
# BEYOND THE MORAL ARGUMENT: THE CONDITIONS THAT INFLUENCE A STATE'S COMPLIANCE OR NONCOMPLIANCE WITH THE CHEMICAL WEAPONS CONVENTION

*by*

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# LIST OF ACRONYMS

BWC – Biological Weapons Convention

CSW – Chemical Warfare Service

CWC – Chemical Weapons Convention

CSCE - Conference on Security and Co-operation in Europe

NATO – North Atlantic Treaty Organization

NPT – The Treaty on the Non-Proliferation of Nuclear Weapons

OPCW – Organization for the Prohibition of Chemical Weapons

WMD – Weapons of Mass Destruction

# CHAPTER I – INTRODUCTION

Shortly after 2:30 a.m. local time on August 21, 2013, residents of the suburbs east of Damascus, Syria were woken by a series of rocket attacks. The suburbs, which were controlled by rebel forces opposing the Syrian government, were familiar with such attacks; in the week prior they had been subjected to heavy artillery barrages and attacks from aircraft as government forces attempted to oust rebels from the area.[1] But, as the following hours would reveal, these rocket attacks were different. Upon impact, the warheads on the artillery rockets released clouds of sarin gas, a colorless, tasteless, and odorless nerve agent that attacks the nervous system.[2] Sarin's most distinguishing characteristic, however, is its lethality. Exposure to as little as 0.01 milligrams per kilogram of body weight can result in death within 15 minutes.[3] In the hours after the attack, videos uploaded on social media depicted graphic footage of adults and children suffering from sarin exposure and bodies of the deceased laid out in hospitals, mosques, and on the street.[4] Over 1,400 people, including over 400 children, were killed in the attack.[5]

The attack shocked the international community. Although chemical weapons had been used in Syria on several other occasions during its civil war, the August 2013 attack

[1] Joby Warrick, "More than 1,400 Killed in Syrian Chemical Weapons Attack, U.S. Says," The Washington Post, August, 30, 2013, https://www.washingtonpost.com/world/national-security/nearly-1500-killed-in-syrian-chemical-weapons-attack-us-says/2013/08/30/b2864662-1196-11e3-85b6-d27422650fd5_story.html?utm_term=.94d684a38a4d.
[2] "Syria Chemical Attack: What We Know," BBC News, September 24, 2013, https://www.bbc.com/news/world-middle-east-23927399.
[3] "Sarin," National Oceanic and Atmospheric Administration, accessed on April 29, 2019, https://cameochemicals.noaa.gov/chemical/5170.
[4] "Syria Chemical Attack: What We Know," BBC News.
[5] United States Government, "Government Assessment of the Syrian Government's Use of Chemical Weapons on August 21, 2013," Office of the Press Secretary, August 30, 2013, https://obamawhitehouse.archives.gov/the-press-office/2013/08/30/government-assessment-syrian-government-s-use-chemical-weapons-august-21.

was notable for its huge number of civilian causalities and for the well-documented suffering of the victims.[6] This attack and the broader pattern of chemical warfare in Syria has led to questions about the strength of the international norm against chemical weapons and whether its erosion will lead to increasing incidents of chemical warfare.[7] The continuing attacks have also raised questions about the effectiveness of the Chemical Weapons Convention (CWC), an international arms control treaty that bans the research, production, and use of chemical weapons, because Syria has been a state party to the Convention since 2013.[8]

The purpose of this thesis is to examine what factors influence a country's decision to comply or not comply with the CWC. The thesis draws on qualitative historical evidence from secondary sources, primary government documents when available, and contemporary policy and news reports to examine the issues of compliance and noncompliance with the CWC from two vantage points: chemical weapons programs and national implementation and enforcement. Using case studies of specific countries, this thesis looks to assess different hypotheses for state behavior regarding the CWC. The goal is to identify common threads within the analysis to better predict what circumstances influence compliance and noncompliance.

*Significance of the Research Question*

As the use of chemical warfare in the Syrian civil war indicates, the elimination of chemical weapons is by no means a completed task. Even with widespread accession to

[6] Warrick, "More than 1,400 Killed in Syrian Chemical Weapons Attack, U.S. Says."
[7] Lori Esposito Murray, "Can Syria's Chemical Weapons be Stopped?" Council on Foreign Relations, April 16, 2018, https://www.cfr.org/interview/can-syrias-chemical-weapons-be-stopped.
[8] Ibid.

the CWC, chemical agents have been used in attacks in Syria, England, and Malaysia in the past three years.[9] Therefore, understanding the factors that influence decisions to comply or not comply with the CWC is essential for moving forward with future disarmament efforts. A better grasp on how circumstances impact state decisions regarding chemical weapons can lead to more informed policymaking and outreach to provide support and assistance to countries in danger of proliferation.

*Classifications and Definitions*

The concepts of compliance and noncompliance are central to the analyses within this thesis. While these terms will be defined more specifically in relation to the chapter topics later on, *compliance* is broadly defined as acting in a way that is consistent with the terms outlined in an agreement. *Noncompliance* is the failure to abide by the terms of an agreement.[10] The other central term within this thesis is *chemical weapons*, which are defined in the CWC as any munitions or device designed to cause death, harm, or incapacitation to humans or animals through the action of chemicals.[11] Throughout the project, the term *non-chemical state* will be used to describe countries that have no current or historical chemical weapons capabilities. The term *chemical state* will be used for countries that have either a current or a historical chemical weapons program.

[9] Anthony Deutsch, "Chemical Weapons Team to Begin Assigning Blame for Syrian Attacks," Reuters, November 13, 2018, https://www.reuters.com/article/us-chemicalweapons-blame/chemical-weapons-team-to-begin-assigning-blame-for-syrian-attacks-idUSKCN1NI1ZN.
[10] Jana von Stein, "Compliance with International Law," Oxford Research Encyclopedias, November 2017, doi: 10.1093/acrefore/9780190846626.013.81.
[11] *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*, September 3, 1992.

*Case Selection*

In Chapter III, I use the cases of Saudi Arabia, Uzbekistan, Argentina, Cameroon, Germany, Libya, the United States, Russia, and Syria to analyze the factors that influence a state's decision to commit to the CWC and to subsequently comply with the aspects of the Convention relating to the research, production, and use of chemical weapons. Further detail on the case selection is given in the introduction to Chapter III.

Chapter IV explores the cases of Bolivia, Armenia, and Lebanon to assess why states have not yet implemented national legislation as required by Article VII of the CWC. Further detail on the case selection is given in the introduction to Chapter IV. In addition to these case studies on implementation, two examples of enforcement, the cases of QC Chen and Hans Raj Shiv, are also examined.

*Evidence and Data*

This thesis uses both primary and secondary sources in its analysis. The majority of the information in Chapter II as well as some of the background information for the case studies in Chapters III and IV comes from secondary sources including articles in academic journals, books on the history of chemical warfare, and studies from nongovernment and government sources. The case studies also draw heavily from primary sources including contemporaneous news reports, international agreements, laws, and government reports.

*Chapter Overview*

This thesis will begin with an overview of the history of chemical weapons including their development and use, the evolution of international views on their development and use, and the succession of international agreements to restrict their production and deployment. It will next consider the issue of compliance and noncompliance with the research, production, and use of chemical weapons through the nine cases in Chapter III. Five hypotheses, outlined at the beginning of that chapter, are used to assess each case. The thesis will then consider the issue of compliance and noncompliance with national implementation of the CWC. Three cases will be analyzed for the factors that impede a state's ability to implement national legislation as required by the Convention. Two more cases will look at national enforcement of established legislation. The project will conclude with a presentation of the findings and a discussion of the implications of those findings.

# CHAPTER II – BACKGROUND AND HISTORY

## THE PRE-INDUSTRIAL AGE

Chemicals have played a role in warfare for over 4,000 years. While naturally occurring toxic substances have been used for hunting and targeted killings since prehistoric times, the first records of chemical weapons attacks on the battlefield date to around 2000 BCE with the use of toxic smoke in India and China.[12] Militaries in India were able to use smoke screens and vapors that induced sleep during large-scale battles.[13] By 1000 BCE, the Chinese had multiple recipes for creating poisonous fumes and had designed smoke bombs that gave off a rudimentary sternutator in order to incapacitate their adversaries.[14] Pulmonary irritants were also used in early Western warfare. Thucydides, an Athenian historian and general, documented the use of poisonous gas against the Athenians in 428 BCE in the Peloponnesian War. While Sparta was besieging the city of Plataea, its soldiers burned wood covered with pitch and sulfur beneath the city walls. The resulting smoke acted as a primitive choking agent on the city's inhabitants.[15] By 80 BCE, the Romans had developed a vapor that induced respiratory distress and blindness. The Roman Empire was able to so effectively incorporate chemical warfare into its battle tactics that, using the toxic vapor they had developed,

[12] "Poisons, Plants and Paleolithic Hunters," University of Cambridge, March 21, 2015, https://www.cam.ac.uk/research/features/poisons-plants-and-palaeolithic-hunters; David J. Baker, *Toxic Trauma: A Basic Clinical Guide* (Switzerland: Springer International Publishing, 2016), 11.
[13] Corey J. Hilmas et al., *Handbook of Toxicology of Chemical Warfare Agents* (Elsevier Inc., 2009), 10.
[14] Ibid. 153-175.
[15] Baker, *Toxic Trauma,* 12.

their military was able to overwhelm and defeat the Charakitanes after only two days of fighting.[16]

Most contemporaneous criticisms of early chemical weapons focused on the use of poisoned weapons. The Hindu Laws of Manu, which date to around 200 BCE, rejected the use of "weapons that are concealed, barbed, or smeared with poison or whose points blaze with fire."[17] Similarly, Greek and Roman writers declared the use of poisoned weapons as "abominable" and "a violation of nature."[18] These sentiments, which can be seen across cultures, were closely tied to the view that poison was a dishonorable and cowardly weapon.[19] Although the use of toxic smoke is not explicitly mentioned in these criticisms, it is likely that it would have been seen in a comparable manner since using vapor to kill or incapacitate the enemy would be considered trickery rather than an honest victory won by skill and strength. The numerous documented cases of chemical weapons use during this period indicate that such criticisms were not significant deterrents to chemical weapons use.

The deployment of toxic fumes in war continued into the Middle Ages. By the 15th century, projectiles containing poisonous vapors were being employed against ships and during sieges.[20] The Bishop of Münster, Christopher Bernhard von Galen, used explosives containing the poisonous plant belladonna to generate noxious vapors while besieging the city of Groningen during the Dutch War in 1672.[21] Concerns about the use of poisonous weapons during the war resulted in the August 27, 1675 Strasbourg

[16] Hilmas, *Handbook of Toxicology,* 11.
[17] Leonard A. Cole, "The Poison Weapons Taboo: Biology, Culture, and Policy." *Politics and the Life Sciences* 17, no. 2 (1998): 120.
[18] Ibid.
[19] Clare Henley, "The Political and Emotional Power of Chemical Weapons," Oxford Research Group, January 18, 2017, https://www.oxfordresearchgroup.org.uk/blog/the-political-and-emotional-power-of-chemical-weapons.
[20] Hilmas et al., *Handbook of Toxicology,* 11.
[21] Baker, *Toxic Trauma,* 13.

Agreement. The agreement, made between France and the Holy Roman Empire, prohibited the use of poisoned bullets.[22]

While the Strasbourg Agreement stands as the earliest known legal constraint on the use of chemical substances during war, it was limited in its purview; it was a bilateral constraint specific to the two signing states and only valid for the duration of the Dutch War.[23] While the agreement came in response to specific incidents regarding the use of poisoned weapons during the Dutch War, it can also be seen as a part of the broader climate of Europe at the time. Poisonous weapons continued to be used throughout the Middle Ages but increasingly prominent figures including William of Malmesbury, Alberico Gentili, Hugo Grotius, Emerich de Vattel, Robert Ward, and Francis Lieber declared their use as against the laws of war and nature.[24]

## THE INDUSTRIAL AGE

Advances in science and technology in the 18th and 19th centuries changed the landscape of chemical warfare. Early uses of chemical weapons relied on naturally occurring poisons such as sulfur and belladonna; however, by the turn of the 18th century, scientific progress had advanced enough to allow the synthesis of manmade toxic substances. Carl Wilhelm Scheele discovered chlorine gas in 1774 and isolated hydrogen cyanide in 1782.[25] John Davy discovered phosgene gas in 1812.[26] The synthesis of sulfur

[22] Jean Pascal Zanders, "International Norms Against Chemical and Biological Warfare: an Ambiguous Legacy," *Journal of Conflict & Security Law* 8, no. 2 (2003): 394.
[23] Zanders, "International Norms," 394.
[24] Cole, "The Poison Weapons Taboo: Biology, Culture, and Policy," 120-121.
[25] Simon Cotton, "What is Chlorine Gas and How Did It Become a Weapon?" Newsweek, September 8, 2016, https://www.newsweek.com/syrias-use-chlorine-gas-and-weapons-history-496568.; The Editors of Encyclopaedia Britannica, "Hydrogen Cyanide," Encyclopaedia Britannica, October 12, 2018, https://www.britannica.com/science/hydrogen-cyanide.

mustard, more commonly known as mustard gas, was documented several times in the early 1800s. By 1860, the British scientist Frederick Guthrie and the German chemist Albert Niemann had both independently documented the compound's irritating properties.[27]

When combined with advancements in manufacturing and technology from the Industrial Revolution, these discoveries opened new possibilities for chemical warfare. Chemical weapons would no longer be constrained to only naturally available poisons, many of which were not well-suited for use on the battlefield; it would now be possible to create substances that were tailored to mass killing or incapacitation in war settings. Additionally, these substances could be produced and stored more efficiently and on a larger scale than was ever possible before the Industrial Revolution. Because of the scientific expertise and industrial infrastructure required to produce the new chemicals, the possibility of widespread chemical warfare remained restricted to states with the resources to support such advanced science and technology.[28]

The discovery of these manmade poisons led to a renewed interest in the use of chemicals on the battlefield. In 1855, Admiral Lord Dundonald, an officer in the British Navy, suggested using sulfur dioxide filled artillery shells against the Russians during the Crimean War.[29] Around the same time, a British chemist named Lyon Playfair also submitted a proposal to use chemicals as weapons against the Russian Navy. His plan made use of shells filled with cacodyl cyanide, which would release arsenic gas when

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[26] Matthew Gunther, "Phosgene," ChemistryWorld, June 3, 2015, https://www.chemistryworld.com/podcasts/phosgene/8617.article.
[27] Dirk Steinritz and Horst Thiermann, "Sulfur Mustard," SpringerLink, June 25, 2017, https://link.springer.com/referenceworkentry/10.1007%2F978-3-319-17900-1_149.
[28] "Chemical Weapons." Encyclopedia of Science, Technology, and Ethics. 2005, https://www.encyclopedia.com/science/encyclopedias-almanacs-transcripts-and-maps/chemical-weapons.
[29] Seymour M. Hersh, *Chemical and Biological Warfare* (United States of America: The Bobbs-Merrill Company, Inc., 1968), 4.

ruptured.[30] The use of chemical weapons was proposed on both sides of the United States Civil War but never acted upon. A New York schoolteacher named John W. Doughty wrote multiple times to encourage United States officials to use chlorine gas shells against the Confederate Army. Joseph Jones, a Confederate Army surgeon, advocated on at least two occasions for the use of hydrogen cyanide against Union ships.[31]

Although none of these proposals resulted in the use of chemical weapons, they illustrated a shift in the attitudes towards the military viability of chemical agents. Earlier uses of toxic substances on the battlefield were primarily aimed at distracting or irritating the enemy in the short term, but advances in chemistry meant that by the end of the 19th century, there existed chemicals such as mustard gas, chlorine gas, and hydrogen cyanide which could cause lasting physical injuries and death to anyone exposed to them.

The advent of this new stage in chemical warfare was not universally embraced. For example, the Lieber Code, a set of instructions written in 1863 to outline acceptable wartime conduct for the United States Military, declared, "the use of poison in any manner, be it to poison wells, or food, or arms, is wholly excluded from modern warfare. He that uses it puts himself out of the pale of the law and usages of war."[32] Similarly, in rejecting Admiral Lord Dundonald's proposal to use sulfur dioxide against the Russians, the War Department declared the effects of the gas would be "so horrible that no honorable combatant" would use them.[33] As with earlier criticisms, these declarations were focused on the morality and honor of using chemical agents in warfare. Both cases illustrate that although there was renewed interest in utilizing chemical substances in war,

[30] Wyndham D. Miles, "The Idea of Chemical Warfare in Modern Times," *Journal of the History of Ideas* 31, no. 2 (1970): 299.
[31] Guy R. Hasegawa, "Proposals for Chemical Weapons during the American Civil War," *Military Medicine* 173, no. 5 (2008): 499.
[32] Francis Lieber, *Instructions for the Government of Armies of the United States in the Field*, Article 70 (1863).
[33] Richard M. Price, *The Chemical Weapons Taboo* (Ithaca: Cornell University Press, 1997), 34.

there was still a prevalent belief that the use of poisoned gas would violate honorable wartime conduct.

The chemical discoveries also came during a climate of increased interest in codifying a universal set of laws governing wartime conduct.[34] Clauses limiting the use of chemicals in warfare were included in several of the agreements that resulted from this desire to establish the guidelines of wartime engagement at the end of the 19th century. The first such effort was the Brussels Convention on the Law and Customs of War. In the summer of 1874, delegates from 15 European States convened in Brussels at the invitation of Tsar Alexander II to discuss a set of proposed guidelines for wartime conduct. Article XIII of the proposal stated that "the use of poison or poisoned weapons" is "strictly forbidden". [35] The guidelines were adopted by the Convention on August 27, 1874 but remained unratified since some countries were reluctant to accept them as binding.[36] Although it was never in force, the sentiments expressed in the Brussels Convention draft had a strong influence on the agreements that followed.

Twenty-five years later, another assembly was convened on the invitation of Russia in order to, in part, "revise the Declaration concerning the laws and customs of war elaborated in 1874 by the Conference of Brussels".[37] Like its forerunner, the 1899 Hague Peace Conference looked to establish guidelines regarding war that would be followed by the signing parties.[38] One major topic of discussion for the 26 states represented at the Conference was the possibility of establishing limitations on various

[34] Peter Holquist, *The Russian Empire as a "Civilized State"* (Washington D.C.: The National Council for Eurasian and East European Research, 2004).
[35] "Project of an International Declaration concerning the Laws and Customs of War. Brussels, 27 August 1874," International Committee of the Red Cross, accessed October 20, 2018, https://ihl-databases.icrc.org/ihl/INTRO/135.
[36] Ibid.
[37] Count Mikhail Nikolayevich Muravyov, "Russian Circular" (1899).
[38] Thomas Erskine Holland, *The Laws and Customs of War on Land, as Defined by the Hague Convention of 1899* (London: Harrison and Sons, 1904).

types of weapons including firearms, explosives, powders, projectiles, torpedoes, and ship rams.[39] Although the delegates were unable to reach consensus on limitations for many of these weapons, they were able to come to an agreement regarding the use of chemicals and other poisons. Article 23 of the Convention (II) With Respect to the Laws and Customs of War on Land, which was taken from Article 13 of the Brussels Convention, broadly asserted that "it is especially prohibited: to employ poison or poisoned arms."[40] Furthermore, Declaration (IV, 2) of the Conference addressed the use of chemical gases more specifically, stating that the contracting states agreed "to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases."[41] The declaration was proposed by Captain Scheine, the delegate representing the Imperial Russian Navy, who stated that "as the task of the Conference is to limit the means of destruction, it seems logical to prohibit the employment of" projectiles that spread asphyxiating and deleterious gases.[42]

At the time of the Conference, none of the recently discovered gases had actually been used on the battlefield, but proposals for their use had been considered at several different times and by several different countries during the 19th century.[43] This interest in the military potential of chemical weapons made addressing the use of gases during war a matter of consideration for the delegates at the conference. For the majority of the states represented at the proceedings, the lack of proven effectiveness of chemical weapons made it easier for the signatories of the first Hague Peace Conference to

[39] Price, *The Chemical Weapons Taboo,* 15.
[40] Convention (II) With Respect to the Laws and Customs of War on Land, July 29, 1899.
[41] "Declaration (IV, 2) concerning Asphyxiating Gases. The Hague, 29 July 1899," International Committee of the Red Cross, https://ihl-databases.icrc.org/applic/ihl/ihl.nsf/Article.xsp?action=openDocument&documentId=2531E92D282B5436C12563CD00516149.
[42] *The Proceedings of the Hague Peace Conferences*. Translated by the Division of International Law of the Carnegie Endowment for International Peace. New York: Oxford University Press, 1899, 296.
[43] Price, *The Chemical Weapons Taboo*, 15-16.

preemptively prohibit their use, as they were not giving up an existing option in their arsenal.[44] The American delegation, however, objected to banning the use of such weapons while "the question of asphyxiating gases is still intangible, since projectiles of this kind do not really exist."[45] Ultimately, Declaration (IV, 2) was signed and adopted as documented in Appendix 1. The result was a declaration that marked the first ratified multilateral agreement to restrict the use of chemicals in weapons during war.

The 1899 Hague Peace Conference Declaration Concerning Asphyxiating Gases was not without its limitations, however. The Conference results only applied during a war between contracting parties. If a non-contracting state was involved, the agreement ceased to be binding on the participants.[46] Six of the affirmative votes for Declaration (IV, 2) were made on the condition of unanimity. Additionally, the declaration only asserted the abstention from the "use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases".[47] This excluded projectiles that emitted poisonous gas as a secondary effect such as picric acid filled shells, which were used as explosives but released arsenic gas as a byproduct of the explosion.[48] The declaration also excluded the release of gases from stationary containers. This exclusion became consequential during World War I.

A second Hague Peace Conference was held in 1907. First proposed by President Theodore Roosevelt and initiated by Tsar Nicholas II, the conference was attended by delegates from 43 states.[49] It reaffirmed many of the clauses previously outlined in the 1899 Hague Peace Conference. The 1907 Convention (IV) Respecting the Laws and

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[44] Ibid. 16.
[45] *The Proceedings of the Hague Peace Conferences*. 283
[46] Price, *The Chemical Weapons Taboo*, 35.
[47] "Declaration (IV, 2) concerning Asphyxiating Gases," International Committee of the Red Cross.
[48] Hersh, *Chemical and Biological Warfare*, 4.
[49] The Editors of Encyclopaedia Britannica, "Hague Convention," Encyclopaedia Britannica. June 8, 2018, https://www.britannica.com/event/Hague-Conventions.

Customs of War on Land once again reiterated that the use of "poison or poisoned weapons" is "especially forbidden".[50] The second Hague Conference did not issue another declaration regarding the use of projectiles containing asphyxiating gases. The existing declaration from the 1899 conference combined with no instances of modern chemical weapon use on the battlefield meant that the issue of chemical warfare was of low priority to the delegates in 1907.[51]

## WORLD WAR I

On April 22, 1915, the Germans discharged chlorine gas on the French troops positioned in Ypres, Belgium.[52] They hoped that the new technology would break the defensive stalemate that was dominating the war and swiftly give rise to a decisive victory.[53] The attack at Ypres marked the first use of chemicals as a stand-alone, lethal weapon and its deployment demonstrated that such weapons could be effective on the field of battle; over 1,000 French and Algerian soldiers were killed and an additional 4,000 injured as a result of exposure to the chlorine.[54] Although such an attack violated the spirit of the Hague Peace Conferences, the Germans avoided breaking the letter of the law by releasing the gas from stationary canisters.[55] This loophole proved to render the Hague Conferences obsolete. The attack was met with outrage by Allied countries, which stressed the suffering and painful deaths experienced by the soldiers exposed to

[50] Convention (IV) Respecting the Laws and Customs of War on Land, October 18, 1907.
[51] Detlev F. Vagts, "The Hague Conventions and Arms Control," *The American Journal of International Law* 94, no. 1. (2000): 31-41.
[52] Hersh, *Chemical and Biological Warfare*, 5.
[53] Fitzgerald, Gerard. J. "Chemical Warfare and Medical Response During World War I." *American Journal of Public Health*. 98, no. 4 (2008): 611-625.
[54] Ibid.
[55] Edward M. Spiers, *Chemical Warfare* (United States of America: University of Illinois Press, 1986), 17.

chlorine.[56] But even as the Allies looked to exploit the Germans' use of gas for moral propaganda back on the home front, they also worked to quickly retaliate in kind.[57] As Lieutenant General Ferguson, the commander of the British II Corps, summarized the sentiment, "it is a cowardly form of warfare which does not commend itself to me or other English soldiers. We cannot win this war unless we kill or incapacitate more of our enemies than they do of us, and if this can only be done by our copying the enemy in his choice of weapons, we must not refuse to do so."[58] The success of the attack on Ypres was enough incentive to overcome any lingering reluctance to use chemical weapons on both sides of the conflict.

Over the course of World War I, around 124 thousand tons of gas were used resulting in approximately 1.3 million casualties.[59] Each year of the war saw an increase in the amount of chemical weapons produced and employed. By 1918, 65,160 tons of poison gas was being expended per year.[60] Although lachrymators and sternutators were employed as irritants to hassle enemy troops, most of the gases used were the new compounds that had been discovered in the 18th and 19th century: chlorine gas, phosgene, and mustard gas.[61] The massive number of battlefield casualties resulting from the use of chemical weapons sparked an offensive and defensive arms race. Countries hurried to develop protective equipment for troops, find more efficient methods of distributing the gases, and discover new chemicals suitable for use on the battlefield.[62] By the end of the

[56] Hugh R. Slotten, "Humane Chemistry or Scientific Barbarism? American Responses to World War I Poison Gas, 1915-1930." *The Journal of American History* 77, no. 2 (1990): 481.
[57] Ibid. 18.
[58] "Poison Gas in World War I," McGill University, accessed April 18, 2019, https://www.cs.mcgill.ca/~rwest/wikispeedia/wpcd/wp/p/Poison_gas_in_World_War_I.htm.
[59] Ibid. 13.; Hersh, *Chemical and Biological Warfare*, 5.
[60] Hersh, *Chemical and Biological Warfare*, 5.
[61] Ibid.
[62] Spiers, *Chemical Warfare*, 13.

war, the two sides combined had assessed upwards of 3,000 chemicals for their potential as weapons; roughly 50 of these compounds were used during battle.[63]

## THE INTER-WAR PERIOD

As a result of World War I, the inter-war years saw significant discussion about the future of gas warfare. Many military leaders were wary of banning the research and production of chemical weapons over the concern that doing so would leave them at a tactical disadvantage.[64] Politicians and the general public, however, were hostile to the continuation of this method of warfare.[65] The strategic effectiveness of chemical weapons on the battlefield was also an open question. The efficacy of gas depended greatly on factors outside of the military's control such as wind direction and air temperature. Additionally, the invention of protective equipment rendered many gases ineffective.[66] Efforts to ban the use of chemical weapons began with the 1919 Paris Peace Treaties, which forbade the possession, manufacture, import, or use of poisonous substances by the countries who had lost World War I.[67] They did not place any restrictions on the victors or attempt to establish any international guidelines regarding the use of poison gases, however.

