

Lessons learned from complex emergencies over past decade

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Major advances have been made during the past decade in the way the international community responds to the health and nutrition consequences of complex emergencies. The public health and clinical response to diseases of acute epidemic potential has improved, especially in camps. Case-fatality rates for severely malnourished children have plummeted because of better protocols and products. Renewed focus is required on the major causes of death in conflict-affected societies—particularly acute respiratory infections, diarrhoea, malaria, measles, neonatal causes, and malnutrition—outside camps and often across regions and even political boundaries. In emergencies in sub-Saharan Africa, particularly southern Africa, HIV/AIDS is also an important cause of morbidity and mortality. Stronger coordination, increased accountability, and a more strategic positioning of non-governmental organisations and UN agencies are crucial to achieving lower maternal and child morbidity and mortality rates in complex emergencies and therefore for reaching the UN's Millennium Development Goals.

Complex emergencies have been defined as “relatively acute situations affecting large civilian populations, usually involving a combination of war or civil strife, food shortages and population displacement, resulting in significant excess mortality”.¹ This definition has limitations; the duration of the emergency, which may be decades, and the inclusion of food shortages as a prerequisite are especially problematic. For the purposes of this *Lancet* series, we have redefined complex emergencies as situations in which mortality among the civilian population substantially increases above the population baseline, either as a result of the direct effects of war or indirectly through increased prevalence of malnutrition and/or transmission of communicable diseases, particularly if the latter result from deliberate political and military policies and strategies (national, subnational, or international). This definition does not include natural disasters, which are usually short term and necessitate a qualitatively different response, but may include situations in which war does not play a major part (famine where government policies contribute to food insecurity) or situations in which food insecurity is not prominent (war and civil strife in developed countries).

Such emergencies have resulted during the past 30 years in the development of the two new scientific fields of emergency public health and public nutrition. Although several analytical studies were published during and after the Biafra and Bangladesh conflicts, the principles of epidemiology and public health began to be systematically applied to complex emergencies only in the late 1970s,²⁻⁴ coinciding with the flight of millions of refugees from Afghanistan to Pakistan and from Cambodia to Thailand.⁵ The first technical guidelines on emergency nutrition were published in 1978 and the first textbook on refugee health came out in 1983.^{6,7} Later during the 1980s, the important association between malnutrition and mortality in refugee camps was documented.⁸

By doubling the baseline mortality rate for countries in sub-Saharan Africa, Toole and Waldman proposed a quantitative crude mortality rate threshold of one death per 10 000 people per day to define the acute phase of a

complex emergency.⁹ This definition was crucial. An objective indicator of the severity of complex emergencies, especially when no local baseline was available, permitted comparisons between different emergencies and the monitoring of trends during an emergency. This indicator, along with mid-upper arm circumference and, later, weight-for-height-based indicators for acute malnutrition, and threshold rates for the incidence of diseases of epidemic potential (such as measles and meningococcal meningitis) provided indicators that assisted in the interpretation of data obtained from rapid assessments, surveys, and surveillance in complex emergencies.¹⁰ Reviews of the epidemiology of complex emergencies were followed by a monograph by the US Centers for Disease Control and Prevention which summarised published work on refugee health.^{9,11,12} In the mid-1990s, a study of the expected evolution of mortality over time suggested 4–6 months as the time taken for mortality to return to normal after an effective humanitarian response.¹³

Guidelines on specific technical issues were produced during the late 1980s and early 1990s that have benefited the UN agencies and non-governmental organisations (NGOs) operating health programmes in humanitarian emergencies. Priorities and standards established include those for measles vaccination coverage (at least 90% of children aged 6 months to 5 years), minimum

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Search strategy and selection criteria

Literature searches were done on the WHO website and the OVID database (which includes preMEDLINE and MEDLINE 1966 to May, 2004). Searches were not limited to English. The following combinations of search terms were used: mortality; mortality and emergencies; mortality and complex emergencies; complex emergencies; refugees; and humanitarian emergencies. All abstracts were reviewed for content consistent with the objectives of the paper. Papers fitting the content criteria were requested. 1992 matches were made on the WHO website and 6414 matches on OVID.

