

New estimates give updated count of Iraq war deaths between 2003 and 2011

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Researchers from the University Collaborative Iraq Mortality Study meet in Erbil, Sept., 2011. Credit: UW

During the U.S.-led invasion and occupation of Iraq from 2003 to 2011, for every three people killed by violence, two died as a result of the collapse of the infrastructure that supports health care, clean water, nutrition, and transportation, according to new estimates in a study from the University of Washington Department of Global Health published

Oct. 15 in the open access journal *PLOS Medicine*. All told, the researchers estimate nearly a half million people died from causes that could be attributed to the war.

Researchers from Johns Hopkins University, Simon Fraser University, Mustansiriyah University, and the UW's Institute for Health Metrics and Evaluation also participated in the study. The study is the first population-based survey since 2006 to estimate war-related deaths in Iraq and the first to cover the full-time span of the conflict.

Researchers state with 95% certainty that there were approximately 461,000 excess deaths during the Iraq war, but the actual number could be as low as 48,000 or as high as 751,000. (For comparison, three years after the 2010 earthquake in Haiti, the death toll has been estimated anywhere between 46,000 and 316,000).

In the *PLOS Medicine* study —"Mortality in Iraq Associated with the 2003-2011 War and Occupation: Findings from a National Cluster Sample Survey by the University Collaborative Iraq Mortality Study"—researchers detail improvements in estimating mortality during the Iraq war and emphasize the public health consequences of armed conflict.

More than 60% of those deaths were directly attributable to violence while the rest were associated with indirect, but war-related, causes.

"Policymakers, governments and the public need better data on the health effects of armed conflict," said Amy Hagopian, associate professor of Global Health at the University of Washington and the lead author of this study. "Without this information, it's impossible to assess the true human costs of war."



This is an Erbil market scene, Sept., 2011. Credit: University of Washington

To conduct this study, researchers went to 2,000 randomly selected households in Iraq in 100 clusters throughout the country to ensure the sample of households was nationally representative. They asked every household head about births and deaths since 2001, and all household adults about mortality among their siblings. According to results from the household survey, researchers estimated about 405,000 excess Iraqi deaths attributable to the war through mid-2011. Researchers also used secondary data sources to estimate rates of death among emigrants and conservatively estimate 55,805 total deaths. Only 24 households refused to participate in the study.

Researchers also detail the limitations of their study and the uncertainty intervals, similar to confidence intervals, in their analysis.

The study analyzed death rates before the war and, through surveys and statistical analyses, estimated excess deaths that were above pre-war rates. Deaths attributable directly to violence were primarily from gunshots, car bombs and explosions. Cardiovascular conditions were the principal cause of about half of nonviolent deaths. War-induced excess deaths not caused by violence would include those caused by diversion of the health system to a focus on crisis care, interruption of distribution networks for crucial supplies and the collapse of infrastructure that protects [clean water](#), nutrition, transportation, waste management and energy.

Based on household survey responses, gunshots were reported to cause 62% of violent deaths; car bombs, 12%; and other explosions, 9%. Cardiovascular conditions were the main cause of nonviolent [death](#), accounting for 47% of nonviolent deaths over the entire study period. Other common sources of nonviolent deaths included infant or childhood deaths other than injuries (12.4%), chronic illnesses (11%) and cancer (8%).

Deaths increased to twice expected levels at the onset of the war, plateaued briefly at the end of 2003, then rose again to a new peak in 2006. Thereafter, deaths dropped until 2008, when they leveled off, and then rose again slightly in 2011.

Previous estimates had covered different periods up to 2006 and arrived at a significant range of findings. Hagopian and colleagues say their new study offers considerable methodological improvements, both with regard to sampling procedures and the amount of data collected from all adults in the households. They also adjusted their results to account for the migration of an estimated 2 million Iraqis out of the country during the war.

"There were two big reasons to do this study: to cover the entire period

of the war and to improve on the groundwork laid by earlier studies," said Gilbert Burnham, professor and co-director of the Center for Refugee and Disaster Response at Johns Hopkins. "By broadening the sources of information we used and by covering the full length of the conflict, this study provides a more complete picture of mortality during the Iraq [war](#)."

More information: Hagopian A, Flaxman AD, Takaro TK, Esa Al Shatari SA, Rajaratnam J, et al. (2013) Mortality in Iraq Associated with the 2003-2011 War and Occupation: Findings from a National Cluster Sample Survey by the University Collaborative Iraq Mortality Study. *PLoS Med* 10(10): e1001533. doi:10.1371/journal.pmed.1001533. www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001533

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