Foreword
How Science and Diplomacy Can Save the World

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How Science and Diplomacy Can Save the World

Over the past two years, the world has been heavily impacted by a massive crisis that has changed everything. With over 5 million people dead from the Covid-19 pandemic and with massive upheaval to the economy, mobility, and society, this catastrophe has proven that we are facing global security threats that require a multilateral and cooperative approach. For the modern protection of people, we need science and diplomacy to be at the heart of any decision-making.

The pandemic has shown us what is needed to solve these new global crises. Healthcare staff stepped up to protect people, working through incredibly challenging circumstances and at great personal sacrifice. Grocery and factory workers, delivery people and other essential workers kept us fed and supply chains going. Scientists worked frantically and coordinated across the globe to develop vaccines in record time, showing remarkable breakthroughs such as the highly efficient mRNA vaccines. Weapons were completely useless in combating this crisis. You cannot threaten a virus with weapons of mass destruction.

And this is only the beginning of this kind of new threat. The world will continue to face these complex types of challenges. We are entering a global climate crisis, with extreme weather, migration flows and instability on the horizon. Nationalism and populism are fueling anti-democratic movements and feeding conspiracy theories and distrust in each other and our institutions. And as if that wasn't enough, we're seeing the nine nuclear armed states engaging in a new nuclear arms race that could literally explode at any second.

These are the threats we're facing in the world today, and none of them will stop at borders. Today's security threats will cross borders, cultures, and continents. They will affect everyone, although the impact will always hit our most vulnerable populations hardest.

None of these threats can be solved by one country, or by nationalistic policies. They can only be solved together, through multilateral action based on scientific evidence and research.

Scientists have warned us before

Scientists started warning about climate change in the 1970s, with global climate models and studies on the impact of increased CO2 levels in the atmosphere. As the 1979 World Climate Conference concluded, "it appears plausible that an increased amount of carbon dioxide in the atmosphere can contribute to a gradual warming of the lower atmosphere, especially at higher latitudes [...]. It is possible that some effects on a regional and global scale may be detectable before the end of this century and become significant before the middle of the next century".

Yet it took decades before the issue of climate change got the attention it deserves. And still today, as people are drowning in floods, fleeing their houses to escape fires, and relocating against their will because of droughts and other climate disasters, governments are still not acting to face the urgent crisis that confronts us.

In 2018, a century after the Spanish flu raged across the world, organizations and experts like the World Health Organization and the International Federation of Red Cross and Red Crescent Societies warned the world that a new pandemic was a real threat to humanity and urged decision-makers to prepare for it, in order to reduce its impact as much as possible. Despite this widely known fact, governments appeared helpless and surprised as the Covid-19 pandemic rolled over the world in early 2020.

These two ongoing crises could have been mitigated if governments had listened to experts and acted earlier.

In 2019, United Nations climate scientists stated that 300 billion US dollars would be needed to stop the rise in greenhouse gases and to buy up to 20 years of time to fix global warming. That is a fraction of the 2 trillion US dollars that governments spend on their militaries each year.

It has been estimated that it would cost 25 billion US dollars to vaccinate the whole world. As new variants of the Covid-19 virus emerge, refraining from ensuring equal distribution of the vaccine across the globe seems like a foolish and shortsighted choice. Instead of spending 25 billion US dollars on vaccinating the whole world and ending this pandemic, world military spending rose to almost 2 trillion US dollars in just 2020. The nine nuclear-armed states spent 72.6 billion US dollars on their nuclear arsenals alone.

For example, the United States spent 37.4 billion taxpayer dollars building and maintaining its nuclear warheads and missiles, planes and submarines. What could it have bought instead? At an average cost of 37,500 US dollars a piece, the United States could

purchase 35,000 more ventilators. At 25,000 US dollars per intensive care unit bed, the United States could buy 300,000 more beds, meeting the reported nation-wide gap. Doctors and nurses across the country are overworked and exhausted. Instead of buying nuclear weapons, the United States could hire 150,000 nurses at an average salary of 75,000 US dollars and 75,000 doctors at an average salary of 200,000 US dollars, as reported by Nurse Salary Guide and Salary.com.

