A forensic team unearths human remains and clothing at a mass grave near the eastern town of Miljevina, Bosnia, in August 2004. (© Danilo Krstanovic/Reuters)

Behind the numbers:
SMALL ARMS AND CONFLICT DEATHS

9

INTRODUCTION

The steady stream of media reports from the battle zones of Iraq has kept the world regularly informed about at least one aspect of the conflict: the numbers of US and UK servicemen and women being killed. Between March 2003 and April 2005, more than 1,700 had died, and more than 11,000 had been wounded (Iraq Coalition Casualty Count, 2005; Antiwar.com, 2005). One obvious question follows directly from these statistics: how many Iraqis have died in the conflict? In April 2005, the public database Iraqi Body Count, basing its information on media accounts, estimated that there had been between 17,000 and 19,000 Iraqi military and civilian deaths (IBC, 2005).

In late October 2004, however, the British medical journal *The Lancet* published results from an epidemiological survey conducted in Iraq estimating that perhaps 100,000 or more excess deaths had occurred in Iraq since the invasion in March 2003 (Roberts et al., 2004), compared to a similar period before the invasion. Of these 100,000 estimated excess deaths, about 40 per cent—an estimated 39,000 deaths—may be the direct result of combat or armed violence.[1]

The large disparity between these estimates and those presented in previous reports raises important questions about how conflict deaths are measured and reported, not just for individual conflicts, but for global aggregate measures of armed conflict deaths. This chapter surveys the range of estimation techniques—from media report datasets to focused case studies—that are used to arrive at conflict death figures, and discusses the advantages and disadvantages of different methodologies. It clarifies the distinction between direct and indirect conflict deaths, highlights the tendency of certain methodologies to underestimate the number of deaths, and points to ways to improve these figures in future research.

Our ability to estimate more accurately total numbers of conflict deaths is not simply an academic preoccupation—it has important political implications. Official reports of conflict deaths supplied by parties involved in conflicts are often deliberately misleading, whether to minimize or exaggerate casualties for public attention, to cover up atrocities, to maintain the appearance of military superiority, or for a host of other reasons. In the case of Bosnia, for example, conflict death estimates disseminated locally and internationally seem to have been arbitrarily inflated in an attempt to hasten Western intervention (see below).

In addition to reviewing information provided by various global datasets based primarily on media reports, this chapter discusses the results of detailed and careful research studies undertaken during or after particular conflicts—including in Guatemala, Peru, the Democratic Republic of the Congo (DRC), Kosovo, Iraq, Afghanistan, and Sudan—in order to draw reasonable inferences and highlight key findings. The overall goal of the chapter is to present, in clear language for the non-specialist audience, the strengths and weaknesses of different approaches to counting conflict deaths, in order to cut through the confusion that often surrounds this debate. Although further data collection, research, and analysis will be required to improve estimates of conflict dead, recent advances in research methodologies now

make it possible to derive more reliable estimates of how many people die in armed conflicts around the world. This chapter reviews the evidence and concludes:

Most recent global estimates underreport the number of direct conflict deaths.

- Most recent global estimates of direct conflict deaths underreport the extent and magnitude of the human death toll, mainly because they depend on incomplete media reports.
- The total number of *direct conflict deaths* is likely to be between two to four times higher than currently reported. The number of direct conflict deaths for 2003 is possibly between 80,000 and 108,000.
- A complete assessment of the human toll from armed conflict must include not only the direct deaths from combat or armed violence, but also the *indirect conflict deaths*. The total number of conflict deaths in both categories in some recent conflicts such as DRC has been many times higher than the number of direct conflict deaths.
- Small arms and light weapons are responsible for the majority—between 60 and 90 per cent, depending on the conflict—of direct conflict deaths. They also play a clear, but unquantifiable, role in causing the indirect deaths from conflict.
- Annual global estimates of conflict deaths are difficult to generate due to dramatic variations in the intensity of individual conflicts over time. More empirical research on specific conflicts, of the type highlighted in this chapter, is required.

This chapter begins by presenting the definitions and key concepts needed to understand the contradictory information on armed conflict deaths. It then introduces the sources, datasets, and methodologies typically used to derive estimates of armed conflict deaths. It explains why the only global, and thus widely cited, datasets or sources underestimate the death toll by comparing different sources of information and offers a judgement on the likely degree to which conflict deaths have been underestimated. Recognizing that significant statistical uncertainties remain, the chapter presents an estimate for the global number of conflict deaths in 2003. It then discusses the specific role of small arms in direct conflict deaths and describes the current state of knowledge on indirect conflict deaths.

Together with the chapter in the 2004 *Small Arms Survey* on criminal or non-conflict violent deaths from small arms, this chapter provides a more complete vision of the overall death toll arising from the use of small arms and light weapons.

CONFLICT, ARMED VIOLENCE, AND DEATH: SOME DEFINITIONAL AND CONCEPTUAL ISSUES

The phenomenon of violent conflict is complex and politically fraught. Labels such as 'war' and 'armed conflict' have specific legal and political meanings (for example, concerning the application of international humanitarian law, or the responsibilities of states party to a conflict), and imply a distinct phenomenon with a clear beginning and end. In reality, however, contemporary conflicts often blur the line between war and other forms of armed violence (Kaldor, 1999, p. 2; Holsti, 1996). For people suffering from high levels of armed violence, to whom definitional debates are hardly relevant, it can be difficult to determine when a 'war' begins or ends, or to distinguish armed conflict from other forms of collective violence (POST-CONFLICT). The way in which terms such as 'war', 'armed conflict', and 'conflict

death' are used, however, does have implications for which conclusions can be drawn. It is thus essential to clarify how these terms are used and what they mean.

Definitions of conflict tend to focus on four particular attributes of conflict: *parties, purposes, consequences,* and *geography*.

Parties. The first feature identifying armed conflict is the nature of the parties involved in the violence. The most important actor is the state, and—following Max Weber's definition of the state as an entity enjoying a monopoly over the legal use of force—many classifications have only counted those wars or armed conflicts in which at least one state is directly involved. Today, however, a wide range of non-state parties is included in different definitions, complicating the task of counting conflicts.[2]

Purposes. Many definitions explicitly or implicitly distinguish between war or armed conflict and other phenomena according to their different *purposes* (Holsti, 1996, pp. 1–18). This attribute is particularly important beyond the realm of traditional war between states, namely in the thicket of civil wars and inter-communal conflicts. Some scholars have attempted to distinguish between 'greed' (economic) and 'grievance' (ideological or political) conflicts (Collier and Hoeffler, 2004).[3] Others have focused on the phenomenon of warlord violence, where the line between armed conflict and large-scale criminal violence becomes blurred (Reno, 1998; DeMars, 2000).

Consequences. One of the first features by which wars were classified was their level of mortality. The best-known definition based on mortality is the Correlates of War Project (CoW), which initially established the standard of 1,000 battle deaths as a threshold for 'war' (between states). This figure has near-iconic status in research that aims to analyse systematically different features of violent conflict (Geller and Singer, 1998, p. 27, n. 16; Small and Singer, 1982, p. 55). Although this mortality-based definition of armed conflict appears to put the human consequences at the centre of the analysis, in fact, the CoW project was mainly concerned with determining the proximate and underlying *causes* of inter-state wars, not their consequences. Today, however, our concern is with a greater range of conflicts in which death and injury are widespread, even if the threshold of 1,000 battle deaths is not crossed.[4]

Geography. Some definitions are based on the geographic scope of violence. Most often, a distinction has been made between international (cross-border) and civil or internal armed conflicts. This distinction was traditionally important for the involvement of the international community (which shied away from internal or civil conflicts), the determination of refugee status (versus that of internally displaced persons) or the application of international humanitarian law. This feature has become less relevant, however, since many conflicts are intra-state.

Most research organizations combine a number of these attributes in their definition of conflict. The definition guiding the Uppsala Conflict Data Program (UCDP),[5] for example, combines three of the four elements described above: 'An armed conflict is a contested incompatibility which concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths' (UCDP, 2005).

The lower death threshold attempts to include a wider range of conflicts than the CoW database. The definition, however, also specifies that at least one of the parties involved must be a state, and limits armed conflict to those disputes whose purpose is 'government and/or territory'. Crucially, it did *not* originally count those conflicts in which

the government was not one of the armed combatants. The UCDP attempted to address this omission by recently creating separate databases that cover *non-state conflict* (conflict between two groups, neither of which is the state), and *one-sided violence* by states or organized groups against civilians (such as massacres and genocide). This approach, however, complicates the data collection and creates an assessment problem, since the most complete data so far only covers the period since 2002.[6]

The relation of small arms and light weapons to conflict is complex and varied. People are killed by small arms-related violence during conflict, in post-conflict phases, and in 'peace time'. When seen through the lens of the small arms debate, delineations between 'conflict' and 'not-conflict' become problematic. For this reason, the Small Arms Survey uses a collective violence definition developed by the World Health Organization (WHO).

> The instrumental use of [armed] violence by people who identify themselves as members of a group—whether this group is transitory or has a more permanent identity—against another group or set of individuals, in order to achieve political, economic or social objectives (Krug et al., 2002, p. 215).

WHO is concerned with the effects of violence on public health, effects that occur in all conflict irrespective of the size or state involvement. The WHO definition is principally concerned with parties and purpose, although it leaves these categories as open as possible. For the purpose of small arms research we have added the word 'armed' to the definition.

This broad conception of armed conflict has several advantages. It includes fighting between non-state groups and captures genocidal violence, whether perpetrated by a state or not, even if the victims are unarmed. It also identifies armed conflict as a category of collective violence, rather than a *sui generis* phenomenon. By employing this definition, this chapter is able to connect its analysis of armed conflict to that of other violent practices, not all of which are armed and not all of which are collective. The definition locates armed conflict against the broader tapestry of violent exchanges, and, by not drawing sharp and arbitrary lines around it, more accurately reflects the variety and fluidity of contemporary armed violence involving small arms.

Within this definition, it is important to distinguish between *direct conflict deaths,* which occur as a direct consequence of fighting, often due to bodily trauma caused by weapons or ordnance, and *indirect conflict deaths,* which arise from the indirect consequences of armed violence, through such phenomena as death from illness, disease, or starvation that would not have occurred in the absence of the conflict. Indirect conflict deaths are most closely associated with the displacement of civilian populations in violent conflict zones. The sum of direct and indirect deaths can be considered to be excess mortality due to violent conflict: the additional mortality in a population beyond the level that would normally be expected in the absence of conflict. For reasons of convenience, this chapter may refer to excess mortality as 'conflict deaths'. Available evidence suggests that the ratio between direct and indirect deaths varies greatly between different violent conflicts, depending on the nature of the fighting (urban versus rural, fighting between conventional forces versus asymmetric warfare), the deliberate terrorization or targeting of civilians, access to health care facilities, and other factors.

The ratio between direct and indirect deaths varies greatly between different violent conflicts.

The datasets and sources discussed below concentrate on direct conflict deaths. They do not estimate how many direct deaths were caused by small arms and light weapons. Using epidemiological surveys, public health specialists have attempted to capture both direct and indirect conflict deaths, although often with imperfect or imprecise data.

COUNTING CONFLICT DEATHS: MULTIPLE SOURCES, DIFFERENT METHODS, WIDELY VARYING NUMBERS

A complete dataset on people killed in conflict—directly or indirectly—does not exist. All published figures are estimates based on incomplete information. Available information also often comes from a narrow range of sources, from which datasets are then constructed based on various criteria.

This section introduces the sources and methods currently used by researchers and describes how these sources are used to build datasets. For all of these sources and datasets, it examines what is not captured, either by definition or by 'real world' data collection limitations, and draws conclusions about their ability to estimate accurately the number of deaths in armed conflict. Then it briefly describes the most common research methods used to examine particular conflicts; it discusses their utility not only for estimating conflict dead, but also for distinguishing between direct and indirect deaths.

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A UN peacekeeper takes notes at a mass grave in Gatumba, Burundi, in August 2004.

Official reports and statistics

Official statements disseminated by warring parties are often the first reports available on the number of conflict deaths. But first does not imply most accurate. While an imprimatur can lend these statements a degree of authority, in practice they should be interpreted cautiously. Not only are official estimates based on incomplete information, but they are also often intended to mislead. As Monty Marshall of the University of Maryland has argued: 'counts are often purely speculative and always political' (Marshall, 2001, p. 3).

Even when relatively open to transparency, military officials often have no way of knowing the true extent of battlefield and civilian casualties. They are rarely present at the violent events and generally do not have data that would allow them to make a complete estimate of the numbers of dead. Knowledge of enemy losses is likely to be particularly limited. In situations of intense fighting, officials usually have more pressing concerns than establishing an accurate count of the number of dead. Systematic mortality surveillance systems also generally break down in times of war, if they ever existed (Hofmann et al., 2004, p. 19; Mathers et al., 2005, p. 172).