The first multilateral attempt to address the future role of chemical weapons during military conflict came at the 1921-1922 Washington Naval Conference. During the Conference, the United States proposed imposing restrictions on research,

[63] Everts, "When Chemicals Became Weapons of War."
[64] Spiers, *Chemical Warfare*, 38.
[65] Ibid.
[66] Ibid. 39.
[67] Michael Bothe, "Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction," Audiovisual Library of International Law, accessed November 21, 2018, http://legal.un.org/avl/ha/cpdpsucw/cpdpsucw.html.

manufacture, and use of poisonous gases and the Committee with Respect to Poison Gases was created to assess the merits of such limitations.[68] Restricting the use of chemical weapons had widespread support in the United States at the time. In the years after World War I, the US chemical industry launched a publicity campaign focusing on the dangers of chemical weapons and portraying themselves as the first line of defense against future attacks. Their efforts, which were successful in obtaining desired protective measures such as high tariffs on chemical imports, also served to solidify public opinion on the "inhumanity" of chemical weapons.[69] Secretary of State Hughes championed the proposal to the Conference, a committee of notable figures appointed by President Harding, including General Pershing and Assistance Secretary of the Navy Franklin Roosevelt, advocated for its adoption, and the senate backed it unanimously.[70] Unfavorable views of gas warfare in the American public and government created pressure on the US delegation for action on the issue on the international stage.

The Committee, which consisted of delegates from Japan, France, Italy, the United States, and the British Empire, considered the 8 central questions listed in Appendix 2 along with each country's response to the questions.[71] The delegates determined that limiting poisonous gases would not be feasible as there was no practical way to prohibit or supervise research and production. Additionally, all the countries expressed concern that restricting chemical weapons would place them at a disadvantage in a conflict against an enemy that was not abiding by the same constraints.[72] As a result

[68] *Minutes (Uncorrected) of Committee Meetings at the Conference on the Limitation of Armament*. Washington, D.C., Vol. 7, 1922. 340.
[69] Victor A. Utgoff. *Challenge of Chemical Weapons: An American Perspective*. New York: St. Martin's Press, Inc., 1991. 12-13.
[70] George Bunn. "Banning Poison Gas and Germ Warfare: Should the United States Agree?" *Wisconsin Law Review* Vol. 375, University of Wisconsin, 1969.
[71] *Minutes (Uncorrected) of Committee Meetings at the Conference on the Limitation of Armament*, 342-346.
[72] Ibid. 352.

of the challenge in effectively limiting the use of poison gas and the risk of military disadvantage if the limitations were not universal, the Conference elected to adopt a statement condemning, but not imposing additional restrictions on, the use of chemical weapons. Article 5 of the Treaty on the Use of Submarines and Noxious Gases in Warfare stated that:

> the use in war of asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices having been justly condemned by the general opinion of the civilized world and a prohibition of such having been declared in treaties to which a majority of the civilized Powers are parties,
>
> The Signatory Powers, to the end that this prohibition shall be universally accepted as a part of international law binding the conscience and practice of nations, declare their assent to such prohibition, agree to be bound thereby between themselves and invite all other civilized nations to adhere thereto.[73]

The treaty was ratified by the United States, the British Empire, Italy, and Japan but it never entered into force since France did not endorse it over opposition to the submarine clauses.[74]

In another effort to place limitations on the use of poisonous weapons, the newly established League of Nations created a committee in 1925 to issue a report on the future of chemical and biological warfare with the purpose of avoiding a repetition of the poison gas use in World War I.[75] In May of the same year, a conference was convened in Geneva to discuss the completed report and consider proposals to prohibit the use of chemical weapons. Once again facing domestic pressure against the use of chemical

[73] "Practice Relating to Rule 74. Chemical Weapons," International Committee of the Red Cross, accessed November 20, 2018, https://ihl-databases.icrc.org/customary-ihl/eng/docs/v2_rul_rule74.
[74] Bureau of International Security and Nonproliferation, "Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (Geneva Protocol)," U.S. Department of State, September 25, 2002, https://www.state.gov/t/isn/4784.htm.
[75] Spiers, *Chemical Warfare*, 44.; The Editors of Encyclopaedia Britannica. "Geneva Gas Protocol." Encyclopaedia Britannica, July 5, 2017, https://www.britannica.com/event/Geneva-Gas-Protocol.

weapons, the United States introduced a proposal to ban the export of poisonous gas stating:

> To the end of lessening the horrors of war and of ameliorating the sufferings of humanity incident thereto, the High Contacting Parties agree to control the traffic of poisonous gases by prohibiting the exportation of all asphyxiating, toxic, or deleterious gases, and all analogous liquids, materials and devices manufactured and intended for use in warfare under adequate penalties applicable in all places where such High Contracting Parties exercise jurisdiction or control.[76]

The United States' proposal was met with three major concerns: that trade and activities of the chemical industry could be severely burdened by efforts to distinguish between legitimate commercial trade and prohibited poisonous gas exports, that the prohibition could prevent the transport of materials between different parts of global empires, and that trade restrictions would block gas-producing countries from assisting non-producing allies in conflict with belligerents that were using poisonous gas.[77] Great Britain, in particular, was opposed to this proposal as its Board of Trade strongly objected to the restrictions it would place on the chemical industry and the Army Council believed it would limit the British Empire's ability to be prepared for chemical warfare in the case that it encountered it during a conflict. After examination of the proposed export ban by the Conference's Technical Committee, most states felt that it would be too difficult to implement and that future efforts to restrict poison gas trade should be put on hold until the role of chemical weapons in war could be further addressed.[78] At the urging of France, the delegates decided to instead include a statement prohibiting the use of poison gas warfare.[79]

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[76] John R. Walker. "The 1925 Geneva Protocol: Export Controls, Britain, Poland and Why the Protocol Came to Include 'Bacteriological' Warfare." *Harvard Sussex Program Occasional Paper* Issue 05. Harvard Sussex Program, June 2016, 5.
[77] Ibid. 5-7.
[78] Ibid. 9.
[79] Nuclear Threat Initiative. "Summary and Analysis." *The 1925 Geneva Protocol*, 8.

The result was a declaration that was nearly identical in wording to that of Article 5 of the Treaty on the Use of Submarines and Noxious Gases in Warfare.[80] Of the 137 states that eventually became parties to the Geneva Protocol, approximately 40 did so with reservations stating that if an adverse party did not respect the terms of the declaration, they would cease to consider the protocol binding.[81] These reservations rose out of countries' concerns that an unqualified agreement to the protocol would leave them at a disadvantage against an enemy that did not sign the Geneva Protocol or had signed but engaged in conduct that was contrary to the terms of the agreement.

Critics of the Protocol also noted that while the text captured the overarching spirit of chemical disarmament, it did not prevent the development or stockpiling of chemical weapons.[82] This shortcoming would allow countries to accumulate large chemical weapons stockpiles without violating the document.[83] It also did not contain any methods to verify compliance or penalize violations. Although the delegates considered specifying a licensing system to differentiate chemical weapons versus chemicals for industrial, medicinal, and agricultural use, they ultimately did not over concerns that it would be too difficult to implement and too burdensome on the chemical industry.[84]

In 1935, allegations that Italy had used poison gas during the second Italo-Ethiopian War highlighted the impotence of the Geneva Protocol. Despite significant evidence to support the allegations, the Protocol provided no recourse for punishing such a violation. Sanctions prohibiting arms deals, financial transactions, and trade were applied against Italy under Article 16 of the Covenant of the League of Nations but there

[80] Spiers, *Chemical Warfare*, 46.
[81] Thomas Bernauer, *A Guide to the Negotiations in the Conference on Disarmament* (New York: United Nations Institute for Disarmament Research, 1990), 12.
[82] Spiers, *Chemical Warfare*, 47.
[83] The Editors of Encyclopaedia Britannica, "Geneva Gas Protocol."
[84] Walker, "The 1925 Geneva Protocol," 5.

were no means for addressing its violation of the Geneva Protocol directly.[85] Although there was nearly complete adherence to the sanctions by all members of the League of Nations, the sanctions proved to have no impact on Italy's behavior towards Ethiopia, as they did not include many of the strategic materials that Italy lacked sufficient indigenous capabilities for such as oil, coal, and steel.[86] The ineffective application of sanctions can be attributed to the complex international climate in the lead up to World War II; the major powers of the League of Nations, Britain and France, were wary of alienating Italy in the face of an increasingly aggressive Nazi Germany.[87] As this case illustrates, even though many countries had signed the Geneva Protocol and expressed their support for a ban on the use of chemical weapons, research and deployment of toxic compounds continued throughout the first half of the 20th century.[88]

## WORLD WAR II

The 1930s also saw a significant scientific development in chemical warfare: the creation of nerve agents. Odorless, colorless, and 75 times more lethal than mustard gas, nerve gases were accidently discovered by a German chemist researching pesticides.[89] Dr. Gerhard Schrader's find led to the development of a suite of German organophosphate-based chemical weapons: tabun in 1936, sarin in 1938, and soman in 1944. The Allied forces remained unaware of these new agents for nearly the entirety of

[85] Stockholm International Peace Research Institute, *CB Disarmament Negotiations, 1920-1970*, (Stockholm: Almqvist & Wiksell, 1971), 186.
[86] Cristiano Andrea Ristuccia, "The 1935 Sanctions Against Italy: Would Coal and Oil Have Made a Difference?" *European Review of Economic History* 4, no. 1 (2000): 86.
[87] Ibid.
[88] "History," OPCW, accessed November 21, 2018, https://www.opcw.org/about-us/history.
[89] Hersh, *Chemical and Biological Warfare*, 7-8.

World War II.[90] Despite the scientific advances of the German chemical warfare program and preparations on both sides of the conflict for the use of poison gases, the predictions of extensive chemical weapon use during the Second World War proved to be mistaken. They were not used in battle on the European front and were only used in Asia by Japan against the Chinese.[91] China's military lacked chemical weapons capabilities and so there was no threat of retaliation in kind by the Chinese. Incidents of poison gas use by the Japanese were well publicized at the time, but with the outbreak of hostilities in Europe, there was little inclination to address the violations in the international community.[92] It was not until American troops began advancing into the Pacific theater that Japan's use of chemical weapons decreased, likely due to the presence of a poison gas-capable enemy and warnings of retaliation for such attacks from President Roosevelt.[93]

Although the Geneva Protocol did not appear to act as much of a safeguard against chemical warfare, concerns on both sides of the conflict about in-kind retaliation and facing an enemy with more advanced poison gas capabilities proved to be strong deterrents throughout the war.[94] British intelligence reports assessed that both Germany and Japan were "capable of introducing offensive gas warfare on a large scale if and when they consider it desirable."[95] Britain feared that it would be outmatched if it initiated chemical weapons attacks against either country. These assessments turned out to be massively overestimated. Although Germany had stockpiled over 10,000 tons of blister, choking, and harassing agents, the majority of it was stored in bulk rather than in

[90] Ibid.
[91] Spiers, *Chemical Warfare*, 66.
[92] Walter E. Grunden, "No Retaliation in Kind: Japanese Warfare Policy in World War II." *One Hundred Years of Chemical Warfare: Research, Deployment, Consequences* (2017): 259-271.
[93] Ibid.
[94] Spiers, *Chemical Warfare*, 62.
[95] Ibid. 63

munitions and their delivery systems had repeatedly failed in field tests.[96] With a limited number of filled chemical munitions and no working delivery systems, Germany was not prepared to wage a chemical warfare campaign. Similarly, reports of Japan's chemical capabilities did not capture the full situation.[97] Japan had not experience gas warfare in World War I and had only begun manufacturing chemical agents in the early 1930s. Although the Japanese used chemical weapons against China, poison gas was never fully integrated to the military as a battlefield weapon.[98] The Japanese armed services never organized a service dedicated to chemical warfare and struggled to outfit their troops with protective equipment. While their poison gas capabilities proved effective against the Chinese, they were not prepared for chemical warfare against an opponent with in-kind retaliatory capabilities.[99]

Both the Germans and the Japanese suffered from similar misleading intelligence. Germany believed that Britain, the United States, the Soviet Union, and the other major European powers had greatly increased their chemical weapons capabilities since the end of World War I. According to the head of Germany's chemical weapons operations, General Lieutenant Herman Ochsner, "the general impression held in Germany was that in all matters pertaining to gas warfare we lagged seriously behind foreign powers."[100] Japan had virtually no information on British, Soviet, or American poison gas capabilities. As a consequence, the Japanese military was very cautious to avoid provoking chemical retaliation from these countries out of fear that their chemical weapons programs were more advanced than the Japanese program.[101]

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[96] Ibid.
[97] Ibid. 65
[98] Ibid. 65
[99] Ibid. 66
[100] Ibid. 64
[101] Ibid. 66

Although assessments of the opponents' poison gas capabilities were largely overestimated by both Allied and Axis powers, the fear of being outmatched in chemical warfare was a strong incentive for restraint. By the end of the war, the lack of poison gas use combined with the advent of nuclear weapons meant that chemical weapons had temporarily fallen out of the international discourse; there were no attempts to further restrict the use of chemical weapons at the international level for nearly two decades.[102]

## THE COLD WAR

Chemical disarmament remained of secondary importance until the end of the 1960s. Reporting on the use of irritants and chemical defoliants in Vietnam brought the issue of chemical weapons back into the public light both in the United States and in the international community.[103] The United States asserted that defoliants were not chemical weapons and therefore their use did not violate its prior position of no first use for chemical warfare.[104] In response to that argument, Hungary raised the subject before the United Nations in 1966 with the request for a resolution mandating compliance with the Geneva Protocol and pronouncing "the use of chemical … weapons for the purpose of destroying human beings and the means of their existence constituted an international crime".[105] This would have redefined chemical weapons to include substances such as defoliants, which impacted people's homes, sources of food, and ways of life. Opposition by the United States and other Western countries prevented the adoption of Hungary's

[102] SIPRI, *CB Disarmament,* 27.
[103] Ibid. 27-28.
[104] U.S. Department of State, "Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (Geneva Protocol)," U.S. Department of State, accessed April 20, 2019, https://www.state.gov/t/isn/4784.htm.
[105] "Hungary," International Committee of the Red Cross, accessed November 21, 2018, https://ihl-databases.icrc.org/customary-ihl/eng/docs/v2_cou_hu_rule74.

proposed resolution; however, a revised resolution declaring the objectives and spirit of the Geneva Protocol a part of customary international law and encouraging states to assent to the Protocol was passed unanimously.[106] A year later, Malta again raised the issue of chemical weapons before the United Nations, suggesting that the Geneva Protocol was outdated and should be revised.[107] Many countries, primarily the Soviet Union and its allies but also Sweden, opposed this suggestion over the concern that the revision process could lead to weakened prohibitions on chemical weapons use.[108] In the end, no revisions occurred and disarmament efforts remained focused on drafting a new agreement.[109]

The UN Secretary-General released a report on chemical and biological weapons in 1969. The report highlighted the dangers of the widespread use of chemical agents in war and assessed that the risk of proliferation was high.[110] In conjunction with the report, the Secretary-General also encouraged all states to agree to the Geneva Protocol and recommended that they work towards establishing a convention to ban the development, manufacture, stockpiling, and use of all chemical and biological agents.[111]

Although discussion continued, further progress on chemical disarmament remained elusive throughout the 1970s. There was no special working group dedicated to the subject and no joint draft text for states to conduct negotiations around. This made it difficult to advance any ideas for disarmament on the international stage.[112] It was not until 1980 that the UN Conference of Disarmament created a working group on chemical

[106] Bothe, "Convention on the Prohibition"; SIPRI, *CB Disarmament*, 28.
[107] SIPRI, *CB Disarmament*, 28.
[108] Ibid. 28
[109] Ibid.
[110] Ibid. 29
[111] Ibid.
[112] Bernauer, *A Guide to the Negotiations, 221*

weapons that was tasked with establishing a rolling text for a ban on such agents.[113] The basic structure of the rolling text was based on a draft submitted to the working group by the United States in 1984. A major area of contention in the draft over the next several years was the section on verification and challenge inspections. The United States insisted on an effective verification regime stating that it would "not accept…a ban without sound machinery of verification."[114] The original draft submitted by the US government in 1984 allowed for states party to request challenge verification inspections of another signatory at any time and in any location.[115] The verification mechanism would involve mandatory onsite inspections by an international body to ensure that the restrictions outlined in the CWC were being followed.[116] This proposal was met with significant opposition from the Soviet Union and its allies. They opposed the involvement of foreign personnel in their industrial establishments.[117] Instead, they argued for national control and verification rather than international oversight. Since the United States and other Western countries viewed national supervision as a nonstarter, this remained an obstacle to an international ban on chemical weapons throughout the 1980s.[118]

International interest in reaching an agreement was further spurred by Iraqi use of tabun and mustard gas against Iran and Kurdish populations.[119] In response to these events, a conference was assembled in Paris during January of 1989 to reaffirm the international community's stance against the use of chemical weapons. The gathering

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[113] "History," *OPCW*.
[114] "Chemical and Biological Weapons Chronology." Federation of American Scientists, accessed April 28, 2019, https://fas.org/nuke/control/bwc/chron.htm.
[115] Amber Teitt, *Public Policy in the United States: Chemical and Biological Warfare*, Roanoke College, 26
[116] Bernauer, *A Guide to the Negotiations*, 225
[117] Stockholm International Peace Research Institute, *CB Disarmament Negotiations,* 309
[118] Bernauer, *A Guide to the Negotiations*, 225
[119] "Iraq," Nuclear Threat Initiative, July 2015, https://www.nti.org/learn/countries/iraq/chemical/.

was attended by 149 countries and issued a declaration on the final day reiterating the participating states' commitment to not utilize chemical weapons and calling for renewed discussions on a global ban.[120]

However, with no international convention on the immediate horizon, several countries resorted to bilateral agreements restricting the use and possession of chemical agents in the early 1990s. The United States and the Soviet Union signed an agreement in 1990 outlining their joint intent:

> (a) to cooperate regarding methods and technologies for the safe and efficient destruction of chemical weapons;
> (b) not to produce chemical weapons;
> (c) to reduce their chemical weapons stockpiles to equal, low levels;
> (d) to cooperate in developing, testing, and carrying out appropriate inspection procedures; and
> (e) to adopt practical measures to encourage all chemical weapons-capable states to become parties to the multilateral convention.[121]

Two years after that agreement, the governments of India and Pakistan followed suit and issued a declaration agreeing not:

> (a) to develop, produce or otherwise acquire chemical weapons;
> (b) to use chemical weapons;
> (c) to assist, encourage or induce, in any way, anyone to engage in development, production, acquisition, stockpiling or use of chemical weapons.[122]

While an international ban on chemical weapons remained stalled on several fundamental disagreements regarding the extent of the ban and methods of verification, these bilateral agreements continued to reinforce the importance of eliminating chemical weapons to the

[120] AP, "Text of the Declaration From the Paris Conference of Chemical Weapons," New York Times, January 12, 1989, https://www.nytimes.com/1989/01/12/world/text-of-the-declaration-from-the-paris-conference-on-chemical-weapons.html.
[121] "Practice Relating to Rule 74. Chemical Weapons," International Committee of the Red Cross.
[122] Ibid.

international community. The agreement between the United States and the Soviet Union was especially significant as it demonstrated that the goal of chemical disarmament was an area of common ground that could unite even the often-opposed superpowers.[123] Negotiations on an agreement that would prohibit chemical warfare continued unabated throughout the 1980s and 1990s.

## CHEMICAL WEAPONS CONVENTION NEGOTIATIONS

Significant disagreements over the scope of such an international ban lingered. Some nations wanted to link chemical and nuclear disarmament.[124] Others, mainly countries without active chemical warfare programs, wanted assurances of aid in the event that they were subjected to a chemical attack. There were also reservations about the effect the verification measures would have on the chemical industry.[125] In an effort to prevent circumvention of military restrictions using civilian industries, negotiators proposed that commercial chemical companies also be subjected to reporting requirements and onsite inspections of their facilities. Although this was an important loophole to close, the proposal produced concern that the intrusiveness would stifle legitimate industry activity and place a large burden on companies.[126] There were also questions regarding the verification regime itself; most of the Western countries favored international verification with mandatory inspections but the Soviet-aligned nations

[123] Stockholm International Peace Research Institute, "The Destruction of Chemical Weapons and Chemical Warfare Agents," SIPRI, accessed April 22, 2019, https://www.sipri.org/publications/1990/destruction-chemical-weapons-and-chemical-warfare-agents.
[124] "History," OPCW.
[125] Ibid.
[126] U.S. Congress Office of Technology Assessment, *The Chemical Weapons Convention: Effects on the U.S. Chemical Industry* (Washington D.C.: U.S. Government Printing Office, August 1993).

preferred national control over the verification process.[127] Negotiators also had to establish what chemicals, precursors, and related technology would be regulated by the international ban.[128] In total, it took 12 years of negotiations to reach a convention text that had enough consensus to move forward.

The Conference on Disarmament adopted a draft of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction on September 3, 1992.[129] The agreement, more commonly referred to as the Chemical Weapons Convention (CWC), was opened for signature on January 13, 1993. During the three-day signing conference in Paris, 130 countries signed the agreement.[130] The signatories also passed the Paris Resolution, which created a Preparatory Commission to organize the first conference of state parties and address any unresolved negotiations. The Commission met 16 times before the CWC entered into force and resolved several issues that were outstanding when the Convention opened for signatures including handling administrative business, establishing procedures for verification inspections, creating deadlines for submitting the information of facilities requiring inspection, and giving recommendations for the frequency of inspections.[131] Some issues, such as instituting further guidelines for inspections and identifying the criteria to be used when assessing the properties of chemical compounds, still remained unresolved by the time the CWC entered into force but efforts to address them continued.[132] The Convention text stipulated that its entry into force would be at least 2

[127] Bernauer, *A Guide to the Negotiations,* 21-22.
[128] Ibid. 25.
[129] "Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction," United Nations, accessed November 22, 2018, https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVI-3&chapter=26&clang=_en.
[130] "History," OPCW.
[131] Preparatory Commission for the Organization for the Prohibition of Chemical Weapons, *Final Report*, April 15, 1997.
[132] Ibid.

years after being opened for signature and at least 180 days after ratification by the 65th state. Hungary became the 65th state to ratify the CWC on October 31, 1996, which meant that the Convention officially entered into force on April 29, 1997.[133]

The Chemical Weapons Convention was written with the intent of completely eliminating the use of chemical weapons in warfare and to prevent their proliferation.[134] The general obligations for the agreement are that:

> Each State Party to this Convention undertakes never under any circumstances:
> (a) To develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer, directly or indirectly, chemical weapons to anyone;
> (b) To use chemical weapons;
> (c) To engage in any military preparations to use chemical weapons;
> (d) To assist, encourage or induce, in any way, anyone to engage in any activity prohibited to a State Party under this Convention.[135]

Unlike previous agreements, which were primarily focused solely on restricting the use of chemical agents, the CWC also includes protocols for weapon destruction and production facility conversion, limitations on chemical precursors and related technology, restrictions on riot control agents, and a verification regime to confirm the State Parties are in compliance.[136] It also contains procedures for challenging states' compliance with the Convention, methods for addressing violations, and support measures for countries that have been subjected to chemical attacks.[137] Expanding upon the sentiments expressed in earlier attempts to restrict chemical warfare, the Chemical Weapons Convention looks to eliminate chemical weapons by regulating all aspects of their existence.

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[133] "History," OPCW.
[134] Ibid.
[135] *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*, September 3, 1992, Article I.
[136] "Convention on the Prohibition," United Nations.
[137] *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*, Article XII.

The CWC stands as one of the most widely acceded to international arms control treaties. Today, 193 countries are members of the Convention (see Appendix 3) and 98% of the world's population lives under its protection.[138] As of November 20, 2018, just over 96% of the world's declared chemical weapons have been destroyed under its auspices.[139] Despite the Convention's high membership and its success in eliminating declared weapons, it has also faced challenges, namely in its ability to ensure complete declaration and destruction of stockpiles, curb the use of chemical weapons by State Parties, and effectively oversee chemical weapons development and use on an international scale without jurisdiction over non-member states and non-state actors such as terrorist groups.

