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Prohibiting Chemical and Biological Weapons: Multilateral Regimes and Their Evolution

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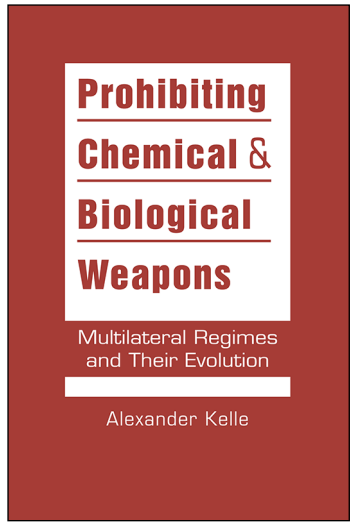

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Contents

1

Introduction: Institutionalism and the CBW Prohibition Regimes

The prohibition of chemical and biological weapons (CBW) is codified in two international regimes. To a large extent they are based on the Chemical Weapons Convention (CWC) and the Biological and Toxin Weapons Convention (BWC), respectively. For the states that have signed up to them, these two international treaties in turn contain a number of obligations, or normative guideposts, for behavior. In order to gain a better understanding of the international prohibition of chemical and biological weapons and its evolution over time, the CBW prohibition regimes and their normative structure are placed at the center of this study.

International Regime–Based Institutionalism as Conceptual Framework

Although regularly referred to in the policy-oriented literature, the term *regime* is often used rather uncritically and without proper definition. This work deviates from such an approach and follows the terminology set out in scholarly debates on international regimes. More generally, as regimes are understood to be a subset of international institutions (Müller 1993; Peters 2011), this study is embedded in the broader academic discourse on institutions and draws on the normative (March and Olsen 2006), historical (Sanders 2006), and constructivist (Hay 2006) variants of the new institutionalism. While putting institutions at the

center of their research programs, the approaches emphasize different aspects of institutional structures and their evolution over time, as well as the room for maneuver of actors taking part in them. For the purposes of this study, these variants of institutionalist theory are used eclectically in order to provide as illuminating an analysis as possible of the two CBW prohibition regimes (Sil and Katzenstein 2010). A formal comparison of the explanatory power of institutionalism's three variants is not intended.

In a broader sense, as Kalevi Holsti has pointed out, international institutions "contain the essential rules of coexistence between states and societies. They are of primary order" (2004: 18). Drawing on Georg Sørensen (2001), Holsti distinguishes between foundational and procedural institutions of the international system. Foundational institutions provide the basic organizing principles for the international system, thereby, inter alia, establishing the actors that populate the system. Procedural institutions, in contrast, establish the rules of the road, providing normative guidance for actors on how to behave toward each other. While the foundational institutions "include sovereignty, territoriality, and the fundamental rules of international law" (Holsti 2004: 25), examples of the latter category are diplomacy, war, and trade. With an understanding of international regimes as issue-area specific subsets of international institutions (discussed later), international regimes draw on both categories of generic international institutions. Holsti identifies three features common to all international institutions. They are characterized by

> patterned practices, or *practices* that are routinized, typical and recurrent . . . Institutions are based, usually, on coherent *sets of ideas and/or beliefs* that describe the needs for the common practices and point out how certain social goals can be achieved through them. . . . Institutions reflect *norms*, and they include rules. . . . They prescribe how the critical actors or agents should behave. (2004: 21–22; emphasis in original)

The reemergence of institutional scholarship in political science beginning in the mid-1980s with the work of James G. March and Johan P. Olsen has been characterized by an emphasis on norms in institutional analysis. Norms provide standards for behavior and are relevant because they inform what the actors deem appropriate in a particular institutional context. This logic of appropriateness applies to state behavior in an international institution and sets the parameters for insti-

tutional change, should the need arise. In this latter context the garbage-can model posits that institutions develop a "set of routinized responses to problems and will attempt to use the familiar responses before searching for alternatives that are further away from core values" (Peters 2011: 36). From a normative perspective, institutional learning and a reaction to institutional crises can both trigger change. In sum, normative institutionalists emphasize the structural dimension of institutions, somewhat at the expense of agency, in setting up an institution—thus creating the initial set of norms to guide appropriate behavior by actors in the institutional context—and in the institution's maintenance and evolution. As a result, this institutionalist approach is more suitable to account for the normative structures that international regimes provide and the conditioning effects these structures have on regime members.