Examples of politically motivated misdirection about conflict casualties are numerous. Traditionally, this was called propaganda; the modern word is spin. From Vietnam to Bosnia, Afghanistan, and Iraq, the technique is still in routine use in modern warfare (see Box 9.1). Misdirection is not limited to the warring parties, however. NGOs and

advocacy organizations can also exaggerate or underestimate conflict deaths for their own purposes, or they may simply get the facts wrong because of limited access to information.

Box 9.1 Bosnia's conflict dead

In 1995, when UN Member States were debating the strategy for ending the violence in Bosnia and Herzegovina, it became routine to refer to 200,000 people killed in the conflict. In 1997, a US State Department report stated that 250,000 had been killed (US DOS, 1997).

These figures appear to have emerged in 1992 from a number of sources as politically motivated *projections*. In September 1992, a leaked CIA report stated that 150,000 deaths were expected if the West did not intervene in the conflict. The special envoy of the UN High Commissioner for Refugees, José María Mendiluce, apparently predicted 400,000 deaths. In December 1992, Bosnian Foreign Minister Haris Silajdzic told journalists that 128,444 persons had died, including Bosnians, Croats, and Serbs loyal to the Bosnian government. This precise figure seemed to imply that the dead had been counted to the last person. In reality it appears to have been derived by adding the list of 17,466 confirmed dead to an estimated additional 111,000 missing. In June 1993, the Bosnian Deputy Minister for Information, Senada Kreso, told journalists that 200,000 had died.

In 1995, the former Yugoslavia desk officer of the US State Department, George Kenney, suggested that a more realistic estimate of fatalities might be in the range of 25,000 to 60,000. He asserted that Bosnia's foreign minister 'understood the benefit of apparent slaughter' implied by combining missing and killed persons in the same figure. Kenney argued that these figures resonated well against the backdrop of pictures of skeletal Muslim men in Serbian prison camps, and that they were instrumental in garnering political support in the West and much-needed financial donations from the Muslim world. Although the figures he suggested appear to be closer to the truth, it should be noted that they, too, were politically motivated: Kenney was opposed to US intervention in the war.

Beginning in 1996, some research organizations had settled on lower figures. The Uppsala Conflict Data Program, publishing its results in the yearbook of the Stockholm International Peace Research Institute, estimates that the conflict in Bosnia and Herzegovina caused 25,000–55,000 battle-related deaths (SIPRI, 1996, p. 24). The 2002 *Annual Report* of the International Committee of the Red Cross (ICRC) states that the human remains of 15,500 persons had been found since 1992 (ICRC, 2002, p. 236). Not all had been identified. By December 2002 the ICRC had received 20,860 tracing requests for missing persons and had been able to close some 3,385 files (ICRC, 2002, p. 237). The ICRC expects that very few of the missing will be found alive, but points out that not all dead will have been reported missing.

These lower figures on Bosnia's conflict dead should not detract from the devastation wreaked on the communities that were affected by it. They do, however, illustrate the political sensitivity and inaccuracy of early casualty figures that were produced by officials within a particular political context.

Source: Kenney (1995), unless otherwise noted

'Casualty agnosticism' involves avoiding making casualty estimates.

When deliberate misdirection is not used, 'casualty agnosticism' is sometimes employed (Conetta, 2004, p. 28). This practice involves avoiding making casualty estimates. For example, the US administration has stated that estimates of non-US casualties from fighting in Iraq and Afghanistan in the past three years are either not available or not important to assessing campaign success (Conetta, 2004, p. 30). Observers believe, however, that more data is available than has been admitted publicly, and that the main motive is to avoid engaging in discussions that are likely to generate opposition to the conflict in Western and Muslim states. In public interviews, however, US Pentagon officials have acknowledged that they do record non-US deaths, to the extent that when Iraqi civilians appear to have been wrongfully killed, investigations are conducted and financial compensation is paid (The Memory Hole, 2004).

The 1990–91 US–Iraq conflict (Operation Desert Storm) provides an example of how casualty figures may be employed for political aims both during and after a conflict. In 1991, the US Defense Intelligence Agency (DIA) estimated with an error factor of 50 per cent that 100,000 Iraqi soldiers had been killed and 300,000 wounded. In 1993, former DIA analyst John Heidenrich estimated that as few as 1,500 Iraqi soldiers had been killed and around 3,000

wounded on the basis of interviews with Iraqi prisoners of war and numbers of bodies found (Heidenrich, 1993; *Jane's Defence Weekly,* 1993). Carl Conetta states that there were between 20,000 and 26,000 military fatalities in the war (Conetta, 2003, p. 39). It seems that the original number was an overestimate designed in part to demoralize Iraqis based on 'wildly exaggerated claims of casualties' (Bakshi, 1999). One interpretation suggests that a lower number of deaths would 'add strength to claims that the coalition campaign had some success in discriminating between military equipment and military personnel' (Roberts, 1993, p. 171).

Mortality statistics

In many countries, state authorities systematically record deaths and code them according to cause of death. Under its Statistical Information System (WHOSIS), WHO collects death registration data from more than 100 participating states. Some of this data can be used to monitor mortality levels and changes in mortality that might be caused by violent conflict. In many cases, however, data collection systems cease to function during conflict, if they ever functioned before. According to an assessment by WHO, only 64 countries submitted data that was considered complete in 2003 and coverage was minimal in sub-Saharan Africa, where deaths from violent conflict are concentrated. Death data in conjunction with censuses are possible sources for evaluating mortality levels, but this has not been fully explored (Mathers et al., 2005, p. 15).

Independent media reports

Media reports provide another perspective on armed conflict violence—and sometimes a more accurate one—than that provided by government sources. But they, too, must be considered with caution. Media reports are most valuable when they are the product of direct investigation by independent journalists on the ground.

Four factors impede the ability of journalists to gather accurate information. The first is formal restrictions placed on where journalists may travel, and with whom they may speak. Since independent reporting can contradict official government reports—and thus upset carefully managed public relations wars—such restrictions are common.

Secondly, the high levels of personal risk involved mean that reporters often do not have direct access to combat zones. Parties in conflict may also be able to effectively exclude journalists through force or coercion, and the deliberate targeting of journalists. In 2003–04, for example, 93 journalists and 17 media assistants were killed, and more than 2,500 were attacked or threatened, most of them in violent conflict zones (Reporters without Borders, 2005, p. 2).

Thirdly, even when journalists are reporting directly on conflict violence, their

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A journalist examines an exhumed mass grave in May 2003. The site was thought to contain up to 600 Kuwaiti prisoners of war executed in 1991 in Habbaniya, north-west of Baghdad, Iraq.

Box 9.2 Death in Darfur

Between 345,000 and 385,000 people are estimated to have died in Darfur since February 2003. Although figures are uncertain, between 60,000 and 240,000 of these deaths may have been direct conflict deaths. Using different data but broadly similar techniques, other analysts have estimated the total death toll at between 380,000 and 400,000 (Reeves, 2005a; CIJ, 2005).

Two epidemiological studies (WHO/EPIET, 2004; Depoortere et al., 2004) and a series of other reports (Reeves, 2004) provide a first assessment of what the possible death toll in Darfur could be. The first epidemiological survey was carried out by Medécins sans frontières (MSF) from April to June 2004 (Depoortere et al., 2004); the second by the European Programme for Intervention Epidemiology Training and the WHO between June and August 2004 (WHO/EPIET, 2004, p. 2). The two surveys covered sample populations of between 17,000 and 20,000 people in north and west Darfur. Many uncertainties remain and the total death toll will only be known once a more extensive survey of the population in Darfur can be done.

Both surveys found shockingly high mortality rates of similar proportions. The WHO survey found that mortality rates[7] averaged 7.3 deaths per 1,000 people per month (WHO/EPIET, 2004);[8] the MSF survey reported 8 deaths per 1,000 people per month (Depoortere at al., 2004).[9] The mortality rate varied between the two areas. WHO observed the lowest mortality in north Darfur: 4 per 1,000 people died every month (WHO/EPIET, 2004, p. 10). The highest rate was documented by MSF in El Geneina refugee camp, where 17 people died per 1,000 per month (Depoortere et al. 2004, p. 1318). In the absence of conflict the crude mortality rate would be about 1.5 deaths per thousand per month.

Table 9.1 uses these results to estimate excess mortality per month among the whole population of Darfur affected by the conflict (est. 2.2 million). A key assumption, but one that accords well with evidence for the intensity of the conflict and the humanitarian crisis (Reeves, 2005b), is that monthly mortality has remained constant over the course of the conflict, or that the periods studied are close to the median monthly mortality. Estimates can thus be derived for the total death toll for the period from February 2003, when the conflict began, until the end of 2004.

The survey data also makes it possible to distinguish violent deaths (direct conflict deaths) and excess mortality (direct and indirect conflict deaths). Although the range of indirect deaths between the two studies is relatively narrow, the estimates of direct conflict deaths differ significantly. In the WHO study, only 17 per cent of all deaths were attributable to violence compared to more than 60 per cent among the people surveyed by the MSF study.

Table 9.1 Extrapolations from mortality: possible death toll in Darfur, February 2003–April 2005

	Excess deaths per month in all of Darfur	Violent deaths per month in all of Darfur	Excess deaths in all of Darfur in 2004 (12 months)	Violent deaths in all of Darfur in 2004 (12 months)	Excess deaths, February 2003-April 2005	Violent deaths, February 2003-April 2005
WHO[1]	12,795[2]	2,224[3]	153,540[4]	26,688[5]	345,465[6]	60,048[7]
MSF[8]	14,300[9]	8,800[10]	171,600[11]	105,600[12]	386,100[13]	237,600[14]

Sources and notes:

1 WHO/EPIET (2004).

2 Based on the calculation that the excess mortality rate of 5.8 per 1,000 per month (documented mortality rate of 7.3 per 1,000 per month – the expected mortality of 1.5 per 1,000 per month) * 2.2 million people * 1,000 would mean 12,795 excess deaths per month.

3 Based on the calculation that the violent death rate of 1.01 per 1,000 per month [(42 recorded violent deaths * 1,000) / (sample population of 20,776 * recall period of 2 months)] * 2.2 million people * 1,000 would mean 2,224 violent deaths per month.

4 Monthly excess death toll times 12 (12,795 * 12).

5 Monthly violent death toll times 12 (2,224 * 12).

6 Monthly excess death toll times 27 (February 2003 to April 2005 = 27 months) (12,795 * 27).

7 Monthly violent death toll times 27 (2,224 * 27).

8 Depoortere et al. (2004).

9 Based on the calculation that the average excess mortality rate of 6.5 per 1,000 per month (average documented mortality rate of 8 per 1,000 per month – the expected mortality of 1.5 per 1,000 per month) * 2.2 million people *1,000 would mean 14,300 excess deaths per month.

10 Based on the calculation that the average violent death rate of 4.0 per 1,000 per month [(330 recorded violent deaths * 1,000) / (sample population of 17,519 * average recall period of 4.7 months)] * 2.2 million people * 1,000 would mean 8,800 violent deaths per month.

11 Monthly excess death toll times 12 (14,300 * 12).

12 Monthly violent death toll times 12 (8,800 * 12).

13 Monthly excess death toll times 27 (February 2003 to April 2005 = 27 months) (14,300 * 27).

14 Monthly violent death toll times 27 (8,800 * 27).

Box 9.2 How many have died in Darfur? (cont.)

This disparity is probably due to one major difference between the two studies: the WHO study only documented deaths that occurred within the area under review, while the MSF study asked people about deaths that occurred before they reached the refugee camps. The MSF study found that the crude mortality and, in particular, violent deaths were extremely high during the 'village and flight' periods. Once the internally displaced people had arrived in the camps, the mortality rate decreased five- to eightfold and the proportion of violent deaths reached similar levels to those recorded by the WHO study (13 per cent). The implication is that the MSF study estimate is closer to the real picture of direct conflict deaths. Both studies, however, highlight the catastrophic death toll in Darfur, and the crucial importance of the rapid provision of humanitarian relief.

Despite being based on a snapshot of mortality in a few accessible locations over a short period of time (between two and four months), these findings are consistent with the estimates from other independent studies (CIJ 2005; Reeves, 2004; 2005a). The levels of mortality recorded may not be representative of the entire duration of the conflict, nor are the surveyed areas necessarily representative of the broader region. The situation in refugee camps, on which the surveys focused, may differ from that of Darfur in general. It will not be possible to refine these estimates until surveyors have wider access to Darfur's population.

information often comes from second-hand sources such as local officials, eyewitnesses, medical personnel, and other individuals close to the conflict. The reliability and comprehensiveness of this information is seldom complete.

Finally, the more physically remote a conflict area is, the harder it is for journalists to reach and report on it, as the case of Guatemala demonstrates (see below). So although in some cases media reporting can generate overestimates—such as when reporting the impressions of soldiers fresh from combat (Conetta, 2003, p. 5)—the more common problem with media accounts is likely to be underreporting.

The most common problem with media accounts is likely to be underreporting.

