Demographic Analysis of Armed Conflict and Humanitarian Crisis:

The Complex Case of Evaluating Elevated Mortality and the US-Led War in Iraq, 2003-2011

Almost nine years after it began, the United States war in Iraq officially ended on December 15, 2011. Begun in the wake of the September 11th attacks on the World Trade Center and the Pentagon, the purported goal of the Iraq war was to eliminate an existential threat to the US from Saddam Hussein and his so-called "weapons of mass destruction." As is now well-known, these supposed weapons proved illusory, and after nine years of warfare, estimated direct expenditures over $1 trillion, thousands of American hundreds of thousands of Iraqi lives lost, and a mixed record of achievement of military or political goals, it would be difficult for even the most ardent proponents of the war to argue that it has was a success from the perspective of American foreign policy.

Since 2003, various public, private and non-profit organizations have attempted to estimate the death toll of the war on Iraq, particularly as relates to civilian casualties of American and Coalition forces' military engagement in the country. In this case, where American public interest and political stakes are high, it is perhaps unsurprising that significant research interest and debate has been generated. However, as in any context where data is scarce and often contested, these studies have produced widely varying estimates, and there are significant challenges of definition and measurement, many of which will be discussed below.

Despite the attention paid and numerous studies produced on Iraq mortality, however, little consensus about the death toll in Iraq has emerged. Also, after an initial flurry of interest, as political fatigue set in among the American public, research on the subject also declined - it is

telling that most of the most significant data collection efforts occurred during the first half of the Iraq war, and few new large-scale studies of direct or indirect civilian mortality have been undertaken since 2007-2008, and many of the published studies focus on elevated mortality only during the first 1-3 years of the conflict (though a few have continued ongoing data collection and reporting efforts, as will be discussed later).

Despite these limitations, relative to other conflicts there is a fairly robust literature on deaths as a result of the war-related violence in Iraq since the US invasion in 2003. However, there is very little literature which specifically addresses elevated mortality from causes other than violence, particularly among refugees and internally displaced persons (IDPs). What is generally agreed upon is that, as in many other cases of armed conflict, the number of refugees and IDPs in the Iraq conflict is substantially larger than the number of direct violent deaths. By some estimates, over 4.5 million – approximately one in five - Iraqis were displaced at the height of the conflict, including 2.7 million internally displaced persons. As violent deaths of civilians have slowed, the refugee crisis has persisted – while the number of refugees and IDPs has fallen marginally as of January 2011, almost 3.4 million Iraqis remain displaced – roughly 1.7 million are living as refugees in other countries, 1.3 million are internally displaced, with the remainder falling into other categories of UNHCR concern (UNHCR 2011). Yet, very little is known about the demographic profile of these populations or the elevated mortality they may be experiencing, either in the present or potentially in the future if they continue to live as displaced persons.

As Reed (2007) and others have illustrated, levels and patterns of age- and gender-specific mortality in conflict, and particularly though not exclusively among refugees and IPDs, vary widely between different conflict scenarios. Particularly vulnerable groups are typically

understood to include women, children, the elderly, and in some cases men of military age (Waldman 2001), but the relative mortality risk to these groups depends on various factors specific to a given conflict. Moreover, little systematic data is collected and reported to enable detailed analysis of elevated mortality, and in particular age- and gender-specific mortality, either as a result of violence or other causes. These difficulties are pervasive in the Iraq conflict as well, although the extreme policy relevance of the two US-led wars in Iraq in 1990-1991 and in 2003-2011 have led to marginally better data collection and reporting than is typical in other conflict scenarios that have been studied with respect to understanding these variations in mortality risk. As such, a detailed analysis of the Iraq case – though it is in many ways quite historically and demographically specific – may yield valuable information for researchers seeking to understand these processes and their implications for populations in conflict.

This study will attempt to compare across a variety of available sources to suggest a range of possible estimates and patterns of elevated mortality, both direct (as a result of violence) and indirect (from other causes attributable to the conflict), during the eight years of the US-led invasion of Iraq. Following a brief discussion of definitions and scope, we will describe the unique history and features of the Iraq conflict and their impact on the process of estimating elevated mortality. Then, we will present and discuss the challenges with published population data in conflict scenarios, and discuss how a baseline mortality profile for the Iraq case might be established. Third, we will detail the substantial literature and debate surrounding estimates of elevated risk of violent deaths in Iraq during the recently-concluded Iraq war (2003-2011), and the politics of data collection and reporting in the case of the Iraq war. Finally, we will describe the profile of Iraqi refugees living abroad using data published by UNHCR and the limited literature addressing mortality among refugees and internally-displaced persons as a result of the present Iraq conflict.

Definitions and Scope

Before proceeding, it may be helpful to articulate some key concepts and the various components and processes by which Iraqis may experience elevated mortality as a result of the US-led invasion and subsequent eight years of warfare in their country. Briefly:

- The goal of the current study is to assess elevated mortality among Iraqis as a result of the US-led war in that country. This study will attempt to systematically distinguish the deaths or Iraqis from other deaths in the conflict, such as American and Coalition forces or private contractors.
- *Iraqis* refers to the population living in Iraq at the time of the US-led invasion in 2003. *Iraqi civilians* refers, at least conceptually, to the non-combatants among this population, i.e. those who are not involved in the war either formally or informally. In the Iraq case, in practice it is extremely difficult to distinguish combatants from non-combatants. For purposes of this study, we will consider the distinction largely moot and make no attempt to identify and isolate civilian deaths per se.
- Iraqis *displaced* by the conflict include those who have left their homes since the beginning of the conflict in 2003. While some may have left for reasons other than the conflict, this distinction is also difficult to draw and is largely moot. Displaced persons include both those who have fled to other countries (refugees) and those still living in Iraq (internally displaced persons, or IDPs).
- For purposes of this study, *elevated mortality* includes all deaths to Iraqis since 2003 above what would have been expected if the US-led invasion had not occurred. These may include violent deaths, as well as deaths attributable to other causes such as disease and malnutrition.

- A substantial number of Iraqis have been killed or died of other conflict-related causes in Iraq, including both IDPs and those who were not displaced before their deaths. These will be reflected in elevated mortality reported or estimated *within* the country. While the conditions affecting IDPs are highly policy-relevant, and will be discussed from time to time in this study, in many cases – and particularly the Iraq conflict, for reasons that will be discussed in more detail later – it is difficult or impossible to distinguish displaced and non-displaced people within Iraq for purposes of measuring mortality. As such, this distinction will not be systematically drawn throughout this study.
- An additional number of Iraqis have been killed or died of conflict-related causes while living as refugees in other countries after fleeing Iraq. These deaths may be reflected in elevated mortality reported or estimated in the refugee's country of residence. While from a policy perspective the concerns of all displaced persons (refugees and IDPs) are often quite similar, from a demographic perspective given that most statistics are reported for countries of residence rather than country of origin, it is necessary to distinguish them for purposes of estimating elevated mortality.

In short, there are three distinct populations with three distinct sets of conditions and data considerations which must be taken into account in developing measures of elevated mortality – those who have not been displaced, those who have been displaced but are still living in the country of origin, and refugees who are living in other countries. (While this three-part conception of the population of interest may be complicated by refugee and IDP returns and resettlements, the three major groups will suffice in this case.)

Given the way mortality data is typically collected and reported, for purposes of assessing elevated mortality in conflict it may be more useful to distinguish those living within

the conflict zone (in this case, the country of Iraq) from those who have fled the country as refugees and may be susceptible to elevated mortality which would be accounted in their eventual country of residence. However, it is also the case that in many conflicts, the conditions and mortality levels among the two groups of displaced people (refugees and IDPs) are more similar than among the two groups still living in the country – IDPs and those who have not been displaced. In this case, adjustments or estimates may be made that take into account these similarities to assist in understanding one population of displaced persons based on data available for the other, for example understanding the conditions of IDPs based on data available for refugees.

The Iraq Conflict: A Brief History and Description of Unique Features

While each armed conflict and humanitarian crisis is in many ways distinct, the recent conflicts in the Middle East, and in Iraq specifically, have an number of particularly notable features which serve to complicate data collection and call into question the applicability of a number of widely-held assumptions about mortality in conditions of conflict which largely derive from previous crises in Africa and Asia. In addition to the obvious specificity of the country's history of conflict, the large role played by foreign military forces, a number of demographic and social factors make this conflict and the resulting mortality patterns distinct.

