

Wartime estimates of Iraqi civilian casualties

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Abstract

Challenges exist when making reliable and valid estimates of civilian mortality due to war. This article first discusses a framework used to examine war's impact on civilians and then considers challenges common to each statistical approach taken to estimate civilian casualties. It examines the different approaches that have been used to estimate civilian casualties associated with the recent fighting in Iraq to date and compares the results of different approaches. The author concludes by proposing that after fighting has ceased, other approaches to estimating Iraqi civilian mortality, such as post-war retrospective surveys and demographic analysis, should be employed.

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During wartime, the public and policymakers legitimately thirst for figures on the war's civilian death toll due to the war's direct violent and indirect health effects on a population. In real time, the public wants to know "How many have died?" However, with few exceptions until relatively recently, demographers and epidemiologists have not applied their expertise to making rigorous, credible estimates of the mortality and morbidity impacts of conflict on populations during wartime. Sometimes a lack of professional freedom prevents those who are perhaps most familiar with data on the suffering population (e.g., analysts whose livelihoods depend on the government(s) directly involved in the conflict) from becoming engaged in the discussion of the conflict's impact. But barring professional freedom issues, wartime circumstances pose other challenges to making civilian casualty estimates.

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This article discusses challenges in making reliable and valid estimates of civilian mortality (hereinafter referred to as casualties) due to war. It first discusses a framework used to examine war's impact on civilians, and then considers challenges common to every statistical approach taken to estimate civilian casualties. After examining the different approaches that have been used to estimate civilian casualties in Iraq, the article finally recommends another approach that could be taken – a post-war survey. The approaches considered – tallying, a statistical sampling approach in the midst of war, and a post-war survey, show that every approach to estimating casualties provides imperfect statistics and users must consider the shortfalls of each approach when considering the veracity of estimates that arise from each.

A framework for estimating war's short-term impact on populations

In 1993, Daponte proposed a framework for estimating the short-term impact of a war on a population.¹ She disaggregated the mortality impact of war, using the 1991 Persian Gulf War as a case study, into five categories:

- deaths of military personnel during the war;
- civilian deaths caused by the war's direct effects;
- civilian deaths from the war's indirect effects on the civilian population;
- civilian deaths due to post-war violence and upheaval; and
- military deaths due to post-war violence and upheaval.

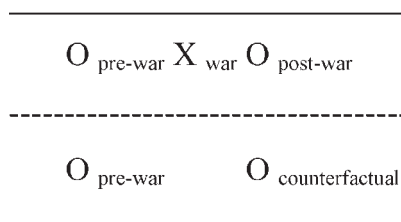
By disaggregating the problem, one could arrive at a methodology and data sources appropriate for the particular category of mortality.

Considering the mortality category of civilian deaths due to the war's indirect effects on the civilian population, Daponte argued that this category of mortality could be deduced by examining the number of deaths that result from population projections run under two scenarios – a no war scenario where the population continues on the demographic trajectory that it was on prior to the war, and a war scenario, where one takes into account the increased mortality mostly due to the damage to the infrastructure and unplanned population movements.

In the field of programme evaluation, one estimates the impact of an intervention on a unit of analysis by analysing data both before and after the intervention, and compares that either to a control group or to counterfactual information on the unit of analysis. The quasi-experimental design² typically used, applied to a war situation, would be:

1 Beth Osborne Daponte, "A case study in estimating casualties from war and its aftermath: The 1991 Persian Gulf War", *PSR Quarterly* 3 (2) (1993), pp. 57–66.

2 Thomas Cook and Donald Campbell, *Quasi-Experimentation: Design and Analysis Issues for Field Settings*, Boston, Houghton Mifflin Company, 1979.



where O represents observations or outcomes and X represents the intervention of the war. One would deduce the impact of the war by using neighbouring countries as a “control” group or by making statements about what the population characteristics of the country at war would have been had the war not occurred.

