The health and humanitarian case for banning and eliminating nuclear weapons

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The health, environmental, and humanitarian facts about nuclear weapons and the consequences of their use have been the focus of three recent international conferences—in Oslo (2013), Nayarit (2014), and Vienna (2014). The evidence presented at all three conferences on the Humanitarian Impact of Nuclear Weapons (HINW) was submitted to the 2015 NPT Review Conference and to the UN First Committee during the 70th Session of the General Assembly, and was cited as the reason for the establishment of this Open-Ended Working Group.

In this paper, we review the most significant health and environmental facts and explain why—from a medical perspective—a proper understanding of what nuclear weapons will do invalidates all arguments for continued possession of these weapons and requires that they urgently be prohibited and eliminated as the only course of action commensurate with the existential danger they pose.

The Evidence

The detonation of nuclear weapons produces incinerating heat, powerful shock waves, overpressures, ionizing radiation, and massive amounts of smoke and soot that can alter the Earth's climate. Unlike conventional weapons or other weapons of mass destruction, nuclear weapons instantaneously wipe out entire populations, level cities, and devastate the environment. They produce radioactive contamination that remains active for millennia, causing cancers and other illnesses that can persist across generations. Moreover, the environmental consequences of nuclear war, including severe climate disruption, can lead to global famine and, in the most extreme case, human extinction. No meaningful medical or disaster relief response to the detonation of nuclear weapons is possible.

Consequences of nuclear weapons and nuclear war

- **Tens of thousands to tens of millions of casualties from incinerating heat and overwhelming blast effects**
- **Acute radiation sickness; increased cancer and chronic disease from radiation exposure; birth defects and multi-generational genetic damage**
- **Nuclear famine, threatening at least two billion with starvation**
- **Nuclear winter and possible human extinction**

1) No other weapon ever invented can cause so much death and destruction so quickly, on such a catastrophic scale, or leave such widespread and persisting toxicity in the environment. **A single nuclear weapon can destroy a city and kill most of its people,** as we tragically learned in Hiroshima and Nagasaki. The blast wave and associated overpressures and hurricane-force winds collapse all but the strongest buildings, destroy roads and transportation systems, and turn objects (including human victims) into missiles that amplify the damage, until nothing remains but rubble. A small number of nuclear explosions over modern cities would kill tens of millions of people. **A nuclear war with weapons in existing arsenals could kill many more people in a single day than were killed during the entire Second World War.**

2) **Nuclear weapons release ionizing radiation** as a result of the uncontrolled chain reaction of fissile materials. Exposure to radiation—including fallout from nuclear tests—causes acute and long-term illnesses that are often deadly, as well as genetic and inter-generational health effects. Acute radiation sickness can cause death within hours, days, or weeks; those who recover may remain ill for months or even years. Lower doses of ionizing radiation can cause leukemia, thyroid cancer, and many other cancers, and other chronic diseases like cardiovascular disease, even many years after exposure. Increased risk of cancer persists for the lifetime of those exposed. Radiation exposure also causes birth defects and genetic damage. Subsequent generations can suffer both because of genetic damage they inherited, as well as exposure to radioactivity from lingering radioactive contamination and fallout. Exposure to dangerous ionizing radiation has become a persistent global problem because of continuing fallout from atmospheric tests and contamination of land and water around the former test sites, nuclear weapons production facilities, and radioactive waste storage sites.

Illnesses and other long-term health problems that can result from exposure to ionizing radiation include:

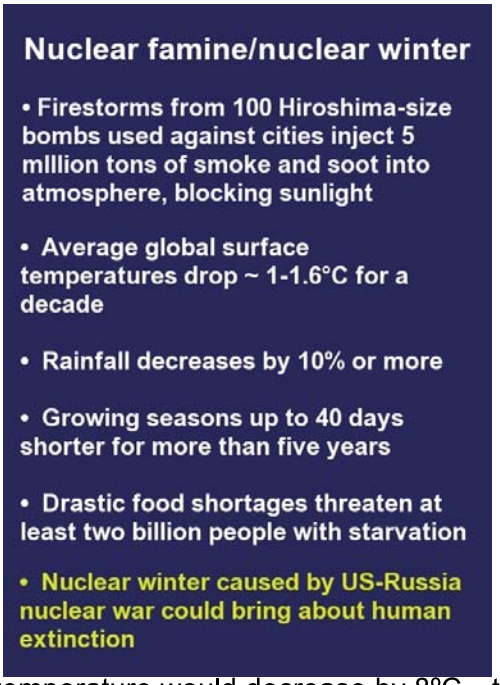
- leukemia
- multiple myeloma
- stomach, colon, lung, breast and thyroid cancers
- salivary gland, esophagus, and bladder cancers
- cataracts
- birth defects
- infertility
- chromosomal aberrations
- hemorrhaging
- infections

3) **An electromagnetic pulse** disrupts the electricity supply grid and electronic equipment and systems, including computers, medical equipment and satellite communications. In the aftermath of a nuclear war, all forms of international travel, including planes and trains, would likely be disrupted for an indeterminate time. Electronic communications could fail worldwide as a result of EMP effects. The entire global economy would be severely impacted.

4) **Nuclear weapons detonations have extreme and long-lasting environmental consequences, including disruption of the Earth's climate and agricultural productivity.** Fewer than one percent of the nuclear weapons in the world today could disrupt the global climate and cause **nuclear famine.** The thousands of nuclear weapons possessed by the US and Russia could bring about a **nuclear winter**, destroying the essential ecosystems on which life depends.[1]

A limited, regional nuclear conflict involving only 100 Hiroshima-size nuclear weapons would severely disrupt the global climate and agriculture for two decades or more. Average global temperatures would drop 1.6°C for five years, would remain 1.1°C cooler after 10 years, and would not return to baseline after 26 years. Global rainfall would decrease by around 10%, with local and regional decreases of 30-40% or more in temperate, grain-growing regions of North America and Eurasia.[2,3,4] Growing seasons would be shorter by up to 40 frost-free days in the world's most important grain-producing areas. For example, US maize (corn) and soybean production would drop 15-20% in the first five years, and 10%

in the next five years. Chinese maize, rice, and winter wheat production would drop 15-40% in the first five years, and 10-25% in the next five years.



More than two billion people would face starvation from a nuclear-war-induced famine, including 795 million people—primarily in the global South—who are chronically malnourished today. Malnourished people have impaired immune function and resistance to disease, and all famines are inevitably accompanied by epidemics of infectious diseases. Famines are also potent triggers of social unrest and violent conflict, both within and between nations. These factors are likely to significantly increase the toll of food shortages and famine induced by a regional nuclear war, especially as the effects would be both widespread and prolonged over many years.

In addition to the direct agricultural impacts, stratospheric ozone depletion would result in large increases in ultraviolet (UV) radiation—30 to 100% increases in summer outside the tropics, endangering human and animal health, and further damaging crops and marine ecosystems.[5]

A war involving the largest nuclear arsenals would produce 50-150 million tons of smoke and soot. Global average temperature would decrease by 8ºC—temperatures not seen on Earth since the coldest point in the last ice age some 18,000 years ago. For three years there would not be a single frost-free day in the temperate regions of the Northern Hemisphere. Agriculture would stop, human civilization would be extinguished, ecosystems would collapse, and many species, perhaps our own, would become extinct.

Nuclear weapons eradicate the physical and social infrastructure required for recovery from conflict. In the aftermath of a nuclear detonation doctors and health care workers would be killed or severely injured along with the general population. Hospitals, clinics, and other medical facilities would be destroyed or rendered unusable. Medicines, blood for transfusions, diagnostic equipment, and all other essential supplies would be unavailable. There would be no water, no electricity, no transportation, and no communication systems. Roads would be impassable and the terrain would be unrecognizable. Corpses would be everywhere, strewn among the injured and the dying. Surviving health care workers would be unable to find, let alone treat, other survivors. Dangerous levels of radiation would prevent emergency responders from entering affected areas in search of survivors. In Hiroshima, 90% of physicians and nurses were killed or injured, and 42 out 45 hospitals became non-functional. The few outside physicians who arrived in Hiroshima and Nagasaki had to work without equipment, blood supplies, medicines, and other resources needed for effective treatment. IPPNW, the ICRC, and international agencies tasked with emergency and disaster response have reached the same conclusion: **a meaningful medical and humanitarian response to aid the immediate survivors of the use of nuclear weapons is impossible.** No humanitarian response could undo even a small part of the terrible destruction and cataclysmic scale of death and injury inflicted.

