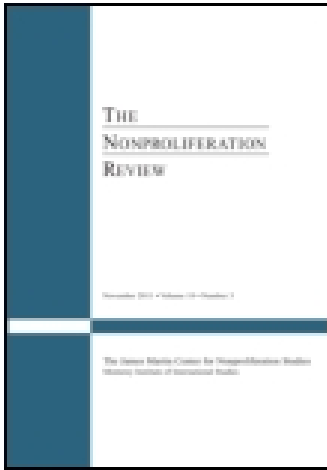


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Publisher: Routledge

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The Nonproliferation Review

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rnpr20>

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Published online: 18 Feb 2014.



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To cite this article: Jason Enia & Jeffrey Fields (2014) The Relative Efficacy of the Biological and Chemical Weapon Regimes, *The Nonproliferation Review*, 21:1, 43-64, DOI: [10.1080/10736700.2014.880560](https://doi.org/10.1080/10736700.2014.880560)

To link to this article: <http://dx.doi.org/10.1080/10736700.2014.880560>

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THE RELATIVE EFFICACY OF THE BIOLOGICAL AND CHEMICAL WEAPON REGIMES

Jason Enia and Jeffrey Fields

The biological and chemical weapon nonproliferation and disarmament regimes are often put forward as models of what the nuclear nonproliferation regime could (or should) be. But are these regimes effective? If so, is one stronger and/or more effective than the other? What is it that makes them relatively stronger than the nuclear nonproliferation regime? In this article, we return to and expand upon a framework for assessing regime health and effectiveness. We utilize this framework to engage in a comparative analysis of the chemical weapon (CW) and biological weapon (BW) nonproliferation regimes, respectively. Our analysis reveals that these two regimes are comparatively healthier than their nuclear counterpart. While some of their behavioral features might be troubling—such as the disputes over stockpile destruction of CW—these tend to be mitigated by the presence of a strong norm against possession and proliferation of both CW and BW. This norm is adequately embedded into the existing institutional features of the regimes in ways that do not exist in the nuclear nonproliferation regime.

KEYWORDS: Biological weapons; chemical weapons; nonproliferation; Syria; Iran; Iraq

Are the chemical and biological weapon nonproliferation and disarmament regimes stronger and more effective than their nuclear counterpart? Much of the sustained attention in international security studies focuses on nuclear weapons and the nuclear regime, but recent events in Syria make this an apropos question. If the chemical and biological regimes are more effective, what is it that makes them so? Also, is one of the two regimes—chemical or biological—stronger than the other? Could these regimes serve as a model for the nuclear nonproliferation regime?¹ This article comparatively assesses the health of the regimes aimed at curbing the proliferation of chemical weapons (CW) and biological weapons (BW), respectively. As with the nuclear nonproliferation regime, which is underpinned and not simply defined by the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the CW and BW regimes have treaties that serve as their foundations and underpin, rather than solely constitute, their respective regimes.

We proceed from political scientist Stephen D. Krasner's definition that regimes are "sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations."² Regimes encompass more than just formal rules and institutions. In fact, regimes are dynamic organisms subject to various and interconnected processes associated with their

emergence and demise as well as any stasis or change that occurs over time. As such, assessing the underlying processes of regime dynamics—and by extension, regime health—requires a multidimensional framework. Our framework captures the normative, institutional, and behavioral features of the regime, specifies various metrics within each of these categories, and allows for the possibility of interaction (and its effects) between dimensions.

In the next section, we introduce our framework. In section three, we use this framework to engage in a comparative analysis of the relative health of these two regimes, drawing comparisons where appropriate to the nuclear nonproliferation regime. Finally, we use our analysis to illuminate the specific challenges associated with regime dynamics. We find that the CW and BW regimes are indeed comparatively healthier than their nuclear counterpart. Many of the behavioral features that might be troubling—such as disputes over CW stockpile destruction or the use of CW by Syria—are mitigated by the presence of a strong norm against possession and proliferation of both CW and BW. This norm is adequately embedded into the existing institutional features of the regimes in ways that do not exist in the nuclear nonproliferation regime.

An Updated Multidimensional Framework

Our framework is grounded in previous and ongoing attempts to pinpoint sources of variance and change over time and across regime type.³ It builds upon our previous work published in these pages.⁴ The three broad dimensions of the framework (see [Table 1](#)) are meant to reflect the focal points that have been identified in the literature, capturing the features deemed critical for understanding regime dynamics.

The *normative features* category is meant to capture the regime's underlying principles and norms. As an aspect of regime health, this is a particularly significant category, as changes within these norms and principles would be powerful evidence that the overall regime is in a state of change (either strengthening or weakening). The *institutional and organizational features* dimension focuses the diagnosis on the various rules—both formal and informal—that underpin the regime. As discussed below, the extent to which these rules and structures effectively mitigate transaction costs inherent in cooperative endeavors to produce various types of public goods is a powerful measure of a regime's health. Finally, our framework uses the broad category of *behavioral features* as a way to capture what states are actually doing "inside" of the regime. The specific aspects of this category are designed to push analysis beyond dichotomous and overly simplistic descriptions of compliance versus noncompliance and focus on particular behaviors around internalization, verification, and enforcement, among others. Each of these categories is discussed more fully below, pointing to the specific aspects of each that we find to be most critical for assessing regime health.

Normative Features

Most regimes emerge from a shared set of *foundational principles* or at least shared understandings about a given issue.⁵ Any consideration of the dynamics and resultant health of a regime must carefully consider the extent of agreement within the regime regarding these underlying principles. Is there evidence of a variety of interpretations

TABLE 1

Dimensions of Regime Health.

Regime Dimension	Specific Aspects	Considerations for Regime Dynamics
Normative features	Foundational principles	Are the foundational principles widely agreed upon or subject to continuous debate? Are they relatively static or constantly shifting?
	Explicit norms	What types of norms explicitly govern the regime? (These might be norms regarding the specific issue area but they could also include, for example, norms that govern the way regime members interact with one another.) Are these debated or agreed upon? Changing?
	Implicit norms	Are there any norms that implicitly underpin the regime? Is their implicit nature problematic? Do any of the regime's norms—explicit, implicit, or a combination—conflict with other norms?
	Emergent norms	Are new norms easily incorporated into the existing regime? Or have new norms threatened—or would they threaten—the very existence of the regime?
Institutional and organizational features	Issue scope	What is the breadth of issues covered by the regime? Where does the regime fall on a continuum from single, specific issue-regimes and multiple, diffuse issue-regimes?
	Level of institutionalization	What is the nature of the rules that govern transactions in the regime? Are they formal or informal? What sort of mechanisms exist that might mitigate information and enforcement-related transaction costs and externalities within the regime?
	Organizational form	What types of bodies exist within the regime?
	Allocational mode	What are the mechanisms that exist for allocating resources within a regime? Do we see any "distributive bias?"
Behavioral features	Participatory scope	How many states consider themselves—and are considered by others to be—participants in the regime? How problematic are regime "outsiders"?
	Level of constraint accepted	What level of constraint are states willing to accept? (e.g., subject themselves to external verification and enforcement mechanisms?)
	Internalization of constraints	Are states willing to internalize these constraints with changes to domestic law and/or procedures?
	Verification	Do states subject themselves to a verification mechanism? Is this external or internal?
	Compliance	What is the regime's compliance success rate? What sorts of compliance issues exist within the regime?
	Enforcement	Are states willing to enforce behavior within the regime by "punishing" norm and/or institutional violators? What form does this punishment typically take?

around these principles? Are these principles subject to continuous debate—that is, are there emerging or constant debates over the nature and scope of this particular regime?