The first challenge in applying such a framework is in clearly defining the intervention of “war”. In the current Iraq case, the war began on 19 March 2003. However, on 14 April 2003 the US military declared “major fighting” over, and on 1 May 2003 the United States declared an end to major combat operations. On 22 May 2003 the UN Security Council approved a resolution lifting economic sanctions, so up until that point the “intervention” included war plus sanctions. Thus in making estimates on wartime mortality, one must be careful and explicit as to exactly how one defines the “war” period. The framework that Daponte proposed may not be cleanly applied when the “war” period and the “post-war” period cannot be clearly delineated. Second, in the quasi-experimental design above, the intervention is the only intervention applied to the population. But in reality, there can be many interventions that occur concurrently. In Iraq, disentangling the impact of war from sanctions can be impossible. For example, the UN Development Programme (UNDP) wrote on the topic of infrastructure and sufficiency issues that

Extensive use for more than twenty years, sanctions during the 1990s, misguided economic policies and three wars in Iraq have contributed to the deterioration, damage and negligence of both the development and maintenance of infrastructure and services. After the most recent war, the situation worsened due to looting, destruction of public property, and general insecurity.³

Thus disentangling deaths due to the war from those due to other factors can be impossible and beyond expertise of most statisticians and demographers. Perhaps the best that the statisticians and demographers can do is to provide estimates of the mortality levels of civilians at different time periods, and let the political scientists argue about the proportion of the increase in mortality that should be attributed to different parties and policies.

3 *Iraq Living Conditions Survey 2004*, United Nations Development Programme and Central Organization for Statistics and Information Technology, Ministry of Development Cooperation, Baghdad, Iraq, April 2005, available at <http://www.iq.undp.org/Default.aspx> (last visited 4 February 2008), Vol. II, *Analytical Report*, p. 16.

Third, the high-quality population data needed to make credible estimates or to put estimates in perspective may be lacking – data may not be available due to its new “sensitive nature”, may never have been collected (sometimes the case in developing nations), or the war may have made the data that do exist obsolete (e.g. due to refugee movements).

In spite of these challenges, analysts have made estimates of the impact of the war on civilians using two approaches: tallies and demographic surveys on a sample of the population. Each of these approaches is considered in turn.

Tallies of civilian deaths

Theoretically, one can obtain an estimate of the number of deaths from violence or the direct effects of the war (e.g. bombings, violence, but excluding war’s indirect health effects) by adding up the number of deaths that occur in incidents of violence. This approach is susceptible to error from both double-counting and undercounting incidents of violence, and also by mis-estimating the number of people who died in each incident. Further, while the number of immediate deaths from an incident might be known, it may be difficult to follow people injured in the incident to determine how many later died from injuries suffered in the incident. Without follow-up, only the civilians who died immediately from the incident will be included in such a data set and the data set will yield an underestimate of deaths from incidents.

A reliable and valid tally depends on having a reliable source of information. Such a source of information cannot have double-counts of incidents, must not omit any incidents, and must accurately count the number of deaths associated with each incident. In practice, such a data source is unobtainable in times of war. However, the lack of a perfect data source has not prevented analysts from using a tallying approach.

Perhaps the best known example of the tally approach being used in Iraq today is Iraq Body Count’s work.⁴ Iraq Body Count (hereinafter IBC) aims to tally civilian deaths from violence that have occurred during the current war in Iraq. IBC has created a data set of wartime deaths, based on incidents of violence and mortality reported by a wide range of media outlets. Thus their data set essentially reflects the accuracy and comprehensiveness of media reports. If there is no double-counting and if the facts of the incidents included in the data set are reported correctly, then since the media reports may not be comprehensive, the tally from the data set represents a minimum number of deaths. However, given the constraints that wartime presents, their data set is likely to provide the best available estimate based on a tallying approach.

The Multi-National Force–Iraq has also estimated civilian deaths from violence by tallying incidents of civilian death that have been reported by Coalition

4 Available at www.iraqbodycount.org (last visited 2 February 2008).

forces, then supplementing the tally with data on deaths collected from administrative data from morgues and police reports. This “supplementing” methodology was first applied to Iraq in 1993 by Daponte.

For the 1991 Persian Gulf War, Daponte used a tallying approach to estimate civilian deaths.⁵ There, she created a data base of incidents of civilian deaths from violence or “collateral damage”. The base data sources used were reports of incidents from Human Rights Watch and other human rights sources, which were based on media and eyewitness accounts. However, she “supplemented” the data set with information from the Iraqi Ministry of Health, which also had compiled unintended civilian casualties from direct war effects. In provinces where the Ministry of Health’s tally exceeded the tally from her data base, she added the difference to her own tally, knowing that her data base was likely based on an incomplete universe of reports. She did not subtract cases from the data base in provinces where the data base tally exceeded the Iraqi Ministry of Health’s tally for that province, believing that either source could have undercounted the number of deaths. (This method yielded an estimate of civilian deaths from the direct effects of the 1991 war that amounted to 3,500 people.)