Even journalists reporting from 'heavily covered' wars suffer from these problems of access. In the case of Afghanistan since 2001, early reports in the Western media estimated civilian deaths resulting from aerial bombardments at 1,000–1,300 (Conetta, 2002a, p. 7). Subsequent surveys of affected communities on the ground established that 5,576 people had died from bombardments, shootings, landmines, unexploded ordnance, and other violence during a nine-month period—more than four times the number reported in the press (Benini and Moulton, 2004, p. 411). A large number of these casualties, it turned out, were victims of the parallel war fought by the Northern Alliance that received much less attention in the Western media than did US military actions.

Similar discrepancies appear to have been evident in the estimates of Iraqi conflict deaths. Media-based estimates of Iraqi military and civilian deaths since military action began in 2003 stood at more than 10,000 by September 2004, and by March 2005 had reached more than 15,000 (IBC, 2005). But this number may underestimate the real death toll from violent means by as much as four times, if extrapolations based on the above-cited figure of 100,000 deaths estimated by Roberts et al. are correct (see below).

The accuracy of media reports ultimately depends on how they were derived. Journalists with first-hand experience of specific conflict incidents are likely to produce more accurate assessments than media statements that are themselves based on official or NGO reports. This inconsistency in accuracy comes to light when different types of media reports are aggregated within a single database. A recent example concerns the situation in Darfur, Sudan. Numerous reports state that 50,000 people have died in this conflict (BBC, 2004b; 2004c), but this figure appears to be based on a misinterpretation and misrepresentation of epidemiological data.[10] It seems to refer only to the few months specifically covered by a WHO study and to include only indirect (non-violent) deaths in camps for refugees or displaced persons (Reeves, 2004; CIJ, 2005). The actual figures, as noted in Box 9.2, are probably many times higher.

For these reasons, media reports must be used carefully and intelligently to avoid turning misleading figures into accepted truths. It should also be recognized that there will almost always be an element of underreporting of conflict incidents in the media, and it is important not to accept incomplete media-based counts as definitive. Broader estimates (such as databases) based on media reports must also be evaluated for the extent to which the media is likely to underreport in any specific conflict, in particular as the fighting becomes particularly intense or if it is located in inaccessible areas. Such media accounts can be supplemented with field research, which helps to provide a more complete picture.

Datasets

Datasets provide longitudinal data on deaths in different conflicts based on a mix of the above sources. The longest time-series dataset is the CoW project, which for some variables have data going back to 1816 (CoW, 2005). Since the early 1990s, a number of different data collection projects have also collected conflict data. Most tended to generate estimates of total numbers of deaths for the entire length of a conflict, and usually divided it by the number of years to obtain an annual average for each conflict.[11] They were thus unable to produce precise annual estimates that took account of variations in the intensity of individual conflicts. The total estimates for each conflict included in these datasets were usually based on figures suggested by governments, NGOs, or others and were thus highly susceptible to imprecision and distortion. In particular, uncritical reporting of incorrect official data probably occurred. For estimates of conflicts in the non-Western and non-industrialized world, the lack of multiple sources is also problematic. Finally, these estimates also often did not necessarily or systematically distinguish between direct and indirect conflict deaths, due to the nature of their sources.

The use of Internet search engines has helped researchers to construct more accurate annual figures as they are based on counts of incidents in a specific year (see Box 9.3). The datasets discussed in this chapter make extensive use of new technologies for data collection. They are the Armed Conflict Database of the International Institute for Strategic Studies (IISS, 2005); the Armed Conflicts Report of Project Ploughshares (Project Ploughshares, 2005); and

Box 9.3 Conflict death datasets: who counts what?

In recent years, Internet search engines have made it possible for conflict datasets to collect data by monitoring news reports from around the world on a continuous basis (King and Lowe, 2003). All three of the datasets discussed in this chapter—the Armed Conflict Database of the International Institute for Strategic Studies (IISS, 2005), the *Armed Conflicts Report* of Project Ploughshares (Project Ploughshares, 2005), and the Uppsala Conflict Data Project (UCDP, 2005; Mack et al., 2005)—make use of this technology to some degree. The results are estimates on the numbers of conflict dead in a particular conflict over a specific period of time, usually one year.

There are, however, differences in the way these projects collect and present their data. IISS employs research assistants who monitor news stories on a weekly basis. UCDP and Project Ploughshares tend to collect all stories in Internet research engines at particular points in the year when they are compiling their reports, thus perhaps missing more ephemeral sources that may disappear from the Internet (e.g. radio transcripts). UCDP and Project Ploughshares count conflict victims by calendar year, whereas IISS starts its year on 1 August of the previous year (2004 thus covers 1 August 2003 to 31 July 2004).

The projects also use slightly varying definitions. UCDP uses a collective violence definition and distinguishes between three different types of conflict: (i) inter- and intra-state conflicts, (ii) non-state conflicts, and (iii) 'one-sided violence' of unilateral force against the civilian population. IISS counts military and civilian lives lost as a direct result of an armed conflict, and distinguishes between (i) international armed border and territorial conflict, involving governments in armed conflict over sovereignty and territory, (ii) internal armed conflict that takes place between government forces and organized groups that control sufficient territory to sustain concerted military operations, and (iii) terrorism, including attacks involving one or more factions in significant armed opposition to a state. Violence directly attributable to state-sponsored human rights violations is not included in this definition. Project Ploughshares collects all data related to armed conflict.

the UCDP (UCDP, 2005; Mack et al., 2005), which collects data for the *Human Security Report* (HSR). These datasets or sources generate annual numbers of conflict dead (or numbers for specific conflicts without global totals, in the case of Project Ploughshares), making it possible to examine trends and changes in particular conflicts over time. These newer databases are able to base many of their entries on individual reported incidents and are thus more fact-based than their precursors.

Estimation techniques

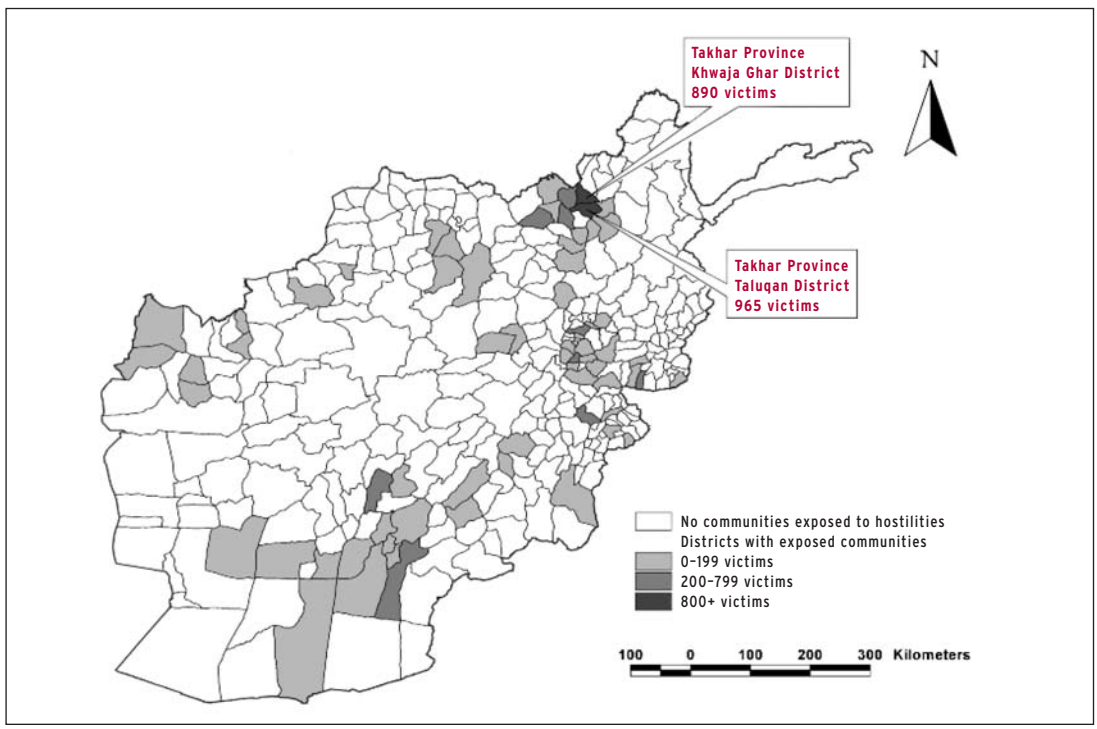
What other tools—in addition to datasets and the official government information and media reports from which they are constructed—are available to estimate conflict deaths? Broadly speaking, there are three types of estimation techniques: violence clustering surveys, multiple system estimation, and epidemiological surveys. These techniques are not mutually exclusive and can in some cases be combined to provide a more precise estimate of conflict deaths, mainly by triangulating different sources of information, or by establishing a matrix of information from which more robust conclusions can be drawn.

Violence clustering surveys, capture–recapture, and epidemiological surveys are the three main estimation techniques.

Violence clustering surveys

This technique to establish numbers of direct conflict deaths is based on the observation that conflict tends not to be spread equally across a region, but clustered in particular areas. It uses a two-step process. Analysts first determine which areas of a country experienced high levels of violence, through media reports, key informant interviews, and

Map 9.1 Districts with victims from direct violence during Operation Enduring Freedom



Source: Benini and Moulton (2004, Figure 3, p. 419)

field visits to areas thought to have been affected by combat. In the second phase, analysts carry out surveys in the areas where hostilities took place to estimate either mortality rates or total conflict deaths. Estimates are then extrapolated to the affected population, rather than for the entire population of the country.

This methodology has been widely used in surveys on landmines but has only recently been applied in Afghanistan to other kinds of weapons used in war (Benini and Moulton, 2004). It represents a promising method for estimating how many people were killed by different weapon types. Map 9.1 reproduces violence clusters in the Afghanistan study. It shows that violence tends to cluster rather than to be spread evenly across a territory. Studies that do not take these clusters into consideration in the selection of sample areas may over- or under-sample incidents of violence.[12]

Multiple system estimation (capture–recapture)

Multiple system estimation (MSE), a technique also known as 'capture–recapture', was developed in environmental science, biology, and other natural sciences, and has been used to estimate, or measure changes in, wildlife populations.

When applied to conflict deaths, MSE techniques take individual body counts as the starting point for a total conflict deaths estimate. The methodology compensates for inevitable undercounts due to lack of reports, unwillingness of families to cooperate, and human error. The technique uses available incomplete lists of the dead that are derived from different sources (such as victim interviews, police reports, morgue or hospital data, media reports that include names). Arriving at the total number of conflict dead involves calculating the frequency with which names appear on more than one list. The frequency provides an indication of the comprehensiveness of each individual list. The total number of conflict dead is then extrapolated on this basis. MSE assumes that any (dead) individual has an equal chance of appearing on any of the lists.

This method has been used to estimate the conflict dead in Kosovo (1999), in Guatemala (1960–96), and in Peru (1980–2000), and has demonstrated that early media-based numbers of conflict deaths were significant underestimates. It is particularly useful for estimating conflict deaths in protracted fighting in areas from where few reports reach the international community.[13] Yet it does require at least two sources with lists of names to be available.

Epidemiological surveys

In recent years, the tools of epidemiology—developed to monitor the occurrence of mortality and morbidity (injury or illness) in specific populations—have been increasingly applied to the study of interpersonal and collective violence. In principle, this approach uses the same techniques employed in studies on the incidence of disease in a specific population.

Epidemiological studies can be used to collect data on all types of death that occur in a particular population, allowing researchers to distinguish between direct and indirect conflict deaths. Analysts are thus able to construct a better picture of the relationship between direct and indirect conflict deaths, although the total estimates of direct deaths are usually subject to greater uncertainty than overall mortality.[14]

Epidemiological studies of conflict violence have been conducted in DRC, Burundi, Republic of the Congo, Sierra Leone, Darfur (Sudan), Kosovo, and Iraq.[15] Because surveys generate first-hand information about affected households, they can produce the most reliable estimates of the recent conflict death toll for the civilian population in the affected area; however, they do not capture groups that do not belong to the remaining community (e.g. combatants who came from an outside area) or groups that may have fled or have been completely eliminated. Epidemiological

surveys can be carried out during phases of violent conflict, but resulting access problems may produce greater risks of under- or over-reporting direct deaths.

Because they must generate their own data through individual and/or household surveys, epidemiological studies are often resource-intensive, costly, and time-consuming. One concern with survey data is that the results can be affected by inappropriate sample design or by enumerators of poor quality. In addition, basic information—such as expected mortality rates and total population figures—seldom available, which makes extrapolations from the survey results to the total population more unreliable.

Basic information—such as expected mortality rates and total population figures—is seldom available.

Combined estimation techniques

Ultimately, many of these methods are best used in combination in order to triangulate different estimates and arrive at a more robust estimate of conflict deaths in a particular case. Epidemiological studies can be conducted as part of violence cluster surveys. Capture–recapture studies can be used to improve estimates in datasets when incident or name lists are available. Individual entries in datasets can be corrected or improved on the basis of more detailed field studies. Table 9.2 illustrates the use of triangulation to derive an estimate of the death toll for the 1998–99 war in Kosovo.

