

# HUMAN SECURITY REPORT 2009

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THE SHRINKING COSTS OF WAR



HUMAN SECURITY REPORT PROJECT

SIMON FRASER UNIVERSITY, CANADA

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## OVERVIEW

### **THE SHRINKING COSTS OF WAR**

PART II OF THE

**HUMAN SECURITY REPORT 2009** (Forthcoming)

Challenging a number of widely held assumptions about global trends in wartime violence, this report reveals that nationwide mortality rates actually fall during most wars.

Several interrelated long-term changes have been driving this counterintuitive development:

- i) The average war today is fought by smaller armies and impacts less territory than conflicts of the Cold War era. Smaller wars mean fewer war deaths and less impact on nationwide mortality rates.
- ii) Dramatic long-term improvements in public health in the developing world have steadily reduced mortality rates in peacetime—and saved countless lives in wartime.
- iii) Major increases in the level, scope, and effectiveness of humanitarian assistance to war-affected populations in countries in conflict since the end of the Cold War have reduced wartime death tolls still further.

These findings stand in sharp contrast to the images of contemporary warfare presented in the media that focus primarily on a relatively small number of wars that have huge reported death tolls—Iraq, Darfur, and the Democratic Republic of the Congo (DRC) are cases in point.

The high death toll estimates in Iraq and Darfur have become a source of intense controversy. But, the survey-based claim by the International Rescue Committee (IRC) that an astonishing 5.4 million people have died as a consequence of the fighting in the DRC has attracted almost no public criticism. However, in what is the most comprehensive analysis to date of the IRC's methodology, we demonstrate that the IRC's 5.4 million estimate is far too high.

We further argue that estimating *excess* war deaths—which include those from war-exacerbated disease and malnutrition, as well as war-related injuries—is a task so fraught with challenges that it can rarely succeed.

#### **The Paradox of Mortality Rates that Decline in Wartime**

Claims that national mortality rates in poor countries mostly decline during periods of warfare are deeply counterintuitive. Yet, the facts are indisputable. Between 1970 and 2007, under-five mortality rates declined overall during periods of warfare in some 80 percent (14 out of 18) of the conflict-affected sub-Saharan African countries in a review undertaken by the Human Security Report Project.

A major World Bank study published in 2008 revealed that these findings were not limited to under-five mortality rates—nor to Africa. Its analysis indicated that the median adult mortality rate for war-

affected countries around the world also declined during periods of warfare. The World Bank's study indicated that infant mortality rates exhibited a similar rate of decline.<sup>1</sup>

These findings seem paradoxical. Common sense suggests that because wars kill people, the extra deaths should cause national mortality rates to increase. But, as Chapter 2 points out, the explanation for this unexpected finding is straightforward enough.

No one of course is suggesting that war causes mortality rates to decline. The reality is simply that today's armed conflicts rarely generate enough fatalities to reverse the long-term downward trend in peacetime mortality that has become the norm for most of the developing world. Three interrelated developments account for the decline.

## **Wars Are Smaller and More Localized**

Today, wars generate far fewer deaths on average than they did in the past. The deadliest year for war deaths since World War II was 1950, mostly because of the huge death toll in the Korean War. The average conflict that year killed some 33,000 people; in 2007, the average toll was less than 1,000.<sup>2</sup>

If we look at the average number of people killed per conflict per year by decade, the decline in the size of the death toll is still remarkable. The average conflict in the new millennium kills 90 percent fewer people each year than did the average conflict in the 1950s.

This dramatic decline is due in large part to the changing nature of warfare. Compared to the Cold War years, relatively few of today's conflicts involve intervention by a major power, or prolonged engagements between huge armies equipped with heavy conventional weapons.

The low-intensity insurgencies of the post-Cold War era are almost always fought within, not between, states. Rebel armies are typically small, ill-trained, mostly equipped with small arms and light weapons—and rarely keen to engage in major battles. The death tolls generated by these conflicts are much smaller than those of the Cold War years.

Obviously not all post-Cold War conflicts fit this pattern. There are some exceptions to the rule—the war in Iraq following the US-led invasion in March 2003 is an obvious example, as is the World War I-style conventional war between Eritrea and Ethiopia from May 1998 to June 2000. But, these cases are rare.

In today's low-intensity wars, rebel organizations—and government forces—often kill civilians and flout international humanitarian law in other ways. But, the horrific nature of much of the violence has tended to divert attention from the fact the actual death tolls are relatively small—and have been decreasing.

These wars also tend to be highly localized, which again tends to reduce their human cost. This trend arises in part because armies, as noted above, are a lot smaller on average than those of the Cold War years, but also because rebel organizations rarely have the capacity to project military power over long distances.

In wars in Sudan (Darfur), Uganda, Sri Lanka, India, Indonesia (Aceh), the DRC, and elsewhere, warfare directly impacts relatively small areas of the national territory. Indeed, a recent review of 11 conflicts in sub-Saharan Africa found that, on average, serious violence affected only 12 percent of the territory of the country in question. In the areas not impacted by serious violence, the provision of basic health services may continue and livelihoods can remain largely unaffected—especially in subsistence economies. This in turn reduces the nationwide health impact of the conflict.

## The Worldwide Decline in Peacetime Mortality

More than three decades of highly successful international efforts to promote public health in developing countries have led to a steady reduction in peacetime mortality rates. But, as this report makes clear, the enduring effects of these efforts have also led to another—largely unnoticed—change, namely the saving of large numbers of lives in wartime.

Drives to increase immunization coverage, which have saved some 20 million lives worldwide over the past two decades, have sharply reduced child mortality rates—in times of war, as well as times of peace.

The extent of the worldwide increase in immunization coverage over the past 30-plus years has been remarkable. Between 1974 and 2006, coverage for the six major vaccine-preventable diseases rose from less than 5 percent to more than 75 percent.

Children who have not been immunized are far more likely to succumb to disease in wartime. Immunization in peacetime, in other words, saves children's lives in wartime.

Children under five typically have a wartime mortality rate that is double that of adults. According to the IRC, nearly 50 percent of those who died from the effects of the war in the final survey period in the DRC were children under five. So, any reductions in child mortality in conflict zones will clearly have a considerable impact on the overall excess death toll.

Since serious violence rarely affects a large proportion of the territory of countries at war, immunization drives often continue—and sometimes even increase—during periods of conflict. In the DRC, for example, immunization coverage for measles, and the diphtheria, pertussis, and tetanus (DTP3) vaccine increased from around 20 percent at the beginning of the war in 1998 to over 85 percent in 2007.

This remarkable change may help explain why the 2007 Demographic and Health Surveys (DHS) carried out in the DRC revealed that under-five mortality rates had been falling since the war began.

Nonmedical health practices like breastfeeding that are instituted in peacetime can also save lives in wartime. In sub-Saharan Africa, exclusive breastfeeding rates, though still low, more than doubled between 1990 and 2004, in part as a consequence of international and national advocacy campaigns. Breastfeeding strengthens the immune systems of infants, reducing the risk that they will die from two of the deadliest threats to children in wartime—diarrheal diseases and acute respiratory infections (ARIs).

It is critical to note that while these peacetime changes reduce the number of deaths from disease during periods of warfare, they have little impact on the death rate from wartime injuries.

## Two Decades of Increased and Increasingly Effective Humanitarian Assistance

There has been a remarkable increase in the level and scope of humanitarian assistance since the end of the Cold War. Aid per displaced person in war-affected countries has more than tripled over the past two decades. It has also become more cost-effective, benefiting in many cases from peacetime developments in public health programs.

A major focus of humanitarian assistance has been the four disease clusters—ARIs, diarrheal diseases, malaria, and measles—that are major killers in wartime. As Chapter 1 points out, all are preventable and/or treatable at very low cost.

In addition to preventing and treating disease, a significant share of humanitarian aid budgets is devoted to treating severe malnutrition, a condition that increases the vulnerability of individuals to disease and is a cause of death in its own right. Here too there have been major improvements in the past

two decades. Fatality rates for severely malnourished children have plummeted because of better treatment protocols and greatly improved emergency feeding rations.

The life-saving impact of humanitarian assistance is evident from health surveys taken in refugee camps. These reveal that mortality rates among displaced people who receive access to basic assistance—health services, nutritional supplements, shelter, and clean water and sanitation—decline rapidly, often falling to the pre-war rate, or even lower, within four to six months.

Treating disease and malnutrition is far more cost-effective than treating injuries in terms of lives saved per dollars spent. For every US\$1 million spent on treating disease or malnutrition, many more lives are saved than if the same US\$1 million were to be spent on treating injuries.

Peacetime immunization drives, plus nonmedical health practices like breastfeeding, together with the life-saving impact of humanitarian assistance, have all contributed to reducing wartime mortality from disease and malnutrition. These developments have minimal impact mortality rates from *injuries* in wartime.

Indeed, contrary to the views of some scholars, the evidence suggests that indirect deaths from disease and acute malnutrition have declined at a greater rate than “direct” deaths from war-related injuries.

## **The Death Toll in the Democratic Republic of the Congo**

The fact that mortality rates generally decline during periods of warfare not only appears deeply counterintuitive but also stands in sharp contrast to the findings of the most ambitious and comprehensive survey-based study ever undertaken to estimate excess war deaths.

Data from a series of five surveys undertaken by the IRC in the DRC over a period of some eight years indicate that the nationwide mortality rate in the country jumped dramatically after the war started in 1998, and has remained greatly elevated ever since, despite declining substantially as of late 2001 and more gradually thereafter.<sup>3</sup>

By 2007, according to the IRC, some 5.4 million people had died who would have lived had there been no war. More than 90 percent of these excess deaths were the result of disease and malnutrition, not violent injuries.

To estimate the excess death toll, the IRC’s researchers used standard epidemiological survey methodology to determine the overall mortality rate during the periods surveyed. They took the average mortality rate for sub-Saharan Africa as their measure of the baseline mortality rate.

The excess mortality rate is the difference between the average survey-derived mortality rate and the baseline rate. But, while the latter is critically important, it is also extremely difficult to determine accurately. And, if the baseline rate is too low, then the excess death rate, and hence the excess death toll estimate, will be too high—and vice versa. As Chapters 3 and 4 demonstrate, getting the baseline mortality rate wrong can make a huge difference to the final excess death estimate.

This report argues the IRC’s choice of the baseline mortality rate for the DRC was far too low—a fact also noted by a number of the experts who have reviewed the IRC’s findings.<sup>4</sup> Far from being an average sub-Saharan African country, the DRC languishes at the bottom of most development measures for the region.

The impact of changing the IRC’s baseline estimate to a more appropriate figure is remarkable. As we demonstrate below the excess death toll drops dramatically.

The results of the IRC's first two surveys, which covered a period between August 1998 and March 2001, were restricted to the violence-wracked eastern part of the country. They indicated that the war had generated approximately 2.5 million excess deaths.

But, the IRC's researchers did not select the areas to be surveyed in a way that ensured they were representative of the region as a whole. This failure to follow standard survey practice means no confidence can be placed in any excess mortality estimates from this period—although no one doubts the death tolls in parts of the region were very high.

But, even if this critical misstep is ignored, other methodological errors, including reliance on the too-low baseline mortality rate, led to large and unwarranted inflations of the excess death estimates. For example, when the Human Security Report Project's research team corrected for a series of erroneous assumptions in one of the IRC's calculations for the period covered by the first survey, the excess death toll fell from 1.6 million to just 678,600—a decline of almost 60 percent.

The excess death estimates for the final three surveys, the only ones to cover the entire country, were not affected by the methodological errors evident in the first two surveys. Here, the major problem, as mentioned above, lay with the inappropriately low baseline mortality rate. The impact of changing this rate to a more appropriate one was dramatic. The estimated excess death toll dropped from 2.8 million to less than 900,000. This is still a huge toll, but it is less than one-third of the IRC's original estimate for the period.

These are not the only reasons for questioning the IRC's extraordinarily high excess death toll. There is also a question mark over the accuracy of the overall mortality rate revealed by the survey itself.

In 2007 the well-regarded DHS carried out an independent nationwide population health survey in the DRC and reported an under-five mortality rate that was just over half that recorded by the IRC for the same period. Both estimates cannot be correct.

### **Calculating Excess War Death Tolls: An Impossible Undertaking?**

Estimates of war death tolls can be extraordinarily controversial, as the intense and often highly politicized debates about war death estimates in Iraq remind us. Population health surveys remain a critically important source of data for governments and international agencies working in war-affected countries, but many conflict epidemiologists are concerned the recent controversies over survey-derived excess death tolls threaten the credibility of population health surveys more generally.

Part of the problem is the appropriateness of using retrospective mortality surveys to estimate excess war deaths has never been validated, and the findings of the small number of surveys that have been used for this purpose show troubling inconsistencies.

In post-invasion Iraq, retrospective mortality surveys taken over similar time periods have revealed sharply divergent mortality rates. For example, the post-invasion mortality rate estimated by one survey was more than twice that of another survey taken over the same period. And, as noted above, the IRC's estimate of the under-five mortality rate in the DRC was almost twice that of the 2007 DHS.

When major surveys produce such sharply divergent nationwide mortality rates over the same time period, it is clear that something is seriously wrong.

The causes of these major discrepancies in findings remain both contested and unresolved. But, they are far from being the only troubling issue. Chapter 4 addresses a quite different problem—one that also challenges the very idea that population surveys can be a reliable method for estimating excess deaths in wars in poor countries.

A major challenge with using retrospective mortality surveys to estimate excess death tolls is that it is almost never possible to obtain reliable data on pre-war mortality trends in poor countries. This information is, however, critical.

If mortality rates in a country are declining before a war, and there is no reason to assume that they would not have continued to decline had there been no war, the declining trend must be taken into account when estimating the excess death toll.

In practice, this is rarely done. Researchers usually take a single point estimate of the mortality rate immediately before the war and assume that, had there been no war, it would have remained constant.

But, in reality, mortality rates are rarely static over time, and failing to take into account pre-war trends can lead to serious errors. Excess death tolls will be underestimated if mortality rates had been declining before the war, and overestimated if they had been increasing. The resulting errors can be very large—and they increase over time.

To demonstrate how much excess death estimates can change when the pre-war trend in the mortality rate is taken into account, we revisited the IRC's calculations for the DRC. We found that taking into account the pre-war decline in mortality increased the HSRP's excess death estimate by more than 70 percent over the period of the last three surveys.

Our original calculations had indicated that the IRC's estimate was more than three times higher than it should have been. When the previously ignored decline in the pre-war mortality rate was taken into account, new calculations suggest that the IRC's estimate was now just double what it should have been.

However, while this exercise clearly demonstrates the importance of taking pre-war mortality trends into account when calculating excess deaths, there are too many uncertainties in the data to take the actual estimate at face value.

Indeed, Chapter 4 argues that, in practice, the use of population surveys to generate estimates of nationwide excess war death tolls raises data and methodological issues so challenging that they can very rarely be overcome. It details these challenges and argues there are more appropriate—and less error-prone—means of measuring the impact of warfare on population health.

## **The Need for a More Appropriate Measure of the Human Costs of War**

Given the practice of estimating the number of excess deaths via retrospective mortality surveys is so prone to error, and given that some of these errors become greater the longer wars last, a strong case can be made for seeking alternative approaches to estimating the human costs of war.

Nationwide excess death toll estimates are mostly used for advocacy. But, if the accuracy of these estimates is subject to further damaging critiques, their value for advocacy purposes will be diminished. And, there are, as Chapter 4 points out, more appropriate ways for advocates to communicate the deadliness of warfare.

For humanitarian workers, nationwide excess death tolls are of little practical interest. Those working to bring assistance to people in war-affected countries need to know who is at risk of dying in the present, where, and from what causes, not how many people have died nationwide since the war began. They get the information they need from the small-scale needs-assessment surveys routinely carried out in war-affected areas. These surveys typically estimate local mortality rates (not excess mortality rates), and the proximate causes of death.

Our argument against the use of surveys to estimate nationwide excess deaths is emphatically not an argument against the utility of population health surveys more generally. These remain critically

important for creating an evidence base for humanitarian needs assessment, for monitoring, and for impact evaluation. Estimates of nationwide excess mortality tolls are not needed for any of these purposes.

### **Health as a Bridge for Peace?**

The main focus of this report is the impact of war on population health, an area in which health professionals have played a key role in seeking more effective ways to reduce the wartime death toll from malnutrition and disease.

But, for some health professionals, the idea that their efforts should focus primarily on reducing the human costs of wars has not been enough. Proponents of the World Health Organization-affiliated “Health as a Bridge for Peace” program argue health professionals also have a role to play in conflict prevention via education, in seeking to stop ongoing wars via what the United Nations calls “peacemaking,” and in post-conflict peacebuilding, where the key security goal is to prevent wars that have stopped from starting again.

The achievements—and challenges—of the “Health as a Bridge for Peace” movement are examined in detail in Chapter 5.

### **Conclusion**

*The Shrinking Costs of War* demonstrates that three interrelated developments have been driving down conflict deaths for more than two decades. The impact of the changes brought about by these developments has been so far-reaching that today’s wars rarely kill enough people to reverse the decline in peacetime mortality that has been underway in the developing world for more than 30 years.

- First, the nature of warfare has changed, with fewer and fewer wars being fought with very large armies, heavy conventional weapons, and major power intervention. A consequence of this change has been the dramatic reduction in war deaths.
- Second global health policy, particularly the drive to increase immunization coverage in poor countries, has been a major factor driving death rates from disease down in peacetime. The protection provided by the key vaccines also reduces death tolls in wartime.
- Third, humanitarian assistance has increased in level, scope, and effectiveness, increasing the number of lives saved in war-affected populations.

There are still many gaps in our understanding of exactly how the three developments noted above affect excess death tolls, not least, we have argued, because retrospective mortality surveys—the instruments of choice for measuring excess death tolls—appear to be far from reliable.

We have argued the evidence that deaths from war-exacerbated disease and malnutrition have declined is compelling, but clearly this is no cause for complacency. The 20-year decline in conflict numbers appears to have stalled, and tens of thousands are still being killed each year by war-related violence with an even greater—though uncounted—toll from war-driven disease and malnutrition. And, humanitarian assistance is often less than needed, distorted by politics, marred by turf battles, and delivered too late.

But, equally there is no reason for undue pessimism. The evidence is clear that international action can play—and indeed has played—a critically important role in reducing the human costs of war.

## ENDNOTES

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<sup>1</sup> References and further details are provided in the relevant chapters unless otherwise cited.

<sup>2</sup> Note these figures are for battle deaths in conflicts in which a government was one of the warring parties. They do not include death tolls from *nonstate conflicts*—those fought between nongovernment groups—nor do they include *indirect* deaths from war-exacerbated disease and malnutrition.

<sup>3</sup> Benjamin Coghlan et al., “Mortality in the Democratic Republic of Congo: An Ongoing Crisis” (New York: International Rescue Committee, 2008), [http://www.theirc.org/sites/default/files/migrated/resources/2007/2006-7\\_congo mortality survey.pdf](http://www.theirc.org/sites/default/files/migrated/resources/2007/2006-7_congo mortality survey.pdf) (accessed 14 January 2010), p.13.

<sup>4</sup> The World Health Organization (WHO)-affiliated Health and Nutrition Tracking Service (HNTS) undertook a review of the IRC’s findings after they were strongly criticized by two Belgian demographers. Details of the Belgian study and the HNTS review appear in Chapter 3.

## 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.<sup>1</sup>

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.”<sup>2</sup> 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.”<sup>3</sup> 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.<sup>4</sup> 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.<sup>5</sup> 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.<sup>6</sup>

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.<sup>7</sup>
- 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.<sup>8</sup>

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."<sup>9</sup> 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.<sup>10</sup> The Crude Mortality Rate was one of the highest ever recorded among refugees or internally displaced people.<sup>11</sup>

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.<sup>12</sup>

### *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.<sup>13</sup> 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.<sup>14</sup>

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

### *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.<sup>17</sup>

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.<sup>18</sup> Immunization programs against the disease have been extraordinarily effective. Between 2000 and 2007, the global measles mortality toll dropped by 74 percent.<sup>19</sup>

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

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<sup>1</sup> 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.

<sup>2</sup> 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).

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

<sup>4</sup> 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).

<sup>5</sup> 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).

<sup>6</sup> See Mack, ed., *Human Security Report 2005*, 129–130.

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

<sup>8</sup> *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.

<sup>9</sup> Loretta Pinoges and Evelyn Depoortere, “Analysis of Excess Mortality in Recent Crises” (Paris: Epicentre, 2004).

<sup>10</sup> 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.

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

<sup>12</sup> 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](http://www.who.int/topics/cholera/publications/en/first_steps.pdf) (accessed 5 November 2009).