Nuclear weapons are indiscriminate in their effects. They cannot distinguish between military and civilian targets, or between combatants and non-combatants. Additional Protocol 1 to the Geneva Conventions, adopted in 1977, prohibits indiscriminate attacks and treats them as a violation of International Humanitarian Law (IHL). The International Court of Justice (ICJ) reaffirmed this conclusion in its 1996 advisory opinion on the illegality of nuclear weapons.

Whether or not they are used against populations during war, nuclear weapons cause widespread harm to health and to the environment. Decades of atmospheric and underground nuclear testing have led to cancers, birth defects, and other radiation-related illnesses among millions of people worldwide. The mining and processing of uranium that provides the fuel for nuclear weapons has serious and long-lasting health consequences for workers, local communities and their environment. Workers at nuclear weapons facilities have sustained severe and debilitating damage to their health as a result of occupational exposure to fissile materials and toxic chemicals involved in the production and maintenance of nuclear weapons.

The International Court of Justice found that "The destructive power of nuclear weapons cannot be contained in either space or time. They have the potential to destroy all civilization and the entire ecosystem of the planet."[6]

Legal and political implications

Since the destruction of Hiroshima and Nagasaki in August 1945, the medical, public health, and international relief communities have understood that there can be no meaningful response to the terrible devastation caused by nuclear weapons. All existing resources would be overwhelmed by the magnitude of the devastation, and no amount of planning or spending on improved capacity can change this reality. Based on this understanding, we have a responsibility to prevent what cannot be cured. Banning and eliminating nuclear weapons is the best and only way to prevent their use.

International Physicians for the Prevention of Nuclear War (IPPNW) is not alone in taking this position as a humanitarian imperative. The **International Committee of the Red Cross (ICRC)—**the world's premier humanitarian organization—first called for nuclear weapons to be banned in September 1945, mere weeks after the atomic bombings of Hiroshima and Nagasaki. Red Cross doctors, including Marcel Junod, were among the first to witness the suffering and devastation in those two cities, and advised the states parties to the Geneva Conventions in 1950 that the "inevitable consequence [of nuclear weapons] is extermination, pure and simple." In November 2011, the Council of Delegates of the **International Red Cross and Red Crescent Movement** appealed to all States "to pursue in good faith and conclude with urgency and determination negotiations to prohibit the use of completely eliminate nuclear weapons through a legally binding international agreement, based on existing commitments and international obligations."[7] At the 2014 Vienna Conference on the Humanitarian Impact of Nuclear Weapons, the ICRC Director of International Law and Policy stated: "… the new evidence that has emerged in the last two years about the humanitarian impact of nuclear weapons casts further doubt on whether these weapons could ever be used in accordance with the rules of customary IHL [International Humanitarian Law]."[8]

Marcel Junod faced insuperable obstacles in attempting to help Hiroshima survivors (ICRC photo)

In 1984, at the height of the Cold War between the US and the former Soviet Union, the **World Health Organization** concluded that doctors and scientists "have both the right and the duty to draw attention in the strongest possible terms to the catastrophic results that would follow from any use of nuclear weapons." The WHO went on to say "the only approach to the treatment of the health effects of nuclear explosions is primary prevention of such explosions, that is, the primary prevention of atomic war."[9]

In 1998, again in 2008, and most recently in 2015, the **World Medical Association** condemned nuclear weapons, citing the "immense human suffering … catastrophic effects on the earth's ecosystem … [and] risk of famine," and urging governments "to work to ban and eliminate nuclear weapons."[10] Over the years, the American Medical Association, the British Medical Association, the Australian Medical Association, the US Institute of Medicine, the Royal Swedish Academy of Sciences, and others have documented the unique dangers of nuclear weapons and nuclear war, and have added their voices as health professionals to the call for nuclear disarmament.

