Overwhelmed: Nuclear Weapons and the Health Care System in Ottawa

Introduction

City governments may believe that nuclear disarmament is an issue best left to national governments but for decades numerous cities around the world have had nuclear weapons aimed at their centres. Although they are targets and the first level of response to a nuclear detonation, cities can never adequately prepare for the humanitarian consequences of their use. Examining the existing health infrastructure available to respond to the explosion of a moderately-sized nuclear weapon over a city makes this point tragically clear. A large-scale nuclear war would realistically involve many nuclear weapons targeting many cities in a country, creating an enormous humanitarian catastrophe impossible for any health care system to deal with - one that could potentially lead to the end of humanity. But if even just one nuclear weapon were to be detonated over a major city today, the immediate health impact would be beyond the ability of any nation to effectively respond.

In early 2022, the International Campaign to Abolish Nuclear Weapons (ICAN) released a report detailing the health impacts of nuclear weapons detonations on ten cities. This report follows ICAN’s report and borrows heavily from their methodology, using publicly available information about hospitals, doctors, nurses and the NUKEMAP simulator, to evaluate the immediate health impacts and the healthcare response capacity to treat victims of a 100-kiloton airburst nuclear weapon detonation in Ottawa, Canada. While the NUKEMAP model does not include all the potential and long-term impacts of a nuclear detonation such as radioactive fallout or the likelihood of wildfires sweeping through Gatineau Park and north across Quebec, which could be just as horrific as the initial damage, it still provides a snapshot of what Ottawa would face in the event of a nuclear attack.

While this report focuses on the Ontario side for health care calculations, we note that there will be immediate health impacts on the Quebec side as well. Indeed, the eastern part of Gatineau, Quebec, will also be considerably impacted by a nuclear weapon detonation in Ottawa, Ontario, and they will face similar difficulties in their healthcare response.

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1 Drafted by Jérémy Cotton, Research and Campaigns Associate and Erin Hunt, Program Manager.
2 ICAN (2022), No adequate response capacity, https://www.icanw.org/no_humanitarian_response
3 ICAN (February 2022), No place to hide: nuclear weapons and the collapse of health care systems, https://d3n8a8pro7vhmx.cloudfront.net/ican/pages/2544/attachments/original/1644334250/NoPlaceToHide-ICAN-Report-Feb2022-web.pdf?1644334250
**A Nuclear Blast in Ottawa**

A nuclear war would realistically involve many nuclear weapons targeting many cities in a country, making for an enormous humanitarian catastrophe that is impossible for any health care system to deal with. But even if just one average-sized nuclear weapon (100 kiloton)—about seven times larger than Hiroshima or five times larger than Nagasaki\(^5\)—were to be detonated over Ottawa today, the immediate health impact would be catastrophic. We used a 100 kiloton weapon for this simulation since it a common size though many of the world’s nuclear arsenal are much larger. An estimated 84,710 people could die immediately and another 212,810 could be injured\(^6\). That’s more than 20% of Ottawa’s population of 1.4 million in 2022\(^7\). Roughly one out of five people in Ottawa would die instantly or be injured.

Upon detonation, a fireball would extend out about 380 meters in every direction from the epicenter. If the bomb were dropped over the Ottawa City Hall, that means that the Ottawa City Hall and Court House, Department of National Defense—North Tower, some embassies and important memorials, like the National Aboriginal Veterans Monument and the National War Memorial, would be engulfed in a fireball and instantly vaporised.

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\(^6\) Alex Wellerstein (2012-2022), op. cit.

At a distance of a little over 1km from the detonation point the explosion would likely generate a fatal dose of ionising radiation should anyone or anything survive the blast and fire. In Ottawa, this would include the National Arts Centre, the Canadian Museum of Nature, and several other well frequented theaters and museums. In addition to the Canadian parliamentary precinct this also includes, the Rideau Centre shopping mall, the Rideau transit hub, and the University of Ottawa.

Within 3.26 kilometers in every direction from the center, there would be blast damage, with most residential buildings collapsing, and local fires starting from the destruction. Everyone in this zone would be injured, and many would die. The blast would also damage four bridges linking Gatineau to Ottawa: Macdonald-Cartier Bridge, Alexandra Bridge, Portage Bridge and Chaudière Bridge.

