Introduction

The term Weapons of Mass Destruction (WMD) often refers to weapons that have been invented with the intention to kill, or severely harm a large number of people. They can be in the form of nuclear, radiological, chemical, and biological or any other type which can bring significant harm.

While the mass killing of people is not a new feature of warfare, the use of WMD poses numerous threats to international peace and security. Over the past century, various states have built and stockpiled lethal arsenals of biological, chemical and nuclear weapons and their raw materials. As of now, ten countries currently possess nuclear weapons: Great Britain, China, France, India, Israel (assumed), Iran (assumed), North Korea, Pakistan, Russia and the United States, with some states possessing chemical and/or biological warfare agents.

Since the early twentieth century, Weapons of Mass Destruction were widely used and are continually being developed around the world. As the World Wars progressed, countries increasingly used chemical weapons on one another: countries such as Japan started conducting research on chemical weapons, and Italy started using mustard gas against civilians and soldiers in Ethiopia (1935-36), not to mention the atomic bombings in Hiroshima and Nagasaki, Japan, in 1945. Since then, the term WMD came to refer to nuclear weapons. Recently, North Korea announced the successful development of its Hydrogen Bomb (January 2016), creating tension in surrounding nations.


Definition of Key Terms

Weapons of Mass Destruction (WMD)

As of now, there is no treaty or international law that solidly defines WMD: each country or organisation has its own definitions of WMD. In general though, the term refers to any nuclear, biological, chemical or radiological weapon that is intended to severely injure or kill a large number of people.

Bioterrorism

Action which involves the intentional release or dissemination of biological agents such as virus, bacteria or toxins to cause illness or death in people or any other living objects. Typically, the biological agents can be found naturally, but can often be mutated or genetically modified to spread certain diseases. The agents can spread through any means such as air, food or water, and can have long incubation periods, making it hard for us to detect them.

Nuclear Disarmament

Nuclear Disarmament refers to either reducing or eliminating the quantity of nuclear weapons held by a country or a group.

Nuclear Weapons

Explosive weapons that gain energy from either splitting, or joining atoms. There are two types of nuclear weapons: fissure weapons and fusion weapons (to be explained later in the report).

Nuclear Terrorism

Nuclear terrorism refers to an act in which a member(s) of a terrorist organisation detonates a nuclear device. In legal terms, the act is an “offense” if committed with the intent to cause death or serious bodily injury; or with the intent to cause substantial damage to property or to the environment; or with the intent to compel a natural or legal person, an international organisation or a State to do or refrain from doing an act.1

Supercritical Mass

The smallest amount of fissile (e.g. uranium or plutonium) needed for a nuclear chain reaction. Typically, the mass depends on its nuclear properties, including its enrichment, density and shape. When the nuclear chain reaction in a specific mass of fissile material is self-sustaining, the mass is said to be in a ‘critical’ state in which there is no change in power, temperature or number of neutrons.

Background Information

Types of Weapons of Mass Destruction (WMD)

**Biological**

Biological weapons (BW) include any weapons which aim to spread diseases to humans, animals or plants. There are two forms of biological weapons: dry powder and liquid. Liquid form of BW carries the advantage of being easily produced, whereas dry powders are better in that they last longer and spreads more widely. Biological agents are often considered as strategic terrorist weapons, as they are not only easy and inexpensive to obtain, but also have long incubation periods, making it hard to be detected. One common example is the intentional food poisoning in the form of salmonella, causing civil unrest. Likewise, biological weapons are often used to create mass panic and disruption of a country.

A successful bioterrorism can result in thousands of casualties. Currently, there are more than three hundred thousand species of bacteria and at least five thousand types of viruses that negatively affect us. At present, with such rapid movements of people, the threat of biological weapons among people increases: crowding in public places increases contact between individuals, increasing the pace of disease spread. Common ways of spreading BW include:

1. Contaminating food or water supplies
2. Releasing infected vectors (e.g. mosquitoes, fleas)
3. Creating aerosol clouds (to be inhaled).

There have not been many cases of heavy bioterrorism as there have been for other types of WMD. Countries such as Japan and the Soviet Union, however, have extensively researched biological warfare during the twentieth century. Started in the
early 1930s, Japan conducted experiments of its biological agents on human prisoners, causing at least ten thousand deaths. Furthermore, Japan dropped bombs in several areas of China, including Manchuria, to infect the population with bubonic plague (1940~1941). Exact figures of casualties are unknown: whereas the Japanese government has acknowledged that its attacks caused twenty thousand deaths, the Chinese government claims over two hundred thousand casualties from the Japanese attacks.