Country, month & year	Area surveyed (population)	Type of population (country of origin)	Camp/non-camp	Methodology	Recall period (months)	Survey sample size	CMR: deaths/10 000/day (95% CI)	<5MR: deaths/10 000/day (95% CI)
Iraq ²⁸ May, 1991	Zakho camp 1 (17 863)	Kurdish IDPs	C	All households surveyed	2	17 863	3.0 (2.7–3.4)	5.5 (NR)
Malawi ²⁹ January–September, 1992	Lisungwe camp (6000–105 000)	Refugees (Mozambique)	C	Surveillance	n/a	n/a	1.0–3.6 (n/a)	5.0 (n/a)
Nepal March–June, 1992 ³⁰	Jhapa and Morang districts (73 500)	Refugees (Bhutan)	C	Surveillance	n/a	n/a	1.5 (n/a)	2.3–3.8
July, 1992–January, 1993 ³¹	Jhapa and Morang districts (73 500)	Refugees (Bhutan)	C	Surveillance	n/a	n/a	0.70 (n/a)	NR
Zimbabwe ²⁹ August, 1992	Chambuta camp (25 000)	Refugees (Mozambique)	C	Surveillance	n/a	n/a	3.50 (n/a)	NR
Somalia November, 1992 ³²	Baidoa (5200)	IDPs	C	Cluster survey	7.6	338	16.8 (14.6–19.1)	32.0 (27.3–36.7)
December, 1992 ³²	Afgoi (35 000)	Locals and IDPs	C and NC	Cluster survey	8	1019	4.7 (3.9–5.5)	10.4 (8.0–12.9)
Southern Sudan March, 1993 ³³	Ame (NR)	Locals and IDPs	NC	Cluster survey	12	442	6.4 (5.2–7.6)	NR
March, 1993 ³³	Ayod (NR)	Locals and IDPs	NC	Cluster survey	12	465	7.6 (6.4–8.8)	NR
July, 1998 ³⁴	Bahr El Gazal (Ajiep, Panthau, Mapel) (NR)	Locals and IDPs	NC	Cluster surveys	1–2	437–458	9.2–26.1 (NR)	17.6–45.7 (NR)
Bosnia and Herzegovina March, 1993 ³⁵	Zepa (33 000)	Locals	NC	NR	NR	NR	1.0 (NR)	NR
April, 1993 ³⁶	Sarajevo (NR)	Locals	NC	Surveillance	n/a	n/a	1.0 (n/a)	NR
Afghanistan November, 1993 ³⁷	Kabul (14 700)	IDPs	NC	Cluster survey	9.4	2407	0.6 (NR)	1.9 (NR)
November, 1993 ³⁷	Kabul old city (NR)	Locals	NC	Cluster survey	9.4	2209	0.6 (NR)	1.1 (NR)
April, 2001 ³⁸	Kohistan district (57 600)	Locals	NC	Cluster survey	4	3165	2.6 (1.7–3.5)	5.9 (2.0–8.8)
Rwanda ³⁹ December, 1993– January, 1994	Kibaye commune, four camps (54 921)	Refugees (Burundi)	C	Surveillance	n/a	n/a	3.0 (NR)	NR
Burundi ⁴⁰ May, 1994	Seven camps in northern Burundi (NR)	Refugees (Rwanda)	C	Surveillance	n/a	n/a	0–8.0 (n/a)	NR
DRC August, 1994 ⁴¹	Katale camp (80 000)	Refugees (Rwanda)	C	Cluster survey	20 days	3819	41.3 (NR)	40.4 (NR)
August, 1994 ⁴⁰	Three camps in East Zaire and Goma town (600 000–800 000)	Refugees (Rwanda)	C and NC	Surveillance	n/a	n/a	34.1–54.5 (n/a)	NR
September–November, 2002 ⁴²	Eastern DRC (9.3 million in accessible zones)	Locals and IDPs	NC	Cluster survey	10	13 425	1.2 (0.7–1.6)	2.97 (1.32–4.62)
September–November, 2002 ⁴²	Western DRC (31.2 million)	Locals and IDPs	NC	Cluster survey	10	12 917	0.70 (0.50–0.86)	1.45 (1.06–1.88)
Ivory Coast January, 1995 ⁴³	Tabou district (96 600)	Refugees (Liberia)	NC	Cluster survey	4	5738	2.0 (1.6–2.6)	5.6 (4.1–7.7)
January, 1995 ⁴³	Tabou district (35 400)	Locals	NC	Cluster survey	4	2115	1.5 (0.9–2.3)	1.9 (0.7–4.6)
Liberia ⁴⁴ October, 1996	Tubmanburg (22 338)	Locals and IDPs	NC	Cluster survey	4.3	3911	14.3 (NR)	34.5 (NR)
North Korea ⁴⁵ July–September, 1998	Recent North Korean migrants to China's Yanbian Korean Autonomous Prefecture (NR)	Migrants	NC	Retrospective survey	36	1632	1.17 (NR)	2.44 (NR)
Guinea-Bissau ⁴⁶ July–September, 1998	Prabis Peninsula (300 000)	Locals and IDPs	NC	Cluster survey with serial follow-up	3	422	NR	2.34–4.23 (NR)
Tanzania October–November, 1998 ⁴⁷	Lugufu camp (10 344)	Refugees (DRC)	C	Surveillance	n/a	n/a	0.4 (0.2–0.7)	1.5 (0.5–2.4)
April–June, 1999 ⁴⁷	Lugufu camp (43 942)	Refugees (DRC)	C	Surveillance with active case finding	n/a	n/a	1.1(0.9–1.2)	3.5 (2.8–4.2)
Federal Republic of Yugoslavia ⁴⁸ September, 1999	Kosovo province (1 536 764)	Locals and IDPs	NC	Cluster survey	17	8605	0.24 (0.16–0.32)	NR
West Timor ⁴⁹ February, 2000 (3 wks)	West Timor 14 sentinel surveillance sites (59 989)	Refugees (East Timor)	C	Surveillance	n/a	n/a	0.2 (n/a)	NR
Ethiopia ⁵⁰ July–August, 2000	Gode district (98 700)	Locals and IDPs	NC	Cluster survey	8	4032	3.2 (2.4–3.8)	6.8 (5.4–8.2)
Guinea ⁵¹ January–May, 2001	Parrots Beak (34 000–89 500)	Refugees (Sierra Leone and Liberia)	C	Surveillance	n/a	n/a	0.3 (n/a)	0.9 (n/a) (continues next page)

(table 1, continued) Country, month & year	Area surveyed (population)	Type of population (country of origin)	Camp/non-camp	Methodology	Recall period (months)	Survey sample size	CMR: deaths/ 10 000/day (95% CI)	<5MR: deaths/ 10 000/day (95% CI)
Angola May, 2001 ⁵²	Camacupa municipality, Bie Province (50 000)	IDPs	NC	NR	NR	NR	2.9 (NR)	4.8 (NR)
February, 2002 ⁵²	Luena, Moxico Province	NR IDPs	NC	NR	NR	NR	3.6 (NR)	6.0 (NR)
June, 2002 ^{53,54}	Bailundo, North Huambo Province (15 000)	IDPs	NC	NR	6	NR	2.3 (NR)	5.7 (NR)
Congo-Brazzaville May, 2002 ⁵⁵	Mindouli town (10 021)	Locals	NC	NR	2	NR	>5 (NR)	>10 (8)

CMR=crude mortality rate. <5 MR=under 5 mortality rate. IDPs= internally displaced people. C= camp. NC=non-camp. NR=not reported; n/a=not applicable. As epidemiology used for mortality assessments has advanced, more data are now available for regions or entire countries affected by complex emergencies. However, reporting and most probably quality of mortality surveys varies considerably. Many studies do not report type of methodology, recall sample size or confidence intervals around estimates. Published peer-reviewed mortality estimates during conflict periods for Chechnya, Sierra Leone, and East Timor are not available.