For some analysts, known as historical institutionalists, the set of factors present at an institution's creation has a lasting effect (Sanders 2006). The institution is set on a particular path of operation and development from which it departs only under certain conditions. According to some scholars in this tradition, who regard institutions as particularly *sticky*, major change only occurs at critical junctures when the institutional equilibrium is *punctuated*. "The punctuations in the equilibrium are assumed to occur when there are 'rapid bursts of institutional change followed by long periods of stasis'" (Krasner 1984, quoted in Peters 2011: 78). Recent work in this tradition (e.g., Streeck and Thelen 2005; Mahoney and Thelen 2010), however, has focused more on incremental change, which is seen as manifesting itself in four different forms: *displacement* of existing normative patterns in institutions by new ones, *layering* of institutional structures on top of existing ones, normative *drift* as a result of pressures stemming from the environment of the institution, and *conversion* of normative structures by utilizing them in different ways in the institutional context. As a recent review of historical institutionalism in international relations scholarship has shown, adoption of this particular branch of institutionalism has been slow despite the fact that

> historical institutionalism stresses the type of processes that often characterize international relations, including the legacies of founding moments in shaping long-term power relations and whether new ideas become consequential, the ubiquity of unintended consequences and, especially, the prevalence of incremental reform over stasis and fundamental transformations. (Fioretos 2011: 369)

The prevalence of incremental reform results from four sets of factors:

1. Lock-in effects allow actors with an interest in maintaining institutional structures a veto power to block major change.
2. Positive feedback effects may create beneficiaries under existing normative structures that then develop a vested interest in preventing major change, risking the loss of benefits.
3. These benefits in some institutional contexts may grow over time and result in increasing returns, which provide an additional incentive to prevent complete institutional overhaul.
4. Institutional structures may develop self-reinforcing qualities through collaboration with other institutions (Pierson 2004 and Page 2006, cited in Fioretos 2011: 377).

As a result, the historical variant—especially in its sticky form—is the most skeptical branch of institutional analysis in relation to the adaptability of institutions and, by implication, the convergence of states' expectations and policies as a result of engagement in international institutions, such as international regimes.

Constructivist or discursive institutionalism, according to Colin Hay, offers in contrast "the potential to overturn new institutionalism's characteristic emphasis upon institutional inertia" (2006: 65). Constructivist or discursive institutionalism does so by focusing on ideas and communication processes as important elements in analyzing and understanding institutions. As B. Guy Peters has summarized, the "basic logic of this approach is that institutions are defined by ideas as well as by the manner in which these ideas are communicated within the structure" (2011: 112). Although institutions in this approach are often regarded as much more fluid than in the normative and historical institutionalist accounts, "institutions viewed from the perspective of discourse may represent relatively stable *fora* in which continuing discussion and redefinition is occurring" (Peters 2011: 113). Constructivist and discursive institutionalism also opens up the somewhat rigid focus on norms as guiding actors in an institutional context and allows for considering ideas originating outside the institution that are affecting it through actors' perceptions. In other words, such "perceptions about what is feasible, legitimate, possible, and desirable are shaped both by the institutional environment in which they find themselves and by existing policy paradigms and world-views" (Hay 2006: 65). Through the combination of these factors—emphasis on ideas and processes, and

the opening up of the normative guidance given by institutional norms—the constructivist and discursive variants of the new institutionalism attempt to move beyond the largely path-dependent understanding of institutional change and incorporate what Hay has labeled "path-shaping" change (2006: 65). Thus, the emphasis in constructivist and discursive institutionalism on "ideas, combined to some extent with the emphasis on structure in other approaches to institutions, can provide a more complete interpretation of the complexities of institutional life than can any one approach alone" (Peters 2011: 126). Proposals for providing a fuller picture of institutions and their evolution have also come from moderate historical institutionalists critical of constructivist institutionalism, who assert that one needs to distinguish between two strands of historical institutionalism, the second of which "focuses on active agency within institutional settings and that sees the agents in question as being shaped . . . by their institutional environments" (Bell 2011: 890). Such active agents within an institutional context are conceptualized as possessing "three sets of capabilities and resources, all of which provide useful agent-centered micro-foundations for institutional analysis" (Bell 2011: 893). According to this approach, "agents interpret and construct the experience of their institutional situation using . . . cognitive and normative frameworks and discursive processes" (Bell 2011: 893). Second, imprecise and ambiguous rules and some degree of discretion during norm and rule implementation give actors space to change institutions over time. In addition, if one accepts that institutions reflect a particular distribution of power at the time of their creation, changing power distributions within an institutional setting are bound to lead to demands for change. In this sense, institutions not only constrain agency but also enable it (Mahoney and Thelen 2010). In sum, Stephen Bell argues that in light of these different factors, thinking of "path contingency" rather than "path dependency" in institutional evolution might be more appropriate (2011: 896).