As in many other nations experiencing conflict, Iraq has a long and complex history of political and social unrest, which has been ongoing since well before the current nation was first established after World War 1. Formerly part of the Ottoman Empire, Iraq was briefly ruled by Britain before becoming an independent state in 1932. Following the first World War, Iraq was alternately a monarchy and a Republic ruled by the Arab Socialist Ba'ath Party. Saddam Hussein,

a member of the Ba'ath Party, ascended to the presidency in 1979 – as President, he engaged in many repressive practices against Shia, Kurds, and other religious and political minority groups in the country. Soon after taking power, Hussein also led Iraq into a protracted war with Iran, which stretched from 1980-1988. Just two years later, Iraq invaded Kuwait, prompting the US-led military campaign which became known as the first Gulf War (1990-1991). The Gulf War was followed by a decade of sanctions, attempts to disable Iraq's military capabilities, and the deeply flawed "oil-for-food" program which allowed the United States and other Western countries to continue to obtain Iraqi oil while imposing severe economic, political and military restrictions. Finally, to a significant extent as an extension of the United States response to the 2001 terrorist attacks on the World Trade Center, in March 2003 the United States and a small group of international allies invaded Iraq for a second time. After deposing Saddam Hussein and initially declaring a swift victory, ongoing violent conflict among different groups competing for power lead to a long and protracted war. The violence peaked in the period from 2006-2008, as did the displacement of large numbers of Iraqi civilians. Since this period, levels of violence have stabilized at lower but still elevated levels – as the United States completed its troop pullout in December 2011, the future of Iraq remains decidedly unclear.

Iraq History Timeline, 1920-2011	
1920	Iraqi State Established
1932	Iraq Gains Independence from Britain
1979	Saddam Hussein becomes president of Iraq
1980-88	Iran-Iraq War
1990	Iraq invades Kuwait; First Gulf War Begins
1991	First Gulf War ends
1992	Military and economic sanctions begin
2001	September 11th attacks on the United States
2003	March 20, 2003 - United States invades Iraq
2004	US hands sovreignty to interim gov't; war against insurgents continues
2005	Elections held in Iraq; violence escalates
2006	Violence continues to escalate; Iraq Study Group describes Iraq situation as "grave and deteriorating"
2007	US military surge; large-scale displacement of Iraqis to Syria and Jordan.
2008	Violence beginning to decrease; US hands over control of Anbar province
2009	Violence continues at lower levels; Barack Obama announces US military withdrawal from Iraq by 2011
2010	Violence continues at lower levels; US combat forces leave Iraq
2011	December, 2011: US completes troop pullout. Violence continues at lower but still elevated levels.
Future	Violence and political unrest likely to continue - future stability uncertain.

As described above, Iraq has the dubious distinction of being perhaps the only nation which has been the subject of large-scale invasion by the unalloyed military might of the United States, not once but twice in its recent history. A nation with a population smaller than several US states, which falls into the lower-middle income group as categorized by the World Bank, in the current war alone Iraq has been the recipient of American gunfire worth more than $1 trillion dollars (roughly 12 times its GDP). And, unlike previous countries which have been the target of United States military action in the 20th century – such as Vietnam and Korea – Iraq

does not even have the military and financial backing of a larger and more powerful ally. While the advisability of and motivations for the two Gulf Wars are certainly open to debate, it is clear that the people of Iraq have borne the brunt of significant brutality, perpetrated by their own leaders, foreign powers, and between different ethnic and religious groups within the population both nationally and in the context of the region. The specific features of the political and social conditions in the country and the region have contributed to this history of instability and violence, and the ongoing challenges of resolving the current political and military situation.

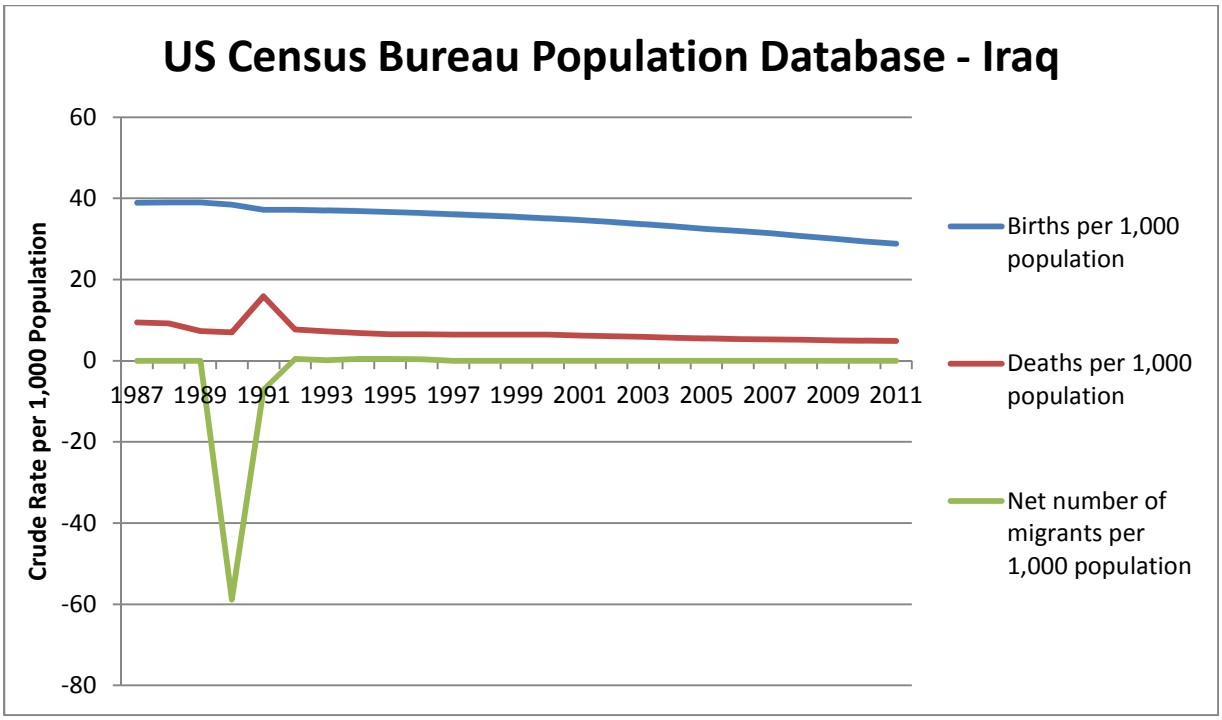
The Iraq conflict has many other distinct features that affect the extent to which mortality rates are elevated as a result of the current crisis. For example, the fact that Iraq and its Middle Eastern neighbors are highly urbanized presents unique patterns of violence and security challenges, as well as opportunities and challenges relative to internally-displaced persons (IDPs) and refugees. These will be discussed in more detail below in the section on the challenges of estimating elevated mortality among refugees.

Census Data and Population Projections in Conflict Conditions: Inadequacy for Understanding the Impacts of Conflict, but Utility in Establishing Baseline Mortality

While it might go without saying that published demographic data available from the leading international agencies is not sufficient to understand mortality in conflict scenarios, it is worth a small illustration of the point. First, official statistics such as national census are not collected regularly and have other significant flaws. The most Iraqi census data available is from 1997, though the 1987 census is the most recent reported by international demographic data sources and the 1997 census has been criticized as being of questionable quality.

In the absence of viable census data, demographers and leading statistical agencies typically utilize indirect estimation techniques to "fill in" data using best estimates and model data, to construct complete datasets for analytical purposes. While these methods may yield satisfactory results in many contexts where population patterns are relatively consistent, they are simply not suited to modeling population statistics in conflict scenarios. For example, in the data shown below, from the US Census Bureau's Population Database, there is no indication of elevated mortality or elevated out-migration during the period 2003-2010. The elevated mortality of several hundred thousand estimated as a result of the conflict by even the most conservative analyses, and the net outmigration of roughly 2 million Iraqi refugees reported by UNHCR, is simply not reflected in the Iraq data based on estimated population projections. Note that in the tables below, the crude death rates decline throughout the period 2003-2010, and net migration is estimated to be zero. This is in stark contrast to the adjustments which were clearly made to reflect increased mortality and net outmigration during the first Gulf War period (1990-1991).