Table 1: Mortality rates for major complex emergencies 1991–2002

quantities of water (15 L per person per day), and micronutrient and caloric requirements of a general food ration (at least 2100 kcal [8.8 MJ] per person per day).^{14,15} As a result, morbidity and mortality from measles, formerly a major cause of death in emergencies, and from both wasting and preventable micronutrient deficiency disorders such as scurvy, pellagra, and beriberi have declined substantially in camp settings.^{16–19} Guidelines on the clinical management of specific disorders, such as cholera, meningococcal meningitis, and severe malnutrition, have led to rapidly declining case-fatality rates from these conditions.^{20–22} Several NGOs (eg, Oxfam, Save the Children UK, and Médecins Sans Frontières) produced technical field manuals on clinical and public health and nutrition topics^{23,24} and these have been codified in the Sphere Project Handbook.²⁵

Many of the highest and most prolonged increases in mortality rates now occur outside camps in provinces, regions, or countries affected by conflict (table 1, figure 1). As the 1990s progressed, mortality rates in camps generally decreased as rates in non-camp situations generally increased. Since 1995, mortality rates in camps have rarely been more than double the emergency threshold of one death per 10 000 per day. In long-established refugee camps, mortality rates are systematically lower for refugees than for the surrounding host population.²⁶ Additionally, services designed for refugees have often benefited surrounding communities.²⁷ Some of the highest recorded mortality rates, however, have occurred in non-camp settings. For example, in southern Sudan in 1998, mortality rates ranged from 20-fold to 30-fold above the emergency threshold and were of the same order of magnitude as in Goma, Zaire (now Democratic Republic of Congo) in 1994, when serial outbreaks of cholera and shigella dysentery contributed to one of the highest mortality rates ever recorded.

Despite subtle shifts, the causes of death during complex emergencies have not changed substantially. As a result of vaccination programmes, in most refugee camps measles is no longer a major cause of death, but it

is still a major killer in non-camp situations. Although cholera, shigella dysentery, meningitis, yellow fever, and other diseases of acute epidemic potential can cause rapid and high peaks in mortality, such epidemics are usually short-lived. In absolute terms, the major causes of mortality during emergencies are essentially the same as in developing countries: diarrhoeal diseases, acute respiratory infection, neonatal causes, and malaria.⁵⁶ Malnutrition, including micronutrient deficiency disorders, may also be declining as a cause of death in camps, but remains a major contributing factor to deaths in communities affected by complex emergencies. Because malnutrition contributes to deaths from communicable disease and is often associated with them, it is not usually reported as an independent cause of death.⁵⁷ As these diseases are usually more severe in children younger than 5 years, most deaths still occur in this age-group. However, in certain geographical areas, chronic infectious diseases (eg, tuberculosis and AIDS) may be responsible for a relatively large proportion of deaths among both children and adults.^{58,59} Finally, in more developed areas such as the Balkans, chronic diseases and violence against civilians have caused the majority of total deaths.^{48,60}

There are three major constraints to reducing morbidity and mortality in complex emergencies. First, both the epidemiological science and programmatic interventions need to go beyond the refugee and internally displaced people camp paradigm upon which much of the original research was based. The number of internally displaced people relative to refugees has increased in the past decade (table 2), reflecting the rise in internal conflicts and perhaps the hardening attitudes of host countries toward the acceptance of large numbers of refugees (table 3). However, the number of people not residing in camps who are affected by emergencies probably greatly exceeds the number of refugees and internally displaced people in camps combined (figure 2). Accordingly, in recent years the context in which humanitarian activities occur has changed significantly. Since the end of the Cold War and until recently, humanitarian agencies were increasingly

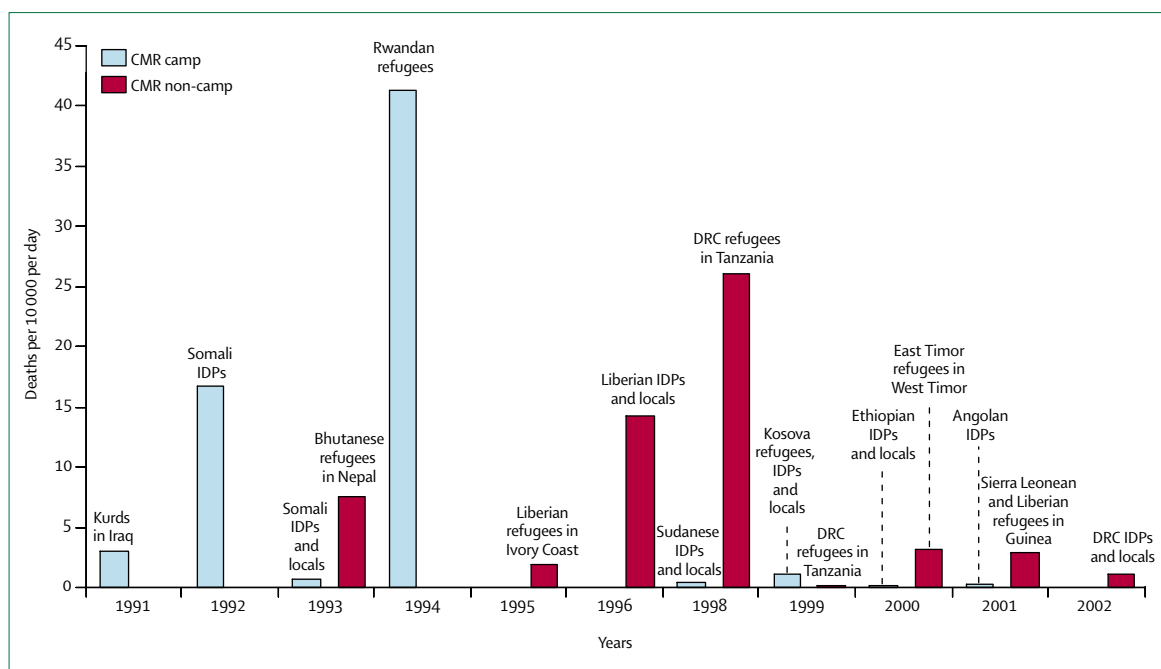


Figure 1: Crude mortality rates from selected complex emergencies disaggregated by camp and non-camp situations
IDPs=Internally displaced people. DRC=Democratic Republic of Congo. CMR=crude mortality rates.

forced to work where no legitimate government existed, resulting in increasing independence of agencies from local authorities. The humanitarian principles of impartiality and neutrality have, to an extent, become confused with the operational principle of independence. While acting independently can be even more effective, in refugee and internally displaced people camps in which the lead agency is usually the UN High Commissioner for Refugees (UNHCR) or another UN agency, humanitarian agencies in countries such as Kosovo, Afghanistan, and Iraq are increasingly facing the need to work closely with, and even be coordinated by and support the capacity of, national government or quasi-state entities.