Our framework differentiates norms—both *explicit* and *implicit*—from foundational principles if only to point out that, while the normative underpinnings of the regime are likely to go hand-in-hand with the foundational principles, certain norms are also likely to influence other aspects of the regime, e.g., operations rather than issue areas. For example, the dispute resolution procedures of the World Trade Organization's (WTO) global trade regime are built on norms of peaceful dispute resolution that are at least partially separate from the norms of free trade that form the regime's foundational principles. As such, changes to the governing norms might affect regime operations and behavior within the regime, despite the persistent strength of the regime's foundational principles. In addition to this distinction, we separate explicit norms from implicit norms to raise the issue that there might be particular weaknesses within the regime that result from implicit norms not being made explicit through particular institutions. Finally, an analysis of regime health needs to pay careful attention to any *emergent norms* that might be on the horizon. Would such norms be easily incorporated into the existing institutional structures and behavioral aspects of the regime? Would they conflict with the norms already at work in the regime, or would they threaten the underlying foundations of the regime?

Institutional and Organizational Features

At a very basic level, in order to assess the health of any international regime, one must be aware of the breadth of issues covered by the regime—a feature we label *issue scope*. Regimes run the gamut between those that cover single and specific issues and those that cover multiple and diffuse issues. While this is a relatively intuitive aspect of regime assessment, it is important to avoid misdiagnoses of the regime that might be built on an assessment of a quality that neither the regime's foundational principles nor its institutional features were ever designed to cover. In fact, regimes often evolve or devolve around this issue scope characteristic, particularly when scope inadequacy proves costly to transacting within the regime.⁶

Within international regimes, states are often willing to subject themselves to various rules. These rules form a critical aspect of regime diagnosis, as there is likely to be quite a bit of variance across regimes, and within regimes over time, on the *level of institutionalization* within the regime.⁷ These rules are typically designed to govern transactions within the regime and particularly help establish the conditions of cooperation that are necessary to avoid political market failure.⁸ Thus, all things being equal, we would expect relatively healthy regimes to contain institutions that attempt to mitigate information deficiencies and asymmetries, externalities, and any enforcement- or property rights-related transaction costs within the various processes of exchange embedded in the regime.⁹ In order to accomplish these goals, regimes might vary on their level of centralization, noted by the presence, absence, or relative vitality of administrative structures for dispute settlement, information sharing, surveillance, and principles guiding representation.¹⁰ The *organizational form* of a regime captures a related, but we argue distinctive, measure of institutional formality within the regime.¹¹

Specifically, the presence or absence of any regime-specific international bodies and/or secretariats could signal a relatively strong or weak regime depending on the way it relates to other regime characteristics.

Finally, we include the notion of *allocational mode* within this category in order to capture the “means and mechanisms used to allocate resources within a regime.”¹² This aspect recognizes the role that power distribution often plays within regime dynamics and day-to-day functioning.¹³ As we argued in the initial conception of this framework, the allocational mode of a regime provides an important window into regime health, particularly in instances where the membership scope of the regime includes the broad diversity of states found in the international system.¹⁴

Behavioral Features

The *participatory scope* of a regime is a broad indicator of the number of states that participate in the regime.¹⁵ A complete analysis of this particular dimension would include the extent to which there exist any differences of perception and opinion on this number. Is there a discrepancy between the number of states that consider themselves to be part of the regime and whether others perceive them as part of the regime? Additionally, the participatory scope category raises the issue of regime outsiders. How problematic—if at all—are the quantity and qualities of the states that exist outside the regime? Are any of these realities fundamentally damaging to the regime itself?

We draw an analytical distinction between the level of institutionalization as a measure of the types of rules that exist within any particular regime and the behavioral attributes of states as they make domestic decisions around the implementation of these international institutions. Thus, we include *internalization of constraints* as an attempt to characterize the extent to which states are willing to enact changes within their own domestic institutions and laws in order to comply with the regime. States are sometimes willing to internalize commitments in the regime through changes to domestic institutions and specific policy choices. However, the interaction between international and domestic commitments is likely to significantly complicate the bargaining space.¹⁶ One would expect that these domestic-international linkages and fissures could alter collective action problems in a way that produces a gap between willingness to accept constraint and the actual levels of formality in regime institutions. Given these challenges, evidence of internalization is likely to be an indicator of a strong regime.

Finally, the framework includes three other behavioral aspects. Regime *compliance* reflects member decisions around regime issues. Do regime members follow the rules with some regularity? Are “defections” from appropriate, rule-compliant behavior rare or a regular occurrence? Are member states willing to subject themselves to *verification* and *enforcement* mechanisms in order to reduce the transaction costs associated with collective action around compliance?¹⁷ Are these verification and enforcement mechanisms internal, contained within individual member states, or are states willing to subject themselves to external mechanisms? And finally, how willing are members of the regime to actually enforce behavior within the regime by punishing violators of regime institutions and/or norms? What form does this punishment typically take?

Dimensional Interaction Effects: A Key to Assessing Regime Health

While each of these individual dimensions is likely to contribute to overall regime health, we argue that regime dynamics are mostly determined by the extent to which particular dimensions directly conflict with other dimensions. Here, the incentives in one aspect of the regime may make it difficult for the regime to gain any sort of healthy diagnosis in another aspect. We refer to these critical junctures as *dimensional interaction effects*. While there are obviously many possible combinations of the individual dimensional aspects that are worth considering, we point to the three unique combinations of the broader dimensional interactions as starting point for considering their effects (see Table 2).

One of the key aspects in assessing regime health is the extent to which the normative underpinnings of the regime—whether they are embedded in the regime’s foundational principles, its explicit norms, or implicit norms—are adequately institutionalized. Thus, the interaction of *normative features* and *institutional features* is a critical space for analysis. Do the regime’s institutions reflect its overall goals? Do they set up competing incentives toward goals that are incompatible with one another? Are some norms privileged through institutional embodiment while others lack specific rules? The answers to each of these questions is likely to point to a more specific set of regime strengths and weaknesses around the connection between ends and means in the regime.

The interaction of *behavioral features* and *institutional features* presents several avenues for assessment that are noteworthy. First, it is critical to pay particular attention to “instances where short-term or ‘myopic’ self-interests collide with regime rules.”¹⁸ In these

TABLE 2
Dimensional Interaction Effects.

Dimensional Interaction	Considerations for Regime Dynamics
Normative features x institutional features	Are the rules captured by the regime’s institutions reflective of the overall goals of the regime? Do they set up competing incentives toward goals that are incompatible with one another? Are some norms privileged through institutional embodiment while others lack specific rules?
Institutional features x behavioral features	Do states privilege the regime over short-term self-interests? If not (a likely scenario), are the regime’s institutions well-positioned to solve the inherent collective action problem around the provision of the regime’s various public goods? Do the regime’s particular institutions contain incentives that are explicitly competing or produce unintended consequences that make regime compliance difficult for states? Finally, do the regime’s institutions adequately correct any political market failures that make it difficult to cooperate? Do they establish clear property rights where appropriate, provide rules aimed at correcting information gaps or asymmetries between the regime’s members, and provide rules regarding verification and enforcement?
Normative features x behavioral features	Are state behaviors around compliance, verification, and enforcement consistent with the foundational norms of the regime? If they are not, are they indicative of a fundamental problem of the regime or merely indicative of standard processes of regime dynamics? Do behaviors follow normative change; do they lead normative change; or are these things mutually constitutive of one another? Do states attempt to conceal noncompliance? Do they follow accusations of noncompliance with strong denial?

situations, what types of decisions do states make? To the extent that they are privileging the regime over short-term interests, this would be evidence of a strong and healthy international regime. However, a more likely outcome is that states pursue their own interests in the short run. We argue that this is not necessarily indicative of regime failure but instead points to the need for the regime's institutions to be better positioned to solve the inherent collective action problem around the provision of the regime's various public goods.