<sup>13</sup> 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](http://www.unicef.org/publications/files/The_State_of_the_Worlds_Children_2008.pdf) (accessed 5 November 2009).

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

<sup>15</sup> Salama et al., “Lessons Learned,” 1809.

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

<sup>17</sup> 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).

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

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

## CHAPTER 2

### The Paradox of Mortality Rates that Decline in Wartime

In this chapter we examine a seemingly paradoxical finding that has attracted virtually no attention in either the conflict research or humanitarian communities, let alone the media—*namely that in most conflict-affected countries today, nationwide mortality rates actually decline during periods of warfare.*

The data reviewed here—which take into account indirect deaths from war-exacerbated disease and malnutrition, as well as deaths from injuries caused by violence—suggest that the human costs of warfare may not be as great as many people believe—and much of the literature suggests.

To illustrate how nationwide mortality rates decline even in lengthy wars, we review under-five mortality trend data for sub-Saharan African countries that have been embroiled in conflict. We then show that the wartime under-five mortality trends in Africa are very similar to adult and infant mortality rates in conflicts around the world.

We argue that the explanation for the apparent paradox is relatively straightforward. First, the long-term forces that have been driving mortality rates down in the developing world in peacetime continue to have an impact in wartime. Second, the relatively small and geographically concentrated armed conflicts that are typical of the current era rarely lead to enough excess deaths to reverse the long-term downward trend in peacetime mortality. Third, increased and increasingly effective humanitarian assistance has had remarkable success in driving down deaths—especially from disease and malnutrition—in wartime.

#### Child Mortality in Wartime

There is comparatively little reliable data collected on trends in adult mortality in the developing world where most wars take place; by contrast there is a great deal of information on the (related) trends in child mortality.

As noted in Chapter 1, only a handful of retrospective mortality surveys have been carried out *expressly* to measure death tolls (for adults as well as children) due to warfare. But, national population health surveys that collect data on child mortality are regularly undertaken throughout the developing world by US Demographic and Health Surveys (DHS), the United Nations Children's Fund (UNICEF), and, most recently, the World Health Organization (WHO). All three organizations cover periods of warfare, but they do not estimate excess war death tolls.

The under-five mortality rate is a particularly sensitive indicator of the indirect costs of war. In humanitarian emergencies children tend to die earlier and—proportionate to their share of the national population—in larger numbers than adults. They are sometimes described as the “canaries in the coal mine” of conflict mortality.<sup>1</sup>

Given that the under-five mortality rate is a highly sensitive indicator of the extent of indirect war deaths, and given that no one doubts that organized violence in poor countries drives up the incidence of malnutrition and deadly diseases to which young children are particularly vulnerable, we might expect under-five mortality rates to increase in countries afflicted by warfare.

Yet, as we illustrate below, nationwide under-five mortality rates measured by DHS and UNICEF and other surveys mostly *decline*, not only in peacetime but also during periods of armed conflict.<sup>2</sup> As we point out later, recent research from the World Bank suggests that this pattern also holds for adult and infant mortality.

In reporting these counterintuitive findings, we stress that we do not for a moment dispute the overwhelming evidence that conflict-exacerbated disease and hunger leads to sharply increased death tolls in war zones and among conflict-displaced populations.

## Child Mortality and Warfare in Sub-Saharan Africa

The worldwide decline in child mortality during periods of conflict is evident even in sub-Saharan Africa, the region that has suffered the highest rates of child mortality in the world since 1950—and the greatest number of wars. The extent of this remarkable trend is revealed in a series of graphs of conflict-affected countries in sub-Saharan Africa that are set out in Figure 2.1 below. These graphs track under-five mortality and gross domestic product (GDP) per capita trend data from 1970 to 2007 against periods of medium-to-high-intensity armed conflict. The data reveal that in the overwhelming majority of these conflict-affected countries, child mortality rates actually declined during periods of warfare.

The under-five mortality trend data are taken from the consensus estimates of the Inter-Agency Child Mortality Estimation Group (IACMEG), which are in turn compiled from data drawn from DHS, UNICEF, other surveys and census data.<sup>3</sup> The conflict data are from the Uppsala Conflict Data Program, as well as the International Peace Research Institute, Oslo, and the GDP per capita data are from the World Bank.<sup>4</sup>

The GDP per capita trend data are included because changes in income levels—and hence welfare—can affect the mortality rate. Indeed, in some countries income appears to be a more powerful driver of mortality than armed violence.

Between 1970 and 2007, under-five mortality rates declined overall during periods of warfare in 78 percent (14 out of 18) of the conflict-affected sub-Saharan African countries in our sample.

Such findings are so counterintuitive that they inevitably give rise to questions about the reliability of the data that generate them. There is, in fact, little reason to doubt that the overall trends are correct, although it is quite true that the “best fit” trend lines are made up of survey (and sometimes census) data that often have wide confidence intervals—that is, they are subject to a considerable degree of uncertainty.<sup>5</sup> We cannot therefore be confident that any particular mortality measure on the “best fit” trend line will be accurate. But, the data are accurate enough to confirm the average trend in child mortality—i.e., that rates generally decline in periods of warfare.

The relatively few cases where child mortality rises in wartime are also instructive. In some cases they suggest that factors other than war may have been driving the increase.

The Republic of the Congo is one such case. Here child mortality rates appear to have been driven more by economic factors than warfare. Nationwide under-five mortality rates declined in the Congo from 1970 to the early 1980s, a period during which incomes were rising. But, when incomes subsequently started to fall, mortality rates started to increase and continued to do so modestly *before* the onset of the three periods of conflict. Clearly, organized violence was not the cause, or the only cause, of any increase during this period.

The most dramatic example of organized violence driving up child mortality is found—not surprisingly—in Rwanda where the genocide killed an estimated 8-9 percent of the population in just a few months. This was the deadliest period of organized violence experienced by any country since the end of World War II.

Notwithstanding Rwanda and a handful of other exceptions, the graphics presented in Figure 2.1 demonstrate unequivocally that in war-wracked sub-Saharan Africa the general trend has been for under-five mortality rates to decline.<sup>6</sup> This is so whether or not countries have been involved in warfare, and

## FIGURE 2.1

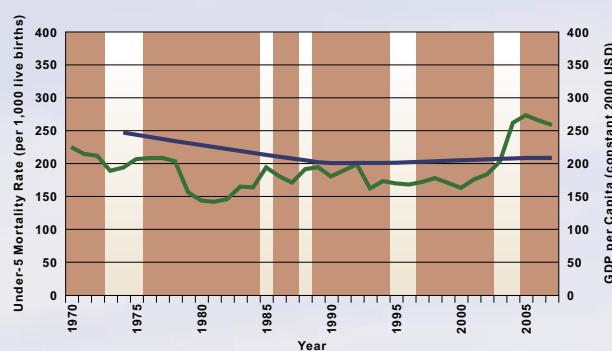
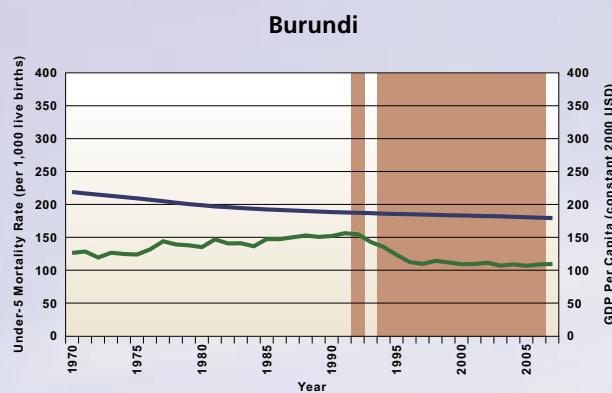
With few exceptions, under-five mortality rates in Sub-Saharan Africa have declined during periods of medium-to high-intensity armed conflict. In fact there is only one country, the Republic of the Congo, in which the child mortality rate at the end of the conflict periods is higher than at the beginning.

There are, however, a small number of wars in which the mortality rate during one or more conflict periods increases. The most obvious case—and one that is wholly unprecedented—is Rwanda where there is a dramatic increase in the child mortality during the conflict period that culminated in the genocide.

### LEGEND

- Period of Conflict
- Under-five Mortality Rate
- GDP Per Capita

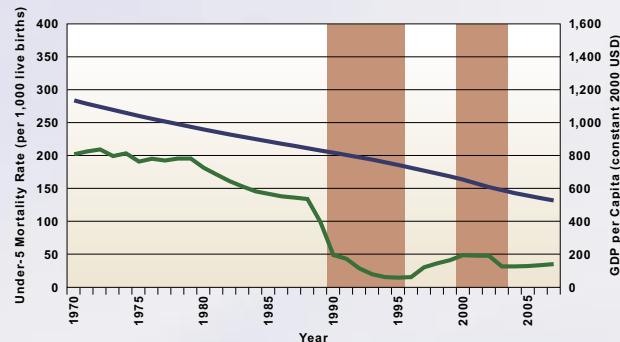
Data Sources: PRIO; UCDP/Human Security Report Project  
Dataset; World Bank; IACMEG.



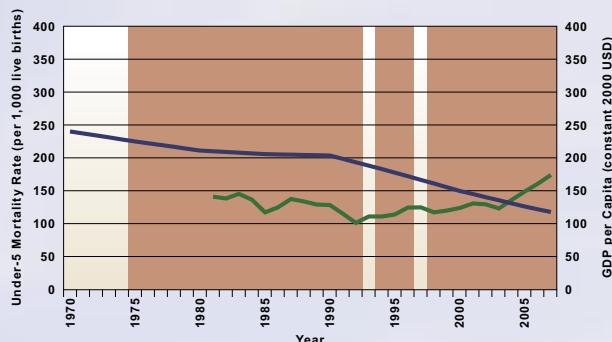
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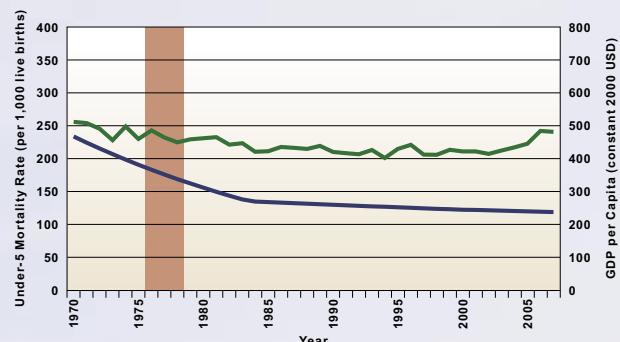
### Liberia



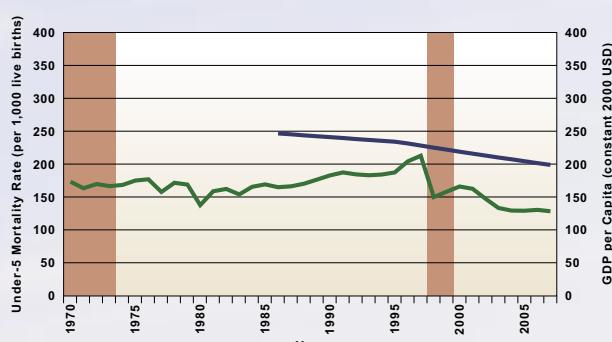
### Ethiopia



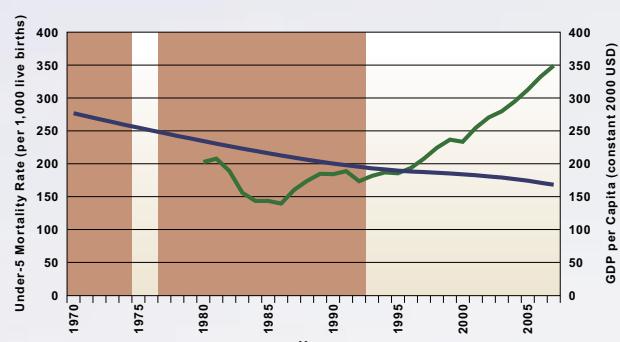
### Mauritania



### Guinea-Bissau



### Mozambique

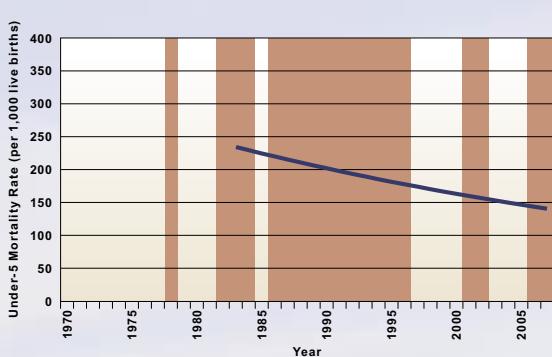
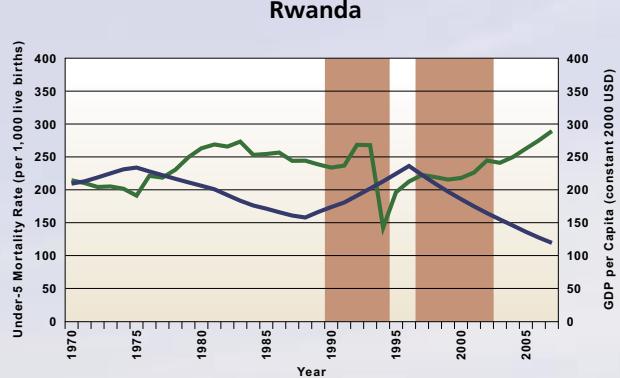
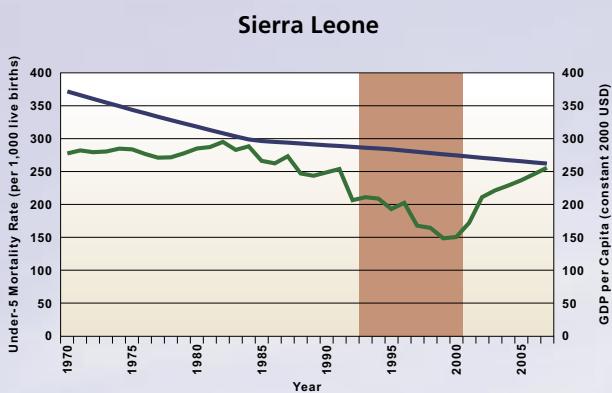
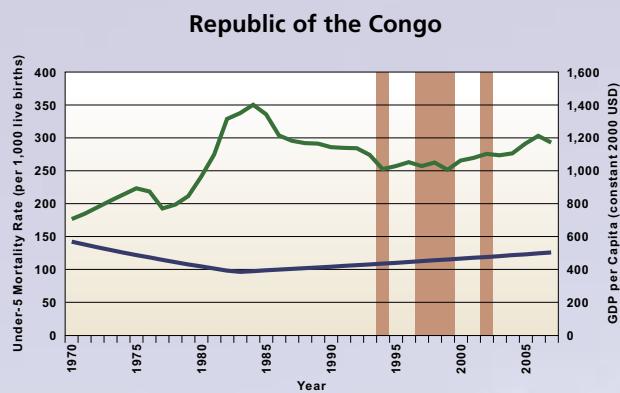
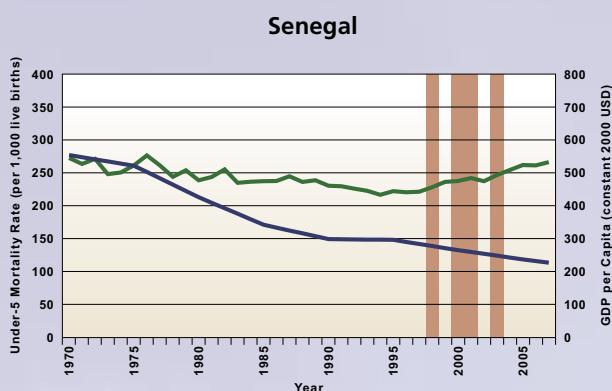


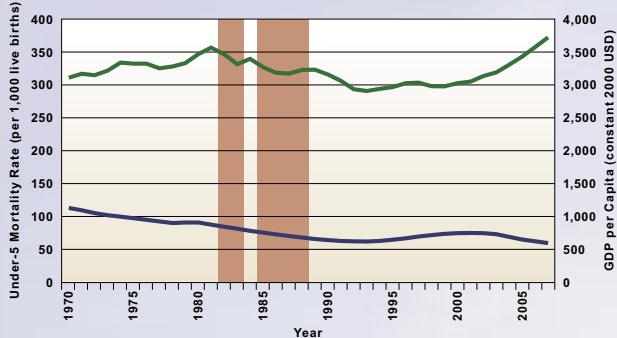
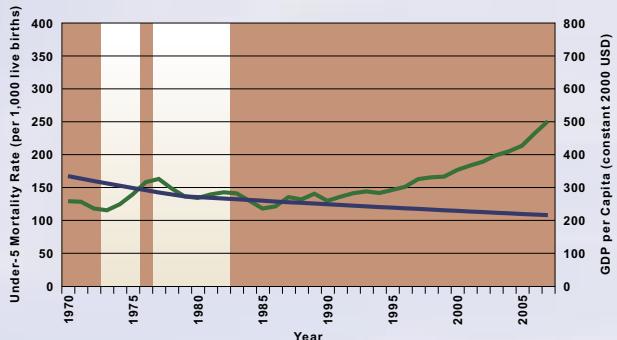
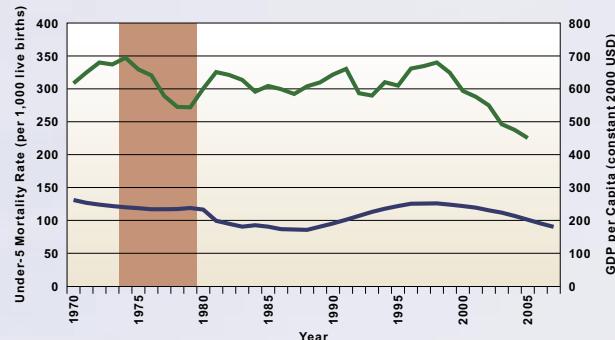
## FIGURE 2.1 continued

### LEGEND

- Period of Conflict
- Under-five Mortality Rate
- GDP Per Capita

Data Sources: PRIO; UCDP/Human Security Report Project  
Dataset; World Bank; IACMEG.



**South Africa****Uganda****Sudan****Zimbabwe**

whether or not incomes have been increasing or decreasing. The greatest challenge to this trend in Africa comes, not from war, but HIV/AIDS—which has already caused child mortality rates to increase in a number of countries in the south of the region. Few of these countries have been affected by violence, however.

## The Human Costs of War in Global Perspective

We have focused on sub-Saharan Africa because it has suffered more wars than any other region and because it has the highest under-five mortality rates. But, data from other conflict-affected countries around the world that can be accessed at [childmortality.org](http://childmortality.org) reveal essentially the same trend of child mortality declining during periods of war—as does the World Bank data on adult and infant mortality trends in wartime discussed below.

In addition to the survey data, there have been a small number of studies that have sought to measure the *global* impact of war on population health. Most of these studies use the WHO's Disability-Adjusted Life Year (DALY)—an indicator of the number of healthy years of life lost—rather than simply mortality rates to measure the health impact of war. The key findings of this research are reviewed later in this chapter (see 'Political Science Estimates of The Human Costs of War').

In 2008 the *World Bank Economic Review* published a major study by Siyan Chen, Norman Loayza, and Marta Reynal-Querol on the worldwide impact of warfare on a range of economic, political, and social variables in war-affected countries.<sup>7</sup> This study is comparable to the HSRP's investigation of mortality rates in wartime Africa, since it also points to the impact of war on mortality rates, though here the trend data are global rather than focused on countries from a particular region.

A second difference is that Chen and her colleagues studied adult male and female mortality and infant mortality, rather than under-five mortality. The study only counted conflicts in which there were at least 1,000 battle deaths each year and they used World Bank mortality rates as their main indicator of population health. The article compares median adult and infant mortality trends for the war-affected countries for a seven-year period before the fighting broke out, and for seven years after a conflict had ended.

The article shows that both median adult and infant mortality declined before, after, and during periods of warfare—the same trend noted in the under-five mortality data for sub-Saharan Africa.<sup>8</sup>

Because the trend lines for both adult and infant mortality represent *median* rates, in some cases mortality rates will, of course, have *increased* over the conflict period more rapidly than the median line indicates. In other cases, rates will have *decreased* more rapidly than graphs indicate.

The article reveals that war-affected countries have far higher *pre-war* mortality rates than regional control countries that are not affected by war, though in both cases median mortality rates decline at similar rates. This suggests that factors other than war—notably levels of poverty-related disease and malnutrition—remain important drivers of mortality in times of war as well as peace.

