

Weapons of Mass Destruction and the Future of U.S. National Security: From Present Problems to Future Challenges

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Table of Contents

Table of Acronyms and Abbreviations	v
Executive Summary.....	vii
Preface	viii
Introduction	1
Seminar on Weapons of Mass Destruction and the Future of U.S. National Security Policy	1
Methodology—Scenario-Based Approach to Highlight Policy Implications for the United States	1
Part 1—Chemical Weapons	5
1.1 Introduction	5
1.2 The Utility of Chemical Weapons: A Typology and Implications for the United States.....	6
Tactical uses of chemical weapons	6
Strategic uses of chemical weapons	7
Utility of chemical weapons as a deterrent	8
Use of toxic chemicals for law enforcement purposes.....	9
Use of toxic chemicals as weapons of terror	10
Implications of the typology on the utility of chemical weapons for the United States	11
1.3 Scenario 1: CWC Violated	12
Analysis of the scenario	13
Policy implications of scenario 1 for the United States	16
1.4 Scenario 2: From “Non-Lethal” Loophole to Toxic Black Hole: The Chemical Weapons Taboo Unravels	17
Analysis of the scenario	18
Policy implications of scenario 2 for the United States	20
1.5 Scenario 3: Organized Crime and Terrorism Go Toxic	20
Analysis of the scenario	21

Policy implications of scenario 3 for the United States	23
1.6 Conclusion	24
Endnotes for Part 1	25
Part 2—Biological Security	28
2.1 Introduction	28
2.2 Intentional Biological Threats: An Overview.....	29
Use of biological agents as tactical and strategic weapons.....	29
Biological weapons as a deterrent.....	29
Use of biological agents as terror weapons.....	30
Implications for the United States of the potential uses of biological weapons.....	31
2.3 Biological Threats from Naturally Occurring Infectious Diseases: Implications for U.S. and International Security	32
2.4 Scenario 1: Nuclear Iran Triggers Suspected Biological Weapons-Related Activities.....	32
Analysis of the scenario	33
Policy implications of scenario 1 for the United States	35
2.5 Scenario 2: Bioterrorism?	36
Analysis of the scenario	37
Policy implications of scenario 2 for the United States	39
2.6 Scenario 3: Pandemic Politics	41
Analysis of the scenario	42
Policy implications of scenario 3 for the United States	43
2.7 Conclusion.....	44
Endnotes for Part 2	45
Part 3—Nuclear Weapons	47
3.1 Introduction	47
3.2 Scenario 1: Diminishing U.S. Nuclear Primacy: Chinese Pursuit of MAD.....	48

Analysis of the scenario	49
Policy implications of scenario 1 for the United States	52
3.3 Scenario 2: A Nuclear Middle East: Iran and Regional Conflict	54
Analysis of the scenario	55
Policy implications of scenario 2 for the United States	57
3.4 Scenario 3: Los Angeles Shattered—Nuclear Terrorist Attack against the United States	59
Analysis of the scenario	60
Policy implications of scenario 3 for the United States	64
3.5 Conclusion on Nuclear Weapons	65
Endnotes for Part 3	66
Conclusion.....	70
WMD-Specific Global Trends	70
Motives	70
Means	70
Opportunities.....	71
Vulnerabilities	71
The Future of American WMD-Specific Policies	71

Table of Acronyms and Abbreviations

BI	Bratislava Initiative
BSL-4	Biosafety Level 4 Laboratory
BWC	Biological Weapons Convention
BWPP	BioWeapons Prevention Project
CDC	Centers for Disease Control and Prevention
CIA	Central Intelligence Agency
CTBT	Comprehensive Test Ban Treaty
CWC	Chemical Weapons Convention
CTR	Cooperative Threat Reduction
DMZ	Demilitarized zone
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FSU	Former Soviet Union
GICNT	Global Initiative to Combat Nuclear Terrorism
GNEP	Global Nuclear Energy Partnership
GTRI	Global Threat Reduction Initiative
HEU	Highly enriched uranium
IAEA	International Atomic Energy Agency
IHR 2005	International Health Regulations 2005
MAD	Mutually assured destruction
MPC&A	Materials Protection, Control, and Accounting Program

NATO	North Atlantic Treaty Organization
NGO	Non-governmental organization
NIC	National Intelligence Council
NPT	Nuclear Non-Proliferation Treaty
OCPF	Other chemical production facility
PEPFAR	President's Emergency Program for AIDS Relief
PSI	Proliferation Security Initiative
SARS	Severe acute respiratory syndrome
SWF	Sovereign wealth fund
UAV	Unmanned aerial vehicle
UN	United Nations
UNSCR 1540	UN Security Council Resolution 1540
WHO	World Health Organization
WMD	Weapons of mass destruction
WTO	World Trade Organization

Executive Summary

WMD Problems and Global Trends 2025

Mat Burrows of the National Intelligence Council (NIC) asked Professor Sumit Ganguly of Indiana University to organize a seminar in which students would examine how trends identified in the NIC's *Global Trends 2025: A Transformed World* (2008) might affect threats from weapons of mass destruction (WMD) over the next 20 years. The seminar analyzed NIC reports on global trends and studied existing problems concerning chemical, biological, and nuclear weapons. This report presents our analysis of how global trends expected to develop by 2025 may affect the WMD threats the United States expects to face during this time period.

Methodology

We developed scenarios that could occur over the next 20 years in the chemical, biological, and nuclear contexts. After presenting the scenarios, we analyzed them using *Global Trends 2025*. Applying these trends to the scenarios illuminated how and why the fictional events could occur. We then identified policy implications for the United States derived from applying the global trends to the scenarios.

Chemical Weapons

Before engaging in the scenario-based analysis, we reviewed why States or non-State actors might be interested in chemical weapons. Our scenarios for chemical weapons focused on (1) a violation of the Chemical Weapons Convention by a State Party; (2) State development and use of incapacitating chemical agents against domestic insurgents and terrorists; and (3) an "unholy alliance" between a drug cartel and a terrorist group on the development of chemical weapons.

Biological Security

Recent policy developments have linked concerns about biological weapons with fears about outbreaks of infectious diseases, and we examine both aspects of "biosecurity." Our scenarios are (1) interest in biological weapons capabilities triggered by Iran going nuclear; (2) confusing developments at a foreign laboratory, a remote village in another country, and terrorist threats that may (or may not) point to bioterrorism; and (3) pandemic influenza triggering backlash against the U.S. "obsession" with bioterrorism and neglect of global health.

Nuclear Weapons

Our scenarios for nuclear weapons focused on (1) China's pursuit of capabilities to achieve mutually assured destruction (MAD) status with the United States; (2) Iranian nuclear weapons provoking interest in nuclear proliferation in the Middle East; and (3) nuclear terrorism perpetrated in the United States.

WMD-Specific Global Trends

We conclude by identifying four WMD-specific global trends over the next 20 years:

- The motives States and non-State actors will have to obtain, develop, enhance, or use WMD capabilities will increase;
- Access to the means of engaging in WMD activities will expand;
- Opportunities for using or threatening to use WMD capabilities will multiply; and
- The vulnerabilities of societies to WMD-related politics and activities will deepen.

Preface

Student members of the Indiana University Seminar on *The Proliferation of Weapons of Mass Destruction and the Future of U.S. National Security Policy*, Fall 2008 Semester:

Nicolas Blarel is a second year PhD student in the Department of Political Science at Indiana University. His main areas of interest are International Relations and Comparative Politics, and he is particularly concerned by security issues in South Asia. Prior to joining IU, he received a B.A. from the Institute of Political Science of Strasbourg in 2005 and an M.A. in Comparative Politics (with a specialization on Asia) from Sciences-Po in Paris. Nicolas published his master thesis on Indo-Israeli strategic relations (*Inde et Israël : le rapprochement stratégique, pragmatisme et complémentarité* (Paris: L'Harmattan, 2006)) and wrote chapters on the Kashmir conflict in *Hot Spot: Asia and Oceania* (Westport : Greenwood Press, 2008) and on Indo-US relations in *New Delhi et le monde: Une puissance émergente entre realpolitik et soft power* (Paris: CERI-Autrement, 2008). Nicolas has held an internship at the French Foreign Ministry's official think tank, the Centre d'Analyses et de Prévisions where he mostly worked on South Asia and Nuclear Proliferation questions. He has also published articles in French scholarly journals such as *Géopolitique* and *Les Carnets du CAP*, and has written articles commenting Indian foreign policy, notably in the Indian newspapers *The Times of India* and *Daily News and Analysis*.

Alexandr Burilkov is in his first year of graduate school at Indiana University, and he is a PhD student in the Department of Political Science. His research interests are in international relations, specifically international security and the emerging threats of the 21st Century. Prior to graduate school, Alex completed a bachelor's in political science from the University of Florida. Alex speaks French, Bulgarian, and some Spanish.

Adrian Florea is a second-year graduate student in the Department of Political Science at Indiana University, Bloomington. His research interests are in international relations, with an emphasis on theories of conflict and cooperation; analyses of power distributions in regional sub-systems; rivalry processes at the inter-state and intra-state level; separatism; state formation and state failure. Prior to joining IU, he received an M.A. in Applied Linguistics and Political Science from Iowa State University.

Ottawa Sanders, originally from Baltimore, Maryland, is a first year transfer student in the Department of Political Science at Indiana University, Bloomington. Her area of interests are international relations and public policy, and she is particularly concerned with issues related to weapons proliferation, armed conflicts between and within states, and foreign policy decision-making. Prior to joining IU, she received an M.A. in International Studies at Birmingham University in the United Kingdom and a M.A. in Political Science at Binghamton University (SUNY) in New York.

Andrea Smith-Rippeon is in her first year of the PhD program in Political Science at Indiana University, specializing in Comparative Politics and Public Policy. She graduated from the University of Dayton in 2007 with a B.A. in Political Science and International Studies, concentrating on Human Rights and Peace and Global Security. She has held internships in East Asian foreign policy analysis. Her research interests center around domestic Chinese politics and in particular identity politics and minority policy. Andrea has lived and studied in Southwest China for a total of 16 months.

CPT Scott Smitson is a native of the state of Ohio, and is a second year student in the Joint PhD in Public Policy and Political Science program at Indiana University. He graduated from The Ohio State University with a degree in Political Science, with an emphasis in Mid East Affairs, in 2000. CPT Smitson is a graduate of the Air Defense Officer Basic Course, the PATRIOT Missile course, and the Aviation Captains Career Course. CPT Smitson has served in a variety of command and staff positions, to include duty in support of Operations SOUTHERN WATCH, ENDURING FREEDOM, and IRAQI FREEDOM, as well as service with the United Nations Command Military Armistice Commission in the Korean DMZ and company command in 2nd Infantry Division. Following graduate school, CPT Smitson will serve as an instructor in the Department of Social Sciences, United States Military Academy, West Point, NY.

Zach Szilagyi is in his third year of law school at Indiana University and will graduate in May 2009. During law school, Zach has worked for the Chief of Staff to Chicago Mayor Richard M. Daley, and most recently, to the Deputy General Counsel for International Affairs, Department of Defense. While at the DoD, Zach's portfolio included assisting the legal counsel to the Chairman of the Joint Chiefs of Staff; assisting the legal counsel to U.S. Central Command; assisting the DoD legal counsel and negotiator to the U.S.- Iraq Status of Forces Agreement; and advising on legal issues for military operational relating to the broad spectrum of ongoing operations in Iraq and Afghanistan. Prior to law school, Zach was a combat arms officer in the U.S. Army and served overseas in several deployments, including: to the Sunni Triangle as part of OIF III with the 3rd Infantry and 101st Airborne Divisions, to Jordan as part of a U.N. mission, and to the Demilitarized Zone of the Republic of Korea with the 2nd Infantry Division.

Faculty supervisors

Sumit Ganguly holds the Rabindranath Tagore Chair in Indian Cultures and Civilizations, and is a Professor of Political Science and the Director of Research of the Center on American and Global Security at Indiana University in Bloomington. Professor Ganguly is also the Director of the India Studies Program at Indiana University. He has previously been on the faculty of James Madison College of Michigan State University, Hunter College of the City University of New York, and the University of Texas at Austin. He has also been a Fellow and a Guest Scholar at the Woodrow Wilson International Center for Scholars in Washington, DC and a Visiting Fellow at the Center for International Security and Cooperation at Stanford University. His research and writing, focused primarily on South Asia, has been supported by grants from the Asia

Foundation, the Ford Foundation, the Carnegie Corporation of New York, W. Alton Jones Foundation, and the United States Institute of Peace. He serves on the editorial boards of *Asian Affairs*, *Asian Survey*, *Current History*, the *Journal of Strategic Studies*, and *Security Studies*. He is the founding editor of both the *India Review* and *Asian Security*, two refereed journals published by Taylor and Francis, London. Professor Ganguly is the author, editor or co-editor of fifteen books on South Asia. His most recent books are *Fearful Symmetry: India and Pakistan Under the Shadow of Nuclear Weapons* (co-authored with Devin Hagerty) jointly published by Oxford University Press (New Delhi) and the University of Washington Press (Seattle) and *More Than Words: U.S.-India Strategic Cooperation Into the Twenty-First Century* (co-edited with Brian Shoup and Andrew Scobell) published by Routledge, London. He is a member of the Council on Foreign Relations, New York and the International Institute of Strategic Studies, London. His latest book is an edited work (with Larry Diamond and Marc Plattner), *The State of India's Democracy*, Johns Hopkins University Press, 2007. He is currently at work on a single authored book, *India Since 1980*, under contract with Cambridge University Press, New York. Beginning in the fall of 2008, Professor Ganguly will be a member of the editorial team of the *International Studies Quarterly*.

David P. Fidler is the James Louis Calamaras Professor of Law at Indiana University School of Law, Bloomington, and Professor Fidler is the inaugural Director of the Indiana University Center on American and Global Security. He is an international recognized expert on global health (including bioterrorism and biosecurity) and arms control and non-proliferation issues (especially chemical, biological, and "non-lethal" weapons). His latest book is *Biosecurity in the Global Age: Biological Weapons, Public Health, and the Rule of Law* (Stanford University Press, 2008)(with Lawrence O. Gostin). At Indiana University, Professor Fidler regularly teaches International Law, International Trade, and National and Homeland Security Law. He also teaches a seminar on Counterinsurgency and Rule of Law Operations. He holds degrees from the University of Kansas, Harvard Law School, and the University of Oxford.

Introduction

Seminar on Weapons of Mass Destruction and the Future of U.S. National Security Policy

Mathews Burrows of the National Intelligence Council (NIC) asked Professor Sumit Ganguly of Indiana University to organize a seminar during the Fall 2008 semester in which graduate students would examine how trends identified by the NIC's work on *Global Trends 2025* might affect threats the United States could face from weapons of mass destruction (WMD) over the next 20 years. Working with Professor David P. Fidler, Professor Ganguly organized a seminar on "Weapons of Mass Destruction and the Future of U.S. National Security Policy." The Indiana University Center on American and Global Security provided support for the seminar.

The students in the seminar studied the NIC's reports on global trends for 2015, 2020, and 2025 to familiarize themselves with the NIC's approach to understanding how, and why, world events may change over time. The seminar also introduced the students to the present state of analysis with respect to chemical, biological, and nuclear weapons in order to provide them with a sense of what experts and policy makers currently consider with respect to each category of WMD. Distinguished guest speakers provided additional insights into the current state of affairs and potential future challenges.¹

Many variables will shape what U.S. policy makers will face in the future concerning WMD threats. Each global trend the NIC identified in *Global Trends 2025: A Transformed World* (Nov. 2008) is itself a composite phenomenon driven by an increasingly complex set of actors and forces. In addition, the present problems and future challenges posed by chemical, biological, and nuclear weapons are very different, creating three distinct policy areas that require particularized attention rather than general policy consideration of how to address the threat posed by "weapons of mass destruction." To borrow from scenarios used in this report, figuring out options for addressing a move by China towards a "mutually assured destruction" (MAD) nuclear capability tells policy makers little about how to balance better U.S. attention between the threat of bioterrorism and the menace of infectious disease pandemics.

Methodology—Scenario-Based Approach to Highlight Policy Implications for the United States

The analyses of chemical, biological, and nuclear threats are pursued through the use of fictional scenarios that potentially could occur within the next 20 years. Each part of the report on a different WMD category contains three scenarios addressing different future possibilities.

¹ Amy Smithson, James Martin Center for Nonproliferation Studies; Christopher Chyba, Princeton University; Keir Lieber, University of Notre Dame; and Peter Scoblic, The New Republic.

Introduction

See Table 1 for a summary of the scenarios. Each scenario presents a hypothetical, but we believe plausible, development describing a threat to U.S. national security and U.S. global interests. The scenarios used in this report do not, of course, exhaust the possibilities of future events or incidents, but the scenarios selected provide a diverse range of potential crises that permitted broader consideration of policy challenges.

Table 1. Summary of the Scenarios Used in This Report

Chemical Weapons	Biological Security	Nuclear Weapons
<i>CWC Violated</i> —A CWC State Party uses a chemical weapon in armed conflict	<i>Nuclear Iran Triggers Biological Weapons Activity</i> —Reactions to Iran going nuclear involve biological weapons-related activities	<i>China Goes MAD</i> —China seeks MAD capability, challenging U.S. nuclear primacy
<i>From “Non-Lethal” Loophole to Toxic Black Hole</i> —State interest in incapacitants expands	<i>Bioterrorism?</i> —Events at a research laboratory, in a remote village, and with terrorist groups raise bioterrorism alarms	<i>A Nuclear Middle East</i> —Iranian nuclear capabilities motivate Saudi Arabia to seek security guarantees or nuclear weapons
<i>Organized Crime and Terrorism Go Toxic</i> —Drug cartel and terrorist group cooperate on chemical weapons	<i>Pandemic Politics</i> —Pandemic influenza produces political backlash against the United States and opportunities for a rival	<i>Los Angeles Shattered</i> —Terrorists detonate stolen low-yield nuclear device in Los Angeles

Global trends analysis

Each scenario is then analyzed using key global trends identified by the NIC in its *Global Trends 2025* report. These global trends illuminate how and why the fictional events in the scenarios could occur. This approach also helps in identifying future challenges U.S. policy makers will confront in attempting to prevent developments from creating the events described in the scenarios. We do not claim that the global trends identified by the NIC will inevitably produce the crises depicted in the scenarios. The trends might not be accurate; totally unforeseen problems could rapidly emerge; policy interventions may prove effective in shaping the direction of events; and individual leaders may emerge who fundamentally change the course of history.

The scenarios used in this report all, in one way or another, reflect one trend the NIC identifies in *Global Trends 2025*—the growing potential for conflict. Key features of the NIC’s analysis of

Introduction

this global trend are reflected in various scenarios, such as the conflict risks created by Iran acquiring nuclear weapons, the continuation of terrorism and insurgencies, and the potential disruptive impact of a global pandemic. For this reason, the global trends analysis of each scenario does not specifically address the trend of the growing potential for conflict. In essence, this trend is built into the assumptions of every scenario.