COUNTING DIRECT DEATHS: UNDERREPORTING IN RECENT CONFLICTS

As noted above, datasets have an inherent tendency to underreport conflict deaths as they rely heavily on media reports. But by what margin do they underestimate these deaths—by a few percentage points or by several times the original estimate? In examining several recent conflicts, this section compares different sources to establish whether a plausible correction factor can be derived for direct conflict deaths in order to arrive at a more complete picture.

First, in an examination of conflicts in Kosovo, Guatemala, Peru, Iraq, and DRC, this section compares figures from media-based datasets with those provided by estimation techniques discussed above.

Kosovo

Table 9.2 shows estimates of conflict deaths in Kosovo in 1998–99 and compares four different studies, which used a variety of estimation techniques, with three media-based datasets. The estimation techniques produce consistently higher estimates than the media-based datasets (except in the case of the high estimate quoted by Project Ploughshares).

These figures illustrate two things. First, the estimation techniques tend to converge on a number of direct conflict deaths between 8,000 and 12,000 depending on the period covered. Second, the figures quoted in the UCDP and IISS databases closely reflect documented body counts (UNGA/UNSC, 2001, p. 33). While they closely match the number of exhumed corpses, they do not provide the full picture of the scale of direct conflict deaths. They appear to underestimate the total number of direct conflict deaths by between two and five times. Project Ploughshares, by contrast, provided a range that included as its lowest figure the exhumed bodies and as the highest the estimate produced by the US Centers for Disease Control and Prevention (Spiegel and Salama, 2000, pp. 2204, 2206).

Table 9.2 Estimated deaths in Kosovo by different sources

Source	Method	Estimated number of conflict deaths	Time period for survey
American Association for the Advancement of Science (AAAS) and American Bar Association (ABA)[1]	Multiple system estimation (MSE)	10,500	20 March–12 June 1999
Centers for Disease Control and Prevention (CDC)[2]	Epidemiological survey	12,000	February 1998–June 1999
International Criminal Tribunal for the Former Yugoslavia (ICTY)[3]	Estimates based on reports and exhumations	4,000 (bodies exhumed); 5,000-12,000 (estimated deaths)	Entire conflict
Physicians for Human Rights[4]	Epidemiological survey	8,000-9,269	May 1998–May 1999
IISS[5]	Media reports	3,000	1 August 1997–31 July 1999
UCDP[6]	Media reports	2,000-5,000 battle deaths	1998–99, but 'no detailed sources on the number of deaths could be found' (UCDP, 2005)
Project Ploughshares[7]	Media reports	4,000-12,000	n/a

Sources and notes:

1 ABA/AAAS (2000, pp. 1, 7). This estimate, based on 3,353 interviews conducted by several NGOs among ethnic Albanians who had fled Kosovo after March 1999, combines information from several lists using MSE.

2 Spiegel and Salama (2000, pp. 2204, 2206). Based on a two-stage health cluster survey among Kosovo's ethnic Albanian population in September 1999 that collected retrospective mortality data, including cause of death, for the period February 1998 to June 1999. War-related trauma was defined as any death occurring as a direct result of an injury sustained during the conflict, including arbitrary killings by gunfire, or by burning or collapsing buildings and other structures. The estimated total death toll was 18,800, which included a total of 6,800 indirect deaths.

3 BBC (1999), UNIS (1999), and UNGA/UNSC (2001, p. 33). In 1999, ICTY based its estimates on the exhumation of 2,108 bodies from about one-third of the reported grave sites and 11, 334 reported deaths. When forensic work ended in 2000, about 4,000 bodies had been exhumed.

4 Iacopino et al. (2001, p. 2016), PHR (1999), figure of 9,269 cited in ABA/AAAS (2000, p. 9).

5 IISS (2005).

6 UCDP (2005).

7 Project Ploughshares (2004).

Guatemala and Peru

The 36 years of violent conflict in Guatemala from 1960 to 1996 are estimated to have resulted in 119,300–145,000 direct conflict deaths. This figure is based on the first comprehensive MSE (capture–recapture) study of conflict deaths, which was conducted for the Guatemalan Commission for Historical Clarification (Ball, 1999; 2003; Ball, Kobrak, and Spirer, 1999).

During the peak of the violence between 1980 and 1983, the press 'missed the story' as it gradually stopped reporting on rural atrocities at a time when massacres were growing in frequency. As early as 1978, when mass killings became deliberate state policy, the reporting fell to zero. Reporters were evidently too afraid to venture into the countryside, or feared retaliation from the government for their interest. The fuller picture did not emerge until long after the conflict, when testimonies were systematically gathered from rural people. Figure 9.1, derived from the data used for the MSE study, clearly reflects the gap in media coverage, with the black line indicating the number of killings reported in the press, and the solid line the estimated number of killings reconstructed from documentary and interview sources using capture–recapture techniques.

In contrast to the MSE estimates, the UCDP dataset refers to at least 45,500 persons killed between 1967 and 1989 (UCDP, 2005).[16] While this figure corresponds roughly to documented numbers, an application of the MSE technique indicates that the real death toll, including undocumented cases, must be around three times higher.[17]

A similar MSE study for Peru estimated that the number of direct conflict deaths in the period 1980–2000 was 69,280, with a range of 61,007–77,552 (Ball et al., 2003, p. 2). This study established that more than half of the conflict dead had not been recorded by name in press or other accounts.[18] The UCDP database records more than 28,000 battle deaths for the period from 1980–1999, suggesting undercounting by at least a factor of two.

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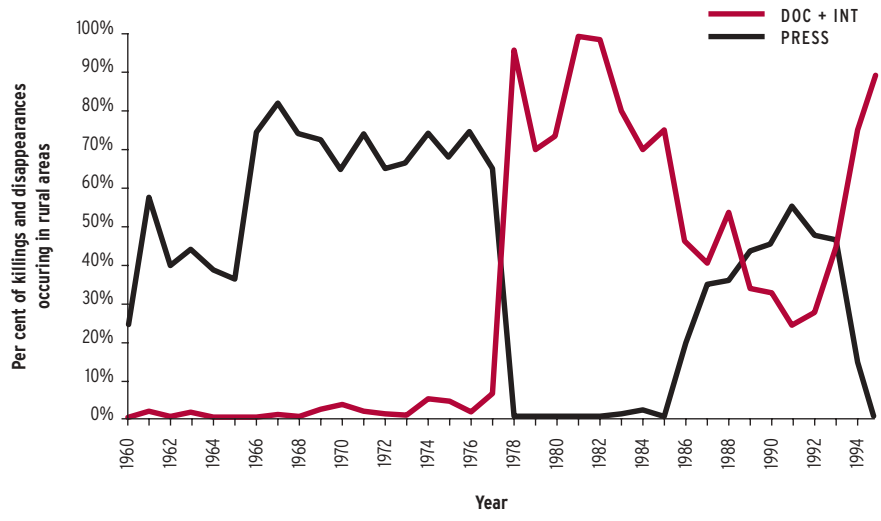
Mayan Indians carry the coffins of the victims of a 1982 massacre in a remote village south-east of Guatemala City in June 2003. The bodies of people slain during Guatemala's 36-year civil war have been exhumed from at least six mass grave sites.

Figure 9.1 Guatemala: per cent of killings and disappearances occurring in rural areas, by year and by source, 1960–1995



Source: Ball, Kobrak, and Spirer (1999, p. 54, Figure 9.2)

Afghanistan

Under Operation Enduring Freedom in Afghanistan, the most intense fighting lasted 12 weeks, from October to December 2001. Triangulation of different sources (see Table 9.3) suggests that more than 9,000 people died in Afghanistan during this period. This estimate is based on a detailed investigation of media reports of individual clashes, and a violence cluster survey of 600 local affected communities (Conetta, 2002a, pp. 4, 6; Benini and Moulton, 2004, p. 411). For the same period the estimates put forward by UCDP and Project Ploughshares are two to ten times lower.

Table 9.3 Conflict deaths in Operation Enduring Freedom, Afghanistan

Individuals killed	Source	Time period	Deaths
US troop losses[1] (direct conflict deaths among combatants)	Official statements	'autumn 2001 to spring 2002'	54
Afghan militia allied with the US[2] (direct conflict deaths among combatants)	Media-based	October 2001–January 2002	600
Taliban troops[3] (direct conflict deaths among combatants)	Media-based	October 2001–January 2002	3,000–4,000
Afghan civilians direct conflict deaths[4]	Violence cluster survey	September 2001–June 2002	5,576
Subtotal:			**9,000–10,000**
Afghan civilians[5] (indirect conflict deaths)	Unspecified mortality surveys in IDP camps in Afghanistan	15 September 2001–14 January 2002	8,000–18,000
Total:			**17,000–28,000**
Civilians, Taliban and al Qaeda fighters, US troop losses	IISS[6]	August 2001–July 2002	4,000
Battle-related deaths	UCDP[7]	2001	more than 1,000
Civilians, Taliban and al Qaeda fighters	(Project Ploughshares)[8]	2001–02	1,500–5,000

Sources and notes:

1 IISS (2005). Text on 2002; 42 of the 54 died in 'non-hostile' circumstances often involving friendly fire.
2 Conetta (2002a, p. 6).
3 Conetta (2002a, p. 4). This number is based on the total of estimates for major battles.
4 Benini and Moulton (2004, p. 411). During the period under review, September 2001–June 2002, 1,582 died from landmines and unexploded ordnance (UXO) and 3,994 died of bombardments, shooting, and other violence.
5 Conetta (2002a, p. 36). Based on mortality information from 10 IDP camps inside Afghanistan where the mortality rate was found to be between 1.5 to 4 per 1,000 per month. It has been assumed that mortality rates may have been higher outside the camps, where the population received less humanitarian assistance. It is possible that the proposed figure of 8,000 to 18,000 includes direct conflict deaths (of 3,200+).
6 IISS (2005).
7 UCDP (2005).
8 Project Ploughshares (2004).

Iraq

As discussed above, there are substantial differences in estimates of conflict deaths in Iraq between datasets based on media reports (10,000–15,000 deaths) and a recently conducted epidemiological survey (39,000 deaths). When comparing equivalent time periods (see Table 9.4), it is apparent that the dataset estimates are lower than the survey estimates by a factor of 1.9. The survey results have to be interpreted with caution, but they do provide strong evidence

of underreporting in the media.[19] On average the media missed every second incident. It is likely that the underreporting was more marked during the periods of high intensity fighting when the media were unable to cover the high number of incidents, in particular because of the dangerous working conditions.

Table 9.4 Estimates for Iraqi civilian deaths

Database	Time period	Conflict deaths estimates from media sources	Extrapolation from epidemiological study[5]	Factor of difference
IISS	August 2002-July 2003	10,000[1]	11,880[6]	1.2
IISS	August 2003-July 2004	15,000[2]	27,180[7]	1.8
UCDP	January–December 2003	8,494[3]	22,080[8]	2.6
Project Ploughshares	January 2003-December 2003	10,000-15,000[4]	22,080[8]	1.5-2.2

Sources and notes:

1 IISS (2005).

2 IISS (2005).

3 Mack et al. (2005).

4 Project Ploughshares (2004).

5 Roberts et al. (2004, p. 1860). Figures are based on the extrapolated total violent deaths in Iraq, excluding Fallujah. The formula applied here is the following: number of violent deaths/1,000 population/month = (number of recorded violent deaths * 1,000) / (sample population * recall period). Numbers were rounded after calculation. One violent death in the sample population of 7,438 during the 14.6 months of the pre-invasion Iraq is equivalent to 0.009 violent deaths per 1,000 per month. Thirteen violent deaths[20] in the sample population of 7,868 during the 17.8 months of the post-invasion period are equivalent to 0.09 violent deaths per 1,000 per month. If this finding is applied to the total population of Iraq (24.4 million), there will have been 225 violent deaths per month in the pre-invasion period (1 January 2002 to 18 March 2003) and 2,265 violent deaths during the post-invasion period (19 March 2003 to 16 September 2004).

6 Roberts et al. (2004, p. 1857). Based on comment 5 above (7.5 * 225 + 4.5 * 2,265 = 11,880).

7 Roberts et al. (2004, p. 1857). Based on comment 5 above (12 * 2,265 = 27,180).

8 Roberts et al. (2004, p. 1857). Based on comment 5 above (2.5 * 225 + 9.5 * 2,265 = 22,080).

Eastern DRC

The example from the eastern part of DRC is particularly instructive because the International Rescue Committee (IRC) conducted four different epidemiological surveys in the area between 2000 and 2003, thereby allowing an analysis of changes over time. The survey results indicate a large number of direct and indirect conflict deaths: perhaps more than 3.8 million direct and indirect conflict deaths as a result of the fighting, the large majority due to treatable and preventable diseases (IRC, 2004a, p. iii).

Table 9.5 compares the findings from the surveys with the data presented by IISS, UCDP, and Project Ploughshares. For the most intense periods of fighting, in particular for 2000 and 2001, the IISS numbers are about five times lower than those of the epidemiological surveys. The epidemiological surveys referred to in the table indicate that more than 190,000 people were direct victims of conflict in 2000 and 2001, while the IISS database records only 40,000 conflict deaths for that two-year period. The two other databases quote numbers that are too low (2,700 for UCDP and 1,200 for Project Ploughshares) to be considered realistic. The sources acknowledge, however, that the intensity of the conflict and difficulties of access meant that 'information on battle-related deaths was sporadic in 2001 and therefore the reliability is low' (UCDP, 2005) or that 'an estimate […] was made difficult by the remoteness of the conflict' (Project Ploughshares, 2004).