## Why Mortality Rates Decline in Wartime

Armed conflict not only causes violent deaths but also population displacement, stress, malnutrition, and loss of access to health services, all of which greatly increase the susceptibility of individuals to fatal diseases. This raises an obvious question: Why don't nationwide mortality rates *increase* rather than decrease during periods of warfare—particularly with respect to the most vulnerable members of society—children under five?

In fact, mortality rates, from disease as well as violence, *do* increase—often dramatically—in and around war zones, as literally hundreds of epidemiological surveys demonstrate. But, if this is the case, why do these fatalities appear to have so little impact on nationwide trends in mortality?

The answer is twofold. First, the enduring impact of what UNICEF calls the “Revolution in Child Survival” has been driving down peacetime under-five mortality rates in developing countries for more than four decades. Second, the impact of war deaths on national mortality rates is much less than was the case with the major wars of the Cold War years, and less than is assumed in much of the literature. This is in part because today’s armed conflicts generate far fewer deaths on average than those of the past, and because they are more geographically concentrated—the latter being a function of smaller armies with limited power projection capacities. In short, the impact of war deaths has not been great enough to reverse the long-term decline in nationwide mortality rates—except in a minority of cases.

The extent of the improvement in health outcomes in the developing world—of adults as well as children—over the past 50-plus years has been extraordinary. As a 2007 report from the Center for Global Development noted, “[o]ne of the greatest human accomplishments has been the spectacular improvement in health since 1950, particularly in developing countries.”<sup>9</sup>

The 2008 *World Bank Economic Review* study cited earlier argues that conflict-affected countries “have been able to participate in international progress, despite the war. This is arguably a testament to the beneficial impact of medical innovations . . . and the international campaigns to promote them.”<sup>10</sup>

## **The “Revolution in Child Survival”**

In most conflict-affected countries, child mortality due to war-exacerbated disease and malnutrition—by far the greatest cause of child deaths in wartime—has been substantially reduced by the *enduring* impact of a range of low-cost, nationwide, public health interventions in peacetime.

These interventions are part of long-term global campaigns waged by the WHO and UNICEF to reduce child mortality that have been directed in large part against infectious and parasitical diseases. Critical elements in these campaigns have been the “Expanded Programme on Immunization” launched by the WHO in 1974 and UNICEF’s “Revolution in Child Survival” initiative launched in 1982.

According to UNICEF:

Immunization coverage of infants for the six major vaccine-preventable diseases—diphtheria, measles, pertussis, polio, tetanus and tuberculosis—rose from less than five per cent in 1974 to more than 75 per cent in 2006.<sup>11</sup>

By some estimates, immunization alone has saved up to 1 million lives a year on average over the past two decades.<sup>12</sup>

The worldwide impact of the “Revolution in Child Survival” is clearly evident in the declines in under-five mortality revealed in Figure 2.2. The graph shows that, while sub-Saharan Africa’s under-five mortality rates are much higher than the developing country average, they have still declined appreciably since 1990. (The decline has in fact been underway at least since child mortality estimates first became available in the 1960s.)

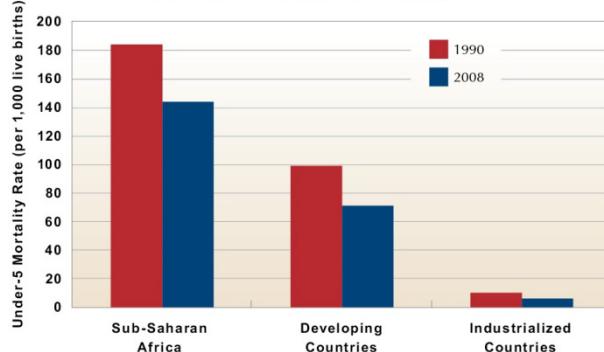
The discussion in this section has focused thus far on declines in child mortality. But, it is important to note that the available data on adult mortality rates in poor countries, though less reliable, suggest that these too have generally followed a similar downward trend.

According to one leading demographer:

Adult mortality appears to have been falling throughout the developing world from the 1960s to the 1990s, on average by about one percent per annum for males and two percent per annum for females, though the HIV/AIDS epidemic undoubtedly will reverse these gains in countries that are substantially affected.<sup>13</sup>

Mortality rates decline during periods of warfare in part because immunization in peacetime saves lives in wartime. War's impacts increase the susceptibility of children to infectious diseases, but the long-lasting protection provided by immunization programs in peacetime significantly reduces the risk of succumbing to infection once the violence starts. Immunization against measles, for example, provides lifetime protection against contracting the disease, though other vaccines require booster shots to provide continued full protection.

**Figure 2.2 Under-five Mortality Rates:  
Sub-Saharan Africa; Developing Countries;  
and Industrialized Countries**



Data Source: UNICEF.

Although under-five mortality rates remain significantly higher in Sub-Saharan Africa than the developing world average, even here there have been marked improvements over the last two decades.

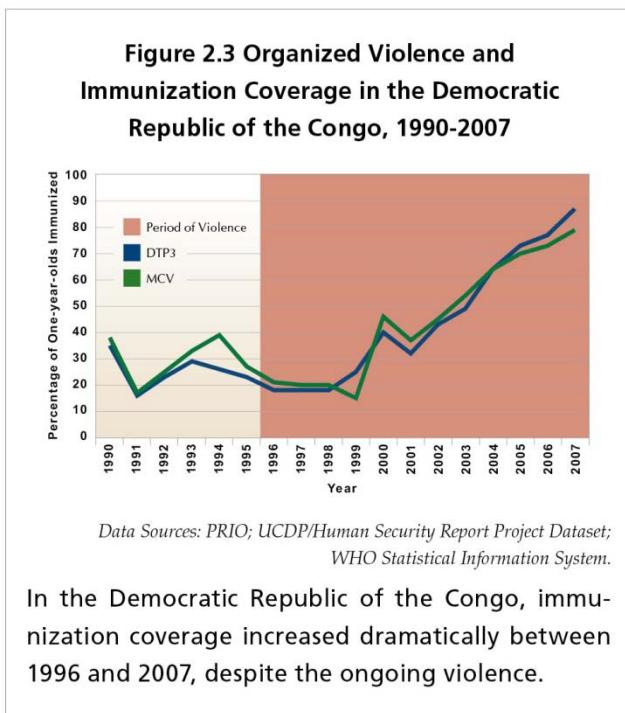
Changes in nonmedical health practices in peacetime can also save lives in wartime. In sub-Saharan Africa, exclusive breastfeeding rates more than doubled between 1990 and 2004—from 15 to 32 percent, in part as a consequence of international and national advocacy campaigns.<sup>14</sup> This is important because breastfeeding infants strengthens their immune system and reduces the risk that they will die from diarrhea and acute respiratory infections (ARIs), both major killers of children in wartime.<sup>15</sup>

This changing practice has also reduced wartime mortality because, as the WHO has pointed out, “Infants aged 0-5 months who are not breastfed have seven-fold and five-fold increased risks of death from diarrhoea and pneumonia, respectively, compared with infants who are exclusively breastfed.”<sup>16</sup> As noted earlier, diarrheal diseases and respiratory infections are two of the major killers of children in wars in poor countries.

### The Impact of Immunization Campaigns

Coverage of the critically important immunization programs can even *increase* in countries experiencing armed conflict. In the Democratic Republic of the Congo (DRC), for example, immunization coverage in

1990, according to the WHO, was 35 percent for diphtheria, tetanus, and pertussis (DTP3) and 38 percent for measles (MCV). By 2007 the coverage had increased to 87 and 79 percent, respectively.<sup>17</sup> The critical point to note here is that *immunization coverage grew steadily throughout the deadliest periods of warfare*. In 1998 and 1999, the conflict in the DRC was the deadliest in Africa. This remarkable change may help explain why, according to the 2007 DHS survey carried out in the DRC, under-five mortality rates have been falling since the war started.



In some countries, immunization within war zones is enabled via negotiated ceasefires—sometimes known as “Days of Tranquility”—that permit health workers access to children deep in rebel territory who would otherwise not have been treated. Humanitarian ceasefires have been successfully negotiated in Afghanistan, Angola, the DRC, El Salvador, Guinea-Bissau, Iraq, Lebanon, the Philippines, Sierra Leone, Sri Lanka, Sudan, and Tajikistan.<sup>18</sup>

Some of the international initiatives to save the lives of children in conflict zones have been extraordinarily ambitious. In Somalia, for example, a country not only wracked by organized violence but without a functioning central government for many years, UNICEF and the WHO embarked in late 2008 on a massive campaign in partnership with local authorities and NGOs to provide every Somali child under five with “immunization against measles, diphtheria, whooping cough, tetanus and polio; Vitamin A supplementation; nutritional assessments; de-worming; the distribution of oral rehydration salts and water purification tablets.”<sup>19</sup>

There have been relatively few population health surveys in Somalia, but even in this largely ungoverned and violence-afflicted country, some progress has been made in improving child health. Data from individual surveys on the IACMEG website, [childmortality.org](http://childmortality.org), show an uneven downward trend in under-five mortality since the mid-1980s.<sup>20</sup>

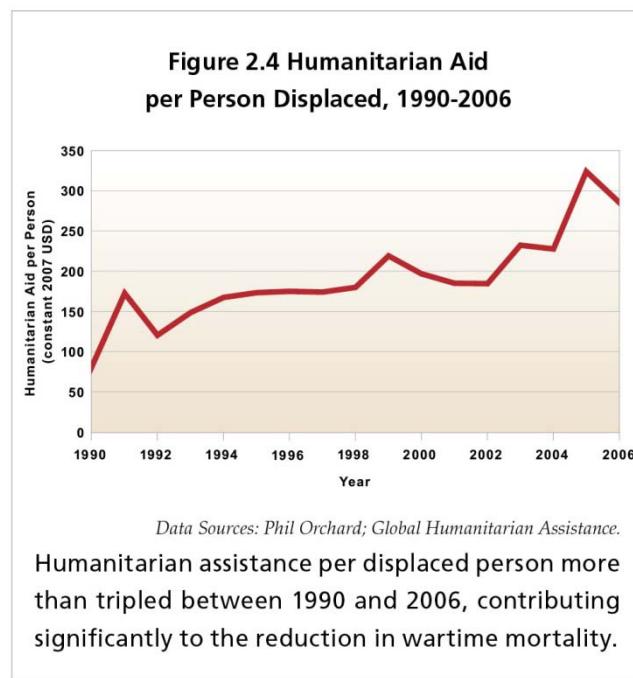
All such estimates are affected by substantial uncertainty, with the potential for error likely to be greatest in conflict-affected countries, so the *extent* of the decline in mortality in Somalia is certainly

debatable. But, unless the population health surveys that have been undertaken are all fundamentally flawed, the evidence suggests that even here the overall trend in child mortality has been downwards.

While the efforts of UNICEF, the WHO, and other international agencies, donors, and NGOs have played a critically important role in the “Revolution in Child Survival,” the decline in child mortality throughout the developing world also owes a great deal to the parallel efforts of national governments to promote life-saving advances in health care, to the more general diffusion of child-saving knowledge among populations in developing countries—the promotion of breastfeeding, for example—and to general improvements in living standards.

### The Impact of Humanitarian Assistance

The “beneficial impact of medical innovations” on wartime mortality, to which the *World Bank Economic Review* article noted earlier refers, is evident not only in the long-term effect of improved access to basic health services in developing countries in peacetime but also in the shorter-term impact of humanitarian action in reducing death tolls from war-exacerbated disease and malnutrition in wartime.



The impact of humanitarian assistance on wartime mortality has increased for two reasons. First, the level of assistance has risen dramatically. As Figure 2.4 shows, the dollar value of humanitarian aid per displaced person has *more than tripled* since the end of the Cold War.

But, humanitarian assistance is not simply better funded today, it is also more effective.

Writing in *The Lancet* in 2004, Peter Salama and colleagues noted that:

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.<sup>21</sup>

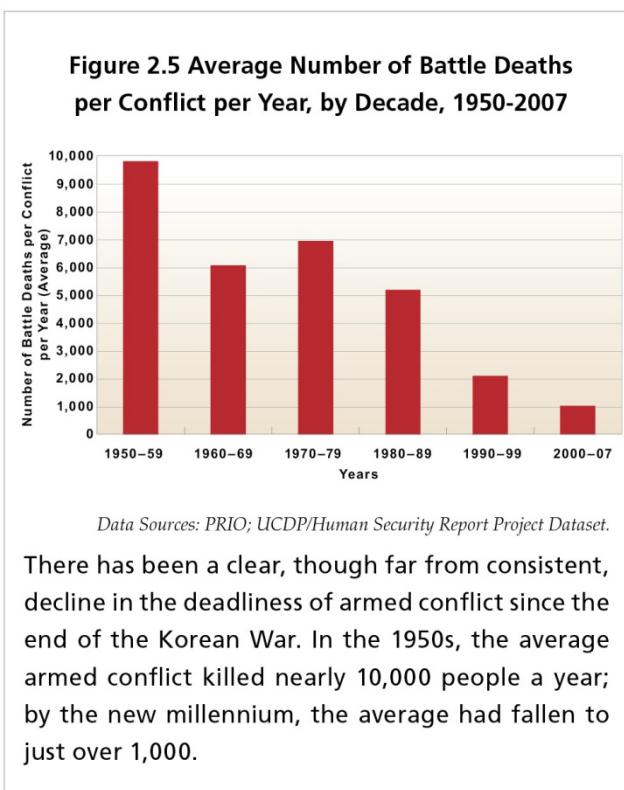
Epidemiological surveys taken in refugee and internally displaced person camps reveal that mortality rates among displaced people who have access to basic humanitarian assistance—health services, nutrition, shelter, and access to clean water and sanitation—often decline rapidly,<sup>22</sup> often falling to the pre-war rate or even lower within four to six months. Sometimes the reduction in mortality is even more rapid. In 1997, for example, the death rate of Rwandan refugees in the Ndjoundou refugee camp in the Republic of the Congo dropped from almost 11 deaths per 10,000 per day to 0.5 in some seven weeks.<sup>23</sup>

Humanitarian assistance, in other words, has been an important factor in reducing the incidence of indirect war deaths, which in turn reduces the impact of war on nationwide mortality rates.

### The Changing Nature of Warfare

As we noted earlier, two long-term changes in the global system explain the apparent paradox of mortality rates that decline in wartime. The first was the decades-long reduction in mortality rates in peacetime. The second was the dramatic, though highly uneven, fifty-plus year reduction in mortality rates in wartime.

The first part of this chapter noted how low-cost, but highly effective health interventions had driven down mortality rates in peacetime and have had major impact in wartime as well. We now turn to the impact of changes in the nature of warfare that have driven down mortality rates—from both direct and indirect deaths—in wartime.



The major armed conflicts of the Cold War years—the Chinese civil war, the Korean War, the French and American wars in Indochina, the Iran-Iraq War, and the Soviet war in Afghanistan—all generated massive annual death tolls. These wars typically involved military intervention by the great powers and were mostly fought with very large armies, with at least one side deploying heavy conventional weapons. Indiscriminate long-range bombardment of cities from the air, or by artillery, was common and

resulted in huge numbers of deaths and injuries. Mobile warfare tactics, plus the fact that one or both sides usually had effective long-range power-projection capabilities, meant that the fighting typically ranged over very large areas of the national territory causing immense disruption in the process.

The poor-country wars of the post-Cold War era by contrast are typically fought with small arms and light weapons and by relatively small rebel armies that tend to avoid major engagements. The warring parties often resort to indiscriminate violence and frequently prefer to target civilians rather than their armed opponents. But, the size of rebel armed forces, their disinclination—or inability—to engage in prolonged high-level combat, or project power over long distances, means that they generally kill relatively few people compared to the major wars of the Cold War era. The Rwandan genocide remains the horrific exception to this rule.<sup>24</sup>

The changing nature of warfare has also reduced the geographical extent of wartime violence. In the predominantly low-intensity conflicts that characterize the post-Cold War era, insurgents rarely have the technical capability—aircraft and medium range missiles—to project military power over long distances, or sufficiently large armies to conduct nationwide military operations. As a consequence, the area directly impacted by fighting is relatively small in most conflict-affected countries. In fact a recent review of 11 conflicts in sub-Saharan Africa, by the Armed Conflict Location and Event Data project (ACLED) found that, on average, only 12 percent of the national territory of war-affected countries is impacted by serious violence.<sup>25</sup>

In Uganda, for example, the conflict involving the Lord's Resistance Army has been in the poor and under-populated north, while the south of the country has remained unaffected. In Sudan's two civil wars, the violence has been concentrated in the south and in the west (Darfur) of the country. In the DRC, the fighting has been mostly in the eastern provinces. Similar patterns are evident in wars in the rest of the developing world.

Given that the economies in these mostly poor, war-affected countries are often based on subsistence agriculture, organized violence in one region of a conflict-affected country may well have little or no impact on livelihoods—which are important determinants of mortality—in other regions. So, while mortality rates from disease and malnutrition may be very high in the areas directly affected by violence, the impact of these deaths on *nationwide* mortality rates will often be relatively small—and frequently within the margin of error of attempts to measure them.

## The Worldwide Decline in Battle Deaths

The decline in the deadliness of warfare is very clear in the trend data on the number of battle deaths per conflict per year by decade—a key indicator of the deadliness of armed conflicts. The data indicate that in the new millennium the average conflict killed 90 percent fewer people each year than did the average conflict in the 1950s. Figure 2.5 shows the trends.

A more fine-grained measure of the deadliness of warfare over time is the average number of battle deaths per million of the world's population per year. Figure 2.6 illustrates the annual trend data.

**Figure 2.6 Battle Deaths per Year,  
per Million of World Population, 1950-2007**



*Data Sources: PRIO; UCDP/Human Security Report Project Dataset;  
UN World Population Prospects.*

The trend in battle deaths per million of the world's population per year provides a more detailed picture of how the deadliness of war has changed over time. Unlike Figure 2.5, this graph takes into account the large increase in population over the past fifty-plus years.

## Indirect Death Tolls Have Also Declined

The large and highly destructive wars of the Cold War era not only generated very high battle death tolls, but also displaced large numbers of people, disrupted health services, destroyed housing, reduced access to potable water and massively disrupted livelihoods. These changes in turn increased indirect death tolls from war-driven disease and malnutrition.

For much of the Cold War period there were few countervailing forces reducing indirect death rates driven up by warfare. Immunization rates were very low in most-war affected populations during this period, and humanitarian assistance was minimal. The situation today is very different. Conflict-affected populations in the Post-Cold War period benefit from both peacetime health interventions *and* increased and increasingly effective humanitarian assistance.

The impact of these changes on battle death tolls and indirect death tolls is well illustrated by comparing the human costs of the Korean War, the deadliest war in the Cold War Period, with that of the deadliest conflict in Africa in the 1990s—the war in the Democratic Republic of the Congo (DRC) that started in 1998.

In the Korean War, an estimated 1.7 percent of the combined population of the two Koreas died from wartime violence in 1950. In the DRC the death toll was somewhere between less than one-tenth of 1 percent to roughly one-fifth of 1 percent of the population.<sup>26</sup> The most violent year of the Korean War, in other words, was proportionately eight to over 20 times more deadly than that in the DRC in terms of battle-related deaths.

The two Koreas also suffered a much greater indirect death toll relative to their combined population than did the DRC. According to one report, some 5 to 6 million people died from starvation during the course of the Korean War.<sup>27</sup> Over four years this would amount to some 4–4.5 percent of the population per year on average—an extraordinary toll. The International Rescue Committee (IRC) claims that there have been some 5 million indirect deaths in the DRC between 1998 and 2007.<sup>28</sup> This estimate is almost certainly too high as we demonstrate in Chapter 3, but even if it were true, it would amount to an average annual death rate of approximately 1 percent of the DRC’s population for the period. In terms of indirect deaths, the Korean conflict was at least 4 to 4-and-a-half times deadlier than that in the DRC.

The statistics for indirect deaths both in the DRC conflict and the Korean War can certainly be contested, but there can be no doubt that the latter was far more deadly than the former.

## Conclusion

As noted earlier, the apparent paradox of mortality rates that decline in wartime is easily resolved. Mortality rates in poor countries mostly decline in peacetime and recent wars rarely generate enough war deaths—direct or indirect—to reverse the downward trend. Warfare is less deadly in large part because wars today are fought with smaller armies, fewer engagements and lesser weapons systems, and so kill far fewer people on the battlefield and generate far less societal destruction than those of the Cold War era.