Second, the regime's particular institutions could contain incentives that are explicitly competing or produce unintended consequences that make regime compliance difficult for states. This is a more likely occurrence where the issue scope of a regime is unnecessarily broad or in some other way makes it difficult to develop incentive-compatible institutions.

Third, exploration of regime health at the interaction between its behavioral and institutional features points us to the classic economic concerns of institutional theory. Do the regime's institutions adequately correct any political market failures that make it difficult to cooperate? To the extent that any regime's institutional arrangements are adequate, we would expect provisions aimed at reducing the transaction costs associated with cooperation: rules establishing clear property rights where appropriate, rules aimed at correcting information gaps or asymmetries between the regime's members, and rules regarding verification and enforcement. In addition, the differences in power and capabilities among regime members are likely to be an important aspect of these concerns about political market failure; thus, the allocational mode aspect of any particular regime becomes an important consideration when evaluating regime health at the behavioral and institutional intersection.

Finally, one must consider the dimensional interaction effects that are visible at the interaction between a regime's *normative features* and its *behavioral features*. Are state behaviors around compliance, verification, and enforcement consistent with the foundational norms of the regime? If they are not, are they indicative of a fundamental problem of the regime or merely indicative of standard processes of regime dynamics? Do behaviors follow normative change; do they lead to normative change; or are these things mutually constitutive of one another?¹⁹ With respect to regime assessment, these are difficult empirical questions. However, it is important to note that noncompliance is not necessarily indicative of the erosion of regime norms. In instances of noncompliance, the circumstances of—and the discourse around—the noncompliance are important pieces of the story.²⁰ Do states attempt to conceal noncompliance? Do they strongly deny noncompliance accusations? Such actions may reveal a weakness of the regime but may indicate the erosion of foundational norms. Indeed, concealment and denial can be strong evidence of norm strength and internalization.²¹

A Multidimensional Diagnosis of the Chemical and Biological Weapon Regimes

Using the dimensions set forth above, this section turns to a comparative analysis of the respective regimes for chemical and biological weapons. The framework allows for a more nuanced understanding of specific regime aspects that might need to be strengthened and uncovers several tensions both within and between these regimes. [Table 3](#) presents an overview of our diagnosis.

TABLE 3
Assessing the Health of the CW and BW Regimes.

Regime Dimension	Specific Aspects	CW Regime Diagnosis	BW Regime Diagnosis
<i>Normative features</i>	Foundational principles	Non-use out of WWI experience	Non-use out of WWI experience
	Explicit norms	Non-use of CW; no production/stockpiling of CW; non-use	Non-use of BW; no production/stockpiling of BW; non-use; dual-use concerns; peaceful research permitted
	Implicit norms	No transfer or proliferation of CW (flows naturally from the explicit norms above); non-discrimination	No transfer or proliferation of BW (flows naturally from the explicit norms above); non-discrimination
	Emergent norms	n/a	n/a
<i>Institutional and organizational features</i>	Issue scope	Geneva Protocol covers non-use; CWC covers possession, non-use, proliferation, and stockpile destruction	Geneva Protocol covers non-use; BWC covers possession, proliferation, and stockpile destruction
	Level of institutionalization	<i>Implementing body:</i> Organisation for the Prohibition of Chemical Weapons (OPCW) <i>Verification mechanism:</i> Yes; “routine inspections” of chemical weapon-related facilities and chemical industry facilities to verify the content of declarations and to confirm that activities are consistent with CWC obligations; rules for “challenge inspections” <i>Review conference:</i> Yes <i>Interim meetings:</i> No	<i>Implementing body:</i> None—but some effort made with Implementation Support Unit (ISU); BWC mandates state parties to consult and cooperate on compliance <i>Verification mechanism:</i> No; BWC mandates state parties to consult and cooperate on compliance; complaints of violation lodged with UN Security Council <i>Review conference:</i> Yes <i>Interim meetings:</i> Intercessional meetings
	Organizational form	OPCW is charged with implementation of the CWC; OPCW has formal Technical Secretariat, Executive Council, and Conference of the state parties; leadership in these bodies is appointed from within the regime	No formal organizations similar to OPCW; however, informal mechanisms as states implement biorisk strategies to comply with International Health Regulation (IHR) standards
	Allocational mode	OPCW encourages and supports scientific and technical exchange of information among state parties in furtherance of peaceful uses of chemistry	BWC recognizes the inherent dual-use nature of many biological agents and permits research using them

<i>Behavioral features</i>	Participatory scope	190 states acceded to the CWC	170 states acceded to the BWC; 16 states have signed but not ratified
	Internalization of constraints	CWC requires States Parties to enact implementing legislation and set up National Authorities; many states yet to fulfill domestic legislation and institutional obligations	BWC's implementing obligation less extensive than CWC but still calls for legislation enacted or other measures taken to assure compliance; mixed record on specific internalization
	Verification	Never been a "challenge inspection" within the CW regime	n/a
	Compliance	<p><i>Use:</i> few cases of non-compliance</p> <p><i>Nonproliferation:</i> CWC verification process</p> <p><i>Disarmament:</i> most states continue to have trouble meeting established deadlines for stockpile destruction; however, only seven states with declared stockpiles</p> <p><i>Regime-strengthening activities:</i> CWC declarations tools; CWC inspections</p>	<p><i>Use:</i> few cases of noncompliance</p> <p><i>Nonproliferation:</i> US Cooperative Biological Engagement Program (part of Cooperative Threat Reduction)</p> <p><i>Disarmament:</i> unclear as to whether key countries (Russia, Syria) are meeting Article II obligations</p> <p><i>Regime-strengthening activities:</i> BWC confidence-building measures and intersessional process</p>
	Enforcement	Specific response to Iraqi use of CW twice in 1980s via Geneva Protocol and UN Security Council; decisions taken on missed deadlines but nothing more; no "challenge inspections" issued; however, very few cases of noncompliance calling for greater enforcement	No complaints have been lodged with UNSC (as described in BWC)
<i>Dimensional interaction effects</i>	Norms x Institutions	Taboo against usage drives many of the institutions at the "sub-levels": production, stockpiling, and proliferation	Taboo against usage drives many of the institutions at the "sub-levels": production, stockpiling, and proliferation; several institution shortcomings—but these cannot be attributed to weak norm
	Institutions x Behavior	CW regime is institutionalized in ways that incentivizes cooperative behavior	BW regime has some gaps in institutionalization with respect to verification and enforcement—potential issues regarding incentives for cooperation; although at present, there is compliance
	Behavior x Norms	Norm against use of CW very strong and drives the other aspects of the regime; famous cases of violations (e.g., Iraq 1980s) followed with evidence that international norm against use of CW is robust	The general compliance within the BW regime is likely due to the taboo—as strong institutional features cannot fully explain compliance

Normative Features

A logical starting point for locating normative foundations is the context in which the norm develops. It is shaped by past events and previous norms and informs actors' understanding of ways to apply current norms and rules.²² The chemical weapon taboo, as it has become known, largely has its origins in extensive chemical weapons use in World War I, though University of British Columbia Professor Richard Price argues that the origin predates the war and begins with the International Peace Conferences in the Hague in 1899 and 1907.²³ Whatever the origins, the norm against CW use was clearly bolstered in the aftermath of World War I and the extensive use of asphyxiating gases on the battlefield. Table 4 shows battlefield casualties from asphyxiating gas in World War I, illustrating in part that "the odium attached to the use of [chemical and nuclear] weapons is indispensable in explaining their non-use."²⁴