In an interesting parallel to the emergence of the new institutionalism, international regime scholarship also came to prominence in the first half of the 1980s. Although the term *international regime* first entered the vocabulary of international relations theory in the mid-1970s in studies on technology management, monetary issues, international trade, and international environmental policy, a so-called consensus definition of international regimes was put forward by Stephen D. Krasner in a special issue of *International Organization* and later in an edited volume (Krasner 1983). According to this definition, which is applied in this study, international regimes are an issue-area-specific

subset of international institutions "around which actor expectations converge in a given issue area" (Krasner 1982: 185). International regimes display a four-part structure, consisting of principles, norms, rules, and procedures. As Krasner has summarized, "Principles are beliefs of fact, causation, and rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for actions. Decision-making procedures are prevailing practices for making and implementing collective choice" (Krasner 1982: 186). Understood in this way, international regimes shape expectations, prescribe roles, guide behavior, and thus create an order among actors on the international level (Müller 1993). This definition also points to the differences between international regimes on the one hand and international organizations and international treaties on the other (Hasenclever, Mayer, and Rittberger 1997). Although many regimes have their structure formalized in a treaty—like the Biological Weapons Convention (BWC) in the case of the biological weapons (BW) prohibition regime—such treaties are purely legal arrangements among states. International regimes—conceptualized as institutions—go beyond this legal dimension. They include state interaction, based on the normative guidelines of the regime, and are socially constructed through the shared expectations and regime-guided behavior of its members. Likewise, many international regimes use an international organization to put the regime's stipulations into effect and for verifying compliance by regime members; for example, the Organisation for the Prohibition of Chemical Weapons (OPCW) has been set up to oversee implementation of the provisions of the CWC. In this context the OPCW provides a forum for the members of the regime to enact a set of recurrent practices and thereby implement the regime's provisions. However, the OPCW is not synonymous with the CW prohibition regime. Rather, the organization is an essential tool for realizing the regime's goals.

Another important characteristic of international regimes is their cooperative character, yet international regimes have to be distinguished from other forms of cooperative behavior, such as crisis management, disaster relief activities, and other ad hoc arrangements. Regimes, in contrast, are conceived of as durable cooperative mechanisms. Last, but not least, the issue-area specificity of international regimes needs to be emphasized. For the purposes of this study, issue areas are understood to be consisting "of one or more, in the perception of the actors inseparably connected objects of contention and of the behavior directed to them" (Efinger and Zürn 1990: 68).

This understanding of international regimes has not enjoyed universal support among scholars. Some regime analysts have questioned whether the four-part structural approach is the best way to define international regimes. The purported wooliness of the concept had been criticized by Susan Strange (1982) and led some to propose a lean definition of international regimes (Young 1986; Keohane 1989). However, as Mark Zacher (1987) and Harald Müller (1993) have shown, such a truncated conceptualization of international regimes does not have the same explanatory power as Krasner's four-part structural definition.

In addition to the initial debates about the concept of international regimes, regime analysis traditionally has focused on three themes (Levy, Young, and Zürn 1995). The first set of questions relates to regime formation: Why and under which conditions are regimes created? Scholars interested in the second set of themes have tried to enrich the debate by identifying the domestic debates and prerequisites that have an impact on regime formation. The third focus of regime analysis has been on the effectiveness of international regimes, which has been most thoroughly explored in the issue area of international environmental policy but also with contributions in the CBW issue areas (Kelle 2003; 2004). In addition, regime research has addressed the related issue of regime robustness (Hasenclever, Mayer, and Rittberger 1997). More recent work has sought to place greater emphasis on nonstate actors in international regimes (Arts 2000); has investigated nonregimes, understood as the absence of international regimes where common sense would expect their creation (Dimitrov 2006; Dimitrov, Sprinz, DiGiusto, and Kelle 2007); and has sought to address regime complexity (Alter and Meunier 2009).

Given the unquestionable existence of the CBW prohibition regimes (see Chapters 3 and 4), non-regimes are a moot point for this study. However, as issues concerning nonstate actors and regime complexity relate to the subsequent analysis of the CBW prohibition regimes, I discuss briefly the key contributions regarding these issues. Drawing on sociologist Anthony Giddens's structuration theory, Bas Arts has proposed to conceive of international regimes and the distribution of actors' capabilities within them as both "medium and outcome of action. They co-determine human behavior" (2000: 527). He argues that "regimes, once established, shape the conduct of agents, although not unilaterally" (Arts 2000: 531). Corresponding to the discussion of agency and change in institutionalist approaches in a wider sense, Arts allows for different kinds of actors to impact on regime implementation and development. In his view, not only states but also substate actors

are relevant in this context. However, as the distribution of capabilities also affects actors' influence on regime outcomes, one can expect that states will remain the major players in many situations, especially security-related international regimes, by determining continuity or change of institutional structures.