It is short-sighted and foolish to waste billions of dollars on weapons of mass destruction when the world is facing such massive immediate threats to global security such as the pandemic and climate change. Covid-19 is not the first and will not be the last pandemic we face; we are only confronting the beginning of an escalating climate change crisis, yet governments are not taking decisive action yet.

Why we urgently need to listen to scientists and experts about nuclear weapons

The Bulletin of the Atomic Scientists, founded in 1945 by Albert Einstein and University of Chicago scientists, created the Doomsday Clock, using the imagery of apocalypse and the contemporary idiom of nuclear explosion (countdown to zero) to convey the threats and risk to humanity and the planet. In 2021, the Board of Scientists concluded, "Accelerating nuclear programs in multiple countries moved the world into less stable and manageable territory last year. Development of hypersonic glide vehicles, ballistic missile defenses, and weapons-delivery systems that can flexibly use conventional or nuclear warheads may raise the probability of miscalculation in times of tension. Events like the deadly assault of January 6th 2021 on the US Capitol renewed legitimate concerns about national leaders who have sole control of the use of nuclear weapons. Nuclear nations, however, have ignored or undermined practical and available diplomatic and security tools for managing nuclear risks. By our estimation, the potential for the world to stumble into nuclear war – an ever-present danger over the last 75 years – increased in 2020. An extremely dangerous global failure to address existential threats – what we called 'the new abnormal' in 2019 – tightened its grip in the nuclear realm in the past year, increasing the likelihood of catastrophe".

It's hard to look back at the last years without sharing the Bulletin of Atomic Scientists' growing concern about nuclear weapons and the security situation in the world.

We've seen the unravelling of arms limitation treaties, whilst all nuclear-armed states are increasing investments in their nuclear forces to the tune of nearly 73 billion US dollars per year. The risk of nuclear use continues to grow, augmented by new developments in cyber operations and military artificial intelligence. These few governments are putting us all at risk and endangering their people in order to hold on to their weapons of mass destruction.

And experts and scientists know that the consequences of any nuclear weapon use would be devastating. After the first nuclear weapons were dropped on Hiroshima and Nagasaki, the International Committee of the Red Cross (ICRC) reported, horror-struck, on the humanitarian travesty and the decimation of the area's medical response capacity.

About 80% of hospitals were destroyed in Hiroshima and out of 300 doctors, 270 died or were injured; out of 1,780 nurses, 1,654 were killed or injured.

Reporting on the conditions at an emergency hospital in Hiroshima, the ICRC's Fritz Bilfinger wrote "Medical equipment was practically nonexistent. The place looked more like a morgue than an emergency hospital".

As the ICRC and medical associations have repeatedly warned, they cannot prepare to respond to a humanitarian catastrophe on this scale today. Because even the detonation of just one 100-kiloton nuclear weapon over a major city would leave hundreds of thousands to over a million people injured.

It takes around 10 seconds for the fireball from a nuclear explosion to reach its maximum size. A nuclear explosion releases vast amounts of energy in the form of blast, heat and radiation. An enormous shockwave reaches speeds of many hundreds of kilometres an hour. The blast kills people close to ground zero, and causes lung injuries, ear damage and internal bleeding further away. People sustain injuries from collapsing buildings and flying objects.

Thermal radiation is so intense that almost everything close to ground zero is vaporized.

The extreme heat causes severe burns and ignites fires over a large area, which coalesce into a giant firestorm. Even people in underground shelters face likely death due to a lack of oxygen and carbon monoxide poisoning.

There would be nowhere near enough hospital beds, doctors, nurses, ICU beds or burn care centres to treat all the patients from such a blast. Every remaining hospital bed and surviving doctor would suddenly have to accommodate dozens if not hundreds of badly injured patients, while coping with basic utility failures.

People within 4 kilometers in every direction from the detonation point would suffer third-degree burns, but many cities' burn beds number in the single digits. Medical infrastructure would be overwhelmed by many times more new patients in one city in one second than new Covid-19 patients in one day in the entire country at the peak of the pandemic.

A full 9 kilometers from the center of the blast, glass windows can be expected to shatter, causing additional injuries to anyone in the vicinity. How could any city respond to a health crisis of this proportion?