Using the global trends identified by the NIC did not always capture the full implications of a proposed scenario, which reveals the complexity of the problems and the limitations of trends analysis. Often the global trends projected for 2025 reinforced current trends the policy makers worry about (e.g., the speed of scientific and technological change in the chemical and biological sciences). The story of continuing trends helped, however, highlight the difficulties that policy makers will face in constructing effective governance interventions in the future. If we are struggling now to manage these trends through national and international governance endeavors, the continuation and acceleration of these global trends portends serious problems for policy makers in the future—especially when U.S. power and influence is expected to diminish relative to other powers over the next 20 years.

Policy implications of the scenarios for the United States

The report follows the global trends-analysis of each scenario with a section that identifies the policy implications the scenario raises for the United States. The policy implications of some scenarios are specific (e.g., how should the United States address the possible stagnation of the CWC?), but other scenarios generate more wide-ranging policy implications (e.g., what does the United States do if Iran crosses the nuclear weapons threshold?).

The scenario-based approach does not lead to a menu of synthesized policy options within each WMD category. Within each category, the scenarios reveal different types of problems that require individualized policy responses. For example, tackling the perceived threat State interest in “non-lethal” chemical incapacitating agents poses to the Chemical Weapons Convention (CWC) is a very different problem from preventing organized criminal groups and terrorists from cooperating on proliferating technologies and materials needed to manufacture chemical weapons.

Although current ideas for addressing problems with chemical, biological, and nuclear threats are mentioned, the report does not make specific recommendations for the U.S. government about what it should do now to prevent the scenarios depicted in the report from happening. Applying the NIC’s global trends to these WMD scenarios provides policy-relevant analysis but not policy-specific action items. With a new administration taking office in January 2009, many groups have been making specific policy recommendations for near-term action on WMD threats, so there is no shortage, at present, of competing proposals for what the Obama administration should do to address these threats.

Instead, we have followed the NIC approach. The NIC does not formulate specific policy recommendations for action today based on its global trend analyses. The point of undertaking

Introduction

such trend analysis is not necessarily to create actionable policy steps in the near future. It is to get experts and policy makers to think beyond today and tomorrow and to contemplate continuities and discontinuities in global affairs that will affect, and perhaps determine, the nature of U.S. policy in the future. How well we executed this purpose we leave to the reader to determine.

Part 1—Chemical Weapons

ALEXANDR BURILKOV & ZACH A. SZILAGYI

1.1 Introduction

Of the threats the United States faces from weapons of mass destruction (WMD), chemical weapons often receive the least attention. For example, the Commission on the Prevention of WMD Proliferation and Terrorism's *World at Risk* (December 2008) decided not to address chemical weapons despite the Commission's mandate "to examine the full sweep of the challenges posed by the nexus of terrorist activity and the proliferation of all forms of WMD[.]"¹ As Amy Smithson, Senior Fellow at the James Martin Center for Nonproliferation Studies, stated, "Chemical weapons are the Rodney Dangerfield of WMD—they don't get no respect."²

The status of chemical weapons in the WMD universe reflects aspects of this particular threat, including perceptions about the limited damage chemical weapons can inflict compared to a communicable biological weapon or a nuclear device.³ In addition, States have created one of the more successful, if not the most successful, arms control regimes to address the chemical weapons threat—the Chemical Weapons Convention (CWC).⁴

Historically, chemical weapons have been the WMD that proliferated most widely and that States used the most often in armed conflicts. In addition, the CWC (1993) was established much later than the Nuclear Non-Proliferation Treaty (1968) and the Biological Weapons Convention (1972), indicating that States found giving up the chemical option more difficult than renouncing nuclear or biological weapons. Part of the utility of chemical weapons compared to biological and nuclear weapons was their more limited impact, particularly as battlefield munitions. The usefulness of a WMD may be inversely proportional to the death and destruction it creates when used.

Our examination of the present situation against political and economic trends of change identified by National Intelligence Council⁵ suggests that the threat of chemical weapons to U.S. national security is likely to increase in the next few decades. Despite the existence of the "chemical taboo," we believe that certain trends, especially technological advances and their globalization around the world, may significantly increase State and non-State actor access to and interest in chemical weapons. We also think that the appeal of chemical weapons may increase because of problems States will experience in making the CWC function effectively against old and new threats.

As a result, the world may witness expanding threats from the development and use of toxic chemicals as weapons without the lethality or destructiveness of chemical weapons changing in material ways. Scientific and technological developments will rapidly advance chemical research, making production capabilities smaller and more efficient and creating possibilities for rapidly and safely synthesizing new kinds of chemical compounds that may be less toxic and lethal. Globalization will spread these developments because developing countries will continue

Chemical Weapons

to seek to build their own chemical industries and capacities. The globalization of smaller, faster, cheaper, more powerful, and potentially exploitable chemical technologies will not escape the notice of global terrorist groups and organized crime. How the non-proliferation regime anchored in the CWC, and other international regimes designed to address the threat of chemical weapons, will fare in this world is a disconcerting question.

Our analysis focuses on three possible scenarios that illuminate how key trends in international relations may increase the threat chemical weapons pose for the United States and other countries:

- The first scenario involves State use of chemical weapons in an armed conflict with rebel forces, a blatant violation of the CWC. This scenario highlights potential changes in perceptions about the utility of chemical weapons occurring simultaneously with the CWC's stagnation and decay.
- The second scenario addresses the possibility that States will undermine the CWC's prohibition on the use of toxic chemicals as weapons through development and use of "non-lethal" chemical agents in mixed law enforcement-military contexts.
- The third scenario focuses on the potential increased risk of terrorist groups accessing toxic chemicals and developing chemical weapons with the help of global organized crime networks.

After presenting each scenario, we analyze it and examine its implications for U.S. policy makers. We conclude with specific recommendations about how the United States could prevent these scenarios from threatening U.S. national security in the future.

1.2 The Utility of Chemical Weapons: A Typology and Implications for the United States

Before presenting our scenarios, an overview of the ways in which chemical weapons might have utility for State and non-State actors proves useful. This overview is particularly relevant given the "Rodney Dangerfield" perceptions about chemical weapons not posing serious threats. By reviewing past and present interest in toxic chemicals as weapons, we can identify tactical, strategic, deterrent, law enforcement, and terror uses for such weapons. The scenarios to come later will illuminate how key trends of change may alter State and non-State perceptions about the utility toxic chemicals have as weapons.

Tactical uses of chemical weapons

Historically, States have employed chemical weapons mostly in tactical contexts. As a tactical weapon, militaries have used chemical weapons to attack enemy troops, deny terrain, or augment the conventional firepower of combat forces. As illustrated by the Iraqi use of

Chemical Weapons

chemical weapons against Iranian human-wave tactics in the Iran-Iraq War, chemical weapons have proven useful against concentrations of poorly trained and equipped adversaries with little or no chemical protection or training. Even so, the actual use of chemical weapons by States against each other on the battlefield has been infrequent in history.

Different reasons explain the infrequency of use of chemical weapons by in inter-State armed conflict, including the prohibition against the first use of chemical weapons contained in the Geneva Protocol (1925) and credible threats of chemical retaliation. In addition, chemical weapons have less tactical utility against modern, mechanized armies, such as those of NATO or Russia, which have armored vehicles equipped with NBC protection and operated by soldiers usually trained and equipped to fight while under chemical attack. Deploying such chemical defenses does, however, reduce the combat effectiveness of even the most advanced army.

Some cases exist in which States have used, or been accused of using, chemical weapons against rebels and insurgencies, such as when Spain used chemical weapons against tribes in Morocco during the Rif War (1920-26),⁶ Egypt's use against royalist insurgents during the North Yemen Civil War (1962-70),⁷ Iraq's use against Kurds in the 1980s,⁸ and Sudan's alleged use of mustard gas against insurgents in southern Sudan in the early 1990s.⁹

The CWC bans any use of toxic chemicals by States as a method of warfare, which, for CWC States Parties (the vast majority of States), outlaws any tactical use of chemical weapons in armed conflict. Any tactical use of chemical weapons in armed conflict in the future would, in all likelihood, openly violate the CWC and the customary international legal norm against use of chemical weapons, and the costs of violating these prohibitions would have to be outweighed by a perceived military or political advantage the use of the chemical weapons would bring (e.g., offsetting an enemy's superiority in conventional military capabilities).

Strategic uses of chemical weapons

For two reasons, chemical weapons have less utility than as tactical weapons when employed strategically to degrade an enemy's military and infrastructure assets (e.g., ports, airfields, railways, factories) or to terrorize its civilian population. First, strategic uses of chemical weapons would require significant quantities of chemical agents to be delivered through sophisticated, long-range delivery systems, such as bombers or ballistic missiles. States that possess such delivery systems probably have access to conventional munitions and do not need chemical weapons to cause strategic damage.

Second, persistent chemical agents, such as mustard gas or VX, work better as strategic weapons in order to deny use of the targets to the enemy for as long as possible, but would have to be used on a large scale to achieve this result and force the adversary to undertake the costly, time-consuming task of decontamination. The costs of weaponizing persistent agents for strategic uses may not be efficient compared to other strategies and munitions.

Chemical Weapons

The best example of a contemporary State that considers chemical weapons useful for tactical and strategic purposes is North Korea. See Box 1.1.

Box 1.1 North Korea and Chemical Weapons^{10, 11}

North Korea possesses a large chemical weapons program, which produces a variety of lethal chemical agents, and a stockpile estimated to be between 4,000 and 5,000 tons. Pyongyang has stated that it is willing to launch a war to reunite the peninsula should North Korea believe its security and survival is threatened. In such a conflict, North Korean forces could employ chemical weapons tactically, delivered from an estimated 8,000 artillery pieces and 2,500 multiple rocket launchers laid along the demilitarized zone (DMZ). North Korea could employ non-persistent agents to breach the DMZ and clear urban areas, while employing persistent agents strategically to disrupt the movement of South Korean and U.S. forces or to channel them into more positions more vulnerable for North Korean conventional attacks.

North Korea could also launch ballistic missiles armed with chemical warheads. North Korea could saturate critical South Korean infrastructure with persistent chemical agents, rendering them useless or at least greatly diminishing their functionality. Ports would be prime targets because disrupting them would reduce the ability of U.S. forces to reinforce South Korean troops. North Korea could also key target South Korean cities, such as Seoul, in order to cause mass hysteria, overload civil emergency response systems, and stress the South Korean government by forcing it to divert attention and resources to address the civilian panic.

Utility of chemical weapons as a deterrent

Chemical weapons may have deterrent value in three different contexts:

- To deter the use of chemical weapons by an adversary. For such deterrence to be credible, a State must have chemical weapons in sufficient quantities and the ability to deliver them effectively. Developing and deploying such a credible deterrent is a complex and expensive undertaking. This type of chemical deterrence was seen during the Cold War when the competing superpowers developed and stockpiled large quantities of chemical munitions to deter each other from using chemical weapons.
- To prevent attack by an enemy that possesses superior conventional military capabilities. This type of deterrence is often implied when chemical weapons are called “the poor man’s WMD”—weaker countries may find chemical weapons useful in order to deter adversaries armed with superior conventional military power. Many experts believe that Saddam Hussein developed an Iraqi chemical weapons program to deter regional (e.g., Iran) and international (e.g., United States) rivals armed with bigger or better conventional military forces.

Chemical Weapons

- To stop an opponent from using biological or nuclear weapons. In this deterrent context, a State does not possess biological or nuclear weapons when an adversary does, in which case it might threaten to use chemical weapons to deter the use of other WMDs. Here, the best examples are Egypt and Syria, which experts believe have stockpiled chemical weapons as a deterrent against Israel's conventional and nuclear capabilities.¹²

The CWC prohibits States Parties from developing and deploying chemical weapons as a deterrent. In addition, experience suggests that chemical weapons do not provide effective deterrents, especially compared against the deterrent effect of nuclear weapons or an overwhelming conventional military capability. Chemical deterrence during the Cold War owed much to the presence of other forms of deterrence (e.g., nuclear) and to other disincentives to enter into armed conflict.

Iraq's chemical weapons program did not deter the United States and its allies from attacking Iraq in 1991 to dislodge Iraqi forces from Kuwait. Egyptian and Syrian chemical weapons have not deterred Israel from launching military strikes against both countries. Chemical weapons might be more effective as deterrents against an adversary with conventional but no WMD capabilities. For example, Iraq finally brought Iran to the negotiating table in 1988 by threatening to use VX-armed missiles in the "war of the cities."

Use of toxic chemicals for law enforcement purposes

The CWC allows States Parties to use toxic chemicals for various permitted purposes, such as law enforcement, including domestic riot control (Article II.9(d)). Law enforcement agencies in many countries use riot control agents, such as tear gas and pepper spray. The CWC's law enforcement provision has caused controversies concerning the development and use of so-called "non-lethal" incapacitating chemical or biochemical agents. Incapacitating agents have more powerful effects on the human body than riot control agents, and, thus, cannot be considered riot control agents under the CWC. Under the CWC, neither riot control agents nor incapacitants can be used as a method of warfare.

Furthermore, the development of science and technology creates the possibility that States may produce new incapacitating chemical or biochemical agents and attempt to use them liberally under the law enforcement provision in the CWC. The potential attractiveness of incapacitants for law enforcement, counter-terrorism, counterinsurgency, and conventional military operations in urban environments has created fears that the law enforcement provision represents a "loophole" in the CWC that States Parties may try to exploit in order to use toxic chemicals as weapons in a broad array of situations. Rather than having to use traditional chemical weapons against rebels or insurgents (see examples of such use noted above), States might find incapacitants useful in counterinsurgency operations and interpret such operations as "law enforcement" to fall within the law enforcement provision of the CWC.

Chemical Weapons

The use of an incapacitating agent by Russian security forces to end a hostage crisis in Moscow perpetrated by terrorists provides the best example of the utility of incapacitants for law enforcement and potentially other purposes. See Box 1.2.

Box 1.2 Russian Use of an Incapacitating Chemical Agent to End a Terrorist Hostage Crisis

In 2002, Russian security forces used an incapacitating chemical agent, believed to be a derivative of the opiate fentanyl (KOLOKOL-1), to end a hostage crisis sparked by a Chechen terrorist group's seizure of a Moscow theater. The incapacitating agent permitted Russian security forces to storm the building, kill the terrorists, and rescue most of the hostages. However, the incapacitating agent caused the death of many hostages, who died from overdoses of the agent. This incident created significant controversy among experts in the chemical weapons area and among those concerned about the adverse implications for the CWC of broadly defined "law enforcement" use of incapacitating agents by security forces.

Use of toxic chemicals as weapons of terror

As many experts have pointed out, toxic chemicals may appeal to terrorist groups interested in creating large-scale disruption, significant casualties, economic damage, and lasting psychological trauma. Terrorists typically target civilians, and a chemical terrorist attack in a densely populated area (e.g., stadiums, public buildings, office complexes) could cause many casualties and sow terror through the wider population. Critical infrastructure is also a potential target, ranging from attacks on transportation assets (e.g., subway systems) to toxic contamination of water supplies.¹³ Terrorists might also mix a chemical attack with conventional or cyber attacks to create even more damage and trauma.

The best example of chemical terrorism is the attacks by Aum Shinrikyo, an apocalyptic Japanese cult that is the only known organization to have used chemical weapons for a large-scale terrorist attack. On March 20, 1995, the cult attacked the Tokyo subway using plastic bags filled with the nerve agent Sarin. Twelve people died and over 5000 were sickened in the attack. Had the cult used a more potent, aerosolized agent,¹⁴ the death toll would have been much higher.

However, the difficulties Aum Shinrikyo had with its large-scale chemical weapons program suggest that terrorists might be more likely to try to steal or otherwise acquire chemical agents through theft or illicit trading than to develop chemical production facilities with large, detectable "footprints." Perhaps even easier would be attacks on civilian chemical facilities, storage tanks, and infrastructure (e.g., rail terminals and ports), which aim to cause massive explosions, release toxic chemicals into the environment, and cause panic in nearby populations.¹⁵ Terrorists could use available conventional weapons technologies, such as

Chemical Weapons

rocket-propelled grenades or land-based or sea-based improvised explosive devices, in such attacks.¹⁶

Although not caused by a terrorist attack, the consequences an attack on a chemical facility could have can be glimpsed in a horrific chemical accident in India in the 1980s. See Box 1.3.

Box 1.3 The Bhopal Disaster

On December 3, 1984, a chemical tank at a Union Carbide pesticide plant in Bhopal, India leaked 42 tons of methyl isocyanate gas, which is highly toxic. Around 8000 people died following the disaster and many more suffer long-term health problems. This disaster occurred because of a malfunction at the plant. To date, the Bhopal disaster has been the most devastating industrial accident involving chemicals. This highlights the danger of large chemical leaks in urban areas.

Implications of the typology on the utility of chemical weapons for the United States

At present, the CWC's prohibition against any hostile use of toxic chemicals in armed conflict, including riot control agents, combined with the U.S. conventional military superiority (including troops trained to fight in a chemical environment) and nuclear capabilities, significantly reduces the threat that another State might use or threaten to use chemical weapons against the United States.

U.S. policy makers have expressed more concern about terrorist use of chemical weapons than about State use in the past 10-15 years. Neither the CWC nor U.S. conventional and nuclear military capabilities have much deterrent effect on terrorist groups interested in chemical options. Fears about chemical terrorism fed into U.S. efforts to create different international regimes that would counteract the possibility of all forms of WMD terrorism, including United Nations (UN) Security Council Resolution 1540¹⁷ and the Proliferation Security Initiative (PSI).¹⁸ The United States and the private chemical industry have also made efforts (with only mixed results to date) to improve security at chemical facilities and supporting infrastructure (e.g., ports) and to improve capabilities to respond to chemical attacks, of whatever kind.

The United States has shown interest in the potential roles incapacitating agents could play in law enforcement and military operations, which has fueled concern about the possible law enforcement "loophole" in the CWC. In this area, the United States contributes to perceptions that new kinds of "non-lethal" incapacitating toxic chemicals have utility for law enforcement and military purposes, making this a topic to watch closely in the future.

For our purposes, the typology of the utility of chemical weapons provides an analytical framework to use in examining major trends that may affect State and non-State actor

Chemical Weapons

perceptions of the future utility of toxic chemicals as weapons. The next three sections present our three hypothetical scenarios, in which we explore how these trends may affect the calculations of State and non-State actors concerning the utility of toxic chemicals as weapons.

1.3 Scenario 1: CWC Violated

BREAKING NEWS: Leaked British diplomatic cable: Nigeria uses chemical weapons against rebel forces

Government troops use chemical agent against militant group

AP | Associated Press
November 24, 2025

ABUJA—Leaked cables from the British Embassy in Nigeria report that Nigerian troops used a chemical weapon in fighting with the militant group, the Niger Delta Liberation Movement. The cables do not indicate what the chemical weapon was. The cables confirm accusations made by Cameroon that Nigeria used chemical weapons, which Cameroon has claimed violates the Chemical Weapons Convention (CWC). The Niger Delta Liberation Movement maintains camps in Cameroon.