Second, public health interventions in all settings must attain high coverage. Although high coverage rates for health and nutrition interventions are relatively easy to attain in camps, challenges can seem insurmountable when an affected population covers a large and insecure area. Poor access to health and nutrition services has restricted the coverage and effectiveness of supplementary and therapeutic feeding programmes, despite dramatically reduced malnutrition-related case-fatality rates inside the facilities.⁶⁸

Third, there is a need to address the more distal underlying causes of complex emergencies, and thus work at the levels of primary and secondary prevention. In complex emergencies in both camp and non-camp settings, humanitarian interventions provide a response that is limited to the health and other social sectors; such interventions might minimise the consequences of

societal disruption, but they cannot undo existing damage. Changing this order will necessitate working at a political level with diplomats and human rights advocates. This last issue will be discussed in the final paper of this series.⁶⁰ The first two issues and other key lessons learned from recent emergencies are discussed below.

Case examples

Goma, Zaire, 1994; Democratic Republic of Congo, 1999–2000

The flight of 500 000 to 800 000 Rwandan refugees into the North Kivu region of eastern Zaire in 1994 overwhelmed the world's capacity to respond. An average crude mortality rate of 20–35 deaths per 10 000 people per day was reported during the first month after the influx, during which an estimated 50 000 people died.⁶⁹ These rates, which resulted from serial epidemics of cholera and shigellosis, were two-fold to three-fold the highest rates previously reported among refugees or internally displaced people (16.8 deaths per 10 000 people per day in Baidoa, Somalia in 1992).³² The prevalence of acute malnutrition ranged from 18% to 23% among children aged 6 months to 5 years, but acute malnutrition was not the primary cause of high mortality. Although a well-coordinated response contributed to a steep decline to five to eight deaths per 10 000 people per day by the second month, at the outset of the emergency many international health workers were not sufficiently experienced or trained in treatment of cholera. This inexperience may have resulted in

excessively high case-fatality because of slow rates of rehydration, inadequate oral rehydration, and use of inappropriate intravenous fluids.⁷⁰ The second key lesson learned during this emergency was the importance of basic sanitation and hygiene, including treatment of potentially contaminated water at source with straightforward technology such as bucket chlorination. Provision of adequate quantities and quality of water and proper sanitation are some of the most important and neglected interventions in emergencies. Empirical evidence for current minimum standards is still needed.²⁶ Finally, the inability or unwillingness of people to go to health facilities and the resulting late presentations to such facilities and high mortality outside them underscored the insufficient emphasis placed by NGOs on community mobilisation and outreach.

In the same region of eastern Democratic Republic of Congo 5 years later, as civil war caused serious population displacement, mortality surveys among the resident population showed crude mortality rates above emergency thresholds. Although daily mortality rates of about one death per 10 000 people per day were far lower than those in 1994 in Goma, the duration of this later emergency and the large area affected meant that an estimated 3·3 million people died across the country over a 4 year period, making this war the deadliest ever documented in Africa.⁴² Major causes of death were diarrhoea, acute respiratory infections, malaria, measles, and malnutrition, all of which occurred at higher incidence rates and with higher case-fatality rates than expected. These high rates resulted from a combination of war-related breakdown in the public health infrastructure and deterioration of access to healthcare. War-related violence was not a major cause of death.

Southern Sudan, 1998

The emergency in southern Sudan in 1998 resulted from 3 consecutive years of drought and the civil war between the government forces and the Sudanese People's Liberation Army. A large famine ensued, with a few major towns in southern Sudan becoming foci for humanitarian interventions. An estimated 78 000 people died during the crisis.⁷¹ The town of Ajiep in Bahr el Ghazal became the epicentre of the famine, and its population swelled from 3000 to 21 000 because people from surrounding areas were attracted by the general food rations and the supplementary and therapeutic feeding programmes for moderately and severely malnourished children.⁷² Despite these interventions, crude mortality rates remained above 20 deaths per 10 000 people per day for several months.³⁴ Major contributing factors to the high mortality were poor hygiene and sanitation that contributed to a major outbreak of shigella dysentery; high prevalence of severe acute malnutrition with high associated case-fatality rates; poor standards in case management of severely

Country (of asylum for refugees)	Refugees (numbers ×1000)		IDPs (numbers ×1000)	
	1992	2001	1992	2001
Afghanistan	60	-	530·0	1000·0
Angola	11	12·3	900·0	2000·0–3000·0
Azerbaijan	246·0	0·4	216·0	572·0
Bosnia and Herzegovina	-	32·7	740·0	439·0
Burundi	271·7	27·9	500 in 1994	600·0
Colombia	0·5	0·2	300·0	2450·0
Democratic Republic of Congo	391·1	362·0	100·0	2000·0
Eritrea	*	2·3	*	90·0
Ethiopia	431·8	152·6	600·0	100·0
Germany	1236·0	903·0	-	-
India	258·4	169·5	250·0	500·0
Indonesia	3·5	73·6	440 in 1999	1400·0
Iraq	115·0	128·1	400·0	700·0
Iran	4150·7	1868·0	-	-
Liberia	100·0	54·8	600·0	80·0
Malawi	1058·5	6·2	-	-
Mozambique	0·3	0·2	3500·0	2000 in 1994
Burma	-	-	500·0–1000·0	600·0–1000·0
Pakistan	1629·2	2198·8	-	-
Peru	0·6	0·7	500·0	60 in 2000
Philippines	6·7	0·1	1000·0	135·0–150·0
Sierra Leone	5·9	10·5	200·0	600·0
Somalia	0·5	0·6	2000·0	400·0
South Africa	-	18·6	4100·0	500 in 1996
Sri Lanka	-	-	600·0	800·0
Sudan	725·9	349·2	5000·0	4000·0
Syria	6·3	3·4	125 in 1996	500·0
Turkey	28·5	3·5	30·0	400·0–1000·0
Uganda	196·3	199·7	300 in 1991	500·0
Tanzania	292·1	646·9	-	-
USA	580·0	515·9	-	-
Federal Republic of Yugoslavia	516·4	400·3	557 in 1991	277·0

*In 1992 Eritrea was part of Ethiopia.