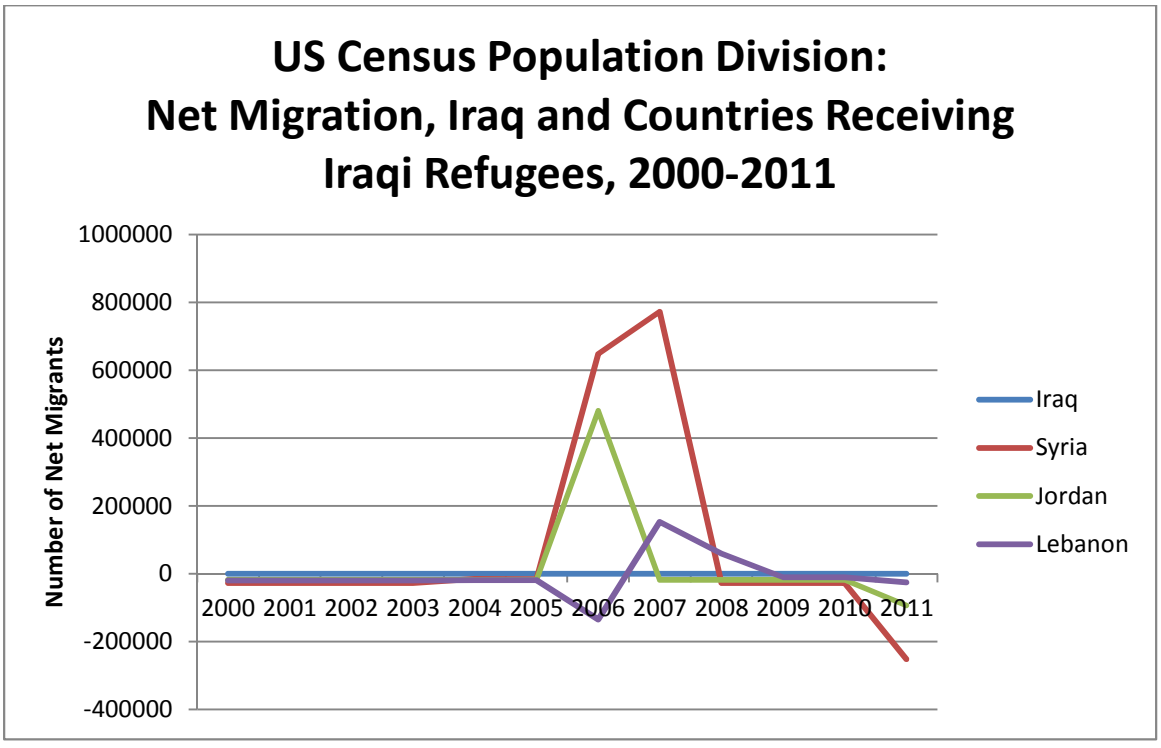
Iraq Population, Crude Birth Rate, Crude Death Rate and Crude Rate of Net Migration US Census Bureau – Population Database						
Year	Population	Deaths	Net Number of Migrants	Births per 1,000 population	Deaths per 1,000 population	Net number of migrants per 1,000 population
1987	16,543,189	156,000	0	38.93	9.46	0
1988	17,040,559	157,000	0	38.98	9.21	0
1989	17,572,536	128,000	0	38.96	7.27	0
1990	**18,139,958**	**127,000**	**-1,067,000**	**38.43**	**7.02**	**-58.82**
1991	**17,477,375**	**278,000**	**-125,000**	**37.21**	**15.92**	**-7.15**
1992	17,868,275	138,000	8,000	37.18	7.72	0.45
1993	18,411,478	133,000	3,000	37.02	7.21	0.16
1994	18,976,086	130,000	8,000	36.84	6.84	0.42
1995	19,563,608	127,000	8,000	36.62	6.48	0.41
1996	20,167,968	131,000	8,000	36.37	6.48	0.4
1997	20,781,246	134,000	0	36.09	6.47	0
1998	21,402,713	138,000	0	35.77	6.46	0
1999	22,035,597	142,000	0	35.42	6.44	0
2000	22,679,080	146,000	0	35.03	6.43	0
2001	23,334,733	145,000	0	34.63	6.23	0
2002	24,004,047	145,000	0	34.19	6.03	0
2003	**24,685,179**	**144,000**	**0**	**33.65**	**5.85**	**0**
2004	25,376,251	144,000	0	33.09	5.67	0
2005	26,076,088	143,000	0	32.49	5.5	0
2006	26,784,179	144,000	0	31.97	5.37	0
2007	27,500,156	144,000	0	31.42	5.25	0
2008	28,221,435	145,000	0	30.75	5.14	0
2009	28,945,569	146,000	0	30.09	5.03	0
2010	29,671,605	146,000	0	29.41	4.92	0
2011	30,399,572	147,000	0	28.81	4.82	0



The crude death rates reported by the US Census Bureau also align with mortality statistics published by the United Nations Population Division, which range between 5 and 6 per 1,000 for each five-year interval during the period 1990-2010 (UNPD 2011).

In contrast to the data on Iraqi mortality and migration, data from the US Census Bureau for the set of Middle Eastern countries which have experienced high in-migration of Iraq war refugees do in fact reflect this inflow of displaced persons and, more recently, outmigration which may indicate refugee returns. This pattern is apparent in the three largest countries which received Iraqi refugees (Syria, Jordan and Lebanon), but smaller refugee flows appear generally insignificant in relation to the population and other migration flows in the larger countries of Egypt and Turkey. While census data specifically identifying the population of Iraqi refugees living in neighboring countries is not available, the number of in-migrants reflected in the major receiving countries is consistent with UNHCR estimates.

Middle Eastern Countries Receiving Iraqi Refugees* - Net Number of Migrants US Census Bureau – Population Database					
Year	Syria	Jordan	Lebanon	Egypt	Turkey
2000	-27,000	-18,000	-20,000	-24,000	52,000
2001	-27,000	-18,000	-20,000	-17,000	51,000
2002	-27,000	-18,000	-20,000	-17,000	50,000
2003	-27,000	-18,000	-20,000	-17,000	49,000
2004	-15,000	-18,000	-19,000	-17,000	48,000
2005	-16,000	-18,000	-19,000	-17,000	47,000
2006	648,000	480,000	-135,000	-17,000	46,000
2007	773,000	-18,000	153,000	-17,000	45,000
2008	-27,000	-18,000	60,000	-17,000	44,000
2009	-27,000	-18,000	-10,000	-17,000	43,000
2010	-27,000	-18,000	-10,000	-17,000	41,000
2011	-252,000	-93,000	-25,000	-17,000	40,000



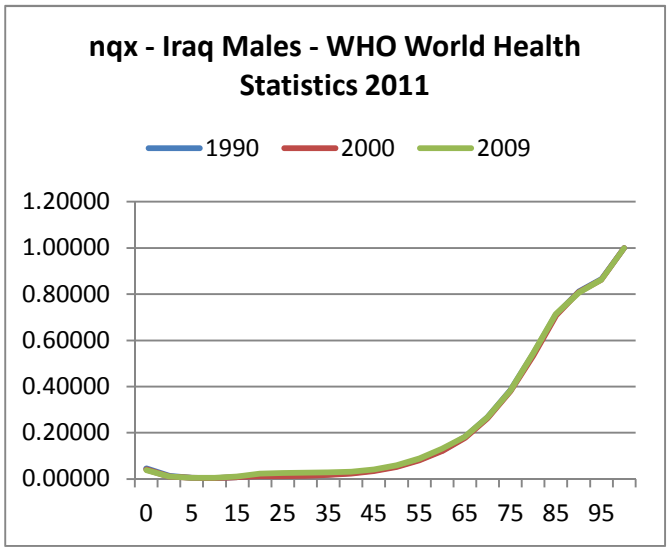
In fact, upon further review, it appears that the US Census Bureau numbers of in-migrants are not just consistent with, but are in fact drawn from, UNHCR data. Specifically, the Census Bureau's data sources reflect that in 2008, migration data for Syria, Jordan and Lebanon

