

CHAPTER 1

Deadly Connections: Wartime Violence and “Indirect Deaths”

Over the past decade, humanitarian organizations and conflict researchers have paid increasing attention to the phenomenon of “indirect” war deaths—those fatalities from war-exacerbated disease and malnutrition that would not have occurred had there been no war.¹

There is general agreement in the research community that the violence that generates deaths on the battlefield is an important driver of indirect deaths, and that the latter are significantly greater in number than the former. But despite the growing interest and a handful of nationwide mortality surveys undertaken to determine excess war death tolls in Iraq, the Democratic Republic of the Congo (DRC), Kosovo, and elsewhere, the number of indirect deaths generated by today’s wars remains mostly unmeasured—and thus unknown.

Data for global, regional, and national violent—or “direct”—deaths caused by combat *are* available, however, and some scholars have suggested there is a consistent ratio between direct death tolls from violent injuries and those from war-exacerbated disease and malnutrition, implying that, if we have data for the former, we will also be able to calculate the latter.

A much-cited article in the *British Medical Journal* noted in 2002, for example, that “for at least a decade, the ratio of indirect to direct conflict deaths has been quoted as 9:1.”² But, the article went on to point out that this figure had never been supported by any reported empirical data. Nor could it have been—no such data existed in the early 1990s.

In a study of Africa’s wars published in 1994, Reginald Green claimed that “lack of food and of medical services, combined with the physical stress of flight, kill about twenty times as many human beings as do bombs, bullets and cold steel.”³ This, too, was a claim for which there was a complete lack of compelling evidence.

More recently, the wide-ranging *Global Burden of Armed Violence* report published by the Geneva Declaration Secretariat estimated that for every person who died violently in wars around the world between 2004 and 2007, another four died from war-exacerbated disease and malnutrition.⁴ The report did not claim there was a consistent ratio between the two, simply that *on average*, the indirect-to-direct war death ratio was 4:1. This ratio is certainly not implausible, but the evidence base used to calculate it is far too narrow and uncertain to place any confidence in its accuracy.

Moreover, even if an *average* ratio between indirect and direct deaths could be accurately determined, this would tell us nothing about individual countries. There are, in fact, huge variations in the direct/indirect death ratios between countries afflicted by conflict.⁵ In wars in relatively developed countries, for example, there are remarkably few indirect deaths; in poor-country wars, by contrast, they greatly outnumber direct deaths.

Yet, while the *extent* of indirect death tolls in warfare remains largely unknown, humanitarian organizations know a great deal about the relationship between war and the vulnerability of war-affected poor-country populations to malnutrition and deadly disease.

Data from hundreds of small needs-assessment surveys carried out by humanitarian agencies and nongovernmental organizations (NGO) in refugee and Internally Displaced Persons (IDP) camps indicate that just four “killer diseases”—acute respiratory infections; malaria; diarrheal diseases; and measles—are responsible for most indirect deaths in conflict zones (see ‘The Four Killer Diseases’ in this chapter).

Malnutrition increases the susceptibility of individuals—particularly children—to these diseases and is an important cause of death in its own right.

The Drivers of Disease in Wartime

War-affected populations are far more susceptible to disease than those in peacetime. This is not surprising.

As the *Human Security Report 2005* noted:

Wars destroy property, disrupt economic activity, divert resources from health care . . . Crowded into camps, susceptible refugees fall ill from infectious diseases and contribute to the further spread of these disease . . .

Wars increase exposure to conditions that, in turn, increase the risk of disease, injury and death. Prolonged and bloody civil wars usually displace large populations—either internally or across borders . . .

Bad food, contaminated water, poor sanitation and inadequate shelter can combine to transform camps into vectors for infectious disease—measles, respiratory disease and acute diarrhoea—while malnutrition and stress compromise people’s immune systems. Diseases rampant in refugee camps easily spread to wider populations . . .

Prevention and treatment programs, already weakened by the wartime destruction of health care infrastructure, simply cannot cope with new threats posed by mass population displacements . . .

Civil wars also deplete the human and fixed capital of the health care system. Heavy fighting often destroys clinics, hospitals and laboratories, as well as water treatment and electrical systems. ⁶

This extract from our first Report accurately describes how major wars can drive up indirect death tolls. But most conflicts that have been waged since the end of the Cold War have been relatively minor and have killed far fewer people than the major wars of the Cold War period. Their impact on population health has been much less extensive and severe than the impression created in the literature—including the above passage.

