Environmental Contaminants from War Remnants in Iraq

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NCCI Brief

Environmental Contaminants from War Remnants in Iraq

NCCI’s brief provides an overview of what appear to be widespread, and often lethal, health effects from war contaminants in Iraq, namely Depleted Uranium (DU). Clearing DU-contaminated war remnants from areas across Iraq, as well as providing support to Iraqi victims of DU contamination, are critical issues for rebuilding this war-torn nation. NCCI published this paper with information and eyewitness testimony from doctors, researchers, NGOs leaders, and activists in the field who are struggling to respond to Iraq’s ostensibly growing health crisis and raise the international community’s awareness concerning Iraqi DU victims’ plight.

Introduction: DU in the Iraqi Context

Contamination from Depleted Uranium (DU) and other military-related pollution is strongly suspected of causing a sharp rise in congenital birth defects and cancer cases in Iraq, as well as in other nations that have been invaded by NATO and the United States military forces over the past two decades.

Many prominent doctors and scientists contend that DU contamination is also connected to the recent emergence of diseases that were not previously seen in Iraq, such as illnesses in the kidney, lungs, and liver, as well as a total collapse of the immune system.

Left: “Bedouins move throughout the desert. They remove parts and components of tanks destroyed by depleted uranium penetrators to sell in town. They are affected by the radiation, and the parts and components they carry around spread the contamination further.” (Demilitarized zone between Iraq and Kuwait, Takashi Morizumi.)
DU contamination may also be connected to the steep rise in leukemia and anemia cases, especially among children, that is being reported in many Iraqi governorates. Additionally, there is a startling jump in miscarriages and premature births among Iraqi women.

At present, a coordinated international response to aid those Iraqis who are likely victims of DU contamination and to clear DU-contaminated war remnants from Iraq is limited and constrained by a number of critical factors, which will be discussed and explored in this paper.

This paper also provides recommendations for policy makers, humanitarian actors, medical researchers, and involved governments to better mobilize resources and support for Iraqis suffering from what appears to be a man-made health crisis that has been systematically silenced and overlooked.

1.0) DU 101

Composition and Production of DU

Enriched uranium is used for fission in nuclear reactors to produce energy and atomic bombs. In brief, the uranium atom found in nature consists of three isotopes: U234, U235, and U238.

The uranium enrichment process produces a form of uranium with a greater proportion of the isotope U235, which is sufficiently radioactive to sustain the fission reaction required to create power in nuclear power plants.

In essence, DU is one of the byproducts or wastes of the enrichment process of natural uranium (see Annex 1 for a useful visual illustrating this information).\(^1\)

For every kilogram of enriched uranium that is produced, seven kilograms of radioactive DU are released as nuclear waste. DU is a heavy metal with a density that is 1.7 times that of lead. DU’s high density, pyrophoricity, and special mechanical properties make it highly valued in the military industry. It has an exceptional ability to penetrate through tanks and other heavy weaponry.

![Basic diagram of a weapon head with DU.](image-url)

However, the fact that there is no method to completely dispose of DU in the environment is extremely problematic. Partial DU decontamination methods that exist are expensive and can pose dangerous health and environmental risks. For example, the geological disposal of the radioactive waste, perhaps the most common method of DU clean-up, simply involves moving the contaminant elsewhere.
The DU Weapons Industry

Those nations that have large uranium enrichment industries, including the US, have begun to use DU to manufacture weapons. DU is mainly used to create the tip or core of many war munitions. In turn, many of the major uranium-enriching nations have armies equipped with effective, advanced weaponry that can effectively hit targets without the need of precision aim.

When a weapon with a DU head hits its target, it ignites to a temperature that is around 3,000 degrees Celsius. Consequently, a DU weapon can easily penetrate through materials like steel, and completely incinerate its target within fractions of a second.

As DU burns and creates an abnormally hot fire, this ignites DU and any other metals in the target area—including steel, lead, nickel, and aluminum. These materials are then released into the air as an aerosol or a “metal fume.” As the metal fumes settle and consolidate, DU is converted into a fine dust of different sized particles, which includes very small, toxic particles (nanoparticles). This dust is composed of uranium oxide and other metals, and can be completely invisible to the human eye.

Some scientists assert that DU dust can move across hundreds of kilometers through the air. When DU particles, as well as intact ammunition and other weapons materials, enter water sources, this can damage the food chain and environment.

A stockpile of various DU weapons.

An Iraqi girl who is a cancer patient. (Takashi Morizumi)

Human Health Effects of DU Dust

When a human inhales, ingests, or is contaminated by dust particles from DU weapons, radioactive DU atoms can settle in the lungs, spleen, kidney, and other vital organs.

Due to its radioactivity, DU dust particles primarily produce alpha particles, as well as beta particles and gamma rays. When an alpha particle, the largest and heaviest kind of radiation, enters the body into the
bloodstream, some of it will be excreted in urine. Other particles may lodge in different parts of the body for extended periods of time and damage DNA configuration in cells. This can lead to altered gene expression, genetic mutations, and carcinogenesis (the transformation of normal cells into cancer cells).