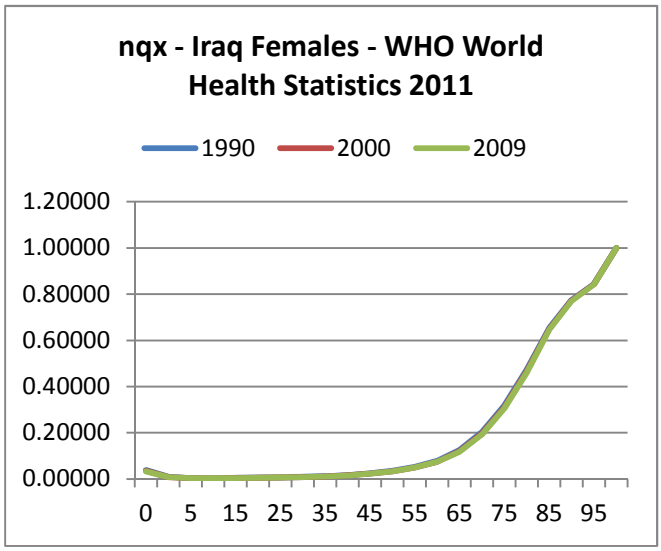
was adjusted based on data reported in the UNHCR's Statistical Online Population Database, which details refugee flows to and from over 120 countries around the world. This data is reported in detail below in the section which discusses estimating mortality among Iraqi refugees living abroad.

So, while census data in many of these countries is no better than what is available for Iraq, and even in some cases (as for Syria) worse, in this case the Census Bureau made a substantial adjustment in the net migration statistics for Syria, Jordan and Lebanon to reflect the inflow of Iraqi refugees. Why they did not make a similar adjustment to reflect the corresponding out-migration of Iraqis remains a mystery, as does the size and timing of the adjustments made (particularly in terms of refugee returns) relative to the reported UNHCR data. It is also notable that this adjustment was apparently made once, in late 2008 – the basis for the Census Bureau's projections of both in-migration and out-migration of Iraqi refugees for 2009-2011 is not clear.

While these concerns severely limit the utility of published demographic data to accurately reflect the population impacts of the war in Iraq, such data can still be used to produce estimates of baseline mortality against which elevated conflict mortality can be compared. It is important to recognize that the Middle East is a region with a number of specific social, economic and demographic features, about which there is relatively little demographic scholarship. Existing model life table systems, such as Coale-Demeny model stable population life tables and even the UN Model life tables, may not be suitable as a basis for comparison for particular countries with unique demographic features. Recently, the World Health Organization released a series of country-specific modified logit life tables based on the Brass logit model (Murray, 2008), which seems like a promising direction for establishing some sort of

baseline mortality scenario for Iraq. As such, for this study we will use the WHO country-specific life tables based on the 1987 Iraq census data.





Estimates and Patterns of Elevated Mortality Within Iraq

As noted above, a substantial number of studies have sought to estimate elevated mortality in Iraq as a result of the US-led invasion in 2003. Most of these studies were undertaken in the early years of the war – while a few projects tracking Iraqi mortality have continued their efforts through to the present, many others were cross-sectional studies which have not been replicated, and no major new cross-sectional studies of Iraq mortality have been released since 2007-2008. However, a number of passive reporting studies, most notably the Iraq Body Count or IBC, have continued to gather data through the present.

The most recent systematic evaluation of these data-collection and estimation efforts was published as a review article in the journal *Conflict and Health* (Tapp et al 2008). This review includes a total of 13 studies identified through a systematic literature review and online

search. A subsequent review conducted for the present study mirroring the search methodology used by Tapp et al did not identify any new studies which warranted inclusion.

The 13 studies included in Tapp et al can be categorized into two broad groups – population-based studies and passive reporting studies. The population-based studies use retrospective household surveys, with cluster sample designs to produce nationally representative estimates of mortality. The passive reporting studies, on the other hand, rely on registered or reported deaths, either from the media or official sources. Population-based studies have the benefit of collecting information about mortality that is not registered or reported by official sources. These systematically produce higher estimated mortality rates than the passive reporting studies, which include only a subset of deaths – those which are reported and/or documented.

However, as with any survey method, the results of population-based studies are highly sensitive to methodological details and complex issues of study implementation – as such, the estimates they produce are quite open to criticism, where the much more straightforward passive reporting studies (when conducted competently and clearly documented) typically are not. (The severe criticisms which have been leveled at the flagship population-based studies of Iraq mortality are discussed in more detail below.) On the other hand, even the proponents of passive reporting methods acknowledge that they produce often significant undercounts of true mortality – these studies are best treated as a lowest-possible estimate, with some unknown number of additional cases remaining unidentified and uncounted.

While Tapp et al include a relatively wide range of studies, they subsequently assess the quality of all 13 studies they include, and find many of them lacking. Upon review, it is clear that a number of the studies which they include in their review are not of sufficient quality to

consider alongside the more robust studies – and, in fact, including them may be more misleading than it is helpful in terms of arriving at a reasonable conclusion regarding the range of mortality estimates, particularly as in some cases (as in the case of Just Foreign Policy) they are entirely duplicative of other studies which are included here.

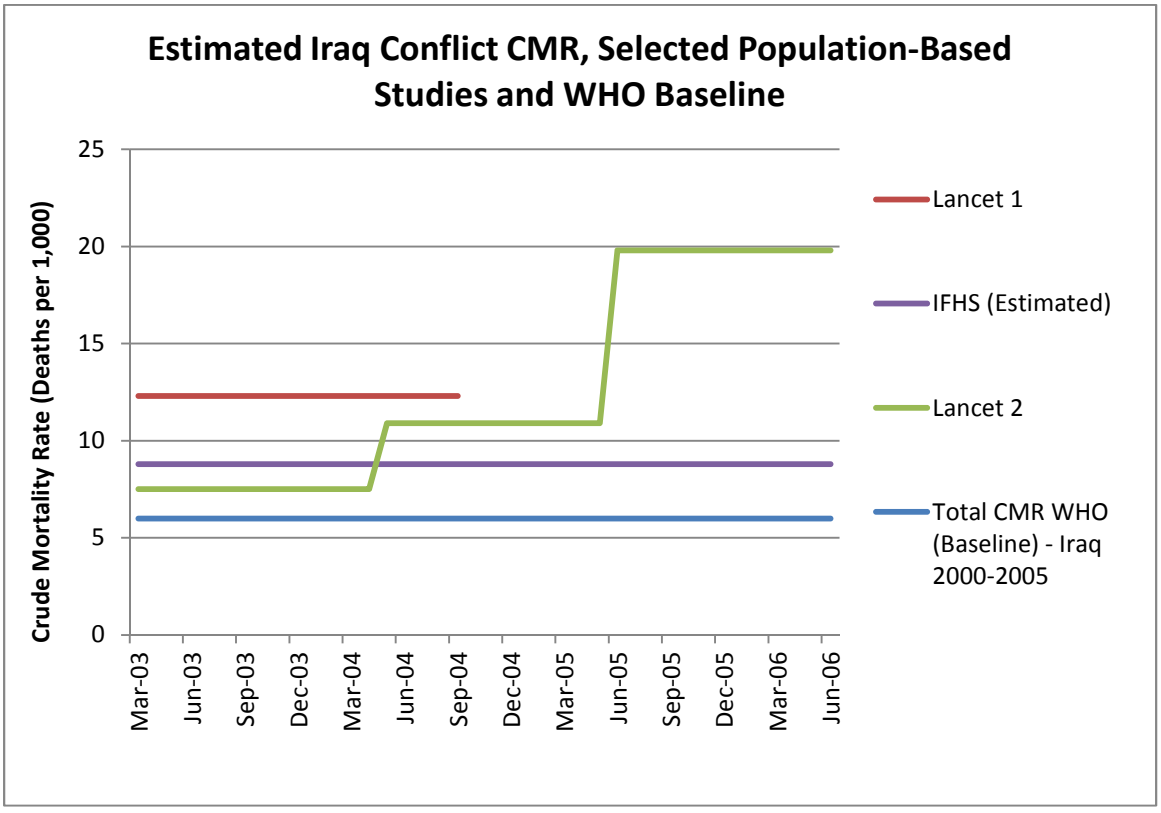
For the current study, we include ten of the 13 studies assessed by Tapp et al – the five population-based studies and five of the passive reporting studies. The studies included here are:

- Roberts et al, 2004 ("Lancet 1") – population-based (see above)
- Iraq Living Conditions Survey, 2004 ("ILCS") – population-based (see above)
- Burnham et al, 2006 ("Lancet 2") – population based (see above)
- Opinion Research Bureau, 2007 ("ORB") – population based (see above)
- Iraq Family Health Survey, 2008 ("IFHS") – population based (see above)
- Conetta, C, Project on Defense Alternatives Research Methods ("PDAR"), 2003 – data collected from journalistic surveys, casualty incidents, hospitals, burial sites and eyewitness accounts from embedded journalists and military personnel
- Iraqiyun, 2005 – data gathered by humanitarian organization from hospitals, reports collected from family and friends of the deceased
- United Nations Assistance Mission for Iraq ("UNAMI"), 2006 – centralized information-sharing group which supports the UN's involvement in Iraq following the conclusion of the Oil for Food program – data collected from the Ministry of Health and the Medica-Legal Institute of Baghdad
- Iraq Body Count ("IBC"), 2011 – independent organization, the most widely-cited source by US politicians for Iraqi mortality estimates. Cases are gathered from online surveys and media-reported deaths, and must be valided by at least two independently reported sources
- The Brooking Institution ("Brookings"), 2011 – a slightly modified version of IBC data is reported as part of the Brookings Institution's weekly Iraq Index, a compilation of various statistical information about the Iraq war.

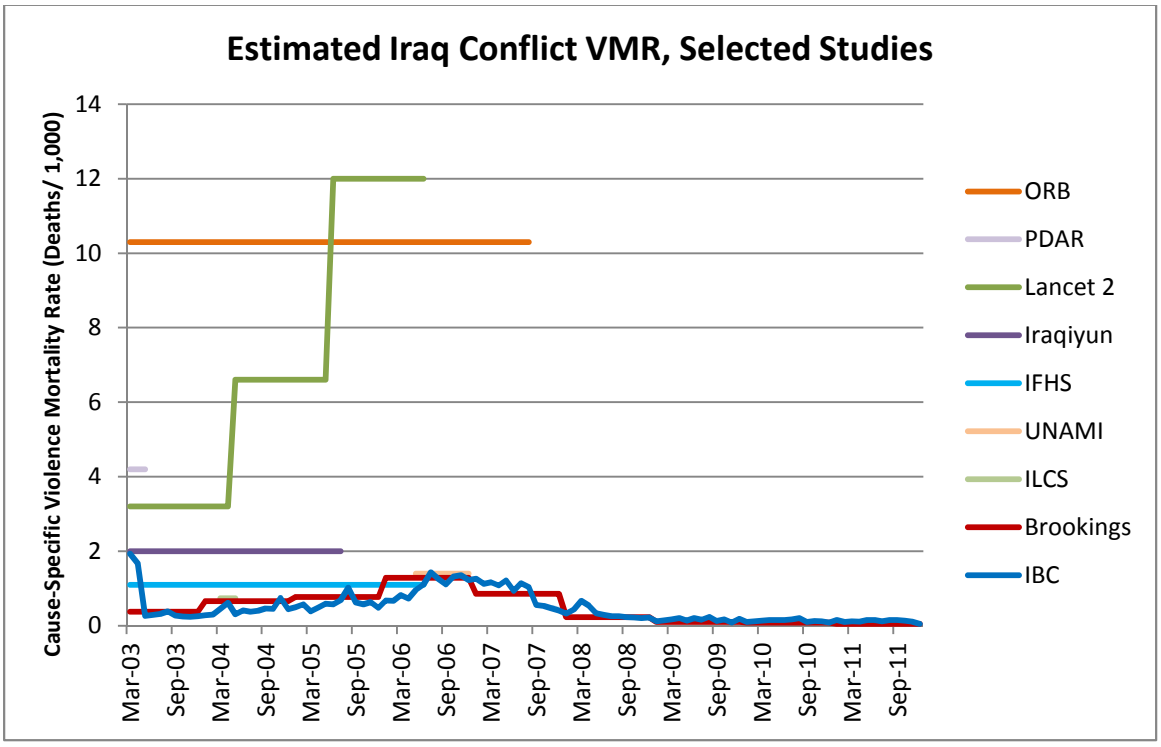
These studies produce a wide range of estimates of crude mortality rates (CMR) and cause-specific mortality due to violence (VMR). Only the population-based studies allow for an assessment of elevated CMR, and the ORB and ILCS studies do not since they only report specifically about elevated mortality in the context of deaths due to violence. Other than IBC, they are also limited in their time range of coverage - most of the studies were conducted in

2006/2007 or earlier, limiting our capacity to understand elevated mortality levels after the first three years of the war.

Elevated Crude Mortality Rates. Lancet 2 and IFHS are the major studies which estimate elevated crude mortality during the first three years of the Iraq war. These two studies develop their own baseline CMRs by asking about mortality during 2002 in the pre-war period – however, we believe that there is significant doubt as to the credibility of these baselines. Using a retrospective household survey to collect information about deaths four years in the past, particularly as these deaths occurred before the current conflict conditions arose, seems highly likely to yield significant under-reporting of pre-war mortality. Instead of these baseline rates, we benchmark the CMRs reported for the March 2003-June 2006 period against mortality rates derived from the WHO country-specific model life table for Iraq. The details of this method and the reasons for choosing the WHO data as the baseline are discussed below.



As is apparent from the discussion above, only a few of the studies of mortality in Iraq allow for an assessment of total mortality - most of the studies focus specifically on cause-specific mortality due to violence. Where mortality due to violence is clearly identified, either independently or as a component of total mortality, it is illustrated in the chart below. For purposes of this analysis, and based on assertions in a number of the published studies, we assume that the prevailing rate of mortality attributable to violence before the war was near zero.



As we can see from the charts above, the estimates of both crude mortality and cause-specific mortality attributable to violence vary widely. In the case of the crude mortality rates, the lowest estimates (IFHS) is 8.8 deaths per 1,000 per year, or roughly 50% higher than the WHO baseline mortality rate of 6 deaths per 1,000 per year. In contrast, the crude mortality rate reported by Lancet 1 is 12.3 deaths per 1,000 per year, and the rate reported by Lancet 2 ranges from 7.5 per 1,000 per year in the early stages of the war up to 19.8 deaths per 1,000 per

year as violence escalated in 2005 and 2006, more than three times the WHO baseline crude mortality rate. Presumably the other studies would have a similar escalating mortality rate if data were reported in shorter time intervals, but it seems clear that these rates would remain substantially below the Lancet 2 estimates. Overall, for the period from March 2003 to June 2006, Lancet 2 estimates a crude mortality rate of 13.2 deaths per 1,000, twice the WHO baseline, compared to 8.8 deaths per 1,000 for IFHS.

The range is even wider for the various estimates of cause-specific mortality attributable to violence. Much of this discrepancy is between the passive reporting studies such as IBC which generally yield low estimates (as discussed above), and the population-based studies like ORB and Lancet 2 which yield much higher estimates. For example, the lowest estimate (IBC) shows an overall VMR of 0.7 per 1,000 per year for the period March 2003-January 2008, and an overall VMR of 0.5 per 1,000 per year for the period March 2003-December 2011. In contrast, the highest estimate (ORB) shows an overall VMR of 10.3 per 1,000 per year for the period March 2003-August 2007, almost 15 times higher than the VMR estimated based on IBC data for the same period. The more reputable study which yields high estimates (Lancet 2) reports an estimated VMR of 7.5 per 1,000 per year for the period March 2003-June 2006, roughly 10 times the rate reported by IBC for the same period. ILCS is the only population-based study which yields comparable results to the passive reporting studies, although the IFHS estimates (also population-based) are only about 50% higher, at 1.1 per 1,000 per year for the period March 2003-June 2006.