There is a broad consensus within the humanitarian and research communities about the factors that affect—positively or negatively—the risk of death from disease and malnutrition. These include the following:

- The geographical scope and intensity of the fighting—the latter being measured by the number of violent deaths, the former often by the percentage of the national territory afflicted by serious violence.
- The number of individuals displaced who become either refugees or—more commonly—IDPs.⁷
- Increased stress and exposure to new strains of disease, both of which are associated with displacement.
- Reduced access to health services as a consequence of conflict.
- Loss of livelihoods.
- Access to potable water, sanitation, and shelter.
- Timely humanitarian assistance.
- The preconflict health status of the war-affected population.

- The physical and psychological resilience of populations in war-affected areas.

The impact of these factors on population health differs markedly from conflict to conflict. And, as we argue in Chapter 2, there are good reasons to believe that a combination of low-cost but highly effective pre-war health interventions, less deadly wars, and increased humanitarian assistance to war-affected areas has considerably reduced the ratio of indirect to direct death tolls in today's wars compared to those of the Cold War era.

Measuring Indirect War Deaths

As noted earlier, warfare generates two related but quite different death tolls. Direct deaths, as the term suggests, are those that result directly from injuries caused by military operations. They include not only combatants but civilians caught in the crossfire. Indirect deaths are those that result from war-exacerbated disease and malnutrition.

“Excess” deaths are the total number of deaths—both direct and indirect—that would not have occurred had there been no war.

Measuring direct deaths is quite straightforward in theory, though often challenging in practice. Direct death data have been collected for “state-based” conflicts, i.e., those in which a government is one of the warring parties, since 1946. Estimating indirect deaths poses a far greater challenge.

When soldiers are killed in combat and civilians are caught in the crossfire, their deaths are—in principle at least—both easy to count and unambiguously attributable to the wartime violence. A combatant shot on the battlefield is clearly a victim of war and can be reported as such. But, individuals who succumb to malaria during the course of the same conflict are not necessarily victims of warfare because they might well have died of the same disease had there been no fighting.

It is rarely possible to determine whether or not a particular individual who dies of disease in wartime perished *because* of factors associated with the war. It is hypothetically possible, however, to determine statistically how the overall mortality rate has increased during the war relative to the pre-war period. The difference between the peacetime and wartime rate—the “excess” mortality rate—can be used to determine the excess death toll provided that the population and population growth rate are known. When the causes of death—violent versus disease and malnutrition—are also known, it is then possible to determine the indirect death tolls.

Measuring Indirect Death Tolls with Surveys

In poor countries affected by war, effective health surveillance systems rarely exist and estimates of mortality rates from disease and malnutrition are usually derived from health surveys. Such surveys have become the standard means for humanitarian agencies and NGOs to assess humanitarian needs and to track the health status of populations receiving assistance in war-affected communities.

Among other things, these surveys typically measure adult and/or child mortality rates and the causes of death—nonviolent, as well as violent. Mortality rates are the single-most important measure of population health in regions affected by warfare, and in these regions survey data usually reveal substantially elevated mortality from disease—often many times greater than in peacetime.

The information these local surveys provide is critically important for the assessment of humanitarian needs but cannot be used to determine the impact of war-driven disease and malnutrition on mortality levels *nationwide*. This is because conditions in refugee and IDP camps—where most surveys are carried out—are not representative of the nation as a whole. Indeed, they are usually highly unrepresentative.

When they are initially being established, camps may not be able to provide adequate services for the displaced persons who crowd into them. In part for this reason, camp mortality rates tend to be considerably higher initially than the national average. But, once camps become properly established and populations gain access to adequate nutrition, life-saving health services, clean water, and basic sanitation, mortality rates drop rapidly, often to below the nationwide pre-war rate.

To determine national mortality rates—and hence death tolls—researchers can employ nationwide retrospective mortality surveys. Only a few such surveys—in Iraq, Kosovo, East Timor, the DRC, and elsewhere—have been carried out with the specific intent of estimating excess death numbers.

The procedure that researchers follow in order to estimate the excess death toll is relatively straightforward:

- *Select* a sample population to be interviewed that is sufficiently large and representative of the population of the country as a whole.
- *Ask* respondents if any members of their household died during the war—and if so, how. The responses provide a record of the number of deaths in the sample population and their cause, e.g., whether from violence or disease.
- *Determine* the mortality rate for the sample population—usually measured in terms of deaths per 1,000 persons surveyed per month, or deaths per 10,000 persons per day.
- *Assume* that the mortality rate for the national population will be approximately the same as that of the sample—though all extrapolations have a margin of error.
- *Estimate* the national pre-war mortality rate—usually referred to as the *baseline* mortality rate. (Note: This is the most challenging part of the process.)
- *Determine* the excess mortality rate from the direct and indirect effects of wartime violence by subtracting the pre-war mortality rate from the survey-derived wartime rate.
- *Estimate* the excess death toll. This is relatively simple to calculate provided that the excess mortality rate, the size of the national population, and the population growth rate for the period covered by the survey are all known.
- *Assess* the causes of death. When survey respondents are asked about the cause of death, the data can be disaggregated to reveal what percentage of deaths were from violent versus nonviolent causes.