While most of the countries that have acceded to the Convention are in compliance with it, several high-profile incidents involving chemical agents in recent years have raised questions about the effectiveness of the CWC. Syria, which has been a CWC member state since 2013, has been credibly assessed to have employed chemical weapons against its citizens on multiple occasions over the past five years.[140] In February of 2017, the half brother of the North Korean leader died after being exposed to the nerve agent VX in what was alleged to have been an assassination attempt by the North Korean government, which is not a member state of the Convention.[141] Just over a year later, a former Russian military officer and his daughter were poisoned by the nerve agent Novichok in Salisbury, England. Three other people also became ill and one woman died

[138] "Mission," OPCW, accessed November 21, 2018, https://www.opcw.org/about-us/mission.
[139] Ibid.
[140] Daryl Kimball, "Timeline of Syrian Chemical Weapons Activity, 2012-2019," Arms Control Association, March 2019, https://www.armscontrol.org/factsheets/Timeline-of-Syrian-Chemical-Weapons-Activity.
[141] Heather Nauert, "Imposition of Chemical and Biological Weapons Control and Warfare Elimination Act Sanctions on North Korea," U.S. Department of State, March 6, 2018, https://www.state.gov/r/pa/prs/ps/2018/03/279079.htm.

after exposure to traces of the chemical in the surrounding area.[142] These incidents highlight the challenges faced by the CWC in eliminating the presence of chemical weapons around the world. There are still some countries that have not acceded to the Convention and even among the nations that have, it is clear that a small minority continue to stockpile and use chemical weapons. The incidents also raise important questions about why states comply or do not comply with the Chemical Weapons Convention. An understanding of what factors influence a state's compliance or noncompliance with the CWC could allow the international community to better limit chemical weapons proliferation, work toward the disarmament of countries with active programs, and possibly interrupt future occurrences of noncompliance.

[142] "Russian operatives carried out Salisbury chemical attack alleges UK; accusations part of 'post-truth world' asserts Moscow," UN News, September 6, 2018, https://news.un.org/en/story/2018/09/1018641.

# CHAPTER III – COMPLIANCE THROUGH CHEMICAL DISARMAMENT AND NONPROLIFERATION

## SECTION I – INTRODUCTION

The majority of the CWC is dedicated to defining prohibited activities and substances, outlining procedures for the dismantling of existing chemical weapons programs, and establishing methods of oversight to ensure states are following the restriction in the Convention. Articles I, II, III, IV, V, VI, IX, XI, and XII are all related to this purpose.[143] States that join the Convention are required to implement disarmament measures including destroying all stockpiled chemical weapons and dismantling all chemical weapons production facilities. They also agree to nonproliferation commitments such as prohibitions on the research, production, stockpiling, and use of chemical weapons.[144] As of May 2019, there are 193 states parties to the Convention, Israel has signed the Convention but not ratified it, and Egypt, South Sudan, and North Korea have not yet signed or ratified the CWC.[145] The majority of the countries that have acceded to the CWC have complied with the aspects of it relating to disarmament and nonproliferation.[146] This includes all of the states that had no chemical weapons programs prior to joining the CWC and most of the states that chemical warfare capabilities at some point in history. A small portion of the chemical states, primarily Russia and Syria, has not complied with disarmament and nonproliferation aspects of the Convention after

[143] *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*.
[144] "Chemical Weapons Convention," OPCW, accessed May 2, 2019, https://www.opcw.org/chemical-weapons-convention.
[145] "OPCW by the Numbers," OPCW, January 31, 2019, https://www.opcw.org/media-centre/opcw-numbers.
[146] James Martin Center for Nonproliferation Studies, "Country Profiles," NTI, accessed February 1, 2019, https://www.nti.org/learn/countries/.

acceding, however.[147] This chapter will focus on countries that have committed to the Convention and examine the factors that have influenced their decision to comply or not comply with the CWC since their accession.

## SECTION II – HYPOTHESES

Throughout this chapter, compliance with the CWC is defined as adherence by a state that has signed and ratified the Convention to the obligations regarding the research, production, and use of chemical weapons as outlined in the Convention. Noncompliance is determined to have occurred when a state that has signed and ratified the CWC fails to observe the guidelines for the research, production, and use of chemical weapons defined in the Convention.

*Hypothesis 1:* if a country has the resources to support a chemical weapons program, it will pursue such a program in violation of the CWC. If a country lacks the resources to support a chemical weapons program, it will comply with the aspects of the CWC relating to the research, production, and use of chemical weapons.

While chemical weapons are much more easily obtained than nuclear weapons, they still require resources to obtain. Resources come in two key forms: technical infrastructure and scientific knowledge.[148] First, a country needs to have the financial resources to purchase chemical equipment for manufacturing the agents, obtain precursor

[147] Ibid.
[148] Federation of American Scientists, "Chemical Weapons Production and Storage," accessed January 15, 2019, https://fas.org/programs/bio/chemweapons/production.html.

materials for use in the manufacturing process, and establish the infrastructure for storing the finished chemicals.[149]

Second, in addition to needing sources of funding for a chemical weapons program, a country also needs individuals who have the scientific knowledge to develop and oversee the production of chemical weapons. Although many compounds used as chemical weapons can be produced in relatively simple reactions, producing them on a sufficient scale to be used as weapons requires a solid understanding of chemistry and chemical engineering.[150] More advanced agents, such as nerve agents, necessitate even more sophisticated procedures including temperature controlled reactions and safeguards to protect against exposure to the deadly compounds. Even the simpler agents can pose technical challenges due to impurities. Impure substances have shorter shelf lives and are not as effective as pure agents. Optimizing the purity of a reaction typically requires sophisticated equipment and significant scientific understanding.[151] Therefore, a successful chemical weapons program involves a country having access to a workforce that has scientific skills and knowledge and therefore a developed system of higher education.

It is possible for a country to mitigate some of these resource requirements by purchasing entire chemical plants from foreign companies, sending its citizens to universities abroad if the domestic educational system is insufficient, or using impure chemical agents immediately instead of storing them. In general, however, a lack of technical and scientific resources poses a significant hurdle to countries looking to develop a chemical weapons program.[152] As a result, the absence of resources to support

[149] Ibid.
[150] Ibid.
[151] Ibid.
[152] Ibid.

a program would make signing the CWC relatively low-cost choice, since having a chemical warfare capability is not an option. The default assumption is that countries will pursue a chemical weapons program if they have the resources and will be unable to pursue a program if they do not. Of course, in practice, low resource countries also may not be interested in chemical weapons programs and, therefore, the absence of a program cannot distinguish whether it is due to capacity and resources or to will.

*Hypothesis 2:* if a country is facing significant threats to its security and survival, whether internal or external, it will pursue a chemical weapons program in violation of the CWC. In the absence of significant threats to security and survival, a country will comply with the aspects of the CWC relating to the research, production, and use of chemical weapons.

A country facing threats to its security and survival will pursue strategies to try to counter those threats. This could include developing a chemical weapons program to supplement a weak conventional military or as a deterrent against the use of chemical warfare by adversaries. Countries that are not facing such threats will not need to pursue those strategies. The default assumption is that countries will pursue a chemical weapons capability if they are threatened but will not pursue a program in the absence of threats.

*Hypothesis 3:* if a country is facing domestic pressure to obtain chemical warfare capabilities, it will pursue a chemical weapons program in violation of the CWC. If a country is facing domestic pressure to refrain from obtaining chemical warfare

capabilities, it will comply with the aspects of the CWC relating to the research, production, and use of chemical weapons.

Domestic pressures, whether public opinion, corporate or non-governmental organization lobbying, or influence from societal elites, play an important role in the adoption or lack of adoption of policies. If a country has domestic pressures advocating in favor of chemical weapons, the country will pursue a chemical warfare program in response to those pressures even in violation of the CWC. If a country has domestic pressures against the production and use of chemical weapons, it will therefore comply with the portions of the CWC relating to chemical warfare capabilities. The default assumption is that countries will surrender to domestic pressures regardless of their commitments to the CWC.

*Hypothesis 4:* if a country has existing domestic norms and values against chemical weapons, it will comply with the aspects of the CWC relating to the research, production, and use of chemical weapons. If a country has existing domestic norms and values in favor of chemical weapons, it will pursue a chemical weapons program in violation of the CWC.

A country more easily adopts international norms if there are already previously existing domestic attitudes or practices consistent with the norm. A country with historically established internal policies against chemical warfare or other weapons of mass destruction will sign and comply with the CWC's restriction on the production and use of chemical weapons because it is simply an international extension of practices that

have already been adopted domestically. A country with internal strategies supporting chemical weapons use will continue to pursue those programs in violation of the CWC. The default assumption is that countries will favor preexisting domestic practices over newly adopted international ones.

*Hypothesis 5:* if a country is facing external pressures from other countries or international organizations to obtain chemical warfare capabilities, it will pursue a chemical weapons program in violation of the CWC. If a country is facing external pressures from other countries or international organizations to refrain from obtaining chemical warfare capabilities, it will comply with the aspects of the CWC relating to the research, production, and use of chemical weapons.

External pressures, such as those from other countries or international organizations, play an important role a state's decision to adopt or not adopt policies. Concerns about reputational standing in the international community or among close partners can influence a state's decision to commit to or not commit to and comply with or not comply with international agreements.[153] If a country is facing external pressures from other states or international organizations that whose opinions are important to the country, such pressure will induce the country to sign and comply with the CWC. If a country is facing external pressures from important allies or international organizations to pursue or maintain a chemical weapons capability in violation of its commitment to the CWC, it will do so. The default assumption is that states will yield to external pressures regardless of the commitment they made to the CWC.

[153] Stein, "Compliance with International Law."

## SECTION II – COMMITMENT AND COMPLIANCE IN NON-CHEMICAL STATES

The vast majority of the world's counties have never had or pursued a chemical weapons program. Nearly all of these countries have signed the CWC, see Appendix 3, and remain in compliance with the program development and weapons use aspects of the agreement.[154] This section examines the group of states that historically have not had a chemical weapons program, have signed the CWC, and have not developed a program since acceding to the agreement. I examine four different countries: Saudi Arabia, Uzbekistan, Argentina, and Cameroon. These states were selected because they are representative of the other non-chemical countries that have signed the CWC. They span a range in terms of their wealth and economic development, are located in different regions around the globe, and have different structures of government. In selecting the case studies, I attempted to incorporate a wide range of wealth, location, and political structure to allow for the contrast of states within each category. The cases illustrate broad support for hypotheses 3, 4, and 5 and mixed results on hypotheses 1 and 2.

### SAUDI ARABIA

Saudi Arabia signed the CWC on January 20, 1993 and ratified it on August 9, 1996.[155] It maintains that it has never had a chemical weapons program and there is no open source evidence to suggest that had chemical warfare capabilities prior to or in the

[154] Kimball, "Chemical Weapons Convention Signatories and States-Parties."
[155] Ibid.

wake of its accession to the CWC. There is also no evidence that it intends to pursue such capabilities.[156]

Saudi Arabia has all of the major resources that would be required to pursue a chemical weapons program. It has significant financial resources including a $69.4 billion (US dollars) military budget in 2017.[157] In addition to sources of funding, Saudi Arabia has also invested heavily in higher education over the past decade. The country has 28 public universities and a growing private sector.[158] To supplement its indigenous higher education system, the state has sponsored the King Abdullah Scholarship Program since 2005, which provides funds for students studying at universities abroad.[159] Many students use the scholarship to pursue science, technology, math, and engineering degrees at top-ranked schools in the United States, China, India, and South Korea.[160] After obtaining their degrees, the students are obligated to return to Saudi Arabia for employment thereby contributing to the country's workforce.[161] Through its indigenous tertiary schools and the King Abdullah Scholarship, the Saudi education system is robust enough to generate graduates with the technical skills and expertise needed to sustain a chemical weapons program. The country is already able to support large chemical industries surrounding petroleum production and agriculture.[162]

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[156] "Saudi Arabia," Nuclear Threat Initiative, August 2015, https://www.nti.org/learn/countries/saudi-arabia/delivery-systems/.
[157] Stockholm International Peace Research Institute, "Global Military Spending Remains High at $1.7 Trillion," SIPRI, May 2, 2018, https://www.sipri.org/media/press-release/2018/global-military-spending-remains-high-17-trillion.
[158] ICEF, "Saudi Arabia's Expanding Higher Education Capacity," ICEF Monitor, July 18, 2018, http://monitor.icef.com/2018/07/saudi-arabias-expanding-higher-education-capacity/.
[159] Ibid.
[160] Yousef Almutariri, Karla Perez-Velez, Tamara Yakaboski. "Collectivists' Decision-Making: Saudi Arabian Graduate Students' Study Abroad Choices." *Journal of International Students* 7, no. 1 (2017): 95; ICEF. "Demand for STEM Programming Continues to Increase; Countries Race to Meet it." ICEF Monitor, November 30, 2012, http://monitor.icef.com/2012/11/demand-for-stem-continues-to-increase/
[161] Almutariri, "Collectivists' Decision-Making," 95
[162] Central Intelligence Agency, "Saudi Arabia," The World Factbook, April, 15, 2019. https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html.

Saudi Arabia also has resources in existing military infrastructure that could be utilized in a chemical weapons program. In the late 1980s, Saudi Arabia obtained a limited arsenal of CSS-2 ballistic missiles from China. The CSS-2 missiles were originally designed to carry nonconventional payloads but were modified for use with conventional warheads before being delivered to Saudi Arabia.[163] There is also reporting suggesting that Saudi Arabia obtained more advanced CSS-5 ballistic missiles from China in the mid-2000s that were similarly modified to carry conventional payloads before delivery.[164] Although altered in design, Saudi Arabia has ballistic missile technology that was originally designed for use with unconventional payloads, which could give them a potential delivery system if it chose to pursue a chemical weapons program. Therefore, given the elements outlined above, Saudi Arabia's choice to sign the CWC and remain in compliance by not pursue a chemical weapons program must be rooted in factors beyond the availability of resources.

The Saudi security environment appears not to provide answers, either. Saudi Arabia is located in an unstable and conflict-prone region of the world. In 2017, the Middle East had the highest average military spending as a portion of gross domestic product (GDP) with a value of 5.2%. For comparison, no other world region expended more than 1.8% of its GDP on military endeavors.[165] This discrepancy highlights the continuing security threats faced by countries within the Middle East. In addition to being located in a region with significant military buildup, many of Saudi Arabia's neighbors are states that have confirmed or alleged chemical weapons activity. Syria, Iraq, Iran, Egypt, Sudan and Israel are all assessed to have had an active chemical weapons program

[163] "Saudi Arabia," Nuclear Threat Initiative.
[164] Jeff Stein, "The CIA was Saudi Arabia's Personal Shopper," Newsweek, January 31, 2014.
[165] Stockholm International Peace Research Institute, "Global Military Spending Remains High."

at some point in time.[166] Furthermore, Egypt and Israel are not parties of the Chemical Weapons Convention and are therefore not bound by the regulations of the agreement.[167] Saudi Arabia's decision not to pursue a chemical weapons program in the face of regional conflict and similar programs in neighboring states indicates that either it is confident in its abilities to counter unconventional warfare through more traditional means or that security concerns are not driving its decision making in regards to chemical weapons. Saudi Arabia has one of the largest military budgets in the world and the largest in the Middle East by over $50 billion US dollars.[168] It also has the backing of powerful countries such as the United States.[169] Therefore, Saudi Arabia likely feels that developing chemical weapons is not necessary to prevent other countries from engaging in chemical warfare against it; its conventional military might and the support of its western allies is enough of a deterrent.

In terms of internal threats, Saudi Arabia is relatively stable. The last attempted coup against the Saudi regime was in 1969, and the current structure of the military, with the security forces divided under the authority of several different members of the royal family, would make organizing another coup difficult.[170] Since the 1990s, the domestic environment has been characterized by anxiety over terrorist threats, economic sluggishness, and the possibility of civil unrest as seen in other countries in the region.[171] Saudi leaders have maintained a tight control on activism and dissent during this

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[166] James Martin Center for Nonproliferation Studies, "Country Profiles," Nuclear Threat Initiative, accessed February 1, 2019, https://www.nti.org/learn/countries/.
[167] "Israel," Nuclear Threat Initiative, July 2017. https://www.nti.org/learn/countries/israel/.; "Egypt," Nuclear Threat Initiative, September 2015. https://www.nti.org/learn/countries/egypt/.
[168] Craig Caffrey, "Saudi Arabia Cuts Defence Budget," Jane's Defence Weekly, December 19, 2018, https://www.janes.com/article/85323/saudi-arabia-cuts-defence-budget.
[169] U.S. Department of State, "U.S. Relations with Saudi Arabia," U.S. Department of State, August 7, 2018, https://www.state.gov/r/pa/ei/bgn/3584.htm.
[170] Helia Ighani, Paul B. Stares. "How Stable is Saudi Arabia?" Council on Foreign Relations, May 15, 2017, https://www.cfr.org/expert-brief/how-stable-saudi-arabia. (accessed February 2, 2019).
[171] Christopher M. Blanchard, *Saudi Arabia: Background and U.S. Relations*, Congressional Research Service, September 21, 2018, 5.

period.[172] Through such crackdowns, state investment in the economy, and, more recently, social reforms, the ruling family has been able to avoid the uprisings seen in neighboring countries during the Arab Spring.[173] Succession within the royal family has the potential to become a flashpoint for internal conflict, but the Allegiance Council, an assembly consisting of senior members of the Al Saud family, has endorsed all transition changes since its creation signifying that the likelihood of unrest over succession is low.[174] All of these factors indicate that Saudi Arabia's decision to forgo developing a chemical weapons program is not based on external or internal threats to security or survival.

Although there is not much information readily available on the domestic pressures regarding chemical weapons within Saudi Arabia, available information suggests that there are not significant pressures either for or against developing chemical warfare capabilities from key constituencies. Saudi Arabia has so far refrained from pursuing WMDs and has consistently advocated for a WMD-free zone in the Middle East in an effort to prevent its regional rival Iran from obtaining nuclear weapon capabilities; however, its officials have not expressly ruled out pursuing such avenues in the future.[175] For example, Saudi Arabia raised complaints with the United Nations Secretary-General over Egypt's use of poison gas in Yemen in the 1960s.[176] Saudi press statements and a statement by Major General Salah El-Din Salim in the late 1980s and early 1990s,

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[172] Ibid.
[173] Talk of the Nation, "How the Arab Spring Affects Saudi Society," NPR, June 7, 2011, https://www.npr.org/2011/06/07/137036450/how-the-arab-spring-affects-saudi-society.
[174] Blanchard, *Saudi Arabia*, 7.
[175] Prince Turki Al Faisal, "The Proposed WMD-Free Zone Proposed in the Middle East: A Saudi Perspective," *A WMD-Free Zone in the Middle East: Regional Perspectives*, Belfer Center for Science and International Affairs, November 2013, 35; "Saudi Arabia," Nuclear Threat Initiative.
[176] W. Seth Carus. "Chemical Weapons in the Middle East," *Policy Focus* No. 9, The Washington Institute for Near East Policy, December 1988, 2-3.

however, expressed approval of Arab states obtaining chemical warfare capabilities.[177] More recently, Saudi Arabia has loudly condemned the recent uses of chemical weapons in Syria and called for a stronger international response to the infractions. A similar trend can be seen with nuclear weapons. Saudi officials have called for the elimination of nuclear weapons in the Middle East but have also not removed the potential for developing their own program.[178] Saudi Arabia has warned it will pursue nuclear capabilities if Iran develops nuclear weapons.[179] These statements suggest that there are not currently strong domestic pressures towards or against proliferation within in the country. Therefore, domestic pressures are not likely playing a significant role in Saudi Arabia's compliance with the CWC at this time.

Although Saudi Arabia had no domestic laws prohibiting the production and presence of chemical weapons within the country prior to acceding to the CWC in 1996, its consistent support for a WMD-free zone in the Middle East since it was proposed by Egypt in 1990 suggests that there were at least some preexisting domestic norms against chemical weapons.[180] Even prior to its support for a WMD-free zone, Saudi Arabia also backed the joint Iranian and Egyptian proposal for a nuclear weapons-free zone in the Middle East in 1974.[181] This historical pattern of support for disarmament indicates that the Saudi decision to sign and comply with research, production, and use portions of the CWC could have been influenced by historically constructed domestic norms.

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[177] Dany Shoham, "Does Saudi Arabia Have or Seek Chemical or Biological Weapons?" *Nonproliferation Review*, Spring-Summer 1999: 123.
[178] Frederic Wehrey, "What's Behind Saudi Arabia's Nuclear Anxiety?" Carnegie Endowment for International Peace, December 17, 2012, https://carnegieendowment.org/2012/12/17/what-s-behind-saudi-arabia-s-nuclear-anxiety-pub-51111.
[179] "Saudi Arabia," Nuclear Threat Initiative.
[180] Hossam Eldeen Aly, "A Middle Eastern WMD-Free Zone: Objectives and Approaches of Arab States," Arms Control Association, accessed April 30, 2019, https://www.armscontrol.org/act/2012_04/A_Middle_Eastern_WMD-Free_Zone_Objectives_and_Approaches_of_Arab_States.
[181] Prince Turki Al Faisal, *A Political Plan for a Weapons of Mass Destruction-Free Zone (WMDFZ) in the Middle East,* Belfer Center for Science and International Affairs, July 2013.

Saudi Arabia is a member of the Arab League, a confederation of 22 Arab states founded in 1945 with the mission to promote collaboration on matters of common interest.[182] The Arab League as a whole has strongly advocated for a WMD-free zone in the Middle East. At the 1995 Nuclear Non-Proliferation Treaty (NPT) Review and Extension Conference, it pushed for and achieved the adoption of a resolution that called for steps to be taken to establish a WMD-free zone.[183] In 2010, after no action was taken, it threatened to derail the 2010 NPT Review Conference unless the international community, specifically the United States, Russia, and Britain, agreed to a conference to discuss a plan of action for creating a Middle Eastern zone free of WMDs. When the conference was postponed, the Arab League once again threatened to hold the NPT Review Conference consensus hostage unless the WMD-free zone conference was rescheduled.[184] Given Saudi Arabia's membership in the Arab League and the League's continuing efforts to prohibit the presence and use of WMDs in the Middle East, it is likely that Saudi Arabia would have felt pressure from the other states in the confederation to oppose the development and use of chemical weapons.

Saudi Arabia is also a party to the Biological Weapons Convention (BWC), which is a treaty that entered into force in 1975 and outlaws the use of biological weapons.[185] It signed and ratified the BWC in 1972. Article IX of the BWC states that,

[182] CNN Library, "Arab League Fast Facts," CNN, March 25, 2019, https://www.cnn.com/2013/07/30/world/meast/arab-league-fast-facts/index.html.
[183] Martin B. Malin, Steven E. Miller, "Introduction: A WMD-Free Zone in the Middle East, From the Outside Looking In," *A WMD-Free Zone in the Middle East: Regional Perspectives*, Belfer Center for Science and International Affairs, November 2013: 1.
[184] Ibid.
[185] Daryl Kimball, "Biological Weapons Convention (BWC) at a Glance," Arms Control Association, September 2018, https://www.armscontrol.org/factsheets/bwc.

> Each State Party to this Convention affirms the recognised objective of effective prohibition of chemical weapons and, to this end, undertakes to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling and for their destruction, and on appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapons purposes.[186]

Although unenforceable, this article was included to encourage states to continue working towards a treaty prohibiting chemical weapons. Saudi Arabia's accession to the BWC could have placed pressure on the country to also accede to the CWC.

Given the evidence outlined above, the case of Saudi Arabia best illustrates hypotheses 4 and 5. Saudi Arabia's backing of a Middle Eastern nuclear-free zone since the 1974 and a WMD-free zone since 1990 indicates that it likely had domestic norms opposing the acquisition of weapons of mass destruction, including chemical weapons, prior to acceding to the CWC. This supports the argument in hypothesis 4 that countries with preexisting norms against chemical weapons will sign and comply with the aspects of the CWC covering research, development and use of chemical weapons. In terms of hypothesis 5, Saudi Arabia's membership in the Arab League and its ratification of the BWC would constitute external pressures against the development of a chemical weapons program. It is therefore consistent with that hypothesis that Saudi Arabia has signed and complied with the research, production, and use aspects of the CWC. The case of Saudi Arabia directly contradicts hypothesis 1. Although it has the resources to support a

[186] "Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction," United Nations Office for Disarmament Affairs, accessed April 30, 2019, http://disarmament.un.org/treaties/t/bwc/text.

chemical weapons program, the Saudis have not yet pursued one. This case also contradicts hypothesis 2. Saudi Arabia is located in a region with significant unrest but has not developed chemical warfare capabilities in violation of its commitment to the CWC. This could be because Saudi Arabia feels that the threats it currently faces to its security can be handled with its conventional military and the support of its Western allies. Therefore, while Saudi Arabia faces threats to its security, they may not be threatening enough to push it to resort to chemical weapons to address them. Hypothesis 3 does not apply to Saudi Arabia, as it does not face domestic pressures specifically for or against chemical weapons.

## UZBEKISTAN

Uzbekistan signed the CWC on November 24, 1995, four years after gaining its independence during the dissolution of the Soviet Union in 1991.[187] It ratified the treaty eight months later on July 23, 1996.[188] Although Uzbekistan is assessed to have never had a chemical weapons program, it inherited chemical weapons infrastructure from the Soviet Union when it gain its independence.[189] The Chemical Research Institute, located in Nukus, Uzbekistan, was a research and testing site for the Soviet chemical weapons program. According to a Soviet defector who worked in the chemical weapons program, the Chemical Research Institute was used to synthesize and test batches of nerve

[187] Central Intelligence Agency, "Uzbekistan," The World Factbook, April, 10, 2019, https://www.cia.gov/library/publications/the-world-factbook/geos/uz.html.; Kimball, "Chemical Weapons Convention Signatories and States-Parties."
[188] Kimball, "Chemical Weapons Convention Signatories and States-Parties."
[189] "Uzbekistan," Nuclear Threat Initiative, May 2015, https://www.nti.org/learn/countries/uzbekistan/.

agents.[190] After Uzbekistan joined the CWC, it began efforts to decontaminate and dismantle this facility. With the assistance of the United States, the Chemical Research Institute had been completely taken apart by 2002.[191]

Throughout the 1990s and 2000s, Uzbekistan faced economic adversity as it transitioned to an independent economy and Soviet-style welfare programs collapsed. The period saw high inflation and partial de-industrialization in Uzbekistan and the larger region.[192] Since the country's independence, the World Bank has labeled Uzbekistan as either a "low-income economy" or a "lower-middle income economy."[193] Military spending as a percentage of the country's GDP has been decreasing since a high of 1.6% in 1999. In 2003, the last year for which there is data, the amount was down to 0.5% of the GDP.[194] Given the stagnant economy and limited spending on military endeavors, it is unlikely Uzbekistan has the financial resources to support a significant chemical weapons program. In addition to lacking sources of funding, Uzbekistan has struggled to modernize and expand its higher education system.[195] In 2014, there were only enough spots at the tertiary level for 1 out of every 10 secondary school graduates.[196] Due to the limited access and resources to higher education within the country, it is unlikely that Uzbekistan would have the technical knowledge or skills needed to research and develop a chemical weapons program.