And yet, in many ways, this is the best-case scenario. It only measures the impact of one average-sized nuclear weapon within the first few hours of detonation.

It does not measure the impact of certain modern nuclear weapons, which are many times more destructive, nor does it consider the radiation that would sicken and kill many more over time, the long-term environmental and climate damage or the escalating nuclear war that a nuclear strike over a nuclear-armed state city would almost certainly trigger.

The trauma of overwhelmed hospitals and overburdened doctors and nurses around the world who are struggling to meet the needs of patients during the Covid-19 pandemic shows just how impossible it would be for medical infrastructure to respond to even one nuclear weapon's detonation. We have seen the overfull morgues and the refrigerated trucks of corpses in hospital parking lots.

And sadly, it is clear that a nuclear attack would be much worse. Yet, the governments of the nuclear-armed states and many nuclear-allied states continue to live in denial, ignoring this massive security threat, ignoring the warnings of experts and scientists.

A diplomatic light in the darkness

But while nuclear-armed governments are sleepwalking into disaster, something significant has changed in the last few years, which could not only provide the solution to the nuclear threat, but might also contribute to solving other global threats such as pandemics and climate change.

In stark contrast to the reckless behavior of the nuclear-armed states, the majority of governments in the world gathered in 2017 to use their most powerful weapons, multilateralism and diplomacy, to protect their people, the world and our future by negotiating and adopting the Treaty on the Prohibition of Nuclear Weapons (TPNW).

This didn't happen by mere accident, but was the result of a coordinated push by a coalition of progressive governments, international organizations, civil society, academics, experts, and impacted communities.

Ever since the atomic bombings of Hiroshima and Nagasaki, citizens the world over have petitioned and protested for a permanent ban on nuclear weapons. That ban – long imagined, long sought – entered into force in January 2021.

For the first time, the worst weapons of mass destruction – weapons so horrific that they threaten the very survival of humanity – are subject to a comprehensive, global prohibition. For the first time, a multilateral legal framework exists to eliminate nuclear-weapon programmes, verifiably and irreversibly. For the first time, an international system is in place to assist victims of the use and testing of nuclear weapons, and to remediate contaminated environments.

This treaty is a monumental accomplishment, and it is important to recognize the diverse coalition that contributed to its creation: the activists and concerned citizens, the scientists and academics, the diplomats of many governments, United Nations officials, and Red Cross humanitarians. But perhaps most of all, the *hibakusha*. We all owe a debt of gratitude to the survivors of nuclear war who have courageously and painfully spoken out, time and again, to save humanity from itself.

In many countries, the victims of nuclear weapon use or testing have struggled for the full realization of their rights. Indigenous communities, already victims of social and political marginalization, have been marginalized further still – by transgenerational cancers, by contamination of traditional lands.

Representatives of these communities spoke during the negotiation of this treaty. And what makes the TPNW so unique is that their voices were finally heard by the diplomats and representatives that participated in those negotiations. And even if some of their own governments, to their shame, ignore these voices, the TPNW is still evidence that multilateralism and international law responded to those voices in the treaty.

Developing multilateral solutions to global challenges is not an easy process, and it will often be extremely difficult – if not impossible – to bring everyone along at the same time. The TPNW has been called "divisive" by those who still ascribe value to nuclear weapons, and many of them continue to try to work against it. But over time, this treaty will stand strong – because it is based on strong foundations. It is morally right, and it is coherent with the framework of international law.

Important progress is rarely easy. Groundbreaking steps forward do not start with consensus agreements. There was a lot of resistance when slavery was abolished. There was plenty of opposition when women fought for the right to vote. The fight for civil rights and to end apartheid weren't met with unanimous support by all.

Progress doesn't happen only when everyone is ready; it must be fought for, and someone has to be brave and lead. And with this treaty, we have seen diplomatic leadership based on scientific and humanitarian arguments.

We see instruments such as the Paris Agreement or efforts to achieve a Pandemic Treaty at the World Health Organization struggle to achieve more than the lowest common denominator.

By using the model of the Treaty on the Prohibition of Nuclear Weapons, a model which allows for a group of progressive governments in collaboration with scientists and civil society to set a higher standard, we can set in motion multilateral solutions to global challenges like pandemics, climate change and more.

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