Changes in the nature of warfare also mean that there are fewer deaths from war-induced disease and malnutrition—smaller wars mean lower levels of displacement, societal disruption and stress that increase the vulnerability of war-affected populations to disease. But additional factors help explain the decline in indirect war death tolls. These include improvements in population health in peacetime that help reduce the vulnerability of children to disease in wartime, and the dramatic increase in the level and effectiveness of humanitarian assistance to war-affected countries.

Although there are no global trend data on the extent of deaths from war-exacerbated disease and malnutrition around the world, a compelling case can be made that they have declined to an even greater degree than battle deaths.

Over the past three decades, the dramatic increase in immunization coverage and non-medical interventions, such as the campaigns to increase breastfeeding, have provided enduring protection for hundreds of thousands of children in wartime who would likely otherwise have succumbed to disease.

But none of these life-saving interventions have any real impact on death rates from war-related injuries. This means that, contrary to the views of some scholars, death rates from disease have very likely declined more than death rates from injury.

In the next chapter, we review the most comprehensive analysis ever undertaken on the human costs of a contemporary armed conflict—the IRC’s survey-based investigation of excess deaths in the DRC. The extraordinary findings of this much-publicized study present a sharply different picture of the human costs of war to that presented in this chapter.

## POLITICAL SCIENCE ESTIMATES OF THE HUMAN COSTS OF WAR

In 2003 the *American Political Science Review* published the first-ever quantitative estimate of the global impact of civil wars on population health. Hazem Adam Ghobarah, Paul Huth, and Bruce Russett's influential article, "Civil Wars Kill and Maim People—Long after the Shooting Stops," reviewed the manifold ways in which intrastate warfare exposed civilian populations to increased risks from a range of killer diseases, while reducing access to health services at precisely the time they are most needed.<sup>29</sup>

The World Health Organization's Disability-Adjusted Life Year (DALY), which measures years of healthy life lost, was used as their indicator of population health. The authors' statistical analysis of data from 177 countries controlled for the effects of health expenditure, income inequality, and other factors likely to impact on health outcomes.

The authors collated battle deaths from some 51 civil wars being waged around the world between 1991 and 1997. To determine the intensity of these wars, they used the death rate per 100 persons in the country in question. To exemplify the "hidden costs" of conflict, they sought to calculate the delayed impact of the civil war deaths in terms of DALYs in 1999.

The key finding of the study was that countries experiencing civil wars between 1991 and 1997 incurred an additional burden of disease and disability in 1999 from the indirect and lingering effects of the earlier conflicts.

In a subsequent article published in 2004 that used more refined data, the authors estimated that some 12 million years of healthy life were lost in 1999 by the citizens of the countries that had been afflicted by war between 1991 and 1997. These are years of healthy life that would not have been lost had there been no wars.<sup>30</sup>

These estimates are subject to considerable uncertainty because most wars take place in countries where health data is poor to nonexistent—the DALY estimates reflect this uncertainty.

Two subsequent macro-quantitative studies published in 2005 and 2006 provided support for these findings. In 2005 Quan Li and Wen Ming reported that intrastate conflict had "a very large immediate effect on both male and female mortality rates," but added, "it does not have strong or robust lingering effects for both genders."<sup>31</sup>

But, early in 2009, Matthew Hoddie and Jason Smith presented findings that arrived at a rather different conclusion. In a study published in *International Studies Quarterly*,<sup>32</sup> the authors relied on a very similar statistical methodology to determine the human costs of war to that used by Ghobarah and his colleagues, but they employed different battle-death datasets.

Running regressions with the widely used data recorded by the International Peace Research Institute, Oslo (PRIO), the authors found that war did *not* have the expected negative impact on population health. Indeed, half of their findings indicated that war was associated with *improving* health outcomes—although it is important to note that almost none of these findings were statistically significant.

When they ran their regressions with mortality data from a second dataset—this time that of the Political Instability Task Force—they again found that "the magnitude of battle deaths does not appear to be a strong determinant of a country's post-conflict public health performance."<sup>33</sup> In fact, their statistical analysis showed that in nine of the 10 age/gender categories, health outcomes had *improved* in the aftermath of war. This result is in line with our finding that child mortality rates improve nationwide in wartime.

None of these latter findings were statistically significant, however, which means that we cannot assume that, *in fact*, health outcomes improved—the reported improvements could have occurred by chance. Equally important, the study found no evidence that, on average, health outcomes *worsened* as a long-term consequence of warfare—which is what most of the literature on indirect deaths assumes.

## THE REVOLUTION IN CHILD SURVIVAL

The “revolution in child survival” had its genesis some 30 years ago when the then executive director of United Nations Children’s Fund (UNICEF), James P. Grant, launched a new initiative to cut child mortality rates.

UNICEF’s main targets were the infectious diseases that posed the greatest threat to children under five.<sup>34</sup> The new strategy stressed prevention—notably immunization against preventable diseases—as well as low-cost treatment.<sup>35</sup>

The key policy elements in the campaign were summarized in the acronym “GOBI”: Growth monitoring to keep track of child well-being in a regular and systematic manner; Oral rehydration therapy to combat diarrhea; Breastfeeding to provide essential nutrients in the child’s early stages of development; and Immunization against tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles.

Subsequently, three more components were added to the GOBI strategy: food supplementation, family spacing, and female education—“GOBI” then became “GOBI-FFF.”<sup>36</sup>

Working with the World Health Organization (WHO) and a broad coalition of nongovernmental organizations, UNICEF’s campaign has had a dramatic impact—child mortality rates in the developing world have declined by more than half since 1960.<sup>37</sup> In 1960, the earliest year for which global data on child deaths are available, an estimated 20 million children died; by 2008, the figure was under 9 million. The “revolution in child survival,” in other words, has helped save millions of lives.

Poverty does not necessarily prevent countries from sharply reducing the rate at which their children die. In almost a third of the 50 least-developed countries, mortality rates declined by 40 percent or more between 1990 and 2006.<sup>38</sup>

In sub-Saharan Africa, progress has been considerably slower than in other regions.<sup>39</sup> According to a 2003 study published in the UK journal *The Lancet*, 41 percent of the estimated 10.8 million child deaths worldwide in 2000 were in sub-Saharan Africa.<sup>40</sup> African children continue to die merely because they lack access to simple, inexpensive, and proven life-saving prevention and treatment programs.

The authors of a subsequent *Lancet* study in the same series focused on the 42 countries that generate 90 percent of child deaths—almost 10 million in 2000—and estimated that with universal coverage of basic health interventions, this toll could be reduced by two-thirds.<sup>41</sup> Thus, notwithstanding the successes to date, it is clear there is great scope for further progress.

It is also clear that in most countries that have made major progress in driving down child mortality, national governments, often under pressure from local communities, have played a critical role.

The ongoing revolution in child survival helps explain the apparent paradox of child—and by implication, adult—mortality rates that decline in wartime.

It does so in several ways.

First, children who are healthy and well nourished immediately prior to a war are likely to be more resistant to disease and malnutrition in wartime than those who are not.

Second, as noted elsewhere in Chapter 2, peacetime health campaigns—for mass immunization, for example—often continue to have a beneficial and enduring impact even in periods of conflict.

Third, much of the research on improving child health in poor countries in peacetime has helped improve the efficacy of humanitarian assistance in war zones and in post-conflict situations. This, in turn, has helped reduce wartime and postconflict mortality rates.

Fourth, in most of today’s conflicts, warfare only has a serious direct impact on a relatively small part of the national territory. In territory unaffected by serious violence, basic health services will often still be provided.

Fifth, in a substantial number of wars, it has been possible for so-called Days of Tranquility to be negotiated with rebel groups. These temporary truces permit health workers to carry out mass immunization programs on children in conflict zones.

Last, the promotion of child health, even in war-affected countries, has widespread support both at home and among donors and international agencies. It is relatively inexpensive, enhances the legitimacy of national governments, and is popular with the citizens whose needs it meets.

## NOTES ON FIGURES

### **Figure 2.1 Armed Conflict, Under-five Mortality Rates and GDP per Capita in Sub-Saharan Africa, 1970-2007**

The 'Period of Conflict' refers to medium-to high-intensity state-based armed conflict only.

The World Bank's World Development Indicators website <http://go.worldbank.org/B53SONGPA0> (Accessed 1 October 2009) does not contain data on GDP per capita in constant 2000 USD for Somalia.

Data sources: Center for the Study of Civil War, International Peace Research Institute (PRIO), Oslo; Uppsala Conflict Data Program (UCDP)/Human Security Report Project Dataset; World Bank, "World Development Indicators", <http://go.worldbank.org/B53SONGPA0> (Accessed 1 October 2009); Inter-Agency Child Mortality Estimation Group (IACMEG), "Child Mortality Estimates Info", <http://www.childmortality.org> (Accessed 23 September 2009).

### **Figure 2.2 Under-five Mortality Rates: Sub-Saharan Africa; Developing Countries; and Industrialized Countries**

Data Source: United Nations Children's Fund (UNICEF), <http://www.childinfo.org/mortality.html> (Accessed 16 November 2009).

### **Figure 2.3 Organized Violence and Immunization Coverage in the Democratic Republic of the Congo, 1990-2007**

The 'Period of Violence' refers to medium-to high-intensity state-based armed conflict, non-state armed conflict, and one-sided violence.

DTP3 immunization coverage is the percentage of one-year olds who have received three doses of the combined diphtheria, tetanus toxoid, and pertussis vaccination in a year.

MCV is measles-containing vaccine.

Data Sources: Center for the Study of Civil War, International Peace Research Institute (PRIO), Oslo; Uppsala Conflict Data Program (UCDP)/Human Security Report Project Dataset; World Health Organization (WHO) Statistical Information System, <http://apps.who.int/whosis/data/Search.jsp> (Accessed 7 October 2009).

### **Figure 2.4 Humanitarian Aid per Person Displaced, 1990-2006**

The data exclude United Nations Relief and Works Agency (UNRWA)-mandated refugees.

Data Sources: Data from various sources collated by Phil Orchard, 2007; Global Humanitarian Assistance, <http://www.globalhumanitarianassistance.org/data-space/excel-data/total-humanitarian-assistance-0> (Accessed 28 Sept 2009).

### **Figure 2.5 Average Number of Battle Deaths per Conflict, per Year, by Decade, 1950-2007**

The data include battle deaths from state-based armed conflict only.

Data sources: Center for the Study of Civil War, International Peace Research Institute (PRIO), Oslo; Uppsala Conflict Data Program (UCDP)/Human Security Report Project Dataset.

### **Figure 2.6 Battle Deaths per Year, per Million of World Population, 1950-2007**

The data include battle deaths from state-based armed conflict only.

Data sources: Center for the Study of Civil War, International Peace Research Institute (PRIO), Oslo; Uppsala Conflict Data Program (UCDP)/Human Security Report Project Dataset; UN World Population Prospects, 2008, <http://esa.un.org/unpp> (Accessed 20 October 09).

## ENDNOTES

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<sup>1</sup> Moreover, child mortality rates are often used as proxies for adult mortality rates, which are far less commonly measured. Indeed, in Africa, the UN Population Division and the WHO use child mortality rates in their estimating of adult mortality and life expectancy in the countries of the region. See Debbie Bradshaw and Ian M. Timaeus, "Levels and Trends of Adult Mortality," in *Disease and Mortality in Sub-Saharan Africa*, 2nd Edition, ed. Dean T. Jamison et al. (Washington, DC: World Bank, 2006), <http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=dmssa&part=A206> (Accessed 24 November, 2009). Child mortality rates are used in determining adult mortality rates because the latter are difficult to determine and relatively few attempts to estimate them are made in poor countries. Indeed, there is "substantial uncertainty about levels of adult mortality for about half the countries of the world." This includes most of sub-Saharan Africa. See Emmanuela Gakidou, Margaret Hogan, and Alan D. Lopez, "Adult Mortality: Time for a Reappraisal," *International Journal of Epidemiology* 33 (2004): 1-8, <http://www.ije.oxfordjournals.org/cgi/reprint/dyh099v1> (Accessed 24 November, 2009).

<sup>2</sup> DHS are sometimes criticized for underestimating child mortality rates—in part, it is claimed, because, unlike humanitarian nongovernmental organizations (NGOs) and agencies, they do not conduct surveys in areas affected by conflict. In fact, DHS do survey conflict-affected areas, but they do so retrospectively. Moreover, the child mortality trend data available online at <http://www.childmortality.org> do not indicate that DHS mortality estimates are consistently lower than those of UNICEF, or other survey data—or indeed census data where available.

<sup>3</sup> The IACMEG includes technical experts from the WHO, UNICEF, the UN Population Division, the World Bank, and independent experts. See WHO, "Measuring Child Mortality," November 2009, [http://www.who.int/child\\_adolescent\\_health/data/child/en/index.html](http://www.who.int/child_adolescent_health/data/child/en/index.html) (Accessed 24 November, 2009). The IACMEG is also known as the Inter-Agency Group for Child Mortality Estimation (IGME).

<sup>4</sup> The sample of sub-Saharan African countries includes all countries that experienced intermediate conflict or war since the 1970s. Angola, Guinea-Bissau, Mozambique and Zimbabwe gained independence after 1970, but were nevertheless included in the sample on the grounds that the process of state-formation did not result in territorial changes. This was however the case for Eritrea and Namibia, seceding from Ethiopia in 1993 and South Africa in 1988 respectively. Since available data cannot be used to determine each side's share of battle deaths in these conflicts, they were removed from Ethiopia's and South Africa's record. In turn, Eritrea and Namibia were excluded from the sample. (It is, however, interesting to note that the under-five mortality data for both countries indicate a downward trend during the war years). Periods of minor armed conflict—those in which there have been more than 25 in a given calendar year, but a cumulative battle death toll of fewer than 1,000 deaths—are not included in these graphs since their death tolls are unlikely to affect nationwide under-five mortality rates. Only conflicts in which at least 1,000 people have been killed in total and at least 25 have been killed in each subsequent year are included. Even in these cases, there may well be years where relatively few people have been killed. These estimates are for armed conflicts in which a state is one of the warring parties. Conflicts between nonstate armed groups and the deliberate killing of defenseless civilians are not included because there are no data on these forms of violence for the full period covered. However, since these forms of violence mostly kill fewer people than "state-based" violence, their exclusion is unlikely to affect the findings.

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<sup>5</sup>In some countries the survey data that go to make up the “best fit” trend line will cluster very close to the line; in others—Nigeria, for example—there may be quite large differences in the survey results. The IACMEG’s website, <http://www.childmortality.org>, reveals the degree of uncertainty associated with different estimates via a shaded band on either side of the “best fit” trend line.

<sup>6</sup>The Human Security Report Project (HSRP) initially used a dataset collated by Dr. Michel Garenne of the Institute for Research and Development and the Institut Pasteur in France that relied primarily on DHS “direct” survey data that many epidemiologists believe to be the most accurate. The “best fit” trend lines drawn from these data were less “smoothed” than the trend lines generated by the website, <http://www.childmortality.org>. But, here too in a large majority—some three-quarters—of war-affected countries, mortality rates were lower at the end of a conflict than at the beginning. Ultimately we chose to use the data from the IACMEG, in part because these represented a consensus judgment of experts in the various agencies and the research community who deal with child mortality, and in part because they were more up to date and included data on key countries that had not been surveyed by DHS.

<sup>7</sup>Siyan Chen, Norman V. Loayza, and Marta Reynal-Querol, “The Aftermath of Civil War,” *World Bank Economic Review* 22, no. 1 (2008): 63-85.

<sup>8</sup>Ibid., 73.

<sup>9</sup>Ruth Levine, *Case Studies in Global Health: Millions Saved* (Sudbury, MA: Jones and Bartlett, 2007), <http://www.jbpub.com/catalog/0763746207>, xxviii (Accessed 25 November, 2009).

<sup>10</sup>Chen, Loayza, and Reynal-Querol, “The Aftermath of Civil War,” 82.

<sup>11</sup>UNICEF, “Immunization Fact Sheet,” [http://www.unicef.org/media/media\\_46851.html](http://www.unicef.org/media/media_46851.html) (Accessed 25 November, 2009).

<sup>12</sup>Ibid.

<sup>13</sup>Kenneth Hill, “Adult Mortality in the Developing World; What We Know and How We Know It” (paper presented at the UN Population Division Training Workshop on HIV/AIDS and Adult Mortality in Developing Countries, New York City, 8-13 September 2003), 13, [http://www.un.org/esa/population/publications/adultmort/HILL\\_Paper1.pdf](http://www.un.org/esa/population/publications/adultmort/HILL_Paper1.pdf), 13 (Accessed 9 December 2009).

<sup>14</sup>UNICEF, “Nutrition Indicators: Exclusive Breastfeeding,” *Progress for Children* May 2006, [http://www.unicef.org/progressforchildren/2006n4/index\\_breastfeeding.html](http://www.unicef.org/progressforchildren/2006n4/index_breastfeeding.html) (Accessed 25 November 2009).

<sup>15</sup>UNICEF, “Infant and Young Child Feeding,” *Nutrition*, [http://www.unicef.org/nutrition/index\\_breastfeeding.html](http://www.unicef.org/nutrition/index_breastfeeding.html) (Accessed 25 November, 2009). See also, Stanley Ip et al., “Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries,” *Evidence Report/Technology Assessment*, no. 153 (April 2007), <http://www.ahrq.gov/downloads/pub/evidence/pdf/brfout/brfout.pdf> (Accessed 25 November 2009).

<sup>16</sup>WHO: Western Pacific Region, “Key Strategies for Promotion of Breastfeeding,” <http://www.unicef.org/eapro/factsheet.pdf> (Accessed 25 November 2009).

<sup>17</sup>See WHO Statistical Information System, <http://apps.who.int/whosis/data/Search.jsp> (Accessed 25 November 2009).

<sup>18</sup>WHO, “Health as a Bridge for Peace—Humanitarian Cease-Fires, Project (HCFP),” May 2001 [http://www.who.int/hac/techguidance/hbp/cease\\_fires/en/index.html](http://www.who.int/hac/techguidance/hbp/cease_fires/en/index.html) (Accessed 25 November 2009).

<sup>19</sup>The campaign also offered health assistance to women of child-bearing age, including “breastfeeding promotion; and tetanus toxoid vaccination of girls and women aged 15–49.” See UNICEF, “Largest Ever, Life Saving Campaign to Reach 1.5 Million Somali Children,” press release, 29 December 2008, [http://www.unicef.org/infobycountry/media\\_46968.html](http://www.unicef.org/infobycountry/media_46968.html) (Accessed 25 November 2009).

<sup>20</sup>The latest update of the childmortality.org website now shows the “best fit” line running parallel for the entire period, essentially ignoring the survey data that show a clear decline. Previously, using the

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same data, the “best fit” line showed a decline. The straight line is not in fact a “best fit” line. Rather, it represents an unexplained lack of agreement among experts about what conclusions to draw from the data. The data from the individual surveys for Somalia continue to show a decline, however, and there would have to be massive error in the existing survey data for *some* decline not to have taken place.

<sup>21</sup> Peter Salama et al., “Lessons Learned from Complex Emergencies Over Past Decade,” *The Lancet* 364, no. 9447 (13 November 2004): 1801-1813, [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(04\)17405-9/fulltext#article\\_upsell](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(04)17405-9/fulltext#article_upsell) (Accessed 25 November 2009).

<sup>22</sup> Charles B. Keely, Holly E. Reed, and Ronald J. Waldman point out that while there is considerable variation, usually caused by political factors, “the general pattern is one of elevated mortality, followed by rapid declines with the arrival of assistance and a modicum of stable and safe living conditions.” See Keely, Reed, and Waldman, “Understanding Mortality Patterns in Complex Humanitarian Emergencies,” in *Forced Migration and Mortality*, ed. Holly E. Reed and Charles B. Keely (Washington, DC: National Academies Press, 2001), 12, [http://books.nap.edu/openbook.php?record\\_id=10086&page=12](http://books.nap.edu/openbook.php?record_id=10086&page=12) (Accessed 25 November 2009).

<sup>23</sup> Dominique Legros, Christophe Paquet, and Pierre Nabeth, “The Evolution of Mortality Among Rwandan Refugees in Zaire Between 1994 and 1997,” in *Forced Migration and Mortality*, ed. Holly E. Reed and Charles B. Keely (Washington, DC: National Academies Press 2001), 61, [http://books.nap.edu/openbook.php?record\\_id=10086&page=61](http://books.nap.edu/openbook.php?record_id=10086&page=61) (Accessed 25 November 2009).

<sup>24</sup> In Rwanda 500,000 to 800,000 people were killed in a matter of months with the most basic weapons.

<sup>25</sup> Personal communication from Clionadh Raleigh of ACLED to HSRP director, Andrew Mack.

<sup>26</sup> The lower estimate is from the PRIO dataset and is just under half the estimate derived from the International Rescue Committee’s (IRC’s) figures.