**Chemical**

Chemical weapons (CW) involve the use of deadly chemical products to cause damage to kill, injure or incapacitate an enemy. Production is relatively easy, and only small amounts are required for effective consequences. One characteristic that differentiates chemical weapons from biological weapons is the rapid reaction of chemical weapons. Unlike biological weapons which have long incubation periods, chemical weapons can bring instant reaction, causing instantaneous deaths in worst cases.

CWs have existed for thousands of years, from poisoned arrow heads to nerve gases used in the two World Wars. The most significant advances, however, took place during the World Wars. Germany was the first to use chemical weapons in WW1, causing over ten thousand deaths and over a million injuries. Similarly, the United States used defoliants called Agent Orange during the Vietnam War (1955~1975), causing uncountable incidents of deformity in both humans and plants.

Most chemical weapons fall into four main categories, which are:

**Chocking (or pulmonary) agents**: chemical agents which attack lung tissues. They can cause respiratory distress or asphyxia (severe deficiency of oxygen within the body)

**Blister agents (vesicants)**: chemical weapons that burn or cause blisters on the skin and respiratory tissues, causing respiratory damage and blindness.

**Blood agents** interfere with the body's oxygen supply. They deprive the blood and organs of oxygen. Examples include cyanide and arsine.

**Nerve agents** disrupt the body's central nervous system, causing rapid death. Examples include Tabun and Sarin.
Nuclear

Nuclear weapons have been around for the past several decades. Today, a handful of nations possess around 30,000 nuclear weapons, each with explosive power twenty times greater than those dropped on Hiroshima and Nagasaki, Japan, in 1945. Although no nuclear weapon has been used in warfare since 1945, its devastating power has been proven through the aftermaths of Hiroshima and Nagasaki Bombings, as well as the Chernobyl and Fukushima nuclear accidents. Due to such destructiveness, possession of nuclear weapons has increasingly come to be seen as a symbol of strength and thus a tool for diplomatic bargaining.

There are two main types of nuclear weapons: fission weapons and fusion weapons, which both work by the energy created from its nucleus.

Fission weapons:

Also known as Atomic Bombs (A-Bombs), fission weapons work by splitting atoms. The core of fission weapons are composed of enriched uranium or plutonium, which has heavy atoms, assembled into a subcritical mass. Then, a supercritical mass is achieved either through shooting one piece of subcritical material to another (the ‘gun’ method), or by compressing a subcritical material (the ‘implosion’ method). During fission, the nucleus splits into smaller nuclei and neutrons are released, eventually leading to a chain reaction of atoms splitting. Many fission products are radioactive and thus cause serious radioactive contamination, as did the Chernobyl power plant did to surrounding areas, if not contained during the fission.

Fusion weapons:

Fusion weapons, also known as Hydrogen Bombs (H-Bomb) or thermonuclear weapons, rely on fusion actions between isotopes of hydrogen. The weapon is often started by using the energy created from a fission bomb (“primary stage”) to compress and heat fusion fuel, creating fusion capsule (“secondary stage”). Thermonuclear weapons can create unlimited extent of explosive force: typically, such weapons can be up to a hundred times more explosive than the atomic bombs dropped in Japan (1945).

Organisations related to Weapons of Mass Destruction

Chemical Weapons Convention (CWC)
The Convention aims to eliminate an entire category of chemical weapons by prohibiting the development, production, acquisition, storage and transfer of CW by Member States. The CWC is the first agreement that provides the framework of the elimination of an entire category of WMD under universally applied international controls. Moreover, all members have agreed to chemically disarm by destroying existing stockpiles of chemical weapons which flouts the Convention’s rules.

With 175 signatories, the Convention currently holds around ninety-eight percent of the global population as members. The CWC allows ‘challenge inspection’, whereby any State Party in doubt of another’s compliance to the Convention and its rules can request an inspection team to be sent.

**International Atomic Energy Agency (IAEA)**

Established in 1957, the IAEA is an international organisation that seeks to promote peaceful use of nuclear energy and to inhibit any use for military purposes. Its objective is “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world”\(^2\). The organisation also is charged with ensuring compliance with the NPT, and is to report to both the United Nations General Assembly and the Security Council. Additionally, the IAEA serves as an intergovernmental forum to encourage research and development, and to secure or provide materials and services to Member States.