Two treaties—the 1925 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases and of Bacteriological Methods of Warfare (commonly referred to as the Geneva Protocol), and the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (commonly referred to as the Chemical Weapons Convention, or CWC)—outlaw the *use* of chemical weapons in warfare, though this is a comparatively odd beginning point of the normative foundations of a nonproliferation regime.²⁵ One could still debate whether the normative aspect *entirely* explains the CW taboo; but it is recognized that these considerations were *extremely* influential in the normative foundations around nonproliferation and non-use.²⁶ Subsequently, the norm became codified into a prohibition, encompassing not only use but also possession and transfer. But given the general disinterest in using BW and CW after World War I (recognizing that there were isolated uses), this is not surprising. Indeed, the norm is quite strong *in comparison with* the nuclear nonproliferation norm. The nuclear weapon states, to varying

TABLE 4
Estimated WWI Casualties from Asphyxiating Gas.ⁱ

Country	Total casualties	Deaths
Austria-Hungary	97,000	3,000
British Empire	180,597	8,109
France	182,000	8,000
Germany	191,000	9,000
Italy	55,373	4,627
Russia	419,340	56,000
United States	70,552	1,221
Others	9,000	1,000

Sources: John Simkin, *First World War Encyclopedia* Spartacus Educational; 1st ed. (October 1, 2012). PDF e-book; Medical Department of the United States Army in the World War, Volume XIV, *Medical Aspects Of Gas Warfare*; US Army Medical Department, <<http://history.amedd.army.mil/booksdocs/wwi/VolXIV/VolXIVhtml/CH08.htm>>.

ⁱEstimates vary slightly from source to source. We used the more conservative numbers and recognize the reporting problems and attribution issues of the exact causes of death in many cases. The scale of casualties, however, was consistent from source to source.

degrees, still view nuclear weapons as a vital part of their national security doctrines, even if only for deterrence purposes. Only one nuclear weapon state (China) has an articulated no-first-use policy, and the nuclear nonproliferation regime continues to subsist on a discriminatory policy on possession. By contrast, there do not exist tensions in the BW or CW regimes over equity and utility of the weapons—they are prohibited to all.

The alleged use of CW in the Syrian civil war in March and August 2013 and the international response illustrate the impact of the normative feature of the regime. The final document of Third CWC Review Conference, which took place in April 2013, “reiterated [the] deep concern that chemical weapons may have been used in the Syrian Arab Republic and underlined that the use of chemical weapons by anyone under any circumstances would be reprehensible and completely contrary to the legal norms and standards of the international community.”²⁷ Whereas Syria demonstrated through its use of CW that it did not accept the non-use norm, the international response to the August attacks quickly veered from considerations of a military, punitive US-led response to multilateral diplomacy. This effectively brought Syria into the regime; Damascus readily agreed to allow international inspectors to destroy its CW infrastructure and stockpile and it acceded to the CWC in September 2013.²⁸

Overall, it is noteworthy how few instances there have been of chemical or biological weapon (CBW) use; though CBWs have been used more frequently than nuclear weapons, they are less technically difficult to procure and easier to use in a limited manner.

Institutional and Organizational Features

Assessing the *scope* of the chemical and biological weapon regimes centers on the three treaties proscribing the use and proliferation of these weapons: the Geneva Protocol, the CWC, and the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (commonly referred to as the Biological and Toxin Weapons Convention, or BWC).²⁹ As noted above, the Geneva Protocol bans the *use* of these weapons in war, where the later conventions go further to ban also the development, production, stockpiling, and acquisition of CBWs. The CWC further requires state parties to destroy existing stockpiles of CWs.

These regimes are more comprehensive in prohibitions than their nuclear counterpart; the NPT does not outlaw use of nuclear weapons and its prohibition against them is not universal. The CWC creates a formal monitoring procedure where “routine inspections” of chemical facilities—both weapon-specific as well as private industry facilities—help to verify the content of declarations and to confirm that activities are consistent with CWC obligations. In addition, “challenge inspections” can be conducted at any facility or location within a state party to clarify questions of possible noncompliance.

The BW regime also has a reinforcing, self-strengthening component that arises from increasing attention to global public health emergencies and laboratory and research best practices. In 2005, the World Health Organization (WHO) established the International Health Regulation (IHR) standards, a set of “best practices” under the rubric of biosafety and

biosecurity (sometimes referred to collectively as “biorisk management”).³⁰ These practices, while intended primarily to have a specific impact on public health—such as increased disease surveillance capabilities to more quickly and effectively report outbreaks—also in turn strengthen the broader bio regime by helping to “protect, control and account for valuable biological materials ... within laboratories, in order to prevent their unauthorized access, loss, theft, misuse, diversion or intentional release.”³¹ The IHR standards constitute “a legally binding agreement [on all 194 WHO member states] providing a framework for improving detection, reporting, and response to public health emergencies of international concern.”³² The IHR’s emphasis on ethical research in the life sciences and laboratory biosecurity also directly relates to the BW regime and potential non-state actor development of BW or diversion of materials.

The *organizational forms* of the BW and CW regimes are framed by the Geneva Protocol, BWC, and CWC. Both the BWC and CWC have review conferences held every five years, as does the NPT. The CWC, in contrast to the NPT and the larger nuclear regime, has a centralized body charged with its implementation: the Organisation for the Prohibition of Chemical Weapons (OPCW).³³ The OPCW was established when the CWC entered into force with the mandate to achieve the object and purpose of the convention, to ensure the implementation of its provisions, including those for international verification of compliance with it, and to provide a forum for consultation and cooperation among state parties. The Technical Secretariat of the OPCW is responsible for the day-to-day administration and implementation of the convention, including inspections, while the Executive Council and the Conference of the States Parties are decision-making organs designed primarily to determine questions of policy and resolve matters arising between states on technical issues or on interpretations of the convention. In addition, the OPCW is responsible for overseeing the destruction of “all existing chemical weapons.”

The BWC has no monitoring and verification organization, though member states continue to debate how to develop one. Because of this lack of a verification mechanism, the late Jonathan B. Tucker characterized the BWC as “a fragile bulwark” and the “the weakest and least developed” treaty when compared with the CWC and NPT. State parties created an “Ad Hoc Group” in 1994 to negotiate such a mechanism. However, after six years of work, negotiations on a protocol fell apart, ostensibly because the United States rejected a draft that would have advanced the issue.³⁴ This had more to do with the inherent dual-use nature of research in the biological sciences than the prevalence of any norm promoting the use or stockpiling of BW. The George W. Bush administration was the primary opponent of a draft protocol that would have codified the verification mechanism. The United States contended that the draft protocol would do little to expose BW proliferation from determined states and could potentially compromise legitimate, proprietary research.³⁵ Short of a verification mechanism, the BWC nevertheless mandates that state parties consult with one another and cooperate to resolve compliance concerns. States may lodge complaints with the UN Security Council if they believe other state parties are violating the convention, though this power has never been invoked.³⁶

Beginning in 2003, an intersessional process formed to provide a forum in the intervening years for states to discuss specific topics related to the BWC. It was initially designed to convene state parties for one week each year (from 2003–05) between review

conferences. The Sixth Review Conference in 2006 extended the intersessional process to 2010 with four annual, week-long meetings.³⁷ The intersessional process began as a proposal from Ad Hoc Group Chair Tibor Tóth to bridge differences between the United States and the other state parties. It was “envisaged [as] a new, future-oriented process involving three annual meetings of member states prior to the next regularly scheduled BWC Review Conference.”³⁸ Five topics were allowed for discussion during the initial 2003–05 period, with the Sixth Review Conference agreeing to six different topics. The lack of verifiable measures in the BWC has not led to stasis in the regime. Rather, it has motivated state parties to develop initiatives that invigorate thinking about the prospects for confidence-building measures, both within the review conferences and in between.