However, what is straightforward in principle can be extremely challenging in practice. Confidence in the accuracy of nationwide death toll estimates is reduced by different forms of bias that impact on all such surveys, and by the often significant uncertainties with respect to pre-war mortality rates, population size, and growth rates.⁸

In Chapter 3, we show how inappropriate estimates of baseline mortality rates can lead to a dramatic exaggeration of excess death tolls.

In Chapter 4, we argue that the conventional treatment of the baseline mortality rate, i.e., the assumption that had there been no war it would have remained constant, is quite wrong and can be a further source of major error in estimating excess death tolls.

Conclusion

This chapter has examined some of the challenges that confront efforts to estimate indirect deaths from war-exacerbated disease and malnutrition. We noted the widespread agreement within the humanitarian community that, in wars in poor countries, indirect death tolls are far greater than tolls

from war-related violence. But we also noted that there is no consensus as to the extent of these deaths, nor indeed what the average ratio of direct to indirect deaths might be. As a consequence, indirect deaths around the world remain uncounted and—except in a few high profile conflicts like Darfur and the DRC—largely unnoticed.

In Chapter 2, we turn to a critically important, deeply counterintuitive, and largely unrecognized phenomenon—namely that nationwide mortality rates mostly *decline* during periods of warfare.

THE FOUR KILLER DISEASES

The deadliest diseases associated with wars in poor countries are malaria, diarrhea, acute respiratory infections (ARIs), and measles. Widespread in many developing countries in peacetime, these diseases are notable not only for their deadly impact but because they can be treated simply and at a remarkably low cost.

Fatalities from communicable disease typically increase during periods of political violence, sometimes dramatically, with children, refugees, and internally displaced persons (IDPs) being particularly vulnerable.

An analysis of 46 retrospective mortality surveys undertaken for the Human Security Report Project by the Paris-based research centre Epicentre found that, overall, malaria was the disease that caused most deaths in conflict and postconflict zones, followed by diarrheal disease, acute respiratory infections, and measles. Malnutrition was responsible for almost as many deaths as diarrheal disease, while almost 30 percent of deaths were attributable to “other causes.”⁹ The incidence of particular diseases varied significantly from one individual conflict to another, however.

Malaria

The deadliest killers in many war zones are malaria-carrying anopheles mosquitoes. Endemic in much of the developing world, malaria causes fever, headache, chills, and vomiting. Without prompt treatment, it is often fatal, particularly among children under five. Displaced populations, often stressed, malnourished, and frequently sleeping in the open, are particularly vulnerable to infection.

Early detection is essential for the effective treatment of malaria; as the disease advances, it becomes increasingly difficult to cure. Moreover, low-cost treatment options have shrunk in recent years due to the growing resistance of malaria parasites to traditional antimalarial drugs. However, the costs of the new therapies remain affordable for most humanitarian agencies.

Diarrheal Disease

Diarrhea is often the first deadly disease to strike war-affected populations. In locations that lack access to safe drinking water, are overcrowded, and have poor sanitation, cholera, dysentery, and other intestinal infections can spread rapidly and with devastating effect. Mortality rates from diarrheal diseases tend to be highest at the onset of complex emergencies before adequate humanitarian assistance becomes available. In the wake of the genocide in Rwanda, an estimated 50,000 Rwandan refugees in eastern Zaire (now the Democratic Republic of the Congo) died in July 1994 following outbreaks of cholera and shigellosis.¹⁰ The Crude Mortality Rate was one of the highest ever recorded among refugees or internally displaced people.¹¹

Treatment of diarrheal disease is simple, very cheap, and highly effective. Oral rehydration salts or IV solutions are used to rehydrate those afflicted, while antibiotics are used to treat cases of cholera and shigellosis.¹²

ARIs

Pneumonia, influenza, and tuberculosis caused by airborne bacteria and viruses spread easily in crowded living conditions, and people suffering from malnutrition are particularly susceptible to infection. In complex emergencies, ARIs are often a major cause of death.