Clearly, the major population-based studies - Lancet 2 and ORB - yield results which are substantially higher than any of the passive reporting studies. The discrepancy between the two may be to some extent a result of their mismatched time periods of coverage, though there are

numerous methodological differences that might have yielded the higher ORB estimates. Both of these studies are an order of magnitude higher than IBC, with its highly conservative passive reporting methodology.

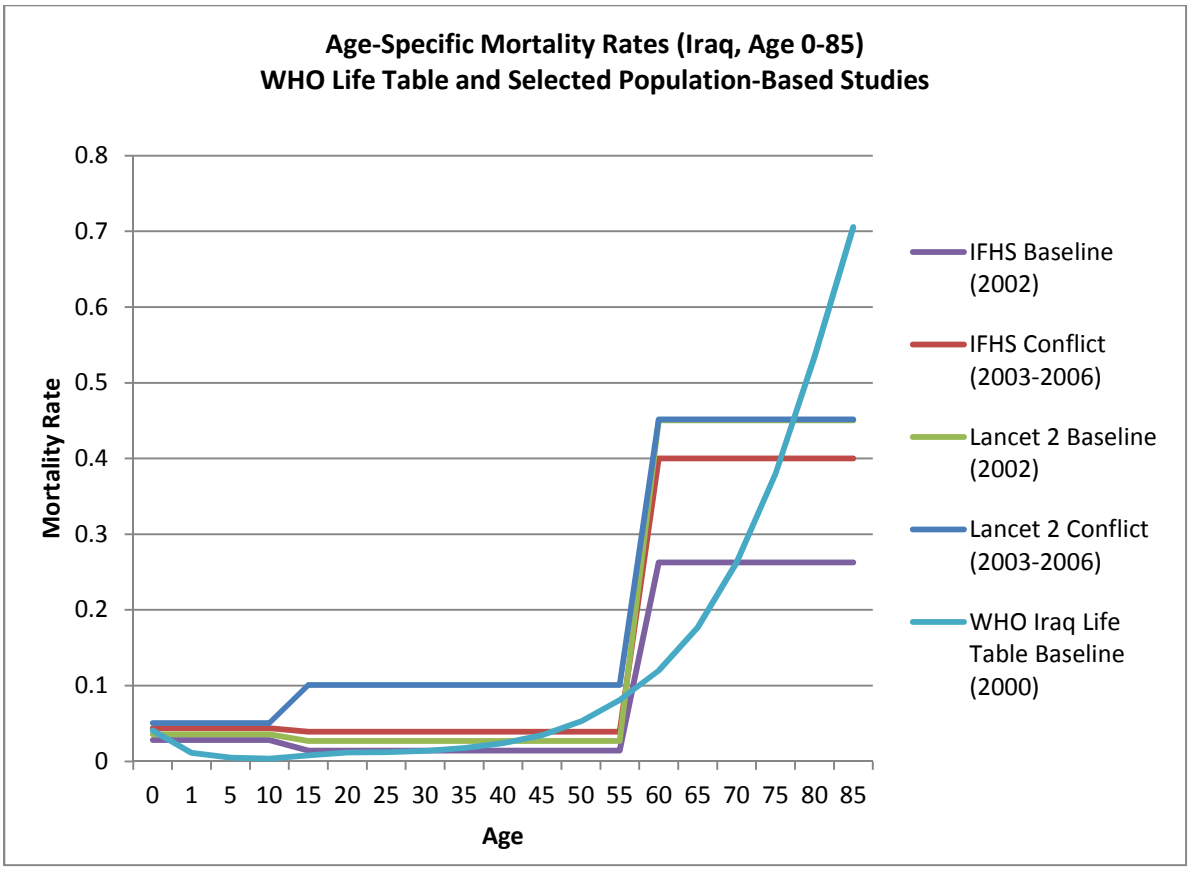
Not surprisingly given their relatively straightforward methodologies, estimates derived from many of the passive reporting studies generally fall within the same range, although a few (Iraqiyun and PDAR) do yield notably higher estimates. As such, given the methodologies of these two different approaches we might reasonably consider the passive reporting studies as a lower bound estimate, and the population-based studies as a high estimate. To that end, we could estimate the range of cause-specific mortality due to violence in Iraq through June 2006 (Lancet 2) or August 2007 (ORB) as somewhere between 0.7 deaths per 1,000 per year (IBC) and 7.5 (Lancet 2) or even 10.3 (ORB).

Unfortunately, however, such a wide range yields a less than satisfying result. Passive reporting numbers clearly undercount mortality, but by how much? The various methodological critiques of both ORB and (to a more moderate extent) Lancet 2 described below call their findings significantly into question. (See Appendix A for a summary discussion of the criticisms and counter-criticisms surrounding ORB and Lancet 2.) Yet, even though these two high estimates (Lancet 2 and ORB) have been widely criticized, after having reviewed the relevant literature it is clear that the critics have not thoroughly discredited their estimates, particularly in the case of Lancet 2, around which there remains robust debate. What all of this means about the credibility or reasonable utility of their estimates remains an open question.

One possible avenue out of this morass would be, as some critics of ORB and Lancet 2 have argued (see Spagat 2008), to support IFHS, which is a population-based study with a more involved and robust study design and cluster sampling methodology than Lancet 2. In addition

to having a more water-tight design, IFHS yields results within a reasonable margin of those generated by passive reporting methods (50% higher than IBC). While this may be a tempting conclusion, it is difficult to image that the true rate of cause-specific mortality attributable to violence during some of the most violent years of the Iraq conflict was only 1.1 per 1,000 per year. (For purposes of comparison, the homicide rate in the United States is 0.05 per 1,000 per year in 2010 according to the FBI's Uniform Crime Statistics, meaning that violent death rates at the height of the Iraq war were only about 20 times higher than homicides in the US.) Or, as is often the case in such circumstances, we may continue to simply report a wide range until (or unless) better data becomes available. Additional data is also critical if we are to effectively estimate mortality after 2006/2007, since IBC (the lowest estimate among the ten studies) is the only primary data source which has continued to be collected and reported since that time.

Finally, in studying elevated mortality in conflict scenarios, it is worth describing – where possible – patterns of age-specific mortality in addition to overall elevated mortality rates. While many studies may collect age and sex-specific mortality data, few studies report this data, to the frustration of demographic researchers (Reed 2007). In the Iraq case, however, ttwo of the population-based studies – IFHS and Lancet 2 – allow for comparison of age-specific death rates for children below age 15, adults age 15-59, and elderly individuals age 60 and above. The chart below compares these studies (baseline and conflict) against the WHO baseline.



These two studies and the comparison against the WHO baseline demonstrate some notably different patterns of age-specific mortality in Iraq during the study period. The age-specific mortality data from IFHS suggests that elevated mortality is largely concentrated among the elderly, with relatively little increased mortality at adult ages. In contrast, Lancet 2 finds that adults have experienced dramatically increased mortality in the Iraq conflict, while the mortality increased only modestly for children and there was no significant increase among elderly populations. As discussed above, there are reasons to be critical of Lancet 2 in terms of the the magnitude of increased mortality in their overall CMR and VMR estimates, but in this case given what we know about the nature of the Iraq conflict it seems likely that their findings relative to age-specific elevated mortality are more accurate than those of IFHS.

Estimates of Elevated Mortality Among Iraqi Refugees

Having achieved such a satisfactory conclusion to our assessment of elevated mortality within Iraq, we turn to an even thornier problem – elevated mortality among Iraqi refugees living abroad. Moreover, while there are a number of published studies based on surveys which have been conducted among populations of Iraqi refugees (detailed below), none of them provide information about or attempt to estimate elevated mortality. While this might be entirely coincidental, the fact that refugee relief agencies, advocates and researchers are not discussing elevated mortality is telling – if mortality was clearly visible in the population, one would expect that these groups would be investigating and reporting on it. What is unclear is to what extent mortality may or may not be visible, and to what extent it may or may not actually be occurring, given the particular profile of Iraqi refugees and the conditions they are living in abroad.