The Niger Delta Liberation Movement has been waging war on the Nigerian government for 15 years, and the Movement seeks a fundamental change in how Nigeria's wealth is distributed within the population. After the Nigerian government suppressed the movement in 2018, it retreated to camps in Cameroon until it reemerged in 2023 by capturing the port city of Oron. The Movement uses oil production and refining facilities in the Oron area to fund its campaign against the Nigerian government. Press reports in Nigeria allege the Movement sells oil on the black market and buys weapons with the proceeds. The Nigerian government considers the Movement to be a grave threat to its survival.

The leaked British Embassy cable reported that Nigerian troops used a chemical agent on a large scale against the rebel group during fighting near the Cameroon border. The cable indicated that the Nigerian use of the chemical agent proved decisive in the battle in question, because the agent killed rebel fighters and allowed Nigerian troops to kill or capture hundreds more.

A violation of the CWC?

Nigeria has not responded to the accusations that it violated its obligations under the CWC not to use chemical weapons in armed conflict. Cameroon has indicated it will bring the matter to the attention of the UN Security Council.

Chemical Weapons

In recent years, however, Nigeria has expressed dissatisfaction with the CWC. For example, Nigeria has opposed efforts to expand CWC inspections to include more civilian chemical production facilities in developing countries.

Largely through Chinese investments, Nigeria has expanded its chemical industry in the past decade, integrating the latest technologies, such as microreactors. The global spread of microreactors has made experts on chemical weapons nervous because microreactors increase chemical development and production possibilities while making inspections and efforts to track and control exports of dual-use technologies nearly impossible.

Nigeria and other developing countries have refused to budge on the inspection issue because the United States and Russia still have failed to meet their CWC obligations to destroy their stockpiles of chemical weapons. In addition, Nigeria and other countries have denounced attempts by the so-called Australia Group of states to impose controls on microreactor exports.

“We’ve lost the microreactor battle,” said an anonymous U.S. intelligence official, “because that capability is now available to almost everyone who wants it. The CWC inspection regime is a hollow shell.”

An unnamed source within the British Foreign and Commonwealth Office expressed her frustration saying, “Nothing we’ve tried has worked. UN Security Council Resolution 1540. Proliferation Security Initiative. Cajoling the chemical industry to self-regulate on these new technologies.”

U.S., European, and Chinese demand for oil may influence how countries respond to the allegations against Nigeria. Nigerian officials often talk about their card-playing skills—when needed, they play the “China card” or the “American card” to get what they want.

Implications of the Nigerian incident

While intelligence communities try to figure out exactly what happened and what, if any, chemical weapon Nigeria used, analysts fear Nigeria may set a precedent attractive to other governments fighting tenacious and vicious insurgency movements.

“We may have just entered the era of chemical counterinsurgency,” said Peter Dzasak, an Australian expert on chemical weapons.

Analysis of the scenario

This fictional news account envisions a State Party to the CWC violating that treaty by using a chemical weapon against a rebel movement that threatens to overthrow the existing government. In the scenario, Nigeria has used a chemical weapon tactically on a large scale in armed conflict, precisely the type of activity the CWC was designed to prohibit and prevent. Nigeria’s action takes place against the backdrop of the CWC’s loss of credibility and relevance.

Chemical Weapons

In the scenario, the CWC's disarmament objectives remain unfulfilled; it has not been able to overcome the stalemate between developed and developing countries on expanding the CWC inspection regime to include more "other chemical production facilities" (OCPFs) in the developing world; and it has not been effective at controlling the global spread of microreactor technologies and the threat they pose to the CWC's non-proliferation objectives. No other international regime (e.g., Australia Group,¹⁹ UN Security Council Resolution 1540, and PSI) has arisen to fill the space the CWC once occupied.

The scenario also foresees that governments, particularly in the developing world, will face increasing dangers from insurgency movements or rebel groups seeking access to valuable economic resources and political power. Thus, the problem of weak, failing, and failed States has not gone away in this scenario's assumptions. Governments battling such movements and groups may seek additional capabilities in fighting off challenges to their power and existence.

The rest of this section analyzes trends identified by the National Intelligence Council that would factor into producing what happens in Scenario 1. These trends are:

- Multipolarity without multilateralism;
- Impact of new players;
- Globalizing economy;
- Technological change; and
- Scarcity of natural resources in the midst of plenty.

Multipolarity without multilateralism

Scenario 1 envisions the CWC—the most important arms control treaty on chemical weapons—stagnating, becoming increasingly irrelevant, and then being violated through failure of its States Parties to (1) comply with its disarmament obligations (failure of the United States and Russia to meet their disarmament deadlines by 2025); (2) agree on how to keep its non-proliferation system credible (failure to expand the inspection regime to OCPFs in developing countries and to address the threat from microreactors); and (3) meet alleged violations of the prohibition against use of chemical weapons with strong action. In addition, other international regimes crafted to address problems of chemical weapons proliferation (e.g., Australia Group, UN Security Council Resolution 1540, and PSI) do not prove effective replacements for the CWC's dwindling authority.

The National Intelligence Council predicts that the trend toward multipolarity will weaken and fragment mechanisms and strategies of global governance.²⁰ Scenario 1 describes the CWC and other international regimes relevant to chemical arms control as becoming less effective as the

Chemical Weapons

interests of the various, multiplying actors diverge and fragment. The status the CWC has achieved in the arms control realm is not permanent, and the CWC, like other multilateral regimes, could see consensus on its objectives decay, making the CWC an increasingly distant bystander in developments affecting the threat chemical weapons may pose.

Impact of new players

Scenario 1 also highlights the potential impact of what the National Intelligence Council calls “the new players,” especially China.²¹ In the scenario, China is the source of foreign investment that fuels the development of Nigeria’s chemical industry, including its ability to access the latest chemical production technologies (the microreactors). China also appears as a competitor of the United States and European countries for access to Nigeria’s oil, which allows Nigeria to play the “China card” against the United States and Europe should they wish to criticize or punish Nigeria for using a chemical weapon. The impact of China as a new geopolitical player creates echoes of the geopolitical calculations of the United States not to criticize or sanction Iraq when it used chemical weapons against Iran and Kurdish populations in the 1980s.

Globalizing economy

Scenario 1 highlights the impact of continued economic globalization over the next twenty years. The scenario reflects Nigeria accessing sources of Chinese capital for its economy and integrating new chemical production technologies available on the global market into its economic capabilities. Indeed, the scenario foresees the global market making microreactor technologies readily available to Nigeria and other countries, undermining the CWC inspection regime and outstripping the ability of other regimes (e.g., Australia Group and PSI) to keep up with the pace and scale of economic change fostered by globalization.

Scenario 1 also envisions a rebel group at war with the Nigerian government over issues of economic justice—the distribution of the proceeds of Nigeria’s oil wealth, proceeds that, under the scenario, are significant given the intense demand for oil from importing countries. The Niger Delta Liberation Movement uses economic inequities in Nigeria, fueled by the importance of Nigeria oil to the global economy, as a platform for engaging in violence on a large scale. This scenario reveals local disadvantages created by how Nigeria’s integration with the global market evolves.

Technological change

This scenario also illustrates the potential difficulties advances in science and technology pose to the arms control regimes relevant to chemical weapons. Microreactors are just one reminder of how technology can simultaneously promote legitimate chemical industrial activity and increase the potential for malevolent misuse of new technologies. In short, the long-present “dual use” problem with respect to chemical weapons will get more difficult with technological advances, such as microreactors, becoming globally available. The scenario predicts that CWC States Parties will not adequately address the threat technological change poses to the CWC,

Chemical Weapons

even though the treaty allows for flexible interpretation.²² The challenge created by rapid technological change connects back to the difficulties States will have crafting effective global governance in a context of multipolarity (see above).

Scarcity in the midst of plenty

Scenario 1 also points to the predicted trend that the world will increasingly experience problems created by a scarcity of natural resources (e.g., oil) in a context of rising expectations of wealth and economic opportunity in the world's growing middle class.²³ Governments with control of increasingly scarce petroleum resources may well be tempted to take increasingly drastic measures to protect such control from other States and non-State actors interested in tapping into those resources (as the Niger Delta Liberation Movement is doing in the scenario). Such measures may be more likely if the State senses that its continued control over the scarce resource protects it from serious consequences for engaging in more extreme behavior. In this scenario, the geopolitics of oil and the decay of the CWC give Nigeria political space with respect to its use of a chemical weapon against a rebel group.

The United States will likely lose influence in such a multipolar world, especially in regards to the CWC compliance. Both Russia and the United States possess the largest stockpiles of chemical weapons, but both have stated that they will not be able to meet the 2012 deadline for the destruction of their stockpiles that was already extended in 2007. Their failure to meet the deadline not only threatens the CWC's legitimacy as a whole,²⁴ but the United States' legitimacy as leader for CWC compliance. Asking any State to comply with the nonproliferation requirements of the CWC, or any arms control regime, simply invites criticism of the United States own failure to emerge as an arms control leader, specifically regarding the CWC. Until the United States address this shortcoming, its influence over CWC compliance in a multipolar world is drastically diluted.

Policy implications of scenario 1 for the United States

Scenario 1 raises a fundamental question for the United States—how important is an effective and evolving CWC to U.S. national security with respect to future chemical weapons threats? The scenario describes an action some today may think is unthinkable because of the perceived success of the CWC—the use of a chemical weapon by a State in armed conflict. Although the United States routinely professes support for the CWC, its actions send mixed messages at home and abroad about how important it considers the CWC. U.S. failure to meet its obligations on destroying its stockpile of chemical weapons is a case in point, which the scenario anticipates will continue to be a problem into the future.

Assuming the United States desires to have a strong CWC process, making specific policy recommendations to support this goal is difficult because no clear policy course is apparent. Timely compliance with the U.S. obligation to destroy existing chemical weapon stockpiles will not prove easy, even with reinvigorated efforts, because of the sheer scale, cost, and environmental considerations.

Chemical Weapons

Good policy options for persuading developing countries to agree to shift CWC verification to other chemical production facilities (OCPFs) in their territories and away from verifying stockpile destruction in the United States and Russia are not obvious, especially when the United States has interests in tightening export control measures within the Australia Group, which developing countries tend to oppose.

What steps the United States could take against the potential threat posed by chemical microreactors is also unclear. Although the export control-focused Australia Group may make policy sense, the enormous utility of chemical microreactors for peaceful purposes and the ease with which this technology will disseminate globally create another dual-use dilemma, but one perhaps more disconcerting than the perceived need to inspect traditional OCPFs in developing countries.

Finally, U.S. national security concerns about chemical terrorism have tended not to create new importance for the CWC but, rather, to generate new governance regimes that specifically address the terrorist threat, namely UN Security Council Resolution 1540, PSI, and improved domestic preparedness and response capabilities against chemical terrorist attacks. Whether UN Security Council Resolution 1540 pays serious dividends against WMD terrorism remains to be seen. Whether the Security Council effectively monitors and enforces Resolution 1540 seems unlikely, especially in a context of declining U.S. influence in an increasingly multipolar world. As for PSI, serious doubts exist as to whether this interdiction strategy is well suited to preventing the proliferation of technologies and chemicals exploitable by terrorists.

1.4 Scenario 2: From “Non-Lethal” Loophole to Toxic Black Hole: The Chemical Weapons Taboo Unravels

ENGLISH TRANSLATION OF AN INTERCEPTED INDIAN MILITARY ORDER FROM NEW DELHI SUPREME HEADQUARTERS TO FIELD COMMANDERS IN KASHMIR:

November 1, 2019, 0700 hours

Concerning the separatist attack on Outpost N33-2 on October 28, intelligence analysis of footage of the attack from our UAVs showed that Pakistani SSG commandos assisted in that attack and used tear gas upon our forces during the assault. In response, the Minister of Defense has authorized the use the new incapacitating Peacemaker agent, which is preloaded into ordnance for your infantry, artillery, fixed-wing aircraft, and helicopters. Your troops have completed tactical training exercises on using Peacemaker ordnance and should be able to make good use of it. Distribution of Peacemaker ordnance has been given the highest priority and airlifts to the field begin today at 0800 hours.

Chemical Weapons

Given the status of the Kashmiri insurgents and the Pakistani infiltrators as illegal under Indian law, use of the Peacemaker agent would be consistent with a law enforcement purpose under India's obligations under the Chemical Weapons Convention. Therefore, you are authorized to use the Peacemaker agent in the pursuit of our strategic objectives of defeating the separatists and enforcing Indian law. Persons incapacitated by the Peacemaker agent should still be considered hostile and dangerous and, depending on the context, subject to the use of lethal force in pursuit of the law enforcement objectives of our government. Field commanders should ensure that all munitions loaded with the Peacemaker agent are ensured the highest level of security. Theft or capture by the enemy is unacceptable.

Analysis of the scenario

Scenario 2 focuses on the future trajectory of State interest in and use of "non-lethal" chemical incapacitating agents. As noted earlier, the CWC allows toxic chemicals to be used for law enforcement purposes, including domestic riot control (Article II.9(d)). Experts fear that this provision is a loophole that, if left open, will lead to the use of incapacitating agents for law enforcement and military purposes. If this fear is realized, the chemical taboo against using toxic chemicals in armed conflict will be breached.

In scenario 2, India defines its actions as "law enforcement" not "armed conflict," even though Indian forces have been engaged in military clashes with Pakistani commandos supporting Kashmiri separatists. The Indians justify use of an incapacitant by stating that Indian security forces will use it within sovereign Indian territory and against "criminals." Put differently, the use of the Peacemaker agent in Kashmir by India would be equivalent to the Russian use of an incapacitating agent to end the hostage crisis perpetrated by Chechen terrorists in Moscow in 2002 (see Box 1.2 above). This characterization allows India to claim that use of the Peacemaker agent falls under the CWC's law enforcement provision.

The relevant trends for Scenario 2 are:

- Technological change;
- Impact of new players;
- Multipolarity without multilateralism; and
- Globalizing economy.

Technological change

This scenario highlights the trajectory of technological and scientific advancements, especially in the life sciences, that may lead to a new generation of chemical or biochemical incapacitating agents. Advances in chemistry and chemical technology, specifically combinatorial chemistry, allow for engineering of new chemical agents. These technological developments will make it

Chemical Weapons

increasingly possible to create more kinds of chemical compounds, which will make the task of identifying chemical agents more difficult.²⁵

Advances in the life sciences are also blurring the line between chemistry and biology. Greater understanding of the human body is leading to a new class of agents known as biochemicals or bioregulators. These agents target specific processes in the human body to elicit specific responses, such as sleep, fear, paralysis, or rapid death.²⁶ Although these breakthroughs could lead to the creation of new lethal agents, they create the potential for States to synthesize a wide-range of new, potent “non-lethal” agents.²⁷ New agents that can rapidly and efficiently elicit responses such as sleep, fear, or paralysis have generated interest from leading powers, such as the United States and Russia.²⁸

Impact of new players

Scenario 2 focuses on India, which the National Intelligence Council projects will emerge as a major political and economic power over the next few decades.²⁹ The scenario envisions India becoming interested in incapacitants as part of its arsenal to deal with continuing Pakistani-supported terrorist and insurgent activities in Kashmir. Although India has long had to cope with such activities, the November 2008 terrorist attacks in Mumbai suggest that this problem will not dissipate for India, perhaps encouraging it to devise new instruments and responses for confronting terrorism in its territory. The potential utility of incapacitants for counter-terrorism is one reason interest by States in these agents has increased in the recent past. As India becomes a “rising heavyweight,”³⁰ it may be less likely to worry about accusations that its development of incapacitants undermines the CWC as long as it perceives that incapacitants help maximize India’s security and autonomy.

Multipolarity without multilateralism

Scenario 2 also draws attention to multipolarity as a driver of change leading to increasing State interest in and use of incapacitating chemical agents. As noted earlier, the issue of incapacitants used under the law enforcement provision of the CWC has already generated controversies, but CWC States Parties have not been able to agree on how to address the incapacitant problem. The projected increase in multipolarity over the next two decades will make reaching consensus on incapacitants within the CWC or elsewhere even more difficult. Compounding the difficulty will be the probable continued interest in incapacitants by Russia and the United States, and, under Scenario 2, rising powers threatened by terrorism and insurgencies may also gravitate towards incapacitants as a new capability in the arsenal of their security forces. With more interest in incapacitants by more of the world’s great powers, the possibility of reaching agreement on restricting or regulating the use of incapacitants under the CWC or another regime seems unlikely.

Globalizing economy

India is already emerging as a leading global economic player, and projections indicate that it will continue to contribute to the globalization of the world’s economies. In the scenario, India’s ability to access and harness new scientific and technological advances developed anywhere in

Chemical Weapons

the world is not far-fetched. India already excels in this area. Thus, as suggested by the scenario, India will, in the future, be more than capable of exploiting new scientific and technological developments that diffuse through the processes of globalization. In fact, as India becomes even more important to the global economy, its desire or needs for new scientific knowledge and technologies will stimulate transfers to India and beyond. The more the wheels of global commerce are greased for such exchanges, the harder it will be to control or regulate exports that have “dual use” capabilities, making things easier for proliferators to spread the tools for developing incapacitating agents worldwide.³¹

Policy implications of scenario 2 for the United States

Scenario 2 focuses U.S. policy makers on how the United States wants to see the future of incapacitating agents develop under the CWC. The United States has been one of the countries opposed to having the CWC process address incapacitants, and it has shown interest in where incapacitant technologies may go in the future. The U.S. reasons for being interested in these technologies are the same motivating India in Scenario 2 (i.e., counter-terrorism and counterinsurgency), but, as the scenario suggests, this path could lead to broader and broader interpretations of “law enforcement” such that use of toxic chemicals as weapons emerges in contexts of armed conflict and not just domestic riot control. The “law enforcement” loophole may have then become a “black hole” for the CWC and the prohibition against the use of toxic chemicals as weapons in armed conflict.

1.5 Scenario 3: Organized Crime and Terrorism Go Toxic

NATO Intelligence Update, 19.5.2021

-URGENT-

English translation of cyber-conference between Taliban leaders. Intercepted by U.S. intelligence services on 18.5.2021.

-BEGIN-

Ali says:

5/18/2021 8:11:05 PM

We need to talk about options to pressure the government, which despite our efforts, and the leaving of the Americans, remains obstinate and able to control population centers. Marwan has an update on Project Crescent Moon.

Marwan says:

5/18/2021 8:11:41 PM

Our contacts in Southeast Asia who run the opium have access to chemicals and technologies that they say we could use to create some weapons. They want a deal—a larger percentage of the opium pipeline in exchange for supplies of precursors and little chemical reactors.