Theoretically, exposure to a single alpha particle from DU can cause devastating diseases. A higher dosage of exposure might greatly increase the risks of developing DU-related illnesses, due to greater and more extensive cell damage. Furthermore, beta particles from DU are particularly hazardous to the skin and eyes.

An Iraqi boy with facial deformities, held by his concerned father. (Takashi Morizumi)

In the aftermath of the Gulf War (August 2, 1990 – February 28, 1991), in which Coalition Forces dropped hundreds of tons of DU in Basra, Iraq, thousands of British and American veterans fell ill with symptoms including Chronic Fatigue Syndrom, immune dysfunction, urinary disorders, memory loss, severe joint pains, and spinal and nerve diseases (including amyotrophic lateral sclerosis). Additionally, many veterans’ wives experienced multiple (and oftentimes consecutive) miscarriages, or gave birth to children with severe congenital deformities and disabilities.

An Iraqi boy with leukemia. (Takashi Morizumi)

At the same time, strikingly similar symptom and disease patterns affected many Iraqi civilians and soldiers around the Gulf War’s main battlefields in southern Iraq, who had also been exposed to dangerous levels of DU contamination. Again, most of these victims were unknowingly exposed, and never compensated for the illnesses that they developed.
Contaminating Iraq's Future

DNA mutations caused by DU may be passed from parent to child. Therefore, DU contamination from the First and Second Gulf Wars may continue to cause a persistent national health crisis for the future generations of Iraq.

The remaining traces of DU in Iraq represent a formidable long-term environmental hazard, as they will remain radioactive for more than 4.5 billion years.xiii

Unusually high radioactivity from DU munitions has been recorded in many areas of Iraq where there was heavy US military fire, including Baghdad city, Anbar (particularly in the cities of Falluja and Ramadi), Najaf city, Muthanna, Babil, and Basra.

A Geiger counter device is one instrument used to test and measure uranium traces. Inxv former Iraqi government buildings that were bombed in Baghdad, like the Ministry of Information, high levels of radioactivity have been recorded. Additionally, civilian homes that were bombed by American aircraft were measured to have dangerously high levels of radioactivity.

Reporters at The Times (London) recently exposed the “toxic legacy” left behind by American troops in five northern and western Iraqi governorates where hazardous military materials remain left in the open (August, 2010). These sites include firearms, shells, tanks, landmines, drums containing toxic substances and unidentified liquids, and other dangerous materials.

Nermeen Othman, the Minister of Environment in Iraq, ordered an investigation into the matter, which concluded that more than 40 illegal sites contain untreated, improperly disposed military waste in Iraq.xvi Many of these illegal toxic waste dumps are in close proximity to densely populated civilian areas and irrigated farmland.xvii

2.0) Left Behind: DU and Other Environmental Contaminants in Iraq

The Pengaton has admitted that the Coalition Forces dropped at least 320 tons of munitions and weapons containing Depleted Uranium (DU) on Iraq during the First Gulf War, although some independent environmental groups believe the amount dropped was much higher (IRIN, 2004). The Multi-National Foces in Iraq (MNF-I) used many times that amount in the US-led 2003 invasion of Iraq, yet the exact quantity has not been released by the US military.xiv
The problem of DU does not simply lie in munitions. Scrap metal processors and vendors have been handling materials from the US’ toxic legacy, some of it contaminated with DU, since the 2003 invasion. These scraps are often sold in the markets of highly populated cities, which can further spread DU contamination. Additionally, the UN Environment Programme has evidence that DU from weapons has been collected and recycled as scrap in Iraq (Edwards, 2004).

3.0) Current Health Phenomenon in Iraq

Before the outbreak of the First Gulf War in 1991, the rate of cancer cases in Iraq was 40 out of 100,000 people. In 1995, it raised to 800 out of 100,000 people. By 2005, at least 1,600 out of 100,000 people were affected by cancer in Iraq. Yet the actual rate of cancer and other diseases is likely to be much higher than these figures suggest.

The Iraqi Ministry of Health does not have precise statistics that include all congenital deformity and cancer cases, mainly due to the poor management of medical centers’ information systems in many parts of the country.

Many Iraqi hospitals do not keep records of all of their patients. Rather, patients often keep track of their own medical records. Additionally, many Iraqi patients go abroad (mainly to neighboring Jordan, Syria and Iran) to seek better quality medical treatment. It is difficult to estimate exactly how many Iraqi patients are unaccounted for in official figures, but it could range from hundreds to thousands.

Iraqi doctors in affected areas are noticing a steep rise in severe congenital birth defects, which include children born with two heads, multiple tumours, disfiguring facial and body disformities, and complex nervous system problems. In Falluja city, residents report that many families are too scared to have children, as an alarming number of women are experiencing consecutive miscarriages and deaths with critically deformed and ill newborns.