The data from the epidemiological surveys also shows a sharp decline in direct conflict deaths from about 88,000 in 2001 to about 5,500 and 4,600 in 2002 and 2003, respectively. IISS also recorded a sharp decline for the same years,

from 30,000 to 6,000 or fewer. The data presented by UCDP and Project Ploughshares appears to have become more reliable as the conflict intensity diminished.[21] The two latter sources, however, still produce estimates that are about 50 per cent lower than the epidemiological studies estimates (see Box 9.2).

Table 9.5 Comparison of conflict death figures for DRC, 2000–03

Year	Epidemiological survey			IISS	UCDP	Project Ploughshares
	Total conflict dead (direct and indirect)	Indirect	Direct	Direct	Battle-related deaths	Direct
2000	924,000[1]	824,000	103,000	30,000	2,500[5]	1,200
2001	937,500[2]	849,000	88,000	10,000	200[6]	– ('thousands')[8]
2002	343,000[3]	337,500	5,500	6,000	4,061[7]	1,000–4,000[9]
2003	286,000[4]	281,000	4,900	4,000	2,154	4,000[10]
Total (2000–03)[11]	**2,490,500**	**2,291,500**	**201,400**	**50,000**	**8,915**	**n/a**

Sources and notes:

1 IRC (2000, p. 1). This report covers the period January 1999–April 2000 and quotes a figure of 77,000 deaths per month. Direct conflict deaths were reported to be 11.1 per cent of total deaths in 2000 (IRC, 2003b, p. 6).

2 IRC (2001a, p. 3). Based on 2.5 million deaths over 32 months, or 78,125 deaths per month. In 2001, the reported percentage of direct conflict deaths was 9.4 (IRC, 2003b, p. 6).

3 IRC (2003b, pp. 6, 13). In 2002, with a decline in fighting, the proportion of direct deaths also declined to 1.6 per cent of the total.

4 IRC (2004a, p. 11). Based on 500,000 deaths in 16 months, or more than 31,000 excess deaths per month, of which 77 per cent were in eastern DRC. The proportion of direct deaths in eastern DRC remained at 1.7 per cent (IRC, 2004a, p. 17, Figure 5).

5 'The figure indicates an absolute minimum. The real death toll could be significantly higher' (UCDP, 2005).

6 'Information on battle-related deaths in DRC was sporadic in 2001 and therefore the reliability of this number is low' (UCDP, 2005).

7 UCDP figures for 2002–2003 from the forthcoming *Human Security Report* (Mack et al., 2005).

8 'An estimate of conflict deaths for 2001 was made difficult by the remoteness of the conflict and the limited media coverage' (Project Ploughshares, 2004).

9 'Independent media reports suggested that over 1,000 people died as a direct result of the conflict with a US State Department report citing over 4,000 ' (Project Ploughshares, 2004).

10 'A US State Department report suggests that over 4,000 civilians died as a direct result of the conflict in 2003. However, due to the remoteness of some of the fighting the real figure may be significantly higher' (Project Ploughshares, 2004).

11 This total does not include prior conflict deaths in 1998–99, which are included in the IRC estimate of 3.8 million total conflict dead (IRC, 2004a, p. iii).

Pulling the numbers together

The cases discussed above all suggest that while the data incorporated into the databases is well researched and based on documented cases, they underreport direct conflict deaths because media reports miss a considerable share of incidents. The degree of underreporting appears to depend on the intensity and remoteness of the conflict, increasing as conflict becomes more intense and more remote. A precise estimate on the extent of underreporting would require classification of conflicts according to intensity, remoteness, and attention paid by the international community, as well as the application of different factors for the expected level of underreporting for different categories. This approach requires further detailed case studies. For now, it is only possible to establish a rough estimate of the extent of underreporting at the global level based on the few studies documented above.

Table 9.6 lists the totals for direct conflict deaths offered by the three main datasets. Even here, significant variation exists—IISS numbers are 50–80 per cent higher than the lowest figures presented.

The above comparisons of estimates for Kosovo, Guatemala, Peru, Afghanistan, Iraq, and DRC suggest that media-based dataset reports underestimate direct conflict deaths by a factor of two to four.[23] This estimate is relatively conservative, and in cases such as DRC in 2000 and 2001, the extent of underreporting was probably greater. Table 9.7

Table 9.6 Dataset estimates of global direct conflict deaths, 2002 and 2003

Dataset	2002	2003
HSR[1]	27,000	27,000
Project Ploughshares[2]	25,303	43,490
IISS[3]	51,000	40,000

Sources:

1 HSR lists 'best' low and high estimates in its database. 'Best' estimates have been offered here: the ranges were 23,274–46,145 (2002) and 25,977–47,398 (2003). These totals include peacekeepers, civilians, and humanitarian aid workers killed in direct conflict. Figures based in part on data collected by UCDP for the 2005 *Human Security Report* (Mack et al., 2005; UCDP, 2005).

2 Project Ploughshares publishes a range of the estimated number of conflict deaths for individual conflicts (Project Ploughshares, 2004). Individual conflict estimates have been added together to provide the totals in this table. For 2002 they are 23,780 to 26,825. For the table above the midpoint of 25,303 has been chosen. For 2003 they are 39,875 to 47,105. For the table above the midpoint of 43,490 has been chosen. Project Ploughshares does not itself provide annual conflict death figures because they believe it to be 'next to impossible' to provide an accurate number.[22]

3 The IISS database continuously monitors newspaper reports (IISS, 2005). Its annual totals will thus continue to change (the database is updated every three months).

presents estimates of annual conflict deaths in 2003 that have been revised using correction factors of 2–4. Applying the highest and lowest numbers on the table yields a total of between 54,000 and 172,000 direct conflict deaths in 2003. A different approach—one that assumes that the lowest database figure calls for the greatest correction, and vice-versa—produces a range of 80,000–108,000 direct conflict deaths in 2003.[24]

Table 9.7 Correcting dataset underestimates of global direct conflict deaths, 2003

Media-based data source estimate		Low correction factor (2)	High correction factor (4)	Mid-point
UCDP	27,000	54,000	108,000	81,000
Ploughshares	43,000	86,000	172,000	129,000
IISS	40,000	80,000	160,000	120,000

Although these figures are higher than those of the most widely cited datasets, they are lower than estimates provided by WHO. WHO has published estimates for the period from 1999 to 2002, ranging from a high of 269,000 (1999) to a low of 172,000 (2002). WHO also works with publicly available datasets and sources, and adjusts for underreporting based on conflict intensity (Mathers, 2005). Unfortunately, no total is available for 2003 to compare with the above-cited adjusted estimate. No details are available about how WHO determines its conflict intensity adjustment factors, making a thorough evaluation of its findings difficult. WHO figures do suggest, however, that the number of direct conflict deaths could be higher than the revised estimate reported above.

For many conflicts, the degree of underreporting exceeds the range of two to four.

These figures are extremely tentative and result from an attempt to bring to bear information from detailed research on a few specific conflicts on the entire range of contemporary conflicts. In view of this imprecision, this chapter deliberately applies relatively conservative correction factors. Yet for many conflicts, the degree of underreporting exceeds the range of two to four (for example, DRC in 2001 or perhaps Darfur in 2003–04). If the initial findings regarding the possible death toll in Darfur (see Box 9.2) are found to be accurate, between 20,000 and 90,000 deaths may have to be added to the total death count for Darfur alone.[25]

Nevertheless, it is clear that although datasets provide useful information, it is essential to complement these sources with detailed research from the field using survey and estimation techniques.

Since the annual number of direct conflict deaths is considerably larger than media-based datasets indicate, two other questions emerge. What proportion of total conflict death is attributable to small arms and light weapons? And what can be said about the total number of indirect conflict deaths?

SMALL ARMS AND CONFLICT DEATHS

It is widely claimed that small arms are the most commonly used weapons in armed conflict, and that they are responsible for the majority of direct conflict deaths. Yet there is little concrete evidence to support this assertion. This section examines the available evidence in order to quantify better the role that small arms play in conflict deaths.

None of the existing datasets systematically distinguishes deaths by weapon type. The IISS database does include information on weapon types used in conflicts, but it does not provide information about the frequency with which weapons are used. One important conclusion can be made, however: small arms and light weapons have been used in every single conflict recorded by IISS; no other weapon category is as ubiquitous.

In the absence of a comprehensive dataset distinguishing weapon type, this section turns again to a closer analysis of individual conflicts to separate small arms conflict deaths from deaths by other causes. Doing so provides an estimate that between 60 and 90 per cent of direct conflict deaths—depending on the nature of the fighting—are caused by small arms and light weapons.

IISS monitored reports from eight conflicts in Asia, Africa, South America, and the Caucasus on a daily basis for four months (June to October 2004) and entered the number of incidents and reports, including weapons involved, into a database. The results are reported in Table 9.8. The data collection encountered all the underreporting difficulties associated with media reporting discussed above, especially in the cases of Nepal, Colombia, Ivory Coast, and Uganda, as well as the problem of state misrepresentation of data in Chechnya, Algeria, and Nepal.[26] In the absence of any evidence suggesting that the use of any particular weapon would be systematically over- or underreported, however, these difficulties do not appear to affect the analysis of the weapons type used.

In many cases, the type of weapon used was not explicitly indicated, but researchers were able to classify deaths based on available information concerning the nature of the incident and on knowledge of weapons availability, arsenals, and use in the country in question.[27] As Table 9.8 indicates, in the absence of specific information to the contrary, IISS researchers were able to classify the majority of incidents as small arms-related, with a high degree of confidence.[28] In all conflicts, however, it was difficult to make any distinction between small arms and light weapons use.

This data, while still tentative, indicates that small arms and light weapons together account for the majority of direct conflict deaths in these conflicts. Of the 1,364 recorded conflict deaths with specified causes in the eight conflicts, 1,225 could be attributed to small arms and light weapons—somewhat less than 90 per cent of specified cases. The significant number of unspecified cases makes it impossible to provide a precise estimate of the percentage of all conflict deaths caused by small arms. Yet even if none of the unspecified deaths were caused by small arms—a highly unlikely scenario—they would still account for more than 60 per cent of all direct conflict deaths.

Table 9.8 Cause of combat death in selected conflicts for the period from June to October 2004

Conflict	Total deaths counted	Deaths that could not be classified by weapon used	Deaths where weapon used could classified	Breakdown of classified deaths				
				Bladed	Small arms	Light weapons	Small arms and light weapons devices (IED)*	Improvised explosive
Aceh	194	0	194	1	178	15	193	0
Algeria	132	0	132	2	115	4	119	11
Burundi	244	0	244	0	244	0	244	0
Colombia	180	107	73	0	13	35	48	25
Ivory Coast	27	26	1	0	1	0	1	0
Nepal	274	1	273	0	234	0	234	39
Russia/Chechnya	558	343	215	0	153	12	165	50
Uganda	233	1	232	11	221	0	221	0
Total	**1,842**	**478**	**1,364**	**14**	**1,159**	**66**	**1,225**	**125**

*Note: IED include explosives, car bombs, and suicide bombers.
Source: IISS (2004)

Another finding emerges clearly from a review of these eight conflicts: although small arms are an important feature of all of them, their use in relation to other weapon types is highly variable even within the same conflict. In Iraq, a survey found that all civilians killed by non-coalition forces were killed by a firearm, while only five per cent of civilians killed by coalition forces were killed by use of a gun, while a large proportion died from bombardments (Lafta et al., 2005). Iraqi combatants, in contrast, died more frequently in direct combat—and thus from small arms—than from air attacks (Conetta, 2003, p. 37). The factors that affect the prevalence of use of different weapons is an important area of further study, but likely influences are the intensity of fighting, the availability of different weapons types, the nature of combatants (state armies or non-state actors), and tactics (whether there is a policy of targeting civilians, for example). For these reasons, it seems inappropriate to construct a global 'average' of the number or percentage of conflict deaths that are attributable to small arms. Such an average conceals the large variation found between different conflicts.

The use of small arms in relation to other weapon types is highly variable.

Further, such accounting necessarily omits the other ways that small arms contribute to direct conflict deaths—such as when they are not used to kill but to empower those who handle them. In the 1994 Rwandan genocide, small arms were used to round up and forcibly hold civilians, who were then killed primarily with blades (machetes). That the guns were instrumental in those killings is clear, for without them, the coercion necessary to detain large numbers of people would not have been possible.[29]

This example demonstrates the complexity of trying to unpack the use of small arms and light weapons in conflict. It is equally challenging to come to firm conclusions about indirect deaths, as shown below.