Within 4.38 km, people would suffer third-degree burns. Technology may be disrupted by an electromagnetic pulse. At least four major hospitals lie in this zone: Ottawa Hospital’s two campuses – Main Campus and Civic Campus, the main pediatric hospital for the region - Children’s Hospital of Eastern Ontario (CHEO), and Pierre-Janet Hospital Center in the neighboring city, Gatineau, Quebec.

A full 9km from the center of the blast, glass windows would shatter, causing additional injuries to anyone in the vicinity and some technology may be disrupted by an electromagnetic pulse.  

**Healthcare Response Capacity**

It would be almost impossible for Ottawa’s healthcare system to respond adequately to such a humanitarian crisis as it would be severely damaged along with the city.

There are four main hospitals in Ottawa, but both the Children’s Hospital of Eastern Ontario (CHEO) and the Ottawa Hospital, the ones closest to the center of the city, would be destroyed by the blast. Canada has 252 hospital beds per 100,000 people so we can estimate roughly 3,500 hospital beds in Ottawa. If half of those were destroyed when the blast decimated the hospitals in the city center, Ottawa would be left with 1,764 hospital beds, which would be woefully inadequate to accommodate over 200,000 injured people. Potentially creating a situation where there are 59 patients per hospital bed.

Injured people from Ottawa may not even be able to find hospital beds in other parts of the country as there are only about 96,500 hospital beds in the rest of Canada, but many of them would already be in use to treat existing patients.

Beyond the physical infrastructure that would be destroyed the loss of human capacity would be more devastating. Canada has approximately 261 doctors per 100,000 people and 994 nurses per 100,000 people, which translates to roughly 3,713 doctors and 14,141 nurses in Canada.

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8 Alex Wellerstein (2012-2022), op. cit.
10 GHS Index (2022), Canada, [https://www.ghsindex.org/country/canada/](https://www.ghsindex.org/country/canada/)
11 Ottawa Public Health (2022), op. cit.
Ottawa. If 21% of that population is injured or killed in the explosion, that leaves about 11,184 nurses and 2,937 doctors to treat about 212,810 injured people. That means every doctor in Ottawa would be responsible for urgently treating about 72 new patients, many with severe injuries.

Since January 2020, the COVID-19 pandemic has infected and killed millions of people around the world, and it has revealed major failures and gaps in the national and international healthcare responses. In Canada, at the reported COVID peak through 2022 on 10 January 2022, 58,155 new COVID cases were reported in one day in all of the country. After a nuclear attack, about four times more people would need medical attention immediately in just one city.

** Conclusion**

This scenario paints a bleak and cautionary picture. It is clear that there is no immediate or long-term response capacity that could adequately respond to a nuclear attack on Ottawa: even a single moderately sized bomb over Canada’s national capital city would be a humanitarian catastrophe. In the event of an actual nuclear war, a far greater level of destruction would engulf scores of cities in the countries involved in the conflict, and the global climate disruption would cause famine across the globe claiming victims far removed from the actual scene of the war and posing an existential threat to modern industrial civilization. The only solution is to prevent the risk to any city by eliminating nuclear weapons.

It is important to remember that human beings created nuclear weapons and we have the power to abolish them. The Treaty on the Prohibition of Nuclear Weapons (TPNW) was adopted in 2017 and entered into force in 2021. The TPNW is a landmark agreement supported by the majority of the world’s nations to prohibit nuclear weapons and provide a pathway for their elimination. Support for the treaty continues to grow as more countries sign and ratify. Even in countries that have not joined the treaty, such as Canada, polls show that public opinion supports joining it. Major Canadian cities such as Montreal, Toronto, and Vancouver have been concerned, and urged their federal government to sign and ratify the TPNW through the ICAN Cities Appeal. However, Ottawa has not yet joined the appeal.

As the treaty continues to expand in membership and influence, Ottawa should join the other Canadian cities in urging the federal government to join the TPNW. Only then, can we put the nightmare scenario described in this report to bed at last.

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12 ICAN (April 2021), *Poll: 74% of Canadians support joining the UN Treaty on the Prohibition of Nuclear Weapons*, [https://www.icanw.org/poll_74_of_canadians_support_joining_the_un_treaty_on_the_prohibition_of_nuclear_weapons](https://www.icanw.org/poll_74_of_canadians_support_joining_the_un_treaty_on_the_prohibition_of_nuclear_weapons)