First, it is necessary to understand the patterns of refugee displacement and flows from Iraq to neighboring host countries. Published data from UNHCR allows for detailed analysis of Iraqi refugee population and flows into and out of host countries. In the case of the current Iraq conflict, neighboring countries – in particular Syria and Jordan – have borne the bulk of population flows leaving Iraqi during the conflict. The outmigration of refugees from Iraq was largely concentrated in 2006 and 2007, when violence was escalating in the country and the US-led invasion increased attacks on civilians both before and during the "surge" phase of the war. Widespread bombings by coalition forces, particularly the highly publicized bombing of Samarra, prompted many Iraqis to flee the country. While some have since returned to Iraq, refugee returns have been slow – as of 2010, roughly 1.7 million Iraqi refugees still lived abroad, including roughly 1 million in Syria and 450,000 in Jordan.

Middle Eastern Countries Receiving Iraqi Refugees - Stock and Net Migration of Iraqi Refugees UNHCR Statistical Online Population Database							
Year	Syria	Jordan	Lebanon	Egypt	Turkey	Other	Total
2000 Mid-Year Population	16,471,000	4,688,000	3,791,000	65,159,000	67,329,000		
2000 Iraqi Refugee Stock *	1829	919	1817	48	642	520,924	526,179
Net Migration of Iraqi Refugees							
2001	-152	23	11	-12	-57	4,519	4,332
2002	39	127	-72	0	-209	-108,277	-108,392
2003	719	-104	-280	-3	-109	-53,762	-53,539
2004	11,956	-76	-328	6	-142	-68,091	-56,675
2005	10,483	-135	-351	-4	1	-59,600	-49,606
2006	675,126	499,246	19,203	8	15	-4,991	1,188,607
2007	800,000	0	30,000	10,230	3,521	-15,410	828,341
2008	-400,000	0	0	-182	3,819	-9,365	-405,728
2009	-50,000	-50,000	0	-3,519	-1,287	16,499	-88,307
2010	-50,000	0	-42,370	200	-917	-8,550	-101,637
2010 Iraqi Refugee Stock	1,000,000	450,000	7,630	6,772	5,277	213,896	1,683,575
2010 Mid-Year Population	22,198,000	6,407,000	4,125,000	80,472,000	77,804,000		
2010 Iraqi Refugees as % of Pop	4.5%	7%	0.2%	0.008%	0.007%		

* Note: In 2000, the majority of Iraqi refugees (386,000) lived in Iran – 75% of these refugees returned to Iraq by 2004, and almost 90% had returned by 2010. The vast majority of the remaining refugees as of 2000 had been re-settled in Western countries, including Sweden, the Netherlands, the United States, Denmark, Australia, the United Kingdom, Norway and Canada. The refugee stock in these countries did decline significantly from 2000-2010, suggesting that a significant number of Iraqi refugees may have returned during this period.

As with published population data discussed above, it is important to note that UNHCR data may also be flawed. Data on refugees and internally displaced persons is notoriously difficult to collect. However, UNHCR is the most credible source for such data, and relies on

multiple methods of data collection on the ground in host countries, including NGOs and its own field offices in addition to governmental agencies. As such, in a messy field it is likely that UNHCR data is the most robust source for population estimates in many humanitarian crises involving migration and displacement.

Unfortunately for our purposes, to date there are no published studies detailing mortality among Iraqi refugees. There are several reasons for the dearth of information discussed in greater below – most notably, the fact that Iraqi refugees are difficult to study given that they live dispersed in urban areas rather than concentrated in camps. Additionally, what data does exist illustrate that Iraqi refugees have somewhat better population health and access to resources than refugees in other contexts which have been widely studied, which suggests that their mortality rates may be somewhat lower than what has been observed in other circumstances of displacement and humanitarian crisis.

The specific conditions faced by displaced Iraqis are quite specific relative to other areas of the world which have faced large-scale humanitarian crises in recent years, most notably in Africa and Asia. it is first important to note that the Middle East is highly urbanized relative to other countries facing humanitarian crises. Iraq itself is 66% urban, with a rate of urbanization of roughly 3%. The World Bank's Middle East / North Africa Region overall is 57% urban, with many middle eastern countries (such as Jordan and Lebanon) much higher, well above 70% (CIA World Factbook, 2011). As such, it is unsurprising that most Iraqis, including both IDPs and refugees living in other middle-eastern countries, live dispersed in cities rather than concentrated in camps. In 2007, the number of urban refugees worldwide surpassed the number living in camps for the first time, and by 2009 almost twice as many refugees were living

in urban areas. The vast majority of urban refugees were in Asia and the Middle East, and particularly in Iran, Jordan, Pakistan and Syria (UNHCR 2009).

The data from UNHCR and surveys of Iraqi refugees conducted in Syria, Jordan and Lebanon clearly illustrates that displaced Iraqis overwhelmingly live dispersed in poor districts within urban areas, rather than concentrated in traditional refugee camps – a fact that has been increasingly recognized by the policy community as requiring new approaches to humanitarian crises (Crisp et al, 2009). For example, more than 75% of Iraqi refugees in Lebanon live in – and pay for – one- and two-room rental housing, most frequently inside of or in the outskirts of Beirut (Khalidi et al 2007). Households in Jordan and Syria are similarly concentrated in urban areas (Amman and Damascus), and based on their relatively high levels of household spending above the cost of food, many likely pay for rental housing (Doocy et al 2011). In terms of mortality patterns, displaced persons living in urban areas have a significantly different demographic profile than those living in camps (generally older and less feminized) and, at least as importantly, the health risks and mortality patterns particularly from communicable disease are very different. These patterns are also documented in surveys of Iraqi refugees in Lebanon, Jordan and Syria (Khalidi et al, 2007; Doocy et al, 2011; Mowafi, 2011).

Second, relative to many conflict-ridden countries in Africa and Asia, while these features are by no means universal it is true that despite its history of conflict, Iraq is a relatively middle-class country, with high levels of educational attainment and reasonably good baseline population health. Moreover, middle-class and professional Iraqis were disproportionately likely to be the target of attacks, and are disproportionately likely to have the means and capacity to leave. Thus, to an extent middle-class Iraqis have been the most likely to flee their homes either for other parts of Iraq or for neighboring countries. The demographic profile of

these immigrants harmonizes with the comparison between urban vs. camp refugees described above (Doocy et al, 2011; Mowafi 2011).

Third, the cities to which Iraqi refugees have largely fled are, generally speaking, also more middle-class places than the camp environments and very poor cities in Africa and Asia. The Middle Eastern cities - such as Aleppo, Amman, Beirut and Damascus – to which these refugees have disproportionately fled are relatively more prosperous than other cities around the world with large numbers of urban refugees, such as Accra, Khartoum, Nairobi and New Delhi. While the resources of these host cities and countries are certainly strained by the addition of large numbers of refugees[1], in these more stable urban environments, refugees are more likely to have access to some degree of health and sanitation infrastructure than those living in camps or those living in less prosperous cities in other parts of the world, and NGOs and relief agencies can draw on this infrastructure to a significant extent in delivering services (Crisp et al, 2009).

These population and structural factors combine to produce a very different mortality picture for the Iraqi refugees, compared to previously studied populations of Asian and African refugees. While Iraqi refugees face many challenges, at least so far these are not the same level of wide-spread starvation and communicable disease faced by refugee populations living in more precarious circumstances and settings, and with fewer resources to begin with. For example, while there is some evidence that the health status of Iraqi refugees is worse than the

[1] It is important to note that the countries receiving large numbers of displaced Iraqis are not signatories to the 1951 UN Refugee Convention or its 1967 Protocol. They have not recognized these incoming populations as "refugees," but rather as "guests," without the rights associated with refugee designation – however, the UNHCR and other agencies work closely with these countries to provide services to the population in question regardless of official designation by the host governments. While Iraqis were officially welcomed into Syria and Jordan, with the influx of increasingly large numbers of displaced persons - particularly following the bombing of Samarra in 2006 – the largest host countries (Syria and Jordan) began to restrict the inflow of displaced Iraqis in 2007-2008.

population of their host communities, there is no indication that Iraqi refugees have experienced communicable disease mortality or morbidity at higher rates than the host population. The most common health problems among Iraqi refugees include non-communicable diseases such as heart disease, diabetes and cancer (Khalidi et al 2007) – the single largest number of patient visits to UNHCR clinics in Syria was related to underlying hypertension (Unpublished data from UNHCR cited in Mowafi 2011). While there is some evidence of malnutrition and relatively limited access to potable water and health care services, there is relatively better infrastructure to distribute resources from government, NGOs and international relief agencies than in other refugee contexts.