Table 2: Numbers of refugees and internally displaced people in countries with ≥500 000 in 1992 or 2001^{61–66}

malnourished children in therapeutic feeding centres; and high prevalence of severe undernutrition among adults and adolescents, with no initial intervention targeting this group.⁷²

Three major lessons were learned during the crisis. First, adolescents and adults are at risk for death due to undernutrition in severe famine-related emergencies and must be targeted by selective feeding programmes.⁷³ Similar findings had been noted in Somalia, but adults were not then included in standard nutritional assessments, surveys, and interventions.⁷⁴ Results from therapeutic feeding of adults in Somalia and southern Sudan have shown that up to 80% of adults can recover, even when average body mass index at admission is lower than that previously believed compatible with life (Salama P, unpublished).⁷⁵ Second, because of the close interaction between malnutrition and communicable diseases, food-based interventions must be accompanied by public health interventions. The focus on food-based interventions may have contributed to mortality by attracting more people to a situation where sanitation conditions were poor and a shigella dysentery outbreak had begun. Finally, minimum standards in emergency

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Africa	5488.3	6417.1	6752.2	5972.9	4361.2	3482.0	3345.4	3523.4	3627.4	3283.9
Asia	7656.7	5873.2	5064.9	4886.9	4812.5	4735.5	4747.5	4782.0	5383.4	5770.3
Europe	2914.8	2996.0	2895.1	3061.8	3234.9	2903.5	2543.5	2543.6	2310.1	2227.9
Latin America and the Caribbean	885.8	125.3	109.1	93.9	88.4	83.2	65.6	61.5	37.9	37.4
North America	763.7	806.3	817.6	775.4	745.5	689.0	653.3	644.5	635.2	645.1
Oceania	73.8	62.3	64.2	69.7	75.0	72.9	74.3	70.7	68.4	65.4
Various/unknown	15.5	-	0.0	0.0	-	-	-	-	-	-
Total	17 798.5	16 280.1	15 703.1	14 860.6	13 317.4	11 966.2	11 429.7	11 625.7	12 062.5	12 029.9

*Classification by region according to UN Population Division

Table 3: Refugee population by region* of asylum, 1992–2001 (thousands)⁶⁴

response must be monitored and enforced, and as learned in Goma, only trained and experienced staff should be deployed in the most acute and severe emergencies.

Kosovo, 1999

The complex emergency in Kosovo, southern Serbia, peaked in 1999. NATO forces, responding to allegations of human rights abuses and ethnic cleansing of the majority Kosovar Albanian population by the Serb government, began a campaign of aerial bombardment and quickly overwhelmed the Serbian forces. Mortality patterns in Kosovo demonstrated three critical points that typify mortality patterns in the Balkans and perhaps in Chechnya and other more developed countries facing complex emergencies. First, the magnitude of mortality in these settings is usually not comparable to that of famine-associated emergencies in developing countries. The lower mortality was attributable to a combination of lower baseline mortality rates, better pre-emergency health status of the population, decreased incidence of major communicable diseases, better environmental conditions, better food availability and accessibility, a stronger income and asset base in these communities, and a more generous humanitarian response. In Kosovo, where 12 000 people died during the war, mortality rates were generally well below the emergency threshold of one death per 10 000 people per day, except

in April 1999 when the war peaked.⁴⁸ The relevance of the accepted one death per 10 000 people per day threshold in emergencies in developed countries, where baseline mortality may be 0.2–0.3 deaths per 10 000 people per day, is questionable. Because the threshold rate of one death per 10 000 people per day was derived by doubling the baseline rate for sub-Saharan Africa, doubling the baseline figure for the specific country or region, wherever data are available, would more appropriately define an emergency in a developed country or in developing countries outside Africa.²⁵

Second, causes of death in emergencies in developed countries differ greatly from those in complex emergencies involving food shortages or famine. In Kosovo, the major cause of death among civilians was not communicable diseases or malnutrition but war-related trauma—ie, a deliberate targeting of civilians with violence for political purposes. In addition to war-related trauma, mortality from chronic diseases—such as ischaemic heart disease, diabetes, and renal disease—were important causes of death throughout the emergency and accounted for an increasing proportion of deaths as access to health services decreased during the NATO bombardment and the Serbian counteroffensive.⁷⁶ Such different causes of death demand different responses from aid agencies.⁷⁷ Furthermore, men had much higher mortality rates from war-related trauma than did women. Because of their relative inability to flee the violence and their special sociocultural importance in the community, older men had the highest conflict-related mortality rates. In addition to its traditional usefulness for designing health programmes, such epidemiological data, by documenting a new facet of ethnic cleansing, clearly have a human rights and advocacy dimension.⁷⁸

Such studies may provide useful evidence for war crimes tribunals and also may help predict patterns of civilian targeting and injuries in future conflicts in the Balkans and elsewhere, thereby allowing humanitarian organisations to protect vulnerable groups more effectively. In the interests of primary prevention, humanitarian agencies need to use such data or at least establish partnerships with human rights organisations that can.

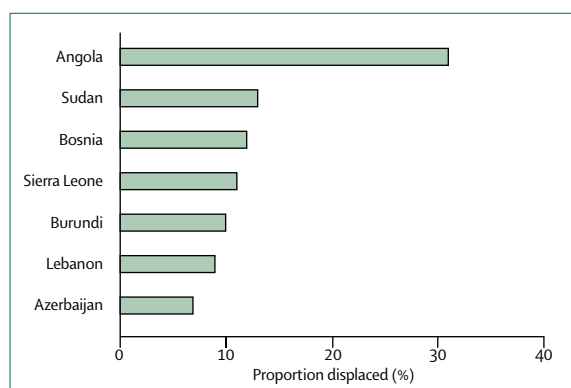


Figure 2: Displaced and resident populations in selected countries with complex emergencies, 2001⁶⁷

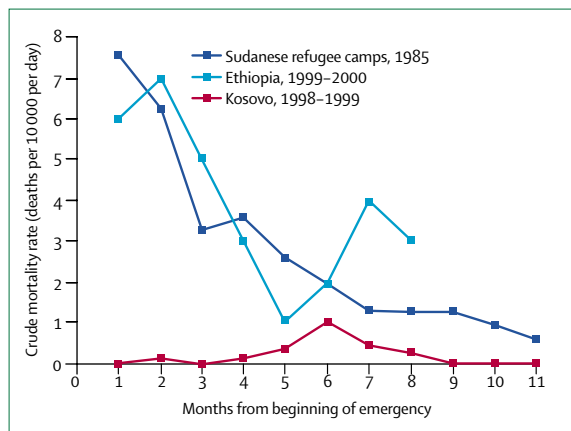


Figure 3: Evolution of crude mortality rates in different complex emergencies^{48,50,81}