Box 9.4 Operation Iraqi Freedom: UK and US combat deaths

Media outlets reported regularly on the number of US and UK servicemen and women killed in Iraq in 2003–04, based on daily central command statements. These reports, which are publicly available, often described the context of each death, including how the victim was killed. Examples of typical reports include: 'died when he came under small arms fire while conducting combat operations in Falluja' or 'killed when a car bomb detonated near his convoy in Baghdad' (CNN, 2004). The Small Arms Survey conducted a detailed survey of these reports for the six-month period of 20 March to 15 October 2003.[30]

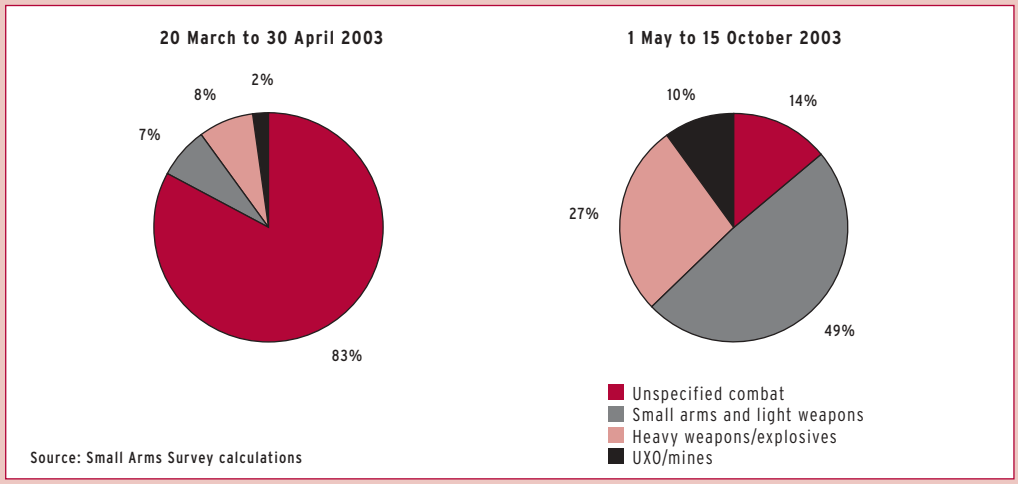
Injured US Marines lie on stretchers after an offensive in Fallujah, Iraq, in November 2004.

This data shows that casualty reports are less detailed during more intensive phases of conflict,[31] which is consistent with the hypothesis that reporting in general declines in quality as fighting intensifies. During the heaviest period of fighting, most reports stop providing weapon type and become vague (e.g. 'died as a result of enemy action'). This trend is highlighted through a comparison of the causes of death in combat between the most intensive period, from 20 March to 30 April 2003, and the months that followed the official end of the combat, from 1 May to 15 October 2003. During the first period, in which about half of all combat-related deaths occurred (109 of 220), the cause of death was specified in only 17 per cent of the reports. As hostilities became less frequent after the combat was declared over on 1 May 2003, reporting improved and cause of death was specified in more than 80 per cent of all reviewed cases.[32]

While the data are not specific enough to estimate the prevalence of small arms-related deaths for the first period, the survey indicated that between 20 March and 15 October 2003, small arms were the single most deadly type of weapon group for US and UK soldiers in Iraq, resulting in 55 per cent of all specified combat deaths.

Box 9.4 Operation Iraqi Freedom: UK and US combat deaths (cont.)

Figure 9.2 Distribution of the cause of US and UK combat deaths during the first six months of Operation Iraqi Freedom, 2003



Source: Small Arms Survey calculations

COUNTING INDIRECT CONFLICT DEATHS

Detailed demographic and epidemiological studies can be used to calculate the number of direct combat deaths. But their primary goal is usually to assess the indirect deaths or excess mortality that results from violent conflict or other forms of social disruption, such as migration, genocide, or natural disasters.[33] These indirect deaths are 'caused' in a narrow sense by specific factors, such as higher infant and maternal mortality triggered by a lack of basic health care, or widespread disease mortality resulting from malnutrition, starvation, and limited access to clean water. But in a broader, counterfactual sense, these deaths would not have occurred in the absence of violent conflict, and hence the conflict itself is a cause of these indirect deaths.

That small arms play a leading role in indirect conflict deaths is also certain. But how are they—or any other tool of war—implicated in indirect conflict mortality? Undoubtedly, the widespread proliferation and misuse of small arms during and after conflict reduces the ability of governments, NGOs, and aid agencies to maintain or restore essential services, in addition to establishing a semblance of law and order (Beasley, Buchanan, and Muggah, 2003; Small Arms Survey, 2002, pp. 155–201). Two-thirds of humanitarian aid workers surveyed in a large-scale survey (of 17 humanitarian agencies in more than 90 countries) reported that at least 25 per cent or more of their target population of vulnerable groups were inaccessible due to the perceived availability of small arms and light weapons (Muggah and Buchanan, 2005). The continued suppression of these services due to small arms-related insecurity must therefore be considered a factor in the resulting preventable deaths.

Small arms proliferation and misuse also continues to be a significant cause of direct deaths in post-conflict settings, where violence levels can linger at elevated levels after the fighting has stopped (POST-CONFLICT).

Quantifying the number of indirect conflict deaths and their relationship to direct deaths in violent conflicts is difficult. A limited amount of data based on epidemiological surveys exists for central and West Africa, Iraq, Sudan, Kosovo, and Cambodia. These studies, using a variety of methods, have generated population figures and crude mortality rates (CMR) for populations affected by conflicts in those regions.[34] By comparing these rates to region-wide

Table 9.9 Excess mortality in selected recent violent conflicts

	Expected CMR (deaths per 1,000 people per month)	Documented CMR	Excess CMR	Ratio of 'documented to expected' CMR
Kosovo, 1998-99[1]	0.31[16]	0.72[1]	0.41	2.3
Iraq[2]	0.4[17]	1.0[2]	0.6	2.5
Eastern DRC, January 1999-May 2000	1.3-1.5	5.2[3]	3.7-3.9	3.5-4.0
Eastern DRC, 2001	1.3-1.5	5.4[4]	3.9-4.1	3.6-4.2
Eastern DRC, 2002	1.3-1.5	3.5[5]	2.0-2.2	2.3-2.7
Eastern DRC, 2003-04	1.3-1.5	2.3[6]	0.8-1.0	1.5-1.8
Burundi, Bujumbura Province, 2001	1.3-1.5	3.6[7]	2.1-2.3	2.4-2.8
Burundi, Bujumbura Province, 2002-03	1.3-1.5	3.6[8]	2.1-2.3	2.4-2.8
Burundi, Muyinga Province, 2002	1.3-1.5	3.4[9]	1.9-2.1	2.3-2.6
Burundi, Makamba Province, 2001-02	1.3-1.5	2.0[10]	0.5-0.7	1.3-1.5
Congo-Brazzaville, Pool Region, 2003	1.3-1.5	2.9[11]	1.4-1.6	1.9-2.2
Sierra Leone, Kenema District, 2001	1.3-1.5	3.7[12]	2.2-2.4	2.5-2.8
Sudan, North Darfur, 2004	1.3-1.5	4.4[13]	2.9-3.1	2.9-3.4
Sudan, West Darfur, 2004	1.3-1.5	8.9[14]	7.4-7.6	5.9-6.9
Sudan, Kalma Camp South Darfur, 2004	1.3-1.5	11.4[15]	9.9-10.1	7.6-8.8

Sources and notes:

1 Spiegel and Salama (2000, p. 2204).
2 Roberts et al. (2004, pp. 1857, 1860). Based on the calculation that 142 recorded deaths (including Fallujah) / by the sample population of 7,868 / by the recall period of 17.8 months (19 March 2003 to mid-September 2004) *1000 = 1.0.
3 IRC (2000, pp. 1, 6). Based on the calculation that 606 recorded deaths (p. 1) / by the sample population of 7,339 (p. 1) / by the recall period of 16 months (January 1999 to May 2000 pp. 1, 6) * 1000 = 5.2.
4 IRC (2003b, p. 12). The CMR here refers to the period August 1999 to April 2001.
5 IRC (2003b, p. 12).
6 IRC (2004a, p. 10).
7 IRC (2002a, p. 1).
8 IRC (2003a, p. 3).
9 IRC (2002b, p. 2).
10 IRC (2002c, p. 1).
11 IRC (2004b, p. 3).
12 IRC (2001b, p. 3).
13 WHO/EPIET (2004. p. 10). Based on the calculation that 82 recorded deaths / by the sample population of 9,274 / by the recall period of 2 months (15 June to 15 August 2004) *1000 = 4.4.
14 WHO/EPIET (2004. p. 16). Based on the calculation that 142 recorded deaths / by the sample population of 7.996 / by the recall period 2 months (15 June to 15 August 2004) *1000 = 8.9.
15 WHO/EPIET (2004. p. 22). Based on the calculation that 80 recorded deaths / by the sample population of 3.506 / by the recall period of 2 months (15 June to 15 August 2004)*1000 = 11.4.
16 Spiegel and Salama (2000, p. 2205).
17 Roberts et al. (2004, pp .1857, 1860). Based on the calculation that 46 recorded deaths in pre-invasion Iraq / by the sample population of 7,438 / by recall period of 14.6 months (January 2002 to 18 March 2003) *1000 = 0.4.

average crude mortality rates, or to pre-conflict data for the same area (when available), analysts can estimate excess mortality due to violent conflict.[35] CMR is often expressed in terms of deaths per 1,000 population per month. For acute emergencies, it can be calculated as deaths per 10,000 population per day.

CMR are usually higher during violent conflict than during peacetime, but there is considerable variation in the excess mortality in different conflicts. Table 9.9 provides a range of observed CMR for recent conflicts, or conflict years. In sub-Saharan Africa the CMR for populations not affected by violent conflict is estimated to be 1.3–1.5 deaths per 1,000 per month.[36] The observed CMR in violent conflict zones, however, has ranged from 2.0 (Burundi, Makamba Province, in 2001–02) to 11.4 (in the Kalma refugee camp in South Darfur in 2004). The median observation is a CMR of 3.6 deaths per thousand population per month, or more than double the crude mortality rate for areas not affected by violent conflict.

A useful comparative indicator of the severity of a conflict or a humanitarian crisis is the ratio of 'documented to expected' CMR. During the conflict in Kosovo in 1998–99, the crude mortality rate was 2.3 times greater than rates prior to conflict; in Iraq 2.5 times the prior rate. In the African cases, excess mortality ranged from 1.5 to 8.8 times the expected mortality rate. The highest rates were found in eastern DRC in 1999–2001, and in parts of Sudan in 2004. These numbers highlight the generalized impact that violent conflict has on an entire population, especially vulnerable groups, far beyond just the direct combatant deaths.

Table 9.10 Ratio of direct to indirect conflict deaths in selected recent violent conflicts

	Direct deaths as a percentage of excess deaths	Indirect deaths as a percentage of excess deaths
Kosovo, 1998-99	100.0[1]	0.0
Iraq, post-2003 invasion	84.9	15.1
Cambodia, 1975-79	50.0	50.0
Eastern DRC, 2000	16.5	83.5
Eastern DRC, 2001	12.2	87.8
Eastern DRC, 2002	2.7	97.3
Eastern DRC, 2003-04	5.2	94.8
Congo-Brazzaville, Pool Region, 2003	18.2	81.8
Burundi, Bujumbura Province, 2001	19.7	80.3
Burundi,Bujumbura Province, 2002	40.5	59.5
Burundi, Muyinga Province, 2002	3.4	96.6
Burundi, Makamba Province, 2002	22.7	77.3
Sierra Leone, Kenema District, 2001	5.0	95.0
Sudan, West Darfur, 2004	14.4	85.6
Sudan, North Darfur, 2004	29.6	70.4
Sudan, Kalma Camp, South Darfur, 2004	11.6	88.4
Zalingei, Darfur, 2004	62.8	37.2
Murnei, Darfur, 2004	87.0	13.0
Niertiti, Darfur, 2004	38.5	61.5
El Geneina, Darfur, 2004	10.5	89.5
Median, sub-Saharan Africa	**23.6**	**76.4**

Sources: See Appendix 9.1.

Note:

1 In Kosovo, the number of violent deaths recorded in the sample population actually exceeded the number of calculated excess deaths (both direct and indirect) in the conflict. This may be a statistical artefact due to the small numbers used to calculate ratios, but it also reflects the fact that intentional injury was a cause of death in Kosovo even before the most intense phase of the conflict measured here. Some direct deaths may therefore have been included in the number of expected deaths for the population.

The final piece of the conflict death puzzle is the relationship between direct and indirect conflict deaths. By examining what we know about excess mortality and direct deaths in specific conflicts, we can begin to shed light on this question. Available evidence shows a wide disparity in the proportion of direct and indirect deaths in any given conflict. Based on information from a limited number of conflicts, summarized in Table 9.10, the two extremes seem to be represented by the Kosovo and Iraq conflicts on one hand, and sub-Saharan conflicts on the other. In Iraq, almost 85 per cent of conflict deaths can be directly attributed to armed violence, and in Kosovo all the reported excess deaths are from violence. In sub-Saharan Africa, by contrast, a median figure of 23 per cent of total deaths are direct conflict deaths—the vast majority result from a higher incidence of disease.