Treatment and prevention of ARIs varies according to the disease. Low-cost antibiotics are usually effective against the bacterial infections associated with pneumonia.¹³ Vaccination is the primary preventive measure against influenza and can reduce flu mortality by up to 80 percent, and sometimes even more depending on the risk level of the group in question.¹⁴

Treating tuberculosis during complex emergencies is challenging, in part because some strains of the disease become resistant to antibiotics if treatment is interrupted.¹⁵ However, timely and appropriate treatment can lead to an 85 percent cure rate.¹⁶

Measles

Despite the recent reductions in global mortality rates from measles, the disease remains a major cause of death in the developing world. In war zones, where displaced persons are often stressed and initially gathered in overcrowded camps, a significant proportion of the population can become infected, with children once again at greatest risk of dying. In the Gode District of Ethiopia during the conflict and drought in 1999 and 2000, for example, measles was a major cause of death among children under fourteen years old.¹⁷

Prevention of measles via vaccination is easier and cheaper than treatment, and vaccination programs are now routine in refugee and IDP camps where crowding would otherwise greatly increase the risk of contagion. The average cost of the measles vaccine for a child is US\$0.60–1.00.¹⁸ Immunization programs against the disease have been extraordinarily effective. Between 2000 and 2007, the global measles mortality toll dropped by 74 percent.¹⁹

The central message of nearly two decades of research on the four diseases that put war-affected populations at greatest risk is that they are all treatable—and that the cost of saving countless lives is very small indeed.

ENDNOTES

¹ The terms *indirect* and *excess* deaths are sometimes—incorrectly—used interchangeably. They are not the same: indirect deaths are those resulting from war-exacerbated disease and malnutrition, while excess deaths include all deaths—direct and indirect—that would not have occurred in the absence of war.

² Christopher Murray et al., “Armed Conflict as a Public Health Problem,” *British Medical Journal* 324 (2002), <http://gking.harvard.edu/files/armedph.pdf> (accessed 19 November).

³ Cited in Hugo Slim, *Killing Civilians: Method, Madness, and Morality in War* (New York: Columbia University Press, 2008), 91.

⁴ See Geneva Declaration Secretariat, *Global Burden of Armed Violence, 2008*, <http://www.genevadeclaration.org/fileadmin/docs/Global-Burden-of-Armed-Violence-full-report.pdf> (accessed 19 November 2009).

⁵ See Figure 4.1 in the *Human Security Report 2005*. Andrew Mack, ed., *Human Security Report 2005: War and Peace in the 21st Century* (New York: Oxford University Press, 2005).

⁶ See Mack, ed., *Human Security Report 2005*, 129–130.

⁷ Some may be able to avoid the worst consequences of displacement by finding refuge with relatives in more secure parts of the country.

⁸ *Recall bias* arises when respondents forget events or get the dates wrong. This can have the effect of either increasing or decreasing the mortality rate. *Survivor bias* arises when whole families get wiped out, so that no family member is available to report deaths to interviewers. This form of bias has the effect of reducing the excess mortality rate.

⁹ Loretzu Pinoges and Evelyn Depoortere, “Analysis of Excess Mortality in Recent Crises” (Paris: Epicentre, 2004).

¹⁰ Goma Epidemiology Group, “Public Health Impact of Rwandan Refugee Crisis: What Happened in Goma, Zaire, in July 1994?” *Lancet* 345, no. 8946 (11 February 1995): 341.

¹¹ Peter Salama et al., “Lessons Learned from Complex Emergencies over Past Decade,” *Lancet* 364, no. 9447 (13 November 2004): 1804.

¹² World Health Organization (WHO) Global Task Force on Cholera Control, “First Steps for Managing an Outbreak of Acute Diarrhoea,” 2004, http://www.who.int/topics/cholera/publications/en/first_steps.pdf (accessed 5 November 2009).

¹³ United Nations Children’s Fund, *The State of the World’s Children 2008: Women and Children – Child Survival*, 2007, http://www.unicef.org/publications/files/The_State_of_the_Worlds_Children_2008.pdf (accessed 5 November 2009).

¹⁴ WHO, “Fact Sheet No. 211: Influenza,” April 2009,, <http://www.who.int/mediacentre/factsheets/fs211/en/> (accessed 5 November 2009).

¹⁵ Salama et al., “Lessons Learned,” 1809.

¹⁶ M. Biot, D. Chandramohan, and J. D. H. Porter, “Tuberculosis Treatment in Complex Emergencies,” *Tropical Medicine & International Health* 8, no. 3 (March 2003): 212.

¹⁷ Centers for Disease Control and Prevention, “Mortality During a Famine—Gode District, Ethiopia, July 2000,” *MMWR Morbidity and Mortality Weekly Report* 50, no. 15 (20 April 2001), <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5015a2.htm> (accessed 5 November 2009).

¹⁸ Peter Salama, Jeff McFarland, and Kim Mulholland, “Reaching the Unreached with Measles Vaccination,” *Lancet* 366, no. 9488 (3 September 2005): 787.

¹⁹ WHO, “Ten Facts on Immunization,” October 2009, <http://www.who.int/features/factfiles/immunization/en/index.html> (accessed 5 November 2009).