The *allocational mode* of the CW and BW regimes is worth noting, particularly in comparison with the nuclear nonproliferation regime. By proscribing proliferation for *all* states, the BW and CW regimes are similar to other weapon regimes but different from the nuclear nonproliferation regime. Management of the regimes supports two main efforts—destroying existing stockpiles and preventing the existence of any and all new CBW. The NPT sets out the parameters for resource allocation by stating an obligation of cooperation regarding the sharing of peaceful nuclear technology between nuclear weapon-possessing states and those proscribed, but does so without providing any formal institutions through which this cooperation is to occur.³⁹ By contrast, the OPCW has seven different cooperation arrangements in pursuit of peaceful uses of chemistry.

The NPT underpins the nonproliferation regime. Part of the NPT “bargain” is the use and sharing of peaceful nuclear technology by state parties. There is no such *bargain* in either the CWC or BWC, though the BWC recognizes the inherent dual-use nature of many biological agents and permits research using them. Article X of the BWC affirms the rights of states to pursue peaceful research in the biological sciences and encourages “contributing individually or together with other States or international organizations to the further development and application of scientific discoveries in the field of bacteriology (biology) for prevention of disease, or for other peaceful purposes.” Because the BWC is non-discriminatory, we make the distinction that this is not a bargain *per se* between unequal member states.

The CWC encourages the state parties to take no actions “which would restrict or impede trade and the development and promotion of scientific and technological knowledge in the field of chemistry for industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes.”⁴⁰ The convention does restrict trade with non-state parties, outlawing the transfer of Schedule 1 and 2 chemicals. The OPCW encourages and supports scientific and technical exchange of information among state parties in furtherance of peaceful uses of chemistry. It also sponsors various projects in developing states.

Behavioral Features

Overall, we judge the chemical and biological weapon regimes to be strong. At present, the BWC has 165 state parties and twelve signatory states. There are 190 state parties to the CWC, constituting near-universal universal membership (190 parties of 196 UN

member states).⁴¹ There are sixteen states that have signed but not ratified the BWC (mostly in Africa). Nominal participation through treaty ratification, though, is only one component. We organize the rest of the discussion in this section around use, nonproliferation, disarmament, and participation in other ongoing regime-strengthening activities (e.g., review conferences).

Behavioral Features—Use. There has been no recent, confirmed state use of BW. However, unlike the nuclear nonproliferation regime, we lack two visible indicators of cheating or general non-acceptance. First, unlike a nuclear explosion, it is difficult to observe a “test” of a BW, barring an obvious experiment coming to the attention of states’ intelligence services or an unexplainable and suspicious outbreak of disease. For example, in 1980, the Soviet Union attributed a large outbreak of anthrax in Sverdlovsk to contaminated livestock feed. At the time, the United States was suspicious of the outbreak and speculated that the Soviets were violating the BWC. But given that anthrax does occur naturally, without an on-the-ground investigation, any conclusions were speculative. It was not until 1992 that Russian President Boris Yeltsin admitted that the Soviet military had been responsible for the outbreak.⁴² However, institutional specifics of the BWC make assessment of compliance quite tricky. Tucker notes that, “Since the BWC prohibits the possession of biological agents for offensive military ends while permitting their use for peaceful scientific, therapeutic, or defensive purposes, judgments of treaty compliance may hinge on a subjective assessment of intent.”⁴³

For CW, the contemporary instances of usage have been either temporally or substantively outside the boundaries of the regime. Iraq used CWs against Iran and its own Kurdish population in the 1980s; however, Iraq did not accede to the CWC until 2009. Though there have been allegations that Iran used CW against Iraq in response to Iraq’s use, this is contested. As of this writing, it has been widely reported that chemical weapons have been used in the Syrian civil war in 2013; however, the assessment of whether this behavior constituted a violation of the regime *per se* is messy. Syria acceded to the Geneva Protocol in 1968, and acceded to the CWC after condemnation of its purported use of CW (and facing a potential military response).

Behavioral Features—Nonproliferation. The United States spearheads the largest biological nonproliferation program in the world—which engages Russia as well as some former states of the Soviet Union, and some other developing states.⁴⁴ The Cooperative Biological Engagement Program, a division of the Cooperative Threat Reduction program, works “cooperatively [to] assist partner nation governments in addressing obligations assumed by signing the United Nations Security Council Resolution 1540, to prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery, including by establishing appropriate controls over related materials, as well as [WHO’s] International Health Regulations ... which aim to enhance national, regional and global public health security.”⁴⁵ The program itself is a unique state-sponsored initiative designed to prevent the spread of all weapons of mass destruction. Its multi-institutional approach further serves to strengthen the regime in terms of preventing state proliferation—which is the general focus

of the regimes—but in particular reinforces efforts to constrain non-state actors who might pursue CBW.

Behavioral Features—Disarmament. The CWC's biggest challenge is states' inability to meet deadlines for destruction of existing stockpiles of CW. Eight state parties have declared chemical weapons, four of which have stockpiles awaiting complete destruction: Russia, the United States, Libya, and Syria. While all declared chemical weapon production facilities have been inactivated, thousands of tons of chemical agents remain, awaiting destruction. This does not *per se* represent a "difficult issue" but there is always a chance that, in the interim, material could be diverted or a state party could renounce adherence to the treaty, in which case it would already possess the weapons or weapon-usable material.

Behavioral Features—Regime-Strengthening Activities. The unclassified version of the US State Department's most recent report, "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Committees," assesses (among others) Egypt, India, Libya, Iraq, North Korea, and Pakistan for BWC compliance. The reports notes that Syria "may be engaged in activities that would violate its obligations under the BWC if it were a State Party to the Convention" and that "North Korea continues to develop its biological research and development capabilities, but has yet to declare any relevant developments as part of the BWC confidence-building measures."⁴⁶ The State Department's unclassified version of the January 2013 report on CWC compliance indicates that there is general compliance with the overall purpose and intent of convention, but notes that, with regard to Iran and Russia, it could not fully verify the accuracy of required declarations "based on available information."⁴⁷

The BWC's biggest point of contention is state parties' inability to adopt a monitoring and verification mechanism. As was mentioned above, though the BWC lacks a formal verification and compliance mechanism, states can refer issues of concern to the UN Security Council, though this has never happened. Cuba's accusations in 1997 that the United States used BW against it did not reach the UN Security Council.⁴⁸

The intersessional process is the current effort within the BWC that endeavors to build confidence and address compliance. The contentiousness (and importance) of a verification mechanism notwithstanding, it is notable that, despite the limitations and criticisms of the intersessional meetings, it nonetheless serves to keep state parties engaged.⁴⁹ This type of behavioral function of constructing processes is a sign of regime health, not weakness, despite the "incrementalism" or imperfection of method.

The CWC, however, does have a formal monitoring system. It consists of "routine inspections" of chemical weapon-related facilities and chemical industry facilities to verify the content of declarations and to confirm that activities are consistent with CWC obligations, as well as "challenge inspections" which can be conducted at any facility or location in state parties to clarify questions of possible noncompliance. There has never been a request for a challenge inspection.

Like the NPT, BWC and CWC state parties convene a review conference (RevCon) every five years. And like the NPT, the success (or failure) of these RevCons is in the eye of

the beholder. To many observers, the absence of a bold, consensus, final document (e.g., the 2005 NPT Review Conference), signals a failure. Even with the achievement of a consensus document (e.g., the 2008 CWC RevCon), some participants and observers are quick to note the lack of real progress.⁵⁰ Judgments of failure, accurate or not, however, are not necessarily (and we would argue in general) indicative of regime strength. Rather, that members, despite differences and grievances, continue to participate—often robustly and constructively—in this aspect of this regime instrument is significant.

