

# Injury and Death During the ISIS Occupation of Mosul and Its Liberation

Results from a 40-cluster Household Survey

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Global Research, May 23, 2018  
[PLOS Medicine](#) 15 May 2018

Region: [Middle East & North Africa](#)  
Theme: [History](#), [Terrorism](#), [US NATO War](#)  
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*Measurement of mortality and injury in conflict situations presents many challenges compared with stable situations. However, providing information is important to assess the impact of conflict on populations and to estimate humanitarian needs, both in the immediate and longer term. Mosul, Iraq's second largest city, was overrun by fighters of the Islamic State of Iraq and Syria (ISIS) on June 4, 2014.*

*In this study, we conducted household surveys to measure reported deaths, injuries, and kidnappings in Mosul, Iraq, both during the occupation of the city by fighters of ISIS and the months of Iraqi military action known as the liberation.*

## Methods and findings

**Mosul was overrun by ISIS forces on June 4, 2014, and was under exclusive ISIS control for 29 months.** The military offensive by Iraqi forces, **supported by [US led] coalition artillery and airstrikes**, began on October 17, 2016, in east Mosul and concluded in west Mosul with the defeat of ISIS on June 29, 2017. We conducted a 40-cluster population-based survey as soon as the security forces permitted access for the survey team.

The objective of the survey was to measure reported deaths, injuries, and kidnappings in Mosul households during 29 months of ISIS-exclusive control (June 2014–October 2016) and the nine months of Iraqi military action known as the liberation (October 2016–June 2017). In east Mosul, the survey was conducted from March 23 to March 31, 2017, and in west Mosul from July 18 to July 31, 2017. Sampling was based on pre-ISIS population distribution, with revisions made following the extensive destruction in west Mosul. The 1,202 sampled households included 7,559 persons: 4,867 in east Mosul and 2,692 in west Mosul. No households declined to participate. During the time from June 4, 2014, to the time of the survey, there were 628 deaths reported from the sampled households, of which 505 were due to intentional violence, a mortality rate of 2.09 deaths per 1,000 person-months. Over the entire time period, the group with the highest mortality rates from intentional violence was adults aged 20 to 39: 1.69 deaths per 1,000 person-months among women and 3.55 among men.

In the 29 months of ISIS-exclusive control, mortality rates among all males were 0.71

reported deaths per 1,000 person-months and for all females were 0.50 deaths per 1,000 person-months. During the nine months of the military liberation, the mortality rates jumped to 13.36 deaths per 1,000 person-months for males and 8.33 for females. The increase was particularly dramatic in west Mosul. The leading cause of reported deaths from intentional violence was airstrikes—accounting for 201 civilian deaths—followed by 172 deaths from explosions. Reported deaths from airstrikes were most common in west Mosul, while reported deaths from explosions were similar on both sides of Mosul. Gunshots accounted for 86 cases, predominantly in west Mosul where ISIS snipers were particularly active. There were 35 persons who were reported to have been kidnapped, almost entirely prior to the military offensive. By the time of the survey, 20 had been released, 8 were dead, and 7 still missing, according to household reports. Almost all of the 223 injuries reported were due to intentional violence. Limitations to population-based surveys include a probable large survivor bias, the reliance on preconflict population distribution figures for sampling, and potential recall bias among respondents.

## **Conclusions**

Death and injuries during the military offensive to liberate Mosul considerably exceeded those during ISIS occupation. Airstrikes were the major reported cause of deaths, with the majority occurring in west Mosul. The extensive use of airstrikes and heavy artillery risks an extensive loss of life in densely populated urban areas. The high probability of survivor bias in this survey suggests that the actual number of injuries, kidnappings, and deaths in the neighborhoods sampled is likely to be higher than we report here.

## **Author summary**

### **Why was this study done?**

- The Islamic State of Iraq and Syria (ISIS) controlled Mosul, Iraq's second largest city, from June 2014 until it was militarily defeated in June 2017.
- No information was available about population events among those living under the control of ISIS or during the military campaign to destroy ISIS.
- This study was undertaken to measure the injuries, deaths, and kidnappings that occurred during the 29 months ISIS controlled Mosul and the impact on households during the nine months of military actions to regain Mosul.

### **What did the researchers do and find?**

- The study sampled 1,202 households in 40 neighborhoods, 25 in east Mosul and 15 in west Mosul, as soon as Iraqi security forces permitted entry of the survey team.
- The mortality rates during the 29 months of exclusive ISIS control were 0.71 and 0.50 reported deaths per 1,000 person-months for males and females, respectively. During the military campaign against ISIS, these mortality rates jumped to 13.36 and 8.33 reported deaths per 1,000 person-months. The increase was particularly dramatic in west Mosul and high among males.
- The leading cause of reported deaths among the 505 who died from intentional violence was airstrikes—accounting for 201 civilian deaths in survey households—followed by 172 deaths from explosions.

### **What do these findings mean?**

- Mortality rates were much higher during the nine months of the military liberation of Mosul than during the 29 months of exclusive ISIS control. The rates for reported deaths were much higher in west Mosul, where house-to-house fighting and aerial and artillery attacks were more intense and population density greater. High mortality rates resulted despite the use of modern precision-targeted ordnance.

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### Conclusion of Report

Despite many limitations, these data depict a city heavily damaged. Although the media accounts report extensive brutality and wanton killing by ISIS, we found that **the [US sponsored] military ground and airstrikes resulted in a death toll exceeding that reported during the ISIS occupation.** The description of airstrikes that were stated to be “one of the most precise air campaigns in military history” seems not to be supported by our data, which found large numbers of civilian deaths attributed to airstrikes [19].

The military offensive brought an increase in injury and death that affected the young, the robust, and the elderly of Mosul to varying degrees. Some persons were able to escape the city or escape the destruction around them, but many were not, and their number we cannot completely measure.

### Acknowledgments

This study is the work of the dedicated interviewers who worked hard to collect data carefully and precisely in difficult circumstances, and to the people of Mosul who without exception welcomed the interview teams and freely shared their experiences. The work of Valeria Cetorelli with the design and the mapping is gratefully appreciated.

The original source of this article is [PLOS Medicine](#)

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