Ethiopia, 2000

Ethiopia experienced 3 successive years of severe drought during the late 1990s, but the food security crisis did not begin to attract serious international attention until early 2000.⁷⁹ During this period, Ethiopia was at war with Eritrea, further complicating donor relations with the government. Despite claims that a famine had been averted in 2000, widespread food shortages resulted in migration and high mortality rates, particularly for the pastoralists in the already marginalised Somali region.⁸⁰ Average crude mortality rates of 3.2 deaths per 10 000 people per day were recorded for more than 7 months, resulting in an estimated 6 070 deaths in Gode district alone.⁵⁰ More than 75% of deaths had occurred before implementation of any substantial humanitarian intervention. The Ethiopian famine and other recent emergencies (figure 3) show how, outside of camps, the evolution of mortality differs markedly from the pattern described by Burkholder and Toole.¹³ As stated above, most complex emergencies today occur within countries or across large geographical areas. In these situations, prolonged elevation of mortality rates can occur, and humanitarian interventions may be less effective, often because access is limited and coverage is lower compared with smaller-scale situations.

Another key lesson re-learned in the Ethiopian famine is the importance of an early epidemiological assessment. Rapid epidemiological assessments that include both mortality and nutrition indicators can provide the data necessary to plan new programmes, or modify existing programmes, and call attention to ongoing crises. Once again, in Gode, the humanitarian response was overly focused on food-based interventions; by attracting more people to central locations for food distributions and not providing adequate preventative health services, such as measles vaccination, the humanitarian intervention might have contributed to the excess mortality, at least in parts of the

country. If the situation had been rapidly assessed earlier, the measles epidemic would have been detected and a more comprehensive intervention perhaps planned. In fact, most deaths occurred before any humanitarian intervention. To be effective, humanitarian response needs to be rapid and achieve high coverage with multisectoral interventions that meet minimum standards of quality.

Measles, particularly in combination with malnutrition, was a major cause of death in Gode, both in children younger than 5 years of age and in older children.⁵⁰ The importance of rapidly implementing measles vaccination in refugee camps has been well recognised. Increasingly, campaigns to reduce measles-associated mortality have been successfully implemented in countries affected by complex emergencies, such as Angola and Afghanistan.⁸² Furthermore, where routine measles vaccination coverage is low and remote rural populations have had little exposure to natural measles infection, extending the age range for such campaigns up to 12 to 14 years of age is important.²⁵ This intervention alone could have saved thousands of lives in the Ethiopian famine during 2000.

Despite the focus by most major agencies on selective feeding interventions, the coverage of supplementary and therapeutic feeding programmes was less than 25% of children meeting the admission criteria. The effectiveness of such interventions on a population basis is therefore questionable; the potential to achieve higher coverage with programmes using community-based approaches to treat malnutrition needs to be explored.⁶⁸ Fortunately many of the problems associated with the response to the 2000 famine in Ethiopia were addressed during the food security crisis in 2002–03.⁸³

Afghanistan, 2001–03

In 2001, the war on terrorism returned the attention of the international community to Afghanistan. Studies completed in 2001 showed crude mortality rates well above emergency thresholds at 2.6 deaths per 10 000 people per day; diarrhoea, acute respiratory infections, and measles contributed to the majority of deaths.³⁸ Scurvy, rarely seen in refugee camps in the last decade (although commonplace earlier), also caused deaths in rural Afghanistan. The American-led military intervention resulted in a change of political regime and, at least for a period of time in 2002, relatively unrestricted access for the humanitarian community to the civilian population. However, internally displaced people and repatriating refugee populations were unable to return to their homes, and asset depletion and increasing debt have affected food accessibility in parts of the country.⁸⁴ Even though food aid was a major intervention initially, agencies recognised that diversity of food was perhaps more important than the quantity of staple foods and modified their approach, supporting

more appropriate food and cash for work programmes from 2002. Major interventions included vitamin C supplementation to prevent scurvy and a national measles vaccination campaign targeting all children aged 6 months to 12 years, a campaign that has reportedly vaccinated more than 11 million children (>90% of the target) and may have contributed to saving 30 000 lives per year.^{82,85} On the policy side, the Ministry of Health has had a strong coordination role; established effective partnerships with UN agencies, donors, and academic institutions; outlined a basic essential package of primary health services; allocated major donors to key underserved rural areas; used major NGOs to deliver the package; and developed standards and indicators for monitoring and evaluation.

However, major technical and policy issues have challenged the humanitarian community. First, there was a concern that the issue of women's rights, which was high on the international public policy agenda before the fall of the Taliban, would become less prominent with the change of government, particularly in the presence of other pressing priorities.⁸⁶ Studies after the regime change, however, have documented high maternal mortality rates of 1600 to 2200 per 100 000 live births, with Badakshan province having the highest ever maternal mortality rate documented.⁸⁷ For the first time in a complex emergency, such data have kept the issue of women's health at the forefront of the public health priorities.⁸⁸ Nevertheless, reducing these unacceptably high maternal mortality rates will require sustained commitment to building the human and physical infrastructure needed to provide comprehensive emergency obstetric care and family planning services as well as sociocultural changes. Whether the international community will make the long-term commitments needed to improve the health status of women in a country affected by an emergency remains to be seen.

Second, international agencies in Afghanistan face a relatively new situation—an emergency-affected country with a new national government that lacks resources and technical expertise, but is determined to coordinate all major interventions and to attract donor funds directly, rather than through UN and other agencies. UN agencies are expected to reduce their direct project implementation role and to instead work closely with the government, taking on a capacity-building role. NGOs are expected to implement programmes according to government policies and standards and in geographical areas determined by the government.

