

The Center for Refugee and Disaster Response

Mortality
in
Iraq
Studies

Photo
Credits

The 2004 and 2006 Survey-Based Estimates of Mortality in Iraq: Frequently Asked Questions

The Center for Refugee and Disaster Response at the Johns Hopkins Bloomberg School of Public Health undertook two studies to address the consequence of war for the Iraqi population, both of which were published in *The Lancet*. The first survey covered the period from January 2002 through mid-2004, and the second study encompassed the period from January 2002 through mid-2006 (1,2). The two studies overlapped from January 2002 through mid-2004. Clusters were randomly selected in both studies using similar probability-based sampling techniques. The surveys encompassed the same administrative areas but households were sampled from different neighborhoods, therefore, results from the two studies are completely independent. Interest continues in the findings of these studies, and below are responses to frequently asked questions.

1. Why were the studies undertaken?

The work of the Center for Refugee and Disaster Response focuses on the public health consequences of natural and conflict-related disasters. Center staff has studied public health consequence of conflict in Afghanistan, Sierra Leone, Liberia, Albania, Tanzania, Uganda, Sudan, DR Congo, as well as the consequences of natural disasters, including earthquakes in Peru and Pakistan, the tsunami in Sumatra and drought in East Africa. The Iraq war's impact on civilians was an important unanswered research question.

2. How were the two Iraq studies financed?

The 2004 study was financed through internal Center funds, and the 2006 study was funded through a grant from the Massachusetts Institute of Technology (MIT). The investigators were unaware of the individual sources of funds for the 2006 study until December 2008, when it was revealed that MIT had received some funds from the Soros Foundation. MIT and donors played no role in the study design or implementation.

3. What are the ethical issues for research in these studies?

Concern about research ethics is part of any study which involves human subjects. Research conducted by U.S. groups is regulated under Federal Regulation Title 45, protection of human subjects, which regulates Institutional Review Boards (IRBs) at universities and other organizations that review all research proposals for compliance with regulations (3,4). The federal regulations are consistent with the Code of Helsinki and the CIOMS ethical guidelines for human subjects (5,6). International studies must also be approved by the relevant body in the country where research is conducted. Both Iraqi studies were reviewed by the Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health, and certified to conform to the relevant parts of Title 45. They were also approved in Iraq by academic and government bodies. Approval specified that no unique identifiers would be collected from households visited by researchers, including complete names, addresses, telephone numbers or other information which could potentially put the households at risk. While household demographics were collected in both Iraq studies, personal information such as the date, location and cause of death was collected only for deceased household members. Research regulations do not consider a dead person to be a human subject and informed consent is not required for uniquely identifying information on the characteristics and circumstances of death. Informed consent was obtained from the principal respondent in each household before interviews were conducted.

4. What were the dates for the 2006 survey?

Survey work began in May 2006, and was considered to be finished when the last cluster was completed. No completion date was set. Originally, completion was planned for May 2006, but administrative procedures delayed start-up of the study.

5. Please explain the research methods used.

Both studies used standard cluster survey methods, widely used by the U.S. government and many other organizations to estimate characteristics in a population, including mortality (7). A number of clusters are selected from a population in a manner so all persons have an equal opportunity to be selected. In the Iraq studies, death rates after the March 2003 invasion were compared with the death rates from January 1, 2002, through the date of the invasion in the same households. Mortality rates were calculated for the households sampled in the survey and then applied to the population as a whole. The number of persons to be included in the survey depends on the prevalence of the characteristic in the overall population, not the size of the population itself. In the 2006 study, the sample size was calculated to detect a doubling of the pre-invasion mortality rates, and the sample size proved more than adequate for describing changes in the population mortality rate.

The number of clusters influences the confidence interval or precision of estimates, and increasing the number of clusters reduces the range in which the true value has a 95 percent chance of being present. A larger number of clusters also allows for comparisons among groups of clusters, but increasing the number of clusters does not influence the accuracy of results. For many outcomes measured in emergencies or disasters, a total number of 30 clusters has given consistently reliable results and is a recommended method for mortality assessment. The 2004 Iraq study used 33 clusters, and the 2006 study included 47 clusters. The number of clusters was increased in 2006 to narrow the confidence interval and provide a smaller range of estimated deaths.

In cluster surveys, a random method is used to locate the first household. In 2004, GPS units were used, but these could not be used in 2006 for security reasons. The sampling method used in 2006 was selected to ensure that all households would have an equal chance of inclusion. This included a listing approach of residential streets and back streets, as well as main streets, to ensure equal representation. In the 2006 survey, two low-violence provinces were inadvertently omitted from the sample. The results were adjusted accordingly, and the mortality estimates exclude these two governorates.

Survey questionnaire: This questionnaire was approximately 10 questions or half a page in length. If no deaths had occurred in the household, the demographic information would typically be completed in less than 15 minutes. While the survey was brief, the study focus was mortality, thus the questionnaire contained as many or more mortality questions than any other surveys that have recently been implemented in Iraq. Teams of four physician-interviewers and one supervisor could complete a cluster in about five hours. If a death was reported then additional data were collected, including a request to see any death certificates.

