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Future Foreign Perceptions of Chemical Weapons Utility

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Introduction

It is inherently speculative to address future foreign perceptions of chemical weapons (CW) utility. This is not only because it concerns things that may be, rather than things that already are, but also because those who might be considering or already pursuing CW capabilities for the future will not be openly sharing their views. Classified sources and assessments also cannot be addressed in this unclassified forum. This paper, therefore, offers some educated guesses about how rational actors might view the future utility of CW on the basis of open source information about relevant technological trends and assumptions about pertinent aspects of the future international security environment.

It is useful to briefly take stock of the present before speculating about the future. Almost all of the world's countries are state parties to the CWC, which comprehensively prohibits chemical weapons, except nonlethal riot control agents used only for law enforcement purposes and declared as such. Today, only seven states have not acceded to the CWC: Angola, Egypt, Israel, Myanmar, North Korea, Somalia, and Syria.[1] Of those seven, Syria and North Korea most evidently maintain active offensive CW programs. Of CWC state parties, the United States has expressed compliance concerns about China, Russia, and Iran.[2] On the one hand, almost all of the world's countries appear to have formally and sincerely foresworn chemical weapons. On the other hand, there appear to be a small number of countries that continue to place value on possessing, or at least keeping open their options to possess, CW.

For any type of weapon, and particularly for one proscribed by treaty, three factors should be assessed when attempting to gauge future foreign perceptions of that weapon's utility: the nature of the future threat, effectiveness of the weapon in countering that threat, and opportunity costs of choosing that weapon over other means of response. These three factors are considered in turn.

The Future Threat

Three aspects of the future international security environment could increase the appeal of chemical weapons.

First, the emergence of the world's currently most populous states as bigger, richer, stronger, and more assertive powers could precipitate greater interest among their smaller, poorer, and weaker neighbors for alternative means of defense.

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For example, Russia may not be able to rely in the future upon superior conventional technology to offset China's greater numbers as the latter should be able to afford at least comparable technology. If those other states have nuclear weapons, they will depend upon them to deter aggression by their more powerful neighbors, but may also look to chemical as well as biological weapons to forestall catastrophic nuclear escalation during an actual conflict, particularly if new and more effective forms of those weapons were to emerge. Iraq showed during its war with Iran that chemical weapons can counter superior numbers.

Second, the persistence of insurgent and terrorist threats to many states could increase those states' interest in nonlethal and low-lethal chemical agents. As the United States once again learned in Iraq and Afghanistan, collateral damage to the local population by counterinsurgency and counterterrorism operations can foster and sustain local support for the insurgents and terrorists. Russia has experienced similarly counterproductive results with its heavy-handed counterinsurgency operations in the northern Caucasus region. Tear gas is a chemical irritating agent already widely used for riot control, a purpose permitted by the CWC. Less evidently compliant with the CWC, Russia employed a chemical incapacitating agent to resolve the 2002 Moscow theater hostage crisis, but clumsily so that over 150 people died. Counterinsurgency and counterterrorism demands could motivate Russia and other states to further develop and employ nonlethal and low-lethal chemical agents. If challenged as to the legitimacy of such efforts, they may assert compliance under the broad law enforcement exemption of the CWC.

Third, the recent revision of U.S. negative security assurances (NSA) could influence some states seeking asymmetrical counters to opt for chemical and/or biological weapons over nuclear ones. The NSA revision withdrew the threat of a U.S. nuclear response to chemical and biological weapons use if the perpetrator is a nonnuclear member of the Nuclear Non-Proliferation Treaty and in compliance with its nuclear nonproliferation obligations.[3] While nuclear weapons offer unsurpassed destructive power and deterrent value, their development is hard and risky: they are technologically sophisticated, they are expensive, they have telltale signatures, and they invite more passionate international responses than the pursuit of other forms of weaponry, whether of weapons of mass destruction or conventional types. External military action ended (or at least interrupted) Iraq's and Syria's nuclear weapons programs, and the specter of such action may have precipitated Libya to abandon its program. North Korea and Iran press on but at high economic and diplomatic cost. Syria, Burma, and perhaps even Venezuela could be influenced by the revised U.S. NSA in deciding where they go next in developing asymmetric counters to their actual or perceived security threats.