The IBC reports a range of civilian deaths from violence since the start of the war until 1 January 2008 of 81,174 to 88,585.⁶ The range results from uncertainty in the number of people killed in incidents. Generally, figures from the IBC exceed those from the Multi-National Force–Iraq.⁷ Relying on different data sources accounts for much of the discrepancy, though differences in the classification of the type of person killed (combatant vs. civilian) may also contribute to the discrepancy. In any case, if the data source assuredly provides figures on deaths that actually occurred and if incidents are de-duplicated and if the number killed per incident is generally accurate, then a tallying approach will generally yield an underestimate of the true number of deaths. It makes sense to supplement with administrative data (e.g., data from morgues), as long as the administrative data set provides the information on the place and circumstances of the death.

Sample surveys

Another approach taken to estimate civilian casualties due to war first estimates the change in the civilian mortality rate (including deaths due to both direct and indirect effects of war) by calculating the change in the death rate during wartime as opposed to a pre-war period. Unlike the tally approach that usually only applies to deaths due to violence, this approach can be used to estimate the increase in

5 See Daponte, above note 1, pp. 57–66.

6 See Iraq Body Count, above note 4.

7 Michael Dobbs, “Counting civilian deaths in Iraq”, *Washington Post*, 1 October 2007, available at http://blog.washingtonpost.com/fact-checker/2007/10/counting_civilian_deaths_in_ir.html (last visited 28 November 2007).

mortality from all causes of death, as well as by cause (assuming one has accurate information on cause at the individual level). This approach requires data upon which to base the rise in mortality, usually derived by conducting a household survey on a sample of the population. It also requires current population figures to which to apply the change in mortality.

Usually, the current figures are a projection of the population obtained from the most recent census. However, these population figures ought to be, but usually are not, based on a methodology called “Bayesian Demography”.⁸ This methodology takes into consideration that since the true population and its components of change (e.g. patterns and rates of fertility, mortality and migration) are never precisely known, an appropriate approach to estimating the population is to use probability distribution functions in estimating all of the population parameters. The rates obtained from the household survey are applied to population estimates that are associated with their place on a probability distribution function. The probability distribution function of the population estimate explicitly expresses the demographer’s modelling of the uncertainty associated with base population and its components of change. Daponte, Kadane and Wolfson introduced this approach and as a case study applied it to the Iraqi Kurdish population.⁹

In household surveys, typically, interviewers ask the head of the household, or someone in the household who would know about the condition of others in the household, questions on the following topics:

- the number and demographic characteristics of pre-war and wartime household members;
- whether any of the people in the pre-war household have died between the pre-war period and the time of the survey;
- the date and cause of any household member’s death;
- the combatant status of each person in the household, to determine whether any of the deaths were of non-combatants.

If done properly, to estimate the number of excess deaths during the wartime period within a range of statistical uncertainty, one could apply the difference between the wartime and pre-war mortality rates to appropriate population data.

When using a sample survey approach during wartime, many potential problems can arise. To create the sample of households to be included in the survey, one needs an accurate list of the population from which to draw the samples. Such a list is usually based on the most recent census. By using the past census, one assumes that the geographic distribution of the population has not changed substantially since the census was conducted. Census data is also used

8 Beth Osborne Daponte, Joseph B. Kadane and Lara Wolfson, “Bayesian demography: Projecting the Iraqi Kurdish population, 1977–1990”, *Journal of the American Statistical Association*, 92 (440) (December 1997), pp. 1256–67.

9 Ibid.

after the survey data is analysed to extrapolate results from the survey to the general population. In a population experiencing a great amount of both internal and international migration, census data quickly become obsolete. Without reliable census data, the sampling and survey approach cannot accurately yield reliable estimates of war's impact on civilians.

To reduce the expense of gathering a random sample throughout the entire country, a cluster approach is often used. Clusters are geographic areas into which researchers have divided the country. In this approach, first a cluster is randomly selected and then households within the cluster are randomly selected.