Death certificates: Issuing death certificates has been common in Iraq for many years, but tabulation of deaths has stopped. In this study death certificates were seen for 501 of the 629 (80 percent) deaths reported. In some cases the certificates were locked up and the household member responding did not have

access. In other cases interviewers opted not to ask because of local conditions and sensitivities. Missing certificates were distributed across 20 of the 47 clusters.

Migration: Responses to questions on migration mirrored the levels of violence found in the data. In areas of low violence only 3.6 percent of households reported an out-migrant. This increased to 9.7 percent in medium-violence areas and to 11.2 percent in high-violence areas. In-migrants to households were the highest in low- and medium- violence areas, as would be expected.

6. Why is there such a preponderance of male deaths?

Of the violent deaths reported, 90 percent were among men. Men clearly had greater mobility and usually had jobs to attend to which likely increased their exposure to violence. In general, women and children were more likely to remain sequestered at home. It is also probable that some of the male deaths reported were among combatants. The rapidly escalating numbers of widows reported in Iraq is consistent with the death patterns observed (8).

7. Refusal and absentee rates seem low.

The consent process offered the opportunity to decline participation in the survey. At 15 households residents refused to participate, and at 16 dwellings no one was home. This level of refusal and absenteeism is lower than in many surveys. The small number of absentees can be explained by the number of people staying home for security reasons. High participation is common in emergency situations. Having the physician-interviewers wear white hospital coats may have increased feelings of trust and willingness to participate. Onlookers in the streets were informed of the nature of the study, and encouraged to spread this information to the rest of the neighborhood so other households would not be caught off guard when interviewers arrived. This is a common survey strategy in many countries and may have reduced refusal rates.

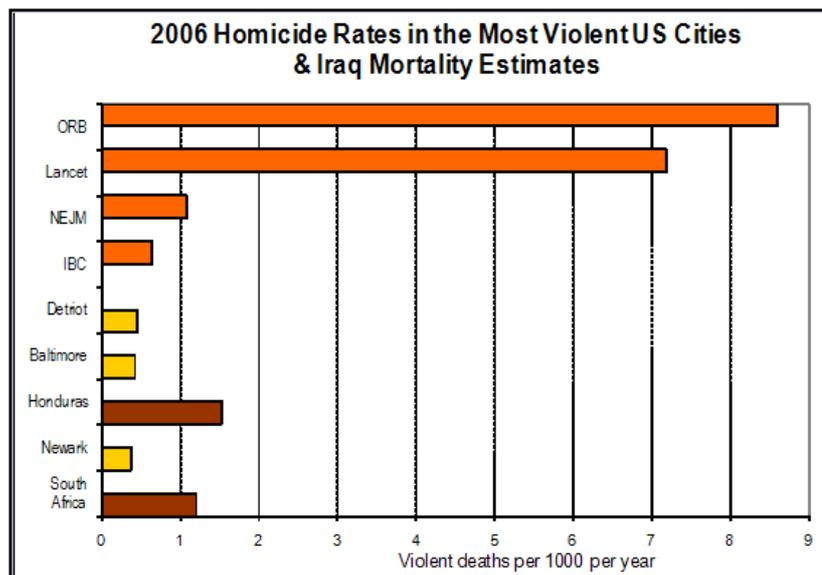
8. How was the field work carried out?

Professor Riyadh Lafta, a member of the research team, oversaw the field work in both studies. Dr. Lafta has a long record as a solid partner in international research studies. These studies have included investigations of childhood cancers, the uptake of uranium into children's teeth and polio in Iraq. Dr. Lafta's publications include assessments of childhood nutrition during the period of the sanctions, and patterns of hospital admissions, both using standard and internationally accepted methods.

In the 2004 survey Dr. Les Roberts, from the Johns Hopkins team, and Dr. Lafta trained the interviewers, and Dr. Roberts supervised the interviewers in the initial phase of data collection. By 2006, security had worsened and Dr. Lafta alone provided the training using a curricula established by the JHU team in Jordan. Collection of data in each cluster was conducted by a team consisting of four physician-interviewers and a supervisor. Each team included a female interviewer because of cultural practices in some areas. In some neighborhoods additional local interviewers were recruited to assist teams with sample planning. Interviews were conducted inside walled household compounds, but interviewers did actually enter dwellings for reasons of safety.