In 1997, the General Assembly of the **World Federation of Public Health Associations** called for the abolition of nuclear weapons, asserting that they pose a threat to the health and survival of human civilization and the global environment.

Since at least 1975, the **International Council of Nurses** has abhorred the use of weapons of war, including nuclear weapons, and has called on its member national nurses associations to support international efforts towards the elimination of these weapons. In its current position statement, ICN notes that "The death, injury and devastation resulting from use of these weapons exceeds the response capacity of the health care system…because of destruction and pollution of food, water supply, shelter, medical supplies and transportation and communication facilities."[11]

Chemical weapons (e.g., mustard gas and sarin) and biological weapons (e.g., anthrax and plague) are also referred to as weapons of mass destruction. These weapons, while inhumane and indiscriminate, cannot kill on the scale and with the intensity of nuclear weapons, nor do they produce the physical and environmental destruction and persistent toxicity across future generations for all living things that put nuclear weapons in a class of their own. Chemical and biological weapons, antipersonnel landmines, and cluster munitions have all been banned by treaties. While international law provides a clear basis and obligation for the elimination of nuclear weapons, they are not yet formally prohibited. A treaty banning nuclear weapons will fill that gap, and is an important step toward their elimination.

The nuclear-armed states and others that claim to rely upon the arsenals of the nuclear-armed states for their security have objected to the proposal for a ban treaty on the grounds that it would delegitimize **deterrence—**the one remaining purpose ascribed to nuclear weapons in order to justify continued possession, deployment, and possible use. They are correct. Nuclear deterrence doctrine would be illegal under a treaty prohibiting nuclear weapons, because it is predicated on their use, and is indefensible from a perspective that gives priority to their consequences.

Unlike conventional forms of deterrence, failure of which can also have terrible consequences, we cannot afford for nuclear deterrence to fail because the consequences of that are unthinkable. Nuclear deterrence, sooner or later, will *inevitably* fail; the history of war has taught us that sooner or later desperation leads to irrational decisions. There are no failsafe technical or human systems. We must not put ourselves in a position where nuclear deterrence *can* fail, and the only way to ensure this is to remove nuclear weapons as an option.

The purpose and practice of deterrence also fails the humanitarian test. From a humanitarian perspective, nuclear deterrence means declaring a willingness to kill millions of people indiscriminately, to irreparably destroy the Earth's ecosystems, and to deploy weapons designed to produce that outcome. We are told that only a credible threat to use nuclear weapons makes deterrence effective, yet a credible threat to use nuclear weapons is nothing short of global blackmail, with the entire world held hostage. Deterrence, regardless of the arguments offered by the nuclear-armed and nuclear-dependent states, is irreconcilable with international humanitarian law. Nuclear deterrence in any form—including extended nuclear deterrence—is an immoral and reckless security strategy that needs to be prohibited as a decisive step toward the elimination of nuclear weapons.

Recommendations to the OEWG

Nuclear weapons are the worst instruments of mass murder ever created. Because they are inevitably indiscriminate and disproportionate in their effects, they violate international law. The ionizing radiation produced at detonation kills people from radiation sickness, while radioactive contamination of the environment causes cancers, chronic diseases, birth defects, and genetic damage. A single nuclear weapon can destroy a city. A nuclear war involving the massive arsenals possessed by the US and Russia could destroy virtually all life on Earth in a nuclear winter. Even a small fraction of the nuclear weapons that exist today can damage the global climate and agricultural production so severely that billions would starve.

The medical and international relief communities cannot respond to the terrible devastation caused by nuclear weapons, and no amount of planning or spending on improved capacity can change this reality.