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[190] Judith Miller, "U.S. and Uzbeks Agree on Chemical Arms Plant Cleanup," The New York Times, May 25, 1999.
[191] "Uzbekistan," Nuclear Threat Initiative.
[192] Uuriintuya Batsaikhan, Marek Dabrowski, "Central Asia – Twenty-Five Years After the Breakup of the USSR," *Russian Journal of Economics* 3, no. 3, September 2017: 296-320.
[193] SIPRI, "SIPRI Military Expenditure Database," SIPRI, accessed on March 12, 2019, https://www.sipri.org/databases/milex.
[194] Ibid.
[195] "Tertiary Education in Uzbekistan – Meeting 21st Century Challenges," The World Bank, September 2, 2014, http://www.worldbank.org/en/news/feature/2014/09/02/tertiary-education-in-uzbekistan-meeting-21st-century-challenges.
[196] Ibid.

Based on the elements outlined above, Uzbekistan lacks the financial and technical resources needed to support the independent development of a chemical weapons program, however, inherited infrastructure from the Soviet Union could have helped jumpstart such a program.[197] Although the Chemical Research Institute would have been a significant asset for Uzbekistan if it had decided to pursue a chemical weapons program, the facility likely would not have been enough to overcome the resource deficits the country faces in terms of funding or technical expertise; given its limited higher education opportunities and low military spending, Uzbekistan would likely have difficulty staffing the facility and procuring the materials needed to conduct research. Therefore, Uzbekistan's decision to sign the CWC, remain in compliance with the agreement, and refrain from developing a chemical weapons program could have been influenced by its lack of resources to sustain such a program.

Uzbekistan resides in a region that has experienced turmoil in the wake of the Soviet breakup due to ethnic, religious, and political tensions.[198] The division of territory and resources has led to disputes with all of its neighbors throughout the past several decades.[199] While disagreements have been frequent amongst the former Soviet republics since their independence, Uzbekistan is considered one of the region's major military powers and therefore would not need an unconventional program such as chemical weapons to supplement its conventional military strength.[200]

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[197] "Uzbekistan," Nuclear Threat Initiative.
[198] Uuriintuya Batsaikhan, "Central Asia"
[199] Fiona Hill, "The United States and Russia in Central Asia: Uzbekistan, Tajikistan, Afghanistan, Pakistan, and Iran," Brookings, August 15, 2002, https://www.brookings.edu/on-the-record/the-united-states-and-russia-in-central-asia-uzbekistan-tajikistan-afghanistan-pakistan-and-iran/.
[200] Jim Nichol, *Uzbekistan: Recent Developments and U.S. Interests*, Congressional Research Service, August 21, 2013, 13-14.

Internally, Uzbekistan is an authoritarian state with a highly centralized political system.[201] It has faced domestic threats from terrorists and militants. This has led to crackdowns on Muslims and political opponents, which has, in turn, has increased support for extremist groups. [202] Despite such threats, the government has remained in control and been able to avoid much of the turmoil that has overturned governments in neighboring Kyrgyzstan and Tajikistan.[203] It seems unlikely that Uzbekistan would use chemical weapons to counter domestic instability when conventional methods have been sufficient.

Although there is unrest in the Central Asian region, there is low risk of chemical warfare. None of Uzbekistan's neighbors have had active chemical weapons programs since their independence from the Soviet Union and all are parties to the CWC.[204] Consequently, Uzbekistan does not face a direct threat of chemical weapons use in any of its conflicts. The state's decision to not pursue a chemical weapons capability and instead commit to and comply with the CWC is contrary to the presence of internal and external threats but may be explained by the lack of chemical weapons in the region and the ability to handle current threats using conventional means.

Through the Nunn-Lugar Cooperative Threat Reduction Program, which allowed the United States to allocate funding and resources to secure and destroy WMDS and related infrastructure in former Soviet states, the United States assisted Uzbekistan with the dismantling and decontamination of the Chemical Research Institute among concerns

[201] Central Intelligence Agency, "Uzbekistan."
[202] Hill, "The United States and Russia in Central Asia."
[203] "Central Asia: A Different Kind of Threat." Stratfor. January 1, 2016, https://worldview.stratfor.com/article/central-asia-different-kind-threat.
[204] James Martin Center, "Country Profiles."

for public and environmental health.[205] When speaking about the decision to give up the facility, military and public officials highlighted the damage that testing chemical weapons had inflicted on the areas surrounding the test site including an incident in 1988 where thousands of antelope were killed after the winds shifted during open air testing.[206] This emphasis on contamination illustrates the domestic pressures faced by leaders to eliminate all remnants of a program that had become unpopular in the country due to Soviet mismanagement and improper disposal of chemical waste.[207] The Chemical Research Institute is situated in the Aral Sea delta, which is already facing a severe environmental and health crisis due to pesticide use and water diversion during Soviet agricultural practices in the 1960s.[208] Local populations feared that the abandoned chemical weapons facility could further exacerbate those problems by contaminating the surrounding environment.[209] Even if Uzbekistan had the resources to support a chemical weapons program, domestic opinion regarding the Soviet program would have presented a challenge to developing their own chemical weapons. It is likely that domestic pressures played a role in Uzbekistan's decision to eliminate its inherited chemical weapons infrastructure and comply with the CWC.

Uzbekistan signed the CWC four years after its independence.[210] There is no evidence of domestic laws regarding chemical weapons during that time, and it is unlikely that the state was able to develop other significant domestic practices against

[205] "Uzbekistan," Nuclear Threat Initiative.; Justin Bresolin, Brenna Gautam, "Fact Sheet: The Nunn-Lugar Cooperative Threat Reduction Program." The Center for Arms Control and Non-Proliferation, June 2014, https://armscontrolcenter.org/fact-sheet-the-nunn-lugar-cooperative-threat-reduction-program/.
[206] Miller, "U.S. and Uzbeks Agree."
[207] Ibid.
[208] "The Aral Sea Crisis," Columbia University, accessed April 30, 2019, http://www.columbia.edu/~tmt2120/introduction.htm.
[209] Beatrice Hogan, "Uzbekistan: U.S. Begins Survey of Chemical Weapons Plant," Radio Free Europe/Radio Liberty, August 9, 1999, https://www.rferl.org/a/1091987.html.
[210] Kimball, "Chemical Weapons Convention Signatories."

chemical weapons in such a short period. Therefore, signing the CWC and subsequent compliance likely do not stem from existing domestic norms.

While Uzbekistan is a member of the BWC, it did not accede to the treaty until January 11, 1996.[211] Therefore, its ratification of the biological weapons treaty is unlikely to have influenced the signing of the CWC in November of 1995 but could have placed external pressure on the country to accede to the CWC and remain in compliance. In addition to its signing of the BWC, Uzbekistan is also a member of several international organizations that could have placed pressure on it to forgo the development and use of chemical weapons. Uzbekistan signed a Partnership for Peace cooperation agreement with the North Atlantic Treaty Organization (NATO) on July 13, 1994.[212] The Partnership for Peace Program provides the opportunity for non-member states to enter bilateral cooperation agreements with NATO on areas of priority for the non-member state.[213] At the time that Uzbekistan signed its agreement, all of the NATO member states had signed the CWC. This may have influenced Uzbekistan's decision to sign and comply with the CWC in an effort to further ties with the organization. Uzbekistan also joined the Conference on Security and Co-operation in Europe (CSCE), now the Organization for Security and Co-operation in Europe, in 1992.[214] The CSCE was designed to address security through politico-military, economic and environmental, and human aspects.[215] When Uzbekistan joined the CSCE, nearly all of the existing members had signed the CWC.[216] Given that one of the CSCE's areas of focus is arms control,

[211] Kimball, "Biological Weapons Convention"
[212] "Signatures of Partnership for Peace Framework Document," North Atlantic Treaty Organization, January 10, 2012, https://www.nato.int/cps/en/natolive/topics_82584.htm.
[213] "Partnership for Peace Programme," North Atlantic Treaty Organization, June 7, 2017, https://www.nato.int/cps/en/natohq/topics_50349.htm#.
[214] "History," Organization for Security and Co-operation in Europe, accessed May 1, 2019, https://www.osce.org/history.
[215] "History," Organization for Security and Co-operation in Europe.
[216] Kimball, "Chemical Weapons Convention Signatories."

Uzbekistan likely felt pressure to sign and comply with the CWC as part of its involvement in the CSCE.[217]

The case of Uzbekistan is an example of hypotheses 1, 3, and 5. Although it inherited chemical infrastructure from the Soviet Union, Uzbekistan lacks the resources to support a program on its own. Consistent with hypothesis 1, the state has not pursued chemical warfare capabilities. Hypothesis 3 addressed the role that domestic pressures play in a state's compliance with the CWC. Uzbekistan faces domestic pressure against the presence of chemical weapons and, as outlined in hypothesis 3, has accordingly not pursued an indigenous program. Uzbekistan's accession to the BWC and its involvement with the Partnership for Peace Program and the CSCE likely placed external pressure on the country to sign the CWC and comply with the aspects of it relating to research, production, and use of chemical weapons. This supports the argument in hypothesis 5 since, in the presence of external pressure to sign and comply with the CWC from its accession to the BWC and involvement with the Partnership for Peace Program and the CSCE, Uzbekistan has done so. In the instance of hypothesis 2, Uzbekistan faces some internal and external threats to its security and therefore would be expected to have pursued chemical weapons capabilities. Because it has not, this is a contradiction of hypothesis 2. However, given that it has been able to address all of its threats using conventional means and none of the countries in the region are known to have active chemical weapons programs, it is possible that the threats faced by Uzbekistan have not risen to the level that would cause it to feel as though it needed chemical weapons to confront them. The fourth hypothesis does not apply in this case, as there is not any

[217] "History," Organization for Security and Co-operation in Europe.

evidence that Uzbekistan had developed domestic practices either in favor of or against chemical weapons in the time between its independence and its signing of the CWC.

## ARGENTINA

Argentina signed the CWC on January 13, 1993 and acceded on October 2, 1995.[218] There is no open source evidence to suggest that it had an active chemical weapons program prior to signing the CWC. There is also no indication that Argentina has sought to obtain chemical warfare capabilities since its accession to the Convention.[219]

Argentina has the resources required to support a chemical weapons program. Although it is not as well-off as it was a century ago when it ranked among the world's wealthiest countries, reforms and international reintegration have undone some of the economic stagnation that occurred during the early 2000s.[220] It has a robust chemical industry that makes up approximately 10% of the country's manufacturing revenue.[221] This means it likely has the skilled workforce and the infrastructure to support a chemical weapons program. Argentina also has a highly literate population and the average number of years spent in school for Argentines is 18 years indicating that a significant portion of the population receives at least some tertiary education.[222] Argentina's military spending peaked at 4.719% of its GDP in 1978 just two years after a coup d'état installed a military junta. Since that point, its military expenditure has been on the decline until it leveled out

[218] Kimball, "Chemical Weapons Convention Signatories."
[219] "Argentina," Nuclear Threat Initiative, April 2015, https://www.nti.org/learn/countries/argentina/.
[220] Central Intelligence Agency, "Argentina," The World Factbook, April 20, 2019, https://www.cia.gov/library/publications/the-world-factbook/geos/ar.html.
[221] Claudio Delpino, M. Soledad Diaz, "Challenges and Opportunities for the Chemicals Industry in Argentina," American Institute of Chemical Engineers, February 2014.
[222] Central Intelligence Agency, "Argentina."

at around 1% of the country's GDP in the early 2000s.[223] Although its military spending has decreased in recent years, it would have had sufficient financial resources throughout the 1970s and 1980s to invest in a chemical weapons program if interested. Given the factors outlined above, Argentina's decision to sign the CWC and remain in compliance with its restrictions on chemical weapons programs is not due to a lack of resources to support such a program.

Argentina faces relatively few external security threats although it has historically had a regional rivalry with Brazil.[224] The two countries have avoided military conflict since 1828 but have continually vied for economic and political influence in the region. Since both states transitioned to democratically elected presidents in the 1980s, tension between the countries has diminished and remains low.[225]

While Argentina has encountered few external threats, it experienced internal turmoil due to political unrest throughout the 1900s and early 2000s.[226] The period was characterized by a series of coups leading to periods of military rule.[227] Although there has been conflict throughout the past several decades, the political instability and frequent changes in leadership would have made developing a chemical weapons program to counter the unrest difficult. Additionally, none of the countries in the region have had a chemical weapons program, so Argentina does not face the threat of chemical warfare in conflict with any of its neighbors. This means that Argentina does not face any

[223] "Military Expenditure (% of GDP)," The World Bank, 2017, https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS?locations=AR&view=chart.
[224] Julio C. Carasales, *National Security Concepts of States: Argentina*, United Nations Institute for Disarmament Research, 1992.
[225] Ibid.
[226] "Argentina Profile – Timeline," BBC News, May 4, 2018, https://www.bbc.com/news/world-latin-america-18712378.
[227] Ibid.

external or internal threats that would lend themselves to the use of chemical warfare and so its decision to comply with the CWC is in line with that.

Domestic pressures solidified against chemical weapons following the extended periods of military rule in Argentina and the larger South American region throughout the 1970s and 1980s. The civilian-led government that came to power in Argentina in 1983 was concerned that the military retained too much influence and independence in the country.[228] In the late 1980s, Brazil's government disclosed the existence of a clandestine effort by Brazil's military to pursue nuclear weapons when it was in power. This disclosure further amplified concerns within Argentina that an unchecked Argentine military could similarly pursue weapons of mass destruction.[229] Anti-chemical weapons sentiment grew out of these concerns as a way to further restrict the influence and scope of the military.[230]

In 1991, two years before the CWC opened for signature, Argentina, Brazil, and Chile signed the Mendoza Agreement, which banned the production and use of chemical weapons within those countries.[231] The agreement was a continuation of efforts to reduce military influence in the region. Argentina, plagued by a struggling economy at the time, implemented the most extreme demilitarization in an attempt to stabilize its domestic affairs.[232] Therefore, it is unlikely that domestic pressures would allow Argentina to pursue an endeavor that would increase the power and scope of the military such as developing a chemical weapons program. The pressure to demilitarize the country after

[228] Nathaniel C. Nash, "3 Latin Nations Agree to Ban Chemical Weapons," The New York Times, September 6, 1991.
[229] Ibid.
[230] Ibid.
[231] *Mendoza Agreement*, September 5, 1991.
[232] Nash, "3 Latin Nations Agree to Ban Chemical Weapons."

several decades of intermittent military rule played a large role in committing to and complying with the CWC.

Argentina's participation in the Mendoza Agreement in 1991 also illustrates that even before the CWC entered into force, the state was interested in taking steps to prohibit the production and use of chemical weapons regardless of the actions of the international community. Argentina is also a member-state of the BWC and the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean.[233] Although these agreements focus on the prohibition of biological and nuclear weapons, they demonstrate a commitment to broader goals of WMD disarmament and nonproliferation. In this manner, Argentina's signing of the CWC and compliance with the regulations on chemical warfare can be seen as a continuation of these domestic policies.

Argentina is a member of several international organizations and treaties that could have resulted in external pressure to join the CWC. It signed the BWC in 1972 and ratified it in 1979.[234] The ratification of the BWC, with its emphasis on continuing efforts to negotiate a ban on chemical weapons, could have placed external pressure on Argentina to sign the CWC upon its open for signature in January 1993. Argentina also joined the Australia Group in 1993.[235] The Australia Group is a cooperative arrangement that seeks to limit the risk of chemical and biological weapon proliferation through controlled exports of participating countries. Although there are no legally binding obligations associated with the group, its objective is to prevent the spread of chemical

[233] "Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction," United Nations Office for Disarmament Affairs.; "Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (LANWFZ) (Tlatelolco Treaty)," Nuclear Threat Initiative, April 29, 2019, https://www.nti.org/learn/treaties-and-regimes/treaty-prohibition-nuclear-weapons-latin-america-and-caribbean-lanwfz-tlatelolco-treaty/.
[234] Kimball, "Biological Weapons Convention"
[235] "The Australia Group: An Introduction," The Australia Group, accessed May 1, 2019, https://australiagroup.net/en/introduction.html.

and biological agents. In light of this aim, Argentina's membership likely placed pressure on it to ratify the CWC and remain in compliance.

The case of Argentina supports hypotheses 2, 3, 4, and 5. Although there have been periods of unrest within the country over the past century, Argentina is situated in a region with no known chemical weapons programs and the effectiveness of its military, which was responsible for several coups during the decades of political turmoil, made pursuing unconventional weapons unnecessary. The lack of threats that could not be countered by more conventional means and Argentina's decision to comply with the CWC's restrictions on the development and use of chemical weapons is consistent with hypothesis 2. Domestic pressures to demilitarize, including to commit to agreements prohibiting the use of chemical weapons, after the decades of strong military presence within the country is aligned with the argument in hypothesis 3. Similarly, Argentina's existing domestic practices against chemical warfare and its later adoption and compliance with the CWC match the outline of hypothesis 4. In terms of hypothesis 5, Argentina's accession to the BWC and its involvement in the Australia Group likely placed pressure on it to sign and comply with the CWC. This supports the argument in hypothesis 5 that a country facing external pressure to ratify and abide by the CWC will do so. The example of Argentina is a contradiction of hypothesis 1, however. Although Argentina possesses the resources to support a chemical weapons program, it has never pursued one.

# CAMEROON

Cameroon signed the CWC on January 14, 1993, the day after it opened for signature. It ratified the Convention on September 16, 1996.[236] There is no information to suggest that Cameroon had a chemical weapons program before its signature or that it has pursued such as program since that point.[237]

Cameroon does not have the resources needed to sustain a chemical weapons program. Although its economy has grown in recent years, it is still facing issues with stagnant income, wealth inequality, corruption, and an economy that mainly based around oil production.[238] The result is that poverty has been a persistent issue over the last couple decades. In 2001, 40.2% of the population fell below the national poverty line. That number had reduced to 39.9% by 2007 and 37.5% in 2014.[239] Given the economic difficulties that Cameroon has been facing for the past several decades, it is unlikely that it would have the financial resources to support a chemical weapons program. In addition to facing economic hardship, Cameroon's major industries are primarily organized around processing various agricultural products; the chemical industry is not considered to be a major contributor to the country's economy.[240]

Cameroon faces educational difficulties as well. Only around 75% of its population is literate and less than 20% of students enroll in tertiary school.[241] This means that it likely does not have a workforce with the technical skills and scientific

[236] Kimball, "Chemical Weapons Convention Signatories."
[237] James Martin Center, "Country Profiles."
[238] Central Intelligence Agency, "Cameroon," The World Factbook, April 19, 2019, https://www.cia.gov/library/publications/the-world-factbook/geos/cm.html.
[239] World Bank Group, "Cameroon," Poverty & Equity Brief, April 2019.
[240] The Editors of Encyclopaedia Britannica, "Cameroon," Encyclopaedia Britannica, accessed February 10, 2019, https://www.britannica.com/place/Cameroon/Manufacturing.
[241] UNESCO Institute of Statistics, "Cameroon," United Nations Educational, Scientific and Cultural Organization, accessed February 10, 2019, http://uis.unesco.org/en/country/cm?theme=education-and-literacy.

knowledge needed to develop a chemical weapons program. Therefore, given its developing economy, insignificant chemical sector, and rudimentary educational system, Cameroon does not have the resources to support a serious attempt to obtain chemical weapons.

In recent years, Cameroon has faced growing internal security threats from terrorist groups and secessionists within its Anglophone regions.[242] The violence has mainly been concentrated in specific areas however, and does not threaten the country as a whole.[243] This means that while these internal threats may pose risks to local political and social stability, they are unlikely to threaten Cameroon's ruling party, which maintains widespread and secure control of the state's institutions.[244]

Cameroon faces relatively few external threats to its safety and security. There have been occasional kidnappings and skirmishes along its borders with neighboring countries, but these were mainly conducted by terrorist groups and were repelled by Cameroonian security forces and therefore not a threat to the country as a whole.[245] None of the countries within the region are known to have had chemical weapons so Cameroon does not face the threat of chemical warfare in disputes with its neighbors.[246] Given the lack of threats to security and survival that would require unconventional weapons capabilities and the absence of chemical weapons in the region, Cameroon has no security reasons to pursue a chemical weapons program and violate its commitment to CWC.

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[242] "Cameroon," International Crisis Group, accessed February 10, 2019, https://www.crisisgroup.org/africa/central-africa/cameroon.
[243] Ibid.
[244] The Economist Intelligence Unit, "Protests Spread in Anglophone Regions," The Economist, November 29, 2016, http://country.eiu.com/article.aspx?articleid=394861823&Country=Cameroon&topic=Politics&subtopic=_7.
[245] "Security Threats on Cameroon's Borders," Stratfor, January 23, 2014, https://worldview.stratfor.com/article/security-threats-cameroons-borders.
[246] James Martin Center, "Country Profiles."

Domestic pressures within the country are primarily focused on alleviating economic concerns. From 1970 to 2016, Cameroon's average capital investment as a percentage of GDP was 21.82% and has been on an upward trend since a low point in the early 1990s.[247] This compares to an average of 1.40% of GDP in military spending over the same period.[248] The country's consistently low military expenditure compared to its increasing capital investment suggests that domestic priorities are focused on economic affairs rather than building up its military capabilities. Therefore, it is unlikely that domestic actors in Cameroon would consider investing in a chemical weapons program.

In terms of domestic practices on chemical warfare, the Instructor's Manual issued by Cameroon's military in 1991 states regarding chemical weapons that "the restrictions here are clear. It is prohibited to use such weapons against enemy combatants as well as against civilian populations."[249] Cameroon signed the CWC in 1993 but the Instructor's Manual indicates that there were already internal policies against the possession and use of chemical weapons in place prior to that point.[250] Therefore, acceding to the CWC would have been an extension of pre-existing domestic norms.

At the time of its signing of the CWC, Cameroon was not a member of any organization or party to any treaty that could have placed external pressure on it to sign, accede to, and comply with the Convention.[251] Additionally, given Cameroon's limited resources and the low risk of WMD proliferation within the region, it is unlikely that

[247] "Cameroon: Capital Investment, Percent of GDP," theGlobalEconomy.com, accessed May 2, 2019, https://www.theglobaleconomy.com/Cameroon/Capital_investment/.
[248] "Cameroon – Military Expenditure (% of GDP)," IndexMundi, accessed May 2, 2019, https://www.indexmundi.com/facts/cameroon/indicator/MS.MIL.XPND.GD.ZS.
[249] "Practice Relating to Rule 74. Chemical Weapons," International Committee of the Red Cross.
[250] Kimball, "Chemical Weapons Convention Signatories."
[251] "Cameroon," International Model United Nations Association, accessed May 2, 2019, https://www.imuna.org/resources/country-profiles/Cameroon.

external organizations and other states would have placed much stress on the importance of its decision to join the CWC.[252]

Cameroon is an illustration of hypotheses 1, 2, and 4. It is a country that likely does not have the resources or infrastructure required to support a chemical weapons program and, consistent with hypothesis 1, has not pursued one. It is also a country that faces no significant threats to security or survival and does not reside in a region where chemical weapons programs are prevalent. Cameroon has not developed a chemical weapons program, which supports the argument outlined in hypothesis 2. Finally, the Cameroonian military's 1991 Instructor's Manual implies that there already were domestic practices against the use of chemical weapons in place before the state signed the CWC. This is consistent with hypothesis 4, which states that if a country has existing domestic norms against chemical weapons it will sign the CWC and remain in compliance with the research, production, and use aspects of the agreement. Hypothesis 3 and 5 do not apply in this case because there are not significant domestic or external pressures advocating for or against obtaining a chemical weapons capability.

## SECTION III – COMMITMENT AND COMPLIANCE IN CHEMICAL STATES

Although it is difficult to assess how many countries have had active chemical weapons programs since World War I, it is estimated that around 44 states have been

[252] Inter-Parliamentary Union, "Effective Implementation of Resolution 1540 in Africa: Opportunities for Parliaments," Regional Seminar for African Parliaments, 23 February, 2016, 4.

capable of chemical warfare at some point since 1914.[253] The majority of these countries discontinued their programs prior to signing the CWC; only eight countries declared chemical weapons stockpiles upon joining the Convention.[254] Three states, North Korea, Israel, and Egypt, have yet to accede to the CWC.[255] This section will focus on the group of countries that gave up their chemical weapons programs prior to or upon signing the CWC and have complied with the restrictions on program development and weapons use by examining Germany, Libya, and the United States as case studies. Each of these countries developed chemical weapons programs prior to the creation of the CWC.[256] The United States and Germany both renounced their programs before the convention negotiations were completed. They each signed the agreement in 1993, the same year it was opened for signature.[257] Libya eliminated its program after negotiations with the United States and Great Britain in the early 2000s and acceded to the CWC in 2004.[258] These cases show consistent support for hypothesis 3 and 5 but mixed support for hypotheses 1, 2, and 4.

[253] Stockholm International Peace Research Institute, "The Rise of CB Weapons," *The Problem of Chemical and Biological Warfare,* Stockholm: Almqvist & Wiksell, 1971, 293; James Martin Center, "Country Profiles."
[254] Daryl Kimball, "Chemical Weapons: Frequently Asked Questions," Arms Control Association, June 2018. https://www.armscontrol.org/factsheets/Chemical-Weapons-Frequently-Asked-Questions.
[255] Kimball, "Chemical Weapons Convention Signatories."
[256] James Martin Center, "Country Profiles."
[257] Kimball, "Chemical Weapons Convention Signatories."
[258] Ibid.