Third, as with Operation Restore Hope in Somalia, the coalition military forces are taking an active role in humanitarian and reconstruction activities in Afghanistan. American-led civil and military provincial reconstruction teams are working to rebuild hospitals and schools, provide drugs and equipment, and even deliver clinical services. Despite concerns of blurring of

humanitarian and military mandates, the international community does not have a coherent policy on respective roles and responsibilities of these groups of agencies in Afghanistan.

A series of recent emergencies in Afghanistan, and in Somalia, the Balkans, and Iraq, underscores the increasing role of the military in humanitarian emergencies.⁸⁹ In some settings, all efforts to maintain humanitarian space may be appropriate.⁹⁰ Other settings might require more coherence between political and humanitarian objectives.⁹¹ The August, 2003 bombing of the UN compound in Iraq and recent murder of International Committee of the Red Cross personnel in Afghanistan and Iraq show that some parties to a conflict do not regard the humanitarian community as either neutral or impartial. Some NGOs and international agencies will attempt to maintain their neutral status at any cost, including withdrawal of their staff; others may concede to a more complex political reality and attempt to remain merely impartial if this concession best serves the affected population. In any event, these developments have ushered in a new era in emergency relief and will necessitate rethinking, at least of the security arrangements for NGOs and international and UN agencies.

New directions

Technical issues

The use of mortality rates for monitoring complex emergencies needs to be reviewed. Previous thresholds and definitions of phases remain useful for refugee and internally displaced people camps but may be less helpful in prolonged emergencies affecting large populations and large areas. More data on baseline mortality rates at the country or at least regional level should be gathered by UN agencies and academic institutions. The rule of a doubling of the baseline mortality rate could then be used with these data. If no baseline data are available, previous threshold levels might still be useful but should be used with caution in countries outside sub-Saharan Africa. The HIV/AIDS epidemic may cause baseline rates and threshold levels to increase. Furthermore, the fact that mortality has not reached such threshold levels should not preclude the use of the term complex emergency or the triggering of an emergency response. Such triggers can include increases in the incidence of certain diseases, worsening of food security, magnitude of displacement, deteriorating security, and the deliberate targeting of civilians. Rising rates of mortality and acute malnutrition are usually very late indicators of the deterioration of a population's health and nutrition status. Interventions should be implemented wherever possible before such indicators change, as was done in East Timor after widespread violence and destruction followed a referendum for independence from Indonesia. Additional research is needed on the relation

between malnutrition and mortality outside the camp setting. Trends in these two indicators are often closely associated, but mortality can rise in the setting of relatively low prevalence of acute malnutrition and acute malnutrition may rise without substantial increases in mortality.^{28,92}

Communicable diseases

Programmes addressing major communicable diseases remain a central component of mortality-reduction programmes in complex emergencies. Of the countries with the ten highest under 5 mortality rates, seven (Sierra Leone, Angola, Afghanistan, Liberia, Somalia, Guinea Bissau, and Democratic Republic of Congo) are or have been recently affected by complex emergencies.^{55,56} Furthermore, implementation, with high coverage, of the same set of interventions recently proposed for improving child survival could reduce mortality drastically.⁹³ Some of these interventions—such as measles vaccination, vitamin A supplementation, water and sanitation, insecticide-treated bednets, oral rehydration salts, and promotion of breastfeeding (all of which prevent morbidity and mortality from common communicable diseases)—are already mainstays of emergency response. Other interventions, such as clean delivery, antenatal steroids, zinc supplementation as part of treatment of severe diarrhoea in children, nevirapine and replacement feeding for HIV-positive mothers where appropriate, need stronger health infrastructure and are more difficult to implement during complex emergencies. However, many examples of successful national programmes implemented in complex emergencies exist.

Measles vaccination campaigns are implemented immediately in most camp situations. Such campaigns need to be implemented systematically in complex emergencies, even when the implementation requires national campaigns. Wherever possible, such campaigns should be combined with administration of vitamin A. These two straightforward and cost-effective interventions alone can reduce mortality by up to 20–30%. The epidemiology of measles in the specific country should determine the target age-group. For populations from remote rural areas, the campaign should consider extending coverage to children aged from 9 months to 12 or 14 years.²⁵ If the incidence of measles in the 6 to 9 month age-group is high, campaigns should include children in this group because case-fatality is likely to be high; these children will need a second dose of measles vaccine at 9 months of age. Where high vaccination coverage rates can be documented in the affected population, relief workers should carefully assess public health priorities to determine the appropriate time for a mass measles vaccination campaign.

Programmes that address the issue of water and sanitation, especially interventions such as soap distribution and bucket chlorination where no other

alternative supply of safe water exists, are critical for diarrhoeal disease control. Point-of-use disinfection using household water systems has proven useful in developing countries and may be effective in emergencies.⁹⁴ Good case management for diarrhoea can save large numbers of lives. Proper case management of acute respiratory infections is also assumed to prevent mortality but has not yet been adequately documented. New initiatives for malaria control include distribution of insecticide-treated bednets, including long-lasting varieties, and clear treatment protocols for antimalarial drugs with demonstrated laboratory efficacy against local parasites (eg, artemisinin-based combination therapy). The recent development of insecticide-treated plastic sheeting might have relevance where shelter materials are distributed.

For many years, tuberculosis programmes have been viewed with caution during complex emergencies because of the lengthy treatment required and the potential to contribute to antibiotic resistance if treatment is interrupted.⁵⁸ However, successful programmes have been implemented in several complex emergencies. HIV/AIDS was ignored for many years in complex emergencies, but in many African and some Asian countries AIDS may be the major underlying cause of death. Depending on local epidemiological factors, complex emergencies may hinder or accelerate the transmission of HIV during the acute phase of the crisis; however, transmission is likely to increase during the post-war period.⁹⁵ New guidelines that aggressively approach the prevention, care, and treatment of people living with HIV/AIDS in complex emergencies have recently replaced older guidelines that advocated a minimalist approach.⁹⁶ Wider access to voluntary counselling and testing for HIV will assist people accessing or demanding services, and will help international agencies in their fundraising and advocacy efforts.