Chemical Weapons

Abdul says:

5/18/2021 8:11:59 PM

Bad deal. How does this help? How does this shake Kabul in its boots?

Marwan says:

5/18/2021 8:12:11 PM

Abdul, come one, we've got guns, bullets, and bombs—but we haven't been able to make headway against the ANA [Afghan National Army] after the Americans left. They are following the COIN strategy—protect the population. We need to change tactics. Use something they don't expect. That will scare people and show them Kabul can't protect them.

Abdul says:

5/18/2021 8:12:35 PM

Scare them how exactly?

Marwan says:

5/18/2021 8:13:44 PM

ICDs. We make improvised chemical devices with the stuff we get from SE Asia. That'll scare the ANA and their supporters. Really bring economic things to a halt. Distract them while we undertake other operations. ICDs can be force multipliers, to use an Americanism.

Hakim says:

5/18/2021 8:14:01 PM

These brothers are just going to sell us this stuff? Sounds like CIA.

Ali says:

5/18/2021 8:14:49 PM

Hakim, these guys are legit. We deal opium through them. They're global. They have access to all kinds of things.

Marwan says:

5/18/2021 8:15:20 PM

And they've got guys to teach us how to use these reactors. We might even learn how to process chemicals we need to make heroin, so we can cut out the middle man, make more money. We start small, see how it goes, then open the pipeline if this looks good. And if they get difficult, we'll know enough to seek this stuff out on the market somewhere else.

-TRANSMISSION INTERRUPTED; NOT RECONNECTED; END-

Analysis of the scenario

Scenario 3 focuses on the potential future face of chemical terrorism. It envisions an “unholy alliance” between drug cartels in Southeast Asia that sell precursor chemicals, technology, and knowledge to terrorists hostile to the United States and its allies. Money from global trafficking in illegal drugs fuels the capabilities of both parties, allowing them to buy and sell chemicals and technologies (e.g., microreactors) needed to produce chemical weapons. Intelligence agencies are able to intercept some of the chatter, but law enforcement agencies may not be positioned to interdict the chemicals and technologies or to prevent chemical attacks.

Chemical Weapons

The key trends of this scenario are:

- Technological change;
- Globalizing economy; and
- Multipolarity without multilateralism.

Technological change

Scenario 3 foresees terrorist groups becoming interested in microreactor technology. Chemical microreactors can process and synthesize chemical compounds rapidly and efficiently.³² Microreactors are also highly modular, allowing arrays of them linked to computers to be used to produce many different chemical compounds. Their characteristics promise to revolutionize chemical production. A modern chemical facility operating through microreactors will be efficient, small, clean, safe, and modular.³³ In addition, such a facility would have a smaller footprint while retaining research efficiency, making it harder to detect than traditional chemical production plants.³⁴

These characteristics of microreactors have three important implications for efforts to address the threat of chemical weapons: (1) chemical agents can be created more easily; (2) the attractiveness of microreactors to the chemical industry will mean that this technology will become increasingly available on a global basis to State and non-State actors;³⁵ and (3) chemical operations will become smaller, easier to conceal, and potentially more mobile. In short, the continued development of microreactor technology will decrease the costs and risks of terrorist groups exploiting toxic chemicals for malevolent purposes.

Globalizing economy

Scenario 3 draws attention to how globalization may facilitate the “unholy alliance” between organized crime and terrorist groups in the area of chemical weapon proliferation. The processes of globalization will drive the global dissemination of chemical knowledge and technologies, such as microreactors. Developed nations will use new technologies to modernize their chemical industries, and will sell the technology to others. The spread of the Internet and scientific networks means that the proliferation of technical knowledge is easier, faster, and more widespread than ever before. Developing States will be eager buyers in this marketplace as they continue to pursue economic development strategies linked to globalization. The compact scale of microreactors will also facilitate their global dissemination—they will be easier to transport than traditional chemical production equipment.

The scenario also highlights the dangers in the globalization of illicit economic activities—the global black market. Opium is traded for microreactors, precursor chemicals, and know-how. The global black market facilitates illicit proliferation networks, such as the one described in the scenario. The deal contemplated in the scenario also takes place in countries and regions that, historically, have had difficult addressing drug trafficking and terrorism. Effective national and

Chemical Weapons

international law enforcement activities against organized crime and terrorists will not get any easier in the future, particularly with respect to the global proliferation of dual-use technologies that are hard to detect in the first place.

Multipolarity without multilateralism

The scenario draws attention to how multipolarity may contribute to organized crime and terrorist groups dealing in chemical weapons. Multipolarity will make reaching agreement on how to address microreactors within the CWC more difficult. To begin, the CWC does not have mechanisms dedicated to regulating trade in chemical technologies, and State and non-State interest in utilizing safer, more efficient chemical production technologies will be strong.

In addition, the present controversy over increasing inspections on OCPFs in developing countries will complicate negotiations on trying to extend CWC inspections to microreactor capabilities in the future. Developing nations do not want more inspections on OCPFs, and they want to develop their chemical industries with the best available technologies, and thus will resist arms control efforts to keep microreactors or other advanced technologies out of their hands. Multipolarity will make export control efforts, such as the Australia Group, more contentious and probably less effective.

The scenario also highlights present and future weaknesses of counter-proliferation regimes aimed at WMD terrorism, such as U.N. Security Council Resolution 1540 and PSI. In the scenario, Golden Crescent drug cartels continue their operations despite efforts by Southeast Asian governments to destroy them. The legislation required by Resolution 1540 requires governments to prevent WMD materiel ending up in the hands of terrorists, and it is doubtful that the legislation would have any better enforcement prospects against international organized crime. States would have to implement tough export controls to be able to monitor all commercial traffic, and this task would be difficult, as proliferators have shown themselves to be adept at circumventing export controls.

Whether PSI could intercept any shipment of microreactors or chemicals from Southeast Asian drug cartels to the Taliban is not clear. The transactions would only have a small physical footprint because microreactors are not large pieces of equipment, and the amount of precursor chemicals needed would not be significant. The intelligence needed to give PSI a chance to interdict such shipments would have to be very fine-grained and precise.

Finally, threats of U.S. military action against a chemical threat under the cover of a pre-emptive self-defense doctrine would not be credible when the protagonists are non-State actors operating in multiple countries and malevolently manipulating the processes of economic and technological globalization for their nefarious ends.

Policy implications of scenario 3 for the United States

This scenario suggests that the threat of chemical terrorism will become more dangerous and more difficult to detect in the future. The United States has engaged in national and

Chemical Weapons

international initiatives to address the threat of chemical and other forms of WMD terrorism, but the scenario indicates that counter-proliferation strategies in UN Security Council Resolution 1540 and PSI may not adequately address how the threat of chemical terrorism may evolve. Even when supported strongly by the United States, the mechanisms of international governance have not shown themselves capable of evolving quickly enough to match the varied and novel threats today, especially when those threats come from non-State actors.

Scenario 3 indicates that the United States has to attack the “unholy alliance” of terrorism and organized crime at both ends, especially when the very profitable drug trade is involved. However, the continued success and expansion of organized crime both at home and abroad is sobering evidence that new policy approaches may be needed all around. The dual-use potential of microreactor technology by non-State actors, as presented in the scenario, will stem from the proliferation of technology and industrial items. To crack down on this proliferation, the United States will have to compromise with States that are worried that such crackdowns are Western efforts to throttle their economic interests. Finally, the United States has to act on this difficult problem in a context in which its global influence and credibility are waning because of the political dynamics of multipolarity.

1.6 Conclusion

Our analysis suggests that continuation of the “Rodney Dangerfield” approach to chemical weapons would be unwise over the next 20 years. Key trends identified by the National Intelligence Council may well increase the prospects of State and non-State development and use of toxic chemicals as weapons and weaken existing international regimes seeking to prevent such development and use. In this context, chemical weapons may become more attractive precisely because they do not have the “death and destruction” profile of biological and nuclear weapons.

Chemical Weapons

Endnotes for Part 1

¹ *World at Risk: The Report of the Commission on the Prevention of WMD Proliferation and Terrorism* (2008), p. xvi.

² Amy Smithson, Senior Fellow, James Martin Ctr. for Nonproliferation Studies, Monterey Inst., Poisonous Problems & Threat Reduction Prospects, Remarks at Indiana School of Law (Sept. 8, 2008).

³ For example, the Commission on the Prevention of WMD Proliferation and Terrorism justified decided to include chemical weapons in its report because “we concluded . . . that this report should focus solely on the two types of WMD categories that have the greatest potential to kill in the most massive numbers: biological and nuclear weapons.” *World at Risk*, op. cit., p. xvi.

⁴ The CWC currently has 184 States Parties, and is often regarded as the most successful of the international arms control conventions. See, e.g., Steven Bowman, *Chemical Weapons Convention: Issues for Congress* (Congressional Research Service, 2003).

⁵ See National Intelligence Council, *Global Trends 2025: A Transformed World* (2008).

⁶ Sebastian Balfour, *Deadly Embrace: Morocco and the Road to the Spanish Civil War* (2002), pp. 123-56.

⁷ See Jonathan B. Tucker, *War of Nerves: Chemical Warfare from World War I to Al-Qaeda* (2006), pp. 190-96.

⁸ *Ibid.*, pp. 279-86.

⁹ See Global Security, “Chemical Weapons—Sudan,” *GlobalSecurity.org*, at <http://www.globalsecurity.org/wmd/world/sudan/cw.htm>.

¹⁰ See Nuclear Threat Initiative, “Country Overview: North Korea,” at <http://www.nti.org/index.php> for a description of the North Korean chemical weapons program and of North Korean artillery forces.

¹¹ See Victor D. Cha, “North Korea's Weapons of Mass Destruction: Badges, Shields, or Swords?,” *Political Science Quarterly* (2002); 117(2): 209-230 for a detailed description of North Korean perceptions about, and potential uses for WMDs, including chemical weapons.

¹² See Nuclear Threat Initiative, “Country Overview: Egypt,” at http://www.nti.org/e_research/profiles/Egypt/Chemical/index.html, and Nuclear Threat Initiative, “Country Overview: Syria,” http://www.nti.org/e_research/profiles/Syria/Chemical/2973.html for descriptions of the histories and current situations of the Egyptian and Syrian chemical weapons programs.

¹³ Most nerve agents remain toxic even when dissolved in water (e.g., VX, Sarin, Soman). Harry Salem, “Issues in Chemical and Biological Terrorism,” *International Journal of Toxicology* (2003); 22: 468.

¹⁴ The cult produced the Sarin in a chemical plant in their compound near Mount Fuji. The crude production methods meant that the Sarin was only 30% pure; military-grade Sarin is at least 80% pure. If the cult had

Chemical Weapons

produced purer Sarin, the Tokyo subway attacks would have been significantly more lethal. See Tucker, *War of Nerves*, op. cit., pp. 333-48.

¹⁵ The GAO estimates that the United States has 123 chemical facilities with worst-case scenarios of a toxic chemical release that put more than a million people at risk; 700 facilities with worst-case scenarios that put more than 100,000 people at risk; and 3000 facilities with worst-case scenarios that put more than 10,000 people at risk. Tobi Mae Lippin et al, "Chemical Plants Remain Vulnerable to Terrorists: A Call to Action," *Environmental Health Perspectives* (2006); 114(9): 1307.

¹⁶ Adal Rafiq, "Chem Shipping Faces Security Challenge," *Chemical News & Intelligence*, Dec. 17, 2007, p. 3.

¹⁷ UNSCR 1540 requires UN Members to monitor and control sensitive technologies, materials, and equipment within their territories, and it invites UN members with the resources and expertise to assist others that may need help in fulfilling the resolution's requirements. Additionally, it prohibits UN members from supporting non-State actors involved in WMD proliferation and requires states to enact and enforce the necessary laws to prevent these activities in their territories. See also Andrew Semmel, Principal Deputy Secretary of State for Nuclear Nonproliferation, *Remarks at Conference on Global Nonproliferation and Counterterrorism: United Nations Security Council Resolution 1540* (Oct. 12, 2004), at <http://www.state.gov/t/isn/rls/rm/37145.htm>.

¹⁸ PSI was introduced by President George W. Bush IN 2004 as a new WMD interdiction effort existing "outside of treaties and multinational export control regimes." PSI seeks to interdict "shipments of WMD, their delivery systems, and related materials worldwide." U.S. Department of State, *The Proliferation Security Initiative*, at <http://usinfo.state.gov/products/pubs/proliferation/#statement.htm>.

¹⁹ The Australia Group is a forum of countries created to coordinate export controls in order to prevent dual-use technologies from contributing to the proliferations of WMD. The Australia Group operates unofficially under the CWC and the BWC. See Australia Group Homepage, at <http://www.australiagroup.net/en/index.html>.

²⁰ *Global Trends 2025*, op. cit., p. 81.

²¹ *Ibid.*, p. 29.

²² Jonathan B. Tucker, "Verifying the Chemical Weapons Ban: Missing Elements," in Arms Control Association, *An Arms Control Today Reader: The 2008 Chemical Weapons Convention Review Conference: A Collection of Articles, Essays, and Interviews on Tackling the Threats Posed by Chemical Weapons* (April 2008), p. 1.

²³ *Global Trends 2025*, op. cit., p. 41.

²⁴ See Bowman, *Chemical Weapons Convention*, op. cit, pp. 8-13.

²⁵ Salem, "Issues in Chemical and Biological Terrorism," op. cit., p. 467.

²⁶ Tucker, *War of Nerves*, op. cit., p. 385.

²⁷ Jonathan B. Tucker, "The Body's Own Bioweapons," *Bulletin of the Atomic Scientists*; 2008; 64(1): 16.

²⁸ Tucker, *War of Nerves*, op. cit., p. 385.

²⁹ *Global Trends 2025*, op. cit., p. 29.

Chemical Weapons

³⁰ Ibid.

³¹ Tuan H. Nguyen, "Microchallenges of Chemical Weapons Proliferation," *Science*; 2005; 309 (Aug. 12): 1021.

³² *Id.*

³³ *Id.*

³⁴ Tucker, *War of Nerves*, op. cit., p. 384.

³⁵ Nguyen, "Microchallenges," op. cit., p. 1021.

Part 2—Biological Security

OTTAWA SANDERS & ANDREA SMITH-RIPPEON

2.1 Introduction

In the past 10-15 years, the United States has grown increasingly concerned about security threats posed by biological terrorism¹ and naturally occurring infectious diseases.² Together, these threats have converged to create new policy attention on “biosecurity”—protecting the United States from biological events that kill people, disrupt economies, and traumatize societies.³

In previous periods, the United States worried more about rival States, such as the Soviet Union, developing and potentially using biological agents as weapons of war.⁴ The new biosecurity context includes the traditional threat of State use of biological weapons, but the emphasis today is not on that problem. Rather, it is, primarily, about how to confront the threat of bioterrorism and, secondarily, about addressing infectious disease epidemics or pandemics. Today, separating discussion of bioterrorism from deliberations about naturally occurring infectious diseases has become very difficult because of interconnections between these areas.

The two sides of the biosecurity problem are part of what makes biological threats very different from chemical or nuclear threats. Although chemical and nuclear accidents occur, they usually do not contain the kind of potential that an infectious disease pandemic does to cause morbidity and mortality globally. As horrific as terrible chemical and nuclear accidents can be (e.g., Bhopal and Chernobyl), the damage they caused pales in comparison to the global killing machine that was the 1918-19 influenza pandemic.⁵

In addition, biological weapons are different from the other WMD. Unlike the use of chemical and nuclear weapons, release of a biological agent would be silent and invisible, with effects not appearing in victims for days or weeks. This time would give perpetrators the opportunity to leave the scene of the attack, making it more difficult, if not impossible, to identify, locate, and punish those responsible. The victim of a biological attack that employed a contagious pathogen could become a biological weapon himself because he could spread the pathogen more widely, multiplying the attacker’s power to cause death, illness, and trauma in a society.

Biological weapons also implicate a different set of first responders than chemical or nuclear agents, which tend to be addressed by paramedics, emergency responders, and law enforcement personnel. The first responders to a biological attack are likely to be family physicians, hospital emergency room doctors and nurses, and infectious disease specialists. This aspect of biological attacks also makes differentiating an attack from a case or outbreak of a naturally occurring infectious disease difficult, which could complicate law enforcement efforts at local, national, and international levels.

The unique features of biological weapons led Donald Henderson, one of the leading thinkers on biodefense in the United States, to conclude that biological weapons are the most greatly feared WMD.⁶ The Commission on the Prevention of WMD Proliferation and Terrorism agreed in its December 2008 report, arguing that bioterrorism constituted a more likely threat than

Biological Security

nuclear terrorism and should be made higher U.S. national security priority than countering nuclear terrorism.⁷

Our task in this part is to identify and examine how key trends of global change may affect threats to biosecurity in the United States and the world. Our scenario-based analysis focuses on three hypothetical possibilities:

- The first scenario describes the impact of a nuclear Iran on interest by States in the Middle East on developing biological weapons as a deterrent capability.
- The second scenario illustrates the confusion and the uncertainty the United States would face in understanding events that may involve bioterrorism.
- The third scenario focuses on an international crisis caused by an influenza pandemic that draws attention to international perceptions that the United States focused its policies too narrowly on protecting itself from bioterrorism.

2.2 Intentional Biological Threats: An Overview

Use of biological agents as tactical and strategic weapons

Despite the prohibition against the first use of biological weapons enshrined in the Geneva Protocol (1925), States have explored how biological agents could be used as tactical and strategic weapons, as illustrated by the biological weapons programs undertaken by the United States, the United Kingdom, Canada, France, and the Soviet Union during and after World War II.⁸ However, States have not often used biological weapons in armed conflict. Japan's use of biological agents against China during World War II is the only documented use of biological weapons by a State against another State in the 20th century. The unilateral U.S. renunciation of offensive biological weapons in 1969 occurred largely because the U.S. government determined that biological weapons had little to no practical military utility. The adoption of the Biological Weapons Convention (BWC)(1972) solidified the international legal prohibition against any use of biological weapons by States for any purpose.

Biological weapons as a deterrent

Biological weapons could function as a useful deterrent weapon in three situations:

- To deter rival States that possess biological weapons from using them. This kind of deterrence existed when major powers developed biological weapons programs during the post-World War II period.
- To deter attacks from adversary States that possess superior conventional military capabilities. Many experts believe that Saddam Hussein attempted to develop biological

Biological Security

capabilities partly as a way to deter regional (e.g., Iran) and international (e.g., United States) rivals having greater conventional military power from attacking Iraq.

- To deter States that have other WMD capabilities, such as chemical or nuclear weapons. We address this potential dynamic in Scenario 1 below.

The prohibitions in the BWC also completely prohibit the development of biological weapons for use in any deterrent capacity, meaning that States Parties to the BWC have agreed to abandon using biological weapons for deterrence purposes.