# GERMANY

Germany signed the CWC on the day it opened for signatures on January 13, 1993. It ratified the Convention on August 12, 1994.[259] It had an active chemical weapons program from World War I until its defeat in World War II.[260]

Germany leveraged its advanced chemical industry, which was the most sophisticated in the world at the time, to develop a chemical weapons program during World War I.[261] It retained an active program through World War II, even though the 1919 Treaty of Versailles, which formally ended World War I, reiterated the ban on chemical weapons that had been previously established in the 1899 and 1907 Hague Conventions.[262] It specifically targeted the German the chemical weapons program stating that "the use of asphyxiating, poisonous or other gases and all analogous liquids, materials or devices being prohibited, their manufacture and importation are strictly forbidden in Germany."[263] While Germany publically declared it was in accord with the treaty's terms, its scientists continued their chemical weapons research in secret.[264]

In the aftermath of Germany's defeat in World War II, Germany's chemical industry was significantly curtailed. IG Farben, the major chemical and pharmaceutical company in the world at the time, was broken up and its directors were tried for war crimes, in part, for their role in Nazi chemical weapons programs.[265] Although many of the resources required to support a chemical weapons program, such as technical expertise and scientific knowledge, were still present in Germany in the post-World War

[259] Ibid.
[260] Everts, "When Chemicals Became Weapons of War."
[261] Ibid.
[262] Ibid.
[263] *The Versailles Treaty*, June 28, 1919.
[264] Everts, "When Chemicals Became Weapons of War."
[265] The United Nations War Crimes Commission, *Law Reports of Trials of War Criminals*, Vol. X, 1949.

II era, limited sources of funding and increased international scrutiny would have made continuing its program difficult in the years following its defeat. As Germany's economy has recovered and international suspicion has decreased in the decades since the war however, it is likely that Germany now has the financial and technical resources to restart its chemical weapons program if it chose to. Therefore, Germany's decision to sign and comply with the CWC is not based on a lack of resources needed to develop a chemical warfare program.

Germany originally pursued its chemical weapons program in the face of significant external threats to its security. Fritz Haber, a German scientist who was a strong proponent of the use of chemical weapons, argued that poison gases could help break the strategic impasse that the Allied and Central powers found themselves in several months into World War I.[266] Although this argument proved to be incorrect, it was based on a concern over the threats facing the German state from the Allies. Similarly, the advancement and expansion of the German chemical weapons program leading up to World War II was also in the face of external threats to security.[267] In this case, there was the added threat of the chemical weapons programs developed by most Western powers during World War I; the Nazis remained unsure of how advanced Allied programs were throughout the conflict.[268] In the post-World War II era, however, Germany has faced relatively few threats to security both internally and externally.[269]

[266] Everts, "When Chemicals Became Weapons of War."
[267] Zach Dorfman, "The Rise and Fall (and Rise) of Chemical Weapons," Carnegie Council, August 7, 2018, https://www.carnegiecouncil.org/publications/articles_papers_reports/the-rise-and-fall-and-rise-of-chemical-weapons.
[268] William J. Broad, "Riddle of Why Hitler Didn't Use Sarin Gas Remains Unsolved," The New York Times, April 13, 2017.
[269] Paul Belkin, *German Foreign and Security Policy: Trends and Transatlantic Implications*, Congressional Research Service, 2009.

Without any significant threats to security or survival, there is little motivation for Germany to restart its chemical weapons program in the present.

Domestic pressures in the wake of World War II were strongly in favor of demilitarization.[270] In 1954, Germany renounced the production of all types of WMDs stating that "the Federal Republic undertakes not to manufacture in its territory any atomic weapons, chemical weapons or biological weapons".[271] It reaffirmed this commitment and further stated that it would not seek to acquire or stockpile chemical weapons when it signed the Biological and Toxin Weapons Convention in 1972.[272] This postwar stance on chemical weapons was part of a larger movement towards antimilitarist sentiments within German society rather than animus towards chemical warfare specifically.[273] Regardless of the reason for the attitude, public pressures within German society that developed after its defeat in World War II likely played a significant role in Germany's decision to sign the CWC and not restart its chemical weapons program.

Germany's post-World War II domestic attitudes towards chemical weapons extended beyond its renunciation of WMDs in 1954. In 1987, Germany proposed the creation of a chemical weapons free zone in Europe.[274] Four years later, the 1991 German Soldiers' Manual prohibited the use of chemical weapons by members of the military.[275] All of these instances illustrate that Germany had domestic practices against chemical weapons in place before it signed the CWC in 1993. Therefore, acceding to and

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[270] Alexander Kelle, "Preventing Chemical Weapons Proliferation: Implementing the Chemical Weapons Convention," Friedrich Ebert Stiftung, February 2000, http://library.fes.de/fulltext/id/00714008.htm.
[271] *Final Act of the Nine-Power Conference held in London Between the Twenty-Eighth of September and the Third of October, Nineteenth Hundred and Fifty-Four* (London: October 3, 1954), https://history.state.gov/historicaldocuments/frus1952-54v05p2/d135.
[272] Kelle, "Preventing Chemical Weapons Proliferation."
[273] Ibid.
[274] "Practice Relating to Rule 74. Chemical Weapons," International Committee of the Red Cross.
[275] Ibid.

complying with the aspects of the CWC covering chemical weapons research, manufacture, and use can be seen as a continuation of existing domestic norms.

Both East and West Germany signed and ratified the BWC prior to the CWC opening for signature.[276] This could have placed external pressure on Germany to sign the CWC in 1993 due to its commitment for signatory states to work towards chemical disarmament. Germany has also been a member of the Australia Group since 1985.[277] Its involvement in the group's efforts to prohibit the proliferation of biological and chemical weapons likely placed pressure on Germany to sign and comply with the CWC. Germany is also a member of the North Atlantic Treaty Organization (NATO).[278] Of the countries that were members of NATO in 1993, 12 of them signed the CWC on the day that it was opened for signature and the remaining three signed it one day later.[279] This indicates that within the NATO community there was strong support for the CWC and therefore there likely would have been pressure on Germany to sign the Convention.

The case of Germany is an illustration of support for hypotheses 2, 3, 4, and 5. Although Germany faced significant threats to its security and survival during the period leading up to World War I through the end of World War II when it had an active chemical weapons program, it has faced relatively few serious threats since it relinquished its program. Therefore, its decision to sign the CWC and comply with the portions of the agreement governing chemical weapons programs is consistent with hypothesis 2. The domestic pressures to renounce WMDs which developed in Germany in the wake of World War II and Germany's subsequent decision to not restart its chemical weapons program, to sign the CWC, and to comply with the weapons

[276] Kimball, "Biological Weapons Convention."
[277] "The Australia Group," The Australia Group.
[278] "Member Countries," North Atlantic Treaty Organization, March 26, 2018, https://www.nato.int/cps/en/natohq/topics_52044.htm.
[279] Kimball, "Chemical Weapons Convention Signatories."

development and use aspects of the agreement align with the argument outlined in hypothesis 3. Even before Germany signed the CWC, it had domestic practices against chemical warfare.

This situation, where a country with existing domestic norms against chemical weapons accedes to the CWC, is in accordance with hypothesis 4. Germany's involvement in the BWC, the Australia Group, and NATO prior to signing the CWC is supportive of the argument made in hypothesis 5. It likely faced external pressure due to the BWC's commitment to continuing efforts towards chemical disarmament and the support for nonproliferation in the Australia Group and NATO so its signing and subsequent compliance with the CWC is in line with the outline of hypothesis 5. The case of Germany is a contradiction of hypothesis 1, however. Germany has the resources to pursue a chemical weapons program but has not made efforts to restart its program after its renunciation.

## LIBYA

Libya acceded to the CWC on January 1, 2004 following negotiations with United States and British officials. It started its chemical weapons program in the 1980s and maintained its capabilities until it joined the CWC in 2004.[280]

Libya's economy is primarily based on oil production. Expansion of oil production combined with a global increase in oil prices in the 1970s led to a boost in its economy.[281] This gave Libya the financial resources needed to pursue a chemical weapons program. Although it lacked the indigenous technical skills and scientific

[280] "Libya," Nuclear Threat Initiative, April 2015, https://www.nti.org/learn/countries/libya/.
[281] "Economy of Libya," Fanack, October 24, 2018, https://fanack.com/libya/economy/.

knowledge needed to develop such a program, Libya was able to compensate by hiring foreign companies to build the required infrastructure.[282] In this manner, Libya was able to overcome its lack of technical and educational resources by obtaining chemical factories from Western commercial sources, which could provide state-of-the-art equipment that Libya was unable to manufacture domestically.[283] This allowed it to establish a functional program with a workforce of less than a dozen chemists and chemical engineers employed on the project.[284]

The fall in oil prices in the 1980s followed by United Nations economic sanctions in the 1990s due to Libyan involvement in several terrorist incidents and due to United States sanctions on companies and individuals doing business with Libya made sustaining a chemical weapons program increasingly difficult.[285] Libya had originally imported the majority of its thiodiglycol, an immediate precursor to sulfur mustard, from foreign suppliers but soon became unable to afford the amounts required to support its program and found itself increasingly isolated from the international community.[286]

As time progressed, Libya lost most of the financial assets that had allowed it to compensate for the lack of domestic resources. By 2003, when Libya began talks to renounce its WMD programs, it still had an active chemical weapons program but production of chemical agents had not occurred in more than a decade.[287] This indicates that by the mid-1900s, Libya no longer had the resources to support chemical warfare, which likely played a significant role in its decision to surrender its program and sign the

[282] Jonathan B. Tucker, "The Rollback of Libya's Chemical Weapons Program," *Nonproliferation Review* 16, no. 3 (2009): 372, doi: 10.1080/10736700903255060.
[283] Ibid. 365.
[284] Ibid. 365.
[285] 104th Congress, *H.R.3107 – Iran and Libya Sanctions Act of 1996*, Library of Congress, August 5, 1996, https://www.congress.gov/bill/104th-congress/house-bill/3107.
[286] Tucker, "The Rollback of Libya's Chemical Weapons Program," 372.
[287] Ibid., 366.

CWC in return for sanctions relief; surrendering a chemical weapons program that had already been dormant for over 10 years was a small price to pay for reintegration into the international community. Libya's economic situation has not improved substantially since then. The outbreak of civil war in 2011 sent the economy into free fall from which it is only starting to recover.[288] The conflict has also impacted Libya's already limited education system; approximately 11% of schools have been destroyed.[289] The result is that it is likely Libya still lacks the resources needed to support restarting its chemical weapons program.

The start of Libya's chemical weapons program came at a time when it was looking to expand its influence in the region and when it was facing increasing security threats from the Middle East.[290] Compared to neighboring countries such as Egypt and Israel, Libya had a weak conventional military. Additionally, several Middle Eastern states, including Iraq, Egypt, and Syria, were pursuing chemical weapons programs of their own.[291] Concerns about its ability to remain competitive within the larger North Africa – Middle East region likely fueled Libya's desire to develop a chemical warfare capability; having chemical weapons would supplement its conventional capabilities and remain in line with developments in the Middle East.

By the early 2000s, Libya's security concerns had shifted, placing a greater emphasis on expanding regional influence in Africa instead of in the Middle East. With this change came a decreased stress on WMD programs, which were seen as politically

[288] "Libya's Economic Outlook," The World Bank, April 2017, http://www.worldbank.org/en/country/libya/publication/economic-outlook-april-2017.
[289] "The World Bank in Libya," The World Bank, accessed January 18, 2019, https://www.worldbank.org/en/country/libya.
[290] Tucker, "The Rollback of Libya's Chemical Weapons Program," 364.
[291] Pranamita Baruah, "Chemical Weapon Profile: Libya," Institute for Defence Studies and Analyses, January 2011, https://idsa.in/cbwmagazine/ChemicalWeaponProfile_PranamitaBaruah.

important in the Middle East but less so in Africa.[292] At the same time, Gaddafi also felt increasingly threatened by the United States, particularly by its "Global War on Terror" and its adversarial position towards the regime of Saddam Hussein in Iraq.[293] In an effort to gain assurances that Gaddafi's government would be allowed to stay in power and to end its global pariah status, Libya reached out to British intelligence to express a willingness to engage in talks regarding its WMD programs.[294] This outreach marked the beginning of negotiations that eventually culminated in the elimination and destruction of the Libyan chemical weapons program.[295] External threats to security played an important role the development and the dismantling of Libya's chemical weapons program. The program was developed in response to concerns that lacking WMD capabilities would put it at a disadvantage in the region and it was dismantled over the concern that having WMD capabilities would lead to continuing isolation on the international stage and possibly an invasion by the United States. Therefore, threats to security proved to be a significant factor in Libya's decision to sign and comply with the CWC.

As Libya's economy faltered under the weight of sanctions from the United Nations and the United States, the Gaddafi regime faced increasing domestic pressure to remedy the situation.[296] In 1993, factions of the Libyan army attempted remove Gaddafi from power in a coup.[297] Although the attempt was ultimately unsuccessful, it illustrated the growing discontent with the Gaddafi regime inside the country. The dissent, which sometimes manifested in violent unrest, was predominately concentrated among army

[292] Tucker, "The Rollback of Libya's Chemical Weapons Program," 364
[293] Ibid.
[294] Tucker, "The Rollback of Libya's Chemical Weapons Program," 364
[295] Ibid.
[296] Ashish Kumar Sen, "Why North Korea is Not Libya," Atlantic Council, May 18, 2018, https://www.atlanticcouncil.org/blogs/new-atlanticist/why-north-korea-is-not-libya.
[297] "Libya," *States of Some Concern*, Carnegie Endowment for International Peace, 306.

officers and Islamic fundamentalists.[298] The severity of internal affairs led Gaddafi to offer renunciation of the country's WMD programs in return for lifting of economic sanctions and normalization of relations with the international community.[299] Although not directly related to chemical weapons, domestic pressures to address the deteriorating conditions within the country played an important role in Libya's decision to give up its chemical weapons capabilities and join the CWC.

In the decades leading up to its accession to the CWC, Libya's domestic practices were primarily in favor of proliferation.[300] Therefore, its decision to sign and comply with the aspects of the CWC regulating the development and possession of chemical weapons was in direct contrast to existing domestic practices. Libya's consent to the CWC cannot then be seen as a continuation of domestic norms.

Libya acceded to the BWC on January 19, 1982.[301] Given that it did not sign the CWC when it opened for signature in 1993, it is unlikely that Libya was influenced by the affirmation to commit to chemical weapons disarmament in the BWC. Libya's pursuit of WMDs was met with international condemnation, especially from the United States.[302] In 1996, 33 countries supported a US effort to stymie exports of military technology and dual-use materials to Libya. That same year, President Bill Clinton imposed sanctions on companies that exported items to Libya that could be used in its WMD programs.[303] In addition to exerting economic pressure, the United States also declined to rule out the possibility of using military intervention to prevent the completion of the chemical plant

[298] Ibid.
[299] Ibid.
[300] "Practice Relating to Rule 74. Chemical Weapons," International Committee of the Red Cross.
[301] Kimball, "Biological Weapons Convention"
[302] "Libya." *States of Some Concern*. Carnegie Endowment for International Peace, 306.
[303] Ibid., 306-307.

at Tarhuna.[304] Although Libya faced pressure from the United States over WMD capabilities, it also had several countries including China, the Soviet Union, South Africa, West Germany, and Iran who were willing to either directly provide materials and expertise to its chemical weapons program or to turn a blind eye towards companies and individuals in their jurisdiction doing so.[305] The support of these countries was more important to Libya than the pressure from the United States or international condemnation. As the United States increased the sanctions on those involved in supplying Libya's chemical weapons program, many countries began curbing their exports to Libya. Additionally, states such as West Germany, that had been ignoring the activities of individuals and corporations involvement in Libya's procurement process, began prosecuting individuals that exported dual-use goods to Libya.[306] This withdrawal of support from the countries that had once been major suppliers of Libya's chemical weapons program placed external pressure on the state to relinquish its program and join the CWC.

The case of Libya supports hypotheses 1, 3, and 5. Although Libya was able to develop a chemical weapons program, deterioration of its economic conditions meant that by the mid-1990s it lacked the resources to support its program. As a result, it gave up its program and has remained in compliance with the CWC's regulations regarding possession and use of chemical weapons as predicted by hypothesis 1. Due to the worsening economic environment, Gaddafi faced significant domestic pressure to remedy the situation. As described in hypothesis 3, this pressure led Gaddafi to renounce the country's chemical weapons program in return for sanctions relief and reintegration into international community. In addition to domestic pressure, Libya also faced significant

[304] Ibid., 308.
[305] *Libya Chemical Chronology*, Nuclear Threat Initiative.
[306] "Libya," Nuclear Threat Initiative.

external pressure to accede to and comply with the CWC. At first, it was able to resist calls to give up its program because it had the support of several countries that were willing to supply it with materials and expertise. But as US pressure on the international community increased, those countries became less willing to assist Libya's program. This diminished support likely contributed to Libya's decision to give up its chemical weapons and sign the CWC, which is consistent with the argument in hypothesis 5. Libya's case is a contradiction of hypotheses 2 and 4, however. Although Libya still faced significant threats to security and survival in the early 2000s, it gave up its program and joined the CWC. This move was also was in direct contrast to historic domestic practices in favor of chemical weapons development within the country.

## UNITED STATES

The United States signed the CWC on January 13, 1993 and ratified it on April 25, 1997. The US developed a chemical weapons program in 1917 in response to the use of chemical weapons during World War I. It maintained an active program through 1990.[307]

The United States' chemical weapons program was first developed during World War I after the Germans used chlorine gas at Ypres, Belgium.[308] The program was continued throughout much of the rest of the century. In 1990, the United States and the Soviet Union signed a bilateral agreement to stop producing chemical weapons and destroy existing stockpiles.[309] This marked the official end to the United States program

[307] "History of United States' Involvement in Chemical Warfare," DENIX, accessed May 1, 2019, https://www.denix.osd.mil/rcwmprogram/history/.
[308] Ibid.
[309] "Summit in Washington Summary of U.S.-Soviet Agreement on Chemical Arms," The

and the start of the destruction of its stockpiles. At this time the United States still had the financial, educational, and technical resources needed to support a chemical weapons program. The country was on the cusp of the best economic performance in decades, 46% of Americans between the ages of 25 and 34 had attended at least some college, and the United States had the world's largest chemical industry.[310] In addition to sufficient educational and technical resources to support a chemical weapons program, the United States has vast financial resources at its disposal. Its military funding has been among the highest in the world over the last several decades with a $686 billion (US dollar) budget in the 2019 fiscal year.[311] Therefore, the US's decision to forgo its program, sign the CWC, and remain in compliance with the convention is not the result of a lack of resources to support a chemical warfare program.

The United States began a chemical weapons program in response to external threats to security presented by the advent of chemical warfare by the Germans in World War I.[312] Although the incidence of chemical warfare on the battlefield was infrequent after World War I, the threat of such weapons remained and so the United States maintained its chemical arsenal as a deterrent.[313] In 1943, George Merck, the director of the US chemical and biological warfare program, issued a report that highlighted, in part, the necessity of countering the threat of German chemical weapons.[314] Much of the

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New York Times, June 2, 1990.
[310] Jeffrey Frankel, Peter R. Orszag, "Retrospective on American Economic Policy in the 1990s," Brookings, November 2, 2001, https://www.brookings.edu/research/retrospective-on-american-economic-policy-in-the-1990s/.;"Educational Attainment Over Time, 1940-2009," CollegeBoard, accessed March 15, 2019. https://trends.collegeboard.org/education-pays/figures-tables/educational-attainment-over-time-1940-2009.; "U.S. Chemical Industry – Statistics & Facts," Statista, 2017, https://www.statista.com/topics/1526/chemical-industry-in-the-us/.
[311] "FY 2019 Defense Budget," U.S. Department of Defense, accessed April 30, 2019, https://dod.defense.gov/News/SpecialReports/Budget2019.aspx.
[312] "History of United States' Involvement in Chemical Warfare," DENIX.
[313] Teitt, *Public Policy in the United States.*
[314] Ibid.

development of the program was driven by global threats such as the Nazis during World War II and the Soviet Union during the Cold War.[315]

Throughout the Cold War, the United States and the Soviet Union engaged in an arms race, part of which included amassing stockpiles of chemical weapons, in an attempt to gain a military and strategic advantage over their rival.[316] The end of the Cold War, however, marked a reduction in the serious security threats faced by the United States.[317] Additionally, the United States emerged with substantial conventional military and nuclear capabilities. Therefore, the lack of significant threats to its security and survival likely played a role in the United States' accession to the CWC and continued compliance with its terms regarding development and use of chemical weapons.

Domestic reaction to chemical weapons after World War I was mixed. Many were opposed to it on moral grounds, claiming it was inhumane and amounted to torture, and there was a general pressure to draw down America's military strength, including disband the recently created Chemical Warfare Service (CWS).[318] Proponents of chemical warfare, however, argued that it was an important capability to have as a deterrent to other countries and that due to its low casualty rate it was actually more humane than conventional munitions such as bullets and bombs.[319] In the interwar period, Brigadier General Amos Fries of the 1st US Gas Regiment, representatives from the United States chemical industry, and members of the American Chemical Society lobbied on behalf of the CWS to make it a permanent branch of the Army. In 1920, their efforts were

[315] "History of United States' Involvement in Chemical Warfare," DENIX.
[316] "History," OPCW.
[317] Ronald O'Rourke, *A Shift in the International Security Environment: Potential Implications for Defense – Issues for Congress,* Congressional Research Service, 2018.
[318] Christopher Warren, "GAS, GAS, GAS! The Debate Over Chemical Warfare Between the World Wars," *Federal History*, 2012.
[319] Ibid.

successful.[320] In the wake of World War II, some observers called for the elimination of the United States' chemical weapons program due to the arrival of nuclear weapons and its lack of use during the war.[321] Once again lobbying by the CWS allowed the program to remain active in the peacetime Army.[322] By the end of the 1960s, however, domestic pressures were beginning to turn against chemical warfare. Public hostility towards chemical weapons increased over the use of defoliants in Vietnam, deployment of riot control agents in Southeast Asia and the United States, well publicized testing accidents, and environmental concerns about chemical waste disposal.[323] After near elimination in the 1970s as a result of public pressure, the US chemical weapons program was revived following revelations about the extent of the Soviet Union's chemical warfare capability.[324] Soviet equipment captured from the Egyptians and the Syrians during the Yom Kippur War was much more sophisticated than had previously been assessed by US officials. The presence of chemical resistant shelters, air filtration systems in vehicles, decontamination equipment, and chemical detector kits suggested that Soviet forces were well prepared to engage in chemical warfare prompting concerns with in the US army that the Soviet Union could seek to deploy chemical weapons in a future war.[325] Although the program was reinstated to counter the Soviet's Cold War threat, domestic support for chemical warfare remained low, a fact that likely hastened the United States' elimination of its program and influenced its decision to sign the CWC in the 1990s and remain in compliance with the agreement.

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[320] Ibid.
[321] Benjamin A. Hill, Corey J. Hilmas, Jeffery K. Smart, "History of Chemical Warfare." Medical Aspects of Chemical Warfare. https://ke.army.mil/bordeninstitute/published_volumes/chemwarfare/CHAP2_Pg_09-76.pdf.
[322] Ibid.
[323] Ibid.
[324] Ibid.
[325] Ibid.

In the decades leading up to the signing of the CWC, the United States had already begun to abolish its chemical weapons program. In 1969, President Richard Nixon resubmitted the 1925 Geneva Protocol, which the Senate had declined to ratify when it was originally signed, to Congress for ratification.[326] This came among a broader effort by the Nixon administration to further clarify and reduce the United States' chemical and biological weapons programs; in his presentation of the Protocol for ratification, Nixon also renounced the use of biological weapons and reaffirmed the US commitment to no first use of chemical weapons.[327] The same year, the United States stopped manufacturing chemical agents and filling munitions. By the early 1970s, the Army planned to eliminate its chemical warfare branch entirely. Although the Cold War reversed these plans, the United States showed little interest in maintaining a chemical weapons capability, possibly due to a lack of public support and its nuclear capabilities; less than a year after reactivating the program, it began talks with the Soviet Union to reach a verifiable ban on chemical weapons.[328] These actions indicate that the United States had established domestic practices and norms against the use of chemical weapons prior to signing the CWC in 1993.

The United States signed the BWC in 1972 and ratified it in 1975.[329] This would have placed pressure on the US to continue working towards a ban on chemical weapons and therefore sign the CWC when it opened for signature. The United States also joined the Australia Group in 1985.[330] Its membership would have created external pressure to sign and subsequently comply with the Convention. The US is also a member of NATO,

[326] Ibid.
[327] Bureau of International Security and Nonproliferation, "Protocol for the Prohibition."
[328] Hill, "History of Chemical Warfare."
[329] Kimball, "Biological Weapons Convention"
[330] "The Australia Group," The Australia Group.

which saw broad support for the CWC among its participants.[331] This widespread support from close international partners could have placed pressure on the United States to sign and comply with the Convention. In addition to its memberships in international organizations, the United States had one of the world's largest chemical stockpiles in 1993 and had led negotiations for a ban on chemical weapons.[332] A failure to sign the CWC by the US would have set a bad precedent for chemical disarmament and hurt its reputation as a reliable negotiator in the international community. This role in the chemical weapons process likely placed pressure on the United States to sign the CWC and remain in compliance.