The organisation has taken steps to promote physical protection of nuclear material, including assisting states with nuclear weapons or energy programs with physical security of their nuclear materials. It also works to interdict illicit trade of nuclear weapons and their components.

**United Nations Office for Disarmament Affairs (UNODA) and Weapons of Mass Destruction Commission (WMDC)**

UNODA is a UN agency charged with promoting disarmament, including that of WMD. The organization does this through a variety of mechanisms and framework, including the major WMD and conventional weapons conventions and regional organizations and agreements. UNODA also works with the Weapons of Mass Destruction Commission (WMDC) to prevent terrorist acquisition of WMD. The WMDC

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\(^2\) Source: IAEA Homepage
met to assess threats and possible responses related to WMD use, as well as to synthesize findings from past studies on WMD.

Key Issues

Definition of WMD

Although many countries have their own definitions of WMD, there is no set universal definition.

Although the Security Council’s 1540 committee addresses the topic of WMD proliferation to non-state actors, the Resolution has neither been fully implemented nor does it apply to all members of the international community.

Lack of enforcements to remove and combat proliferation of WMD

In 1972, the Biological Weapons Conventions (BWC) was signed. The treaty was the first to ban the development, stockpiling, transfer and the use of biological weapons worldwide. It also was the first treaty which aimed to destroy all existing stockpiles of biological weapons and to prevent its proliferation.

Despite such objectives, however, the convention did not include formal measures to ensure compliance by its Member States. Violation of the convention was apparent in the Cold war. Eventually, the BWC was considered by many as a failed “gentleman’s agreement” which lacked effective verification procedures.

Furthermore, most countries generally lack common standards about which security measures are appropriate to each biosafety level. Also, countries such as the United States (US) do not have comprehensive laboratory safety laws, or those on reporting requirements for accidental releases, possibly due to the wide array of labs ranging from classroom labs to biotechnology companies.

In another light, although the CWC members have managed to remove over two-thirds of existing chemical weapons, large quantities still remain. Not only has that, but the fact that chemical weapons and biological weapons are easily reproducible also kept the international committee in tension. Ingredients of CW and BW are widely available for purchase in open markets and thus it is relatively easy to develop and store weapons in secrecy. Currently, it is believed that nations which have not signed the CWC (e.g. North Korea, Israel and Syria) still
possess such weapons.

**Use of WMD by terrorists**

The lack of treaties addressing the acquisition of WMD by terrorists has been identified as a key threat to the international security. Existing organisations such as the IAEA and the OPCW, which promote actions to prevent WMD terrorism, only work within specific categories of weapons and thus do not provide solutions to all areas of WMD.

The threat of terrorism through WMD is not a recent phenomenon: international terrorist groups gained notoriety for political assassinations in the late 19th century, and their notoriety continue to the present.

Terrorism became a regular topic of discussion at the United Nations (UN) in the mid-1990s. In 1995, the Japanese group Aum Shinrikyo released sarin gas in the Tokyo subways system, resulting in 12 casualties and thousands of injuries. In 1984 the Rajneesh group, an American organization, spread salmonella by placing live bacteria in salad bars, causing in over seven hundred illnesses. Furthermore, other terrorist groups have attempted to utilize biological cultures and cyanide to contaminate water supplies, a typical type of indirect attacks.

In fact, after the September 11 attacks in the United States, the UN Security council (UNSC) declared that acts of terrorism are threats to international peace and security. Later that month, the council adopted resolution 1373, establishing the Counter-Terrorism Committee (CTC). The CTC aims to help its member states prevent acts of terrorism within their borders.

As shown by international terrorist acts, the proliferation of weapons of mass destruction to terrorist groups poses one of the most serious threats to international peace and security: no country today can remain indifferent to the possibility of such groups getting their hands on WMD and using them against the innocent. The use of WMD by terrorists is generally viewed as worst case attacks and thus attracts great concerns.