9. Comparisons with other studies (see figures)

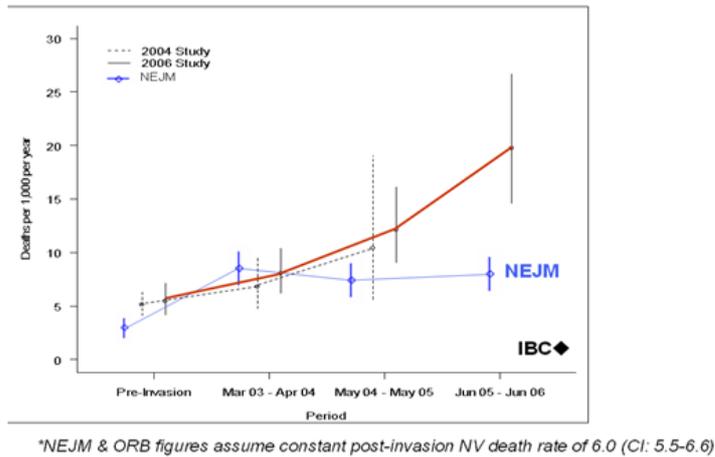
The lowest estimates of conflict deaths in Iraq come from the Iraq Body Count, which tabulates reports of deaths primarily in the international media, augmented with some reports from morgues (9). While such passive surveillance of deaths provides useful information on trends and causes of death, these counts cannot estimate the full scale of deaths. If the deaths noted by Iraq Body Count did represent the true sum of deaths in Iraq, the risk of death in Iraq would be similar to some of the more violent cities in the United States and several countries worldwide which are not considered conflict-affected. Surveys, not media reports, are the standard method of estimating mortality in almost all parts of the world. Small follow-up surveys show that passive surveillance methods such as Iraq Body Count omit many deaths which occur, including 10 percent or more of the Iraqi deaths reported in American print media (10).



Source of U.S. Data: FBI Investigation of Uniform Crime Reports.
Homicide rates from 2006, based on FBI statistics from September 2007

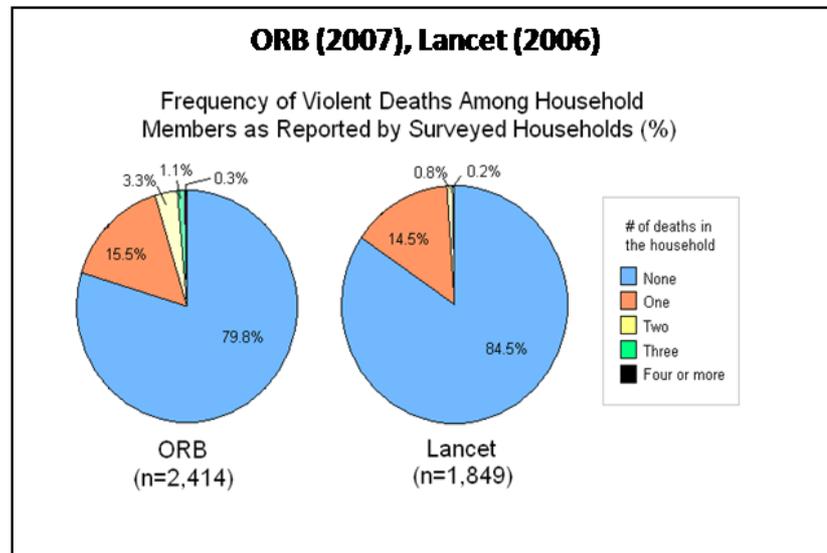
A recent Iraq government survey of living conditions in Iraq published in *The New England Journal of Medicine* (11). Interviews in this study lasted several hours and were based on long questionnaires that contained a few questions on household deaths. The deaths were not verified with death certificates. The study reported implausibly low mortality figures, and statistical adjustments were required to compensate for underreporting of deaths. Some of the most violent areas of Iraq were not visited in the survey, and mortality figures were further adjusted for missing clusters. The Iraqi government study estimated an excess mortality of 151,000 from violent causes during the time between the American-led invasion and June 2006. Their results paralleled death rates found by both the 2004 and 2006 Johns Hopkins studies for the first 18 months of the post-invasion period, then remained essentially flat for the next two years in spite of rising violence and resulting increases in migration.

Trends over time in violent deaths



*NEJM & ORB figures assume constant post-invasion NV death rate of 6.0 (CI: 5.5-6.6)

The only other independent attempt to estimate a national violent death toll was conducted by the British polling group ORB which has conducted many polls in Iraq (12). They concluded that as of August 2007, an excess of one million deaths had occurred following the 2003 invasion of Iraq. After receiving some criticism for rural undersampling, additional samples were completed, which resulted in minimal changes to their total estimate. The ORB study found that at the end of 2007, violent deaths had occurred in 20.2 percent of Iraqi households as compared with the 15.5 percent of households in the 2006 Johns Hopkins survey.



10. Limitations

Every study has limitations, and in both *Lancet* reports we have addressed the key limitations which could influence study results. Random sampling depends on population data. The study relied closely on mid-year 2004 UNDP/GOI population estimates for sample locations, and migration associated with the later stages of the conflict may have affected sampling representativeness. A major limitation of the survey approach is inability to distinguish among combatants, criminal elements and those with no involvement in the violence. Neither is it able to detect underreporting of deaths by households or to independently confirm the causes of deaths reported by households.

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