Nutrition and food security

Major advances have taken place in the field of nutrition in emergencies during the past decade. Anthropometric surveys now follow a reasonably standard cluster survey format, although minor variations exist between major agencies. Despite adequate guidelines, nutrition surveys are still not always done with methodological rigour.^{97,98}

The general food ration, providing at least 2100 kcal per person per day and all essential vitamins and minerals, is now widely available, particularly in the acute phase in camp settings. Outbreaks of micronutrient deficiency disorders are reported much less often in camps, but outbreaks still occur outside camps. Field-friendly equipment for measuring the prevalence of such micronutrient deficiency disorders are urgently required. Consensus now exists on the criteria for anthropometric assessment of moderate and severe

malnutrition (using weight-for-height indices) and on treatment protocols for supplementary and therapeutic feeding for children. New high-energy, low-protein milk products, including F-100 and F-75, have made selective feeding a much more consistent and successful intervention; in a well-managed therapeutic feeding centre more than 80% of severely malnourished children are expected to recover fully.^{25,99} Despite this progress, the effectiveness of selective feeding has been challenged on the basis that its coverage is often poor.¹⁰⁰ New pilot programmes for treating severely malnourished children with ready-to-use therapeutic foods and treating children at home after a short, intense treatment period in a clinic are under trial.¹⁰¹ Additionally, the importance of treating malnourished adolescents and adults in prolonged severe famines has been recognised. Methods for assessing such individuals, taking into account different body habitus, and treatment protocols have been developed.^{50,102} Standards on best practice in infant feeding are increasingly implemented.¹⁰³ Although the risk of maternal-to-child transmission should be taken into account in countries with high prevalence of HIV, alternatives to early and exclusive breast-feeding and rapid cessation at 6 months will remain limited in most complex emergencies. Finally, advances in understanding food security and the complexities of coping strategies that different communities use to meet their household food requirements have been incorporated into analytical instruments to assess the most appropriate responses. These responses are usually multisectoral. Such responses will become increasingly important in complex emergencies in Africa where the HIV pandemic interacts powerfully with the regional food security crises.¹⁰⁴

New areas

Finally, two relatively new areas for intervention in complex emergencies have been developed during the past decade. Both reproductive health and mental health during emergencies are discussed increasingly in policy and research forums as essential components of emergency programmes.^{105,106} In both fields, however, implementation remains constrained by a lack of both clear and feasible programme strategies and of sufficient field staff with expertise in these areas. Controversies regarding the most appropriate strategies also hinder progress. In reproductive health, the minimum initial services package, which includes condoms, universal precautions, and designation of a reproductive health coordinator, has been a major advance in camp situations.¹⁰⁷ Implementation remains sporadic, however, and real improvement in maternal mortality needs expensive and complex programmes that include emergency obstetric care (including safe blood transfusion and access to caesarean section) and family planning. The issue of mental health will be addressed

in a later paper in this *Lancet* series.¹⁰⁵ The increasing number of assessments has not been matched by the same number of well-evaluated programmes in complex emergencies, and there is a fundamental conceptual disagreement between advocates of a more western, psychiatric approach and a more holistic, psychosocial approach. Additionally, neonatal health in emergencies is becoming recognised as an important cause of mortality and morbidity needing more programme and research attention.

Policy issues

Despite the importance of coordination in humanitarian activities, little progress has been made in the past decade.¹⁰⁸ In refugee camps, UNHCR, in keeping with its mandate, usually coordinates health and nutrition interventions but does not have sufficient personnel and technical capacity to fulfil this role globally. In situations involving internally displaced people or where no national government functions, UNHCR does not have the mandate, and the representative of the Secretary-General designates a lead UN agency (eg, UNHCR, UNICEF, WHO). In post-conflict settings where government still partly functions, WHO is usually the lead agency in the health sector, but needs often outstrip the capacity of any individual agency. In Afghanistan, for example, during 2001–03, the Ministry of Health fulfilled the lead role, with support from a group of agencies including WHO, UNICEF, US Agency for International Development, Management Sciences for Health, the World Bank, and the European Union. Such an ad hoc solution may not be appropriate for all settings. An international system for providing guidance and technical and policy advice to fledgling governments emerging from conflict should be established, and agency responsibilities should be assigned clearly and in advance.

Accountability is critical to the health and nutrition sector. The Sphere project has successfully gained consensus among more than 200 major agencies on critical technical standards. However, implementation is voluntary, and several major NGOs have rejected the project altogether because of concern that adherence to minimum standards could hinder creativity in programming or be used punitively by donors or host governments. In the absence of strong government supervision in most emergencies, a mechanism is required to ensure that all agencies adhere to basic standards in implementing their projects. Although attainment of minimum quantitative standards may be more difficult in some settings than others and their interpretation will vary with the context (the water standard may be easier to attain in Bosnia than Sudan), standards should have universal applicability. Relief workers must reflect carefully on the needs of affected populations and find ways to provide people with at least the minimum requirements for a dignified existence until the crisis passes or they find ways of coping.

Furthermore, because conducting comprehensive multisectoral assessments and appropriately balancing food-based and public health interventions in large geographical areas needs a lead agency with a clear mandate and functioning coordination mechanisms, accountability must extend beyond individual NGOs to the major UN agencies and, as appropriate, government ministries. The recent emergencies in southern Sudan and Ethiopia showed that when responsibilities are not clear, acceptable performance by any one agency is difficult to ensure.

The future

To improve outcomes, the skills of health and nutrition professionals working in complex emergencies need to be broadened and reinforced. The curricula of short-courses and master's degrees should be reviewed. Programmes should focus on the practical and analytical skills needed by relief workers—how to do assessments and surveys, use basic epidemiological methods, prevent and treat diarrhoea, acute respiratory infections, malaria, measles and malnutrition, manage vaccination campaigns, and monitor and evaluate projects. Use of carefully developed case-studies and simulations and supervised field work may be successful. Additionally, training programmes should familiarise students with the roles and capabilities of the major international organisations and with relevant international policies and standards, such as those outlined in the Sphere Project. Finally, focus on the requirements and limitations of national health and nutrition systems needs to increase so that the skills of relief workers match the needs of major emergencies. Most of all, if gains in health and nutrition during emergencies are to be sustained, graduates need to understand the importance of capacity building of national staff and institutions. The changing nature and focus of complex emergencies, from short-term emergencies in refugee camps to prolonged emergencies in large geographical areas, needs a profound shift in approach. The implementation of public health and public nutrition programmes that address such needs has the potential to contribute substantially to the global mortality reduction targets outlined in the Millennium Development Goals.

Conflict of interest statement

We declare that we have no conflict of interest.

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