Finally, while initially there were fears about political and sectarian violence in Iraq spreading to refugee host countries, while incidents of such attacks are certainly not unheard-of, these fears largely have not come to pass (Crisp et al, 2009). However, while these threats have begun to diminish they are certainly still very present within Iraq – combined with limited economic opportunities, the ongoing fear of violence among refugees and the precarious security situation in Iraq has significantly curtailed refugee returns, even as civilian mortality overall has stabilized at relatively low levels.

A number of surveys both inside and outside of Iraq indicate that, relative to other scenarios involving displaced persons, as a result of the factors described above the threats faced by displaced Iraqis relate more to legal, economic and housing security and access to health care services – as well as violence which is still prevalent within the country - rather than acute food security or communicable disease risk. For example, a recent survey by the International Rescue Committee shows that internally displaced Iraqis report housing and access to jobs as their primary needs, followed by education and legal assistance – “food” was only

identified as a priority need by 3% of respondents, and "health" was identified by less than 1% (IRC 2009). While food insecurity is a challenge for Iraqi refugees (Doocy et al, 2001) and significant challenges clearly remain regarding access to health care – and primarily to mental health services - access to employment and legal status is perhaps the most frequently cited concern in studies of refugees living in Syria, Jordan and Lebanon (Bader et al 2007; Khalidi et al 2007; Doocy et al 2011; IRC 2010).

In short – the above data strongly suggests that one of the major reasons why there are no studies of elevated mortality among Iraqi refugees may be that these populations are not experiencing substantially elevated mortality. While these refugees clearly face significant challenges, these challenges may not – or may not yet – have resulted in substantially elevated death rates. While there are few comparable cases, refugees of the war in the Balkans during the early 1990s present the closest parallel to the current population and conditions of Iraqi refugees. Kosovar refugees, for example, were generally more middle-class, and in relatively good health before becoming displaced. Mortality occurred primarily from violence, during the crisis itself –once refugees fled the region, they lived temporarily in more middle-class host countries, in that case in Europe, for a matter of a few years before most were able to return or resettle elsewhere. Refugees of the war in the Balkans did not experience elevated mortality rates, nor did certain other refugee groups with similar patterns, such as those in the crisis in East Timor in the late 1990s (Waldman 2001). It may turn out that Iraqi refugees fit this pattern as well, but the outcome will likely not be known unless new research is conducted and/or the Iraq conflict and displacement has run its course and can be evaluated retrospectively.

Conclusion

Our attempt to estimate elevated mortality in Iraq leaves us with more questions than answers. In terms of mortality occurring within Iraq, we can conclude that possible estimates for elevated crude mortality range from 8.8 per 1,000 per year (IFHS) to 13.2 per 1,000 per year (Lancet 2). Estimates of elevated cause-specific mortality attributable to violence, including a larger number of studies, range from 0.7 per 1,000 per year (IBC) to 10.2 per 1,000 per year (ORB) for the period March 2003-June 2006. IBC – which generates the lowest estimates of all of the studies due to its highly conservative method for identifying and documenting deaths - is the only primary data source which has continued to collect and report information on Iraqi civilian deaths on an ongoing basis. No new cross-sectional population-based studies of Iraq mortality have been released since 2007. As such, our capacity to understand elevated mortality from 2006/2007 through the end of the war in 2011 is severely limited.

In assessing elevated mortality among Iraqi refugees living abroad, the picture is in some ways more complicated and in some ways more straightforward. The lack of studies of refugee mortality to some extent reflects the difficulties of identifying and surveying populations dispersed in urban populations, compared to more traditional camp-based refugee populations. However, a number of significant factors related to the demographic and health profile of Iraqi refugees, as well as their conditions of life and access to infrastructure and services in more affluent, urban contexts, suggests that their mortality rates may in fact be relatively low. While there is no question that Iraqi refugees face significant challenges and likely to experience some amount of elevated mortality, the outcomes for these displaced persons may mirror the relatively low refugee mortality observed in during the humanitarian crisis in the Balkans during the early 1990s.

Appendix A: The ORB and Lancet 2 Critiques and Implications for Iraq Mortality Research

Both ORB and Lancet 2 have been the subject of widespread and sustained criticism from other researchers, the policy community, political leaders and advocates. While ORB is easily dismissed because it was conducted by a polling firm with dubious methodological credentials (see Spagat and Dougherty 2010), Lancet 2 represents one of the only peer-reviewed population-based studies of Iraq war mortality, and was conducted by well-respected researchers at the Johns Hopkins Bloomberg School of Public Health. Yet, while some advocates embraced Lancet 2 and its substantially higher mortality estimates than what had previously been released by governmental agencies and IBC, others – particularly some academics and many political leaders –were quick to dismiss and criticize it. President George Bush rejected the study's findings as "not credible," on the grounds that it was substantially higher than previously reported information based on passive reporting studies. The British government also explicitly rejected the study's findings, despite the fact that the UK Ministry of Defense Chief Scientific Officer said that the study was "robust" and "close to best practice" in the field (BBC 2007).

Perhaps more importantly, many survey researchers and Iraq experts came out against the Lancet 2 findings, citing a wide range of methodological and even ethical criticisms of the study - for a full discussion of the methodological critiques see Spagat 2008. These criticisms have evoked a significant body of counter-criticisms in the field as well. As a result of these attacks, several investigations into the study were launched, and the primary author, Gilbert Burnham, eventually had his IRB privileges suspended following an internal review of the study by his home institution (Johns Hopkins, 2009).

Unlike the attacks from political actors with a stake in suppressing public perceptions of high civilian mortality in Iraq, the attacks by researchers do not seem by in large to be politically motivated. In fact, a number of organizations devoted to illuminating the human cost of the war in Iraq, such as IBC, have criticized Lancet 2 (and ORB as well) for opening the community of advocates and the mortality estimates they have generated to criticism from the right. While IBC and other passive reporting projects acknowledge that their numbers under-report mortality, potentially significantly, IBC (for example) asserts that their purpose is to "ensure that the human consequences of military intervention in Iraq [are] not neglected" (IBC 2011). Yet Josh Dougherty, an IBC researcher and analyst, was a co-author with Michael Spagat, one of the main critics of Lancet 2, of a recent article in *Survey Research Methods* which harshly criticizes both ORB and Lancet 2.

While this harsh criticism from those of similar political orientations or sympathies might be surprising at first blush, it points to a significant change in the way that those seeking to advance political goals using research have increasingly shaped their research agendas and claims. While there are clearly legitimate grounds for criticism of ORB and to a lesser extent Lancet 2, IBC's position – that a rigorously documented undercount of mortality is something to be defended, and a high estimate of mortality derived using relatively robust population-based methods should be actively criticized and systematically dismantled – seems counterintuitive. Yet, given the harsh criticism that has been increasingly leveled at advocates and researchers suspected of inflating their numbers to make a political case, it makes a paradoxical kind of sense that those who are deeply concerned about a given issue might opt to forestall any such criticism by pursuing – and defending – research practices that are extremely methodologically conservative. By insisting on only recording the most clearly documented cases of Iraqi deaths,

IBC has established an absolute floor, a minimum count of violent deaths which has by in large been accepted by political leaders and academics alike.

However, this approach has clear limitations as well. While IBC and other passive reporting projects clearly assert that their estimates are the lower bound, rather than the total number of deaths, this does not keep their numbers from being treated as the total number of deaths by political leaders, media outlets, etc. By participating in the dismantling of population-based studies, IBC and the larger research community have made exploration of the "dark figure" of deaths above this baseline a very costly enterprise. It is unsurprising, then, that no new studies of mortality in Iraq have been undertaken since 2007 – given the example of Lancet 2 and the sanctions of its principal investigator, only the most masochistic of scholars would choose to wade into these volatile political waters.

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