Karen Alter and Sophie Meunier put forward a more recent addition to the international regime literature, drawing attention to the increasingly observable phenomenon of regime complexity, which, in their words, "refers to the presence of nested, partially overlapping and parallel international regimes that are not hierarchically ordered" (2009: 13). Based on half a dozen case studies, Alter and Meunier posit that the effects of such complexity

> do not point in a single direction. Sometimes complexity empowers powerful states actors, while at other times NGOs and weaker actors gain from the overlap of institutions and rules. Sometimes overlap introduces positive feedback effects that enhance cooperation and the effectiveness of any one cooperative regime. Sometimes, however, complexity introduces unhelpful competition across actors, inefficiencies, and transaction costs that end up compromising the objectives of international cooperation and international governance. (2009: 14)

How does the body of academic literature on international institutions and regimes relate to the topic of this book? Starting with regime complexity, only since the late 1960s have the threat of proliferation and, correspondingly, the prohibition of CBW been regarded as two separate issue areas. This change was evidenced by the separation of the negotiations for the BWC in the late 1960s from negotiations on a ban on chemical weapons (Sims 1988). Regime complexity in the issue areas of CBW prohibition is further increased by the existence of the Australia Group of states harmonizing export controls since the mid-1980s (see Chapter 5), the UN Secretary-General's mechanism to investigate the use of biological and chemical weapons, and UN Security Council Resolution 1540—along with the implementation activities set up under this resolution (see Chapter 7). With a view to Arts's notion of the involvement of additional substate actors in regime evolution, their emergence could be observed most clearly in the BW prohibition regime during the first decade of the twenty-first century in the deliberations between BWC Review Conferences of BWC states parties in the so-called intersessional process (ISP; see Chapter 3).

In terms of structural regime components, the BW prohibition regime contains four principles: the first is related to regime partici-

pants' belief that the use of biological warfare agents constitutes an abhorrent act of warfare and is therefore prohibited. Sometimes referred to as the *BW taboo*, this principle was first expressed in the 1925 Geneva Protocol, which states that the "use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilized world" and has been reiterated in the BWC's preamble.

According to the second principle on which the BW prohibition regime is based, peaceful uses of the biosciences are a legitimate undertaking. Article I of the BWC reflects this peaceful-uses principle:

> Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:
>
> (1) Microbial or other biological agents, or toxins whatever their origin or method of production, *of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes*. (OPBW webpage; emphasis added)

From this so-called general-purpose criterion, the third regime principle can be derived. It expresses the belief of states participating in the regime that "protective purposes"—in other words, defenses against the threat or use of BW—are permitted. The fourth principle underlying the BWC prohibition regime is the complementarity principle, again spelled out in the BWC's preamble: the 1925 Geneva Protocol and the BWC are complementing each other. Nothing in the latter can be construed to contradict the content of the former.

No consensus emerged among regime members at the time of the BWC's creation, however, that the verification of regime-compliant behavior by states parties should be established as a fifth guiding principle for the BW prohibition regime; this feature is the most obvious distinguishing point between the biological weapons and the chemical weapons prohibition regimes. Emerging compliance concerns in the BW realm as well as a favorable global political environment during the second half of the 1980s led to including the verification principle in the CW prohibition regime almost two decades after the BWC was negotiated. The other four mentioned principles of the BW prohibition regime were not only integrated into the CW prohibition regime but are supported by a much denser set of norms, rules, and procedures, as is the case in the BW prohibition regime (see Chapters 3 and 4).

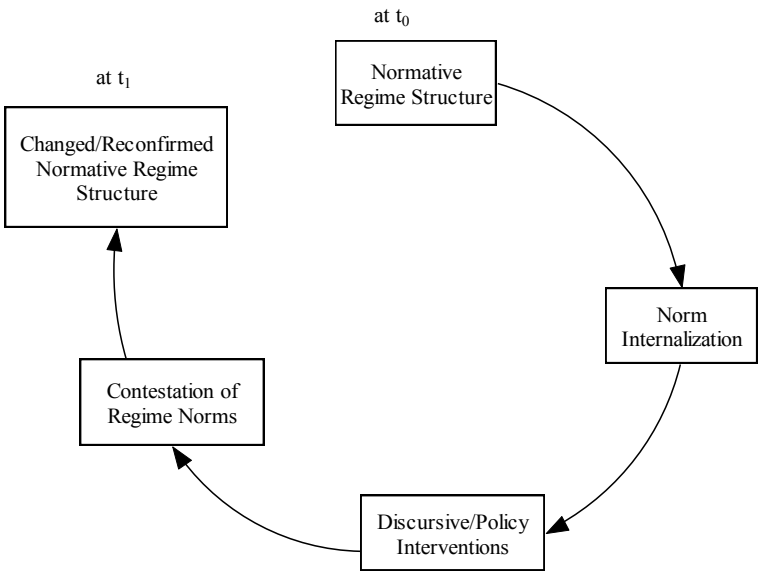
As I show in the chapters on the BW and CW prohibition regimes, the actual meaning and interpretation of the regime norms and rules—and, to a lesser degree, of principles—have been far from uncontrover-