Dimensional Interaction Effects

A great deal of the “behavioral” success of the CW and BW regimes is due to the strength of their respective normative foundations. Separating the general norm against the use of CW in war from the nuclear taboo is in part sequencing. The invention and use of CW predates the nuclear age. Thus, the time span for a norm to develop has been substantial—the time during which a protocol, even un-ratified by many states, moderated their behavior.⁵¹ A number of authors have attempted to account for the “taboo” against CW use, approaching it from different perspectives.⁵² For the purposes of this paper (other than policy prescriptions), the origin of the norm is less important than its effect.

In addition, violations of these regimes—particularly the chemical weapon regime (or at least the normative precepts of the regime), which have subsequently been well-documented—were accompanied by some evidence of norm strength. In the cases of Iraqi use of chemical weapons during the Iran-Iraq War (e.g., the attack on Sardasht in 1987) and its use of chemical weapons on its own Kurdish population in Halabja in 1988, the actions were met with a series of denials and obfuscations. In the Halabja case, President Saddam Hussein and the Iraqi perpetrators blamed the attack on Iranian forces that were controlling the town and actively working to supply the Kurdish resistance. This attempt to justify actions at least partially supports the notion that the Iraqi government recognized that the norm against the use of chemical weapons was fairly universal and would be condemned.⁵³ In addition, during the Iran-Iraq War, the US government attempted to carefully balance its perceived strategic needs to remain neutral in the CW discussion for fear of provoking a wider response from Iran by recognizing Iraq’s use of CW, which was widely condemned at the time.⁵⁴ Finally, that eight states are committed to openly destroying their CW stockpiles is behavioral evidence that the norms against all aspects of these weapons (production, stockpiling, proliferation, and use) are robust. Despite disagreements regarding time lines and deadlines associated with the stockpile reduction process, there is nothing comparatively as strong in other weapon regimes. The nuclear nonproliferation regime, for example, has no treaty that deals with destruction of non-deployed warheads and weapons.

The strong norms in both the CW and BW regimes are fairly well-embedded into the regime’s institutions. This source of regime strength is even more evident compared with the nuclear nonproliferation regime counterpart. The widespread condemnation of CBW has driven the crafting of rules within the regime against the production, stockpiling, and use of these weapons, which are universally prohibited for all states. This points to the most striking normative and institutional difference between nuclear weapons and CBW:

the possession of nuclear weapons is still allowed in a circumscribed manner by the NPT. While there is no convention that proscribes the use of nuclear weapons, the CWC and BWC universally prohibit CBW for all states, with the exception of incapacitating chemical agents.⁵⁵

Finally, the CW and BW regimes are generally institutionalized in ways that provide proper incentives for cooperation. The CW regime in particular has fairly robust monitoring and verification provisions aimed at reducing the transaction costs associated with cooperation. Here, the BW regime is comparatively less robust given the difficulties associated with establishing such rules. As discussed previously, this is a consequence of the difficulties associated with the dual use aspects of biological research; however, despite the challenges, there are ongoing efforts to rectify these gaps in the BW regime. The strength of the norm against the production and use of BW points toward the hope that these differences regarding the regime's institutional features will eventually be resolved.

A final word about Syria is in order. As the writing of this article progressed, Syria went from being the alleged perpetrator of multiple attacks using chemical weapons in its civil war to a member of the CWC. Is this a success for the regime? We would argue yes. Though Syria is a signatory to the Geneva Protocol, it acceded to the CWC only after it appeared it would face punitive, military retaliation, and then after the intervention and mediation of Russia. In a way, Syria serves as an example of how complex and dynamic regime behavior can be. In this case, the intersection of domestic politics, norms, and self-interest/survival proved to be powerful forces that resulted in strengthening the CW regime.

Conclusion

It is useful to conclude by thinking more carefully about the comparison between the nuclear nonproliferation regime and the CW and BW regimes, as there may be obvious but important lessons to be gleaned from a comparative analysis. One may be that the lessons are starker when the weapon-based regimes are disaggregated from one another. Analysts in particular speak non-specifically of the "nonproliferation regime." It seems in practice that they are referring to the *nuclear* nonproliferation regime, and more specifically and parochially, the NPT.

It is difficult to discount the interaction of a normative bias that generally militates against the use and possession of CW and BW *and* the nondiscriminatory nature of the CWC and BWC. This is an important and fundamental difference in the regimes. As University of Southern California Professor Nina Rathbun writes, "Legitimate regimes are universal and nondiscriminatory. They allow equal participation and decision making for all and do not discriminate among their members in terms of rights and obligations."⁵⁶ Though scholars still debate the *source(s)* of the chemical and biological weapons taboo, it is difficult to dispute its existence. The debate on the taboo centers on whether normative bias or military utility is the central factor in the general disfavor of CW and BW.⁵⁷ Price argues that the two interact to reinforce the taboo, though recently he dismissed the

notion that states did not consider CW as efficient weapons of war, asserting that “that kind of post-facto rationalization does not stand up to the historical record.”⁵⁸

However, an important difference between CBW and nuclear weapons should be noted. Though the evolution of nuclear doctrine passed through long phases in which the weapons were considered for countervalue targets (e.g., Hiroshima, Nagasaki, and non-military targets), most nuclear weapon-armed states now, at least implicitly, agree that they are for counterforce and deterrent purposes only and would likely only be used in a counterforce manner. However, chemical and biological weapons by nature have very limited counterforce use except against live troops or contaminating food sources, for example. Indeed, as the Richard M. Nixon administration debated the place of biological weapons in the US arsenal, “[Henry] Kissinger’s former Harvard colleague, biologist Matthew Meselson ... provided Kissinger with studies demonstrating the high risk and limited utility of biological weapons as part of the American arsenal.”⁵⁹ This distinction may be important for the enduring role of nuclear weapons in the doctrines of states that possess them. Though they are seen as the ultimate weapons capable of inflicting extraordinary destruction, they are not entirely viewed as weapons that would be used to devastate civilian populations. Such possible military utility—of, for example, earth-penetrating “bunker busters”—may ensure that nuclear weapons continue to have a role. Conversely, there is no chemical or biological weapon equivalent to a “bunker buster,” for example.

Because there is perceived military utility, a counterforce mission against non-human targets, and a substantial period during which they have become ingrained in military strategy and doctrine, it is almost certain that nuclear weapons will remain in the arsenals of states that possess them until extraordinary events or an external shock dramatically shifts views of their utility.⁶⁰ There is also the considerable problem of the process of reducing the numbers of nuclear weapons. There is a robust debate now about strategic stability at low numbers of nuclear weapons, with one argument that low numbers or total elimination of nuclear weapons would compromise stability. By contrast, one argument about how the CW taboo emerged points out that militaries never undertook serious plans (or figured out how) to integrate CW into doctrine and battle plans, opening space for the normative bias against use to gain an even stronger foothold. Thus, a taboo emerged and formed the core of the normative aspect of the regime. However, a nuclear proliferation *taboo* does not exist to the same extent.⁶¹ Nine states possess nuclear weapons—eight more than existed at the end of World War II. The military utility, particularly the deterrent value, of nuclear weapons is still the subject of much debate and is at the core of debates over disarmament, testing, and the nuclear triad. Thus, it is hard to dispute that along all aspects of our framework, the CW and BW regimes are more robust than the nuclear regime. A normative taboo against possession *and* use of CBW is bolstered by two conventions, one of which has an extensive monitoring and verification mechanism.