The United States case supports hypotheses 2, 3, 4, and 5. In the wake of the Cold War, the United States emerged as a global military power facing few threats to its security. Additionally, given its conventional military strength and nuclear capabilities, maintaining its chemical weapons capability was unnecessary. The lack of threats and the United States' decision to sign the CWC and comply with its restrictions on chemical weapons development and use is an example of hypothesis 2. The movement towards eliminating its chemical weapons program over domestic opposition in the 1960s and 1970s is an illustration of the power of internal pressure as outlined in hypothesis 3. This pressure also led to the development of domestic practices against chemical warfare in the decades leading up to 1993. Therefore, signing the CWC can be seen as a continuation of these domestic policies as described in hypothesis 4. The United States' accession to the BWC, its membership in NATO and the Australia Group, and the role that it played in negotiating the CWC all likely introduced external pressure on the country to sign the Convention and comply with the aspects of it on chemical weapons

[331] "Member Countries," North Atlantic Treaty Organization.
[332] "Chemical and Biological Weapons Status at a Glance," Arms Control Association, June 2018, https://www.armscontrol.org/factsheets/cbwprolif.

programs. This response to external pressure is consistent with hypothesis 5. The case of the United States is a contradiction of hypothesis 1, however. Although it still had the resources and capabilities to continue its chemical weapons program, the United States has not done so and has remained in compliance with the aspects of the CWC relating to the development, production, and use of chemical weapons.

## SECTION IV – COMMITMENT WITHOUT COMPLIANCE

A small subset of the countries that developed chemical weapons systems before signing the CWC have not entirely given up their programs after their accession. I will examine the cases of Russia and Syria in this section. While both countries declared their stockpiles upon accession to the agreement and had the stockpiles' destruction verified by the OPCW, recent accusations of chemical weapons use by both countries have raised questions about the completeness of their declarations.[333] Russia has been assessed by Great Britain, France, Germany, and the United States to have used a nerve agent to poison a former spy and his daughter in 2018.[334] The Syrian military and affiliated groups have been accused of using chemical weapons against rebels and civilians in over 300

[333] Scott Shane, "Wasn't Syria's Stock of Chemical Weapons Destroyed? It's Complicated," The New York Times, April 8, 2017.; "OPCW Marks Completion of Destruction of Russian Chemical Weapons Stockpile," OPCW, October 11, 2017, https://www.opcw.org/media-centre/news/2017/10/opcw-marks-completion-destruction-russian-chemical-weapons-stockpile.
[334] Karla Adam, William Booth, "Nerve Agent Poisoning: Theresa May Says Russian Intelligence Officers Carried Out Attack on Ex-Spy in Salisbury," The Washington Post, September 5, 2018, https://www.washingtonpost.com/world/europe/britain-charges-two-russians-with-attempted-murder-of-ex-spy-with-nerve-agent/2018/09/05/db99c5c8-b0f7-11e8-a20b-5f4f84429666_story.html?utm_term=.1f108ae23074.

attacks during the country's civil war.[335] These cases demonstrate support for hypotheses 1, 2, and 4, mixed results on hypothesis 5, and are inconclusive on hypothesis 3.

## RUSSIA

Russia signed the CWC on January 13, 1993 and ratified it on November 5, 1997.[336] It developed a chemical weapons program during War World I and maintained an active program throughout the Soviet era until signing a bilateral agreement with the United States to eliminate its programs in 1990.[337] Although the OPCW declared Russia's chemical stockpile destroyed in October of 2017, the use of chemical weapons in a 2018 assassination attempt on a former spy in England that was likely carried out by Russian intelligence officers indicates that it still has chemical weapons capabilities.[338]

At the time that the agreement with the United States was signed, the Soviet Union had all of the necessary resources to support a chemical weapons program. Shortly after that agreement, however, the Soviet Union was dissolved and the newly independent Russia experienced a period of economic collapse as it transitioned from a central command economy to a market-based one.[339] Throughout the 1990s, it is unlikely that Russia would have had the financial resources to devote to maintaining a chemical weapons program, especially considering that it was also supporting a nuclear weapons

[335] Louisa Loveluck, "Syrian Military Linked to More than 300 Chemical Attacks, Report Says," The Washington Post, February 17, 2019, https://www.washingtonpost.com/world/middle_east/syrian-military-linked-to-more-than-300-chemical-attacks-report-says/2019/02/16/c6e128de-31d4-11e9-ac6c-14eea99d5e24_story.html?utm_term=.3074b1048793&wpisrc=al_news__alert-world--alert-national&wpmk=1.
[336] Kimball, "Chemical Weapons Convention Signatories."
[337] "Summit in Washington Summary of U.S.-Soviet Agreement on Chemical Arms," The New York Times.
[338] "Joint Statement on the Salisbury Attack," U.S. Department of State, September 6, 2018, https://www.state.gov/r/pa/prs/ps/2018/09/285770.htm.
[339] William H. Cooper, *Russia's Economic Performance and Policies and Their Implications for the United States,* Congressional Research Service, 2009.

program. This lack of resources probably played a role in Russia's decision to sign the CWC in 1993. The Russian economy recovered throughout the 2000s mainly due to increased oil revenue.[340] Due to this recovery, Russia likely once again has the resources to support a chemical weapons program. This change could be a contributing factor to Russia's noncompliance with the CWC.

As with many countries in Europe, Russia developed its chemical weapons program in response to the use of chemical warfare by the Germans during World War I.[341] It expanded and updated its program during the interwar years in order to match the capabilities of other industrial powers. In the wake of World War II and throughout the Cold War, the Soviet Union continued research on and production of chemical weapons as part of its response to the threats posed to its security and survival by the United States and other European powers.[342] After the dissolution of the Soviet Union in 1991, these external threats diminished as the newly formed Russia focused on domestic affairs. In more recent years, as tensions with the United States and other European powers have increased, Russia appears to have produced and utilized a chemical weapon in violation of the CWC. The 2018 poisoning of the former Russian spy and his daughter in Salisbury, England has been assessed to be a Russian military operation carried out by two intelligence officers. The attack used Novichok, a nerve agent developed by Soviet scientists in the 1980s.[343] It is likely that increased concerns over threats from the West has played a significant role in Russia's decision to violate the CWC.

[340] "Russia's Economy," The Economist, December 22, 2011, https://www.economist.com/graphic-detail/2011/12/22/russias-economy.
[341] "Russia," Nuclear Threat Initiative, June 2015, https://www.nti.org/learn/countries/russia/chemical/.
[342] Ibid.
[343] Adam, "Nerve Agent Poisoning"

Russian President Vladimir Putin enjoys significant domestic support within Russia. He won reelection by a large margin with nearly 77% of voters favoring him.[344] After his victory, Putin's campaign spokesman jokingly thanked Great Britain for increasing turnout over their accusations about Russia role in the Salisbury poisonings, suggesting that voters had turned out in large numbers to support Putin because of the perceived attacks on him from the West.[345] Although there is minimal information publically available on public opinion within Russia regarding chemical weapons programs, the high level of approval that President Putin has, even in the aftermath of the Novichok incident, suggests that there is little domestic pressure on him to comply with the CWC.

Throughout the Soviet era, chemical weapons capabilities were pursued in secret. Even in the decades following the dissolution of the Soviet Union, the citizens of Russia have remained relatively in the dark regarding the extent and capabilities of the Soviet Union's chemical weapons program.[346] This domestic practice of secretly researching and manufacturing chemical agents appears to have continued in Russia through the present day. Although Russia and the OPCW declared its stockpiles destroyed in 2017, the poisoning in Salisbury, England raises questions about whether Russia declared its entire stockpile or if it has been conducting clandestine research.[347] Consistent with its previous domestic norms in favor of chemical weapons development and use, Russia appears to continue to view chemical agents as a viable weapon.

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[344] John Lloyd, "Commentary: Why Putin is Still – genuinely – popular in Russia," Reuters, March 19, 2018, https://www.reuters.com/article/us-lloyd-putin-commentary/commentary-why-putin-is-still-genuinely-popular-in-russia-idUSKBN1GV25D.
[345] "Moscow Thanks UK for Helping Putin Win Landslide Vote in Russia," Financial Times, https://www.ft.com/content/efab0a30-2ad4-11e8-a34a-7e7563b0b0f4.
[346] Lev Aleksandrovich Fedorov, "Chemical Weapons in Russia: History, Ecology, Politics," Federation of American Scientists, July 27, 1994, https://fas.org/nuke/guide/russia/cbw/jptac008_l94001.htm.
[347] "OPCW Marks Completion of Destruction of Russian Chemical Weapons Stockpile," OPCW.

Russia signed the BWC in 1972 and ratified it three years later.[348] The inclusion of a commitment to chemical disarmament in the BWC could have placed external pressure on Russia to sign the CWC in 1993. Upon the dissolution of the Soviet Union, Russia assumed its position in the Conference on Security and Co-Operation in Europe (CSCE).[349] The CSCE's focus on arms control likely placed pressure on Russia to commit to and subsequently comply with the CWC. In the wake of the chemical attack in Salisbury, England, over 20 Western countries including the United States, Germany, France, Poland, Ukraine, Sweden, Canada, and Australia, expelled Russian diplomats for the country's assessed role in the attack.[350] This widespread condemnation of Russia's violation of the CWC likely placed pressure on Russia to acknowledge and address its clandestine chemical weapons capabilities. Despite that pressure, as of May 2019, Russia has publically maintained it has no chemical weapons capabilities and that it is not responsible for the attack in England. Given that Russia has appeared to have produced and used chemical weapons in violation of its commitment to the CWC, these external pressures towards accession and compliance do not seem to be significant factors for the country.

The Russia case supports hypotheses 1, 2, and 4. Russia has the resources to support a chemical weapons program and, as predicted by hypothesis 1, has pursued one in violation of the CWC. In recent years, tensions between Russia and the West have increased leading to amplified threats to Russia's security and survival. As outlined in hypothesis 2, Russia has produced and used chemical weapons in response to these

[348] Kimball, "Biological Weapons Convention"
[349] The Editors of Encyclopaedia Britannica, "Organization for Security and Co-operation in Europe," Encyclopaedia Britannica, accessed April 28, 2019, https://www.britannica.com/topic/Organization-for-Security-and-Co-operation-in-Europe.
[350] Julian Borger, Heather Stewart, Patrick Wintour, "Western Allies Expel Scores of Russian Diplomats Over Skripal Attack," The Guardian, March 27, 2018, https://www.theguardian.com/uk-news/2018/mar/26/four-eu-states-set-to-expel-russian-diplomats-over-skripal-attack.

threats. Throughout the Soviet era, there were domestic practices of secrecy and proliferation. Russia's noncompliance with the CWC can be seen as a continuation of these historic internal policies. Although Russia acceded to the BWC prior to 1993 and is a member of the CSCE, which would both likely create external pressure for commitment and compliance to the CWC, it has not complied with the research, production, and use restrictions outlined in the Convention. It has also not given in to pressure from Western countries in the wake of the Skripal attack to declare any clandestine chemical weapons. This is a contradiction of hypothesis 5. Hypothesis 3 does not apply to the case of Russia, as there does not appear to be significant domestic pressure for or against chemical warfare.

## SYRIA

Syria acceded to the CWC on September 12, 2013 after negotiations between the United States and Russia in response to reports of chemical weapons use by Syrian government forces.[351]

Syria obtained chemical warfare capabilities in the mid-1970s. During that time, economic growth rates were high due to an increase in global agriculture and oil prices.[352] Syria also received foreign assistance, primarily from the Soviet Union and then West European companies, which helped overcome some of its lack of indigenous resources.[353] Throughout the next several decades, it amassed one of the world's largest

[351] Kimball, "Timeline of Syrian Chemical Weapons Activity, 2012-2019."
[352] "The Economy," U.S. Library of Congress, accessed March 19, 2019. http://countrystudies.us/syria/39.htm.
[353] Jannis Brühl, "Where Did Syria's Chemical Weapons Come From?" ProPublica, September 25, 2013, https://www.propublica.org/article/where-did-syrias-chemical-weapons-come-from.

stockpiles of nerve agents and mustard gas.[354] In 2011, civil war broke out between President Bashar al-Assad's government and pro-democracy opposition supporters.[355] The conflict weakened the economy and further damaged Syria's already lagging education system.[356] However, Syria's significant chemical weapons stockpiling throughout the late 1980s, 1990s, and early 2000s have mitigated the more recent lack of indigenous resources. Therefore, Syria likely still has sufficient remnants of its chemical weapons program to support its noncompliance with the CWC.

Syria pursued its chemical weapons program in response to regional security threats. Military asymmetry in its relationship with Israel, which is widely believed to have nuclear capabilities, was a primary motivator to gain unconventional weapons capabilities.[357] These threats have remained undiminished through the present day. In addition to external threats, the 2011 civil war introduced a significant internal threat to the security and survival of the Assad regime. The use of chemical weapons on rebels and civilians throughout the civil war, even after Syria officially acceded to the CWC and declared its stockpiles destroyed, highlight the role that threats to security play in influencing a state's decision to pursue a chemical weapons program and comply with the CWC.[358]

The Assad regime's continued use of chemical weapons over the past seven years, in spite of international condemnation, suggests that domestic pressures on the Syrian president are supportive of, or at least unopposed, to the development and use of

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[354] Esposito Murray, "Can Syria's Chemical Weapons be Stopped?"
[355] "Why is There a War in Syria?" BBC News, February 25, 2019, https://www.bbc.com/news/world-middle-east-35806229.
[356] Elena Holodny, "Syria's Civil War has Destroyed Economy 'for Years to Come'," Business Insider, June 9, 2016, https://www.businessinsider.com/syria-economy-destroyed-2016-6.
[357] "Syria," Nuclear Threat Initiative, April 2018, https://www.nti.org/learn/countries/syria/chemical/.; Lionel Beehner, "Israel's Nuclear Program and Middle East Peace," Council on Foreign Relations, February 10, 2006, https://www.cfr.org/backgrounder/israels-nuclear-program-and-middle-east-peace.
[358] "Syria," Nuclear Threat Initiative.

chemical weapons.[359] There is little publically available information on such pressures, however.

In the decades leading up to its joining of the CWC, Syria had a substantial history of domestic policies supporting the development, stockpiling, and use of chemical weapons.[360] Its decision to accede to the convention, only done under international pressure following a United Nations investigation into the use of chemical weapons in 2013, was in direct contrast to its domestic practices.[361] It is unsurprising, therefore, that the Assad regime has continued to use chemical weapons against opposition forces and citizens in violation of the regulations outlined in the CWC.

Syria is not currently a member of any international organizations or party to any international agreements that could place external pressure on it to sign and comply with the CWC. Since the start of the Syrian civil war between the current government under Bashar al-Assad and opposition forces in 2011, the country has faced significant international pressure to join the CWC and give up its chemical weapons stockpiles.[362] Following reports of chemical attacks within Syria in 2012 and 2013, the United States, the United Kingdom, and France all released statements detailing that intelligence assessments determined there was a high likelihood chemical agents had been used and that the Syrian government forces were responsible for their use.[363] On August 21, 2013, a chemical weapons attack attributed to Syrian government forces in the suburbs of Damascus resulted in the deaths of over 1,000 civilians. This incident greatly increased

[359] Robert J. Bunker, "Strategic Insights: The Assad Regime and Chemical Weapons," Strategic Studies Institute, May 18, 2018, https://ssi.armywarcollege.edu/index.cfm/articles/Assad-Regime-Chemical-Weapons/2018/05/18.
[360] "Syria," Nuclear Threat Initiative.
[361] Ibid.
[362] Ralf Trapp, Jean Pascal Zanders, "Ridding Syria of Chemical Weapons: Next Steps," Arms Control Association, accessed May 1, 2019, https://www.armscontrol.org/act/2013_11/Ridding-Syria-of-Chemical-Weapons-Next-Steps.
[363] Kimball, "Timeline of Syrian Chemical Weapons Activity, 2012-2019"

the international pressure on Syria with the United States, Britain, and France all considering military action against the Syrian government in response.[364] In the aftermath of the attack, Russia, an ally of al-Assad's government, recognized the growing risk for international intervention in the civil war against the Syrian government forces. It proposed a plan for Syria to surrender its chemical weapons stockpiles to the international community and accede to the CWC if no military action would be taken against al-Assad's government. This proposal was accepted by the United States and Syria joined the CWC on September 12, 2013.[365]

Although international pressure from the United States and other Western countries led to Syria's accession to the CWC, it has not influenced the country's compliance with the Convention's restrictions on research, production, and use of chemical weapons. Since Syria committed to the CWC, approximately 50 chemical weapons attacks have been attributed to Syrian government forces.[366] Russia, whose cooperation with the United States led to Syria's signing of the CWC, has opposed any further investigation into the Assad regime. It has used its position on the UN Security Council to veto resolutions condemning chemical weapons attacks and to extend investigations to identify the parties responsible for the attacks.[367] The result is that while pressure from the United States, the United Kingdom, and France appears to have little impact on Syria's commitment and compliance with the CWC, the Assad government is highly influenced by pressure from the Russian government.

The case of Syria is an illustration of 1, 2, 4, and 5. Since the start of its civil war, Syria's economy has fallen significantly and it likely would not have the resources

[364] Ibid.
[365] Ibid.
[366] "Syria: A Year On, Chemical Weapons Attacks Persist," Human Rights Watch, April 4, 2018, https://www.hrw.org/news/2018/04/04/syria-year-chemical-weapons-attacks-persist.
[367] Kimball, "Timeline of Syrian Chemical Weapons Activity, 2012-2019."

necessary to start a chemical weapons program at this point in time. But with foreign assistance and the development of massive stockpiles of chemical munitions, Syria has managed to mitigate these hurdles and find other sources of supplies to support its program. This is consistent with the argument outlined in hypothesis 1. Since it first developed its chemical weapons program, Syria has faced both internal and external threats that it lacks the conventional military strength to counter. Therefore, its violation of the CWC is an example of hypothesis 2. Syria's original pursuit of chemical warfare capabilities led to decades of domestic policies supporting the production and use of chemical weapons. Its accession to the CWC was in direct opposition to those internal practices and so, as predicted by hypothesis 4, its noncompliance with the convention can be seen as a continuation of those domestic policies. Syria's accession to the CWC came after pressure from the Russian government and its continuing noncompliance comes with Russian obstruction of international oversight through the UN Security Council. These actions support the arguments in hypothesis 5 that a state will act according to pressure from important partners and allies. When Russia proposed that Syria surrender its chemical weapons and join the CWC, it did so. But now that Russia has provided diplomatic cover and support, which is a kind of pressure in itself, for the Assad regime's use of chemical warfare, Syria has continued to violate its commitments to the CWC. Hypothesis 3 does not apply to Syria, as there does not appear to be any significant domestic pressures for or against its chemical weapons program.

## SECTION V – CONCLUSIONS ON CHEMICAL DISARMAMENT AND NONPROLIFERATION

Analysis of the cases above indicates that domestic and external pressures are factors that have a strong influence on states that comply with the aspects of the CWC covering the research, development, and use of chemical weapons. Among countries that do not comply with the CWC, the availability of resources for a chemical weapons program, the presence of threats to security, and domestic norms are the most influential factors.

States that have no previous history of chemical weapons programs prior to signing the CWC have all remained in full compliance with the Convention since they joined it. In the case studies of Saudi Arabia, Uzbekistan, Argentina, and Cameroon, the hypotheses that appeared to best explain the states decision to sign and comply with the CWC were hypothesis 3, 4, and 5. Hypotheses 1 and 2 had mixed results. Based on these results, it appears that the factors that most strongly influence non-chemical weapons capable states are domestic pressures, domestic norms, and external pressures.

The cases of Germany, the United States, and Libya were representative of chemical weapons capable countries that gave up their programs, signed the CWC, and have remained in compliance with the aspects regarding research, production, and use since then. The hypotheses that best describe the behavior of these countries are hypotheses 3 and 5. Hypotheses 1, 2, and 4 returned mixed results. This indicates that the factors that were most important to the decision to sign and comply with the CWC for countries with historical chemical weapons programs were domestic and external pressure.

Russia and Syria were the cases for countries with chemical weapons programs prior to joining the CWC that have not complied with the Convention in regards to the use and production of chemical weapons. The analysis of these case studies suggests that the hypotheses that best represent the behavior of these states are hypotheses 1, 2, and 4. Hypothesis 5 produced mixed results and hypothesis 3 was inconclusive, as it did not apply to either case. The resulting conclusion is that the availability of resources for the chemical weapons program, the presence of threats to security, and domestic norms are the most important factors in a chemical weapons capable state's decision to commit to but not comply with the CWC.

# CHAPTER IV – COMPLIANCE THROUGH NATIONAL IMPLEMENTATION AND ENFORCEMENT

## SECTION I – INTRODUCTION TO ARTICLE VII

In addition to prohibiting the research, production, and use of chemical weapons, the CWC also looks to prevent the proliferation of chemical weapons through the implementation of national legislation. Article VII of the Convention outlines the need for countries to incorporate legislation into their national frameworks that prohibits the development, production, stockpiling, and use of chemical weapons as outlined in the Convention.[368] Specifically, signatory states must adopt measures that cover three areas: to prohibit and make it a crime for any person or entity to engage in activities prohibited under the CWC anywhere within the country or its jurisdiction, to not permit activity prohibited by the CWC to occur in any place under the country's control, and to make it a crime for any citizens of the country to engage in activity prohibited by the CWC anywhere in the world.[369]

These laws are expected to cover several areas that are referred to as "initial measures" including: defining the terms "chemical weapons," "toxic chemical," "precursor," and "purposes not prohibited" in a manner that is consistent with the CWC; outlining the requirements for reporting on the transfers of schedule 1, 2, and 3 chemicals as defined in CWC (see Appendix 5); banning the activities prohibited in the CWC and setting penalties for violations of those bans by legal persons within the country;

[368] "Article VII National Implementation Measures," OPCW, 1993, https://www.opcw.org/chemical-weapons-convention/articles/article-vii-national-implementation-measures.
[369] *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction*.

extending the penal code to allow for the prosecution of the country's nationals regardless of the location where their violations occurred (extraterritoriality); and assigning legal powers to the relevant government agencies to regulate and enforce these prohibitions.[370] Countries are also supposed to submit updates to the OPCW regarding their compliance with this article and to provide the organization with the text of the laws covering these areas. Using this information, the OPCW Technical Secretariat, the group responsible for carrying out the Convention's verification measures and for providing technical assistance to countries that need it to fully implement the CWC, determines if a country is in compliance or not.[371]

As of July 31, 2018, approximately 63% of the states parties have implemented national legislation covering all of the initial measures. An additional 17% have implemented legislation covering some, but not all, of the initial measures.[372] This means that roughly one-fifth of the CWC's signatories still lack any national measures for enforcing and prosecuting violations on their territory or by their citizens despite such legislation being required by the text of the CWC. Most of these countries are small states with no history of chemical weapons programs and at little risk of obtaining chemical weapons capabilities.[373] A few of the countries, however, are states that have had programs in the past or are located in areas of the globe that have seen chemical weapons proliferation. These states include Libya and Syria.[374]

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[370] OPCW, "Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2015: Article VII – Initial Measures," July 31, 2015, https://www.opcw.org/sites/default/files/documents/EC/80/en/ec80dg15_c20dg12_e_.pdf.
[371] "Technical Secretariat," OPCW, accessed February 20, 2019, https://www.opcw.org/about-us/technical-secretariat.
[372] OPCW, "OPCW by the Numbers."
[373] Director-General of the OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018," OPCW, August 24, 2018, https://www.opcw.org/sites/default/files/documents/2019/03/c23dg08%20ec89dg09%28e%29.pdf.
[374] Ibid.

Among the countries that do have fully implemented national legislation (see Appendix 4 for a complete list) it is difficult to ascertain if the laws are being properly enforced. Violations are generally only discovered when the perpetrators are caught. As a result, there is persistent and inevitable uncertainty over how many violations are actually occurring and whether national legislation is being appropriately implemented and enforced. This chapter will primarily examine the implementation of national laws as evidence of compliance or noncompliance. A section regarding enforcement of the national legislation is included below in Section III.

The hypothesis regarding compliance with Article VII of the Convention is that states that have no history of chemical weapons capabilities and with developing economies will have little political urgency and few resources to dedicate to implementing national legislation. Therefore, their lack of compliance is unintentional.

## SECTION II – NATIONAL IMPLEMENTATION

Nearly all of the 71 countries that have not fully implemented the initial measures required under Article VII are developing countries that have historically neither had nor pursued chemical weapons capabilities.[375] This suggests that noncompliance with the CWC due to a lack of national legislation is primarily unintentional rather than a deliberate effort to keep the production, storage, and use of chemical weapons legal.[376] While this may explain why the majority of the states have not fully implemented initial

[375] World Bank, "List of Developing Countries," 2013.; Kimball, "Chemical Weapons: Frequently Asked Questions."
[376] Abram Chayes, Antonia Handler Chayes, "On Compliance," *International Organization* 47, no. 2 (1993): 175-205.

measures, there are some states that do have a history of chemical weapons development and use.[377] For these countries there should be the additional consideration of whether the lack of implementation is deliberate.

I have selected the cases of Bolivia, Armenia, and Lebanon for analysis using the hypothesis. Bolivia, Armenia, and Lebanon were chosen as representative examples of the common setbacks facing the countries that have not fully implemented Article VII. They are all states that have never had a chemical weapons program, are uninterested in pursuing chemical warfare, and are middle-income economies.[378] Additionally, they are countries that have had changes in their implementation status over the last seven years, which will allow the analysis to track how the variation of circumstances impacted national implementation.

I will also look at the cases of Libya and Syria. Since these are the only states that declared chemical weapons upon joining the CWC to not have implemented national legislation, they are not indicative of any larger trend.[379] I will therefore consider each case on its own without an attempt to draw any broader conclusions.

## BOLIVIA

On January 13, 1993, the CWC opened for signature and Bolivia signed it one day later.[380] Bolivia ratified the Convention with the passage of Act No. 1870 on June 15,

[377] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018."
[378] "World Bank Country and Lending Groups," The World Bank, accessed May 1, 2019, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.; James Martin Center, "Country Profiles."
[379] Kimball, "Chemical Weapons: Frequently Asked Questions."
[380] Kimball, "Chemical Weapons Convention Signatories and States Parties."