When using a household survey approach, one must consider whether the households that were ultimately interviewed were truly representative of the sample drawn or whether they are a select subsample in some sense. Extrapolating the survey results to the general population requires that those who were actually surveyed truly represent the desired sample. If the desired sample was drawn to be random, any violation of the assumption that being included in the sample is due only to random factors would make the results less likely to represent the true situation. Of course, households where all members have left and households where all members were killed will not be included in the achieved sample. Households where members refuse to respond will also not be included in the achieved sample. If interviewers do not actually go to some households because of inconvenience or insurmountable logistical considerations, then the interviewers are violating the assumption of randomness.

Another issue to consider is the validity and reliability of questions on the survey instrument. A valid question measures what the survey designers intended to measure. Reliable questions will always elicit the same response from people in like situations. Survey results can only be accurate to the degree that respondents answer valid and reliable questions accurately and without bias.

Depending on the sample size used, the sample may produce estimates with a confidence interval (CI) so large as to not be meaningful. In any sample survey, one estimates the true propensity of a phenomenon in a population. The degree to which the estimate accurately reflects the prevalence of the phenomenon in the population is a function of the sample size, the representativeness of the sample that responded to the survey, and the reliability of the questions that were asked. The smaller the sample size, the larger the standard errors of the estimate from the survey. Unreliable questions also increase standard errors.

For all of the above reasons, collecting data using a survey is in the best of circumstances a difficult and costly procedure. One needs to think through all possible sources of bias to the results. During wartime, the difficulties of conducting surveys mount, but, in spite of the difficulties, researchers have used this approach.

The *Lancet* studies

Two studies, known as “The *Lancet* studies” after the British medical journal in which they were published, were conducted in 2004 and 2006 by a group of

researchers primarily based at Johns Hopkins University.¹⁰ The estimates from these students have been lauded but also questioned, partially because the researchers have misinterpreted their own figures but also because of fundamental questions about the representativeness of the achieved survey sample.

For example, in the abstract of the 2004 study they write, “Making conservative assumptions we think that about 100,000 excess deaths, or more, have happened since the 2003 invasion of Iraq”. In fact, that study yielded very wide confidence intervals of the number of deaths. The authors misinterpreted the analysis of the data they had interviewers collect when they reported “at least 100,000” – the 95 per cent confidence interval reflects that the accurate statement should have been “we can say with 95 per cent certainty that between 8,000 and 194,000 excess deaths occurred to Iraqis during the period”.¹¹ Such a wide confidence interval makes one question the usefulness of the information.

The standard errors of the estimates were affected by the numbers of clusters sampled and the number of households per cluster interviewed. The 2004 study was based on 33 clusters in which persons from 988 households were interviewed.

Aware of the problem of wide confidence intervals and wanting to update their estimates, the group in 2006 essentially repeated the study using a larger sample size. They increased the number of clusters to 47 and the number of persons in households interviewed to 1,849. Again, the researchers had interviewers administer a survey that resembled a typical household health/demographic survey to what was to be a random sample of households. Appropriately, the authors at the end of the article discuss research processes that may have yielded a non-random sample, including: not following up with households where no one was home when an interviewer went to it; not including households where everyone in it was killed or where all the members of the household had migrated out of Iraq; and the misreporting of the number of deaths, the cause and circumstances of death, and the combatant status of the deceased.¹²

Problems with the analysis of the data also plagued the second effort. The authors used crude death rates (CDRs), which reflect the number of deaths per thousand population, to show the rise in mortality. Demographers rarely use crude death rates because these rates are affected by the age structure of a population, and thus CDRs do not accurately represent the mortality schedule in a population. Instead, demographers think in terms of age- and sex-specific mortality rates, usually summarized in terms of “life expectancy”. That being said, Burnham et al. report that the CDR increased from 5.5 per thousand population

10 L. Roberts, R. Lafta, R. Garfield, J. Khudhairi and G. Burnham, “Mortality before and after the 2003 invasion of Iraq: Cluster sample survey”, *The Lancet*, Vol. 364, Issue 9448 (2004), pp. 1857–64; and G. Burnham, R. Lafta, S. Doocy, L. Roberts, “Mortality after the 2003 invasion of Iraq: A cross-sectional cluster sample survey”, *The Lancet*, Vol. 368 (9,545) (2006), pp. 1421–8.

11 The complexity added to their analysis by dealing with data on Falluja is not reflected in the above statement, but the authors do not present confidence intervals for the Falluja data.