Future CW Technological Developments[4]

Today's advanced countries have had decades to understand the effects of traditional chemical warfare agents and to develop effective defensive countermeasures. While there are still some significant knowledge and treatment gaps (for example, mustards and soman), U.S. military leaders probably would be correct to conclude that their forces could successfully "fight through" traditional chemical attacks, albeit while incurring increased casualties and delays. Capable military forces enter battlefields prepared for the possibility of chemical weapons use, shielded by protective equipment and medical treatments developed to defeat traditional agents. Civilian populations, on the other hand, are not prepared on a day-to-day basis to defend against chemical attack, and so would suffer heavy casualties if subject to attack. Traditional chemical agents thus remain a significant instrument of deterrence for their capacity to inflict large-scale casualties against vulnerable civilian populations, but are less effective as a means of warfare.

The emergence of novel chemical agents could dramatically increase the military utility of chemical weapons. Former Soviet scientists have publicly asserted that the Soviet Union developed novel chemical agents that are more effective than traditional ones. If such agents exist and proliferate, even advanced military forces might find it difficult to successfully fight through chemical attacks.

Even more potent forms of chemical agents may emerge from future technological developments. New tools, including robotics, micro-reactors, and ever more powerful computing capabilities, have dramatically increased the number of new compounds that can be synthesized and the rate at which they can be synthesized and screened. Commercial entities are creating large libraries of new chemical compounds, some of which may be highly toxic and useful for weapons.[5] Nanotechnology is a rapidly developing area that could have important implications for chemical warfare.

Building on ongoing work to improve the delivery of drugs for therapeutic purposes, nanotechnology may be utilized to develop new or improved CW dissemination techniques.[6] There is a growing convergence of chemistry and biology as biological and other scientific disciplines are applied to the search for new chemical compounds with particular effects on biological systems.[7]

More people in more countries will have the knowledge and skills to exploit new technological developments in the chemical arena. Chemical manufacturing has globalized. Production no longer is dominated by a few, mainly Western, multinational companies, but now occurs in many more facilities spread over many more countries. Growth has been particularly pronounced in Asia. Chemical production facilities are also getting smaller and utilizing new technology. Individual plants used to focus on the bulk production of just a few chemicals; modern plants can economically produce a wide range. It may be harder to detect illicit activity in smaller plants utilizing new technology.[8]

Much as in the biotechnology area today, the rapid pace and diffusion of chemical technology is creating new scope for the development of novel chemical weapons and for offensive applications to outpace defensive ones. States with existing offensive chemical weapons programs likely will be the first to exploit these developments for malign purposes. Technological diffusion, however, will make these novel chemical weapons capabilities available more broadly over time, including eventually to nonstate actors.

Future CW Opportunity Costs

One opportunity cost for states considering the pursuit of CW is the risk of being exposed as, or at least being suspected of, violating the CWC. This risk is most clear for nations that are state parties to the CWC. States do not want to be seen as not complying with their international obligations. That attracts negative diplomatic attention, possibly sanctions, and calls into question such states' reliability in other areas. With specific regard to CW, it can invite undesirable political-military countermeasures by neighbors and rivals. Even for states not party to the CWC, their CW pursuits are viewed as violating the international norm embodied by the CWC, and invite similar negative responses.

Yet illicit CW activity can be difficult to detect and expose. The dual-use nature of most chemical facilities, processes, and compounds provides cover for illicit pursuits. Research and development can be pursued under the cover of civilian laboratories. States no longer need to produce and stockpile large quantities of CW during peacetime; production can be undertaken shortly prior to and during wartime, mobilizing commercial chemical industrial infrastructure to that end. Greater use of micro-reactors in the future could expedite just-in-time production of a high-quality CW agent.

The CWC established an intrusive monitoring and verification mechanism, administered by the Organisation for the Prohibition of Chemical Weapons (OPCW), in an effort to address the dual-use problem, but its effectiveness is unclear. One impediment to OPCW monitoring and verification is state parties' reluctance to invoke the CWC challenge inspection authority. Despite reports of illicit CW activity by some countries, no challenge inspection has even been requested, much less conducted.

The inspection regime also focuses on traditional CW agents. These are the agents specifically listed in the CWC Schedules of Chemicals and the ones that OPCW inspectors are trained and equipped to monitor for. If new types of agents emerge in the future, then the CWC Schedules will need to be updated to reflect these new compounds when they emerge and corresponding changes made to OPCW inspection equipment and procedures. This might not be easily accomplished. The OPCW operates by consensus, though it is not required to do so. If any CWC state parties are among those who in the future will be pursuing new types of agents, particularly if they include one or more of the convention's major players, they will be in a position to block any move to add new agents to the Schedules. The Schedules have never been amended, and have had only two noncontentious technical changes made to them.