"A desperate father finally reaches a Baghdad hospital after carrying his son from a northern Kurdish area. His son has leukaemia and is in dire need of special medical care." (Naomi Toyoda)

Those children who are fortunate enough to survive these deformities through infancy and early childhood must face a lifetime of
significant developmental, social, medical, and educational challenges with little to no available support for their special needs.

In many areas of Iraq, more children are being born with Congenital Birth Defects (CBDs), including severe developmental and learning disabilities that remain for a lifetime. (Takashi Morizumi)

It remains to be seen whether possible DU-related illnesses will emerge in some areas, such as Mosul city, Ninewa, which experienced heavy USF combat in 2007 and 2008. Furthermore, some symptoms and illnesses from DU exposure and resulting radiation may not appear for many years. The incubation period of DU can widely vary, especially for different health outcomes and patients.

To further complicate this dire situation, Iraq’s fragile, poorly-functioning health sector is under major pressures, with hundreds of doctors killed, a massive exodus of medical professionals, low staff capacity, and a shortage of basic supplies and facilities (McCrummen, 2011). Even in those hospitals that are fortunate enough to have sonograms and CT scans provided by the Iraqi Health Ministry, Iraqi doctors still face daily shortages of IV catheters, essential antibiotics, central venous lines, intravenous fluids, and so on.

Although approximately $1 billion has been provided to reconstruct Iraq’s health sector since the 2003 invasion, corruption and poor planning has blocked this money from revitalizing health services. Overall, Iraqi health facilities lack the necessary means and capacity that are required to adequately treat the health effects associated with DU weapons, in addition to victims from the multiple attacks which still occur throughout central and southern Iraq on a daily basis.

4.0) International Law and Legal Challenges toward DU

There is a stolid refusal among the world’s most powerful nations, which produce and use DU in war munitions, to acknowledge the potentially serious and permanent health risks of DU weapons and assume responsibility for the destruction that they appear to be causing.

Existing arms control law bans the use of chemical and biological weapons, yet there are no explicit rules or treaties in arms control law that address the scope of DU. However, there are some key legal arguments, mainly derived from existing International Humanitarian Law (IHL), which support a moratorium and consequent ban of uranium weapons.
Article 35 of Protocol I, a 1977 amendment of the Geneva Conventions, prohibits any means or methods of warfare that cause superfluous injuries or unnecessary suffering among 168 nations. Article 35 also prohibits those nations from resorting to means of war that could inflict extensive and long-term damage on human health and the environment. Therefore, the observed impacts of DU in Iraq suggest that DU weapons fall under Article 35 as prohibited weapons, by the very nature of their suspected long-lasting effects on human health and the environment.

Article 36 (of Protocol 1) also obliges any state studying, developing, or acquiring a new weapon to hold a legal review of that weapon. This binding law also requires 168 states to ensure that any new weapon or means of warfare does not contravene international law, which thereby prohibits the use of weapons that cause widespread, long-term damage, as is being experienced in the aftermath of DU weapons usage in Iraq.

Furthermore, Article 51 (of Protocol I) prohibits indiscriminate attacks "which employ a method or means of combat" of which the effects "cannot be limited as required," which certainly characterizes attacks involving DU.

In customary international humanitarian law, the International Committee of the Red Cross notes in Rule 44 that a "lack of scientific certainty as to the effects of the environment of certain military operations does not absolve a party to the conflict from taking such precautions [to protect the natural environment and human health]."xxi

Based on the risks associated with DU weapons usage, as well as precautionary obligations outlined in IHL, states should halt the use of DU weapons and initiate a "moratorium phase," in which scientific studies would be carried out to elucidate the effects of DU.

So far, Belgium (2007) and Costa Rica (2011) have passed domestic laws prohibiting uranium weapons within their territories. Other nations, including the Republic of Ireland and New Zealand, may follow. In 2008, the European Parliament adopted a resolution which stated that "the use of DU in warfare runs counter to the basic rules and principles enshrined in written and customary international, humanitarian and environmental law."
The United Nations has adopted a few non-binding resolutions (such as 1996/16 and 1997/36), which discuss the “indiscriminate effects” of DU and acknowledge mounting international concern about the “long-term consequences of the use of such weapons” on human health and the environment. The UN also passed resolutions in 2007 and 2008, which acknowledge potential health and environmental risks from DU weapons and call for more focused research on affected states. However, this research has been hindered and limited by DU users’ lack of transparency.

Back in Iraq, the government, at both the provincial and national level, has poorly responded to complaints from civilians about damage to their health from US military war munitions contaminated by DU.

In fact, it is potentially dangerous to even discuss DU, outside of close family and community circles, in Iraq. The Iraqi Health Ministry sent a letter to the Anbar Department of Health, which was then sent to local hospitals, stating that doctors in affected governorates, including Anbar, are prohibited from making any statements about congenital deformities. Similar threats have been made in Iraq’s other badly affected governorates.