12 Burnham et al., above note 10, p. 1427.

in 2002 to 13.3 per thousand population in the post-invasion (March 2003–June 2006) period.

In conducting any survey, the moment of trepidation comes when an analyst compares results from the survey with other data sources. Usually, analysts take some comfort in finding that some of the results compare with what is already known about the population. In this case, one should find that the pre-war CDR falls comfortably within the range of CDRs that one would expect for pre-war Iraq. (The authors did not report other, more robust measures of mortality in their article, so that one can only examine the crude death rates they report.) Instead, Iraq's pre-war CDR of 5.5 estimated by the Johns Hopkins team seems beyond what seems reasonable.

To put the pre-invasion figure that results from the sample in perspective, consider UN Population Division figures, generally deemed to be of very high quality. The United Nations estimates that Iraq's pre-invasion CDR was 10 per thousand, not the 5.5 per thousand estimated from the two *Lancet* studies. Comparing internationally, the UN reports that Iran's CDR in the 2000–5 period was 5.3. Prior to the war, most thought that the situation in Iraq was considerably worse than in Iran, mostly due to the impact of sanctions.

The pre-war CDR that the two *Lancet* studies yield seems too low. That is not to say that it is wrong, but the authors should provide a credible explanation as to why their pre-war CDR is nearly half that of what the UN Population Division estimates for pre-war Iraq. Since Burnham et al. arrive at their estimate of Iraqi "excess deaths" by taking the difference in the pre-war and wartime crude death rates and applying it to a population, if the pre-war mortality rate was too low and/or if the population estimates are too high (e.g., do not take into account the refugee movement out of Iraq), then the resulting number of "excess deaths" would be too high, yielding inflated estimates. Unfortunately, the authors have not adequately addressed these issues.

Another issue with conducting surveys during wartime is the process used to arrive at estimates. In social science research one should not put any interviewers at risk of bodily harm. Burnham et al. sent interviewers to the field to ask respondents for information, knowing that this could put interviewers' lives at risk. In doing so, the research team was professionally irresponsible. Further, in an effort to "protect interviewers" (even though they had already put them in danger), they sacrificed the scientific randomization that the research relies upon. Burnham et al. write that "Calling back to households not available on the initial visit was felt to be too dangerous",¹³ and in the 2004 study Roberts et al. write "to lessen risks to investigators ...".¹⁴ Certainly, risks to investigators needed to be "lessened", perhaps by waiting to conduct the survey until after fighting ceases. Both references show how they violated the random household selection process that is statistically required for credible estimates.

13 Ibid., pp. 1421–8.

14 Roberts et al., above note 10, p. 1859.

Further, one should question how a proposal to conduct this research made it through the Institutional Review Board at a US university. One role of institutional review boards is to ensure that the research being conducted at or through universities is ethical. However, in deciding whether to approve a research agenda, institutional review boards at universities often consider only the risks of harm to research subjects. In determining whether to approve research, guidelines often disregard the risk to those collecting data, certainly an ethical oversight. In this case, the utility of the additional data on the population was probably not worth the risk to interviewers' lives, so that the proposal to carry out such research should not have been approved.

Iraq Living Conditions Survey and Iraq Family Health Survey

Two large-scale sample surveys have been conducted on the Iraqi population: the Iraq Living Conditions Survey and the Iraq Family Health Survey. The UNDP carried out the Iraq Living Conditions Survey (ILCS) using a two-stage cluster design.¹⁵ The selection of the sample for non-Kurdish areas was based on the 1997 census and for Kurdish areas was based on local lists. In each governorate of Iraq 1,100 households were selected to be included in the survey, with the exception of Baghdad, where 3,300 households were selected. The number of households actually interviewed amounted to 21,668 households, which represents a 98 per cent response rate.

Based on the data collected, UNDP calculated that between the start of the war and the data collection date, which was in 2004, approximately 24,000 people died due to warfare, with a 95 per cent confidence interval of 18,000 to 29,000 deaths.¹⁶ This figure is on the lower end of the 95 per cent confidence interval of 8,000–194,000 that Roberts et al.¹⁷ calculated for the 18 months post-invasion.