sial over time. In order to capture better these occasionally diverging interpretations of the two regimes' stipulations, I employ the notion of "contested compliance" as a means to investigate "changes in the normative structure of world politics" (Wiener 2004: 189). This approach uses "a reflexive understanding of conflictive interaction which implies that the meaning of norms as the dependent variable is embedded in social practice" (Wiener 2004: 191). Echoing Arts's contribution mentioned earlier, from this perspective, "Norms entail a dual quality. They are constructed and structuring. Hypothetically, the meaning of norms evolves through discursive interventions" (Wiener 2004: 201) that can lead to either the confirmation or the reinterpretation of their meaning, which in turn determines compliance with the norm. Returning to the above mentioned scholarship on international institutions, this approach combines normative and constructivist institutionalism. With a view to broader scholarship on international regimes, this literature has focused mostly on either the formation of new regimes or their structuring effects on the issue area that the regimes regulate and effects on state behavior (e.g., regime effectiveness, compliance research). In Figure 1.1 the boxes for *normative regime structure* and *norm internalization* and the arrow connecting the two reflect the latter dimension of regime scholarship. Regime research has not yet captured in a systematic way the processing of regime norms within states that are participating in the regime and its feedback into the evolutionary processes of the regime on the international level.

Intrastate analysis has usually stopped with the determination of (non)compliance, at that point shifting the focus of attention to the question of how to deal with noncompliant behavior. This approach, however, leaves unattended much of the identified feedback loop, which either leads to a reconfirmed or changed normative regime structure. As a detailed analysis of norm internalization and discursive or policy interventions by all states parties of the BW and CW prohibition regimes—over forty years in the case of BW and more than fifteen years with respect to CW—is beyond the scope of this study, I focus instead on the contestation of regime principles, norms, and rules on the international level as well as its implications for the evolution of the two regimes. Interventions of BWC and CWC states parties at annual meetings and at five-yearly (quinquennial) review conferences serve as indicators of the attribution of meanings to individual regime norms as well as their operationalization.

The separation of prohibitions on CW and BW more than four decades ago has been justifiable on grounds of available scientific and

Figure 1.1 Feedback Loop of Changed/Reconfirmed Normative Regime Structure



technological (S&T) knowledge as well as political expediency (Tucker 2002). However, S&T advances in the life sciences and the resulting increasing likelihood of the availability of biochemical weapons raise the question of whether the BW-CW distinction and the corresponding regimes set up to prohibit them will be tenable in the longer term (Wheelis 2002; Kelle, Nixdorff, and Dando 2006, 2012). Should the perception of the biochemical threat catch up with the exponential growth of knowledge in the life sciences and its potential for misuse for biochemical weapons, this development might represent a critical juncture for the institutions created for CBW prohibition; a major change might result in the form of a substantial restructuring of the multilateral architecture for prohibiting this kind of weaponry. Were BWC and CWC states parties to take such steps, however, this move would constitute a massive departure from the present tendency toward incremental change. In order to help assess the likelihood of such a major change, I offer in this volume an in-depth analysis of the CBW prohibition regimes and

complementary institutional arrangements. First I frame the CBW issue areas and offer an overview of the book's chapters.

The Issue Areas of CBW Prohibition

Chemical and biological weapons were reportedly employed in ancient times, were used through the Middle Ages, and have been the object of substantially increased military interest since the beginning of the twentieth century. Examples of chemical and biological warfare usually quoted in the literature range from the use of toxic—sulfur-containing—smoke by the ancient Greeks and Romans in siege warfare to British settlers' use of smallpox-contaminated blankets to decimate Native American populations (Wheelis 1999a). However, these isolated incidents do not represent the systematic application of knowledge in chemistry or biology for armed conflict. The use of chemistry and biology to advance military capabilities required acquiring the underlying scientific knowledge in the first place, which did not occur until the late nineteenth century, with industrial chemistry and the advent of bacteriology providing the basis for the offensive CBW programs of the early decades of the twentieth century.

In the chemical weapons realm, advances in the chemical industry—in particular, the large-scale liquefaction of chlorine and its storage and transport in pressurized cylinders during the late nineteenth century—provided the technical basis for the first CW attacks during World War I (Robinson 1989). During the 1930s and 1940s, civilian research into a new group of organophosphorous compounds led to the development and production of the nerve agents Tabun, Sarin, and Soman (Martinetz 1995). After World War II, civilian work to exploit the new group of toxic organophosphates continued, leading to the development of even more toxic compounds, some of which the US military adopted during the 1950s and which became known as *V-agents* (Sidell, Newmark, and McDonough 2008). These developments clearly mirror the ones in the biological weapons area, where civilian scientific and technological advances in bacteriology, virology, aerobiology, and genetic engineering were also exploited for offensive military purposes. According to one comprehensive review, the relationship between scientific developments and BW programs during the twentieth century witnessed "a continuous process of military programs developing on the back of growth in scientific knowledge" (Dando 1999: 51).