**Illicit development of WMD and tension that arises**

Nuclear weapons can have severe effects on surrounding objects, depending on the duration of exposure and the quantity of radiation. Radiation affects human body cells that actively divide, and can eventually lead to cell death. Effects include increased incidence of leukemia and various types of cancer, and can be seen from within hours to years, depending on the duration of exposure to radiation. In Hiroshima and Nagasaki, over two hundred
thousand casualties arose, with between sixty thousand to eighty thousand people instantly vanishing from the heat. In the long term, incidents of anemia, cataracts and cancers skyrocketed. An increase in leukemia appeared about two years after the attacks and reached the peak around six years later – it is estimated that 46 percent of the survivors were at risk of having the disease. Similarly, the accident in the Chernobyl nuclear power plant (1986) is known to have caused around seven thousand cases of thyroid cancer among young adults.

Currently, the Non-Proliferation of Nuclear Weapons Treaty (NPT) limits the possession of nuclear weapons to the five permanent members of the Security Council. However, countries that have not signed to the treaty continue the development of such weapons. On January 6th, 2016, North Korea claimed to have reached the “next level of nuclear might”, having achieved successful test of its first Hydrogen Bomb (H-Bomb). Although officials abroad cast doubt on the assertion, the trial of North Korean experiment was viewed as further evidence of the steady expansion of North Korea’s nuclear ambitions. Moreover, countries such as India, Pakistan and Israel are also known to illegally hold nuclear weapons (flouts the Non-Proliferation Treaty).

**Major Parties Involved and Their Views**

**Democratic People’s Republic of Korea (DPRK)**

North Korea was once a member of the NPT, but withdrew in 2003. In 2006, North Korea announced that it had successfully conducted its first nuclear test, and in 2009 declared the development of a nuclear weapon. In addition to the small quantities of nuclear weapon it already possesses, it is suspected that DPRK also may have chemical and/or biological weapons.

North Korea carried out several nuclear tests, with the most recent being on January 6th, 2016. The United States Geological Survey detected a magnitude 5.1 seismic earthquake in the peninsula. The North Korean media proudly announced a successful development of a Hydrogen Bomb, but the truth remains unverified. Yet, the incident brought condemnations from surrounding countries such as the Republic of Korea, Japan and the United States.

**Iraq**

Iraq is a Member state to numerous international conventions and treaties on disarmament and non-proliferation. At the same time, Iraq is known to have been condemned
for his use of chemical weapons during the Iran-Iraq War (1980s) against the Kurdish and Iranian civilians. After the Persian Gulf War, the United Nations located and destroyed large quantities of Iraqi chemical weapons with varying degrees of Iraqi cooperation and obstruction. However, the United States and the United Kingdom asserted that Hussein still possessed large hidden quantities of WMD (2003), and that he was clandestinely producing more.

Despite such suppositions, the Iraqi Government Reported to the United Nations\(^3\) that: “Iraq fully supports the strengthening of relevant non-proliferation multilateral and legally binding instruments with a view to tackling the threat posed by the acquisition by terrorists of weapons of mass destruction... Iraq will continue to work at the national, regional and international levels to strengthen and promote its capabilities for counter proliferation. ”

**United Kingdom of Great Britain and Northern Ireland**

The United Kingdom is a member of the five Nuclear Weapons States (NWS) under the Nuclear Non-Proliferation Treaty, and is estimated to have around 225 nuclear warheads in total.

During the Second World War, the UK manufactured millions of linseed-oil cattle cakes (containing anthrax) and planned to drop on Germany, in the hope that the seeds would destroy German beef and eventually spread diseases to humans. Developments of offensive weapons continued after the war. Up to the 1950s, the United Kingdom continued tests regarding plague, tularemia and brucellosis.

Although it had all three types of WMD in the past, the UK renounced the use of biological and chemical weapons and thus destroyed their general stocks in 1956. In 1974, biological weapons were banned, and ratified the Biological and Toxin Weapons Convention in 1975.

**United States**

The United States is also a part of the five Nuclear Weapons States under the Nuclear Non-Proliferation Treaty, and is known to hold all three types of WMD. However, it has neither tested any nuclear weapon since 1992 nor used biological or chemical weapons against other countries.

The U.S. is the only country which has used nuclear country against another in warfare. It dropped two atomic bombs in Hiroshima and Nagasaki on the 6\(^{th}\) and the 9\(^{th}\) August, 1945.

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\(^{3}\) UN General Assembly, Measures to prevent terrorists from acquiring weapons of mass destruction: Report of the Secretary-General (2014), Reply received from governments, Iraq.
USA, until joined by Soviet Union during the beginning of Cold War, was the only nation to hold nuclear weapons. America is also known to have conducted over one thousand nuclear testing program during the Cold War, pioneering the development of both nuclear fission and fusion weapons.