The Iraq Family Health Survey (IFHS),¹⁸ conducted in 2006–7 by collaboration between various Iraqi ministries and the World Health Organization, used a design nearly identical to that of the ILCS. The survey's purpose was to estimate mortality between January 2002 and June 2006. A member from a total of 9,345 households in 56 unique strata in Iraq was interviewed.¹⁹ Data from the IFHS yield excess mortality estimates of 151,000 violent deaths since the 2003 invasion and until the survey date, with a 95 per cent confidence interval of 104,000–223,000.²⁰

15 *Iraq Living Conditions Survey 2004*, above note 3, Vol. I, *Tabulation Report*, Appendix 2.

16 *Ibid.*, Vol. II, *Analytical Report*, p. 55.

17 Roberts et al., above note 10, pp. 1857–64.

18 *Republic of Iraq: Iraq Family Health Survey Report*, 2007, World Health Organization and Republic of Iraq (Ministry of Health in Iraq, Central Organization for Biostatistics and Information Technology, Ministry of Health Kurdistan, Kurdistan Regional Biostatistics Office), available at www.who.int/mediacentre/news/releases/2008/pr02/2008_iraq_family_health_survey_report.pdf (last visited 5 February 2008).

19 *Ibid.*, p. 4.

20 Amer Alkhuzai et al., "Violence-related mortality in Iraq from 2002 to 2006", *New England Journal of Medicine*, Vol. 358 (5) (31 January 2008), p. 484.

One way of considering the reliability of the data collected by the ILCS and IFHS is to compare pre-war levels of mortality based on these data with the level of pre-war mortality based on other sources. Although the ILCS and IFHS both had a much larger sample size than that of the *Lancet* studies, their results on infant mortality in pre-war Iraq seemed substantially lower than other estimates. The ILCS results show a pre-war infant mortality rate (IMR) of 35 deaths per thousand births for males and 29 for females.²¹ The IFHS yields a 2001 IMR of 34,²² consistent with the ILCS. However, one can contrast these estimates with the 1995–2000 IMR of 94 for Iraq estimated by the UN Population Division,²³ the 1994–9 IMR of 108 IMR estimated by Ali and Shah,²⁴ the 1999 IMR of 102 estimated by one source at UNICEF,²⁵ or a 2000 IMR of 38 estimated by another part of UNICEF in 2007.²⁶ Thus even before the war there existed uncertainty about the level of mortality in Iraq. If results from the IFHS are internally consistent, then one would conclude a substantial rise in the IMR from 34 in 2001 to 41 in 2005.²⁷

Similar to the *Lancet* studies, the ILCS and IFHS surveyed households during wartime. However, unlike the *Lancet* studies, the ILCS was careful in its attribution of the root causes of civilian casualties in Iraq. Because of the confounding of other factors at the time of the war, UNDP wrote,

While the child mortality rate has been reduced in most countries of the world over the last decade, it has increased in Iraq. Exactly how many excess deaths should be attributed to the sanctions and wars is a matter of controversy. Lack of good empirical evidence, combined with discrepancies in the estimates, has produced some confusion. There is, however, no disagreement that the steady decline in child mortality rates in Iraq in the 1970s and 1980s was sharply interrupted at the time of the Gulf War in 1991.²⁸

The authors of the IFHS also provide words of caution in their report, writing that

Rapid small-scale surveys of households are likely to yield unreliable estimates. Surveys of a large number of respondents with carefully prepared households interviews and multiple methods for collecting data on mortality still run into reporting problems because of the insecurity, instability, and migration associated with the conflict situation.²⁹

21 *Iraq Living Conditions Survey 2004*, above note 3, Vol. II, *Analytical Report*, p. 50.

22 *Iraq Family Health Survey Report*, above note 18, Table 25.

23 United Nations Population Division, *World Population Prospects: The 2006 Revision Population Database*, available at <http://esa.un.org/unpp/p2k0data.asp> (last visited 4 February 2008).

24 Mohamed Ali and Iqbal Shah, "Sanctions and childhood mortality in Iraq", *The Lancet*, Vol. 335, Issue 9218 (2000), pp. 1851–7.

25 See http://www.unicef.org/infobycountry/iraq_statistics.html#27 (last visited 8 January 2008).

26 *UNICEF Statistics*, UNICEF, October 2007, available at <http://www.childinfo.org/areas/childmortality/infantdata.php> (last visited 30 November 2007).

27 *Iraq Family Health Survey Report*, above note 18, Table 25.

28 *Iraq Living Conditions Survey 2004*, above note 3, Vol. II, *Analytical Report*, p. 57.