Many Iraqi parents of multiple miscarried babies, or babies with severe congenital defects, have been told by their doctors that DU exposure is the cause of these medical problems. But these doctors usually decline to provide a written report documenting their opinion, mainly out of fear of reprisal. Although doctors across Iraq are witnessing similar cases and a similar pattern, most DU victims’ cases remain anecdotal in nature,
unaccounted for in any official records or studies. Iraqi doctors in affected areas will usually only speak on the condition of anonymity.

Most DU experts concur that the American military and government is pressuring the Iraqi government to censor and stifle any serious conversation about DU, in order to prevent international awareness and condemnation from developing via the press and other key information pathways.

US military officials have not disclosed the total amount of DU used in Iraq, and maintain that DU is not proven to cause significant health or environmental damage. The US military has also not released important information about the types and locations of DU weapons use in Iraq.

The Pentagon, which has overseen the US military’s operations since the 2003 invasion, has a vested interest in discouraging, and even censoring, scientific investigations which further expose DU’s genotoxicity. Initially, the US established an American-run administration—known as the Coalition Provisional Authority (CPA)—to fill the Iraq’s administrative and power vacuums post-invasion.

Dr. Frederick Burkle, who was well-qualified in the field of public health and had priorities of tackling the apparent DU crisis from the First Gulf War via collecting base-line epidemiological data on apparent DU-related health effects and establishing new public health priorities, was replaced after only two weeks by James Haveman. Havemen, whose professional experience was limited to faith-based NGOs in the United States, immediately replaced his predecessor’s priorities with anti-smoking campaigns and privatizing the Iraqi health care system.

Ever since, the US forces have consistently forbidden any DU-related exploration programs or research in-country, unless they are conducted by scientific teams which are employed and overseen by the Pentagon/Department of Defense.

Powerful, pro-nuclear UN Agencies, such as the International Atomic Energy Agency (IAEA), also appear to exert pressure against anti-DU lobbying and impartial investigations on the health effects of DU. Indeed, there are many instances in which both American and international pro-nuclear groups and lobbies have sought to censor studies, conducted by leading radiation and medical experts, which expose the possible dangers that DU poses to human health and the environment more generally.

Local scientific teams and medical researchers often avoid researching DU, fearing consequences that range from censorship and threats to being violently targeted by the military. To further complicate matters, enduring insecurity makes it difficult for international teams to conduct field investigations into the effects of DU on health in Iraq. In this context, few studies regarding post-2003 increases in terminal illnesses related to DU have been initiated.
5.0) Latest Research on Iraq’s Health Crisis

More than twenty years after the First Gulf War, the extent and effects of DU contamination in Iraq has not yet been comprehensively assessed or studied. No large-scale studies have been undertaken in Iraq to assess the health consequences of DU exposure for Iraqi civilians.

This absence of persuasive primary research into the effects of DU on Iraqi civilians makes it impossible to draw a causal link between DU exposure and the illnesses currently seen in Iraq; consequently, advocates of DU usage often deem research that is critical of the potential harms of DU as “widely speculative.”

Yet data available from independent laboratory studies conducted since 1991 certainly indicates that DU munitions pose genotoxic health risks for humans. Theresearchers have found that radiation damages more than those cells that it directly hits. Several tests have used equipment to irradiate single cells, and have found that gene expression is altered in both the irradiated cells and neighbouring cells that are not directly exposed. This means that even low doses of radiation exposure may result in genetic damage that is generally overlooked. Additionally, there is a growing consensus that the effects of radiation from DU may actually amplify in an exposed individual’s decedents, over many generations.

Dr. Keith Baverstock, who previously worked as WHO’s senior radiation expert, published the independent study titled “Radiological Toxicity of DU” in 2001, which concluded that DU weapons appear to pose a unique health hazard to humans, and cause more damage to human cells than was previously assumed.

There is also mounting evidence that DU is a teratogen, or an agent that can disturb the development of an embryo or fetus and thereby cause birth defects of haltpregnancy.

Despite compelling evidence from laboratory studies, which demonstrate that DU is hazardous, scientists have not yet established a causal relationship between DU and Iraq’s...
alarming health phenomenon in the field. The field of epidemiology, which involves the study of causes, distribution, and prevention of diseases in a population, is even more complex in post-conflict environments. In Iraq and other post-conflict contexts, there can be many risk factors for disease, medical and registration systems collapse, significant population displacement and exodus further complicates scientific investigations.

Thus far, no independent epidemiological study has analyzed all of the possible factors that could contribute to the observed rise in cases of serious illness in many areas of Iraq. Some researchers and doctors have faced serious threats and obstacles in investigating DU’s health consequences in the Iraqi field, and yet persisted to disseminate their results to the media and general public.

A recent and widely known epidemiological study titled “Cancer, Infant Mortality and Birth Sex-Ratio in Falluja, Iraq 2005–2009” involved a door-to-door survey of more than 700 Falluja households (Busby, et al. 2010). The research team interviewed Fallujans about abnormally high rates of cancer and birth defects, and estimated that cancer rates have increased in Falluja 38-fold since the 2003 US-led invasion.