Timeline of Relevant Resolutions, Treaties and Events

<table>
<thead>
<tr>
<th>Date</th>
<th>Description of Event</th>
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<tbody>
<tr>
<td>1925</td>
<td>The Geneva Protocol, which prohibited the use of chemical weapons in warfare, was signed.</td>
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<tr>
<td>August 1945</td>
<td>World’s first atomic bomb used by the USA on Japan, dropped on Nagasaki and Hiroshima</td>
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<tr>
<td>August 5, 1963</td>
<td>Nuclear Test-Ban Treaty signed by the United States, Soviet Union and Great Britain</td>
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<tr>
<td>July 1, 1968</td>
<td>Treaty on Non-Proliferation of Nuclear Weapons (NPT) signed in New York, USA.</td>
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<tr>
<td>March 12, 1993</td>
<td>North Korea announces withdrawal from the NPT, but was suspended before the withdrawal came into effect.</td>
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<tr>
<td>April 10, 2003</td>
<td>North Korea withdraws from the NPT</td>
</tr>
<tr>
<td>July 2006</td>
<td>The FBI created the Weapons of Mass Destruction Directorate (WMDD) to build a cohesive approach to incidents involving nuclear, radiological, biological or chemical weapons</td>
</tr>
<tr>
<td>January 6, 2016</td>
<td>North Korea announces the success of its first Hydrogen Bomb (H-Bomb)</td>
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Evaluation of Previous Attempts to Solve the Issue

Counter-Terrorism Committee (CTC)

The committee was established by the Security Council Resolution 1373, which was unanimously adopted in September 2001 after the September 11 attacks in the United States.
The CTC comprises of all fifteen Security Council Members, and urges other States to become parties as soon as possible. The resolution 1373 and 1624 (adopted in 2005) requests that its member take steps to⁴:

- Criminalise the financing of terrorism
- Freeze without delay any funds related to persons involved in acts of terrorism
- Deny all forms of financial support for terrorist groups
- Suppress the provision of safe haven, sustenance or support for terrorists
- Share information with other governments or any groups practicing or planning terrorist acts
- Cooperate with other governments in the investigation, detection, arrest, extradition and prosecution of those involved in such acts
- Criminalise active and passive assistance for terrorism in domestic law and bring violators to justice

**Non-Proliferation of Nuclear Weapons (NPT)**

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was signed on the first of July, 1968, with the objective to prevent the spread of nuclear weapons and its technology. It also aims to promote cooperation and extend the goal of achieving nuclear disarmament. The treaty represents the only binding commitment to disarmament by nuclear-weapon States. Since its signing, the membership increased to 191, though North Korea withdrew in 2003.

To extend the goal of non-proliferation and as a means of confidence-building between Member States, the Treaty establishes a safeguard system under responsibilities of the International Atomic Energy Agency (IAEA), which conducts inspections on the Treaty, preventing the diversion of fissile material for weapons use.

**Security Council 1540 Committee**

Unanimously adopted in 2004, the Committee is comprised of the Member States of the Security Council and multiple working groups. The Resolution affirms that the proliferation of biological, chemical and nuclear weapons and their means of delivery pose a threat to

⁴ Articles taken from the Security Council Counter-Terrorism Committee [website](#)
international peace and security. The Resolution obliges States to refrain from supporting any non-States from developing, acquiring, possessing or transporting any form of WMD and their delivery systems. The Security Council then added Resolutions 1673, 1810 and 1977 which extends the mandate period of the 1540 committee to 2021.

Possible Solutions

In the context of Biological Weapons, there is an urgent need for an increase in education and training in to reinforce ethical norms and to uphold the “codes of conduct” as a tool to combat the misapplication of WMD. Also, in all three areas of WMD, it is imperative that we quickly identify and alert affected populations and appropriate authorities regarding the outbreaks, and to respond to them without delay. In cases of Hiroshima and Nagasaki bombings in 1945, alerts were either provided few minutes after the bomb was detected, or not provided at all. Had there been quick warnings prior to the event, more lives could have been saved.

The World Health Organisation (WHO) is responsible for coordinating the intergovernmental system of reporting disease outbreaks. However, the organisation is only supported by voluntary contribution from its member states, and has limited finances. Moreover, there is a lack of existing public health infrastructures which help infected civilians. Increases in finance resources to develop education regarding WMD is key factor in solving problems discussed above.

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