1998.[381] Prior to the CWC, Bolivia's primary law relating to hazardous chemicals was Environmental Law No. 1333, which stipulates in Article 113 that any person or entity involved in the introduction, transport, or storage of toxic waste, including chemicals, within the country can face a prison term of up to ten years.[382] This legislation, however, chiefly focuses on environmental restrictions rather than prohibiting the development, production, stockpiling, and use of chemical weapons by individuals within the country. The ratification of the CWC meant that Bolivia was now required to comply with its contents, including Article VII. However, Environmental Law No. 1333 did not cover many of the initial measures required by Article VII, therefore requiring the implementation of new regulations. Over the next decade, Bolivia worked to create and pass a set of laws that would meet the requirements stipulated by Article VII.

Throughout the early and mid 2000s, Bolivia submitted draft legislation to the Technical Secretariat for feedback at least once a year.[383] Despite these efforts, progress towards passing the regulations was slow and faced setbacks. For example, in April of 2006, Bolivia reported to the OPCW that there "no material or technical resources were available to achieve its objectives" and that it "would continue to need external assistance to achieve its goals".[384] Later that year, it further expanded on this by saying that assistance with reviewing the draft regulations was necessary because its National Authority lacked the required funding and remained unstaffed. The draft legislation was submitted to the Bolivian National Congress in November 2007 but the process was

[381] Congreso Nacional de Bolivia, "Bolivia LEY No 1870 del 15 Junio 1998," June 15, 1998, http://www.derechoteca.com/gacetabolivia/ley-1870-del-15-junio-1998/.
[382] Congreso Nacional de Bolivia, "Law No. 1333 - Environmental Law," 1992, https://digitalrepository.unm.edu/la_energy_policies/ 271.
[383] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 29 July 2011," July 29, 2011, 60.
[384] Ibid.

delayed further by the adoption of a new constitution in December of 2008.[385] Because of the delay and changes to the structure of the National Authority due to the new constitution, the draft had to be resubmitted to Parliament. This was not accomplished until 2010.[386] Then, it would be another three years before the *"Ley de Armas de fugeo, municiones, explosivos y otras materiales relacionados"* was adopted by the Bolivian National Congress on August 28, 2013.[387] The passage of this legislation, which was assessed to cover all of the initial measures required by the CWC, placed the country in full compliance with Article VII.[388]

Since that time, however, Bolivia has raised questions about the comprehensiveness of its regulations. During the August 2017 to July 2018 reporting period, Bolivia "informed the [Technical] Secretariat that it has legislation covering only some of the measure and has requested legislative assistance in addressing the gaps in its legislative and regulatory framework on the Convention."[389] In response to this, the OPCW has downgraded Bolivia to a partial implementation status and requested more information regarding the deficiencies in its legislation. As of May 2019, Bolivia has not yet publically disclosed what areas of legislation contain gaps. [390]

The case of Bolivia highlights the difficulties faced by many countries when adopting national legislation to implement the CWC. The country ratified the CWC in 1998, which means that it was in noncompliance with Article VII until at least 2013 and now may be in noncompliance once again. This violation is clearly not a conscious

[385] Ibid.
[386] Ibid. 62.
[387] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2014," July 31, 2014, 6.
[388] Ibid.
[389] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018."
[390] Ibid.

choice, however, as Bolivia's regular status updates and draft submissions to the Technical Secretariat indicate it is committed to developing and implementing effective national legislation. Instead, Bolivia's noncompliance appears to stem from insufficient resources and hurdles in government and the legislative process. As its representatives repeatedly pointed out to the OPCW, the country lacked the means to establish a functioning National Authority that would oversee and organize the implementation process because the National Authority decree passed by the its congress lacked sufficient funding to procure the necessary technical and material resources.[391] Additionally, passing national regulations on chemical weapons was of low importance within the government, especially when considering the other matters on the table such as adopting a new constitution.[392] This resulted in a slow legislative process. The draft regulations took roughly 15 years to work their way through the National Congress and be approved. The case of Bolivia also illustrates that even once implemented, national regulations may fall short of their intended goal. Its comment to the Technical Secretariat during the last reporting period indicates that although the regulations may appear to cover all the initial measures on paper, Bolivia has been unable to implement them in a way that fulfills its obligations under the CWC.

## ARMENIA

Armenia ratified the CWC on January 27, 1995, and the Convention entered into force in the country on April 29, 1997 when the required 65 instruments of ratification

[391] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 29 July 2011," 60.; "Entry into Force," OPCW, accessed May 1, 2019, https://www.opcw.org/chemical-weapons-convention/articles/article-xxi-entry-force.
[392] Ibid.

were obtained.[393] Per Article 6 of the Armenian Constitution, which was adopted on June 5, 1995, international treaties become part of the Armenian legal system upon their ratification.[394] Therefore, in addition to requiring compliance with the Convention, the CWC's ratification also established it as superseding any domestic laws that may be in conflict with the prohibitions set out in the Convention. When Armenia constructed and adopted the Criminal Code of the Republic of Armenia in 2003, it included measures relating to WMDs in an effort to comply with the CWC and other non-proliferation treaties.[395] Because this umbrella law covered nuclear, biological, and chemical weapons, Armenia's Ministry of Justice originally asserted that it did not need further legislation to meet the requirements of Article VII.[396]

To confirm that its current legislation was sufficient, Armenia requested that the Technical Secretariat review it. After reviewing the existing legislation, however, the Technical Secretariat recommended Armenia make updates to its legal code that specifically target chemical weapons to allow for more effective implementation of the CWC. The changes, which Armenia adopted, were primarily aimed at ensuring the state's ability to accurately report on schedule 1, 2, and 3 chemicals.[397] With the updates, the Criminal Code was deemed to cover all the initial measures required by Article VII in 2006.[398] However, by 2010, this assessment had changed; the Technical Secretariat recommended including additional specific legislation to complement the more

[393] Kimball, "Chemical Weapons Convention Signatories and States Parties."
[394] Permanent Mission of Armenia to the United Nations, "The report of the Republic of Armenia on the implementation of Security Council resolution 1540 (2004)," 2004, 2, https://undocs.org/S/AC.44/2004/(02)/72.
[395] Ibid.
[396] OPCW, "Report on the Plan of Action Regarding the Implementation of Article VII Obligations," 2005, 49. https://www.opcw.org/sites/default/files/documents/CSP/C-10/en/C-10_DG.4_Rev.1.pdf.
[397] Ibid.
[398] OPCW. "Report to the Conference of the States Parties at its Eleventh Session on the Status of Implementation of Article VII of the Chemical Weapons Convention as at 1 November 2006." November 1, 2006, 48, https://www.opcw.org/sites/default/files/documents/CSP/C-11/en/c11dg06_en.pdf.

overarching existing laws.[399]After modifying Government Decree No. 861, the legislation regarding a protection plan in case of a chemical attack or other chemicals-related disaster, to include definitions of "chemical weapons," "poisonous chemicals," "toxic chemicals," "precursors," and "chemical equipment," Armenia was once again declared in compliance with Article VII.[400]

In 2015, the Technical Secretariat raised additional concerns about the comprehensiveness of the legislation covering chemical weapons and Armenia was determined to be lacking regulations regarding some of the initial measures.[401] In particular, it assessed that Armenia's penal code did not include extraterritoriality for Armenian nationals who engaged in prohibited activities outside of the country's jurisdiction.[402] This evaluation of partial implementation has continued through 2018 as Armenia continues to interface with the Technical Secretariat to address its gaps in national implementation.[403]

The case of Armenia illustrates another difficulty facing countries implementing national legislation: a lack of clarity on what the regulations require and how they should be incorporated into existing legal structures. In several instances, Armenia believed it was and declared to be in compliance only to have it be determined that its laws were not specific enough to allow for effective implementation of its obligations under the CWC. Although Armenia has not been in compliance with Article VII, its violations have not

[399] OPCW. "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 29 July 2011,"51.
[400] Republic of Armenia, "National Action Plan for the Implementation of UN SC Resolution 1540 2015-2020," 2015, 6, https://www.un.org/en/sc/1540/documents/Armenia-action-plan.pdf.
[401] OPCW, "Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2015: Article VII – Initial Measures," July 31, 2015, https://www.opcw.org/sites/default/files/documents/EC/80/en/ec80dg15_c20dg12_e_.pdf.
[402] OPCW, "Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018: Article VII – Initial Measures," August 24, 2018, https://www.opcw.org/documents/2018/08/c-23dg6-ec-89dg7/report-director-general-status-implementation-article-vii.
[403] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018," 26.

been intentional. It has updated its Criminal Code when alerted of a potential area of noncompliance and continues to work with the Technical Secretariat to address its outstanding gaps in legislation.[404]

## LEBANON

Lebanon's legal restrictions on the use of chemical weapons predate its accession to the CWC in 2008. A 1958 act outlines that "all acts intended to cause a state of terror or committed by means such as explosive devices, inflammable substances, poisonous or incendiary products or infectious or microbial agents that are of such nature as to cause a public danger" are punishable by a life sentence of hard labor or execution.[405] It was passed as part of a broader effort to increase the criminal penalties for sedition, terrorism, and civil war.[406] Although this law does not specifically address chemical weapons use, it could have been used to prosecute perpetrators who did engage in the use of such weapons. However, this preexisting legislation was not sufficient to cover the initial measures detailed in Article VII once Lebanon had joined the CWC in 2008.[407] For example, it did not contain definitions for terms central to the CWC such as "chemical weapon", it lacked a legal framework for reporting on the use of scheduled chemicals, it did not allow for extraterritoriality, and although it more broadly provided an avenue for the prosecution of chemical weapons use, it never actually established them as prohibited

[404] Ibid.
[405] Lebanese Republic, "First report of Lebanon to the Security Council Committee established pursuant to resolution 1540 of 28 April 2004," October 20, 2004, 3, https://undocs.org/S/AC.44/2004/(02)/83.
[406] "Security Council Authorizes Establishment of Special Tribunal to Try Suspects in Assassination of Rafiq Hariri," United Nations, May 30, 2007, https://www.un.org/press/en/2007/sc9029.doc.htm.
[407] Kimball, "Chemical Weapons Convention Signatories."

substances.[408] As a result, Lebanon and the Technical Secretariat determined that additional national legislation would be required to be in compliance with Article VII.[409]

To assist with the implementation process, Lebanon requested and received model provisions and samples of the national legislation of other States Parties from the Technical Secretariat. The Technical Secretariat additionally offered assistance to the country in determining what measures to adopt and how existing legislation fit in to the obligations of the Convention.[410] After several years of minimal progress, Lebanon participated in the Internship Programme for Legal Drafters and National Authorities' Representatives in 2013. The program is a week long legal workshop designed to provide countries and their representatives with the skills to draft national legislation and see it through the approval process held by the OPCW to assist states that are not yet in compliance with Article VII of the CWC.[411] As a result of the program, the representatives of Lebanon were able to produce a draft national implementing legislation and to submit it to the National Authority later the same year. In 2014, the National Authority noted a delay in the draft's progress due to its translation into Arabic but reaffirmed that its adoption was of high priority.[412] As of 2018, Lebanon is still determined to be in noncompliance with Article VII as it waits for government approval of its draft national implementation measures.[413]

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[408] OPCW, "Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2015: Article VII – Initial Measures," 13.
[409] OPCW, "Report to the Conference of the States Parties at its Fifteenth Session on the Status and Progress Regarding Legislative and Regulatory Implementation of Article VII of the Chemical Weapons Convention (Including Assistance Provided) as at 30 July 2010," July 30, 2010, 104.
[410] Ibid.
[411] "Internship Programme for Legal Drafters and National Authority Representatives," OPCW, 2018, https://www.opcw.org/resources/capacity-building/national-implementation-programmes/internship-programme-legal-drafters.
[412] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2014," 72.
[413] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018," 38.

Lebanon's case once again highlights that a lack of national implementation measures can primarily be due to insufficient resources and slow governmental processes rather than an intentional decision to remain in violation of Article VII. Lebanon has taken numerous steps to produce regulations covering the initial measures required by the CWC including seeking assistance from the Technical Secretariat and attending workshops to mitigate its lack of legal experience in this area. Although it remains in violation of the CWC, it is attempting to address the gaps in its national laws with the draft legislation that has been pending governmental approval for the past several years. A lack of urgency on the part of its government has greatly slowed Lebanon's efforts to be in compliance with the CWC.

As illustrated in the three cases above, most of the countries still lacking national implementation of the initial measures are doing so unintentionally, mostly due to a lack of resources, confusion about expectations, and slow approval of draft legislation by the countries' governments. The vast majority of the 71 states that are not in compliance with Article VII of the CWC are actively working with the Technical Secretariat to address gaps in their legislation.

Although most of the countries without national legislation are non-chemical states, there are a few countries, primarily Libya and Syria, that are chemical states and have yet to implement national measures. Given their current or historical chemical weapons capabilities, there is the possibility that their lack of compliance is deliberate rather than unintentional.

Libya joined the CWC and gave up its chemical weapons program in 2004.[414] It is not assessed to be interested in restarting its program at this point in time.[415] The country has faced internal instability and civil war for significant periods over the last decade.[416] These conflicts have likely hindered Libya's ability to adopt national legislation as competing coalitions have each created governments making it unclear what body would approve such legislation.[417] In spite of the domestic turmoil, Libya currently has draft legislation awaiting government approval.[418] This suggests that the country's compliance issues are primarily due to instability and civil war rather than an intentional desire to keep chemical weapons legal within its borders.

Syria acceded to the CWC in 2013.[419] When it committed to the Convention, Syria gave up its stockpiles for destruction and said it was ending its chemical weapons program. The use of chemical weapons by Syrian government forces in the years since then, however, indicates that the country still has an active chemical weapons program.[420] As of July 2018, it has not yet started draft legislation.[421] It is possible that this delay is due domestic instability from the Syrian civil war but, given Syria's ongoing chemical weapons program, it cannot be ruled out that Syria's noncompliance with Article VII is deliberate. The Syrian government would likely be reluctant to pass legislation criminalizing the production and use of chemical weapons if they intended to maintain an active chemical warfare program.

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[414] Kimball, "Chemical Weapons Convention Signatories."
[415] "Libya," Nuclear Threat Initiative.
[416] "Civil War in Libya," Council on Foreign Relations, accessed on April 30, 2019, https://www.cfr.org/interactive/global-conflict-tracker/conflict/civil-war-libya.
[417] Ibid.
[418] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018."
[419] Kimball, "Chemical Weapons Convention Signatories."
[420] Kimball, "Timeline of Syrian Chemical Weapons Activity, 2012-2019."
[421] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018."

## SECTION III – NATIONAL ENFORCEMENT

Compliance does not end with the implementation of national regulations, however. These laws must be enforced if they are to accomplish their goal of prohibiting the development, production, stockpiling, and use of chemical weapons around the world. Unfortunately, it is difficult to assess whether countries with national legislation are enforcing it properly by identifying illegal activities and prosecuting violations. Violations can generally only be detected when they are discovered. Detection requires effective monitoring and reporting, which in turn requires resources. A lack of resources or a lack of political will can make it challenging to determine the true number of violations, both detected and undetected, and, therefore, it can be difficult to evaluate whether national laws are being employed in an appropriate manner. This process is further complicated by the dual-use nature of many chemicals and related equipment, which can then require the differentiation between legitimate trade and chemical weapons proliferation. The difficulty in assessing compliance with the CWC through enforcement of national laws is illustrated in the cases of QC Chen and Hans Raj Shiv.

### QC CHEN

QC Chen is a Chinese national who has been sanctioned multiple times since 1997 by the United States for allegedly providing supplies to other countries' chemical weapons programs, most frequently Iran.[422] In response to the sanctions, China has pushed back highlighting that it is in compliance with Article VII and therefore would

[422] U.S. Department of State, "Complete List of Sanctioned Entities," 2019, https://www.state.gov/t/isn/c15231.htm.

have not allowed QC Chen's business transactions if they were violating any aspect of the CWC.[423] It is possible the QC Chen did not break any Chinese laws with his business dealings; however, given evidence linking him to exports of dual-use chemical precursors, equipment, and technology to Iran along with the assessment of US intelligence that he is a chemical weapons proliferator operating a black market for chemical weapons-related materials out of China, this is unlikely.[424]

QC Chen is just one of many Chinese entities or foreign entities operating in China that have been sanctioned by the United States and other countries for their involvement in providing supplies and expertise for chemical weapons programs.[425] China has had laws prohibiting the production, development, and transfer of chemicals controlled by the CWC since 1995. An additional law passed in 1997 made it illegal to acquire, possess, store, use, aid another engaging in the aforementioned activities, and finance the aforementioned activities.[426] But this pattern of alleged chemical weapons procurement raises questions about China's enforcement of its national regulations regarding chemical weapons, especially in the areas of trade and dual-use materials. It is unclear whether the failure to catch these violations is due to a lack of resources to implement its national laws effectively or a willful blindness to the actions of these entities. Additionally, although the number of sanctioned entities is compelling evidence that China is at least not fully complying with the application of the laws stipulated under Article VII of the CWC, China maintains that these individuals and businesses did not

[423] Ibid.
[424] "Chinese National Linked to the Chemical Black Market," Nuclear Threat Initiative, June 4, 2007, https://www.nti.org/gsn/article/chinese-national-linked-to-chemical-black-market/.

[425] U.S. Department of State, "Complete List of Sanctioned Entities."
[426] "1540 Committee Matrix of China," United Nations, December 4, 2007, https://www.un.org/en/sc/1540/documents/China%20revised%20matrix.pdf.

violate the law and are being wrongly punished as no evidence, which the US government asserts is based on intelligence sources, has been made public.[427]

The dual-use nature to the materials being transferred makes it difficult to assess the validity of the United States' and China's assertions. Although dual-use chemicals and related technology can be used in weapons applications, they also have legitimate civilian and commercial uses.[428] It can be difficult to determine if individuals or corporations that are involved in supplying chemical weapons programs with materials are aware of the purpose of the goods. Even evidence tying the entities to the final destinations of the goods is not entirely conclusive as commodities can be illicitly diverted from their original destination without the knowledge of the seller.[429] This adds an additional layer of complexity to the challenge of assessing the enforcement of national legislation because entities can believe they are following the law while simultaneously being part of an unlawful procurement network. The case of QC Chen highlights the difficulties in determining if a country is implementing its national legislations and, if it is not, identifying if the noncompliance is intentional or unintentional.

[427] Seth Brugger, "China Sanctioned for Chem, Bio Transfers to Iran," 2002, https://www.armscontrol.org/act/2002_03/cbchinamarch02.; Tim Johnson, "U.S. Slapping More Sanctions on Chinese Defense Companies," McClatchy DC Bureau, May 24, 2007, https://www.mcclatchydc.com/latest-news/article24450598.html.
[428] "Examples of Dual Use Items," The University of Oklahoma, accessed May 1, 2019, http://www.ou.edu/exportcontrols/advice_for_researchers/Examples_Dual_Use.
[429] Steve Osborne, "Brexit and Export Controls: Challenges Facing the UK and the EU in Controls and Enforcement, and the Implications for Proliferation and National Security," Project Alpha, January 31, 2018, https://projectalpha.eu/tag/export-control/#.

## HANS RAJ SHIV

The case of Hans Raj Shiv also illustrates the difficulty in identifying if noncompliance is intentional or deliberate and in determining if discovered violations are isolated incidents or emblematic of a systemic problem. Shiv, an Indian national, is the founder of the India-based NEC Engineers Private Limited. In the early 2000s, NEC Engineers Private Ltd. was investigated for falsifying customs documents, mislabeling goods, and routing exports through other Middle Eastern countries to avoid UN restrictions on Iraqi imports in order to supply Iraq with materials for producing chemical weapons.[430] The company was also accused of sending personnel to Iraq in order to install equipment for the Fallujah II chemical plant that was used for the large-scale manufacture of chlorine, which is a dual-use chemical with applications in water purification and as a chemical weapon.[431] India's decisions to suspend the export privileges of the company, revoke the passports of the company's senior officials, and launch an investigation in response to the intelligence reports exposing evidence of possible violations, suggest that the lapses were unintentional.[432] However, it is difficult to be certain that those actions were taken in an effort to enforce national non-proliferation legislation and hold perpetrators responsible or if they were just in response to international pressure over the incident.[433] This example also highlights the difficulties in determining if identified violations are isolated incidents or part of a larger trend. Since Hans Raj Shiv and his company were found to be exporting goods and materials to Iraq

[430] Satinder Bindra, Amol Sharma, "Probe into Illegal Indian Exports to Iraq," CNN, January 26, 2003, http://www.cnn.com/2003/WORLD/asiapcf/south/01/25/sprj.india.iraq/.
[431] Ibid.
[432] Bob Drogin, "Indian Firm Aided Iraq," Los Angeles Times, January 19, 2003, https://www.latimes.com/archives/la-xpm-2003-jan-19-fg-india19-story.html.
[433] Nuclear Threat Initiative, "India Chemical Chronology," 2008, 9-11.

in violation of Indian law and UN restrictions, there have been few allegations of CWC violations by entities in India or of Indian origin.[434] What remains unclear is whether this is because there are no individuals or entities attempting to violate the prohibitions outlined in the CWC or whether it is because individuals and entities violating those prohibitions have remained undetected.

Although national enforcement of restrictions on the production, stockpiling, trade, and use of chemical weapons is obviously essential to assessing compliance with the CWC, the examples above highlight the difficulties in determining the status of national enforcement. Given the uncertainty in considering if enforcement is occurring among countries that have implemented national legislation, another option would be to look at how violations by non-state actors have changed over time. Prior to the CWC's entry into force in 1997, there were a large number of individuals and companies identified and prosecuted as chemical weapons proliferators. These were global illicit trade operations often incorporating people and entities in multiple countries including the United States, China, India, West Germany, Singapore, and Pakistan.[435] Since the CWC has entered into force, the number of incidents involving violations of the Convention by companies and individuals has appeared to decrease.[436]

In 1994, the US sanctioned 12 entities under the CBW Act for having been determined to have "knowingly contributed to the efforts of a country to acquire, use, or

[434] U.S. Department of State, "Complete List of Sanctioned Entities."
[435] "Iran Chemical Weapons Update –1998," Wisconsin Project on Nuclear Arms Control, January 1, 1998, https://www.wisconsinproject.org/iran-chemical-weapon-update-1998/.
[436] U.S. Department of State. "Complete List of Sanctioned Entities."

stockpile chemical or biological weapons."[437] Six entities were sanctioned in 1995 and 10 were sanctioned in 1997, the year the CWC entered into force. In 2002, five years after the CWC entered in to force, eight entities were sanctioned under the CBW Act.[438] The following year, three entities were sanctioned. Since then, only foreign governments have been sanctioned under that act: Syria in 2013, North Korea in 2018, and Russia in 2018.[439] Although the U.S. Department of State's List of Sanctioned Entities is a limited sample of data, the trend suggests that several years after the CWC entered into force, there were fewer incidents of individuals or companies being sanctioned for their support of chemical and biological weapons programs than there were in the years prior to 1997. This change could be because of a number of factors, such as the legal restrictions required by Article VII, a decrease in interest in pursuing chemical weapons capabilities, an increased ability of violators to escape detection, or a combination of the aforementioned.

## SECTION IV – CONCLUSIONS ON COMPLIANCE WITH ARTICLE VII

The countries that have struggled to be in compliance with Article VII of the CWC suggest that their noncompliance is primarily unintentional rather than purposeful. They are mainly developing countries and have not had a chemical weapons program in the past or expressed any interest in obtaining in the future. Therefore, there would be little motivation for them to resist criminalizing the development, storage, and use of

[437] Ibid.; 102th Congress, *H.R.3409 – Chemical and Biological Weapons Control and Warfare Elimination Act of 1991*, Library of Congress, November 26, 1991, https://www.congress.gov/bill/102nd-congress/house-bill/3409.
[438] U.S. Department of State, "Complete List of Sanctioned Entities."
[439] Ibid.

chemical weapons. It is more likely that their noncompliance is due to a lack of resources to properly implement the initial measures outlined in Article VII. The examination of the case studies Bolivia, Armenia, and Lebanon supports this supposition. These examples additionally demonstrate that confusion regarding how the measures should be incorporated into existing legal structures and slow governmental approval processes are also major contributors to a lack of national implementation measures.

In terms of determining compliance with Article VII in countries that have implemented legislation covering all of the initial measures, the limitations regarding assessing this area make it difficult to draw a broad conclusion. It appears that the number of violations of the CWC by individuals and entities has decreased since the Convention has entered into force. This would suggest that at least some states are in compliance as either the countries' adoption of new national legislation or their enforcement of such regulations is proving to be a deterrent to would-be violators. But given the uncertainty in identifying violations, this conclusion cannot be given much weight.

# CHAPTER V – CONCLUSIONS AND IMPLICATIONS

*Main Findings*

This thesis examined the factors that influenced compliance or noncompliance with the CWC from the vantage points of chemical disarmament and nonproliferation and national legislation. Both sections utilized case studies of various countries to assess what circumstances were influential in a state's decision to comply or not comply with the CWC. The analysis of the case studies on chemical disarmament and nonproliferation found that domestic and external pressure were the most significant factors among states that were in compliance with the CWC. In countries that were in compliance with the CWC and also had no history of chemical weapons programs, the presence of domestic norms against chemical weapons was an additional influencing factor. Among countries that were not in compliance with the CWC, the most important factors in the decision to not comply with the Convention were access to resources for a chemical weapons program, the presence of security threats, and domestic norms in favor of chemical weapons programs.

The analysis of case studies on the implementation of national legislation determined that a lack of resources and low political priority for adopting measures required by the CWC were the primary reasons countries had not yet implemented the legislation required by Article VII. For countries that have implemented national legislation, it is difficult to draw a broad conclusion because of the complicated task of assessing the effectiveness of enforcement as both of the case studies in this section highlighted. An examination of how United States sanctions on individuals and entities

for chemical weapons-related violations have changed since the CWC entered into force suggests that the number of violations has decreased in the years since 1997. It is not clear if this is due to the implementation of national legislation, a decrease in interest in procuring materials for chemical weapons, or the increased ability of entities to evade detection.