Use of biological agents as terror weapons

Biological agents can also be deployed as weapons for terrorist purposes. The BWC addresses State development and stockpiling of biological weapons and does not directly address the threat of bioterrorism. The potential terrorist use of biological agents is the threat that has preoccupied the United States in the realm of biosecurity since the latter half of the 1990s. Policy attention on bioterrorism increased exponentially after the anthrax attacks in the United States in 2001. Terrorist use of biological weapons has not been frequent, perhaps explained by the reasoning that most terrorist groups shun biological weapons because their use would destroy the groups' political support and agendas. Similarly, organized criminal elements might have reluctance to get involved in using biological weapons against enemies (as opposed to profiting from the illicit sale of technologies that might facilitate bioterrorism by other groups).

Terrorist groups motivated by apocalyptic religious causes or violent, intolerant ideological doctrines (e.g., racist groups) may be more likely to use biological weapons. See Table 2.1 below. Fundamentalist religious groups carried out two of the three known instances of the use or attempted use of a biological weapon by terrorists:

- In 1984, the Rajneeshees, a religious cult, carried out a series of bioterrorist attacks in Oregon by poisoning salad bars in restaurants with a strain of *salmonella enteritica*, causing 751 cases of illness but no fatalities.⁹
- Aum Shrinkyo, a religious cult located in Japan made nine attempts to develop and disseminate *Botulinum toxin* and *Bacillus anthracis* from customized vehicles and spray nozzles, including at a U.S. Naval base at Yokosuka. None of the attempts were successful.¹⁰

“Lone wolf” and amateur terrorists may be willing to develop and use a biological weapon as a terror instrument for a variety of reasons (e.g., seeking notoriety or revenge) that may never be entirely clear. The identification of a lone U.S. government scientist, Bruce Ivins, as the leading suspect in the anthrax attacks of 2001, if correct, is an example of an individual engaging in bioterrorism for reasons that remain unclear to this day.

Biological Security

Box 2.1 Types of Non-State Actors and the Kinds of Weapons They are Likely to Use¹¹

Non-State Actors	Biological Weapons	Chemical Weapons	Nuclear Weapons	Conventional Weapons	Other
Political Terrorists				√	√
Fundamentalist and Religious Groups	√	√		√	√
Racists and Anarchists Groups	√	√		√	√
Amateurs	√	√	√	√	√
Organized Criminals	√	√		√	√

Implications for the United States of the potential uses of biological weapons

At the present time, the United States is not preoccupied with the threat that rival States may develop and use biological weapons against the U.S. homeland or vital U.S. interests overseas. The superiority of U.S. conventional military power and its nuclear capabilities reduce the likelihood that another State might “go bio” against the United States in any armed conflict. Nor is the United States particularly concerned that other States may develop robust biological capabilities to deter U.S. political or military actions.

The major U.S. concern involves bioterrorism. U.S. policy makers have expressed the most concern about terrorist use of biological weapons over past 10-15 years. The December 2008 report of the Commission on the Prevention of WMD Proliferation and Terrorism likewise spent the majority of its attention on biological weapons focusing on the threat of bioterrorism. Neither the BWC nor U.S. conventional and nuclear military capabilities have much deterrent effect on terrorist groups interested in biological options. Fears about biological terrorism fed into U.S. efforts to create different international regimes that would counteract all forms of WMD terrorism, including United Nations (UN) Security Council Resolution 1540 and the Proliferation Security Initiative (PSI). The United States has also made efforts to improve its domestic preparedness and response capabilities in order to handle the consequences of a biological attack more effectively.

Biological Security

For our purposes, the discussion of the different possible uses of biological weapons provides an analytical framework for examining major trends that may affect State and non-State actor perceptions of the future utility of biological agents as weapons. We turn to this analysis in Sections 2.4-2.6 below.

2.3 Biological Threats from Naturally Occurring Infectious Diseases: Implications for U.S. and International Security

Contemporary thinking on biosecurity does not just focus on biological weapons and biological terrorism. One of the most significant changes to occur in the past decade in U.S. security and public health discourses has been framing certain infectious disease threats, such as HIV/AIDS, SARS, and pandemic influenza, as threats to national and international security.¹² For example, the United States strongly supported the adoption of a radically new set of international legal rules to address public health emergencies of international concern—the International Health Regulations 2005 (IHR 2005)¹³—because the United States believed that this new instrument of global governance would support U.S. national security and international security. Giving such security prominence to an international public health agreement was unprecedented.

Viewing naturally occurring infectious diseases as a security threat is not without controversy, and this aspect of biosecurity has not received as much attention as the threat of bioterrorism in U.S. policy circles, even though experts believe the likelihood of a deadly influenza pandemic is greater than a bioterrorist attack. In addition, tensions exist between the primary U.S. focus on bioterrorism and developing countries' primary concern of dealing with infectious diseases. Our third scenario (Section 2.6) focuses on how key trends of global change might affect these serious tensions.

2.4 Scenario 1: Nuclear Iran Triggers Suspected Biological Weapons-Related Activities

AN OPEN LETTER TO THE WORLD'S LEADERS ON THE GROWING CONCERN OF POTENTIAL BIOLOGICAL WEAPONS-RELATED ACTIVITY IN THE MIDDLE EAST

November 17, 2017

We, at the BioWeapons Prevention Project (BWPP), are deeply concerned about what we perceive to be evidence of increasing biological weapons-related activities in the Middle East, and the apparent lack of interest on the part of the world's leaders to address this concern.

Since Iran's acknowledgment of its nuclear weapons capability in 2015, Saudi Arabia and Egypt have participated in intensive activities in the biological area that raise alarms in the arms control community. The unprecedented scale of these activities, and their intensity, signals that

Biological Security

Saudi Arabia and Egypt have developed a serious interest in exploring biological weapons capabilities.

In July, Egypt opened the Egyptian Institute for Bioengineering and Biotechnology. Egypt suddenly aspires to become a world leader in life sciences and biotechnology. The Institute plans to launch programs in nanotechnology, pharmaceutical science, and biotechnology on a significant scale. Simultaneously, Saudi Arabia is joining the biotech bandwagon by announcing the establishment of the House of Saud Biological Sciences Research Park.

States can conduct research for “prophylactic, protective, or other peaceful purposes” under the Biological Weapons Convention (BWC), but only Saudi Arabia is a party to this treaty. The timing and scale of these projects in two countries not previously involved in this realm raises questions whether Egypt and Saudi Arabia seek a biological deterrent against Iran’s conventional military power and nuclear capabilities.

Egypt and Saudi Arabia are worried about Iran, and have devoted increasing resources towards their military establishments. The percentage of Egypt’s gross national product devoted to military expenditures has doubled since 2012, whereas Saudi Arabia’s increased by a third for the same period. Even more alarming is the fact that Egypt and Saudi Arabia did not participate in the last BWC Review Conference in 2016, and have failed since 2013 to submit any information under the BWC’s system of Confidence Building Measures.

For greater peace and stability in the Middle East and throughout the world, we call on you to develop a plan of action to respond to the growing concern of the possible development of biological weapons in the Middle East.

With Concern,

The BioWeapons Prevention Project

Analysis of the scenario

The fictional open letter from the BWPP, a leading non-governmental organization working against the proliferation of biological weapons,¹⁴ envisions States in the Middle East potentially signaling their willingness to develop biological weapons as a deterrent capability against a powerful, nuclear-armed Iran. The BWPP expresses concern that an exogenous shock—Iran’s nuclear capability—may undermine the BWC’s norm against State development of biological weapons. The scenario suggests the difficulties inherent in figuring out the intent of Egypt and Saudi Arabia in moving quickly into biotechnology promotion, especially in light of the right of BWC States Parties to engage in peaceful biological research.

In addition, Egypt is not bound by the BWC because it is not a State Party to that agreement. In fact, experts believe that Egypt has refused to join the BWC and the CWC because it wants to retain biological and chemical options to deter Israel’s nuclear capability. The scenario suggests the same logic unfolding with Egypt and Saudi Arabia vis-à-vis Iran.

Biological Security

The key trends identified by the National Intelligence Council that would factor into Scenario 1 are:

- Impact of new players;
- Globalizing economy;
- Technological change;
- Demographics of discord; and
- Multipolarity without multilateralism.

Impact of new players

Scenario 1 focuses on the impact of Iran going nuclear. The National Intelligence Council considers Iran an “up-and-coming power,”¹⁵ and the Council identifies dangers to the Middle East from Iranian nuclear proliferation.¹⁶ The scenario envisions reactions to growing Iranian power from Egypt and Saudi Arabia, which might be signaling to Iran that they will develop WMD capabilities to counter-balance Iranian influence and ambitions.

Although this scenario focuses on possible biological moves by Egypt and Saudi Arabia, such moves may only be one aspect of their strategic responses, which might involve seeking security guarantees from the United States or developing their own nuclear deterrents. Most discussion of Iranian nuclear proliferation focuses on the fears that Iran could trigger a nuclear arms race in the Middle East, but, in connection with other trends analyzed below, such proliferation may trigger other forms of WMD proliferation, even if countries worried about Iranian nuclear weapons will eventually seek nuclear weapons themselves.

Globalizing economy

Scenario 1 suggests that Egyptian and Saudi efforts to access cutting edge technologies and know-how in the biological sciences will benefit from the global dissemination of biotechnology and developments in the life sciences. This dissemination already worries experts with respect to biological terrorism, and the same processes of globalization that make advanced, powerful biotechnologies increasingly available to non-State actors would also make them available to States such as Egypt and Saudi Arabia. In short, the economic barriers to entry for Egypt and Saudi Arabia are quite low in this area—lower, in fact, than the barriers to entry for nuclear capabilities. This fact may create incentives for Egypt and Saudi Arabia to move in the biological direction as a first step in sending warning signals to Iran about its intentions.

Technological change

Similarly, the rate of change in the biological sciences is anticipated to continue to be staggering over the next 10-20 years. Under the scenario, Egypt and Saudi Arabia could capture powerful biotechnologies that would give them significant dual-purpose biological capabilities.

Biological Security

The costs of exploiting such capabilities will continue to decrease over the next two decades, which may make moving in the biological direction more attractive than it might appear today, especially when the same advanced technologies could be easily switched over to peaceful uses once Egypt and Saudi Arabia had developed more significant means to deter Iran.

Demographics of discord

The anticipated demographic trends over the next 20 years identified in *Global Trends 2025* suggest that need and demand for the products of biotechnology, such as new generations of drugs for infectious and non-communicable diseases, will increase. The world's growing middle class populations will wish to have access to life-saving and life-enhancing medicines, and pharmaceutical and biotechnology companies will seek to service this expanding market. Antimicrobial resistance to existing antibiotics and anti-virals (e.g., anti-retrovirals for HIV/AIDS) is also expected to increase in the near future, producing the need for new drugs and therapies to combat infectious diseases. This increased demand for the peaceful products of biotechnology will help fuel the globalization of cutting edge research and development in the life sciences. More countries will want to make their companies and economies incubators for the biotechnology and pharmaceutical industries. In this context, the desire of countries, such as Egypt and Saudi Arabia, to move into the biotechnology direction will connect to the public health and health care needs of expanding and aging populations in 2025.

Multipolarity without multilateralism

Finally, Scenario 1 illustrates concerns with biological weapons driven by the emergence of a multipolar international system. To begin, the emergence of Iran as a nuclear power indicates the dangers of WMD in a multipolar world—such emergence may cause other countries to think more seriously about obtaining WMD capabilities. The scenario suggests failure of the regime on nuclear non-proliferation and threats to the norms enshrined in the BWC. The context of multipolarity may also mean that other great powers, such as China and India, will increasingly compete with the United States for political and economic influence in the Middle East, making it more difficult for the United States to assert leadership on arms control initiatives in the region.

In addition, the lack of any verification or compliance machinery in the BWC means that concerns about Egypt's and Saudi Arabia's activities, such as those expressed by the BWPP, have no institutional support. Moves to pressure Egypt and Saudi Arabia to come clean about their activities will be more difficult in a multipolar world, especially with respect to Saudi Arabia and its continued importance in terms of world oil supplies. Egypt too could threaten to reduce cooperation with the West over the Israeli-Palestinian and other issues if the United States or European countries attempt to turn up the heat.

Policy implications of scenario 1 for the United States

Scenario 1 connects two troubling issues from the perspective of U.S. national security—Iranian nuclear proliferation and the decreasing political and economic costs States might face in obtaining advanced biotechnological capabilities readily exploitable for purposes of developing

Biological Security

biological weapons. *Neither problem generates clear policy paths for the United States to take unilaterally or multilaterally.* The proximate cause of the biological proliferation in the scenario—Iranian nuclear proliferation—is not a problem the United States will solve from within biosecurity policy, even though such proliferation could have an impact on biological weapons proliferation to the detriment of U.S. and international security.

2.5 Scenario 2: Bioterrorism?

Response to 16 December presidential tasking requesting an updated comprehensive analysis of events related to the potential terrorist threat emanating out of Vietnam.

17 December 2020

Presidential Daily Brief: Nature of Vietnam Bio-threat Remains Unclear

Intelligence, diplomatic, and media reports indicate unknown biological agents were stolen from the National Institute of Hygiene and Epidemiology (NIHE) in Hanoi on 3 December.

Growth in Vietnam's biotechnology industry and biodefense program has prompted closer scrutiny by the U.S. intelligence community. Since 2016, Vietnam's interest in State Department programs to advance and monitor bio-lab safety and pathogen security precautions has waned, and, consequently, the U.S. government has less information about the quality of Vietnam's biosafety and biosecurity measures. The U.S. intelligence community has also been monitoring several known and suspected terrorist groups operating in Southeast Asia, some with documented antipathy towards U.S. interests and the ability to conduct operations in Vietnam.

Analysts intercepted a phone call on 7 November between unknown actors in Hanoi discussing highly pathogenic materials they believed to be in the NIHE's BSL-4 lab. On 4 December, diplomats reported heightened Vietnamese law enforcement activity at the NIHE laboratory. Intelligence sources in Hanoi indicated that highly pathogenic biological materials had been stolen from the lab, perhaps including strains of highly pathogenic avian influenza. However, a Vietnamese government spokesman stated on 9 December that the NIHE laboratory was not compromised and no biological materials were missing.

On 8 December, a newspaper in Laos published a letter—ostensibly from an insurgent branch of the Hmong ethnic group, called the Chao Fa—claiming the group would release biological agents in urban centers unless the Laotian government agreed to stop attacking Hmong villages and initiated negotiations for an autonomous Hmong prefecture.

On 12 December, ProMED-mail (a trusted NGO early warning system for disease outbreaks) reported unusual clusters of "flu-like" diseases cases in a remote village in Laos. Laos has refused to allow the WHO to enter Laos to help evaluate the outbreak. Speculation is rife that the outbreak is related to pathogenic biological materials stolen from the Vietnamese lab, but

Biological Security

public health experts in the intelligence community caution that the outbreak might be naturally occurring.

Some circumstantial evidence suggests the Chao Fa may have stolen biological agents from the NIHE, but we have no reliable sources confirming the presence of Chao Fa members in Hanoi on 4 December. Several Hmong villages are located in the outbreak area, but, without more cooperation from Vietnam and Laos, analysts cannot determine if the incident at the NIHE laboratories, the Chao Fa letter, and this outbreak are connected.

The U.S. Centers for Disease Control (CDC) announced 15 December that this season's influenza strain is particularly virulent—hospitals nationwide are at capacity with patients. When contacted, CDC experts judged that the United States is not presently capable of responding to a biological attack effectively.

Analysis of the scenario

Depicted through a CIA report included in the Presidential Daily Brief, Scenario 2 describes the confusion and lack of cooperation that could unfold concerning events involving fears of bioterrorism. The events described may or may not be related; the deaths in Laos may or may not be bioterrorism or a naturally occurring outbreak. Highly pathogenic biological materials may or may not have been stolen from the lab in Vietnam. In the midst of this confusion, the CDC indicates that the U.S. health system could not cope with a bioterrorist attack. In a number of ways, the scenario reveals how biological security events differ in fundamental respects from chemical or nuclear incidents or attacks, particularly in the confusion that surrounds whether a biological event is an attack or a naturally occurring outbreak.

The key trends most important to this scenario are:

- Globalizing economy;
- Technological change; and
- Multipolarity without multilateralism.

Globalizing economy

Scenario 2 reveals possible consequences of the diffusion of biotechnology and the life sciences worldwide over the next 20 years. Developing countries are becoming increasingly interested in biotechnology as a method of maximizing agricultural output, developing robust pharmaceutical industries, responding to naturally occurring diseases, and of otherwise competing in the global economy. However, the development of sophisticated laboratories conducting research on biological agents requires high standards for biological safety—to prevent lab accidents—and biological lab security—to prevent pathogenic material from being stolen or misused. Experts worry that the global spread of biotechnology without the

Biological Security

corresponding spread and implementation of appropriate lab safety and pathogen security measures will prove dangerous.

In Scenario 2, Vietnam's cooperation with the United States on lab safety and security diminished over time, leaving the United States less informed about Vietnam's standards and their implementation. Vietnam's response to allegations of a breach of security at its BSL-4 facility was denial, likely because Vietnam would want to avoid the adverse political and economic consequences of admitting that a break-in occurred or of allowing international scrutiny of exactly what scientists were doing in the BSL-4 lab. Serious concerns exist about lab safety and security in the United States,¹⁷ let alone in a developing country, such as Vietnam, attempting to harness biotechnology for economic development.

Globalization is also present in Scenario 2 in the potential concerns that dangerous infectious diseases could spread transnationally. Laos refuses to cooperate with WHO about a rumored outbreak in its territory. SARS and avian influenza serve as reminders of how local disease problems can explode, through the trade and travel pathways of economic globalization, into global disease crises, regardless of the disease's origins.

Technological change

Scenario 2 also highlights dangers in the global dissemination of increasingly powerful and advanced biotechnological capabilities. The rapid pace of technological change in the biological sciences is outpacing, and will continue to outpace, the ability of the States and the international community to implement policies that will prevent and mitigate harm. Although advances in the life and biological sciences promise to improve the quality of healthcare and agriculture, they increase the threat posed by accidental release of disease causing agents or malevolent misappropriation of biotechnology.

Technological change increasingly permits scientists to develop improved understandings of the nervous system and the mechanisms disease-causing microbes employ in interaction with humans, animal, and plants. This knowledge, in the wrong hands, could have disturbing applications, such as designing new biological or biochemical weapons and reengineering existing viruses and bacteria to evade diagnosis and treatment.¹⁸

In combination with globalization, the speed and scale of technological advance in biotechnology undermines any remaining ambitions to establish verification or compliance mechanisms within the BWC to ensure that the global diffusion of dual-use technologies are not diverted to produce biological weapons. The difficulty of achieving such verification is part of what made the efforts in the 1990s and early 2000s to develop a BWC verification protocol contentious and, ultimately, unsuccessful. Technology has since developed, and will continue in the next 20 years to develop, at a pace and in ways that will perhaps bury any remaining hopes for a verification regime within the BWC.