The CW and BW nonproliferation regimes are comparatively healthier than their nuclear counterpart. Many behavioral features that might be troubling—such as the disputes over stockpile destruction of CW—are mitigated by the presence of a strong norm against possession and proliferation of both CW and BW. This norm is adequately

embedded into the existing institutional features of the regimes in ways that do not exist in the nuclear nonproliferation regime. Our multidimensional analysis reveals the importance of various dimensional interaction effects—particularly the level of cohesion between the normative underpinnings and the regime's specific institutional features. Ongoing policy and analytical attention to these issues is likely to point to the actual underpinnings of weapon of mass destruction regime dynamics, helping us to avoid the relatively thin and unrealistic notion that regime health and the prospects for future dynamics are solely functions of perfect compliance.

DISCLAIMER

The views and analysis in this article are the authors' alone and do not represent those of the Department of Defense or the US government.

ACKNOWLEDGEMENTS

An earlier version of this article was presented at Annual Meeting of the International Studies Association, Montreal, Canada, March 2011. We thank David Gartner, Jeffrey Knopf, and two anonymous reviewers for their helpful comments.

NOTES

1. For example, see Ambassador Rogelio Pfirter, "Going to Zero With Weapons of Mass Destruction: Lessons From the Chemical Weapons Convention," a talk delivered at Woodrow Wilson International Center for Scholars, June 16, 2009, <www.wilsoncenter.org/sites/default/files/pfirterspeechfinal.pdf>.
2. Stephen D. Krasner, "Structural Causes and Regime Consequences: Regimes as Intervening Variables," *International Organization* 36 (1982), pp. 185-205. Though there is a large literature on this with varying definitions, Krasner's articulation gets to the heart of our purpose here. For a good overview of the debates on regime definition, see Andreas Hasenclever, Peter Mayer, and Volker Rittberger, *Theories of International Regimes* (Cambridge: Cambridge University Press, 1997).
3. Volker Rittberger, ed., *Regime Theory and International Relations* (Oxford: Oxford University Press, 1993); Stephan Haggard and Beth A. Simmons, "Theories of International Regimes," *International Organization* 41 (1987), p. 496; Hasenclever, Mayer, and Rittberger, *Theories of International Regimes*; Oran R. Young, ed., *The Effectiveness of International Environmental Regimes: Causal Connections and Behavioral Mechanisms* (Cambridge: The MIT Press, 1999).
4. Jeffrey Fields and Jason S. Enia, "The Health of the Nuclear Nonproliferation Regime: Returning to a Multidimensional Evaluation," *Nonproliferation Review* 16 (2009), pp. 173-96.
5. Krasner, "Structural Causes and Regime Consequences;" John Gerard Ruggie, "International Regimes, Transactions, and Change: Embedded Liberalism in the Postwar Economic Order," *International Organization* 36 (1982), pp. 379-415.
6. While regimes and institutions can reinforce one another, it can be a mistake to presuppose an automatic relationship between them. In fact, regimes can exist separately from specific and formal institutions. See Haggard and Simmons, "Theories of International Regimes," p. 498.
7. Arthur A. Stein, "Coordination and collaboration: regimes in an anarchic world," in Stephen D. Krasner, ed., *International Regimes* (Ithaca: Cornell University Press, 1983), p. 133.
8. Keohane and others use the economic concept of *market failure* to illustrate the ways that the costs of transaction (e.g., information, monitoring, enforcement, etc.) can inhibit cooperation in an anarchic international environment. Institutions and regimes theoretically mitigate some of these issues. See

- Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy* (Princeton, NJ: Princeton University Press, 1984).
9. Douglas C. North, *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990).
 10. Haggard and Simmons, "Theories of International Regimes," pp. 496–97.
 11. Donald J. Puchala and Raymond F. Hopkins, "International regimes: lessons from inductive analysis," in Krasner, ed., *International Regimes*, p. 63.
 12. Fields and Enia, "The Health of the Nuclear Nonproliferation Regime," p. 178.
 13. Puchala and Hopkins, "International regimes: lessons from inductive analysis," p. 66.
 14. Fields and Enia, "The Health of the Nuclear Nonproliferation Regime," p. 178.
 15. Puchala and Hopkins, "International regimes: lessons from inductive analysis," p. 64.
 16. Robert D. Putnam, "Diplomacy and Domestic Politics: The Logic of Two-Level Games," *International Organization* 42 (1988), pp. 427–60.
 17. Keohane, "After Hegemony: Cooperation and Discord in the World Political Economy."
 18. Haggard and Simmons, "Theories of International Regimes," p. 496.
 19. See, for example, Alexander Wendt, *Social Theory of International Politics* (Cambridge University Press, 1999).
 20. Andrew P. Cortell and James W. Davis, "Understanding the Domestic Impact of International Norms: A Research Agenda," *International Studies Review* 2 (2000), p. 71.
 21. Vaughn P. Shannon, "Norms Are What States Make of Them: The Political Psychology of Norm Violation," *International Studies Quarterly* 44 (2000), pp. 300–03; Alice D. Ba, "On Norms, Rule-Breaking and Security Communities: A Constructivist Response," *International Relations of the Asia Pacific* 5 (2005), p. 260.
 22. Fields and Enia, "The Health of the Nuclear Nonproliferation Regime," p. 178.
 23. Richard M. Price, *The Chemical Weapons Taboo* (Ithaca: Cornell University Press, 2007), pp. 14–43. Jonathan Tucker notes that the Lieber Code of Conduct issued by the US War Department in 1865 banned the use of poison and the Brussels Declaration, signed (but not ratified) by fourteen European nations, banned the use of poison, poisonous gas, and weapons that inflicted unnecessary suffering. Jonathan Tucker, *War of Nerves: Chemical Warfare from World War I to Al-Qaeda* (New York: Anchor Publishing, 2007).
 24. Richard Price and Nina Tannenwald, "Norms and Deterrence: The Nuclear and Chemical Weapons Taboos," in Peter J. Katzenstein, ed., *The Culture of National Security* (New York: Cornell University Press, 1996), p. 120.
 25. Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, June 17, 1925, <www.un.org/disarmament/WMD/Bio/pdf/Status_Protocol.pdf>.
 26. Marie Isabelle Chevrier, "Review of The Chemical Weapons Taboo," *American Political Science Review* 92 (1998), pp. 507–08; Price, "A Genealogy of the Chemical Weapons Taboo," especially pp. 74–79.
 27. See OPCW, "Report of the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention," April 19, 2013, <www.opcw.org/fileadmin/OPCW/CSP/RC-3/en/rc303__e_.pdf>.
 28. See OPCW, "Syria's Accession to the Chemical Weapons Convention Enters into Force," October 14, 2013, <www.opcw.org/news/article/syrias-accession-to-the-chemical-weapons-convention-enters-into-force/>.
 29. The treaty, signed in Geneva in 1925, does not prohibit production and stockpiling of biological and chemical agents.
 30. World Health Organization, "Biorisk Management: Laboratory Biosecurity Guidance," WHO/CDS/EPR/2006.6, September 2006, <www.who.int/csr/resources/publications/biosafety/WHO_CD-S_EPR_2006_6.pdf>.
 31. See World Health Organization, "International Health Regulations," 2nd ed., (2005), <whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf>.
 32. Kashef Ijaz et al., "International Health Regulations—What Gets Measured Gets Done," *Emerging Infectious Diseases* 18 (July 2012), p. 1,054.