Weapons this powerful and destructive belong in no one's hands. UN Secretary General Ban Ki-moon is right when he says there are no right hands for the wrong weapons. **The only way to prevent the use of nuclear weapons is to ban and eliminate them.** While international law provides a clear basis for the elimination of nuclear weapons, they are not yet formally prohibited. Chemical and biological weapons, antipersonnel landmines, and cluster munitions have all been recognized as causing unacceptable harm and, therefore, have been banned by treaties. **A treaty banning nuclear weapons will fill that gap for the worst weapons of all, and is the best and most feasible step that can be taken now toward their elimination.**

While this OEWG is not a negotiating body, it does have an opportunity and a clear mandate to prepare and recommend substantive elements of a new legal instrument and to set the stage for subsequent negotiations. The OEWG can and should:

- **Assert the need for a new treaty** that fills the current legal gap by explicitly prohibiting development, production, testing, acquisition, stockpiling, transfer, deployment, threat of use, or use of nuclear weapons, based on their unacceptable consequences;
- **Engage in preparatory work on the elements of such a treaty**, in order to clarify how it can build on existing norms, reinforce existing legal instruments, and close loopholes in the current legal regime;
- **Reaffirm the rights of people who have been victimized by nuclear weapons**, including the Hibakusha of Hiroshima and Nagasaki, the worldwide victims of nuclear testing, and nuclear weapons workers who suffer from a range of radiation-related illnesses;
- **Provide a forum for engagement,** where states without nuclear weapons and civil society can engage with the nuclear-armed and nuclear-dependent states with an expectation that the evidence about humanitarian consequences should determine the requirements, process, and timelines for nuclear disarmament.

Nuclear weapons protect no one and endanger everyone. When deterrence inevitably fails, the casualties and environmental devastation will affect not only countries involved, but also countries on other continents whose people will face starvation from nuclear famine. The lives of everyone on Earth would be put at risk by a nuclear winter. Displaced populations from a nuclear war will create a refugee crisis that is orders of magnitude larger than the one we seem unable to cope with today. In the worst case—a nuclear war between the countries with the largest arsenals—the lives of everyone on Earth could end in a nuclear winter. The lesson we need to take from the three HINW conferences is that the stakes really are that high, and we are all stakeholders.

As health professionals, we have not only warned people who use tobacco about the health dangers, we have also campaigned for bans on smoking in workplaces, pubs, restaurants, and other public spaces in order to protect the health of non-smokers. We have not only provided data about the consequences of gun violence, we have also supported prohibitions and trade restrictions with the goal of saving lives by making guns less available. Success in those campaigns, and in others that have a significant public health dimension, has depended upon collective leadership from those prepared to challenge the tobacco companies, the gun manufacturers, and their lobbies. Ridding the world of nuclear weapons will require a similar—but even more determined—effort from those who understand the urgency to eliminate them.

The nuclear-weapon-free states and civil society groups participating in this OEWG have a unique opportunity and a shared responsibility to take leadership on nuclear disarmament by reframing the goal as a humanitarian-based process for banning and eliminating nuclear weapons; developing and agreeing upon concrete measures to achieve nuclear disarmament; and offering the nuclear-armed and nuclear-dependent states a better roadmap to a nuclear-weapon-free world than the ineffective and obsolete one they are currently using.

† IPPNW is a non-partisan federation of national medical groups in 64 countries, representing tens of thousands of doctors, medical students, and other health workers who share the common goal of creating a more peaceful and secure world freed from the threat of nuclear annihilation. IPPNW received the Nobel Peace Prize in 1985.
†† The World Medical Association (WMA), comprising 112 national medical associations, was founded in 1947. The mission of the WMA is to serve humanity by endeavoring to achieve the highest international standards in medical education, medical science, medical art and medical ethics, and health care for all people in the world.
‡ The World Federation of Public Health Associations (WFPHA) is an international, nongovernmental organization comprising more than 100 multidisciplinary national public health associations. It is the only worldwide professional society representing and serving the broad field of public health. WFPHA's mission is to promote and protect global public health.
‡‡ The International Council of Nurses (ICN) is a federation of more than 130 national nurses associations (NNAs), representing the more than 16 million nurses worldwide. ICN's core values include advancing and sustaining the nursing profession and its contribution to peoples' health and public policy, and achieving equity and equality for society and the profession.

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