Against this background of continuous exploitation of civilian S&T advances for offensive military CBW programs, the ongoing revolution in the life sciences and supporting technologies—in areas such as drug discovery and development, neuroscience, immunology, and synthetic biology—presents obvious cause for concern that military history will repeat itself (Meselson 2000). These revolutionary developments require continued multilateral efforts to prevent CBW proliferation and use and might very well change the entire conceptualization of chemical and biological weapons. The shifting character of the object of efforts to prevent chemical and biological warfare—and, to a lesser degree, terrorism—may require a fundamental reevaluation of the adequacy of existing institutional structures.

The Plan of the Book

In the next chapter I provide a short overview of the scientific and technological foundations of CBW prohibition in relation to the classical chemical and biological warfare agents developed and produced for offensive state CBW programs. Then I briefly discuss some recent developments in the life and associated sciences, such as the convergence of chemistry and biology and the emergence and implications of synthetic biology. I conclude the next chapter with a short review of defensive measures against CBW, which, as already hinted at, are permissible under the CBW prohibition regimes. As a matter of fact, CBW defenses represent the oldest efforts to counter the threat and use of CBW. During World War I, troops were already equipped with simple gas masks, seeking to prevent the inhalation of CW agents dispersed on the battlefield. After introduction of the less volatile mustard agents, which also act through the skin, individual protection had to cover the whole body. In addition to such physical protection measures, which can be extended to larger groups through air filtration equipment, individual protection measures began to include medical countermeasures against CBW agents. Such efforts include pre- and post-exposure measures and range from vaccination to the administration of antibiotics—or, in cases where none of the above are available, palliative care. From the perspective of the CBW prohibition regimes, CBW defenses are unproblematic as long as they do not raise suspicions that they may be a cover for clandestine offensive CBW procurement activities. Hence, I address issues involved in distinguishing defensive from offensive CBW activities.

The two multilateral CBW prohibition regimes are the focus of my analysis in Chapters 3 and 4. Both of these regimes are based on early normative guidelines for state action that date back to the 1925 Geneva Protocol. During the 1925 Geneva Conference on the Supervision of the International Traffic in Arms, the United States proposed an export prohibition for poisonous gases, which upon a French suggestion was extended to cover their use as well. A Polish initiative expanded the prohibition of use to bacteriological weapons; the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare can be regarded as the foundation upon which the CBW prohibition regimes rest (SIPRI 1971). Further development of this rudimentary no-first-use regime was contemplated during the 1960s when negotiations on CW and BW considered banning both categories of weapons by an international agreement (SIPRI 1971). However, following a British diplomatic initiative, negotiations were separated, leading to the conclusion of the 1972 Biological and Toxin Weapons Convention (BWC), which came into force in 1975 (Wright 2002). Unlike biological weapons, chemical weapons had been used in warfare and continued until the 1980s to have a role, albeit a limited one, in the military strategies of the North Atlantic Treaty Organization (NATO) and the Warsaw Pact. Only during the final stages of the Cold War at the beginning of the 1990s did a window of opportunity open for concluding negotiations of the Chemical Weapons Convention (CWC). The CWC was opened for signature in January 1993 and entered into force in April 1997.

In Chapter 3 I present an in-depth analysis of the major elements of the multilateral BW prohibition regime as they relate to the 1972 BWC. I begin with a short history of multilateral disarmament efforts leading up to the BWC and subsequently discuss the regime's normative and organizational structures. The absence of a verification principle and of an implementing organization led to several sequential attempts to strengthen the regime, among other ways, through establishing a transparency norm, the negotiation of a Compliance Protocol, and improved national implementation measures. Analysis of the thirty-five-plus-year implementation history of the BWC constitutes the major part of the chapter, structured around key norms of the regime, both established ones and additions negotiated subsequently. I first discuss early concerns about noncompliance with the disarmament norm of the regime in relation to the Soviet offensive military BW program. The first two of the five-yearly BWC Review Conferences (1986 and 1991) resulted in agreement among BWC states parties on a set of so-called Confidence-

Building Measures (CBM). Then I analyze several more key norms of the regime, including the transparency, investigation, internalization, assistance, and adaptation norms. Efforts by the Ad Hoc Group (AHG) of states parties during the second half of the 1990s aimed at broadening the normative base of the regime by negotiating a legally binding Compliance Protocol and including a number of proposals for establishing declaration and inspection norms, are also reviewed. After the United States terminated the AHG process in 2001, efforts to broaden the normative base of the regime were abandoned in favor of a greater emphasis on improving the implementation of several existing regime norms. Proposals in this regard have been discussed in the intersessional processes (ISP) that have taken place since 2003. Somewhat to the surprise of observers and participants in this process, the first ISP cycle had yielded some useful insights into actual implementation of the BWC and has thus been renewed after the Sixth and Seventh BWC Review Conferences, respectively. I close Chapter 3 with a summary of the evolution of the BW prohibition regime and an assessment of the implications that the renewed ISP might have for the future of the multilateral BW prohibition regime in the aftermath of the Seventh BWC Review Conference in December 2011.