33. The International Atomic Energy Agency predates the NPT (established in 1957) and its mission is “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose.” The difference may seem trivial, but the IAEA existed before the NPT and presumably would continue to exist should that treaty dissolve. See “The Statute of the IAEA,” <www.iaea.org/About/statute.html>.
34. For a discussion of protocol negotiations, see Kenneth D. Ward, “The BWC Protocol: Mandate for Failure,” *Nonproliferation Review* 11 (Summer 2004), pp. 1–17.
35. Rebecca Whitehair and Seth Brugger, “BWC Protocol Talks in Geneva Collapse Following U.S. Rejection,” *Arms Control Today*, September 2001, <www.armscontrol.org/act/2001_09/bwcsept01>; Judith Miller, “U.S. Explores Other Options on Preventing Germ Warfare,” *New York Times*, July 25, 2001, <www.nytimes.com/2001/07/25/international/25WEAP.html>.
36. In 1997, Cuba accused the United States of using an aircraft to spread the crop-eating insects thrips palmi over the province of Matanzas in 1996. Cuba requested a “special consultative meeting” concerning the purported attack. However, lack of objective evidence hampered the investigation. See also Jonathan B. Tucker and Raymond A. Zilinskas, “Assessing U.S. Proposals to Strengthen the Biological Weapons,” *Arms Control Today*, April 2002, <www.armscontrol.org/act/2002_04/tuczila-prii02>. “Cuban Accusations of U.S. Insect Raid on Island to Be Studied,” *New York Times*, August 28, 1997, <www.nytimes.com/1997/08/28/world/cuban-accusations-of-us-insect-raid-on-island-to-be-studied.html>.
37. See “Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and On Their Destruction (Geneva, 20 November–8 December 2006), Final Document,” (BWC/CONF.VI/6), <www.opbw.org/rev_cons/6rc/docs/6/BWC_CONF.VI_6_EN.pdf>.
38. For an overview of the origins of the intercessional process, see Jonathan Tucker, “The BWC New Process: A Preliminary Assessment,” *Nonproliferation Review* 11 (Spring 2004), pp. 26–39.
39. Fields and Enia, “The Health of the Nuclear Nonproliferation Regime,” p. 184.
40. See Article XI of the CWC, available at <www.opcw.org/chemical-weapons-convention/articles/article-xi-economic-and-technological-development/>.
41. In addition, Myanmar is said to be “making preparations to ratify” both the CWC and BWC. See Radio Free Asia, “Myanmar Prepares to Ratify Chemical, Biological Weapons Treaties,” December 2013, <www.rfa.org/english/news/myanmar/weapons-12112013192030.html>. Angola and South Sudan are preparing to join the CWC, according to the head of the OPCW, Ahmet Üzümcü. See Reuters, “OPCW Chief Urges Israel to Join Chemical Arms Treaty,” December 10, 2013, <www.jpost.com/Middle-East/OPCW-chief-urges-Israel-to-join-chemical-arms-treaty-334562>.
42. Jeanne Guillemin, *Biological Weapons: From the Invention of State-Sponsored Programs to Contemporary Bioterrorism* (New York: Columbia University Press, 2004), pp. 141–43.
43. Jonathan Tucker, “The Biological Weapons Convention (BWC) Compliance Protocol,” Nuclear Threat Initiative, <www.nti.org/e_research/e3_2a.html>. One might argue this should be less of a concern because the norm against BW proliferation is arguably stronger than that of nuclear proliferation or at least their utility. However, the question of the military utility of BW is still the subject of some debate. See Alexander Kelle, Kathryn Nixdorff, and Malcom Dando, *Preventing a Biochemical Arms Race* (Palo Alto: Stanford University Press, 2012), for a recent discussion around these issues.
44. National Research Council, *Countering Biological Threats: Challenges for the Department of Defense’s Nonproliferation Program beyond the Former Soviet Union* (Washington, DC: National Academies Press, 2009), p. 4, <www.nap.edu/catalog.php?record_id=12596>.
45. Center for Disaster and Humanitarian Assistance Medicine, “Cooperative Biological Engagement Program (CBEP),” <www.cdham.org/cooperative-biological-engagement-program-pakistan>.
46. Department of State, “Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Committees,” July 2013, <www.state.gov/t/avc/rls/rpt/2013/211884.htm>.
47. Department of State, “Compliance with the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction: Condition (10)(C)

- Report," January 2013 <www.state.gov/documents/organization/212108.pdf>. The report addresses reporting issues with Iran, Iraq, Libya, and Russia but does not suggest blatant violations of the CWC.
48. Regarding Cuba, see note 36 and Charles H. Calisher, "Scientist in a Strange Land: A Cautionary Tale," *Nonproliferation Review* 16 (November 2009), pp. 509-19. States must file yearly reports as part of BWC confidence-building measures. However, only seventy-three state parties did so in 2010. See Global Security Newswire, "U.S. Considers Alternatives to BWC Verification Protocol," June 20, 2011, <http://gsn.nti.org/gsn/nw_20110620_5767.php>.
 49. Kirk C. Bansak, "Enhancing Compliance With an Evolving Treaty: A Task for an Improved BWC Intersessional Process," *Arms Control Today*, June 2011, <www.armscontrol.org/act/2011_06/Bansak>.
 50. While the 2008 CWC RevCon did produce a consensus document and many of the participants viewed the final outcome a success, others noted that the success was "modest" and that "agreement was only possible at the price of avoiding contentious issues and copying large sections from the final document of the first CWC review conference in 2003." See Oliver Meier, "CWC Review Conference Avoids Difficult Issues," *Arms Control Today*, May 2008, <www.armscontrol.org/act/2008_05/CWC>.
 51. The taboo against CW use has not been absolute since World War I. Italy used chemical weapons in the 1930s against Ethiopia. Iraq used chemical weapons against Iran during the war the two countries fought in the 1980s. Iraq again used CW (mustard gas and nerve agents) against portions of its own Kurdish population of Halabja, in northern Iraq in 1988. Finally, most recently there was the use of chemical weapons in 2013 in the Syrian civil war.
 52. See, for example, Price and Tannenwald, "Norms and Deterrence."
 53. Tucker, *War of Nerves*.
 54. For examples, see Department of State Action Memorandum, "Iraqi Use of Chemical Weapons," November 21, 1983, <www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB82/iraq25.pdf>; Department of State telegram, "UN Human Rights Commission: Item 12: Iranian Resolution on Use of Chemical Weapons by Iraq," March 14, 1984, <www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB82/iraq47.pdf>.
 55. The issue of incapacitants that can be used for law enforcement is an issue often discussed within the proceedings of CWC meetings. However, state parties have not come to agreement on how to deal with them. The final document of the Third CWC RevCon does not mention them. Though the CWC bans riot control agents in war, it does not proscribe their production and use for domestic law enforcement purposes. While this issue is obviously an important one to some states, we mention them here only in passing because we see a fundamental difference between incapacitants of the sort used by law enforcement and potentially lethal chemical weapons designed expressly for use in warfare.
 56. Nina Rathbun, "The Role of Legitimacy in Strengthening the Nuclear Nonproliferation Regime," *Nonproliferation Review* 13 (2006), p. 228.
 57. See Frederic J. Brown, *Chemical Warfare: A Study in Constraints* (Princeton, NJ: Princeton University Press, 1968); SIPRI, *The Problem of Chemical and Biological Warfare*, vol. 5 (Stockholm: Almqvist & Wiksell, 1971); Price, *The Chemical Weapons Taboo*.
 58. Richard Price, "Chemical Weapons: How We Built a Taboo," *Boston Globe*, September 7, 2013, <www.boston.com/2013/09/08/chemical-weapons/4LmSkZpbXgLDpVYpKBOnwJ/story.html>.
 59. Robert A. Wampler, ed., "The Nixon Administration's Decision to End US Biological Warfare Programs," National Security Archive Electronic Briefing Book No. 58, updated December 7, 2001, <www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB58/>.
 60. Only one state, South Africa, has ever developed a functioning nuclear weapon capability and later abandoned it.
 61. Several authors have written on the taboo against the use of nuclear weapons. See for example, T.V. Paul, *The Tradition of Non-Use of Nuclear Weapons* (Palo Alto: Stanford Security Studies, 2009).