There is a large disparity between different conflicts regarding the proportion of direct and indirect deaths.

Why is there such a great disparity between different conflicts regarding the proportion of direct and indirect deaths? Although this is a new area of inquiry, two hypotheses can be suggested:

Pre-existing health care systems, disease patterns, and the extent of humanitarian response explain differences in ratios. As noted by Spiegel and Salama (2000, p. 2207), infectious diseases commonly associated with malnutrition are the largest cause of mortality during conflicts in less-developed countries. This may explain the observed differ-

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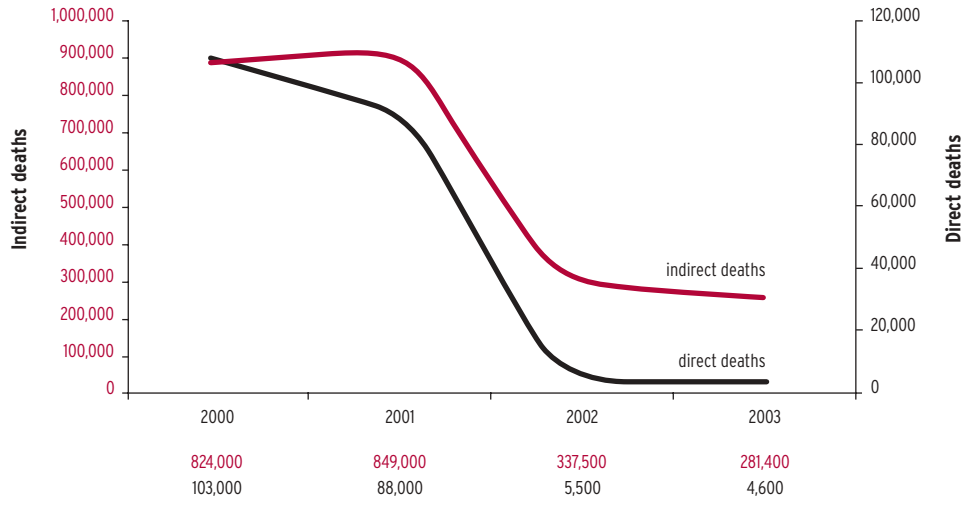
Medical staff examine an eight-year-old girl who is suffering from malnourishment in a Sudanese IDP camp in June 2004. The girl and her family fled their village after Janjaweed Arab militants burnt it down.

ences between sub-Saharan Africa and Kosovo and Iraq. Both Kosovo's and Iraq's health care systems were better developed before the conflict than those of the sub-Saharan countries presented here. In addition, the period of widespread violence in Kosovo was comparatively short, and the humanitarian response of the international community was more vigorous and covered a greater share of the population than has been the case for most of the populations affected by conflicts in sub-Saharan Africa. The relatively small share of indirect deaths in Iraq compared to African countries may also reflect the nature and relatively concentrated levels of violence in Iraq.[37]

Direct and indirect crude mortality rates change over the duration of the conflict and during the post-conflict phase. It appears that when violence breaks out, direct mortality rates increase rapidly as people are killed; they are followed by an increase in indirect mortality rates. As conflict subsides and violence is brought under control, direct mortality rates decline rapidly. Indirect mortality rates also decline, but somewhat more slowly, and they remain elevated for an unspecified time (Ghobarah, Huth, and Russett, 2001). There is a limited amount of data to demonstrate this point, but the three surveys carried out in DRC between 2000 and 2003 support this hypothesis, showing how the lingering effects of violent conflict are manifest in high levels of excess mortality—indirect deaths—even after the violence has ebbed. Figure 9.3 charts how, in the eastern part of DRC, both direct and indirect death rates have declined since 2000, but direct death rates have fallen much more significantly (approaching zero in 2003) than indirect death rates, which remain worryingly high. Subsequent outbreaks of violence in 2003–04 suggest that mortality rates may have climbed again.

Figure 9.3 Decline in indirect and direct deaths in DRC based on IRC studies



Sources and notes:
2000: IRC (2000, p. 1). This reports covers the period January 1999–April 2000 and quotes a figure of 77,000 deaths per month as the total death toll. Direct deaths were reported to be 11.1 per cent of the total deaths in 2000 (IRC, 2003b, p. 6).
2001: IRC (2001a, p. 3). Based on 2.5 million deaths over 32 months, or 78,125 deaths per month. In 2001, the reported percentage of direct conflict deaths was 9.4 (IRC, 2003b, p. 6).
2002: IRC (2003b, pp. 6, 13). In 2002, with a decline in fighting, the proportion of direct deaths also declined to 1.6 per cent of the total.
2003: IRC (2004a, p. 11). Based on 500,000 deaths in 16 months, or more than 31,000 excess deaths per month, of which 77 per cent were in eastern DRC. The proportion of direct deaths in eastern DRC remained at 1.7 per cent (IRC, 2004a, p. 17, Figure 5).

The persistence of high levels of indirect conflict deaths after the end of the violent phase of a conflict is an important problem for policy-makers concerned with humanitarian aid and reconstruction. It is often far more time-consuming to restore health infrastructure, services, and security than to negotiate a ceasefire, or even demobilize combatants. States that have been weakened by long-term violent conflicts generally lack the resources and capacity to address these challenges, and progress is not made until long after a conflict has ended (Small Arms Survey, 2003, pp. 125–67). The disruption and increased mortality that persists at the end of a violent conflict needs to be taken seriously into account when planning long-term reconstruction and development programmes.

Assembling the puzzle: global direct and indirect conflict deaths

Without additional information or very general estimates, the figures given above cannot be easily used to construct an overall global estimate of indirect conflict deaths. What is required is some or all of the following information:

- a comprehensive and up-to-date inventory of ongoing conflicts;
- reliable and standardized figures for direct conflict deaths (either raw or adjusted, if necessary, by an appropriate multiplier);
- a good estimate (denominator) of the affected population (which is usually not the total population of a country, but rather of a conflict zone within a country, or spanning an international frontier);
- a baseline pre-conflict expected CMR for the affected population;
- a means of estimating the appropriate ratio of 'documented to expected' CMR, which takes into account such factors as the intensity of the conflict or the coverage and quality of health and other basic services.

Such information is scarce, but a robust model based on existing partial information could be developed. The enormous variations between the ratios of direct and indirect deaths observed in sub-Saharan Africa highlight the need to develop estimation techniques that consider factors of health care provisions in conjunction with conflict intensity. It might be particularly useful in early warning systems, and for alerting the international community to the relative severity of a humanitarian crisis, beyond the impressionistic information conveyed by media accounts or other informants.

Of all the regions affected by armed conflict, sub-Saharan Africa will likely provide the most important indications of how direct and indirect deaths fit together. Not all necessary data points are yet available, however. Among the missing data are CMR estimates for countries not affected by conflict; an average CMR for conflict-affected areas; and accurate population counts for both conflict and post-conflict settings.

But even when this data falls into place, an acceptably precise global count of indirect conflict deaths may remain elusive. Although based only on two recent conflicts, it appears likely that the ratio of indirect to direct deaths is lower in other parts of the world than in sub-Saharan Africa. There are many reasons for this, but one is the ability (or inability) of governments, international organizations, and NGOs to access affected populations and to provide basic services and assistance even during violent conflicts.

It is thus not yet possible to generate an annual global total for conflict deaths. In retrospect, however, the widely circulated estimate of 300,000 annual small arms conflict deaths (Small Arms Survey, 2001) may be too high for recent years. Yet it would be reasonable to assume that overall conflict deaths would reach well beyond 300,000 if

indirect deaths were included. Certainly such a figure is within the range suggested by the available evidence and the ratio for sub-Saharan Africa. The true number of conflict dead may of course be higher, but it is not likely to be much lower.

It is important, however, *not* to claim that small arms and light weapons 'caused' all these deaths. As noted above, small arms and light weapons are directly responsible for 60–90 per cent of direct conflict deaths, but they cannot be considered responsible in the same way for indirect deaths—no individual weapon 'causes' an indirect death. Instead, analysts should apply the same counterfactual criterion that is used in epidemiological studies. In the absence of widespread proliferation and misuse of small arms and light weapons, what would be the level of excess mortality (indirect conflict deaths)? It would be much, much lower than has been witnessed in recent wars. From a policy-making perspective, this conclusion is perhaps more important than any statistic.

Small arms and light weapons are directly responsible for 60–90 per cent of direct conflict deaths.

The distinction between direct and indirect deaths has enormous implications for policy-makers. Knowing the main causes of excess mortality in conflict will help them tailor aid according to the most urgent needs.

For people affected by violent conflict, however, it matters little whether the death of a child or partner was caused by a bullet, or by disease or starvation because the family was forced to flee its home. It is therefore important—as the epidemiological studies stress—to count all deaths from violent conflict, and not simply to focus on those caused by the use of violent means on combatants or civilians.

CONCLUSION

Innovative research and data-gathering in recent years has greatly improved our understanding of how many people are killed in conflict, and how they die. This chapter has provided an overview of different methods of calculating conflict deaths—both for individual conflicts and for global annual estimates. It finds that the datasets based on media accounts—even those that use continuous monitoring technologies—probably underestimate the number of people killed directly in conflict by a factor of between two and four.

More importantly, the evidence is strong that in most conflicts in the developing world, the number of indirect conflict deaths greatly exceeds direct conflict deaths. Many publicly cited estimates do not accurately count those who die indirectly, even though in places such as DRC or Sudan, they greatly outnumber those who die by violent means. A full picture of the human costs—in terms of lives lost—in contemporary conflicts must include indirect as well direct conflict deaths.

Small arms and light weapons are also a big part of the problem; this research suggests that small arms are responsible for 60–90 per cent of direct conflict deaths, and that they play an analogous role in causing indirect conflict deaths.

Going beyond existing knowledge will require not just the refinement of estimation techniques and data collection, but serious field work and studies designed to provide comparative data on the intensity and duration of violent conflicts, on weapons use patterns, and on the reliability of reporting (due to the remoteness of conflict zones or lack of access by the international media). The practical utility and policy relevance of such information is clear, for humanitarian agencies and relief organizations, conflict mediation and resolution efforts, post-conflict disarmament, demobilization, and reintegration programmes, and reconstruction and development efforts.

Data limitations also make it difficult to conclude there has been a recent decline in armed conflict deaths, although the *number* of active armed conflicts seems to have declined (Marshall and Gurr, 2003, p. 12). Improvements in the way media reports are collected and assessed in databases, and greater care in the use of official estimates, may have inadvertently exaggerated the decline in conflict deaths, since many previous figures appear to have included direct and indirect deaths in an indiscriminate way. Today, most data sources only include direct deaths. Further, the apparent decline in conflict deaths may also be only a short-term phenomenon; the overall level of global violence has witnessed periodic spikes and low periods since 1816, but the overall level of conflict mortality per 1,000 people has not varied greatly over the long term (Sarkees, Wayman, and Singer, 2003, p. 66). Despite certain progress in reducing the incidence of inter-state war and in resolving some long-standing conflicts, looming demographic crises and resource scarcities in many parts of the world mean that researchers should not conclude that the era of violent conflict is ending.

Finally, the human impacts of conflict go far beyond direct and indirect mortality. Many of those who survive will bear non-fatal injuries, disability, economic privation, and psychological trauma for the rest of their lives. Thousands will lose a family member, a parent, a friend. Hundreds of thousands will be displaced from their homes and communities for years, possibly forever. Violence does not only destroy lives, but also infrastructure, social capital, and livelihoods. All of these long-term effects warrant greater attention and require better analysis and data from researchers.

APPENDIX 9.1 DIRECT AND INDIRECT CONFLICT MORTALITY RATIOS

	Total Deaths		Direct Deaths		Indirect Deaths	
	Total deaths recorded	Estimated excess deaths in sample population	Recorded in the sample population	% of excess deaths	Estimated indirect deaths among excess deaths	% of excess deaths
Kosovo, 1998-99[1]	105	62	67	108.1	-5	-8.1
Iraq, post-2003 invasion[2]	142	86	73	84.9	13	15.1
Cambodia, 1975-79[3]	n/a	n/a	n/a	50.0	n/a	50.0
Eastern DRC, 2000[4]	606	419	69	16.5	350	83.5
Eastern DRC, 2001[5]	894	690	84	12.2	606	87.8
Eastern DRC, 2002[6]	443	256	7	2.7	249	97.3
Eastern DRC, 2003-04[7]	3174	1044	54	5.2	990	94.8
Congo-Brazzaville, Pool Region, 2003[8]	47	22	4	18.2	18	81.8
Burundi, Bujumbura Province, 2002[9]	214	127	25	19.7	102	80.3
Burundi, Bujumbura Province, 2003[10]	272	163	66	40.5	97	59.5
Burundi, Muyinga Province, 2002[11]	106	59	2	3.4	57	96.6
Burundi, Makamba Province, 2002[12]	84	22	5	22.7	17	77.3
Sierra Leone, Kenema District, 2001[13]	197	119	6	5	113	95
Sudan, West Darfur, 2004[14]	142	118	17	14.4	101	85.6
Sudan, North Darfur, 2004[15]	82	54	16	29.6	38	70.4
Sudan, Kalma Camp, South Darfur, 2004[16]	80	69	8	11.6	61	88.4
Zalingei, Darfur, 2004[17]	100	78	49	62.8	29	37.2
Murnei, Darfur, 2004[18]	322	276	240	87.0	36	13.0

	Total Deaths		Direct Deaths		Indirect Deaths	
	Total deaths recorded	Estimated excess deaths in sample population	Recorded in the sample population	% of excess deaths	Estimated indirect deaths among excess deaths	% of excess deaths
Niertiti, Darfur, 2004[19]	116	78	30	38.5	48	61.5
El Geneina, Darfur, 2004[20]	115	105	11	10.5	94	89.5
Median Sub-Saharan Africa				**23.6**		**76.4**

Sources and notes:

1 Spiegel and Salama (2000, pp. 2205). Based on the calculation that with an expected mortality rate of 0.31 per 1,000 per month, 43 deaths would be expected to occur within the sample population of 8,605 during the recall period of 16 months.