<sup>27</sup> Bethany Lacina, Nils Petter Gleditsch, and Bruce Russett, “The Declining Risk of Death in Battle,” *International Studies Quarterly* 50 (2006) 50: 675.

<sup>28</sup> [www.theirc.org/resource-file/irc-congo-mortality-survey-2007](http://www.theirc.org/resource-file/irc-congo-mortality-survey-2007) (Accessed 25 November 2009). The IRC’s data indicate that, on average, well under 10 percent of the deaths were due to violence.

<sup>29</sup> Hazem Adam Ghobarah, Paul Huth, and Bruce Russett, “Civil Wars Kill and Maim People—Long after the Shooting Stops,” *American Political Science Review* 97, no. 2 (2003):189-202.

<sup>30</sup> Hazem Adam Ghobarah, Paul Huth, and Bruce Russett, “The Post-War Public Health Effects of Civil Conflict,” *Social Science & Medicine* 59 (2004): 881. The authors also calculated the impact of civil wars on neighbouring countries—estimating that these added another 3 million healthy years of life lost worldwide in 1999.

<sup>31</sup> See Quan Li and Wen Ming, “Immediate and Lingering Effects of Armed Conflict on Adult Mortality: A Time Series Cross-National Analysis,” *Journal of Peace Research* 42, no. 4 (2005): 487. See also, Zaryab Iqbal, “Health and Human Security: The Public Health Impact of Violent Conflict,” *International Studies Quarterly* 50, no. 3 (2006): 631-649.

<sup>32</sup> Mathew Hoddie and Jason Mathew Smith, “Forms of Civil War Violence and Their Consequences for Future Public Health,” *International Studies Quarterly* 53, no. 1 (March 2009): 175-202.

<sup>33</sup> Ibid, p. 185. The authors, however, also show that the distinction between warfare and the more exceptional genocidal events is important when studying the health consequences of organized violence—a finding mirrored in the under-five mortality data in sub-Saharan Africa reviewed elsewhere in this section.

<sup>34</sup> UNICEF, “The 1980s: Campaign for Child Survival,” in *The State of the World’s Children 1996—Children in War*, 1995, <http://www.unicef.org/sowc96/1980s.htm> (Accessed 1 December 2009).

<sup>35</sup> Ibid.

<sup>36</sup> UNICEF, *The State of the World’s Children 2008: Women and Children—Child Survival*, 2007, <http://www.unicef.org/sowc08/docs/sowc08.pdf> (Accessed 1 December 2009).

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<sup>37</sup> See David Oot, "Coalition Launches the Second Child Survival Revolution," *International Health* (Spring 2005), <http://www.apha.org/membergroups/newsletters/sectionnewsletters/interna/spring05/1670.htm> (Accessed 21 December 2009); and Kofi A. Annan, *We the Children: Meeting the Promises of the World Summit for Children*, 2001, [http://www.unicef.org/specialsession/about/sgreport-pdf/sgreport\\_adapted\\_eng.pdf](http://www.unicef.org/specialsession/about/sgreport-pdf/sgreport_adapted_eng.pdf), (Accessed 9 December 2009).

<sup>38</sup> UNICEF India, "Global Data Sheet: SOWC—Key Statistics," 2008, [http://www.unicef.org/india/media\\_3896.htm](http://www.unicef.org/india/media_3896.htm) (Accessed 1 December 2009).

<sup>39</sup> UNICEF, *The State of the World's Children 2008*, (Accessed 12 January 2009).

<sup>40</sup> Robert E. Black, Saul S. Morris, and Jennifer Bryce, "Where and Why Are 10 Million Children Dying Every Year?" *Lancet* 361, no. 9376 (28 June 2003): 2226.

<sup>41</sup> Gareth Jones et al., "How Many Child Deaths Can We Prevent this Year?" *Lancet* 362, no. 9377 (5 July 2003): 65.

## CHAPTER 3

### The Death Toll in the Democratic Republic of the Congo

Claims that national mortality rates decline during periods of warfare are not only deeply counterintuitive but they also stand in sharp contrast to the findings of the largest, most widely cited, and most influential research project ever undertaken on the human costs of war.

In 2008, after carrying out five retrospective mortality surveys in the Democratic Republic of the Congo (DRC), researchers at the International Rescue Committee (IRC) concluded that some 5.4 million people died between 1998 and 2007 who would not have died had there been no war.<sup>1</sup> The IRC estimated that more than 90 percent of the victims perished from war-exacerbated disease, malnutrition, or other nonviolent causes, rather than violence. Indeed, by 2007, less than 1 percent of war-related fatalities were due to violence.

This huge death toll arises, according to the IRC, because the mortality rate in the DRC increased dramatically after the war started in 1998. They note that it dropped in 2001, but has remained significantly higher than the IRC's assumed pre-war—"baseline"—mortality rate of 1.5 deaths per 1,000 per month ever since.

But, while no one doubts that the death rate in the DRC is tragically high, critical analysis of the IRC's data and methodology presented in this chapter suggests that a number of the key assumptions made by the organization's researchers are highly questionable and that the claim that 5.4 million Congolese have died because of the war cannot be sustained.

The IRC is a New York-based humanitarian organization with operations in many parts of the developing world and a long history of engagement in the DRC. In its three nationwide surveys carried out in 2002, 2004, and 2007, IRC researchers used standard survey methodology, selected large samples, and reported appropriate confidence intervals for their mortality estimates. The US Center for Disease Control and, subsequently, the Burnet Institute at the University of Melbourne, Australia, were consulted on the methodology used to undertake the surveys.

The surveys in 2000 and 2001, were compromised by questionable methodological assumptions, however. And, while they clearly reveal very high levels of mortality in parts of the eastern region of the DRC, we argue that the excess death estimates they produced should be rejected.

The IRC's findings on mortality in the DRC have become widely known and accepted and have attracted none of the public controversy that has surrounded war death estimates for Iraq and Darfur. They have been published in the influential UK journal, *The Lancet*, and have been cited in enumerable other peer-reviewed journals, as well as by governments, international agencies, the media, and many nongovernmental organizations (NGOs).<sup>2</sup>

The IRC's reputation, and the effective publicity that has attended the launches of its reports on the DRC, have ensured that its findings have gained widespread media attention for a humanitarian crisis that had long been neglected. Its research has also helped increase public understanding of the indirect impact of wartime violence on population health.

Moreover, there is no doubt the IRC's tireless and effective advocacy has helped focus the attention of the US government and other major donors, as well as the United Nation's (UN's) Security Council on the violence in the DRC. "Following the release of the 2000 survey results, total humanitarian aid

increased by over 500% between 2000 and 2001. The United States' contribution alone increased by a factor of almost 26.”<sup>3</sup>

The number of peacekeepers in the country has also increased substantially. Indeed, with a force of 20,255 uniformed personnel on the ground, the DRC is now host to the UN’s biggest peacekeeping force.<sup>4</sup>

The IRC’s research-informed advocacy has, in other words, had a considerable impact not only in the global media but also on donors and international agencies.

## Two Challenges to the International Rescue Committee’s Findings

Although the extraordinary figure of 5.4 million excess deaths has attracted little public controversy, two recent reports in the public domain, both released in French, have produced mortality estimates that are sharply at odds with those of the IRC. Neither has received much media attention in the English-speaking world.

In October 2008 two Belgian demographers, André Lambert and Louis Lohlé-Tart, published a critique of the IRC’s findings that drew on demographic data collected between July 2005 and February 2006 for the voter registration process in the DRC, together with data from the national census in 1984 and a demographic survey taken in 1956.<sup>5</sup> (Both authors had been invited by the European Commission to assess the voter registration process in 2005 and 2006.) Their estimate of the excess death toll between 1998 and 2004 was some 200,000—*just one-twentieth of the IRC’s 3.9 million excess death estimate for the same period.*<sup>6</sup>

Both the Belgian study and the IRC assume very high mortality levels in the DRC from 1998 to 2004, but the critical difference is that the IRC assumes a dramatic jump in the mortality rate after the war starts. Indeed, it is this sudden increase from a very low—we believe too low—baseline mortality rate that creates the IRC’s huge cumulative excess death toll. By contrast, the Belgian study assumes that mortality rates are uniformly high *before*, as well as during and after, the war.

The Belgian study has in turn been criticized by other demographers both on methodological grounds, and because there was insufficient information provided in the paper to permit independent replication of its findings. The publication of the paper triggered a review of its methodology and that of the IRC by the World Health Organization (WHO)-affiliated, Health and Nutrition Tracking Service (HNTS).<sup>7</sup> The HNTS reviewers were critical of some of the methodological assumptions and the lack of information provided in the Belgian study, but they also criticized the IRC’s methodology.<sup>8</sup>

The second challenge to the IRC’s estimates comes from a survey undertaken in the DRC in 2007 by the authoritative Demographic and Health Survey (DHS).<sup>9</sup> The DHS data indicate that the DRC’s under-five mortality rate—the most sensitive indicator of the indirect costs of war—is dramatically lower than that reported by the IRC for the same period. Since the IRC found that children made up 47 percent of all excess deaths in the DRC during the final survey period, the child mortality rate is clearly an important indicator of overall mortality.

For the 2006-2007 period, the IRC’s survey data indicates that the nationwide child mortality rate is 5.00 under-five deaths per 1,000 per month. The DHS estimate for this period is 148 deaths per 1,000 live births over a five-year span.<sup>10</sup> This translates into 2.63 deaths per 1,000 children per month—a *little over half the IRC’s estimate.*<sup>11</sup> Both estimates cannot be correct.

The DHS data show the under-five mortality rate (calculated by the direct estimation method) declining from the end of 1994 to the end of 2004, with the decline continuing through all periods of warfare covered by their survey data.<sup>12</sup> By contrast, the IRC’s data indicate that the overall mortality rate

*increased* dramatically after the war started in 1998, decreased substantially as of late 2001, and subsequently decreased more gradually.

However, as with the earlier discussion of the Belgian study, our point here is not to determine which of the estimates is correct. It is simply to note that the IRC's fatality estimates, while not publicly controversial, have not only been challenged but are *much* higher than those of other studies.

## **Questioning the International Rescue Committee's Methodology**

The analysis that follows reviews the methodology used in all five of the IRC's surveys. It argues that key assumptions used by the researchers to estimate excess death tolls are incorrect, and that these errors had the effect of unwarrantably increasing the excess death toll estimates.

The first and second surveys only covered the war-affected eastern part of the DRC—the three subsequent surveys were nationwide.

The first survey was conducted in 2000, and covered a 22-month period from the beginning of the most intense period of fighting in August 1998.<sup>13</sup> It found that some 1.7 million people had died in the eastern part of the country who would not have died had there been no war. However, as we explain below, the methodology used to make this estimate is highly problematic because the areas to be surveyed were not chosen appropriately.

The second survey was carried out in March and April 2001. It had a recall period of some 15 months from January 2000 to March 2001. Its findings—along with interpolated excess death estimates from the nonsurveyed period covering April 2000 to December 2000—boosted the cumulative excess death toll estimate for the two survey periods to 2.5 million, of which 350,000 were violent deaths. As with the first survey, its findings were compromised because of the way the areas to be surveyed were chosen.

The primary problem with the three nationwide surveys that were conducted in 2002, 2004, and 2007 was the IRC's reliance on a baseline mortality rate that was too low.

In reaching its cumulative nationwide excess death estimate of 5.4 million for the period covered by all five surveys, the IRC added the excess death tolls from the first two surveys to those of the subsequent three surveys.

Readers may wonder how the IRC could calculate *nationwide* excess war deaths from 1998 to 2001, given that the two surveys taken in this period only provided fatality data for the war-affected eastern part of the country. The short answer is the IRC assumed that the violence was concentrated in the east and that there were *no* excess war deaths in the west of the country over this period. From this it follows that the excess war death toll for the east of the country in this period will also be the nationwide excess death toll.

In the analysis that follows, we do not rely on demographic data as did the Belgian study, nor do we draw on other surveys—except to note some of the findings from the 2007 DHS data. The focus here is rather on the IRC's own estimates, and the methodology and assumptions that underpin them.

## **In All of the Surveys the Baseline Mortality Rate is Too Low**

In determining the excess death toll, the “baseline” mortality rate is critically important. If it is too low, the excess death toll will be too high.

The IRC uses the sub-Saharan average of 1.5 deaths per 1,000 per month as its baseline mortality rate for all but the very last survey when the sub-Saharan average drops to 1.4.<sup>14</sup> Using the sub-Saharan African average mortality rate as a comparator—to indicate how high death rates were in the east of the

DRC compared to the rest of sub-Saharan Africa, for example—would have been both instructive and appropriate. Using it as a measure of the pre-war mortality rate in the DRC itself makes little sense.

The IRC argues the sub-Saharan average mortality rate is a conservative choice for pre-war DRC because it was the highest estimate available.<sup>15</sup> But, the DRC is in no sense an average sub-Saharan African country—indeed, it is ranked at, or near, the bottom of every sub-Saharan African development indicator. The baseline mortality rate for the country as a whole should therefore be considerably higher than the sub-Saharan African average. The survey evidence from the western part of the country suggests that this is indeed the case.

In 2002 the IRC recorded no violent deaths in the western region—which it refers to as the “nonconflict” zone. Yet, the mortality rate in this zone is 2.0 deaths per 1,000 of the population per month—a third higher than the sub-Saharan African average that the IRC uses as its pre-war baseline mortality rate.

The fighting in the DRC was also heavily concentrated in the eastern provinces during the period covered by the first two surveys. This suggests that in this period too there was no significant violent death toll in the western part of the country. Indeed, this is precisely the assumption the IRC makes in arriving at its 5.4 million excess death toll estimate for the DRC for the period 1998 to 2007.

As we show later, using this 2.0 deaths per 1,000 rate as the baseline mortality figure, rather than the sub-Saharan African average of 1.5 deaths, sharply reduces the estimated excess death toll attributable to the war throughout the entire period, with the decreases being greatest for the three most recent surveys.

## **The 2000 Survey: Survey Locations Inappropriately Selected**

The most serious problem with the IRC’s first survey is that the survey locations were inappropriately selected for the purpose of estimating excess mortality in the war-affected eastern region of the country. (This was also the case with the second survey.) In addition, too few areas were surveyed to allow much confidence in the results even if the locations had been selected appropriately.

The IRC’s May 2000 report on the first survey notes: “While the 1.2 million people within the sampling universe of the five IRC studies *are not representative of the approximately 20 million people in eastern DRC*, these surveys probably represent the best broad-based data available.”<sup>16</sup>

While the latter part of the above statement is very likely true, the fact remains that extrapolating from a small convenience sample of five nonrandomly selected populations to the region’s entire population is a serious violation of basic statistical principles. Furthermore, there are no indications of any attempt to implement alternative selection criteria for the survey sites that would have ensured that, even if not randomly chosen, they were nevertheless representative of the population of the eastern DRC.

It is theoretically possible that the nonrandomly chosen survey areas could by chance have been representative of the population as a whole, but the IRC’s selection procedure minimized this possibility.

Three of the five areas the IRC selected were those in which it was operating—or intended to operate—humanitarian assistance missions. Since there would be little point in setting up humanitarian operations in areas where the war had had little or no impact, the IRC’s selection of Kisangani, Kabare, and Katana as areas to be surveyed meant that parts of the eastern DRC that had low mortality rates had little chance of being chosen. Had the selection of locations been random, low-mortality areas could well have been selected, in which case the surveys would have revealed a lower excess death toll.

It is not clear what criteria were used to select the other two areas surveyed. But, whatever the reason for the choice, both areas had extremely high mortality rates.

The information obtained from the raw survey data may well have been useful for humanitarian purposes, and it certainly indicated that parts of the eastern region of the DRC were suffering dramatically high levels of mortality, but the statistically inappropriate selection of the survey areas means that the findings should never have been used to generate excess death estimates for the eastern region as a whole.

## The 2000 Survey: Estimation Methods Challenged

Even if the inappropriate selection procedure is ignored, the IRC's methodology remains highly problematic. In the first survey, the IRC's researchers used three separate estimation methods to determine the excess death toll. Each of these methods is different, but all three produce similarly large death tolls—ranging from 1.6 to 1.8 million. The IRC takes the fact that very different estimation methods all produce comparably high death tolls as evidence for the robustness of their findings. It turns out, however, that each of the estimation methods is based on questionable methods and/or assumptions.

The first estimation method takes the arithmetic mean of the mortality rates of the five individual areas surveyed and assumes that this figure is the average mortality rate for the entire population of the conflict-afflicted eastern region of the country.

The average regional mortality rate thus estimated is 5.2 deaths per 1,000 population per month. The IRC's baseline mortality rate of 1.5 per 1,000 per month is then subtracted from this figure to arrive at the excess mortality rate of 3.7 deaths per 1,000 per month for the five areas surveyed. This rate, in turn, is applied to the estimated population of some 20 million in the eastern region of the DRC for the period covered by the surveys—22 months. This estimation method yields an excess death toll of some 1.6 million.

The problem with this approach is that it biases the total estimate upwards by giving too much weight to high death rates in survey areas with small populations. Because the population sizes, as well as the death rates, of the surveyed areas are very different, the appropriate procedure would have been to take a *population-weighted* average of the mortality estimates.

This is easy to calculate and the weighted average turns out to be 3.55 deaths per 1,000 per month, not the 5.2 rate produced by the IRC's calculations. If the weighted average mortality rate is used to determine the excess death toll, the excess death rate shrinks from 3.7 to 2.05 and *the IRC's estimate of 1.6 million excess deaths is almost halved—to 897,500*.

But, this revised estimate uses the baseline mortality figure that we have argued is too low. Recalculating the excess death toll using the corrected CMR estimate of 3.55 deaths per 1,000 per month for the five areas surveyed, *and* the more appropriate baseline mortality rate of 2.0 deaths per 1,000 per month, reduces the total excess mortality toll by some 60 percent—down from the IRC's original figure of 1.6 million to 678,600.

The second and third estimation methods that the IRC uses to calculate excess deaths for the survey in 2000 are also problematic. In the survey carried out in Moba in Katanga province, the average mortality rate was 11.4 per 1,000 per month—the highest recorded in *any* of the IRC's DRC surveys from the earliest to the most recent. In its second and third estimation methods, the IRC extrapolates the Moba death rate to the entire population of Katanga.<sup>17</sup>

What is happening here is that a single survey area with an extremely high death toll and a relatively small population is being treated as typical of an entire province. Since Moba's death rate is so high, and since Katanga province has the largest population of those in which the five surveys were carried out, the impact of this single survey location on the excess death rate for the entire region is very large.

In the second estimation method, Katanga accounts for 1.4 of the estimated 1.8 million deaths (or 77 percent) for the region as a whole; in the third “conservative” estimate, it accounts for 0.9 out of 1.7 million deaths (or 54 percent). In other words, the death toll from the single Moba survey—which we have no compelling reason to assume is representative of Katanga as a whole—is driving most of the death toll estimate for the entire eastern region.

The IRC provides no argument to support its assumption that it is appropriate to extrapolate the Moba mortality rate to Katanga as a whole. In fact, it is highly improbable that the Moba rate—or indeed any other rate from a single survey in Katanga—would be equal to the Katangan provincial average. This is because, as subsequent surveys have demonstrated, there is a high degree of intraprovincial variation in death rates throughout the whole of the country, including the eastern provinces.

There are, in other words, no good reasons to accept the excess mortality estimates that derive from the IRC’s second and third estimation methods. But, the biases generated by the IRC’s procedures are then compounded by the decision to sum the provincial totals in order to provide an excess death estimate for the eastern region as a whole. The more statistically appropriate way to provide a region-wide estimate would have been to use all five surveys together—as was done (though without the appropriate population-weighting) in the first estimation method.

To reiterate, the methodological problems with the IRC’s first survey are that:

- The five areas surveyed were not chosen randomly and were, at any rate, too few to obtain reliable projections.
- The excess mortality estimation methods used either:
  - i) failed to weight the mortality rates from the five surveyed areas by population (in the first estimation method); or
  - ii) inappropriately generalized from a single survey to a province, and then—equally inappropriately—summed the excess death tolls calculated for each province to arrive at a regional total for the eastern part of the country (in the second and third estimation methods).

All three estimation approaches applied an inappropriately low baseline mortality rate. However, the error generated by the use of the inappropriately low baseline has a much greater impact on mortality estimates in the final three surveys than in the first two.