Similar to my presentation in Chapter 3, Chapter 4 on chemical weapons starts with a short overview of multilateral arms control efforts culminating in the 1993 CWC; I also discuss normative and organizational structures, followed with an in-depth analysis of treaty implementation since the CWC's entry into force in April 1997. One of the key elements of the CW prohibition regime—in contrast to the BW prohibition regime—is the complete destruction of declared CW stocks under strict international verification. My discussion of the different regime norms and their implementation begins with analysis of the disarmament norm, which obliges the declared CW possessor states to destroy their CW stockpiles in a specified time frame. I then offer a critical assessment of the non-acquisition norm, which may come under threat as some CWC states parties are showing increasing interest in so-called incapacitating chemical agents (ICA). The declaration and inspection norms are relevant to a number of other prescriptions and proscriptions for state action, but I discuss them in the context of their central importance to the nonproliferation dimension of the regime related to preventing the re-emergence of chemical weapons. Further analysis of the internalization, consultation, investigation, assistance, and adaptation norms sheds light on these important normative elements of the regime and their implementation by CWC states parties and the Technical Sec-

retariat (TS) of the organization specifically set up to oversee implementation of the CWC: the Organization for the Prohibition of Chemical Weapons (OPCW). The detailed review of these norms informs the concluding section of this chapter, which takes stock of the CW prohibition regime in the run-up to the Third CWC Review Conference in spring 2013.

As indicated during the discussion of regime complexity, the core elements of the CBW prohibition regimes—the CWC and the BWC—are complemented by a number of additional institutional arrangements at the international level in order to prevent the proliferation and use of CBW. CBW-related dual-use export controls have been one key element of these measures. Beginning in the mid-1980s an initial group of fifteen states under Australian leadership agreed upon the harmonization of their national export controls for CBW-related knowledge, technologies, material, and equipment. The formation of the so-called Australia Group was prompted by the realization of participating states that some of their dual-use exports had found their way into the Iraqi CBW programs. At the time, formation of the Australia Group was regarded as an interim measure until a multilateral ban on CW under international verification was completed. Yet, despite the CWC being in effect for more than fifteen years now, the Australia Group has not been discontinued. Quite to the contrary, the Australia Group has since expanded the scope of its activities and has attracted new participating states as well, raising interesting questions in relation to regime complexity and the stickiness of this particular part of the CBW prohibition regimes. Therefore, I devote Chapter 5 to a discussion of the raison d'être of export controls in general, an analysis of the Australia Group's evolution over the last quarter century, and its relationship to the two conventions that form the core of the CW and BW prohibition regimes—in particular, their nontransfer and cooperation norms.

In Chapter 6 I address what many analysts and policymakers since the second half of the 1990s have identified as the second big challenge for the CBW prohibition regimes—in addition to the existing one posed by the S&T advances discussed in Chapter 2: the emergence of substate actors, especially terrorist groups or even individuals, who were increasingly perceived as credible perpetrators of chemical and biological attacks with a potential to cause mass casualties. The March 1995 Sarin nerve gas attack in the Tokyo subway system by the millenarian Aum Shinrikyo cult is the often-quoted wake-up call that focused attention of policymakers, scholars, and the wider public on this emerging security threat. The attack, which represented the culmination of a

series of attempts by the Aum cult to employ CBW agents, killed twelve and resulted in the hospitalization of more than one thousand commuters, but also first responders, who inhaled the toxic Sarin vapors. This incident resulted in the exponential growth of academic and policy debates on CBW terrorism, particularly in the United States.