More recently, a study titled “Four Polygamous Families with Congenital Birth Defects (CBD) from Falluja, Iraq” concluded that the high prevalence of CBD in Falluja appears to be linked to the use of weaponry, such as DU (Alaani, et al. 2011). This analysis of four families, which involves tracing their reproductive history and phenotypes of offspring, suggests that the parents’ exposures to war-related sites and events were followed by the emergence of alarming and reoccurring health problems in the families, and particularly among their newborns.

These papers were written with the presumption that DU is likely a leading factor that influences the rates of illnesses including cancer, infant mortality, and CBD. Future studies should consider a wider range of possible factors that may be causing Iraq’s health crisis. In addition to genetic stress from DU, scientists should study other factors such as the possible effects of other environmental contaminants (such as White Phosphorus) and infrastructural damage from the last eight years of war (especially in terms of any industrial plants that have been hit in fighting) on human health. Furthermore, a much larger population, which was definitely exposed to DU (as shown through medical testing), should also be surveyed in the future to increase epidemiological certainty about the effects of DU in the Iraqi field.

In July 2010, the WHO and Iraqi government officially launched an eighteen-month survey of congenital birth defects (CBD) in six Iraqi governorates (Baghdad, Anbar, Basra, Thi Qar, Sulaymaniyyah, and Diyala). The purpose of the study is to provide initial baseline information for an eventual national prevention programme that aims to improve maternal and child health. This household survey will provide useful information about the distribution and types of birth defects, yet it neglects many governorates where CBD is believed to be the worst (including Najaf and Muthanna). The extent to which this study...
aims to ascertain the causes of the sharp increase in CBD cases in many Iraqi governorates is not yet clear. The second phase of this study and project will involve laboratory investigations, capacity development initiatives to strengthen CBD registry and surveillance, and a general assessment of the burden of CBD on Iraq’s health care system and local communities.

The WHO study may represent a positive step in the right direction, but it is not enough by itself. Past and currently underway studies have demonstrated that CBD, cancer, leukaemia, and the incidence rates of other mutations and deficiencies are multiplying in many areas of Iraq. Nevertheless, it will be much more difficult to conduct a series of impartial scientific investigations that conclude, with absolute certainty, that DU is to blame. Such research is currently constricted by an acute lack of funding and support, as well as a hostile political climate.

6.0) Nongovernmental and Humanitarian Responses

Overall, the NGO and humanitarian response to Iraq’s health and environmental crisis, as related to DU, has been limited, uncoordinated, and compromised by a number of factors.

The United Nations Office for Project Services (UNOPS) and other UN agencies assert that “landmines, unexploded ordinance (UXOs), and depleted uranium are a major threat to the Iraqi people’s ‘right to life, liberty, and security of person,’” as enshrined in the UN Universal Declaration of Human Rights and the UN Convention on the Rights of the Child (IAU, 2011). The WHO states that areas with very high concentrations of DU should be cordoned off until they are cleaned up. The WHO further elaborates that DU decontamination and disposal should “conform to appropriate recommendations for the use of radioactive materials.”

However, until the US military releases the firing coordinates of DU rounds to appropriate Iraqi authorities, it is difficult to initiate a comprehensive monitoring and clearance operation for Iraq. To date, very few sites contaminated by DU in Iraq have been cordoned off from the public, and even fewer have been entirely decontaminated. This continues to inhibit Iraq’s recovery and economic development.

Experts note that many buildings hit by DU shells have been repaired and reoccupied, without any decontamination operation taking place. Furthermore, it is not uncommon to see Iraqi children playing on discarded American and Iraqi tanks and other war remnants that lie in the open. In some impoverished and rural areas, Iraqis are not well-educated about the dangers of approaching or disturbing discarded war munitions, and particularly DU. It is important to note that most Iraqi civilians do not have the means to test radioactivity levels, so it is therefore impossible for them to know what is safe with any certainty.

In terms of coordinated clean-up operations, there have been some initiatives to remove contaminated war wastes and materials. Yet many of these clean-up operations have been
characterized as insufficient and implemented under inappropriate conditions. Serious health and environmental risks for those involved in clean-up operations can actually be exacerbated by pervasive negligence and a failure to adopt necessary precautionary procedures (UNEP, 2005).

Iraqi non-governmental organizations (NGOs) try to do what is in their limited capacity to support cancer patients, and especially children who appear to be victims of DU. Yet the high cost of medical treatment and lack of sufficient local and international support actually limits NGO capacity to adequately assist likely DU victims. Some NGOs work on issues related to treatment, by providing psychological, moral, and technological support to patients and their families in light of the overwhelming denial of psychological and health needs of sick Iraqi patients.