### **The 2001 Survey: Survey Locations Inappropriately Selected**

The second survey, whose results were published in 2001, surveyed five additional areas, but again without random sampling and using the same inappropriately low baseline mortality estimate. However, the significant bias generated by the excessive reliance on the death toll in Moba in the first survey was not an issue in the second survey. In the 2001 report, the IRC used the results of all five surveys taken in 2000, *plus* the five taken in 2001, as well as a single survey taken in 1999, when estimating cumulative the death toll.<sup>18</sup>

Because of the inappropriate selection of the areas to be surveyed, we believe that the IRC’s excess death toll estimates for the eastern region of the DRC derived from the second survey should also be rejected.

### **The 2002, 2004 and 2007 Surveys: Impact of the Inappropriate Baseline Mortality Rate**

This section demonstrates how the IRC’s inappropriately low baseline mortality rate generates unwarrantably high excess death estimates.

The methodology the IRC relied on in the three nationwide surveys (i.e., the 2002, 2004, and 2007 surveys) does not suffer from the same flaws as the first two. The areas to be surveyed were selected appropriately, and the mortality rate for the country as a whole is based on a large number of surveyed areas, which increases confidence in the accuracy of the estimates. The mortality estimates are, however, subject to a number of sources of uncertainty.<sup>19</sup> These include:

- Very wide confidence intervals for some mortality estimates, particularly in the case of the first of the three nationwide surveys that was carried out in 2002.
- Uncertainties arising from design effects—especially with the survey in 2002. In 2002 the design effect was huge, which increased the magnitude of the standard errors, in turn increasing the range of uncertainty of the excess death toll estimates.
- Lack of reliable data on population size and growth rates—which can impact excess mortality estimates.
- Absence of survey-based mortality data for the between-survey periods in 2001 and 2004 to 2005.

### An Alternative Estimate of Excess Mortality

The IRC's best estimate of the excess death toll calculated from the three surveys carried out in this period is 2.83 million. However, this does *not* mean that the IRC believes that figure is necessarily the correct one. In fact, the very wide confidence intervals associated with the 2.83 million fatality estimate indicate that the IRC's researchers are 95 percent confident that the cumulative death toll for the most recent three surveys lies somewhere between 1.34 and 4.54 million. The 2.83 million figure is simply the one that has the highest probability of being correct.<sup>20</sup>

**Table 2.1 Excess Deaths in the Democratic Republic of the Congo, 2001-2007: International Rescue Committee and Human Security Report Project Estimates**

Period	IRC (best)	HSRP (best)	IRC (low)	HSRP (low)	IRC (high)	HSRP (high)
May 2001-December 2001	418,400	209,200	180,800	29,800	654,500	402,300
January 2002-December 2002	343,200	257,400	120,100	34,300	583,400	497,600
January 2003-April 2004	607,000	101,200	101,200	-404,700	1,112,900	607,000
May 2004-December 2005	735,000	136,600	419,300	-179,700	1,138,100	539,100
January 2006-April 2007	727,000	158,600	522,000	-31,800	1,050,000	371,300
May 2001-April 2007	2,830,600	863,000	1,343,400	-552,100	4,538,900	2,417,300

Data Sources: IRC and Human Security Report Project.

The International Rescue Committee's (IRC) 'best estimate' of excess deaths in the Democratic Republic of the Congo for the period May 2001 to April 2007 is 2.83 million. Using the IRC's survey data, but a more realistic baseline mortality rate, the Human Security Report Project's 'best estimate' of the excess death toll for this period is 0.86 million. In both cases the margin of probable error is large, as indicated by the wide confidence intervals.

But, the high level of uncertainty surrounding the 2.83 million death toll estimate is not our reason for rejecting it. The problem lies with the baseline mortality rate.

We have argued that the IRC's estimated baseline mortality rate of 1.5 deaths per 1,000 per month is too low and that the 2.0 mortality rate recorded in the western part of the country for 2002 is more appropriate. WHO epidemiologist, Francesco Checchi, makes essentially the same case in his review of the IRC's DRC research for the HNTS.<sup>21</sup>

When the IRC's excess death figures for the period of May 2001 to April 2007 are recalculated using the revised baseline rate, there is a massive reduction in the excess death toll. *The best estimate of the excess death toll shrinks to less than one-third of the IRC's original figure—from 2.83 million to 0.86 million.*<sup>22</sup>

## Conclusion

In this analysis, we argued the IRC's inappropriate selection procedures for the areas surveyed in 2000 and 2001 mean that for this period the organization's excess death estimates are statistically invalid. The survey data leave no doubt that mortality levels in much of the eastern part of the DRC are very high. But, because the IRC failed to choose the areas it surveyed in a way that ensured they were representative of the population of the eastern region as a whole, they should not have been used to generate excess death estimates. In addition, we noted that even if this problem were ignored, other methodological errors had the effect of increasing the excess death tolls significantly and unwarrantedly. For these reasons, we argued that the findings of both the 2000 and 2001 surveys should be rejected.

We also demonstrated how, for the May 2001 to April 2007 period, the inappropriately low baseline mortality rate used by the IRC grossly inflated the excess death toll. Using a more appropriate baseline derived from the IRC's own data, the "best estimate" of the excess death toll for this period declines from the IRC's 2.83 million figure to just over 0.86 million.

Our revision of the IRC's estimates reduces the excess death toll dramatically, but the revised data still show a large number of excess deaths (direct as well as indirect), which, given the deadliness of the conflict measured in terms of battle deaths, is not surprising. The accuracy of our revised estimate, which still relies on the IRC's survey data for overall mortality rates, is however, impossible to determine.

The primary reason for concern here is that the IRC's estimate of the under-five mortality rate is *twice* that of the 2007 DHS for the same periods. Both estimates, as we noted earlier, cannot be correct.

In the next chapter, we discuss a major, but largely ignored, source of potential error that arises when retrospective mortality surveys are used to estimate excess death tolls. We demonstrate this source of error is rarely possible to correct, and argue that the goal of accurately estimating excess death tolls using surveys is effectively unachievable, except in very short wars.

## WHY THE NUMBERS MATTER

Since no one doubts that mortality levels in the Democratic Republic of the Congo are tragically high, does getting it wrong about excess death toll estimates really matter? The country remains trapped in a major humanitarian crisis, and preventing further deaths and alleviating suffering remains a critically important task whatever the excess death toll.

And even if the International Rescue Committee's (IRC) estimates are too high, they have drawn world attention to the previously ignored plight of the Congolese and have helped successfully pressure the international community into providing more humanitarian assistance and increasing the number of peacekeeping forces. This has made a real difference to the lives of millions.

All of this is true. But, getting it wrong about excess mortality tolls, nevertheless, matters a great deal.

Take the case of Darfur. In the fall of 2006, the high-profile Save Darfur Coalition, a US-based advocacy group, claimed that since the fighting in Darfur had started some three years earlier, "400,000 innocent men, women and children have been killed."<sup>23</sup>

This figure was at least double that of most expert estimates at the time and the reference to innocents being "killed" was wholly misleading. The overwhelming majority of deaths in Darfur in this period were *not* the result of a government-instigated "slaughter"—as Save Darfur had claimed—but of disease and malnutrition, which were already major killers before the war. Determining what percentage of these deaths could be attributed to the impact of wartime violence rather than pre-existing conditions of abject poverty and malnutrition is extraordinarily difficult, if not impossible.

Getting mortality estimates wrong can have real-world consequences and the Save Darfur campaign's claims have been sharply criticized by humanitarian groups and area specialists. As one critic noted, "Exaggerated death tolls . . . make it difficult for relief organizations to deliver their services. Khartoum considers the inflated numbers to be evidence that all groups that deliver aid to Darfur are actually adjuncts of the activist groups that the regime considers its enemies, and thus finds justification for delaying visas, refusing to allow shipments of supplies and otherwise putting obstacles in the way of aid delivery."<sup>24</sup>

Humanitarian agencies and nongovernmental organizations (NGOs), as well as human rights advocacy groups, actively publicize the plight of the war-affected populations they seek to assist—and often use excess mortality tolls to make a case for more aid. There are compelling reasons for doing this, as the IRC's Rick Brennan and Anna Husarska pointed out in an article in the *Washington Post* on July 16, 2006, "When there is media coverage, aid increases. Large donors may be more inclined to press for a greater presence of international peacekeeping forces to protect civilians and humanitarian assistance teams. And the presence of peacekeepers makes it easier for the media to report."

If these factors come together, they accomplish the goal of every humanitarian response: saving lives.<sup>25</sup>

Saving lives is, of course, the raison d'être of humanitarian organizations.

However, a potential conflict of interest arises here because the institutional survival of humanitarian NGOs is dependent on donor funding. But, the level of funding they receive is directly related to assessments of humanitarian need—assessments that they themselves are usually responsible for generating.

Some critics believe that individual NGOs deliberately exaggerate death tolls in order to secure more funding, while others argue that lack of experience in survey design and implementation is the problem.<sup>26</sup>

There is also disagreement within the expert community about *how* to estimate excess war deaths. In Iraq, for example, a series of nationwide mortality surveys—two undertaken for United Nations agencies and two by independent researchers (whose findings were published in the prestigious UK medical journal, *The Lancet*)—have produced sharply divergent excess death estimates over the same time periods. There is no consensus as to the causes of the differences.<sup>27</sup>

The challenges to the IRC's findings noted in this report and others will almost certainly generate more controversy about the value of using retrospective mortality surveys to measure excess deaths.<sup>28</sup>

This is cause for concern because, whatever the reason for the controversies, the effect has been the same—mutual suspicion between donors, NGOs, and humanitarian agencies, and an increased risk that survey methods as a whole—which remain critically important in this field—will be discredited.

## NOTES ON FIGURES

**Table 2.1 Excess Deaths in the Democratic Republic of the Congo, 2001-2007: International Rescue Committee and Human Security Report Project Estimates**

The figures in the table have been rounded to the nearest hundred.

Sources: Benjamin Coghlan et al., "Mortality in the Democratic Republic of Congo: Results from a Nationwide Survey" (New York: International Rescue Committee/Melbourne: Burnet Institute, 2004); Benjamin Coghlan et al., "Mortality in the Democratic Republic of Congo: A Nationwide Survey". *The Lancet* 367, no. 9504 (13 January 2006): 44-51; Benjamin Coghlan et al., "Mortality in the Democratic Republic of Congo: An Ongoing Crisis" (New York: International Rescue Committee, 2008), [http://www.theirc.org/sites/default/files/migrated/resources/2007/2006-7\\_congomortalitysurvey.pdf](http://www.theirc.org/sites/default/files/migrated/resources/2007/2006-7_congomortalitysurvey.pdf) (Accessed 14 January 2010); Les Roberts, "Mortality in Eastern DRC: Results from Five Mortality Surveys" (New York: International Rescue Committee, May 2000); Les Roberts et al., "Mortality in Eastern Democratic Republic of Congo: Results from Eleven Mortality Surveys" (New York: International Rescue Committee, 2001); Les Roberts et al., "Mortality in the Democratic Republic of Congo: Results from a Nationwide Survey" (New York: International Rescue Committee, 2003).

## ENDNOTES

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<sup>1</sup> See Benjamin Coghlan et al., *Mortality in the Democratic Republic of Congo: An Ongoing Crisis* (New York: IRC, 2007), [http://www.theirc.org/resources/2007/2006-7\\_congomortalitysurvey.pdf](http://www.theirc.org/resources/2007/2006-7_congomortalitysurvey.pdf). (Accessed 20 December 2009). A single survey was also carried out by the IRC in the eastern Congo in 1998-1999.

<sup>2</sup> Benjamin Coghlan et al., "Mortality in the Democratic Republic of Congo: A Nationwide Survey," *The Lancet* 367, no. 9504 (13 January 2006): 44-51.

<sup>3</sup> Richard Brennann et al., "Mortality surveys in the Democratic Republic of Congo: humanitarian impact and lessons learned," *Humanitarian Exchange Magazine* 35, November 2006, <http://www.odihpn.org/report.asp?id=2838> (Accessed 10 January 2010).

<sup>4</sup> UN, "Democratic Republic of the Congo—MONUC—Facts and Figures," MONUC Fact Sheet,, <http://www.un.org/Depts/dpko/missions/monuc/facts.html> (Accessed 6 January 2010). Figure on total uniformed personnel as at 30 November 2009.

<sup>5</sup> André Lambert and Louis Lohlé-Tart, "La Surmortalité au Congo (RDC) Durant les Troubles de 1998-2004: Une Estimation des Décès en Surnombre, Scientifiquement Fondée à Partir des Méthodes de la Démographie," ADRASS, October 2008, <http://www.obsac.com/E20090105172451/index.html> (Accessed 22 December 2009).

<sup>6</sup> Ibid.

<sup>7</sup> The Human Security Report Project commissioned Yale University's Dr. Beth Daponte to review the Belgian demographers' findings. Her—critical—findings are available on request.

<sup>8</sup> The review done for the HNTS was released into the public domain after this report was completed. It is available at [http://www.icn.ch/HNTS\\_peer\\_review.pdf](http://www.icn.ch/HNTS_peer_review.pdf) (Accessed 22 December 2009).

<sup>9</sup> Macro International Inc., "Democratic Republic of the Congo: Demographic and Health Survey 2007 Key Findings," August 2008, <http://www.measuredhs.com/pubs/pdf/SR141/SR141.pdf> (Accessed 20 December 2009). While the main DHS report was published in French, its key statistics were also published in

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English. Interestingly, the DHS report does not mention the very different IRC findings, let alone challenge them, though it does cite other survey research on the DRC.

<sup>10</sup> Macro International Inc., "Democratic Republic of the Congo," 16, (Accessed 20 December 2009).

<sup>11</sup> The IRC and DHS calculate child mortality differently. The IRC, like most humanitarian organizations, is interested in determining short-term mortality levels, so it measures child mortality in deaths per 1,000 per month. The DHS organization focuses its analyses on long-term trends, and its mortality estimates are measured in deaths per 1,000 live births over a five-year period. The different approaches to measuring child mortality are not comparable in some cases—when comparing, for example, countries with markedly different underlying demographic structures. But, since there is little difference in the IRC's child mortality estimates between 2003 and 2007, the two rates are in fact reasonably comparable in this case. Jon Pedersen, in his review of the IRC's research for the HNTS, notes that the IRC's estimate of child mortality would translate into 350-400 deaths per 1,000 live births over five years. This is well in excess of double the DHS estimate of circa 150 deaths per 1,000 live births over five years in 2006. Pedersen notes, "[I]t is difficult to see how the DHS 2007 could be that wrong without glaring data quality problems."

[www.who.int/hac/techguidance/hnts/hnts\\_drc\\_re\\_examining\\_mortality\\_1998\\_2006.pdf](http://www.who.int/hac/techguidance/hnts/hnts_drc_re_examining_mortality_1998_2006.pdf), p.19.

<sup>12</sup> The *direct* method of estimation is generally more accurate than the *indirect* method. See "Methodology of DHS Mortality Rates Estimation",

[http://www.measuredhs.com/help/Datasets/Methodology\\_of\\_DHS\\_Mortality\\_Rates\\_Estimation.htm](http://www.measuredhs.com/help/Datasets/Methodology_of_DHS_Mortality_Rates_Estimation.htm) (Accessed 20 December 2009).

<sup>13</sup> The recall period of the first survey only went back to January 1999. The researchers extrapolated backwards in order to cover the first five months of the fighting.

<sup>14</sup> During the fifth survey, the sub-Saharan average mortality rate was revised downwards, so for part of the period covered by this survey—January 2006 through April 2007—the IRC uses the new baseline mortality rate of 1.4 deaths per 1,000 per month. This change had the somewhat bizarre consequence of increasing the IRC's excess death toll estimate for the DRC, regardless of whether or not a single additional Congolese person actually died.

<sup>15</sup> Coghlan et al., *Mortality in the Democratic Republic of Congo*, 17, (Accessed 22 December 2009).

<sup>16</sup> IRC, *Mortality in Eastern DRC: Results from Five Mortality Surveys* (New York: IRC, May 2000), 12. Emphasis added.

<sup>17</sup> The IRC's third, preferred, estimation method is simply a variation on the second. Here, the IRC assumes in addition that "one-third of the population has escaped Katanga and is somewhere else, having never experienced excess mortality from this war." No reason is given for this latter assumption, which is dropped in the survey that follows. See Les Roberts et al., *Mortality in Eastern DRC: Results from Five Mortality Surveys* (New York: IRC, 2000), 13.

<sup>18</sup> See Les Roberts et al., *Mortality in Eastern Democratic Republic of Congo: Results from Eleven Mortality Surveys* (New York: IRC, 2001).

<sup>19</sup> Such uncertainty has many other possible causes, including sampling error, reporting bias, response bias, recall bias, and survival bias.

<sup>20</sup> When presenting survey results, standard statistical practice is to provide not only the single best estimate but also some measure that indicates the degree of certainty about its accuracy. The conventional approach is to calculate confidence intervals. Standard practice is to provide "95 percent confidence intervals" for the point estimate. What does this mean? Simply, it means that if one were to sample the same population repeatedly, then the range within which 95 percent of the samples falls would constitute the confidence interval.

<sup>21</sup> Francesco Checchi, "Comments on studies of war-related excess mortality in the Democratic Republic of the Congo," in *Re-examining mortality from the conflict in the Democratic Republic of Congo, 1998-2006*,

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HNTS Peer Review Report, May 2009,  
[http://www.who.int/hac/techguidance/hnts/hnts\\_drc\\_re\\_examinig\\_mortality\\_1998\\_2006.pdf](http://www.who.int/hac/techguidance/hnts/hnts_drc_re_examinig_mortality_1998_2006.pdf). p.41  
(Accessed 27 December 2009).

<sup>22</sup>In the following chapter, we challenge the standard assumption that baseline rates remain constant—mostly they do not.

<sup>23</sup> Cited in Sam Dealey, "An atrocity that needs no exaggeration," *New York Times*, 12 August 2007, <http://www.nytimes.com/2007/08/12/opinion/12iht-eddealy.1.7088161.html> (Accessed 8 December 2009).

<sup>24</sup> Dealey, "An atrocity that needs no exaggeration," (Accessed 8 December 2009).

<sup>25</sup> Richard Brennan and Anna Husarska, "Inside Congo, An Unspeakable Toll," *The Washington Post*, 16 July 2006, <http://www.washingtonpost.com/wp-dyn/content/article/2006/07/14/AR2006071401389.html> (Accessed 8 December 2009).

<sup>26</sup> See Ian Smillie and Larry Minear, *The Charity of Nations: Humanitarian Action in a Calculating World* (Bloomfield: Kumarian Press, 2004) for a detailed discussion on inflated claims by NGOs seeking humanitarian funding.

<sup>27</sup> See, for example, J. Bohannon, "Iraqi death estimates called too high; methods faulted," *Science* 314 (20 October 2006): 396–397; J. Bohannon, "Calculating Iraq's death toll: WHO study backs lower estimate," *Science* 319 (18 January 2008): 273; B. O. Daponte, "Wartime estimates of Iraqi civilian casualties," *International Review of the Red Cross* 89, no. 868 (2007): 943–957; J. Giles, "Death toll in Iraq: Survey team takes on its critics," *Nature* 446, no. 7131 (2007): 6–7; D. Guha-Sapir and O. Degomme, "Estimating mortality in civil conflicts: Lessons from Iraq: Triangulating different types of mortality data in Iraq," CRED working paper (June 2007), [http://www1.cedat.be/Documents/Working\\_Papers/CREDWPIraqMortalityJune2007.pdf](http://www1.cedat.be/Documents/Working_Papers/CREDWPIraqMortalityJune2007.pdf) (Accessed 8 December 2009).

<sup>28</sup> One way to address this challenge would be to make assessments of the health consequences of armed conflicts *independent* of the organizations responsible for on-the-ground implementation of humanitarian assistance. This idea, canvassed by UNHCR's Paul Spiegel, among others, would improve the often uneven quality of data from the field, while addressing donor concerns that NGOs may inflate the seriousness of crises to secure more assistance. NGOs, on the other hand, would be able to point to independent assessments when making the case that more assistance is needed.

## CHAPTER 4

### Can Retrospective Mortality Surveys Determine Excess Death Tolls?

We now turn to a problem that has been ignored in the literature on conflict epidemiology, but that challenges the very idea that surveys are useful instruments for estimating excess death tolls.

We demonstrate why retrospective mortality surveys that use point estimates of the pre-war mortality as a baseline, and assume this do not change over time, will tend to produce erroneous excess death estimates, except in the case of very short wars. The longer the war lasts, the greater will be the extent of the error.

We also argue that, since war deaths are not the only factor that can change overall mortality, attributing increases (or decreases) in mortality to wartime violence may sometimes be highly inaccurate.

Finally, we point out that retrospective mortality surveys are simply too crude an instrument to detect the impact of most wars on nationwide mortality rates.