Biological Security

Multipolarity without multilateralism

As already suggested under the trends of the globalizing economy and technological change, national governance and international collective action will, over the course of the next two decades, struggle to keep pace with developments in biotechnology and the life sciences. The prediction of increased multipolarity will only increase the difficulty of these struggles. Although Vietnam is not expected to become an emerging great power by 2025, Scenario 2 illustrates how a developing country pursuing economic development through biotechnological means may become a potential source of global danger, either as the victim of biological theft by terrorists or as the source of an infectious disease event.

Scenario 2 also reveals the potential roles non-States actors will have in the emerging multipolarity. Multinational corporations will facilitate the global diffusion of biotechnology; NGOs are involved in monitoring public health conditions nationally and globally (e.g., ProMED-mail¹⁹); and terrorist groups continue to plague developing and developed countries alike. How States in a messy multipolar world would regulate, harness, or control activities undertaken by non-State actors across all the realms implicated by Scenario 2 is not clear.

The value of international regimes relevant to bioterrorism (e.g., UN Security Council Resolution 1540 and PSI) and to naturally occurring infectious diseases (e.g., IHR 2005) is also challenged by Scenario 2. The theft of biological materials from the Vietnamese lab might reflect Vietnam's failure to implement national legislation required under UN Security Council Resolution 1540 adequately, but Scenario 2 suggests that the UN Security Council has done little, by 2020, to enforce the mandate in Resolution 1540. None of the facts described in Scenario 2 appear to make PSI relevant at all to addressing this confusing incident. Absent permission from Laos to enter its territory, the WHO does not have many options under the IHR 2005 for figuring out exactly what type of public health threat exists in that country.

Policy implications of scenario 2 for the United States

Scenario 2 raises many policy challenges the United States has to confront in the future if it wants to minimize the chances that something like this scenario would occupy the time and energies of the U.S. national security and intelligence communities. For brevity's sake, these challenges can be divided into five areas:

- Improving the ability of companies, universities, non-governmental research institutes, and individual scientists working with biological agents to avoid contributing to biosecurity threats and to contribute to strengthening biosecurity precautions. The Commission on the Prevention of WMD Proliferation and Terrorism referred to this task as one of creating "a culture of security awareness in the life sciences community."²⁰
- Intensifying efforts within the United States and with other countries to strengthen biosecurity policies and practices. Biosecurity at research labs and facilities in the United

Biological Security

States is currently insufficient, particularly in light of rapid expansion in such labs and facilities after the anthrax attacks in 2001. Internationally, the U.S. would seek to have cooperative efforts with other countries do as much as possible to prevent a scenario of theft as described in Scenario 2 above. In this realm, competition from other countries, such as China, in raising biosecurity standards might be a positive outcome of multipolarity—as long as the standards being promoted and implemented were sound from scientific and security perspectives.

- Deepening U.S. cooperation with other countries in intelligence gathering and law enforcement capabilities related to biosecurity threats. As Scenario 2 depicts, intelligence and law enforcement agencies will play critical roles in working through all the “noise” to discover what happened in incidents believed to be associated with terrorist groups.
- Working to improve global infectious disease surveillance capabilities of States, IGOs (such as WHO), and NGOs so that the global community can know as rapidly and accurately as possible whether a disease event is naturally occurring, accidental, or malevolent in origin. This task could include scaled-up U.S. support for serious implementation of the IHR 2005 in developing countries around the world.
- Strengthening U.S. public health and health care systems for responding to serious biological events, whether they are caused by naturally occurring outbreaks or bioterrorist attacks. Scenario 2 reveals the United States still in a position of struggling to cope with the annual visitation of influenza, and not in a position to handle this routine public health challenge and another serious biological incident (e.g., a bioterrorist attack, or the arrival of the mystery disease in Laos in the United States through the channels of global travel).

Biological Security

2.6 Scenario 3: Pandemic Politics

Mr. Xie Fang
Foreign Minister,
People's Republic of China

January 23, 2025

Honorable Minister Xie Fang, Greetings:

I am responding to your offer of assistance to counter the impact of the influenza pandemic in Nigeria. As you know, since the so-called "Lagos strain" emerged and spread globally, Nigeria has suffered terribly from influenza and from the irrational responses of other countries. We are facing a national security crisis because of the pandemic.

Although the World Health Organization has offered to help, it has so few resources (having been starved of money by the major developed countries for decades) that it cannot do much for us. Apart from PEPFAR, past bilateral support from the United States included conditions related to the American obsession with bioterrorism, and these conditions hindered our ability to prepare for real public health threats, such as pandemic influenza. Washington made trouble with respect to our efforts to develop stronger biological research capabilities, fearing we would somehow become fodder for bioterrorists.

However, China has proved a stronger partner for Nigeria and for global health. Through your sponsorship of public health laboratories in Nigeria, assistance with Nigeria's implementation of the International Health Regulations 2005, and support of African development, China has been an excellent partner in African disease prevention and public health initiatives.

In addition, the United States seems in no condition to help us. Its population is traumatized by the impact of the pandemic, and they are angry with the government for not having been better prepared for the pandemic. Americans want to know why more money was not spent on public health as opposed to bioterrorism schemes, such as Projects BioWatch and BioShield. Most U.S. hospitals have already run out of surgical masks and gloves, such is the lack of preparedness in the United States.

Any assistance China can offer is urgently needed. In exchange we can discuss preferential access to several new Nigerian oil exploration and exploitation projects.

Respectfully,

Ike Ekweremadu

Foreign Minister, Nigeria

Biological Security

Analysis of the scenario

Scenario 3 focuses on the naturally occurring disease aspect of biosecurity.²¹ In the scenario, the world experiences pandemic influenza, which experts have often predicted. The scenario anticipates that most countries will not be better prepared for pandemic influenza in 20 years than they are today. The Nigerian foreign minister's response is not that "flu happens"; rather, he reads the pandemic politically and accuses the United States of focusing on bioterrorism and not broadening its role in global health to help developing countries more effectively. In the scenario, China emerges as a preferred partner for Nigeria and Africa because it was not "obsessed" with bioterrorism. China's reward is greater influence in Africa and potentially preferred access to Nigerian oil supplies.

The key trends relevant to Scenario 3 are:

- Globalizing economy;
- Demographics of discord;
- Impact of new players; and
- Multipolarity without multilateralism.

Globalizing economy

Scenario 3 reveals the speed with which a virulent infectious disease can circumnavigate the global through the channels of globalized trade and travel. The continued interconnections between national economies expected in the next 20 years will only serve to accelerate the pace at which the next influenza (or other disease) pandemic rips through the global community. The scenario suggests, however, that globalization does less for preparing nations for the virtually inevitable emergence and transnational spread of pathogens.

In addition, the scenario indicates that China is better positioned to help Nigeria than the United States. This aspect suggests that China's economic capabilities will continue to grow over the next 20 years, and that China will be able to harness its economic power effectively to serve its national interests, even in a time of crisis. The United States will, however, see its economic advantage on the world stage decline relative to China and other countries, and, as the financial crisis gripping the United States at the end of 2008 suggests, the United States may lose resiliency in being able to handle domestic and global crises simultaneously.

Demographics of discord

Given projections in the growth of the world's population and the populations of developing countries,²² the carnage of a virulent, transmissible influenza virus will be frightening. As the scenario portrays the Nigerian foreign minister saying, his country is suffering terribly and faces a national security crisis because pandemic influenza. The death toll and human suffering may be exacerbated by increasingly urbanized societies full of people in poor health because

Biological Security

government services (e.g., food supplies, health care, sanitation) are inadequate. Unhealthy people tend to have compromised immune systems and are, thus, more vulnerable to virulent infectious diseases.

Impact of new players

Scenario 3 focuses on China as a new, powerful global player in 20 years time. The scenario alludes to China's interest, influence, and stature in Africa in 2025. In addition, the scenario describes China as Nigeria's (and perhaps Africa's) preferred partner with respect to cooperating during the global influenza crisis. The goodwill the United States developed in Africa through the President's Emergency Program for AIDS Relief (PEPFAR)²³—the single largest disease-specific assistance program in history—has, by 2025, faded, being little more than a throw-away phrase in the Nigerian foreign minister's letter. The scenario envisions China taking a more effective approach to health diplomacy through assistance related to African public health needs rather than projects that service U.S. bioterrorism concerns. In short, the scenario sees China emerging as a more powerful, better resourced, and respected country in the eyes of Nigeria (and perhaps Africa) than the United States in the midst of a global crisis.

Multipolarity without multilateralism

Scenario 3 describes the WHO as something of a helpless bystander as pandemic influenza ravages Nigeria and the planet. The scale of the pandemic dwarfs WHO's capabilities as an intergovernmental organization. Nigeria's foreign ministry suggests that WHO suffers from financial starvation by developed countries, an accusation all too familiar to global health experts frustrated by the lack of resources WHO has to undertake its mandate as the UN specialized agency on health. The scenario also suggests that the IHR 2005 have proved of little utility in stopping pandemic influenza. In short, key collective action mechanisms established by States have failed to function adequately in a time of global crisis.

The poor condition of collective action on global health in 2025 depicted in the scenario would reflect the anticipated difficulties countries will have in an increasingly multipolar world to reach sustainable and robust global governance regimes. The scenario describes the United States and China as pursuing different biosecurity interests and policies that would be hard to reconcile in any sustainable manner. Under the scenario, Nigeria seeks to barter oil for assistance from China rather than relying on collective action mechanisms that can supply medical or financial assistance to developing countries in times of urgent need.

Policy implications of scenario 3 for the United States

Scenario 3 draws attention to concerns that the U.S. biosecurity policies disproportionately focus on protecting the United States from bioterrorism and shortchange protecting Americans and other countries from large-scale threats posed by naturally occurring infectious diseases. The Commission on Prevention of WMD Proliferation and Terrorism reasoned that bioterrorism should be a higher national security priority than nuclear terrorism because bioterrorism was

Biological Security

more likely.²⁴ Under that logic, a global health threat, such as pandemic influenza, should be a higher national security priority because not only is it more likely but it also would threaten to kill many more people. But U.S. policies on biosecurity do not follow this logic with respect to potentially damaging naturally occurring infectious disease threats.

Scenario 3 raises, therefore, policy questions about whether the United States should recalibrate its biosecurity strategies to give more attention and resources to public health both at home and abroad. The scenario describes Nigerians *and* Americans angry with the U.S. government for not paying more attention to the expected emergence of pandemic influenza and for giving priority to the threat of bioterrorism (e.g., Projects BioWatch²⁵ and Bioshield²⁶). In the scenario, the often-promised “synergy” between bioterrorism policies and public health protection did not materialize.

Recalibration of U.S. biosecurity strategies could entail:

- Stronger U.S. support for WHO and U.S. leadership in advancing global implementation of the IHR 2005;
- Expanding how the U.S. Department of State includes public health capacities (e.g., disease surveillance and response capabilities) in its Biosecurity Engagement Program;²⁷ and
- Redirecting resources from bioterrorism-specific programs with little benefit for public health into initiatives that strengthen U.S. and global capacities to address both bioterrorism and naturally occurring infectious diseases.

2.7 Conclusion

Our analysis of the biosecurity challenges facing the United States over the next 20 years concurs with assessments that warn about the emergence of State interest in the power of cutting-edge scientific and biotechnological capabilities as sources of deterrence, the dangers the globalization of biotechnology stimulates with respect to bioterrorism, and the lack of sufficient attention to naturally occurring infectious disease threats. Key trends identified by the National Intelligence Council are poised to increase the magnitude of these challenges and the difficult of organizing national and international responses to them.

Biological Security

Endnotes for Part 2

- ¹ *World at Risk: Report of the Commission on the Prevention of WMD Proliferation and Terrorism* (Dec. 2008).
- ² The White House, *National Security Strategy of the United States of America* (2006), p. 47.
- ³ David P. Fidler and Lawrence O. Gostin, *Biosecurity in the Global Age: Biological Weapons, Public Health, and the Rule of Law* (2008).
- ⁴ Judith Miller, Stephen Engelberg, and William Broad, *Germs: Biological Weapons and America's Secret War* (2001), p. 49.
- ⁵ See John Barry, *The Great Influenza: The Epic Story of the Deadliest Plague in History* (2004).
- ⁶ Donald Henderson, "The Looming Threat of Bioterrorism" *Science* (Feb. 1999), pp. 1279-82.
- ⁷ *World at Risk*, op. cit., p. 24.
- ⁸ Mark Wheelis, Lajos Rozsa, and Malcom Dando, *Deadly Cultures: Biological Weapons since 1945* (2006).
- ⁹ Miller, Engelberg, and Broad, *Germs*, op. cit., p. 30.
- ¹⁰ Robert Kadlec, Allan Zelicoff, and Ann Vrtis, "Biological Weapons Control: Prospects and Implications for the Future," in *Biological Weapons: Limiting the Threat* (J. Lederberg, ed.) (1999), p. 96.
- ¹¹ Jonathan B. Tucker, "Bioterrorism: Threat and Responses" in *Biological Weapons: Limiting the Threat*, op. cit., pp. 293-300.
- ¹² Fidler and Gostin, *Biosecurity in the Global Age*, op. cit., pp. 121-45.
- ¹³ See World Health Organization, International Health Regulations 2005, at <http://www.who.int/csr/ihr/en/>.
- ¹⁴ See BioWeapons Prevention Project, at <http://www.bwpp.org/index.html>.
- ¹⁵ *Global Trends 2025: A Transformed World* (Nov. 2008), p. 35.
- ¹⁶ *Ibid.*, p. 61. In *Global Trends 2025*, these dangers are connected directly with concerns about an Iranian nuclear capability triggering a nuclear arms race in the Middle East. On this scenario, see Part 3, Section 3.3 below.
- ¹⁷ *World at Risk*, op. cit., pp. 27-28.
- ¹⁸ Mark Wheelis, "Will the New Biology Lead to New Weapons?" in *An Arms Control Today Reader* (2006), pp. 46-47.
- ¹⁹ See ProMED-mail, at <http://www.promedmail.org/pls/otn/f?p=2400:1000:>.
- ²⁰ *World at Risk*, op. cit., p. 30.
- ²¹ The NIC describes the potential emergence of a global pandemic in *Global Trends 2025*, op. cit., p. 75.
- ²² *Ibid.*, p. 19.
- ²³ See President's Emergency Program for AIDS Relief, at <http://www.pepfar.gov/>.
- ²⁴ *World at Risk*, op. cit. p. 24.

Biological Security

²⁵ See Dana Shea and Sarah Lister, *The BioWatch Program: Detection of Bioterrorism* (Congressional Research Service Report No. RL 32152, Nov. 13, 2003), at <http://www.fas.org/sgp/crs/terror/RL32152.html>.

²⁶ See The White House, Project BioShield, at <http://www.whitehouse.gov/infocus/bioshield/>.

²⁷ See U.S. Department of State, Biosecurity Engagement Program, at <http://www.bepstate.net/>.

Part 3—Nuclear Weapons

NICOLAS BLAREL, ADRIAN FLOREA, & SCOTT A. SMITSON

3.1 Introduction

Scholars and policy makers have generally looked at nuclear weapons as primary catalysts for international stability in the post-World War II era. In the 1960s, strategists in the White House anticipated that no less than 20 states would acquire nuclear weapons by the end of the 1970s. Although many states are capable of making a nuclear weapon, no more than 10 countries (including Israel and North Korea) possess such weapons today. The destructiveness of nuclear weapons, the uncertainties surrounding even small-scale nuclear attacks, and the questionable strategic utility of nuclear weapons programs (especially for smaller states), have kept the nuclear taboo against the use of such weapons robust throughout the post-World War II period.

The international system is, however, undergoing transformation caused by the rise of emerging powers, a globalizing economy, and an historic transfer of relative wealth and economic power from West to East.¹ As the system moves towards multipolarity, some states may look at nuclear weapons as a way to guarantee their security and/or to achieve regional or global dominance. Moreover, the terrorist attacks of September 11, 2001, ushered in new transnational actor in world politics that may seek to acquire and use nuclear weapons: Al-Qaida. Thus, in a volatile and highly competitive environment, the United States not only needs to prevent nuclear proliferation and potential use of nuclear weapons by States but also must combat nuclear terrorism.

This part uses three scenarios to analyze potential nuclear threats to U.S. national security over the next 20 years. Although the United States is likely to remain the single most powerful actor in international politics, U.S. nuclear and conventional capabilities will probably shrink, and U.S. leverage will decrease. As a result, a central dilemma for U.S. policy makers is to identify the trends that could lead to nuclear challenges, and to devise policies to mitigate their adverse effects. Our scenario-based approach focuses on three potential developments that would increase the threat nuclear weapons would pose for the United States:

- The first scenario envisions the United States losing its nuclear primacy and entering protracted nuclear rivalry with China.
- The second scenario focuses on the consequences that a nuclear-armed Iran might have for nuclear proliferation and conflict in the Middle East.
- The third scenario concentrates on the risk of terrorist groups acquiring nuclear weapons and launching nuclear attacks on U.S. territory.

Nuclear Weapons

These scenarios illuminate how political and economic trends identified by the National Intelligence Council could converge to produce transformative events involving nuclear weapons. In order to understand how these trends affect politics involving nuclear weapons, we look at systemic, regional, and state level effects. After analyzing each scenario, we examine the implications that the scenario has for U.S. policy makers.

3.2 Scenario 1: Diminishing U.S. Nuclear Primacy—Chinese Pursuit of MAD

USPACOM J2

July 21, 2025

MEMORANDUM FOR RECORD

FROM: Commanding Officer, PACOM Joint Intel Ops Center, J2 (Intelligence), United States Pacific Command, CAMP H M SMITH, HI 96861-4031

TO: Commander, Deputy Commander, and Chief of Staff, USPACOM

Subject: Analysis of Trends in Accelerated Chinese Nuclear Weapons Program.

- I. This memorandum identifies and outlines trends in China's pursuit of a strategic nuclear weapons capability, which recent open- and closed-source intelligence confirm.
- II. Nearly twenty years after the Beijing Olympics, China is a great power in both a regional and global context. The expansion of China's economy has enabled Beijing to acquire vast currency reserves, allowing it to pursue strategic, economic, and domestic initiatives, as well as increasing the PRC's leverage internationally.
- III. China's military strength, unwillingness to acknowledge any historical or self-determinist claims against its territorial integrity, and the contribution of rising living standards to Beijing's emphasis on class ties over religious or ethnic identities, have overshadowed tensions in Tibet and Xinjiang. The government's crackdown on protests and willingness to compensate some individuals for their grievances, especially in urban economic centers, has mitigated most instances of political dissent.
- IV. Within Asia, South Korean and Japanese political parties continue to demand the decreased basing and presence of U.S. military personnel on their soil. The land-based U.S. military footprint in the Western Pacific has been minimized to Guam, with residual forces in Japan and South Korea. Both of these countries desire some U.S. presence in their territories to serve as a security guarantee against China, but the deployed forces are only credible as forward deployed command and control structures, not major combatant commands.
- V. Additionally, the U.S. military has adopted a "soft power/nation building" mantra, and, although conventional doctrine and training are still conducted, the U.S.