Another opportunity cost of pursuing CW is the corresponding reduction in the resources available to pursue other military capabilities, whether conventional or unconventional. Two effects that states would likely assess in deciding whether to invest a certain amount of resources into CW or into other capabilities are those various capabilities' respective contributions to deterring aggression and prosecuting a conflict. Nuclear weapons generally are considered to have unsurpassed deterrent value but very limited applications during conflict given their high threshold for employment. The inverse applies for conventional weapons. CW lie somewhere between these two ends of the deterrence-warfighting

spectrum. As weapons of mass destruction, they are perceived as having greater deterrent value than conventional weapons, but not as much as nuclear or some biological weapons, which can inflict more casualties for any given attack size. CW's lesser capacity for catastrophic destruction plus the fact that they have been employed more often than nuclear or biological weapons arguably make their future use, especially on the battlefield, less abhorrent and therefore more conceivable. Moreover, unlike nuclear or biological weapons, CW has been shown to be effective on the battlefield.

Conclusion

The perceived utility of chemical weapons will increase in the future with the emergence of novel chemical agents. Some of these agents are likely to be responsive to increased demand for highly lethal weapons that can defeat superior conventional military forces and for non/low-lethal weapons effective for counterinsurgency/counterterrorism missions. Offensive applications likely will outpace defensive countermeasures. CW programs utilizing novel chemical agents may appeal to some states as a viable alternative to expensive and risky nuclear weapons programs. The Chemical Weapons Convention and Organisation for the Prohibition of Chemical Weapons will not pose major obstacles to states determined to acquire these CW capabilities, but they will cause those states to pursue those agents on a covert basis.

Notes

[1] Angola, Egypt, North Korea, Somalia, and Syria have not signed the CWC. Israel and Myanmar have signed the convention but have not ratified it. See Organisation for the Prohibition of Chemical Weapons, "Non-Member States," available at <www.opcw.org/about-opcw/non-member-states/>.

[2] U.S. Department of State, *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, July 2010, 37–51. The United States also has indicated that Libya has not yet met its CWC, Article VII, obligations, but at this point this appears more indicative of a slow or incompetent bureaucratic process than a possible interest in maintaining an offensive CW program.

[3] U.S. Department of Defense, *Nuclear Posture Review Report* (Washington, DC: U.S. Department of Defense, April 2002), 15.

[4] Much of the following section is excerpted or adapted from John P. Caves, Jr., and W. Seth Carus, "Problems of Proliferation," *Global Strategic Assessment 2009: America's Security Role in a Changing World*, ed. Patrick M. Cronin (Washington, DC: NDU Press, 2009).

[5] As noted in the February 2008 Report of the Scientific Advisory Board on Developments in Science and Technology for the Second Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (Second Review Conference): "New biologically active molecules are being discovered at an unprecedented rate. . . . The tools for such techniques are becoming widely available and could be selectively targeted at toxic moleculres," 9, available at <www.opcw.org/index.php?eID=dam_frontend_push&docID=1871>.

[6] Ibid., 11.

[7] Alexander Kelle noted in his introduction to a 2006 report on preventing the misuse of 21st-century chemistry: "The chemistry of the 21st Century is a far cry from the one of the 1980s. . . . The new chemistry is utilizing other scientific disciplines and technologies to a much higher degree in its quest for new chemical compounds." See Alexander Kelle, *The Changing Scientific and Technological Basis of the CBW Proliferation Problem*, ed. Alexander Kelle, 7, available at <www.brad.ac.uk/acad/sbtwc/ST_Reports/ST_Report_No_7.pdf>. This report was the result of the workshop "Preventing the Misuse of 21st Century Chemistry: State of the Art of Drug Development and Delivery, and Selected Enabling Technologies," Belfast, Ireland, January 13–14, 2006.

[8] As the Director-General of the Organisation for the Prohibition of Chemical Weapons noted in April 2008, "important changes are taking place. The layout, design, and characteristics of plant sites are under continued review by industry. Very importantly, globalization is bringing about a massive redistribution and regional migration of chemical production and trade in the world. In parallel with these movements, there has been an exponential growth in the number of declared Other Chemical Production Facilities. . . . Due to their technological features . . . a number of [these facilities] could easily and quickly be reconfigured for the production of chemical weapons. . . . This is all the more pertinent in view of the evolving threat posed by terrorism." See Opening Statement by the Director-General to the Second Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention, April 7, 2008, The Hague, The Netherlands, available at <www.opcw.org/news/article/opening-statement-by-the-director-general-to-the-second-review-conference/>.

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