“I first met eight-year-old Safaa at the entrance to the Mansour Teaching Children’s Hospital in Baghdad. She was checking out that day and was delighted to be going home after a long stay. She was smiling at everyone. I whipped out my 200 mm lens and took a quick close-up of her smiling face. She looked beautiful in her white lace shawl. Suddenly, a breeze from the Tigris River lifted her shawl. Her hand darted up to catch it, but the shawl fell from her head. The next instant, her smile was gone. As a side effect of the anti-cancer medicine she was taking to treat her leukemia, she had lost all her hair. Her mother standing next to her whispered, ‘She’s going home because they’ve run out of medicine.’ That whisper was filled with fear.” (Takashi Morizumi)
7.0) Recommendations

In an ideal world, the international community should adopt a comprehensive prohibition of the development, production, transport, storage, possession, transfer and use of DU ammunition, DU armour-plate and of any other military use of DU.

Furthermore, the international community, and particularly those nations with armies that participated in the US-led Coalition Forces that invaded Iraq, are ethically and legally obligated to acknowledge their roles and responsibilities in light of the DU-caused health crisis in Iraq. Accordingly, they should increase aid and support for ill Iraqis who may be the victims of DU contamination.

However, in light of the present circumstances, NCCI would like to make the following recommendations as essential, intermediary steps forward, toward achieving the aforementioned goals.

1 - Identify and fully clear sites contaminated with DU.

- First, the US government must be pressured to release relevant data concerning the firing coordinates of DU rounds to Iraqi authorities and NGOs working in Iraq’s demining sector. In this way, DU-contaminated sites can be identified.

- All relevant site contamination data from the US government, the Iraqi Ministry of Environment, and demining NGOs must be combined in one database. This database should include case histories for each site, detailing what work has been done, when, and by whom.

- NGOs and other organizations that work in the sector of clearing war remnants must work closely together to coordinate safe, effective DU cleaning operations.

2 - Develop an integrated harm reduction strategy for DU and other environmental contaminants of war in Iraq

- Design and implement hazard awareness programmes about DU and other war contaminants for Iraqi civilians living in identified contaminated areas. Such a hazard awareness program should provide local Iraqis with information about the nature of risks from environmental contaminants, precautions that they should take, ways to identify contamination, and known contaminated areas to avoid.
3 - Monitor populations living near identified contaminated sites and provide DU contamination medical tests for those who were potentially exposed.

- Currently, thousands of Iraqi civilians who may have been exposed to DU do not have the available means to seek DU contamination medical tests. Relevant Iraqi ministries, UN agencies, and other actors should collect a sizeable sample of DU contamination tests from civilians. This would help researchers and the humanitarian community identify the scope of the DU-related crisis, and respond to it accordingly.

4 - Acknowledge the complex health crisis that has evolved in Iraq since the First Gulf War and 2003 US-led invasion, and provide necessary support to patients and other appropriate actors.

- The international humanitarian community must acknowledge the unusual severity and growth of the current health crisis facing Iraq, and accordingly provide medical support, social-psychological support, and develop advocacy to increase awareness among the public and policymakers. Specifically, the international humanitarian community should seek to protect the rights of the sick in the following ways:
  
  - Equip health care centers and hospitals with medicines, medical equipment, and other supplies necessary to treat the aforementioned illnesses.
  
  - Provide Iraqi health care professionals with special trainings and other capacity-building tools, in order to help health care centers deal with growing rates of serious illnesses.
  
  - Develop psycho-social support services, like counseling and youth programs, for apparent victims of DU contamination in Iraq.
  
  - Develop reintegration programs in schools and communities where there are particularly high incidence rates of illnesses among children and youth, in order to help apparent recovered victims of DU contamination continue their lives in a healthy way.
  
  - The US government and other responsible parties have the duty to sustain adequate funding and humanitarian assistance to apparent DU victims in Iraq.
  
  - Iraqis who survive infancy and childhood with congenital deformities have special educational, developmental, physical, and emotional needs. Some families living in
areas that experienced heavy USF fighting have several handicapped children, some with severe disabilities. These children need special services and assistance, which are rarely available in Iraqi communities.

5 - Conduct further scientific investigations into the possible health and environmental effects of DU in Iraq.

- Independent scientific teams should be permitted to conduct studies exploring any possible effects of DU contamination, as well as any other factors that may be responsible for the dramatic rise in miscarriages, congenital birth defects, cancer, leukemia, and other chronic and fatal illnesses in communities throughout Iraq. The basic steps involved in such a study are as follows:

  o **Cancer registration**: Medical professionals and health authorities must work together to ensure that local hospitals begin recording cancers in the same way, and adopt uniform diagnostic procedures. These records should be maintained in a central location.

  o **Targeting data**: The US military should be required to release all DU targeting information, including sites that were targeted by DU and any available assessments of individual site histories. Relevant Iraqi authorities, UN agencies, and NGOs should also cooperate to identify the locations of scrap yards and other potential ‘hot spots’ of contamination.

  o **Environmental assessment**: Iraq’s environment is now affected by a range of contaminants. Accordingly, all potential risk factors that could cause cancer and other observed illnesses in Iraq should be carefully measured and studied.

  o **Population analysis**: Experts must collect and analyze detailed information on societal factors that may influence cancer rates and assessment of population dynamics, such as internal displacement and migration.

  o **Epidemiological assessment**: Once the above mentioned steps are completed in a satisfactory manner, researchers can begin to undertake a comprehensive epidemiological assessment to study illness statistics from an informed viewpoint and make adjustments for population dynamics and structure, as well as environmental and societal risk factors. In this way, the international community can develop a meaningful assessment of the extent to which DU is causing documented health problems.
Annex

Annex 1: Image from the Associated Press.