29 Alkhuzai et al., above note 20, p. 492.

Other approaches possible at a later date

Both approaches that have been used to date – tallying and conducting sample surveys – have their challenges. Two other approaches could be used – doing household surveys at a later date, and demographic analysis.

One could wait until after the war has truly ended and the country has returned to a peaceful and stable situation, and conduct surveys on the health and demographics of the Iraqi population. However, asking people retrospectively about occurrences some years prior also has its pitfalls. Generally, responses to survey questions about the past become less reliable as the past becomes more distant. While one would thus suspect that questions about the circumstances of a death may become less certain, the death of a family member may be so traumatic and memorable that the exact date of the death will be accurately remembered by family members, even if responses on the circumstances around the death become less reliable.

Demographic analysis is a tool used by demographers usually to determine the accuracy of a census. However, it can also be used to derive broad estimates of the impact of a war on a population. After fighting has ceased, a census of the population could be taken. If one takes results of the most recent pre-war census and projects the pre-war population forward to the date of the post-war census, taking into account fertility and mortality rates that would have prevailed had the war not occurred and the accuracy rates of the two censuses, then one can arrive at broad estimates of excess mortality by comparing the projected population with the population included in the post-war census. The censuses do not have to be accurate or complete, but the likely degree of their inaccuracy and incompleteness must be known. This approach can yield broad estimates for the country, but usually does not provide trustworthy figures for smaller units of analysis.³⁰

Discussion

This paper has presented the different approaches used to arrive at the number of civilian casualties. Table 1 summarizes mortality results from all of the surveys discussed above. The table shows that not only do the data sources differ in their definitions of excess mortality, but they arrive at substantially different estimates of excess mortality. Because the sources apply to different time periods, comparison is made easier by creating an estimate of average monthly excess deaths, by source. But it should be noted that these figures are not perfectly comparable because of the difference in definitions of excess mortality. Figure 1 graphs the estimate of average monthly excess deaths. The figure demarcates

30 See Margo Anderson, Beth Osborne Daponte, Stephen Fienberg, Joseph Kadane, Bruce Spencer, and Duane Steffey, “Sampling-based adjustment of the 2000 census: A balanced perspective”, *Jurimetrics* 40 (3) (Spring 2000), pp. 341–56.

Table 1. Excess mortality estimate by data source

Source	Methodology	Data source	Estimate	Unit estimated	Period: start of war to	
Iraq Body Count	Tally	Accounts from media sources	81,174– 88,585	Civilian deaths from violence	1 January 2008	1,489
Roberts et al., 2004 (Lancet)	Cluster sample survey	Sample of 988 households from 33 clusters	98,000 (95% CI 8,000–194,000)	Excess Iraq deaths as a consequence of war, excluding Falluja	September 2004	5,444
Burnham et al., 2006 (Lancet)	Cluster sample survey	Sample of 1849 households from 47 clusters	654,965 (95% CI 392,979–942,636) 601,027 (95% CI 426,369–793,663)	Excess Iraqi deaths as a consequence of war Iraqi deaths due to the violence of war	July 2006	16,374
Iraq Living Conditions Survey (UNDP)	Cluster sample survey	Sample of 21,668 households from 2,193 clusters	24,000 (95% CI 18,000–29,000)	“The number of deaths of civilians and military personnel in Iraq in the aftermath of the 2003 invasion” (p. 55)	March 2004	2,000
Iraq Family Health Survey (WHO)	Cluster sample survey	Sample of 9,345 households from 971 clusters	151,000 (95% CI 104,000–223,000)	Violent deaths in Iraq	June 2006	2,649

* The average number of excess deaths per month was calculated by taking either the midpoint or mean of the estimate and dividing by the number of months in the estimation period. Because definition of excess death is not comparable between all categories, the average monthly excess deaths are not directly comparable.