*Implications and Recommendations*

The conclusions of this thesis hold implications for the future of the CWC and chemical disarmament and nonproliferation efforts more broadly. They illustrate that in terms of disarmament and nonproliferation, countries that comply with the CWC are primarily influenced by domestic and external pressure to sign the Convention and abide by its restrictions. Countries that do not comply with the CWC, however, are faced with significant threats to their security and have both access to resources for a program and domestic norms in support of it. Therefore, if the international community is looking to strengthen compliance with the disarmament and nonproliferation aspects of the CWC, it should focus on combining these factors to influence states' behavior. Encouraging domestic and external pressure on a noncompliant country from entities the country cares about in addition to restricting the country's access to resources it needs to support its program and providing outreach to help mitigate security threats could provide an environment that is conducive to motivating a country to come into compliance with the CWC. This approach could also be used to target Israel, Egypt, South Sudan, and North Korea, which have yet to accede to the CWC.

In terms of national legislation, the conclusions demonstrate that states that are not in compliance with the CWC are generally noncompliant out of a lack of resources and lack of political urgency to adopt such measures. To boost compliance among these countries, the Technical Secretariat could provide additional legislation review services, drafting workshops, and give presentations to the country's lawmakers to emphasize the importance of Article VII to help countries draft and adopt legislation in a timely manner. Clearer and more detailed explanations of what national legislations should include would also likely result in a more streamlined implementation process, as it would prevent states from adopting laws they believe cover all initial measures required by the CWC only to discover later on that they do not.

The conclusions on national legislation also highlight that as more and more states adopt laws to enforce the CWC within their territory, the next challenge in assessing compliance will be tracking enforcement of national legislation. This is an issue that the OPCW should begin addressing now to prevent difficulties with unintentional noncompliance due to a lack of resources, lack of will, or confusion about the requirements down the road. By providing additional resources and training for countries upfront to assist in the establishment of enforcement mechanisms and tracking, the international community can likely avoid some of the noncompliance issues seen with the implementation of national legislation.

*Conclusion*

In the past year, dozens of people have died and hundreds have been injured in chemical weapons attacks.[440] While these numbers may pale in comparison to the number of people injured and killed by conventional arms, the use of chemical warfare is still a very pressing issue. Civilian populations are uniquely vulnerable to chemical weapons attacks because they lack protective equipment. Nearly all of the causalities from chemical attacks in the last year have been civilians.[441] Additionally, children and babies are often disproportionately affected by exposure to chemical agents because their small bodies have much lower lethal doses than adults. The risk that these weapons pose to vulnerable populations in addition to the suffering that they inflict upon victims highlights the importance of reducing their use.

While this thesis has primarily focused on issues of compliance and noncompliance with the CWC, there are broader implications for the conclusions than just improving compliance with the Convention. Increased compliance with the CWC moves the international community closer to the complete elimination of chemical warfare and, in turn, decreases the chance than anyone, civilians and soldiers alike, will become the victim of a chemical weapons attack. This thesis hopes to contribute to that process by identifying the factors that are most important in a country's decision to comply or not comply with the CWC so that they can be leveraged to promote disarmament, nonproliferation, and the implementation of effective criminal penalties.

[440] "Syria War: What We Know About Douma 'Chemical Attack'," BBC News, July 10, 2018, https://www.bbc.com/news/world-middle-east-43697084.
[441] Ibid.

# GLOSSARY

Blistering Agent: compound that produce burn-like skin injuries

Blood Agent: compound that disrupts the ability of blood cells to transfer oxygen

Choking Agent: compound that causes swelling and fluid secretion in the respiratory track

Lachrymator: chemical agent that causes tear production

Nerve Agent: organophosphorous compound that blocks nerve impulses between cells

Precursor: a chemical that is used as a reactant in the synthesis of chemical weapons

Riot Control Agent: compound that causes temporary irritation to the eyes, skin, and respiratory system, effects disappear quickly after exposure is ended

Sternutator: chemical agent that causes respiratory irritation resulting in sneezing

# APPENDIX I

Country Responses to Declaration (IV, 2) of the 1899 Hague Peace Conference as of July 29, 1899[442]

| Country | Declaration (IV, 2) |
|---|---|
| Germany | Signed |
| Austria-Hungary | Signed |
| Belgium | Signed |
| China | Signed |
| Denmark | Signed |
| Spain | Signed |
| United States of America | Not Signed |
| United Mexican States | Signed |
| France | Signed |
| Great Britain | Not Signed |
| Greece | Signed |
| Italy | Signed |
| Japan | Signed |
| Luxemburg | Signed |
| Montenegro | Signed |
| Netherlands | Signed |
| Persia | Signed |
| Portugal | Signed |
| Roumania | Signed |
| Russia | Signed |
| Serbia | Signed |
| Siam | Signed |
| United Kingdoms of Sweden and Norway | Signed |
| Switzerland | Signed |
| Turkey | Signed |
| Bulgaria | Signed |

[442] *The Proceedings of the Hague Peace Conferences*. Translated by the Division of International Law of the Carnegie Endowment for International Peace. New York: Oxford University Press, 1899.

# APPENDIX 2

Country Responses to the Questions Posed to the Committee with Respect to Poison Gases on December 6, 1921[443]

| | Japan | France | Italy | Great Britain | United States |
|---|---|---|---|---|---|
| "Do poisonous gases represent as to their effect a weapon analogous to the other means of fighting?" | No | Yes | No | Yes | Yes |
| "Is it possible to take as a basis for a conventional limitation of the uses of poisonous gases their physical, chemical or physicological effects?" | No | No | No | No | No |
| "Is it technically possible or not to confine the actions of poisonous gases to combatants only?" | Yes | Yes | Yes | Yes | Yes |
| "Is it technically possible or not to prevent the research or fabrication of poisonous gases in time of peace?" | Yes | No | No | No | No |
| "Is it technically possible or not to restrict the research of poisonous gases in time of peace?" | No | No | No | No | No |
| "Is it technically possible or not to restrict the fabrication of poisonous gases in time of peace?" | Yes | Yes | Yes | Yes | No |
| "Assuming that it would be possible to restrict the research or fabrication of poisonous gases in time of peace, is it technically possible or not to supervise such research or fabrication?" | Yes | Yes for fabrication, No for research | Yes for fabrication, No for research | No | No |
| "Is it possible to establish a conventional basis for the limitation of the use of gases, on the ground of the effect of the gases; e.g., prohibiting the use of lethal gases against cities?" | No | No | No | No | No |

[443] *Minutes (Uncorrected) of Committee Meetings at the Conference on the Limitation of Armament*, 342-346.

# APPENDIX 3

Chemical Weapons Convention Signatories and States-Parties[444]

| Country | Signature | Ratification/Accession |
|---|---|---|
| Afghanistan | 1/14/93 | 9/24/03 |
| Albania | 1/14/93 | 5/11/94 |
| Algeria | 1/13/93 | 8/14/95 |
| Andorra | — | 2/27/03 |
| Angola | — | 9/16/15 |
| Antigua & Barbuda | — | 8/29/05 |
| Argentina | 1/13/93 | 10/2/95 |
| Armenia | 3/19/93 | 1/27/95 |
| Australia | 1/13/93 | 5/6/94 |
| Austria | 1/13/93 | 8/17/95 |
| Azerbaijan | 1/13/93 | 2/29/00 |
| Bahamas | 3/2/94 | 4/21/09 |
| Bahrain | 2/24/93 | 4/28/97 |
| Bangladesh | 1/14/93 | 4/25/97 |
| Barbados | — | 3/7/07 |
| Belarus | 1/14/93 | 7/11/96 |
| Belgium | 1/13/93 | 1/27/97 |
| Belize | — | 12/1/03 |
| Benin | 1/14/93 | 5/14/98 |
| Bhutan | 4/23/97 | 8/18/05 |
| Bolivia | 1/14/93 | 8/14/98 |
| Bosnia and Herzegovina | 1/16/97 | 2/25/97 |
| Botswana | — | 8/31/98 |
| Brazil | 1/13/93 | 3/13/96 |
| Brunei Darussalem | 1/13/93 | 7/28/97 |

[444] Kimball, "Chemical Weapons Convention Signatories and States-Parties."

| | | |
|---|---|---|
| Bulgaria | 1/13/93 | 8/10/94 |
| Burkina Faso | 1/14/93 | 7/8/97 |
| Burundi | 1/15/93 | 9/4/98 |
| Cambodia | 1/15/93 | 7/19/05 |
| Cameroon | 1/14/93 | 9/16/96 |
| Canada | 1/13/93 | 9/26/95 |
| Cape Verde | 1/15/93 | 10/10/03 |
| Central African Republic | 1/14/93 | 9/20/06 |
| Chad | 10/11/94 | 2/13/04 |
| Chile | 1/14/93 | 7/12/96 |
| China | 1/13/93 | 4/25/97 |
| Colombia | 1/13/93 | 4/5/00 |
| Comoros | 1/13/93 | 9/17/06 |
| Congo | 1/15/93 | 12/4/07 |
| Cook Islands | 1/14/93 | 7/15/94 |
| Costa Rica | 1/14/93 | 5/31/96 |
| Côte d'Ivoire | 1/13/93 | 12/18/95 |
| Croatia | 1/13/93 | 5/23/95 |
| Cuba | 1/13/93 | 4/29/97 |
| Cyprus | 1/13/93 | 8/28/98 |
| Czech Republic | 1/14/93 | 3/6/96 |
| Democratic Republic of Congo | 1/14/93 | 10/12/05 |
| Denmark | 1/14/93 | 7/13/95 |
| Djibouti | 9/28/93 | 1/25/06 |
| Dominica | 8/2/93 | 2/12/01 |
| Dominican Republic | 1/13/93 | 3/26/09 |
| Ecuador | 1/14/93 | 9/6/95 |
| El Salvador | 1/14/93 | 10/30/95 |
| Egypt | | |
| Equatorial Guinea | 1/14/93 | 4/25/97 |
| Eritrea | — | 2/14/00 |
| Estonia | 1/14/93 | 5/26/99 |
| Ethiopia | 1/14/93 | 5/13/96 |
| Fiji | 1/14/93 | 1/20/93 |

| | | |
|---|---|---|
| Finland | 1/14/93 | 2/7/95 |
| France | 1/13/93 | 3/2/95 |
| Gabon | 1/13/93 | 9/8/00 |
| Gambia | 1/13/93 | 5/19/98 |
| Georgia | 1/14/93 | 11/27/95 |
| Germany | 1/13/93 | 8/12/94 |
| Ghana | 1/14/93 | 7/9/97 |
| Greece | 1/13/93 | 12/22/94 |
| Grenada | 4/9/97 | 6/3/05 |
| Guatemala | 1/14/93 | 2/12/03 |
| Guinea | 1/14/93 | 6/9/97 |
| Guinea-Bissau | 1/14/93 | 6/19/08 |
| Guyana | 10/6/93 | 9/12/97 |
| Haiti | 1/14/93 | 2/22/06 |
| Holy See | 1/14/93 | 5/12/99 |
| Honduras | 1/13/93 | 8/29/05 |
| Hungary | 1/13/93 | 10/31/96 |
| Iceland | 1/13/93 | 4/28/97 |
| India | 1/14/93 | 9/3/96 |
| Indonesia | 1/13/93 | 11/12/98 |
| Iran | 1/13/93 | 11/3/97 |
| Iraq | — | 1/13/09 |
| Ireland | 1/14/93 | 6/24/96 |
| Israel | 1/13/93 | — |
| Italy | 1/13/93 | 12/8/95 |
| Jamaica | 4/18/97 | 9/8/00 |
| Japan | 1/13/93 | 9/15/95 |
| Jordan | — | 10/29/97 |
| Kazakhstan | 1/14/93 | 3/23/00 |
| Kenya | 1/15/93 | 4/25/97 |
| Kiribati | — | 9/7/00 |
| Kuwait | 1/27/93 | 5/28/97 |
| Kyrgyzstan | 2/22/93 | 9/29/03 |
| Laos | 5/13/93 | 2/25/97 |

| | | |
|---|---|---|
| Latvia | 5/6/93 | 7/23/96 |
| Lebanon | — | 11/20/08 |
| Lesotho | 12/7/94 | 12/7/94 |
| Liberia | 1/15/93 | 3/25/06 |
| Libya | — | 1/6/04 |
| Liechtenstein | 7/21/93 | 11/24/99 |
| Lithuania | 1/13/93 | 4/15/98 |
| Luxembourg | 1/13/93 | 4/15/97 |
| Macedonia | — | 6/20/97 |
| Madagascar | 1/15/93 | 10/20/04 |
| Malawi | 1/14/93 | 6/11/98 |
| Malaysia | 1/13/93 | 4/20/00 |
| Maldives | 10/1/93 | 5/31/94 |
| Mali | 1/13/93 | 4/28/97 |
| Malta | 1/13/93 | 4/28/97 |
| Marshall Islands | 1/13/93 | 5/19/04 |
| Mauritania | 1/13/93 | 2/9/98 |
| Mauritius | 1/14/93 | 2/9/93 |
| Mexico | 1/13/93 | 8/29/94 |
| Micronesia | 1/13/93 | 6/21/99 |
| Moldova | 1/13/93 | 7/8/96 |
| Monaco | 1/13/93 | 6/1/95 |
| Mongolia | 1/14/93 | 1/17/95 |
| Montenegro | — | 10/23/06 |
| Morocco | 1/13/93 | 12/28/95 |
| Mozambique | — | 8/15/00 |
| Myanmar | 1/14/93 | 08/07/15 |
| Namibia | 1/13/93 | 11/27/95 |
| Nauru | 1/13/93 | 11/12/01 |
| Nepal | 1/19/93 | 11/18/97 |
| Netherlands | 1/14/93 | 6/30/95 |
| New Zealand | 1/14/93 | 7/15/96 |
| Nicaragua | 3/9/93 | 11/5/99 |
| Niger | 1/14/93 | 4/9/97 |

| | | |
|---|---|---|
| Nigeria | 1/13/93 | 5/20/99 |
| Niue | — | 4/21/05 |
| North Korea | | |
| Norway | 1/13/93 | 4/7/94 |
| Oman | 2/2/93 | 2/8/95 |
| Pakistan | 1/13/93 | 10/28/97 |
| Palau | — | 2/3/03 |
| Palestine | — | 5/17/18 |
| Panama | 6/16/93 | 10/7/98 |
| Papua New Guinea | 1/14/93 | 4/17/96 |
| Paraguay | 1/14/93 | 12/1/94 |
| Peru | 1/14/93 | 7/20/95 |
| Philippines | 1/13/93 | 12/11/96 |
| Poland | 1/13/93 | 8/23/95 |
| Portugal | 1/13/93 | 9/10/96 |
| Qatar | 2/1/93 | 9/3/97 |
| Romania | 1/13/93 | 2/15/95 |
| Russia | 1/13/93 | 11/5/97 |
| Rwanda | 5/17/93 | 3/31/04 |
| St. Kitts & Nevis | 3/16/94 | 5/21/04 |
| St. Lucia | 3/29/93 | 4/9/97 |
| St. Vincent & the Grenadines | 9/20/93 | 9/18/02 |
| Samoa | 1/14/93 | 9/27/02 |
| San Marino | 1/13/93 | 12/10/99 |
| Sao Tome and Principe | — | 9/9/03 |
| Saudi Arabia | 1/20/93 | 8/9/96 |
| Senegal | 1/13/93 | 7/20/98 |
| Serbia | — | 4/20/00 |
| Seychelles | 1/15/93 | 4/7/93 |
| Sierra Leone | 1/15/93 | 9/30/04 |
| Singapore | 1/14/93 | 5/21/97 |
| Slovak Republic | 1/14/93 | 10/27/95 |
| Slovenia | 1/14/93 | 6/11/97 |
| Solomon Islands | — | 9/23/04 |

| | | |
|---|---|---|
| Somalia | — | 5/29/13 |
| South Africa | 1/14/93 | 9/13/95 |
| South Korea | 1/14/93 | 4/28/97 |
| South Sudan | | |
| Spain | 1/13/93 | 8/3/94 |
| Sri Lanka | 1/14/93 | 8/19/94 |
| Sudan | — | 5/24/99 |
| Suriname | 4/28/97 | 4/28/97 |
| Swaziland | 9/23/93 | 11/20/96 |
| Sweden | 1/13/93 | 6/17/93 |
| Switzerland | 1/14/93 | 3/10/95 |
| Syria | | 9/12/13 |
| Tajikistan | 1/14/93 | 1/11/95 |
| Tanzania | 2/25/94 | 6/25/98 |
| Thailand | 1/14/93 | 12/10/02 |
| Timor Leste | — | 5/7/03 |
| Togo | 1/13/93 | 4/23/97 |
| Tonga | — | 5/29/03 |
| Trinidad & Tobago | — | 6/24/97 |
| Tunisia | 1/13/93 | 4/15/97 |
| Turkey | 1/14/93 | 5/12/97 |
| Turkmenistan | 10/12/93 | 9/29/94 |
| Tuvalu | — | 1/19/04 |
| Uganda | 1/14/93 | 11/30/01 |
| Ukraine | 1/13/93 | 10/16/98 |
| United Arab Emirates | 2/2/93 | 11/28/00 |
| United Kingdom | 1/13/93 | 5/13/96 |
| United States | 1/13/93 | 4/25/97 |
| Uruguay | 1/15/93 | 10/6/94 |
| Uzbekistan | 11/24/95 | 7/23/96 |
| Vanuatu | — | 9/16/05 |
| Venezuela | 1/14/93 | 12/3/97 |
| Vietnam | 1/13/93 | 9/30/98 |

| | | |
|---|---|---|
| Yemen | 2/8/93 | 10/2/00 |
| Zambia | 1/13/93 | 2/9/01 |
| Zimbabwe | 1/13/93 | 4/25/97 |

# APPENDIX 4

Implementation Status of National Legislation Measures as of July 31, 2018[445]

| Country | Complete | Partial | None |
|---|---|---|---|
| Afghanistan | | | X |
| Albania | X | | |
| Algeria | X | | |
| Andorra | X | | |
| Angola | | X | |
| Antigua & Barbuda | | X | |
| Argentina | X | | |
| Armenia | | X | |
| Australia | X | | |
| Austria | X | | |
| Azerbaijan | X | | |
| Bahamas | | | X |
| Bahrain | | X | |
| Bangladesh | X | | |
| Barbados | | | X |
| Belarus | X | | |
| Belgium | X | | |
| Belize | X | | |
| Benin | | | X |
| Bhutan | | X | |
| Bolivia | X | | |
| Bosnia and Herzegovina | X | | |
| Botswana | X | | |
| Brazil | X | | |
| Brunei Darussalem | | | X |

[445] OPCW, "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention as at 31 July 2018."

| | | | |
|---|---|---|---|
| Bulgaria | X | | |
| Burkina Faso | X | | |
| Burundi | X | | |
| Cambodia | X | | |
| Cameroon | X | | |
| Canada | X | | |
| Cape Verde | X | | |
| Central African Republic | X | | |
| Chad | | | X |
| Chile | | X | |
| China | X | | |
| Colombia | X | | |
| Comoros | X | | |
| Congo | X | | |
| Cook Islands | X | | |
| Costa Rica | X | | |
| Côte d'Ivoire | | X | |
| Croatia | X | | |
| Cuba | X | | |
| Cyprus | X | | |
| Czech Republic | X | | |
| Democratic Republic of Congo | | | X |
| Denmark | X | | |
| Djibouti | | | X |
| Dominica | | X | |
| Dominican Republic | | X | |
| Ecuador | | X | |
| El Salvador | | X | |
| Egypt | | | |
| Equatorial Guinea | | | X |
| Eritrea | | | X |
| Estonia | X | | |
| Ethiopia | X | | |
| Fiji | X | | |

| | | | |
|---|---|---|---|
| Finland | X | | |
| France | X | | |
| Gabon | | X | |
| Gambia | X | | |
| Georgia | | X | |
| Germany | X | | |
| Ghana | | X | |
| Greece | X | | |
| Grenada | X | | |
| Guatemala | | X | |
| Guinea | | | X |
| Guinea-Bissau | | | X |
| Guyana | | X | |
| Haiti | | | X |
| Holy See | X | | |
| Honduras | | X | |
| Hungary | X | | |
| Iceland | | X | |
| India | X | | |
| Indonesia | X | | |
| Iran | X | | |
| Iraq | | X | |
| Ireland | X | | |
| Israel | | | |
| Italy | X | | |
| Jamaica | | | X |
| Japan | X | | |
| Jordan | X | | |
| Kazakhstan | X | | |
| Kenya | | | X |
| Kiribati | X | | |
| Kuwait | | X | |
| Kyrgyzstan | X | | |
| Laos | X | | |

| | | | |
|---|---|---|---|
| Latvia | X | | |
| Lebanon | | | X |
| Lesotho | X | | |
| Liberia | X | | |
| Libya | | | X |
| Liechtenstein | X | | |
| Lithuania | X | | |
| Luxembourg | X | | |
| Macedonia | X | | |
| Madagascar | X | | |
| Malawi | | | X |
| Malaysia | X | | |
| Maldives | | | X |
| Mali | X | | |
| Malta | X | | |
| Marshall Islands | | | X |
| Mauritania | X | | |
| Mauritius | X | | |
| Mexico | X | | |
| Micronesia | X | | |
| Moldova | X | | |
| Monaco | X | | |
| Mongolia | | X | |
| Montenegro | X | | |
| Morocco | X | | |
| Mozambique | | | X |
| Myanmar | | X | |
| Namibia | | | X |
| Nauru | | | X |
| Nepal | | | X |
| Netherlands | X | | |
| New Zealand | X | | |
| Nicaragua | | X | |
| Niger | X | | |

| | | | |
|---|---|---|---|
| Nigeria | | X | |
| Niue | X | | |
| North Korea | | | |
| Norway | X | | |
| Oman | X | | |
| Pakistan | X | | |
| Palau | X | | |
| Palestine | | | X |
| Panama | X | | |
| Papua New Guinea | | | X |
| Paraguay | X | | |
| Peru | X | | |
| Philippines | | X | |
| Poland | X | | |
| Portugal | X | | |
| Qatar | X | | |
| Romania | X | | |
| Russia | X | | |
| Rwanda | | X | |
| St. Kitts & Nevis | X | | |
| St. Lucia | X | | |
| St. Vincent & the Grenadines | X | | |
| Samoa | | X | |
| San Marino | | X | |
| Sao Tome and Principe | | | X |
| Saudi Arabia | X | | |
| Senegal | X | | |
| Serbia | X | | |
| Seychelles | | X | |
| Sierra Leone | | | X |
| Singapore | X | | |
| Slovak Republic | X | | |
| Slovenia | X | | |
| Solomon Islands | | | X |

| | | | |
|---|---|---|---|
| Somalia | | | X |
| South Africa | X | | |
| South Korea | X | | |
| South Sudan | | | |
| Spain | X | | |
| Sri Lanka | X | | |
| Sudan | X | | |
| Suriname | | | X |
| Swaziland | | | X |
| Sweden | X | | |
| Switzerland | X | | |
| Syria | | | X |
| Tajikistan | X | | |
| Tanzania | | | X |
| Thailand | X | | |
| Timor Leste | | X | |
| Togo | | X | |
| Tonga | | | X |
| Trinidad & Tobago | | | X |
| Tunisia | X | | |
| Turkey | X | | |
| Turkmenistan | X | | |
| Tuvalu | | | X |
| Uganda | X | | |
| Ukraine | X | | |
| United Arab Emirates | X | | |
| United Kingdom | X | | |
| United States | X | | |
| Uruguay | X | | |
| Uzbekistan | X | | |
| Vanuatu | | | X |
| Venezuela | | X | |
| Vietnam | X | | |

| | | | |
|---|---|---|---|
| Yemen | X | | |
| Zambia | X | | |
| Zimbabwe | | X | |

# APPENDIX 5

A. GUIDELINES FOR SCHEDULES OF CHEMICALS[446]

Guidelines for Schedule 1

1. The following criteria shall be taken into account in considering whether a toxic chemical or precursor should be included in Schedule 1:

(a) It has been developed, produced, stockpiled or used as a chemical weapon as defined in Article II;

(b) It poses otherwise a high risk to the object and purpose of this Convention by virtue of its high potential for use in activities prohibited under this Convention because one or more of the following conditions are met:

. (i) It possesses a chemical structure closely related to that of other toxic chemicals listed in Schedule 1, and has, or can be expected to have, comparable properties;

. (ii) It possesses such lethal or incapacitating toxicity as well as other properties that would enable it to be used as a chemical weapon;

. (iii) It may be used as a precursor in the final single technological stage of production of a toxic chemical listed in Schedule 1, regardless of whether this stage takes place in facilities, in munitions or elsewhere;

(d) It has little or no use for purposes not prohibited under this Convention.

Guidelines for Schedule 2

2. The following criteria shall be taken into account in considering whether a toxic chemical not listed in Schedule 1 or a precursor to a Schedule 1 chemical or to a chemical listed in Schedule 2, part A, should be included in Schedule 2:

. (a) It poses a significant risk to the object and purpose of this Convention because it

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possesses such lethal or incapacitating toxicity as well as other properties that could enable it to be used as a chemical weapon;

. (b) It may be used as a precursor in one of the chemical reactions at the final stage of formation of a chemical listed in Schedule 1 or Schedule 2, part A;

. (c) It poses a significant risk to the object and purpose of this Convention by virtue of its importance in the production of a chemical listed in Schedule 1 or Schedule 2, part A;

. (d) It is not produced in large commercial quantities for purposes not prohibited under this Convention.

Guidelines for Schedule 3

3. The following criteria shall be taken into account in considering whether a toxic chemical or precursor, not listed in other Schedules, should be included in Schedule 3:

. (a) It has been produced, stockpiled or used as a chemical weapon;

. (b) It poses otherwise a risk to the object and purpose of this Convention because it possesses such lethal or incapacitating toxicity as well as other properties that might enable it to be used as a chemical weapon;

. (c) It poses a risk to the object and purpose of this Convention by virtue of its importance in the production of one or more chemicals listed in Schedule 1 or Schedule 2, part B;

. (d) It may be produced in large commercial quantities for purposes not prohibited under this Convention.

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