The discussion that follows is in no sense intended as a critique of nationwide retrospective mortality surveys. On the contrary, as we argue elsewhere in this chapter, such surveys are critically important sources of data for war-affected countries where there are rarely any reliable governmental statistics.

Nor do we question the utility of the local health surveys that humanitarian organizations carry out in internally displaced person and refugee camps that provide vital needs-assessment information for humanitarian missions. Our focus is rather on the use of retrospective mortality surveys for the particular purpose of measuring nationwide *excess* war death tolls. The nationwide population health surveys undertaken by the Demographic and Health Survey (DHS), United Nations Children's Fund, and the World Health Organization (WHO)<sup>1</sup> are not used by these organizations to produce such estimates—we believe with good reason.

We further argue that not only is it rarely possible to calculate accurate estimates of excess war deaths, but that such estimates are of little practical utility for humanitarian policy on the ground. Excess death estimates may well be useful for advocacy purposes, and are of obvious interest to historians and conflict researchers, but their utility even for these latter purposes is very limited given their accuracy is so dubious.

#### The Elusive Quest for Baseline Mortality Data

In Chapter 1 we described how nationwide surveys can be used to estimate the overall mortality rate for a war-affected population. We noted that, providing the pre-war mortality rate is known, researchers can easily determine the excess mortality rate—the difference between the wartime rate and the pre-war rate—and thence, the excess death toll.<sup>2</sup>

The first part of this process—using survey-derived data to estimate the overall mortality rate—is subject to many sources of uncertainty and possible error—such as sampling error, reporting bias, response bias, recall bias, and survival bias. But, these challenges, which are all well described in the literature, can be taken into account and are not the focus of this discussion.

The more problematic, and much less analyzed, step involves the estimation of the baseline mortality rate. This is critically important. Without reliable baseline data, it is impossible to determine the excess mortality rate or the excess death toll. Moreover, as we saw in Chapter 3, an inappropriate choice of the baseline mortality rate can have a dramatic impact on the excess death toll estimate.

When there are no reliable official data to permit the baseline mortality to be determined directly—as there almost never are in war-affected poor countries—researchers have a number of different ways to obtain the data they need. All are error-prone.

The options include the following:

- Using the mortality rate for a neighbouring country that has similar characteristics to the country being surveyed, but which is at peace. Here, the problem is that the neighbour's mortality rate can be quite different from that of the war-affected country—even where the characteristics of the two countries appear similar.
- Using the regional average mortality rate, as the International Rescue Committee (IRC) did for its surveys in the Democratic Republic of the Congo (DRC). Since all regions encompass countries with very different peacetime mortality rates, the probability that any one country in a region will have the same mortality rate as the regional average is low.
- Relying on the survey data itself. Here, there are two choices:
  - i) Respondents can be asked if anyone died, and if so, from what causes, for a period *before* the war started. A major challenge with this method is recall bias—the probability that respondents will make mistakes in recalling past events.<sup>3</sup>
  - ii) The survey-derived wartime mortality rate for part of the country that has *not* been impacted by wartime violence can be used as the baseline. The assumption here is that the mortality rate in an area that has not been affected by the fighting should be the same as the peacetime mortality rate for the whole country in the immediate pre-war period.<sup>4</sup> This is the approach that was adopted in Chapter 3 to re-estimate excess war deaths in the DRC.

## The Real Challenge: Determining What Would Have Happened Had There Been No War

The challenges involved in determining pre-war mortality rates are daunting. But, even if the difficulties involved in obtaining an accurate estimate of the mortality rate *immediately* prior to the start of a conflict can be overcome, a more challenging problem remains to be addressed.

To determine the excess death rate, researchers must try and imagine what would have happened to mortality rates *in the absence of war*. In practice, they usually do this by making a simplifying assumption that is rarely correct, namely that the mortality rate immediately before the war would have stayed the same had there been no war.<sup>5</sup>

In the following section, we demonstrate how using a single point estimate of the pre-war mortality rate can lead to either an under- or overestimation of the excess death toll.

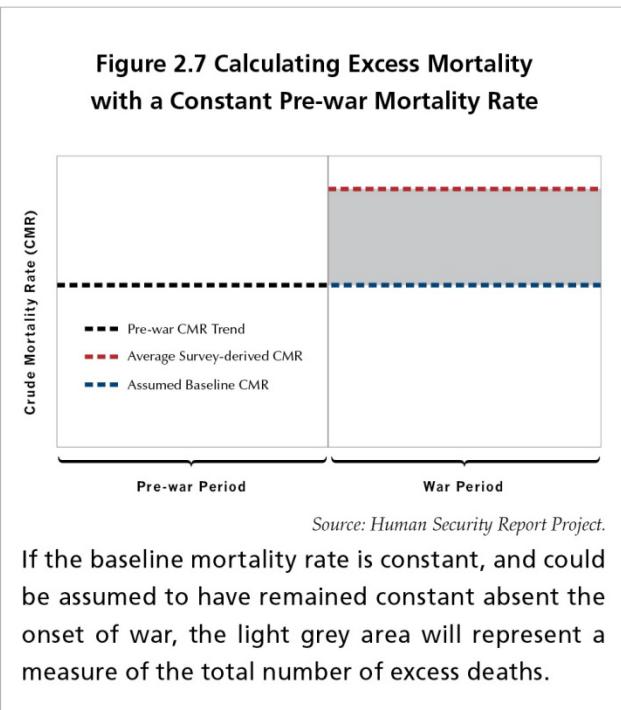
### Calculating Excess Mortality with a Constant Pre-war Mortality Rate

Figure 2.7 depicts a situation in which the pre-war mortality rate does in fact remain constant. In this case, the excess death rate is measured correctly.

In the graph, the red-dashed line represents the average nationwide mortality rate for the war period that is derived from the survey. This rate takes into account the excess war deaths (direct as well as indirect), in addition to deaths from all other causes. The baseline mortality is represented by the blue-dashed line.

The excess mortality rate is determined by subtracting the baseline mortality rate from the survey-derived mortality rate. The grey-shaded area, which is a function of the time period over which the war

has been waged, as well as the average excess death rate, thus becomes a measure of the extent of excess deaths.<sup>6</sup>



## Calculating Excess Mortality with a Declining Pre-war Mortality Rate

We now turn to a situation that represents the norm in the developing world, namely one in which mortality rates are declining in peacetime and could reasonably be expected to have continued to decline had there been no war. We can immediately see from Figure 2.8 that the excess mortality rate, which is “measured from the slope”—i.e., the vertical distance between the black- and red-dashed lines—increases over time.

The light- and dark-shaded grey areas taken together constitute a measure of the extent of excess mortality.

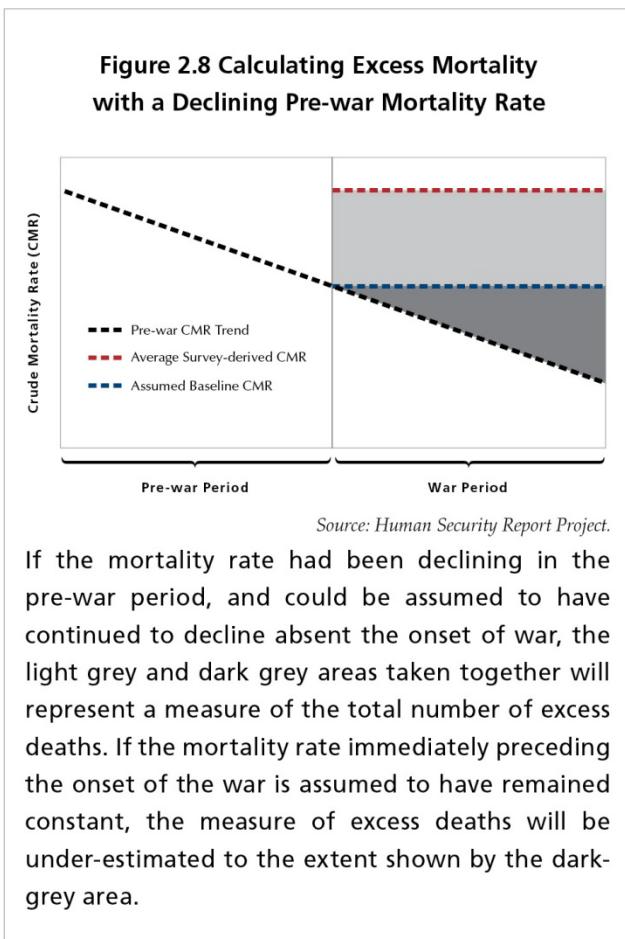
It is clear from Figure 2.8 that the excess death toll will be underestimated if researchers fail to take into account the fact that the declining pre-war mortality trend would reasonably be expected to continue had there been no war, and instead assume that the mortality rate immediately before the war will remain unchanged. The longer the period of war, the greater will be the underestimation.

Figure 2.8 represents a purely hypothetical situation. But, we can get some idea of how a declining pre-war mortality rate *might* impact excess mortality estimates in the real world by revisiting the IRC’s excess death estimates in the DRC for the period covered by the surveys that were carried out between 2001 and 2007.

This is not a simple exercise, and it is far from precise. But, the evidence from the DHS on under-five mortality and the WHO data on adult mortality suggest that the overall mortality rate in the DRC in the pre-war period was declining at a rate of approximately 1.76 percent a year. If we assume that in the absence of the war, this decline would have continued through to 2007 (the last year for which there are data), *and* if we take this into account when calculating the excess death toll, then our previous estimate of

the excess death toll of 0.86 million rises to 1.50 million—an increase of 74 percent.<sup>7</sup> This is approximately half the IRC's best estimate of 2.83 million excess deaths.

Without taking the decline in pre-war mortality into account, our original estimate indicated the IRC's excess death toll for its final three surveys was too high by a factor of three. When the declining pre-war mortality rate is taken into account, it appears the IRC's estimate was too high by a factor of two.



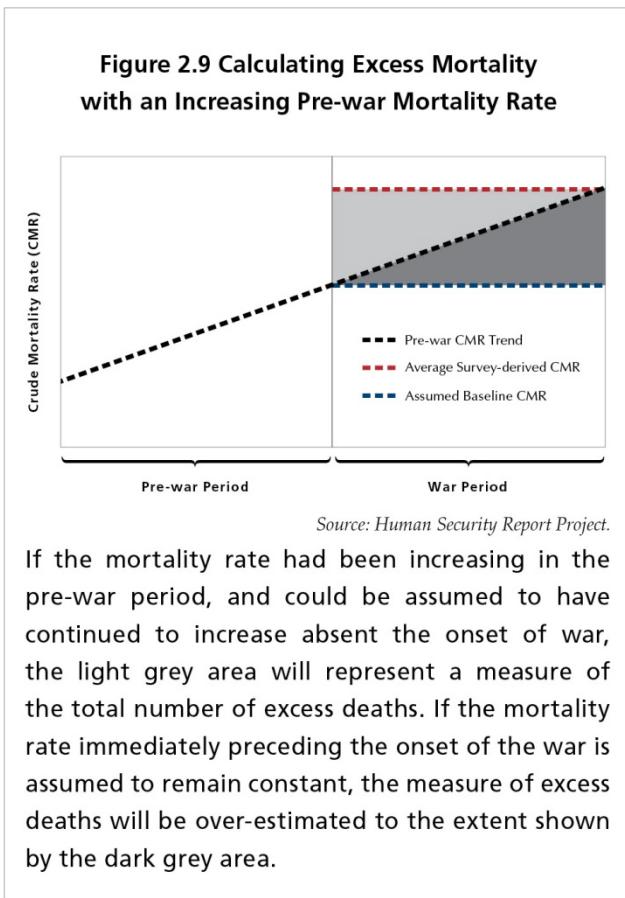
Because of the many uncertainties, no confidence should be placed in the actual estimates noted above. But, this exercise nevertheless demonstrates that taking pre-war mortality trends into account can have a significant impact on the magnitude of estimated excess death tolls.

### Calculating Excess Mortality with an Increasing Pre-war Mortality Rate

Assuming that mortality rates would have remained unchanged had there been no war usually results in an underestimation of excess death tolls, but it can also result in an overestimation on occasion. A small number of southern African countries have seen overall mortality rates *increase* as a consequence of the HIV/AIDS death toll.

In Figure 2.8 the assumption that the mortality rate at the beginning of the war did not change resulted in an underestimation of the excess death toll. In Figure 2.9, however, the same assumption results in the excess death toll being overestimated. The extent of the overestimation is represented by the dark grey-shaded area. When the appropriate procedure of measuring from the slope is followed, the

light grey-shaded area provides a measure of the extent of excess mortality. As Figure 2.9 shows, this declines over the period of the conflict.



## Additional Methodological Challenges

In the highly schematic graphics in Figures 2.8 and 2.9, excess mortality can be determined by measuring from a changing baseline mortality rate. In the real world, things are not so simple and this is rarely possible. Getting an accurate point estimate for the baseline mortality rate at the start of wars is, as we have already noted, extremely challenging, particularly in poor countries engulfed in, or emerging from, war. Getting accurate pre-war *trend* data on national mortality rates is even more difficult. But, there are additional problems that are equally challenging.

First, as mentioned previously, political violence is not the only cause of changing mortality rates during periods of conflict. Mortality surveys in poor countries measure the effect not just of war but of *all* factors that impact mortality rates. Some nonwar factors—a major drought taking place during a period of fighting, for example—will push mortality rates upwards; others may cause them to decline. The problem is the mortality data cannot be disaggregated to determine what the impact of these different factors is. In fact, *there is no way of determining the extent to which changes in wartime mortality rates revealed by surveys are caused by war or other exogenous factors.*

Second, survey-derived mortality rates often have quite wide confidence intervals. For example, the IRC's "best estimate" of the nationwide mortality rate for the 2003–2004 period was 2.1 deaths per 1,000

per month. But, the IRC's researchers could not be certain that this was the correct figure. Their methodology, however, indicated that they were 95 percent confident that the actual rate lay between 1.6 and 2.6 deaths per 1,000 per month.

Any measurement of baseline mortality is likely to have a wider confidence interval than the survey-derived mortality rate for the war period—in part because pre-war trend data are often made up of widely divergent survey and census data.

What this means in practice is that excess death tolls from low-intensity conflicts may well be undetectable. If the real excess death toll is less than the uncertainties in wartime and pre-war mortality trend data, then the impact of war deaths may be hidden by the imprecision of the very instruments that are being used to try and detect them.

The clear implication of this analysis is that retrospective mortality surveys are rarely appropriate instruments for measuring excess death tolls in wars in poor countries, except in relatively rare circumstances—namely very short wars.<sup>8</sup>

## Conclusion

Given that the practice of estimating excess death tolls via retrospective mortality surveys is so prone to errors, and given that some of these errors become greater the longer the war lasts, a strong case can be made for choosing an alternative approach to measuring the human costs of war.

There are, moreover, more appropriate ways for advocates to communicate the deadliness of warfare than publicizing the nationwide excess death toll—a measure that, even when accurate, takes no account of population size.<sup>9</sup>

The issue of reliability aside, excess death toll estimates are of little practical utility to humanitarians working on the ground. The data that humanitarian workers require comes from the surveys that are routinely carried out at the local level in conflict-affected zones by humanitarian agencies and nongovernmental organizations. These surveys typically estimate local mortality rates (not *excess* mortality rates) and provide information on the proximate causes of death.

Mortality *rates* are the metric most used by humanitarians. But, for nonexperts, the fact that there were, for example, 15 deaths per 1,000 of war-affected population per month—actually a very high death rate—will be largely meaningless and therefore of little use for advocacy purposes.

Perhaps the best approach—one that conveys the deadliness of wars in a way that is both meaningful and accessible to nonexperts—is to compare the mortality rate in war zones with that of the regional average. Saying, “The death rate in the war-affected eastern DRC is now 10 times the sub-African average,” will make far more sense to nonexperts than the (equally true) statement to the effect that, “The crude mortality rate in the eastern DRC is 15 deaths per 1,000 of the population per month.”

Finally, we reiterate a point already made in this and earlier chapters, namely that if the controversies associated with survey-based estimates of excess deaths continue, they threaten to discredit the entire survey approach—one that remains critically important to the creation of evidence-based humanitarian and peacebuilding policies.

In Chapter 5, the focus shifts from humanitarian policy and the measurement of war deaths to the broader debate about the nexus between health and security, and in particular the program the WHO calls “Health as a Bridge for Peace.”

## WHY NATIONWIDE POPULATION SURVEYS ARE NEEDED IN WAR-AFFECTED COUNTRIES

The evidence presented in this chapter suggests that nationwide mortality surveys are of little utility for the specific task of estimating excess war deaths tolls. The problem, we have argued, lies with the near-insurmountable challenges associated with establishing reliable baseline mortality trend data in the poor countries where most wars take place.

However, none of the criticisms presented in this chapter, or in Chapter 3, should be taken as suggesting that nationwide population surveys are of little value for humanitarian and postconflict peacebuilding programs. On the contrary, in the absence of reliable government statistics, such surveys could play a valuable role—for beneficiaries as well as donors—in creating a broad evidence base both for humanitarian policies and postconflict peacebuilding programs.

Currently, national governments, donors, international agencies, and nongovernmental organizations that confront the multiple challenges posed by complex emergencies rarely have the data needed to measure progress—or lack thereof.

The challenges of creating a reliable evidence base for policy planning and impact evaluation for humanitarian and peacebuilding programs would be addressed in large part if the United Nations (UN) Security Council were to include in the mandate of each new peace operation a requirement to undertake a nationwide population survey of immediate post-war health, socio-economic, and security conditions. Similar surveys could be carried out in postconflict countries where non-UN peace and stability operations were being implemented.

The widely respected Demographic and Health Surveys (DHS) offer one possible model for such an initiative. DHS collect considerably more information than do mortality surveys of the type the International Rescue Committee carried out in the Democratic Republic of the Congo. They have a strong focus on maternal and child health, but they also collect data on income, livelihoods, and education.

National governments have a major responsibility for the actual implementation of DHS and this official buy-in has avoided the sort of public controversies encountered by other major population health surveys in Iraq and elsewhere.

Technical assistance in carrying out DHS is provided at all stages by Macro International, a US corporation that has worked for many years with USAID on issues related to survey design and implementation. Macro International is also responsible for collating and analyzing the data collected in the surveys.

Since Macro International is a private corporation and already contracts with UN agencies, there would be no reason in principle why it should not work with the UN and postconflict governments to create what is a much-needed instrument to evaluate the impact of relief, recovery, and peacebuilding programs.

Unlike other approaches to impact evaluation, such surveys would provide information for national governments, not just donors and international agencies—a further advantage of official buy-in and ownership.

DHS-type surveys would not replace the surveys that humanitarian organizations carry out in and around conflict zones for needs-assessment and monitoring purposes. However, they would provide data that was not only nationwide, but would also cover a far greater range of issues relevant to relief and recovery.

DHS cost up to US\$2 million each and if the primary purpose of a Security Council-mandated survey was to provide the evidence base needed to evaluate the broad impact of humanitarian and postconflict reconstruction/peacebuilding programs, there would obviously have to be follow-up surveys—perhaps every two years. However, relative to the US\$8 billion a year currently being spent on UN peace operations alone, these costs are minimal.

A commitment by the Security Council to conduct a DHS-type nationwide survey at the outset of every new peace operation, with follow-up surveys to measure progress, would provide national governments and donors with a unique source of data to evaluate the impact of humanitarian and postconflict peacebuilding policies. Currently, no such evidence base exists.

## ENDNOTES

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<sup>1</sup> See the relatively new World Health Surveys.

<sup>2</sup> Such a calculation would obviously require information on the size of the population and the population growth rate.

<sup>3</sup> This source of potential error is of sufficient concern among epidemiologists for the Standardized Monitoring and Assessment of Relief and Transitions (SMART) guidelines on survey methodology to state categorically that “[r]ecall periods longer than one year should not be used.” (See Standardized Monitoring & Assessment of Relief & Transitions (SMART), “Measuring Mortality, Nutritional Status, and Food Security in Crisis Situations: SMART Methodology”, p. 31,

[http://www.smartindicators.org/SMART\\_Methodology\\_08-07-2006.pdf](http://www.smartindicators.org/SMART_Methodology_08-07-2006.pdf) (Accessed 15 January 2010). The longer the war, the greater the risk that mistakes will be made in remembering the years in which deaths occurred. This risk is growing because wars are getting longer. In the early 1990s, less than 25 percent of conflicts had been active for 20 years or more, but by 2007 this figure had risen to roughly 50 percent.

<sup>4</sup> This assumes the mortality rate for part of the country is an appropriate proxy measure for the whole country. It may not be.