Nuclear Weapons

military's emphasis on nation building, humanitarian aid, and "operations other than war" have diminished its ability to fight major, state-on-state strategic war.

VI. Noticing these trends, Beijing has moved to bolster Chinese strategic nuclear forces in order to achieve a Mutually Assured Destruction (MAD) capability against the United States. The Chinese are asserting themselves in a strategic nuclear context, thereby increasing their capability to address and act on issues, such as (1) Taiwan, (2) entering and stabilizing a collapsed North Korea, and (3) contemplating a major strategic rivalry with the United States, akin to the U.S.-Soviet rivalry during the Cold War.

Analysis of the scenario

Scenario 1 focuses on the development of a strategic rivalry between the United States and China, which includes China's attempt to achieve a Mutually Assured Destruction (MAD) capability. This outcome would overcome the nuclear primacy that the United States currently possesses. The scenario assumes that Chinese pursuit of MAD will alter the current U.S.-China strategic balance and force the United States to confront difficult choices in determining how the United States would react to a Chinese effort to increase the size and capability of its nuclear weapons arsenal.

Using key trends of global transformation identified by the National Intelligence Council, Scenario 1 highlights four:

- Impact of new players;
- Globalizing economy;
- Technological change; and
- Multipolarity without multilateralism.

Impact of new players

Scenario 1 focuses on China, which the National Intelligence Council identifies as the most important emerging great power.² As Scenario 1 suggests, China's decision to pursue a MAD capability would be a "game changer" in the strategic relationship between the United States and China. The impact of China achieving MAD would be felt systemically and regionally.

Systemically, Chinese nuclear parity with the United States would signal the end of U.S. nuclear primacy and intensify all aspects of the U.S.-China rivalry, including in terms of conventional military power. This intensified rivalry would affect other existing or emerging great powers, such as Russia and India, which would pursue their interests by maneuvering in the seams of the U.S.-China rivalry. In short, the intensified U.S.-China rivalry sparked by China achieving MAD capabilities would "heat up" multipolarity and

Nuclear Weapons

make it more fluid. Creating these systemic effects may be a Chinese objective in reaching MAD status because it reduces the ability of the United States to dominate the international system and frees up more political space for China to pursue its global interests. On the other hand, an agitated multipolar system may be less stable and more dangerous for all the great powers, but especially the United States and China.

Regionally, the impact of China's development of a MAD capability would affect three issues. First, it would affect the conditions informing U.S. conventional military power in the Asian region. Although Scenario 1 indicates that, by 2025, the United States will have lost some of its ability to fight conventional war, the United States will remain a major conventional military power in Asia in 20 years. The United States will continue to have a major naval presence in the Pacific, including nuclear carrier groups and attack submarines. The United States will perhaps also have deployed refined anti-satellite capabilities, as well as means to find and destroy mobile launch platforms. Additionally, the United States will probably have developed advanced anti-submarine capabilities.³ China's move to MAD may trigger concerns that U.S. conventional military capabilities in Asia need to be reinforced in order to provide additional conventional deterrence against potential Chinese military activities.

These concerns would connect to the second regional issue Chinese MAD capabilities would affect—political trends in northeast Asia. Scenario 1 describes a reduced U.S. military presence in Japan and South Korea because of opposition in those countries to U.S. bases and troops. This trend may have informed the Chinese decision to pursue a MAD capability in the scenario—as a signal to Japan and South Korea to seek a closer strategic and political relationship with China rather than the United States. This signal would be stronger if North Korea is no longer viewed in 2025 as a credible threat to Asian security, necessitating less U.S. presence in northeast Asia. Conversely, South Korea and Japan could perceive the advent of an increasingly powerful China as a reason to continue to need, or even increase, U.S. military presence on their soil, thus reversing the trend the scenario envisions leading up to 2025.

Third, the impact of China's achievement of MAD with the United States would affect calculations concerning unresolved territorial disputes in Asia, especially concerning Taiwan. Under the scenario, the balance of conventional and nuclear forces in Asia has shifted away from the United States towards China, perhaps increasing China's willingness to risk conventional war to settle the Taiwan issue or other territorial disputes it has. The bet would be that the United States would not risk nuclear war with China over Taiwan once China achieves MAD status. This incentive could be another factor influencing China's decision to go for MAD. However, there is no precedent for determining the escalation risks of two established nuclear powers fighting a conventional war.⁴

Nuclear Weapons

Globalizing economy

A second key driver of global transformation informing Scenario 1 is China's continued development as a powerful, globalized economy. This scenario assumes that China will continue practicing "state capitalism"⁵ successfully. China will have increased global economic flexibility with the advent of sovereign wealth funds (SWFs) and increasing involvement in the global economic system.⁶ China's accumulated wealth and financial resources will allow it to pursue costly, capital intensive programs, including the robust nuclear triad China would need to achieve MAD. China's importance to the global economy will also make it less vulnerable to political and economic sanctions by countries upset at the expansion of its nuclear capabilities.

In order to maintain its dynamic economic growth through 2025, China will need to expand access to raw materials and fossil fuels. To achieve such access, China will use its wealth, perhaps through its SWFs, to invest in supplies of strategic natural resources (e.g., in Africa). In addition, China will have to focus more on geostrategic access and transportation issues to keep these resources flowing safely to China. In particular, energy security will be a key imperative in Chinese economic and strategic doctrine.⁷ Therefore, China will need to protect its shipping lanes, a need that will push the Chinese to create a blue water naval capability.

Technological change

A third key driver of change that will be important to China's achievement of a MAD capability is technological change. To get to MAD from its present nuclear posture, China will have to make significant technological advances, including upgrading their early warning networks.⁸ With its economic resources, access to global markets for technologies, and increasing number of universities and research, and development facilities, China should have the capability to make technical advances in their nuclear forces "in house", and will not have to rely on external assistance to modernize their forces. This situation will make China less vulnerable to export controls on sensitive technologies that the United States or other countries could impose. In an effort to impede China's nuclear efforts.

Multipolarity without multilateralism

The final driver of transformative change relevant to Scenario 1 involves the weakness of international regimes in a context of multipolarity. The scenario envisions China's attempt to achieve MAD capability occurring without reference to any multilateral arms control regime or bilateral agreement between the United States and China.

The most relevant agreement would be the Nuclear Non-Proliferation Treaty (NPT), and non-nuclear States Parties to the NPT could allege that China's effort to achieve MAD with the United States violates the commitment of nuclear States Parties to engage in

Nuclear Weapons

disarmament. Such NPT claims in an international system characterized by multipolarity and State interest in retaining, expanding, or obtaining nuclear capabilities will be ineffective. In terms of bilateral agreements (e.g., U.S.-Russian arms control treaties (START)), the United States and China currently do not have bilateral arms control agreements, largely because China's nuclear arsenal is miniscule compared to that of the United States. But Scenario 1 envisions China's interest in MAD as being constrained by such agreements in the future. Appeals to the UN Security Council about China's nuclear ambitions would go nowhere because China is a permanent member of the Security Council and possesses veto power over any Security Council resolution.

Policy implications of scenario 1 for the United States

A Chinese attempt to attain MAD vis-à-vis the United States would have extremely high impact on the United States, U.S. allies, the international system, and international institutions. Therefore, Scenario 1 raises a host of policy implications for the United States.

First, the scenario describes one potential development in an increasingly multipolar system where global rivals move to check U.S. power and influence. In such a system, how the United States would respond to China's move, and with what support from other powers, is not clear. In a multipolar world, other major players will act in their own self-interests, meaning they will probably play China and the United States against each other. The stability of a strategic dyadic rivalry between China and the United States in a multipolar world is difficult to ascertain. The United States will probably experience, however, less political influence and more uncertainty and instability in a multipolar system affected by Chinese efforts to achieve MAD capabilities.

Second, a Chinese move to MAD would affect the U.S. policy of extended deterrence in Asia.⁹ Historically, the U.S. nuclear umbrella removed Japanese and South Korean incentives to develop their own nuclear arsenals. The Chinese achievement of a MAD capability might make Japan and South Korea worry about the credibility of the U.S. nuclear umbrella, but China's action does not necessarily mean Japan and South Korea would seek their own nuclear capabilities. A Chinese MAD capability would, however, necessitate that the United States, Japan, and South Korea engage constructively on security matters to preserve strategic flexibility in Asia.

Third, Scenario 1 does not indicate that U.S. moves concerning strategic missile defense or its nuclear arsenal factored into China's decision to go for MAD. However, U.S. policy decisions in these realms could be factors in Chinese nuclear thinking in the next 20 years. For example, U.S. attempts to preserve its nuclear primacy by modernizing its nuclear weapons (e.g., Trident II missiles, land-based missiles, strategic bombers) and by building strategic missile defense systems¹⁰ would increase the "primacy gap" China would have to overcome in order to achieve a MAD capability and perhaps deter Beijing from making the attempt. By contrast, efforts to upgrade U.S. nuclear forces and build

Nuclear Weapons

strategic missile defenses could convince China that it must achieve MAD status (e.g., by building larger, more dispersed nuclear forces, pre-delegating launch authority, and adopting a rapid retaliatory doctrine) in order not to be vulnerable to U.S. nuclear primacy in a multipolar world.¹¹

Fourth, a Chinese move to MAD would create questions about how the United States wants to shape its economic relationship with China. Unlike the situation during the Cold War, where the United States and the Soviet Union had no serious economic relationship, China and the United States will likely continue to have a major trading and investment relationship. Thus, a nuclear standoff between China and the United States could have serious consequences for the two countries and the global economic system. How two great powers that are economically interdependent would maintain their economic relationships during a nuclear rivalry is not known because no precedents for this scenario exist.

Fifth, Scenario 1 raises questions about whether and when the United States should pursue arms control agreements with China. The need for U.S.-Chinese arrangements is only now being discussed (e.g., creation of Confidence Building Measures and installation of a nuclear “hotline” between Beijing and Washington).¹² But, as the world moves into multipolarity, the need will get more serious but the political conditions for striking agreements will get more difficult.

Sixth, China’s pursuit of a MAD capability raises problems for the U.S. need to have China’s assistance in addressing threats of nuclear proliferation. China will play a central role in the future of proliferation issues. It is a historical rival with Russia; it is a rival with India; and it has had a strategic nuclear partnership with Pakistan. China might seek a MAD relationship with the United States before engaging more deeply in the non-proliferation effort.¹³

In such a situation, the United States would have to reexamine its China policy and calculate which is more important: (1) leading global efforts for non-proliferation and disarmament, (2) attempting to maintain nuclear primacy, or (3) preparing for nuclear rivalry with China. Conversely, Chinese efforts to achieve MAD capabilities will weaken China’s credibility as a country concerned about nuclear weapons and their proliferation.

Nuclear Weapons

3.3 Scenario 2: A Nuclear Middle East: Iran and Regional Conflict¹⁴

Letter from the Saudi Foreign Minister to the U.S Secretary of State

October 27, 2019

To the Secretary of State:

My government would like to share its concerns about an intelligence briefing to the U.S. national security team last week. According to the *New York Times*, the U.S. intelligence community briefed that it believes “with moderate-to-high confidence that Iran now has enough uranium-enrichment capacities to build nuclear weapon.” Our intelligence services concur this analysis.

This agreement proves that, despite sanctions and efforts to limit nuclear proliferation, Iran finally reached its objective of obtaining credible offensive nuclear capabilities. These revelations put an end to the Council of Ayatollahs’ claim that Iran’s enrichment program had always been exclusively for peaceful purposes.

We are also troubled by Israel’s reaction to the development of Iran’s nuclear weapons program. Although Tel Aviv still has not officially recognized it has a nuclear weapons program, Israel has undertaken improvements of its nuclear program to counter Iran.

These developments force us to reconsider our position towards non-proliferation efforts. In the past, the Nuclear Non-Proliferation Treaty (NPT) was an effective regime concerning nuclear proliferation. However, the Iranian case reveals the problems plaguing the NPT, leaving it unable to monitor and prevent non-compliance. All non-proliferation efforts Saudi Arabia has supported in the last 20 years in the Middle East have failed. Now, the Middle East will never become a Nuclear-Weapons-Free Zone.

Our government has concluded that Iran’s nuclear weapons pose an existential threat to Saudi Arabia, and we will take new measures to defend our nation. Saudi Arabia has always been grateful for U.S. military protection from regional threats. As a consequence, our government is asking for security assurances from our U.S. partner. However, if nuclear proliferation continues in the region, our government will be open to any option, including the development of our own nuclear weapons program.

Sincerely,

Prince Saud al-Asad

Foreign Minister

Nuclear Weapons

Analysis of the scenario

Scenario 2 envisions the development of Iranian nuclear weapons beginning a process of nuclear proliferation, and potentially conflict, in the Middle East. The scenario depicts Iran finally crossing the nuclear weapons threshold, triggering concerns from Saudi Arabia and Israeli moves to improve its nuclear arsenal. Israel's reaction indicates that Iran and Israel remain bitter enemies, with Iran perhaps continuing to use Hamas and Hezbollah as proxies to attack Israel. Iran's nuclearization occurs during political struggles involving domestic problems with its growing youth population and its moderate factions. Iran's decision to cross the nuclear threshold may also be related to its increasing isolation (created by years of economic sanctions and hostile relations with the West and neighboring countries) and its desire to emerge as a regional hegemon.

In the scenario, Saudi Arabia asks for U.S. security guarantees against Iran, which, if not provided, will mean Saudi Arabia will pursue its own nuclear program. The Iranian nuclear capability and the Saudi pursuit of nuclear weapons would probably mean Egypt and Syria would become more interested in getting their own nuclear weapons. In such a context, Israel would become increasingly concerned, and consider pre-emption rather than defense as a response to emerging threats. Israeli pre-emptive strikes could escalate into regional conflicts and crises. The scenario offers a glimpse into the Middle East on the precipice of a nuclear arms race and regional conflict—with the United States in the eye of the storm.

For this scenario, the key trends are:

- Impact of new players;
- Globalizing economy;
- Scarcity in a world of plenty;
- Demographics of discord; and
- Multipolarity without multilateralism.

Impact of new players

Scenario 2 focuses on the tremors a nuclear-armed Iran could send through the Middle East and the international system. It depicts an Iran able to survive efforts by the United States and other countries to prevent its acquisition of nuclear weapons, revealing resilience in the Iranian political system that allows it to emerge as a member of the nuclear club. The emergence of a nuclear-armed Iran will deepen the world's move into multipolarity, and many countries, not just the United States and Saudi Arabia, will have to re-think and perhaps re-adjust their policies towards Iran.

Nuclear Weapons

The scenario also envisions the possibility of Saudi Arabia considering becoming a nuclear-armed state, which would elevate it to a new level of importance in the Middle East and international politics. Saudi Arabia's oil power (perhaps heightened by 2025—see below) would give it leverage over States, including the United States, if it threatened to “go nuclear” if it did not get security guarantees against Iran. Such a development would deepen the nuclearization of multipolarity and perhaps create heightened instabilities in the Middle East and beyond.

Globalizing economy

Iran's abundant fossil fuels and its proximity to the strategic Straits of Hormuz place it at the center of gravity of the oil-fueled global economy. As long as globalized economies rely on fossil fuels, Iran will have leverage vis-à-vis oil-dependent States, and will have capital to devote to nuclear weapons development. The same features of the global economy would facilitate Saudi Arabia's ability to access the nuclear technology it would need to pursue a nuclear weapons capability.

The open nature of the global economy will allow Iran to continue to exploit loopholes in export controls to obtain nuclear technology it cannot develop. In the past, experts believe that Iran participated in the illicit exchange of nuclear materials through Pakistan's nuclear black market, headed by A.Q. Khan.¹⁵ Iran remains active in the international nuclear black market and has built an extensive procurement network to evade export controls.¹⁶ In addition, Iran's proximity to Dubai enables it to access weak import/export trading centers, which have historically served as proliferation hubs.¹⁷

Scarcity in a world of plenty

Scenario 2 suggests that the world has not made a fundamental energy transition away from fossil fuels by 2025, which is consistent with doubts that a breakthrough in energy technologies will have occurred and be integrated globally by that date.¹⁸ Such a breakthrough could have profound adverse consequences for Iran and Saudi Arabia as leading petro-powers,¹⁹ and perhaps make “Iranian leaders . . . more willing to trade their nuclear policies for aid and trade.”²⁰ In the absence of such a breakthrough, Iran's perceived future needs for alternative sources of energy, such as nuclear power, may factor into Iran's calculations as a justification for its nuclear activities. Thus, in the scenario, scarce natural resources—oil and natural gas—provide Iran and Saudi Arabia with heightened political and economic power to pursue their respective national interests, which would exacerbate the complexities and dangers of multipolarity.

Demographics of discord

Another factor that may stimulate Iran's pursuit of a nuclear weapon over the next 20 years is demographic trends within Iran. Iran's total population is expected to grow from 66 million today to 77 million by 2025, which will include a “youth bulge” entering the 15-24 age group.²¹ Experts differ as to whether these demographic trends will favor

Nuclear Weapons

hard-line politics or more moderate attitudes in the population. Division in the population over the wisdom of going nuclear may stimulate hard-line elements in Iran to push for crossing the nuclear threshold. Another possibility is that the Iranian nuclear program will find general support across demographic sectors because of the security benefits it produces (e.g., deterrence of enemies) and the influence it brings Iran as another Islamic member of the nuclear club.

Multipolarity without multilateralism

Scenario 2 also reveals how the emergence of multipolarity in international relations may contribute to the dilemmas revealed in Saudi Arabia's letter to the United States. Saudi Arabia's criticism of the NPT and the Middle East's Nuclear-Weapon-Free Zone, its appeal to the United States for a security guarantee, and its threat to pursue a nuclear weapons program if a U.S. guarantee is not made paint a grim picture of international governance of nuclear proliferation in 2025. Iran's crossing of the nuclear threshold also suggests that the great powers, including the United States, China, Russia, India, and European nations, were not able to cooperate effectively to keep Iran from going nuclear. This outcome would reflect Iran's ability to play the competing great powers off each other to preserve its space for action. Its oil and natural gas resources would give it the "petro card" to play in seeking support or threatening adversaries.

The scenario suggests as well that diplomatic efforts to assuage Iranian security concerns about the United States and Israel failed, if any were made at all. Iran might feel compelled to move towards a nuclear posture if it believed that the United States continues to pose an existential threat through its regional advantage in conventional forces and possession of nuclear weapons. In all likelihood, the United States in 2025 will maintain significant military assets in the Middle East, as well as numerous naval assets operating in the Indian Ocean, Persian Gulf, and the Mediterranean Sea. Continued U.S. dependence on oil, commitments to Israel, and other security interests in the region (e.g., Iraq, Afghanistan) will ensure that the United States retains a formidable military presence in the Middle East. Iran might well conclude that a nuclear arsenal is the sole credible deterrent against U.S. or Israeli military strikes.