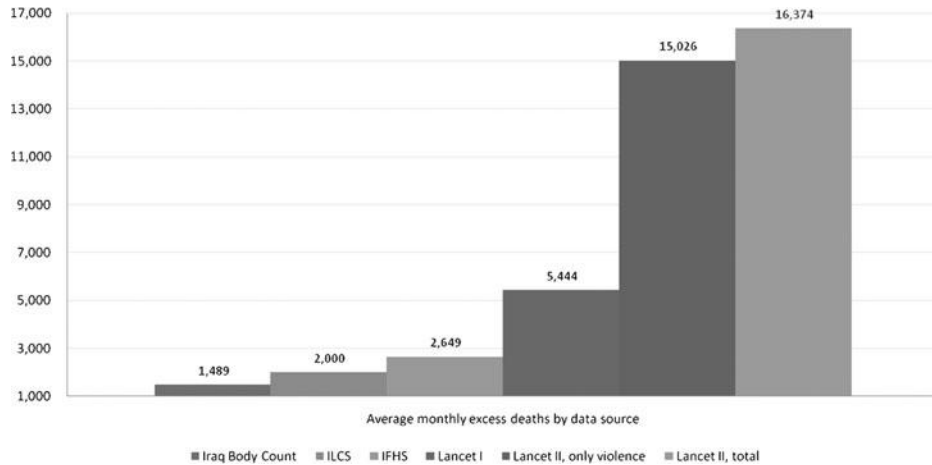


Figure 1. Average Monthly Excess Deaths by Data Source. Note: The average number of excess deaths per month was calculate by taking either the midpoint or mean of the estimate and dividing by the number of moths in the estimation period. Because definition of excess death is not comparable between all categories, the average monthly excess deaths are not directly comparable. Source: Calculations by B. Daponte

essentially two groups of estimates – one that includes those from the Iraq Body Count, ILCS, and IFHS, and another based on the *Lancet* studies.

While each approach has its drawbacks and advantages, this author³¹ puts the most credence on the work that the Iraq Body Count has done for a lower-bound estimate of the mortality impact of the war on civilians. The data base created by IBC seems exceptional in its transparency and timeliness. Creating such a data base carefully is an incredibly time-consuming exercise. The transparency of IBC’s work allows one to see whether incidents of mortality have been included. The constant updating of the data base allows one to have current figures.

The consistency between the ILCS and IBC suggests that those estimates might also be quite credible. However, if they are, then one must reconsider what the pre-war mortality rate must have been. If one accepts that pre-war, the IMR in Iraq was in the low 30s, then one should also accept the estimates provided by these surveys.

Household surveys allow for a variety of questions to be asked and information gleaned. Even in times of peace, results from household surveys are fraught with uncertainty. In times of war, the information becomes even more susceptible to all of the potential sources of error and bias explicated above. The conclusion of the 2004 *Lancet* study that “the lack of precision does not hinder the clear identification of the major public-health problem in Iraq – violence”

31 The author has no connections with the staff of the Iraq Body Count. To date, she has not met any of the staff members and has never received any payment or solicitation from the organization.

demonstrates that the most one could reliably draw from the survey's results is that the Iraqi population has suffered from the violence associated with the war.³² However, this was certainly already known to those both inside and outside Iraq, if not from eyewitness accounts and the day-to-day media reports, then from the compilation of the media reports by IBC.

The richness of the data collected by the Iraq Living Conditions Survey and the Iraq Family Health Survey allow one to consider correlations between different socio-economic conditions and adverse outcomes, and to deduce which parts of society have been the most affected and are the most vulnerable to war's adverse effects. These surveys are useful for considering the texture of the war's impact on civilians.

Those who demand statistics on civilian mortality during wartime must understand the limitations of data collected during wartime. Surveys that yield estimates of the war's toll on civilians that have a high degree of uncertainty may be of little practical worth, depending on the purpose such statistics are to serve. Certainly, no lives should be put at risk because the public is impatient for reliable statistics. Given the issues surrounding the conduct of household surveys during a war, one should question the purpose such numbers truly serve. Surely, after the dust has settled, numbers play a role in evaluating the costs, and benefits (if any), of the war. But, during the war, do the numbers really add to the debate on the legitimacy of the war? Do they really provide more information than the Iraq Body Count figures provide? Does one have the appropriate context to interpret the numbers?

Perhaps the best that the public can be given is exactly what IBC provides – a running tally of deaths derived from knowledge about incidents. While imperfect, that knowledge, supplemented by the wealth of data of the Iraq Living Conditions Survey and Iraq Family Health Survey (which have their own limitations), provides enough information in the light of the circumstances. At a later date, additional surveys can be conducted to determine the impact and/or do demographic analysis. But for now, the Iraq Body Count's imperfect figures combined with the data of the ILCS and IFHS may suffice.

32 Roberts et al., above note 10, p. 1861.