What is depleted uranium?
Depleted uranium is a byproduct of the process of making enriched uranium. The technology isolates the uranium-235 needed for nuclear reactors and warheads and discards uranium-238 (depleted uranium).

Use of depleted uranium in munitions
Depleted uranium's density and hardness also make it a choice for weapons to tear through enemy targets and burst into flames on contact. Scientists worry that battle-damaged remnants of depleted uranium could cause health problems in both U.S. military personnel and Iraqi civilians.

Exposure to depleted uranium
U.S. military sources say the effectiveness of weapons and armor made with depleted uranium outweighs the risks of exposure. Opponents disagree. There are three ways people could become exposed to depleted uranium in areas where it has been used in combat:

- Inhalation: Small particles of depleted uranium could be inhaled if wounds or torn embossed depleted uranium shrapnel.
- Skin contact: It could enter the bloodstream if broken through open wounds or from disturbed and lifted soil.
- Cancer risk: Fears of cancer from exposure to depleted uranium are related to its radioactivity. The black smoke of depleted uranium contains cesium-137, a radioisotope that emits alpha and beta rays that damage DNA.
The name “depleted uranium” can be misleading. Scientist Dr. Rosali Bertell, President of the International Institute of Concerns for Public Health, explains: “The difference in radioactivity between natural and depleted uranium is that given equal quantities, depleted uranium has about half the radioactivity of the natural mixture of uranium isotopes. However, because of the [high] concentration of uranium in the depleted uranium waste, depleted uranium is much more radioactive than uranium in its natural state.”

Some countries, like the UK and France, use DU metal imported from the US, rather than their own DU waste, to manufacture DU weapons.

DU has also been used in armour to protect US M1A1 and M1A2 battle tanks, as the heavy metal serves as an effective shield. Smaller traces of DU are used to produce certain types of landmines, including the M86 PDM and ADAM.

DU also has the ability to “self-sharpen” upon piercing an armoured target, and then explodes and sends tiny, piercing shards into the surrounding environment.

Such heat blasts can cause horrific damage, especially within the small space of an armored vehicle.

It is not yet clear whether DU dust can spread to surrounding countries—and in the long-term, even other continents—along wind currents. Studies show that the fine uranium dust released by US and UK-produced shells during the Gulf War (1990-1991) have already spread from the battlefields, more than 200 kilometres to Basra city.

Frequent, severe dust storms in central and southern Iraq can considerably accelerate the spread of DU across the country and to neighbouring countries.

“Inhalation is the most likely route of intake during or following the use of depleted uranium munitions in conflict or when depleted uranium in the environment is resuspended in the atmosphere by wind or other disturbances. Accidental inhalation may also occur as a consequence of fire in a depleted uranium storage facility, an aircraft crash or the decontamination of vehicles from within or near areas of conflict” (WHO’s report on “Health Effects of Depleted Uranium,” 2001).

“Ingestion could occur in large sections of the population if their drinking-water or food became contaminated with depleted uranium. In addition, the ingestion of soil by children is also considered a potentially important pathway” (WHO’s report on “Health Effects of Depleted Uranium,” 2001).

Dermal contact is considered a relatively unimportant type of exposure since little of the depleted uranium will pass across the skin into the blood. However, depleted uranium can enter the systemic circulation through open wounds or from embedded fragments of depleted uranium” (WHO’s report on “Health Effects of Depleted Uranium,” 2001).

Although the body is capable of repairing some damage from DU, the body’s self-repair mechanisms are not perfect and higher exposure or damage from DU can overwhelm this natural process.

It has been suspected, and in many cases confirmed, that these affected soldiers had handled DU weapons, or had been exposed to targets hit by DU, while in Iraq. Some American soldiers were not provided with necessary protective gear and were unknowingly exposed to sites contaminated with invisible DU dust. In January 1998, the Pentagon’s Office of the Special Assistant for Gulf War Illnesses admitted that “the failure to properly disseminate such information [about the risks and dangers of DU exposure] at all levels may have resulted in thousands of unnecessary exposures.” According to data released by the National Academy of Sciences in 2010, “of the nearly 700,000 US personnel who were deployed to the region [in the First Gulf War]...more than 250,000 of them suffer from persistant, unexplained symptoms” that are characterized as “Gulf War Syndrome.”

