th edition: Médecins Sans Frontières (2005). Oxfam: Mears and Chowdhury (2001). AAP: Mandalakas, Torjesen, and Olness (1999). Sphere: Sphere Project (2004). WHO: World Health Organization (2000a).

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AAP	Sphere	WHO	IMCI
1	1	1	1
1 & 3	3	2	1
2	2	2	1
2	1	2	-
-	2	-	-
-	2	-	-

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Appendix C

About the Authors

William J. Moss is an assistant professor in the departments of Epidemiology, International Health, and Molecular Microbiology and Immunology at the Johns Hopkins Bloomberg School of Public Health, and he holds a joint appointment in the Department of Pediatrics at the Johns Hopkins University School of Medicine. He is a pediatrician with subspecialty training in pediatric infectious diseases. He has lived and worked in Ethiopia, Kenya, Zambia, and South Africa. Much of his research has focused on virological and immunological interactions between measles virus and HIV, as well as the impact of the HIV epidemic on measles control. He has served as a consultant to the World Health Organization on measles and measles vaccination, as well as on child health in complex emergencies. He has M.D. and M.P.H. degrees from Columbia University.

Lulu Muhe works in the Department of Child and Adolescent Health and Development of the World Health Organization. His work involves HIV prevention, care, and treatment and coordinating guidelines and training manuals in the areas of child and public health. Previously he worked in district management, coordination of medical education as associate dean of the medical faculty of Addis Ababa University, clinical work, and teaching and research on common public health problems. He has worked extensively in Africa, including Lome and Ethiopia, and was professor of pediatrics and child health at the University of Addis Ababa. His qualifications are in pediatrics and child health and epidemiology.

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Meenakshi Ramakrishnan is a consultant at the World Health Organization, where she is involved in projects covering such subjects as measles vaccines and child health in complex humanitarian emergencies. She is also a consultant at Nemours Health and Prevention Services, where she conducted a pilot study of infant death reviews in Delaware using the National Fetal-Infant Mortality Review. Previously she worked at the Chester County Hospital. She currently serves as a member of the working group on child health in complex emergencies at the Johns Hopkins University Bloomberg School of Public Health. She has worked on issues ranging from public and rural health to clinical pediatrics in India and Guatemala. She is a member of several professional organizations, including the American Academy of Pediatrics and the American Public Health Association. She has an M.D. from Harvard Medical School and an M.P.H. from Johns Hopkins University.

Anne Henderson Siegle is an associate at the Johns Hopkins University Bloomberg School of Public Health and the Tulane School of Public Health, where her focus has been on humanitarian interventions in complex emergencies and community-based primary health care. She has 18 years of integrated health programming field experience in more than 30 countries in Africa, Latin America, Asia, and Eastern Europe. Her work has included the design, management, and evaluation of development, transition, and emergency humanitarian assistance programs within a multisectoral platform. She served for 10 years as a district, national, regional, and headquarters health manager and technical specialist in the humanitarian agency World Vision, where she continues to contribute to health programming and policy. Her interest is to contribute to the development of sustainable health systems and practices among underserved populations. She has an M.P.H. from the Johns Hopkins University Bloomberg School of Public Health.

Dory Storms is senior associate in the Department of International Health at the Johns Hopkins University Bloomberg School of Public Health and, until recently, director of monitoring and evaluation at Hôpital Albert Schweitzer in Deschapelles, Haiti. Previously she was director of the child support program at the Johns Hopkins University School of Public Health, where her primary responsibilities included the development of a program to improve management and technical performance of U.S.-based private voluntary organizations. She has consulted for many organizations, includ-

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ing the World Health Organization, UNICEF, the World Bank, and the U.S. Agency for International Development, and she has served on numerous committees and panels. Currently, she is a member of the advisory board for Advocacy for Survivors of Torture and Trauma and a member of the executive board for the American Public Health Association. She has an Sc.D. from Johns Hopkins University and an M.P.H. from Yale University.

William M. Weiss is a public health, development, and training specialist with over 15 years of experience in working with and supporting health and development programs in Africa, Asia, and Latin America. As senior monitoring and evaluation adviser for Johns Hopkins University's TSEHAI project, he provides technical assistance for monitoring and evaluating this project's support for antiretroviral treatment of persons living with HIV/AIDS across four regions of Ethiopia. At the Johns Hopkins University Center for Refugee and Disaster Response, he provides support in the design, collection, and analysis of qualitative and quantitative methods useful for assessing and solving health and development problems. As technical adviser to the CORE Group Polio Partners Project, he provides technical and management support to 20 polio projects in five countries. He has served as a consultant to nongovernmental organizations working in Latin America, South Asia, the former Soviet Union, and Africa. He has a Dr.P.H. in international health from the Johns Hopkins University Bloomberg School of Public Health.

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The **Committee on Population** was established by the National Academy of Sciences (NAS) in 1983 to bring the knowledge and methods of the population sciences to bear on major issues of science and public policy. The committee's work includes both basic studies of fertility, health and mortality, and migration and applied studies aimed at improving programs for the public health and welfare in the United States and in developing countries. The committee also fosters communication among researchers in different disciplines and countries and policy makers in government and international agencies.

The **Roundtable on the Demography of Forced Migration** was established by the Committee on Population of the National Academy of Sciences in 1999. The Roundtable's purpose is to serve as an interdisciplinary, nonpartisan focal point for taking stock of what is known about demographic patterns in refugee situations, applying this knowledge base to assist both policy makers and relief workers, and stimulating new directions for innovation and scientific inquiry in this growing field of study. The Roundtable meets yearly and has also organized a series of workshops (held concurrently with Roundtable meetings) on some of the specific aspects of the demography of refugee and refugee-like situations, including mortality patterns, demographic assessment techniques, and research ethics in complex humanitarian emergencies. The Roundtable is composed of experts from academia, government, philanthropy, and international organizations.

Other Publications of the Roundtable on the Demography of Forced Migration

Supporting Local Health Care in a Chronic Crisis: Management and Financing Approaches in the Eastern Democratic Republic of the Congo (2006)
Fertility of Malian Tamasheq Repatriated Refugees: The Impact of Forced Migration (2004)
War, Humanitarian Crises, Population Displacement, and Fertility: A Review of Evidence (2004)
Psychosocial Concepts in Humanitarian Work with Children: A Review of the Concepts and Related Literature (2003)
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