2 Roberts et al. (2004, p. 1860). Based on the calculation that with an expected mortality rate of 0.4 per 1,000 per month, 56 deaths would be expected to occur within the sample population of 7,868 during the recall period of 17.8 months.

3 Data for Cambodia is based on demographic reconstruction and estimates the total number of violent deaths between 1975 and 1979 at 1.1 million, or about half of estimated excess deaths (Heuveline, 2001, p. 125).

4 IRC (2000, pp. 1, 3; 2003b, p. 6). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 187 deaths would be expected to occur within the sample population of 7,339 during the recall period of 17 months. The total number of deaths of 606 has been taken from IRC (2000, p. 1). The figure of 624 presented in IRC (2003b, p. 6) has not been used here; only the number of violent deaths (69) has been taken into account.

5 IRC (2001a, pp. 8–11; 2003b, p. 6). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 204 deaths would be expected to occur within the sample population of 11,347 during the recall period of 12 months.

6 IRC (2003b, pp. 5–6). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 187 deaths would be expected to occur within the sample population of 13,425 during the recall period of 9.3 months.

7 IRC (2004a, pp. 11, 13, 17). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 2,130 deaths would be expected to occur within the sample population of 88,746 during the recall period of 16 months.

8 IRC (2004b, p. 7). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 25 deaths would be expected to occur within the sample population of 1,508 during the recall period of 11 months.

9 IRC (2002a, p. 1). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 87 deaths would be expected to occur within the sample population of 2,822 during the recall period of 20.5 months.

10 IRC (2003a, pp. 3, 17, 18). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 109 deaths would be expected to occur within the sample population of 3,144 during the recall period of 23.1 months.

11 IRC (2002b, p. 2). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 47 deaths would be expected to occur within the sample population of 2,068 during the recall period of 15.2 months.

12 IRC (2002c, p. 1). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 62 deaths would be expected to occur within the sample population of 2,311 during the recall period of 18 months.

13 IRC (2001b, pp. 5, 10). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 119 deaths would be expected to occur within the sample population of 4,340 during the recall period of 12 months.

14 WHO/EPIET (2004, pp. 16, 17). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 24 deaths would be expected to occur within the sample population of 7,996 during the recall period of 2 months.

15 WHO/EPIET (2004, pp. 10, 11). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 28 deaths would be expected to occur within the sample population of 9,274 during the recall period of 2 months.

16 WHO/EPIET (2004. pp. 22, 23). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per month, 11 deaths would be expected to occur within the sample population of 3,506 during the recall period of 2 months.

17 Depoortere et al. (2004, pp. 1316, 1317, 1318). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per months, 22 deaths would be expected to occur within the sample population of 2,386 during the recall period of 6.1 months (183 days).

18 Depoortere et al (2004, p. 1316, 1317, 1318). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per months, 46 deaths would be expected to occur within the sample population of 4,754 during the recall period of 6.4 months (193 days).

19 Depoortere et al. (2004, pp. 1316, 1317, 1318). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per months, 38 deaths would be expected to occur within the sample population of 5,188 during the recall period of 4.8 months (145 days).

20 Depoortere et al. (2004, pp. 1316, 1317, 1318). Based on the calculation that with an expected mortality rate of 1.5 per 1,000 per months, 10 deaths would be expected to occur within the sample population of 5,191 during the recall period of 1.3 months (39 days).

LIST OF ABBREVIATIONS

AAAS	American Association for the Advancement of Science
ABA	American Bar Association
CDC	Centers for Disease Control and Prevention (United States)
CMR	Crude mortality rate
CoW	Correlates of War Project
DIA	Defense Intelligence Agency (United States)
DRC	Democratic Republic of the Congo
HSR	*Human Security Report*
ICRC	International Committee of the Red Cross
ICTY	International Criminal Tribunal for the Former Yugoslavia
IISS	International Institute for Strategic Studies
IRC	International Rescue Committee
MSE	Multiple systems estimate
PHR	Physicians for Human Rights
UCDP	Uppsala Conflict Data Program
UXO	Unexploded ordnance
WHO	World Health Organization
WHOSIS	World Health Organization Statistical Information System

ENDNOTES

[1] The estimate of deaths from violent causes is based on the Small Arms Survey's analysis of raw data collected in this study. The collection of this data was partly sponsored by the Small Arms Survey project.

[2] See, for example, Florquin and Berman (2005).

[3] A critique of this approach is provided by Fearon (2004).

[4] CoW used different battle-death thresholds for inter-state, extra-state, and intra-state wars. Inter-state wars were counted only if they had a minimum of 1,000 battle fatalities among all of the states involved; extra-state wars required an annual average of 1,000 battle deaths; intra-state wars counted civilian as well as military deaths (Small and Singer, 1982, pp. 55–56, 213; Sarkees, 2000, p. 129).

[5] The UCDP database contains specific data for the period since 1989 and less specific data for the period from 1946 to 1989. Since 2002 UCDP has also been collecting data specifically for the forthcoming *Human Security Report* (Mack et al., 2005), and its data was not publicly available at the time of writing (April 2005).

[6] This data will be published in the forthcoming *Human Security Report* (Mack et al., 2005).

[7] The following formula is used: mortality rate = [(the number of deaths in sample) / (the number of living in sample)] / (the recall period) x 1,000.

[8] Based on the calculation that 304 recorded deaths [82 (p. 10) + 142 (p.16) + 80 (p. 22)] / sample population of 20,776 [9,274 (p. 10) + 7,996 (p. 16) + 3,506 (p. 22)] / recall period of 2 months (15 June–15 August.) * 1,000 = 7.3.

[9] Based on the calculation that 653 recorded deaths [100 + 322 + 116 + 115 (p. 1317)] / sample population of 17,519 [2,386 + 4,754 + 5,188 + 5191 (p.1317)] / average recall period of 4.7 months [6.1 (183 days) + 6.4 (193 days) + 4.8 (145 days) + 1.3 (39 days) (p. 1316) / 4] * 1,000 = 8.

[10] The source of this commonly accepted number is unclear but appears to have originated in July 2004 during an interview with the BBC, when a 'major aid agency' that wanted to remain anonymous criticized the UN resolution (BBC, 2004a). Aid agencies and human rights organizations have since quoted this figure (BBC, 2004b; 2004c; 2005a; 2005b).

[11] See, for example, HIIK (2005), VINC (2005), and Marshall (2005).

[12] In Afghanistan, data collection was carried out in 600 affected communities after interviewers had visited 747 communities suspected to have been subjected to air strikes or ground operations. It is 'considered to be close to a full census of the affected communities' (Benini and Moulton, 2004, p. 408). There are some concerns that numbers have been exaggerated by communities, but high correlation of victim counts among neighbouring communities make the authors reasonably certain that the data is reliable (Benini and Moulton, 2004, pp. 407–08).

[13] See Ball, Kobrak, and Spirer (1999), Ball et al. (2003), Laporte (1994), and Ball (2003).

[14] The sample size of epidemiological studies is usually sufficiently large to produce statistically reliable data on crude mortality rates;

however, the sample size is often not sufficiently large to produce a reliable estimate of direct conflict deaths, a sub-group of all deaths measured.

[15] See IRC (2000; 2001a; 2001b; 2002a; 2002b; 2002c; 2003a; 2003b; 2004a; 2004b), WHO/EPIET (2004), Roberts et al. (2004), and Spiegel and Salama (2000).

[16] This figure is found in the UCDP database in the comments concerning battle-related deaths for 1989 (UCDP, 2005).

[17] This theoretical maximum of 50,000 documented deaths in the Guatelmala conflict comes from addng the total number of entries on the three lists, and assuming that individuals do not appear in more than one database. Of course, duplication does occur. A further study documented 37,255 recorded deaths or disappearances (Ball, Kobrak, and Spirer, 1999, p. 8).

[18] The range offered is at the 95 per cent confidence interval. Of the 24,000 recorded reports of people dead or disappeared, 18,397 were specifically name (Ball et al., 2003, pp. 2–3).

[19] The total direct and indirect conflict death toll could be as high as 212,000 if the sample from Fallujah is included in the estimate. Because the study used random clusters based on the assumption that violence was spread equally across of Iraq, it is unclear whether to include estimates from the intensely violent Fallujah cluster. The decision to exclude it from the 100,000 estimate has significant implications not only for the overall figure, but for the direct deaths estimates that we might abstract from it.

[20] The figure of 13 violent deaths comes from a personal communication of the author with Les Roberts, who specified that 7 of the 21 violent deaths listed on p. 1860 were not war-related.

[21] Another possible explanation is that the search engines used for the databases were not as well established in 2000 and 2001, and so produced lower estimates. It is also possible that the epidemiological studies, which did not apply violence clustering techniques, produced inaccuracies (either overestimating in earlier periods or underestimating in 2002–03). The studies themselves do not discuss whether their sample clusters were representative of the violence.

[22] Personal communication.

[23] On average, the underreporting in IISS appears to be 2.6; for UCDP/HSR, the factor is 7.3. See Appendix 9.1.

[24] 43,000 * 2 and 27,000 * 4.

[25] This range is based on the assumption that between 2,224 and 8,880 deaths may have occurred every month since the conflict escalated in February 2003 (*11 months).

[26] The challenges encountered were particular to each conflict. In Nepal, the press tended to account for lives lost due to rebel attacks, but there was limited information on casualties caused by the military and by paramilitaries. In Colombia, many reports concentrated on one casualty, such as a leader of the Fuerzas Armadas Revolucionarias de Colombia (FARC), but failed to mention the deaths of his bodyguards. In Ivory Coast, the reporting was vague and nondescript and at times presented contradictory accounts. In Uganda, the lack of information was seen as the result of attempts to control information flow (IISS, 2004).

[27] For example, the Nepalese counter-insurgency is known to rely primarily on small arms and light weapons, and the Royal Nepalese Army uses heavy weapons and aerial attacks only in exceptional cases.

[28] For Colombia, where weapons use is more complex, such assumptions could not be made. In certain cases, bombs and explosions were recorded, but it was usually not possible to specify small arms fire.

[29] For more information, see Meijer and Verwimp (2005).

[30] The time span for the review was chosen to comprise five equal periods of six weeks, since the first period of Operation Iraqi Freedom—from its start on 20 March to 30 April—was six weeks.

[31] No quantitative measure for the intensity of conflict underlines these conclusions. These descriptions are based on news reports that speak of 'intensive phases' in general terms.

[32] There were 15 unspecified combat deaths of the total 111 counted for the period 1 May to 15 October 2003.

[33] See Reed and Keely (2001), Heuveline (1998; 2001), de Walque (2004), and Verwimp (2004).

[34] CMR can be defined as '[(the number of deaths in sample) / (the number of living in sample + 1/2 deaths in the sample population during the recall period – 1/2 those born during the recall period)] x (1,000) / (the recall period)', and is expressed as 'deaths/1,000 population/month' (IRC, 2003b, p. 3). This chapter follows this usage.

[35] Much of the existing data has been generated by surveys conducted by the IRC in central and West Africa; the CDC also carried out an epidemiological survey in Kosovo in 1999 (Spiegel and Salama, 2000), and WHO and the EPIET surveyed the situation in Darfur, Sudan (WHO/EPIET, 2004). Detailed data and sources are listed in the bibliography and in Appendix 1.

[36] There is no detailed data on crude mortality prior to the conflict. The only reference available is the expected mortality rate for Africa of 1.3 as reported by the UN Population Division (IRC, 2004b, p. 3). The IRC is more conservative by assuming an average expected mortality rate of 1.5 for sub-Saharan Africa (IRC, 2004a, p. iii).

[37] *The Lancet* mortality study on Iraq measured 93 violent deaths per 10,000 in the sample population. That is the fourth highest rate of violence of all countries studied. The highest rate was documented in Kalemie province in DRC (268 per 10,000 in the sample population) followed by Bujumbura Rural in Burundi in 2002 (210 per 10,000 in the sample population), and Moba in Katanga Province in eastern DRC in 2000 (99 per 10,000 in the sample population).

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