



## War Crimes: Baby Teeth of Iraqi Children Tell Troubling Tale of War's Toxic Impacts

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*In an effort to learn more about the impacts of long-term exposure to heavy metals and other toxins associated with warzone bombardments and military installations, a new study released Friday examined a sample of donated teeth and discovered that the children of Iraq are suffering from alarming levels of such substances, specifically lead.*

The study—entitled [Prenatal Metal Exposure in the Middle East: Imprint of War in Deciduous Teeth of Children](#)—focused on Iraq, invaded by the U.S. and coalition forces over thirteen years ago, due to the amount of bombing its population has witnessed over the last thirteen years and the troubling level of cancers and birth defects now evidenced in the population that could be related to that relentless violence. The Iraqi teeth were compared to donated samples from both Lebanon, which has seen a more moderate level of bombing and warfare during the same time period, and Iran, which has experienced relative peace since the end of the Iraq/Iran War in 1988.

« In war zones, » the abstract of the study explains, « the explosion of bombs, bullets, and other ammunition releases multiple neurotoxicants into the environment. The Middle East is currently the site of heavy environmental disruption by massive bombardments. A very large number of US military bases, which release highly toxic environmental contaminants, have also been erected since 2003. Current knowledge supports the hypothesis that war-created pollution is a major cause of rising birth defects and cancers in Iraq. »

Scientifically known as a person's « deciduous teeth, » what are also called « baby teeth » are useful to study, the researchers explain, because they « originate in fetal life and may prove useful in measuring prenatal metal exposures. » The researchers say their findings confirm the hypothesis that in war-torn Iraq the levels of contaminants found were much higher than in those countries that have seen markedly less violence.

« Our hypothesis that increased war activity coincides with increased metal levels in deciduous teeth is confirmed by this research, » reads the study. « Lead levels were similar in Lebanese and Iranian deciduous teeth. Deciduous teeth from Iraqi children with birth defects had remarkably higher levels of Pb [lead]. Two Iraqi teeth had four times more Pb, and one tooth had as much as 50 times more Pb than samples from Lebanon and Iran. »

To further explain the context and implications of the newly-published researchers, it is worth quoting the study at length:

In war zones, the explosion of bombs, bullets, and other ammunition releases multiple neurotoxicants into the environment, adding to the burden of childhood exposures. Recent studies in Iraq indicate widespread public exposure to neurotoxic metals (Pb and mercury) accompanied by unprecedented increases in birth defects and cancers in a number of cities (Savabieasfahani [2013](#)). Current knowledge supports the hypothesis that war-created pollution is a major factor in the rising numbers of birth defects and cancers in Iraq.

The Middle East has been the site of a massive environmental disruption by bombardments. In 2015 alone, the USA dropped over 23,000 bombs in the Middle East. Twenty-two thousand bombs were dropped on Iraq/Syria (Zenko [2016](#)). US military bases also produce and release highly toxic environmental pollutants in the Middle East. Though our knowledge is limited, a recent report by Physicians for Social Responsibility (PSR) offers a conservative estimate of two million killed in the Middle East since the 2003 US invasion of Iraq. Around one million people have been killed in Iraq, 220,000 in Afghanistan, and 80,000 in Pakistan. A total of around 1.3 million, not included in this figure, have been killed in other recently created war zones such as Yemen and Syria ([Physicians for Social Responsibility \(PSR\)](#)).

It may seem callous to focus on the “long-term” effects of war while these horrific consequences of war are here and now. Nevertheless, long-term public health consequences of war need to be better examined if we are to prevent similar wars in the future (Weir [2015](#)). To that end, here we report the results of our last samples from a growing war-zone.

Deciduous teeth of children from Iraq, Lebanon, and Iran can show a continuum of high to low war-related-exposures in children. Measurements of environmental samples in the areas of our interest are rare in the literature. Therefore, we deduce that a continuum of high to low war-related exposures can be detected in children of the selected areas based upon the knowledge of the number and length of wars fought in each country in modern times. We do know that Iraq continues to be the target of repeated bombings and military activity, that Lebanon has been the site for multiple wars, and that military activities have occurred in Lebanon intermittently up to 2016 (Haugbolle [2010](#)). In contrast, Iran has been the site of only one war in modern times, which ended in 1988 (Hersh [1992](#)). Our aim is to evaluate deciduous teeth for their suitability to serve as markers of prenatal exposures to neurotoxic heavy metals.

Metals are one of the main components of bombs, bullets, and other weaponry. Buncombe ([2011](#)) offers a historic account of the very large number of bombs and bullets that were dropped in the Middle East post-2003. Additionally, 1500 US military bases and facilities—with their associated toxic pollutants—have been erected in the Middle East since 2003 (Nazaryan [2014](#); Vine [2014](#)). It has been suggested that US military bases are among the most polluting operations on earth (Nazaryan [2014](#); Broder [1990](#); Milmo [2014](#)).

In Iraq, there are currently over 500 US military bases (Kennedy [2008](#); Vine [2014](#)). Pollutants released from these bases have reportedly harmed human health (Institute of Medicine, IOM [2011](#)). Metals are released in the environment in large quantities during and following wars, either by direct bombing or as a result of waste generated and released by military installations (IOM). Metals are persistent in the environment (Li et al. [2014](#)), and their adverse effects on health—especially the health of sensitive populations (i.e., pregnant mothers, fetuses, growing children)—have been established (Parajuli et al. [2013](#); Grandjean and Landrigan [2014](#)). Public exposure to war-related pollutants intensifies as wars become frequent and as the environmental release of waste associated with military bases increases. Metal exposures and toxicity are frequently reported in children, particularly

those living in areas of protracted military attacks in the Middle East (Alsabbak et al. [2012](#); Jergovic et al. [2010](#); Savabieasfahani et al. [2015](#)).

« As prenatal exposures become more severe and common in war zones, » the authors write, « the accurate measurement of those prenatal exposures becomes more urgent. The use of deciduous teeth, which originate in fetal life, as a biomarker of prenatal exposure, is worthwhile if we are to protect children from such exposures in the future. »

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