The half life of U238, the main isotope of DU, is approximately 4.5 billion years. After that time, half of the material in any given amount of DU will have decayed away into daughter products.

It is frequently stated that 2,000 tons of DU were used by the Multi-National Forces in Iraq (MNF-I) since the 2003 invasion. However, this rough estimate is difficult to verify without user transparency from the US military.

A Geiger counter, also known as a Geiger-Müller counter, is a particle detector that can be used to detect whether an object emits nuclear radiation, and measure the emitted dose of radiation.

Moreover, UN agencies estimate that contaminated sites cover at least 1,730 square kilometers in Iraq and affect over 1.6 million people in over 1,600 communities (IAU, 2011).

The IAU also estimates that 90% of contaminated land is agricultural. It states that this “inhibits communities’ ability to develop livelihoods” (IAU, 2011).

In 2004, Pekka Haavisto, the former chairman of the UNEP’s Post-Conflict Assessment in Geneva, warned that recycled DU “could end up in a fork or a knife,” or other common household materials in Iraq.

Governorate-level statistics for cancer rates are generally more available and up-to-date. For example, in 2004, 500 cases of cancer were diagnosed in Babil governorate. That figure rose to almost 1,000 two years later. By 2008, the number of cases had increased sevenfold to 7,000.

There is a well-known cemetery in Falluja city, growing nearly every day, where babies who died at birth and shortly thereafter are buried. This cemetery was established after 2003 out of necessity.
According to Stuart W. Bowen, the US Special Inspector General for Iraq Reconstruction, “The health sector...fell the farthest short of expectations” in terms of rebuilding Iraq after the country had experienced thirteen years of international sanctions and three wars.

The full text of Rule 44 reads as follows: “Methods and means of warfare must be employed with due regard to the protection and preservation of the natural environment. In the conduct of military operations, all feasible precautions must be taken to avoid, and in any event to minimise, incidental damage to the environment. Lack of scientific certainty as to the effects on the environment of certain military operations does not absolve a party to the conflict from taking such precautions.”

Within the human body, “genotoxic” substances chemically alter DNA, allowing abnormal genes to be expressed.

There is a growing concensus among leading researchers that the effects of radiation do not always appear immediately after exposure. Because damage to genes amplifies with cell division, the long-term consequences of genetic damage may not fully appear for many generations after initial DU exposure.

Falluja city was closed off and heavily bombarded with DU, white phosphorous, and other lethal weapons after the 2003 American invasion, particularly in April and November 2004.

In the study, Fallujans answered a questionnaire to provide details about cancer, birth outcomes and infant mortality in their households. While the researchers could not provide conclusive evidence, they hypothesized that the American forces’ use of DU munitions in Falluja resulted in regional genetic damage, and is thereby causing the alarming health patterns that have emerged in Falluja over the past seven years.

This study came under the Iraqi government’s suspicion. According to The Independent, “Researchers were initially regarded with some suspicion by locals, particularly after a Baghdad television station broadcast a report saying a survey was being carried out by terrorists and anybody conducting it or answering questions would be arrested.” Such intimidation tactics have become common in terms of carrying out studies related to DU in Iraq.

This step is especially crucial, as Iraq’s reconstruction process will be further delayed and compromised if DU is not removed from the environment and continues to affect the health and overall well-being of Iraq’s future generations.

The US government and other responsible parties have the duty to fund and assist war remnant clearing operations in Iraq.

It is difficult and costly to clean an area contaminated with DU, and the current methods of clean-up have major limitations. In some cases, soil contaminated with DU has been dug up and deposited in landfills. Another clean-up process involves leaching uranium from contaminated soil using chemical substances that bind to uranium. Biological methods of clean-up, in which certain bacteria and plants would naturally absorb and store heavy metals like DU, are still undergoing research.

Most individuals who were exposed to DU in Iraq remain untested; this is especially true for Iraqi soldiers and civilians, as DU medical screenings are unavailable in many parts of Iraq, or extremely costly where they are available.

A twenty-four hour test for uranium isotopes in urine samples typically costs $1,000 USD per individual in the United States.

The US military has a clear responsibility to make this medical screening widely available and affordable for potentially exposed individuals in both the US and Iraq. However, since the 2003 invasion, the US military has consistently refused American soldiers’ requests to cover the costs of DU contamination testing. Many American soldiers who independently found the means to have a DU medical screening discovered that they had been exposed to high levels of DU in the battlefield. In 2004, the New York Daily News funded testing for nine American soldiers of the 442nd Military Police Company of the New York Army National Guard. These American soldiers had recently returned from Iraq, were suffering with symptoms and illnesses similar to the “Gulf War Syndrome,” and were denied DU screening by the US military. Four of the nine soldiers tested positive for depleted uranium contamination; these were the first confirmed cases of inhaled depleted uranium exposure, post-2003-invasion.

Iraqi doctors and various Iraqi communities, most notably in Falluja city and Basra, have previously appealed for such an investigation, but their calls have been ignored.
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