The anthrax attacks in the fall of 2001 following the terrorist attacks on the World Trade Center and the Pentagon on 11 September 2001 seemed to confirm dramatically the views of analysts who regarded the question of *whether* terrorists can use CBW to cause mass casualties as overtaken by events and for whom the only questions worth pondering were about *when* and *how* such attacks were going to happen. Although since those anthrax attacks in 2001, no terrorist group has conducted a successful mass casualty attack with CBW, the threat perception shifted dramatically at the turn of the millennium and resulted in substantial policy changes in many countries—again, most notably, the United States. The changed threat perception has resulted in biosecurity and biodefense-oriented political measures receiving by far the largest amounts of additional funding. Overall, the changed threat perceptions concerning CBW terrorism have also affected the CBW prohibition regimes. My argument in Chapter 6 proceeds in three steps: first, revisiting the lack of interest of traditional terrorist groups in CBW. Second, I address the supposed new terrorists' willingness and ability to use CBW, in the process analyzing the political and moral hurdles to overcome and the technical and organizational challenges to master. In the third section of the chapter, I trace the discussion of CBW terrorist threats in the two CBW prohibition regimes, the responses formulated to counter this emerging threat, and the resulting impact on the normative structure of the two regimes.

In Chapter 7 I discuss further institutional arrangements that have been added over the past quarter century to the multilateral treaties forming the core of the CBW prohibition regimes analyzed in Chapters 3 and 4 and the export control activities of the Australia Group discussed in Chapter 5. These institutional elements all contribute to a web of responses to CBW threats (Kelle, Nixdorff, and Dando 2012), thereby increasing regime complexity. These responses are characterized by varying scope and have taken different forms, such as involving either a subset of regime members—as in the case of the Proliferation Security Initiative—or setting up a temporary parallel institution that has relied on and created additional UN infrastructure. In two cases—the UN Secretary-General's Mechanism to Investigate Chemical and Biological Weapons Use and UN Security Council Resolution 1540—

their regulatory reach goes well beyond membership in either of the two prohibition regimes.

In tracing the growth of regime complexity historically, the first of these additional institutional mechanisms to consider is the UN Secretary-General's Mechanism to Investigate Chemical and Biological Weapons Use dating back to 1982 (Littlewood 2006). The second institutional mechanism was created in the form of the UN Special Commission on Iraq (UNSCOM), set up in 1991 to oversee the disarmament of Iraqi nuclear, biological, and chemical (NBC) weapons (Black 2002). UNSCOM was later replaced by the UN Monitoring, Verification, and Inspection Commission (UNMOVIC) when the original inspection mandate was judged to be insufficient in light of Iraqi obstructions to UNSCOM's verification efforts (Smithson 2011). Notably, the inspection regime set up for Iraq was coercive in character as it had its roots in the cease-fire conditions imposed upon Iraq by the UN Security Council and as such is not part of the CBW prohibition regimes. All international regimes rely on the voluntary accession of its members. As a result, under UNSCOM the cooperative character of the CBW prohibition regimes was largely missing. In addition, UNSCOM's and UNMOVIC's activities had their legal foundation in a series of resolutions adopted by the UN Security Council, not in a multilateral treaty.

In contrast, the Proliferation Security Initiative (PSI) started out as a national initiative that was announced by then US president George W. Bush in May 2003. Its goal is to enable the interdiction of NBC weapons, components, and delivery systems while in transit. With a view to the scope of this study, PSI seeks to address CBW proliferation once the export control measures analyzed in Chapter 5 have either failed or were not in existence at all. The core group of eleven states participating in PSI from the outset had grown to more than one hundred states by the end of 2012. All of them subscribe to a set of interdiction principles, and some have entered into bilateral ship-boarding agreements with the United States in an effort to provide the legal basis for interdiction activities on the high seas.

Less than one year after PSI was initiated, the UN Security Council took action to prevent the proliferation of NBC weapons to nonstate actors. Resolution 1540, adopted on 28 April 2004 under Chapter VII of the UN Charter, calls on all UN member states—not just members of any of the NBC disarmament and nonproliferation treaties—to take effective action to prevent the proliferation of NBC weapons to nonstate actors, such as terrorist groups. The resolution establishes a reporting

requirement that is legally binding on all UN members and has set up a committee to receive and process national reports and assist with the implementation of the resolution. Given the lack of transparency in the BW prohibition regime—and, to a considerably lesser extent, also in the CW regime—these declaration and assistance mechanisms represent potentially useful additions to the normative fabric of the CBW prohibition regimes.

Thus, in Chapter 7 I address regime complexity in the CBW issue areas by discussing the UN Secretary-General's investigative mechanism, the inspection regime set up for Iraqi NBC disarmament as well as the supply-side efforts contained in PSI, and the activities under UNSC Resolution 1540 (2004) and its reaffirmation in subsequent UN Security Council resolutions. I analyze these institutional structures with a view to their relationship to and capability for strengthening the existing multilateral CBW prohibition, and thereby complementing core norms of the CBW prohibition regimes.

In Chapter 8 I summarize the arguments developed in the individual chapters of this study and link them back to the S&T dimension as well as the changing political contexts informing the evolution of the CBW prohibition regimes. I also revisit some of the central concepts developed in this introductory chapter in relation to regime evolution and complexity, as well as review more broadly the determinants and manifestations of institutional change.