<sup>5</sup> The IRC changed its baseline mortality rate during the last survey period when the sub-Saharan African rate changes. However, as we have argued, this rate was not the appropriate one to have used in the first place.

<sup>6</sup> To calculate the excess death toll, the average excess mortality rate in deaths per 1,000 of the population per month (a common way of measuring mortality in retrospective mortality surveys) is multiplied by the number of months the conflict lasts and then by the war-affected population number. The resulting figure is then divided by 1,000.

<sup>7</sup> In calculating its estimate, the Human Security Report Project used the annual rate of decline in the child mortality rate from the DHS data at Childmortality.org and the annual rate of decline in the adult mortality rate from the WHO data. See WHO, WHO Statistical Information System, <http://apps.who.int/whosis/data/Search.jsp?countries=%5bLocation%5d.Members> (Accessed 30 December 2009); and Childmortality.org, “COD\_Demographic and Health Survey\_Direct (5 year)\_2007”, [www.childmortality.org](http://www.childmortality.org) (Accessed 11 January 2010). Further information on the methodology and data used in these calculations is available on request from hsrp@sfu.ca.

<sup>8</sup> In very short wars—those that last a year or less—the errors introduced by failing to take into account pre-war mortality trends will be minimal.

<sup>9</sup> For example, 100,000 deaths is a more significant toll in a country with a population of 10 million than it is in one with a population of 100 million.

## CHAPTER 5

### Armed Conflict and Health Policy

The discussion in this study has focused thus far on the indirect impact of war on population health, where health professionals, particularly in the humanitarian community, have played a key role in seeking more effective ways to reduce the wartime death toll from malnutrition and disease.

But, for some health professionals, the idea that the medical profession should focus primarily on reducing the human costs of wars has not been enough. Proponents of “Health as a Bridge for Peace” argue that health professionals also have a role to play in conflict prevention via education, in seeking to stop ongoing wars—“peacemaking” in UN-speak—and in postconflict peacebuilding, where the key security goal is to prevent wars that have stopped from starting again.<sup>1</sup>

The World Health Organization’s (WHO’s) “Health as a Bridge for Peace” program started in August 1997 and was accepted by the 51st World Health Assembly in May 1998. The various initiatives associated with the program are predicated on the assumption that health policy can help to create a more secure world in a number of different, but complementary, ways.

Three policy approaches that are associated with the concept of “Health as Bridge for Peace” are discussed here. Many of them are pursued by nongovernmental organizations (NGOs) rather than international agencies like the WHO and the United Nations Children’s Fund, and some predate the WHO’s “Bridge for Peace” program.

First, are the advocacy and education programs that seek to inform publics and governments about the true human costs of war. Enhancing public knowledge about warfare is seen here as contributing to conflict prevention.

Second, is the idea that trust generated by negotiating health interventions in conflict zones—typically to immunize children—can create enough confidence between enemies to jump-start negotiations that can eventually lead to peace settlements. From this perspective, interventions by health professionals can become stepping stones to peace.

Third, is the belief that, where official state policy improves the health outcomes of ordinary citizens in postconflict settings, this will enhance the legitimacy of the governments concerned and thus decrease the risks of wars restarting. Here, health policy is seen as contributing to postconflict peacebuilding—although this, as we will see, is a controversial issue.

#### Health Education and Conflict Prevention

Advocacy programs designed to educate publics about the true costs of war are based on the assumption that if publics, and indeed governments, understand that the true costs of conflict are far greater than commonly believed, the incentive for going to war will be reduced, while the incentives for conflict prevention, peacemaking and effective postconflict peacebuilding will be increased.

In the 1980s, physicians’ organizations, including the Nobel Prize-winning International Physicians to Prevent Nuclear War, waged a high profile public campaign to persuade publics and policy-makers that the true costs of nuclear war, which included the possibility of a consequent “nuclear winter,” were far more devastating than generally realized. Some analysts have argued that such campaigns helped create a “nuclear taboo” and that, as a consequence, nuclear war has become literally “unthinkable”—and thus less likely.<sup>2</sup>

The advocacy programs pursued by the International Rescue Committee in the Democratic Republic of the Congo (DRC), and those of literally hundreds of NGOs in other conflicts, are other cases in point. Advocacy is focused primarily on generating pressure to provide more resources to reduce the human costs of war via the provision of humanitarian assistance. But, few health professionals believe that humanitarian assistance is enough—many support the broader security goals of conflict prevention, peacemaking, and postconflict peacebuilding.

Focusing international attention on the human costs of war could, in principle, help further these latter goals. Indeed, there is little doubt that efforts by NGOs and international agencies to publicize the huge death tolls from war-exacerbated disease and malnutrition in the DRC, Darfur, and elsewhere, have made donors and attentive publics far more aware of the hidden costs of war. Nor is there any doubt that for more than a decade, donors and international organizations have been committing far more resources to humanitarian assistance, conflict prevention, peacemaking, and postconflict peacebuilding. Humanitarian advocacy campaigns have surely been one of the factors driving these changes.

## **Health Interventions and Peacemaking**

In a paper prepared for the 1995 World Summit for Social Development, the WHO argued:

Health is valued by everyone. It provides a basis for bringing people together to analyze, to discuss and to arrive at a consensus acceptable to all. The potential for using health as a mechanism for dialogue, and even peace, has been demonstrated in situations of conflict.<sup>3</sup>

“Bridge for Peace” advocates believe that because health, particularly children’s health, is valued by all parties, and because medical professionals who have a humanitarian mandate are traditionally seen as neutral, it may be possible for them to facilitate dialogue between the warring parties where other attempts have failed. The dialogue will initially be technical with a completely apolitical goal—to gain access to children in war zones in order to deliver very basic life-saving health interventions. But, health advocates believe that the degree of trust generated by negotiating humanitarian access can be built on and used to build a process of conflict mediation and, ultimately, resolution.

As Paula Gutlove puts it, health professionals, “can create a bridge of peace between conflicting communities, whereby delivery of health care can become a common objective and a binding commitment for continued cooperation.”<sup>4</sup>

Humanitarian ceasefires, often called, “Days of Tranquility,” have been implemented in many conflict zones and are held up as examples of the utility of the “Health as a Bridge for Peace” approach in practice. Here, a temporary truce is negotiated between government and rebels that permits health workers to enter conflict zones in order to immunize children against a variety of infectious diseases, or deliver food or other humanitarian assistance. Humanitarian ceasefires of this type have been implemented in many conflict situations in, for example, Afghanistan, Cambodia, El Salvador, Lebanon, the Philippines, Sudan, and Uganda.<sup>5</sup>

Sometimes the truce can be extended for considerable periods. In 1994, for example:

WHO-Afghanistan and the Afghan Ministry of Public Health brokered a cease-fire . . . during which children throughout the country could be immunized. The two weeks of tranquility became a two-month cease-fire during which an intensive “Mass Immunization Campaign” was carried out.<sup>6</sup>

These health interventions, which are most frequently referred to as “Bridge for Peace” initiatives in the literature, have undoubtedly saved lives, but there is little evidence that they have contributed in any major way to bringing wars to an end.

The claimed causal relationships between humanitarian health interventions and peace in the literature are problematic in a number of ways.<sup>7</sup> First, they are asserted, rather than demonstrated—and they invariably ignore the possibility that “Days of Tranquility” initiatives might be an *effect* of improved relations, rather than their cause.

Second, the “Bridge for Peace” literature is almost certainly subject to publication bias—that is, there is a higher probability that articles on successful, rather than unsuccessful, initiatives will get published in academic journals. The fact that many individuals writing in this field are advocates who may have little interest in publicizing unsuccessful cases does nothing to reduce the risk of bias.

Third, even where there is a clear *association* between “Bridge for Peace” initiatives and peace settlements, this does not necessarily indicate any causal relationship. Many of the conflicts that have witnessed “Days of Tranquility” have indeed ended, but it is far from clear that the health interventions played even a minor role in bringing them to an end.

Successes in what the UN calls “peacemaking” and “postconflict peacebuilding” have many causes. An editorial in the *British Medical Journal* may have been overstating things when it noted in 2001 that there were few examples of successful peace through health initiatives, adding that “it is ideology that is driving the movement at present.”<sup>8</sup> Yet, some eight years later, there has still been no systematic evaluation of the effectiveness of humanitarian interventions in driving subsequent peace negotiations.

Moreover, there is little recognition in the literature of the risks that “Bridge for Peace” initiatives may involve. The assumption that cooperation is *possible* because people on both sides of a conflict value good health does not mean that rebel groups will in fact choose to cooperate. Rebel leaders may perceive state-supported initiatives to deliver humanitarian assistance into war zones as tactics intended to generate support for the government, and reject them for precisely this reason.

Moreover, humanitarian assistance, as is now widely recognized, can have profoundly negative consequences in certain circumstances. As Mary Anderson demonstrated more than a decade ago, the food and medicine provided by international agencies and NGOs can have the perverse effect of fuelling the very wars whose human costs they seek to reduce.<sup>9</sup> Rebels often steal aid shipments, or impose a “tax” on their delivery and use the resources thus acquired to support their war effort. Rebel groups can also use “Days of Tranquility” to redeploy their forces to greater strategic advantage without fear of attack.

Humanitarian organizations today are well aware that aid can have perverse effects, however, and most now seek—though not always successfully—to ensure their operations “do no harm.”

Finally, while health professionals may aspire to leverage the trust generated in negotiating access to war zones to promote peace negotiations, few have the depth of knowledge of the political issues at stake, or the necessary experience mediating in such situations, to facilitate a negotiated settlement.

## Health Policy and Peacebuilding

In postconflict situations, governments that gain legitimacy in the eyes of their citizens are less likely to succumb to renewed rebel violence. As one review of the “Bridge for Peace” literature noted:

Through the provision of health and other public services to their populations, governments have the opportunity to (re)establish their legitimacy, reduce alienation

from society and, crucially, to visibly demonstrate that they are upholding their side of the social contract.<sup>10</sup>

An important source of what is sometimes called “performance legitimacy” is a government’s ability to provide goods and services that are desired by its citizens. And, the reliable provision of accessible health care is a critical determinant of performance legitimacy, even in poor countries where health services are often minimal. In 2007, for example, a survey of 18 African nations by Afrobarometer found that respondents’ satisfaction with their government was associated with their satisfaction with the delivery of social services such as health and education, as well as its political and economic performance.<sup>11</sup> Factors influencing satisfaction with health care were, in order of importance: perceived ease of access, the respondent’s level of poverty, perceived absence of corruption, and affordable fees for medical treatment.<sup>12</sup>

However if, as is often the case, it is NGOs, rather than the government, that are providing most of the health care in postconflict situations, the government is less likely to gain legitimacy than if its own health workers were providing the services.

As Margaret Kruk has noted, effective and equitable delivery of health care can influence citizens’ perceptions of the legitimacy of oppositions, as well as governments.<sup>13</sup> In southern Lebanon, where the national government has long underinvested in health care services, the militant Hezbollah organization has provided generous health insurance and efficient, accessible, and reliable health services to the local Shia population. In 2005, for example, some 50 hospitals in the country were being run by the organization, which also provides life and disability insurance, as well as other social services.<sup>14</sup> In the wake of the August 2006 war with Israel, Hezbollah’s rapid provision of health care and reconstruction aid appears to have only strengthened its legitimacy in the south.<sup>15</sup>

A major multi-country study by the RAND Corporation published in 2006 provided considerable support for the thesis that effective delivery of health services can enhance the legitimacy of governments in postconflict settings.<sup>16</sup> In evaluating the impact of the provision of health services in rebuilding Germany and Japan after World War II, and in Somalia, Haiti, Kosovo, Iraq, and Afghanistan, the authors concluded that “health can have an important independent impact on nation-building and . . . on security by helping to ‘win hearts and minds.’”<sup>17</sup>

## **Humanitarian Assistance and Counterinsurgency**

But, while the provision of health services in postconflict settings does not sound controversial, it can pose real risks for humanitarian health professionals in those situations where armed resistance remains. The “win hearts and minds” approach the RAND Corporation report refers to is, of course, a critically important element in contemporary counterinsurgency strategy. And, it is perceived as such by forces opposed to governments in Afghanistan and elsewhere. The Taliban attacks health facilities in the Afghan countryside because it has a direct interest in preventing the government in Kabul from “winning hearts and minds” and thus gaining legitimacy.

Some humanitarian organizations, notably the International Committee of the Red Cross (ICRC) and Médecins Sans Frontières (MSF), strongly repudiate any association between humanitarian actors and military campaigns in part for this reason. As the head of MSF’s Afghanistan mission noted in 2004:

The deliberate linking of humanitarian aid with military objectives destroys the meaning of humanitarianism. It will result, in the end, in the neediest Afghans not getting badly needed aid—and those providing aid being targeted.<sup>18</sup>

The ICRC and MSF have also refused to join the UN's integrated missions initiative, which is intended to improve the effectiveness of postconflict reconstruction efforts via a greater degree of coordination and integration between the organizations that undertake different mission responsibilities. Integrated missions are problematic for the ICRC and MSF because in postconflict situations where there is still considerable armed resistance directed against a government, humanitarian organizations that join an integrated mission cease to be neutral and impartial. They become, according to Jacques Forster, ICRC vice-president, part of "a political and military strategy to defeat the enemy. In other words, the subordination of humanitarian activities to political goals, using aid as a tool for local or foreign policy."<sup>19</sup>

Where humanitarian assistance is no longer perceived as being neutral, health workers and clinics may be targeted by rebel movements for precisely this reason. This, in turn, will have a negative impact on population health in the areas affected.

The risk is real. Attacks against aid workers worldwide in 2008 were the highest in 12 years and have increased appreciably since 2006. They have also become increasingly politically motivated, "reflecting a broad targeting of the aid enterprise as a whole."<sup>20</sup>

If threats to aid workers mean that service provision is reduced, then health outcomes will not improve, and any legitimacy gains that governments seek to achieve from enhancing health outcomes will not be realized.

However, while there is no doubt that the incidence of violent assaults against aid workers has increased worldwide, the violence has not been uniformly distributed. Indeed, some 60 percent of these violent assaults in 2008 took place in just three countries—Afghanistan, Sudan (Darfur), and Somalia.<sup>21</sup> All three countries were experiencing ongoing conflicts, and both Afghanistan and Somalia have Islamist movements strongly opposed to what they see as Western political agendas. The risks to aid workers are much lower in countries where there are major peacebuilding missions underway but no active rebel movements.

## Conclusion

The WHO's "Health as a Bridge for Peace" program is less actively promoted today than was the case even five years ago. The "Bridge for Peace" page is still active on the WHO website, but the links are now very dated. A recent UK review of the program suggests that the declining interest may be in part because the effectiveness of "Bridge for Peace" policies has been more asserted than demonstrated. The review, by Colin McInnes and colleagues, noted that:

Critically, the evidentiary base appears slim and overly reliant on anecdotal evidence rather than rigorous and systematic empirical work. Moreover, there has been little conceptual work done on key questions including: what works and why? What conditions are susceptible to such an approach? What level and form of health investment is required? When might it backfire and allow a conflict to continue? Can it be used to assist in ending conflicts, or just in post-conflict reconstruction? And can it be used to prevent conflict?<sup>22</sup>

None of this means that "Bridge for Peace" initiatives—like the "Days of Tranquility" immunization programs for children in conflict zones—are not worthwhile from a health perspective. Rather, it simply means their security benefits have yet to be compellingly demonstrated.

## ENDNOTES

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<sup>1</sup> This chapter draws on a background paper on “Health as a Bridge for Peace” prepared by Dr. Margaret Kruk for the Human Security Report Project (HSRP).

<sup>2</sup> See, for example, Nina Tannenwald, *The Nuclear Taboo: The United States and the Non-Use of Nuclear Weapons Since 1945* (Cambridge: Cambridge University Press, 2007),

<http://www.cambridge.org/catalogue/catalogue.asp?ISBN=9780521524285> (accessed 5 November 2009).

<sup>3</sup> WHO Task Force on Health in Development, “Health in Social Development,” (WHO position paper prepared for the World Summit for Social Development, Copenhagen, Denmark, March 1995), 19. Cited in Paula Gutlove, “Health as a Bridge for Peace: Briefing Manual,” Institute for Resource and Security Studies, May 2000, <http://www.irss-usa.org/pages/documents/HBPbriefmanual.pdf> (accessed 5 November 2009).

<sup>4</sup> Gutlove, “Health as a Bridge for Peace,” 2, (accessed 5 November 2009).

<sup>5</sup> A major review of the literature in this field reported that the process of negotiating such ceasefires, “can have spill-over effects in terms of building trust among conflicting parties”; R. Rodriguez-Garcia, M. Schlesser, and R. Bernstein, “How Can Health Serve as a Bridge for Peace?” *CERTI Crisis and Transition Tool Kit Policy Brief*, May 2001, 9 <http://www.certi.org/publications/policy/gwc-12a-brief.PDF> (accessed 5 November 2009).

<sup>6</sup> Gutlove, “Health as a Bridge for Peace,” 3, (accessed 5 November 2009).

<sup>7</sup> A. Ciro, C. A. de Quadros, and Daniel Epstein, “Health as a Bridge for Peace: PAHO’s Experience,” *The Lancet* 360, Supplement (2002): 360; (Supplement 1): s25-s26.

<sup>8</sup> Alex Vass, “Peace Through Health,” *British Medical Journal* 323, no. 7320 (3 November 2001): 1020.

<sup>9</sup> See, for example, Anderson’s “Humanitarian NGOs in Conflict Intervention,” in *Managing Global Chaos*, eds. Chester Crocker, Fen Hampson, and Pamela Aall (Washington, DC: United States Institute of Peace Press, 1996), 343-354.

<sup>10</sup> Simon Rushton, “Health and Peacebuilding: Resuscitating the Failed State in Sierra Leone,” *International Relations* 19, no. 4 (December 2005): 442.

<sup>11</sup> Michael Bratton, “Are You Being Served? Popular Satisfaction with Health and Education Services in Africa,” (Afrobarometer Working Paper 65, Michigan State University, January 2007), <http://www.afrobarometer.org/papers/AfropaperNo65.pdf> (accessed 22 December 2009).

<sup>12</sup> Ibid.

<sup>13</sup> Taken from Kruk’s background paper on “Health as a Bridge for Peace” prepared for the HSRP.

<sup>14</sup> Matthew A. Levitt. “Hezbollah: Financing Terror Through Criminal Enterprise,” (testimony given to Committee on Homeland Security and Governmental Affairs, Washington, DC, 25 May 2005), <http://www.washingtoninstitute.org/html/pdf/hezbollah-testimony-05252005.pdf> (accessed 21 December 2009); Sabrina Tavernise, “Charity Wins Deep Loyalty for Hezbollah,” *New York Times*, 6 August 2006, <http://www.nytimes.com/2006/08/06/world/middleeast/06tyre.html> (Accessed 15 January 2010).

<sup>15</sup> Richard J. Brennan and Egbert Sondorp, “Humanitarian Aid: Some Political Realities,” *British Medical Journal* 333, no. 7573 (21 October 2006).

<sup>16</sup> Seth G. Jones et al., “Securing Health: Lessons from National Building Missions,” (Santa Monica, CA: RAND Center for Domestic and International Health Security, 2006), [http://www.rand.org/pubs/monographs/2006/RAND\\_MG321.pdf](http://www.rand.org/pubs/monographs/2006/RAND_MG321.pdf) (accessed 5 November 2009).

<sup>17</sup> Ibid., 281.

<sup>18</sup> Kenny Gluk, “Coalition Forces Endanger Humanitarian Action in Afghanistan,” MSF, 6 May 2004, <http://www.msf.org/msfinternational/invoke.cfm?objectid=409F102D-A77A-4C94>

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<sup>19</sup> Jacques Forster, “An ICRC Perspective on Integrated Missions” (speech presented at an event hosted by the Norwegian Ministry of Foreign Affairs and the Norwegian Institute of International Affairs, Oslo, Norway, 31 May 2005), <http://www.icrc.org/Web/eng/siteeng0.nsf/html/6DCGRN> (accessed 5 November 2009).

<sup>20</sup> Abby Stoddard, Adele Harmer, and Victoria DiDomenico, “Providing Aid in Insecure Environments: 2009 Update,” ODI HPG Policy Brief 34, London, UK, April 2009, 1, <http://www.cic.nyu.edu/internationalsecurity/docs/HPG%20Briefing%2034crc.pdf> (accessed 5 November 2009).

<sup>21</sup> Ibid.

<sup>22</sup> Colin J. McInnes, Kelley Lee, and Egbert Sundorp, “Health, security and foreign policy,” *Review of International Studies* 32, no. 1 (January 2006): 18.