In addition, the complexity and difficulty of achieving effective multipolar multilateralism against nuclear proliferation would also appear with respect to Saudi Arabia's threat to go nuclear if it does not get a U.S. security guarantee. Rival great powers could compete for Saudi Arabia's favor, which might involve China taking on the role of mediating Saudi-Iranian relations in order to displace the United States as a power broker in the Middle East.

Policy implications of scenario 2 for the United States

Scenario 2 presents implications for U.S. policy makers beyond whether the United States should provide Saudi Arabia with the security guarantee it seeks. The scenario envisions the failure of decades of U.S. efforts to prevent Iran from going nuclear,

Nuclear Weapons

whether those efforts were made within the UN Security Council, the NPT, regionally, bilaterally, or unilaterally. In short, the scenario presents a “worst case” outcome for the United States.

Thus, the scenario contains incentives for the United States to re-think its approach to the threat of Iranian nuclearization and its grim consequences for the Middle East and the world. Re-thinking U.S. strategies towards Iran in the next stage of their relations has to keep in mind the predictions of diminishing U.S. influence and the increasing difficulties of multilateralism in multipolarity. With this caveat, we present some policy options the United States could consider with respect to preventing the nightmare scenario outlined above:

U.S.-Iranian participation in existing non-proliferation regimes

- *Seek U.S. and Iranian ratification of the NPT's Additional Protocol:* The United States could ratify the additional protocol of the NPT, which establishes an improved monitoring system (including snap inspections of nuclear facilities by IAEA experts), and encourage Iran to do the same.²²
- *Push for U.S. and Iranian ratification of the Comprehensive Test Ban Treaty (CTBT):* The United States could ratify the CTBT, which it refused to do in 2001, and encourage Iran to do the same.²³ This U.S. diplomatic move would blunt Iran's criticism of U.S. nuclear policy and could be considered a confidence-building measure to reassure Iran on U.S. intentions. Getting Iran to agree not to conduct nuclear tests would help ensure Iran did not cross the nuclear threshold.

New diplomatic and governance initiatives

- *Support development of a multilateral system for civil nuclear fuel production and transfer (Global Nuclear Energy Partnership):* The United States could promote a multinational approach to civil nuclear fuel production and invite Iran to participate in the system. The multilateral mechanism could control circulation of highly enriched uranium in civil commerce and would bring government and industry together to share the best practices and increase security for nuclear materials.²⁴ Finally, this system could create an international nuclear fuel bank to serve as a last-resort fuel reserve for nations that make a sovereign choice not to build indigenous nuclear fuel capabilities.
- *Support a multi-nation negotiation process with Iran and make progress on the Israeli-Palestinian problem:* The United States and its allies could engage Iran in

Nuclear Weapons

cooperation on their shared interests in Iraq, Afghanistan, and the wider Middle East. Additionally, sustained progress on Arab-Israeli peace that would limit Iranian-Syrian ties, weaken Iran's sub-state proxies (Hamas and Hezbollah), and create incentives for Iran to adjust its regional role.

U.S. actions

- *Direct negotiations with Iran:* The United States could engage Iran in direct negotiations²⁵ and offer assurances relating to Iranian sovereignty by rejecting regime change as a U.S. policy goal.²⁶ Economic incentives (e.g., support for Iran's admission to the WTO) could supplement the non-aggression assurances.
- *Security assurances for regional allies:* The United States could offer credible, pre-emptive security assurances to regional States potentially threatened by an Iranian nuclear capability. Israel will continue to have security guarantees from the United States, but Saudi Arabia and Egypt will perceive Iran's development of nuclear weapons (or a latent weapons capability) as an existential threat. The United States could offer these countries security guarantees before Iran crosses the nuclear threshold.
- *Strengthen U.S. counter-proliferation efforts:* The United States could strengthen its counter-proliferation efforts by increasing sanctions on companies or countries that assist Iranian proliferation efforts and by expanding the scope and effectiveness of the Proliferation Security Initiative.²⁷

3.4 Scenario 3: Los Angeles Shattered—Nuclear Terrorist Attack against the United States

Office of the Director of National Intelligence—President's Daily Brief

November 9, 2012, 8am

The CIA has received unconfirmed reports that security has been breached at the Urals Electrochemical Combine (UEKhK) facility (formerly Sverdlovsk – 44) in Russia, and that a cache of low-yield (.5 - or 1-kiloton) nuclear devices has been missing since October 13, 2012. The FSB has denied that there has been a security breach at the UEKhK facility. The Russian President's Office has also denied the breach-of-security reports, and has declined to make further comments on the issue.

Nuclear Weapons

Office of the Director of National Intelligence—President’s Daily Brief

December 14, 2012, 8am

CIA operatives in Russia have received plausible, but unsubstantiated, information that a suspect container has been loaded on a U.S.-bound ship in the Russian port of Vladivostok on December 9, 2012. Although the CIA has received the information through a channel that has provided reliable intelligence in the past, the specific details regarding the identity and the exact U.S. destination of the cargo-ship are not known.

Office of the Director of National Intelligence—President’s Daily Brief—Special Memo

December 24, 2012, 1pm

A powerful blast occurred at around 11am (ET) today in downtown Los Angeles in what appears to be a terrorist attack with a low-yield nuclear device. Several dozens casualties have been reported, and buildings within a .25-mile radius have been shattered. There are confirmed reports of radiological materials in the blast area. The FBI has confirmed that anonymous calls were made to CNN claiming that similar bombs will be detonated in major U.S. cities. FEMA and mayors are considering plans for mass evacuations in some major urban areas. Economic and social activities are at a standstill. Airports have been closed and are beginning evacuation procedures. The FBI is investigating every lead related to the blast and the phone calls received by CNN.

Analysis of the scenario

Scenario 3 highlights that nuclear terrorism will remain a serious threat to U.S. national security in the years ahead. In the scenario, terrorists manage to acquire low-yield nuclear bombs from a Russian nuclear site that lacks adequate security measures.²⁸ After acquiring these weapons, terrorists transport them to U.S. territory in cargo-containers, detonate them in a major U.S. city, create havoc, and disrupt social and economic activities. The terrorist group threatens more attacks. As a consequence, the United States is paralyzed, and aftershocks reverberate throughout the world.

The scenario envisions that terrorists interested in nuclear attacks would more likely steal nuclear material than attempt to build weapons themselves. Making nuclear devices will remain demanding, and, unlike in the chemical and biological weapons areas, technological change is unlikely to lower these barriers measurably in the next 20 years because the main impediment will continue to be access to fissile material.²⁹ Thus, terrorists would, more realistically, try to steal or acquire a low-yield nuclear device made from highly enriched uranium (HEU) or plutonium.³⁰

Nuclear Weapons

The scenario's depiction of a terrorist attack with a stolen low-yield nuclear weapon is plausible because many nuclear sites remain improperly secured and vulnerable to intrusions,³¹ nuclear theft of HEU and weapon-grade plutonium is an ongoing threat,³² and Russia still has not accounted for the whereabouts of several low-yield nuclear devices in its arsenal.³³

For Scenario 3, the key trends of global change identified by the National Intelligence Council are:

- Impact of new players;
- Globalizing economy;
- Scarcity in a world of plenty; and
- Multipolarity without multilateralism.

Impact of new players

Scenario 3 identifies Russia as a key actor because it is the site of the theft of the nuclear devices. The National Intelligence Council identifies Russia a key player as the world moves towards 2025.³⁴ The Council's analysis suggests a future captured in this scenario—a Russia failing to realize its potential because it continues to be plagued by political, economic, and social problems—including “crime and corruption.”³⁵ In the scenario, several low-yield nuclear devices are stolen in, transported across, and shipped out of Russia. The scenario envisions Russia lacking full control over security assets in its territory and vulnerable to well-organized criminal or terrorist groups.

The scenario describes a situation in Russia not too far removed from the contemporary situation in Russia. Russia continues to store and secure thousands of low-yield nuclear weapons inadequately, making the possibility that Russian nuclear weapons or fissile material could be stolen a serious concern for U.S. national security.³⁶ Scenario 3 also suggests that U.S. bilateral efforts to help Russia secure “loose nukes” (e.g., Cooperative Threat Reduction Program) proved ineffective (see more below).

The scenario focuses on Russia, but similar threats could arise from other States that have weak or decaying governance capabilities, rendering their military or civilian nuclear materials vulnerable to theft. Potential regime collapse in Pakistan or North Korea could facilitate theft or smuggling of nuclear material, which will increase the prospect of nuclear terrorism. The decay of governance capabilities in Pakistan could produce a new A.Q. Khan-style nuclear smuggling network, which would increase the likelihood of terrorists acquiring nuclear devices or materials. In addition, security at many HEU-fueled research reactors around the world is poor. Many of these places are secured by nothing more than a chain-link fence and a guard, so, without more security, they remain potential sources for nuclear material smuggling or theft.³⁷

Nuclear Weapons

Globalizing economy

Another global trend relevant to Scenario 3 is the globalizing economy, which fuels the global dissemination of nuclear-related technologies and know-how and makes State borders more permeable and harder to monitor. Globalization helps spread nuclear technologies and materials because they are in demand for peaceful, civilian purposes. Increasing interest in expanding nuclear energy because of the dangers of dependence on oil (see below) or a desire to reduce greenhouse gas emissions will likely, in the next 10-15 years, create larger markets for nuclear know-how, technologies, and materials. Economic globalization also permits nuclear scientists to seek employment in other countries or offer their services to “the highest bidder.”³⁸ Consequently, increasing technological diffusion and the spread of scientific knowledge increase the likelihood that dangerous capabilities will come closer within terrorists’ reach.³⁹ This problem, combined with poor security for fissile material in key countries, lowers the barriers terrorist groups face when seeking what they need to undertake nuclear terrorism.

The globalized economy also tends to reduce barriers to the movement of people and goods, creating increasingly porous State borders. This environment offers improved prospects for trafficking in nuclear material and the illicit transportation of low-yield nuclear devices (up to 1 kiloton),⁴⁰ which can be small enough to fit into a suitcase. Moreover, in a globalized world, large amounts of goods are transported daily in cargo containers, which makes the detection of small nuclear devices very difficult.

Scarcity in a world of plenty

A third trend Scenario 3 implicates is the likely increase in interest in nuclear energy as part of efforts to shift to alternative energy sources and away from fossil fuels.⁴¹ Much of the new demand for nuclear energy will come from developing countries seeking rapid economic growth and ways to reduce their dependence on foreign sources of energy. The spread of nuclear expertise and material to meet this demand will raise proliferation concerns and fears about the security and safety of fissile material.

Multipolarity without multilateralism

The terrorist attack envisioned in Scenario 3 connects to the global trend of multilateral governance becoming more difficult as the world moves into multipolarity. The scenario suggests that efforts to secure Russian nuclear weapons and materials failed to prevent theft of low-yield nuclear devices. Since the end of the Cold War, the United States has participated in a number of bilateral and multilateral initiatives to help Russia and other nations secure nuclear weapons and materials. See Box 3.1. Despite some successes, most of these programs suffer from a lack of urgency, inefficient oversight, unrealistic expectations, and inadequate interagency collaboration.⁴² Projecting them into a future characterized by increasing multipolarity—a context that makes effective multilateral actions more difficult and in which U.S. influence is diminished—underscores the plausibility of Scenario 3.

Nuclear Weapons

Box 3.1 Initiatives Used to Help Russia and Other Countries Secure Nuclear Weapons and Materials

- The Nunn-Lugar Cooperative Threat Reduction Program (CTR), launched in 1991, is the most comprehensive framework targeted at dismantling and securing weapons in the Former Soviet Union (FSU).⁴³
- The Materials Protection, Control, and Accounting Program (MPC&A), launched in 1997, aims to perform security upgrades at Russian nuclear sites.⁴⁴
- The Global Threat Reduction Initiative (GTRI), launched in 2004, is aimed at limiting terrorist access to fissile and radiological material.⁴⁵
- The Bratislava Initiative (BI), launched in 2005, is targeted at enhancing joint emergency response capabilities to deal with nuclear or radiological attacks.⁴⁶
- The Global Initiative to Combat Nuclear Terrorism (GICNT), launched in 2006, aims to build an international capacity to prevent, defend against, and effectively respond to nuclear terrorism.⁴⁷

Scenario 3 also illustrates that existing multilateral initiatives, such as the Proliferation Security Initiative (PSI), UN Security Council Resolution 1540 (UNSCR 1540), and the Global Nuclear Energy Partnership (GNEP),⁴⁸ also failed in preventing a nuclear terrorist attack against the United States.⁴⁹ The plausibility of the scenario is reinforced by the existing gaps in these efforts. First, PSI was launched in 2003 to stem the flow of illegal traffic in WMD materiel. PSI has had limited success because: (1) some countries have questioned PSI's legality under international law; (2) PSI only enters the picture late in the "proliferation delivery chain;" and (3) some nations (e.g., China) consider PSI discriminatory and corrosive of other multilateral treaties.

Second, UNSCR 1540 requires states to enact and enforce security measures to prevent WMD materiel from falling into the hands of non-State actors. This mandate lacks financial backing to help countries meet the mandate, and suffers from a lack of Security Council enforcement.

Third, GNEP's goal of encouraging commercial reprocessing and recycling of plutonium has been faulted with increasing rather than decreasing nuclear theft and nuclear proliferation risks throughout the entire world.⁵⁰

Finally, Scenario 3 also illustrates the complexity and difficulty of constructing effective multilateral solutions in multipolarity when sophisticated and powerful networks of terrorists and criminals operate transnationally, free riding on the pathways of economic globalization for malevolent purposes. These networks can, and will

Nuclear Weapons

increasingly, prey on the weaknesses of States, whether that involves stealing inadequately protected nuclear materials or operating from ungoverned spaces in failing or failed States.

Policy implications of scenario 3 for the United States

Scenario 3 focuses U.S. policy makers on how the United States can better protect itself against nuclear terrorism over the next 10-20 years. This challenge is not new because nuclear terrorism has worried the U.S. government for many years, as evidenced by all the initiatives the United States has undertaken or supported to diminish the risk of nuclear terrorism or to prepare for the consequences of a nuclear terrorist attack. As with seeking to reduce the likelihood of chemical or biological terrorism, succeeding against the threat of nuclear terrorism has no “silver bullet” solution. Instead, this task will have to involve U.S. government action across a wide spectrum of activities involving many countries, organizations, and non-State actors. There is no shortage of policy ideas in this realm—some are new, and some represent “more of the same.” However, many existing polices need to be executed more effectively. See Box 3.2.

Box 3.2 Policy Options for the U.S. Government with respect to Nuclear Terrorism

- Building with Russia, China, India, and the EU a comprehensive global alliance to combat nuclear terrorism that would rely on sharing of information, expertise, and technology for monitoring the traffic of nuclear armaments, nuclear material, and radiological material.
- Strengthening GTRI by including programs aimed at securing nuclear materials and radioactive sources located at civilian research reactors.
- Building international police and intelligence cooperation on nuclear smuggling around the world.
- Building international consensus for a “beefed up” UNSCR 1540 that provides for the enactment and enforcement of national laws that make nuclear/radiological theft and smuggling a national crime with penalties comparable to those for treason.
- Cooperating with foreign governments on installation of radiation detection equipment and associated infrastructure at the major ports throughout the world.
- Increasing satellite surveillance of nuclear facilities around the world.
- Increasing intelligence collection in areas suspected of nuclear smuggling.
- Upgrading security at U.S. nuclear sites.
- Strengthening the nuclear forensics effort.
- Improving cargo screening at all U.S. ports of entry.
- Improving preparedness to respond to a nuclear/radiological attack.

Nuclear Weapons

The United States struggled with reducing the risk of nuclear terrorism when it was the world's sole superpower and *de facto* hegemon. The move into multipolarity will not eliminate the need for U.S. leadership in this area, but it will diminish U.S. capacities to foster and sustain needed changes in the international system.

3.5 Conclusion on Nuclear Weapons

The three scenarios on nuclear weapons communicate that key global trends may increase the likelihood that the United States will have to confront challenges concerning nuclear weapons in the next 20 years. Although these challenges all involve nuclear weapons, the problems and the policy demands they produce are significantly different and require distinct political responses. Countering a Chinese move to MAD does little to improve U.S. national security against shadowy terrorist groups intent on causing nuclear mayhem in the United States. Securing "loose nukes" in Russia does not convince Iran to abandon its drive for a nuclear weapons capability. The United States must address each of these nuclear threats on its own terms, and do so, unfortunately, when the U.S. power and interests appear "to be heading toward a potentially more fragmented and conflicted world over the next 15-20 years[.]"⁵¹

Nuclear Weapons

Endnotes for Part 3

¹ See National Intelligence Council, *Global Trends 2025: A Transformed World* (Dec. 2008).

² *Ibid.*, p. 29.

³ Keir Lieber and Daryl Press, "End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security* (2006); 30(4): 29-30.

⁴ *Ibid.*, p. 32.

⁵ *Global Trends 2025, op. cit.*, pp. 8-9.

⁶ *Ibid.*, p. 10.

⁷ *Ibid.*, p. 51.

⁸ Lieber and Press, "End of MAD?", p. 22.

⁹ Secretary of Defense Robert Gates, "Nuclear Weapons and Deterrence in the 21st Century", speech given at the Carnegie Endowment for International Peace, October 28, 2008, p. 4, at http://www.carnegieendowment.org/files/1028_transcrip_gates_checked.pdf.

¹⁰ Lieber and Press, "End of MAD?", *op. cit.*, p. 28.

¹¹ *Ibid.*, pp. 10, 13.

¹² Gates, "Nuclear Weapons and Deterrence in the 21st Century," *op. cit.*, p. 11.

¹³ George Perkovich, "Principles for Reforming the Nuclear Order", IFRI, Fall 2008.

¹⁴ This scenario echoes analysis in *Global Trends 2025*, pp. 61-62, where the National Intelligence Council examines the possible implications of Iran's development of nuclear weapons.

¹⁵ David Montero, "Report: Pakistani Scientist A.Q. Khan Aided Iran," *Christian Science Monitor*, May 4, 2007.

¹⁶ For more information, see International Institute for Strategic Studies, *Nuclear Black Markets: Pakistan, A. Q. Khan, and the Rise of Proliferation Networks—A Net Assessment* (2007).

¹⁷ James A. Russell and Christopher Clary, *Globalization and WMD Proliferation Networks: Challenges to U.S. Security*, Conference Sponsored by the Advanced Systems and Concepts Office of the Defense Threat Reduction Agency at the Naval Postgraduate School, June 29-July 1, 2005.

¹⁸ *Global Trends 2025, op. cit.*, p. 46.

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ *Ibid.*, p. 26.

Nuclear Weapons

²² Iran signed the Additional Protocol on December 18, 2003, but has yet to ratify it. “Iran signs up to nuclear checks”, *BBC News*, Dec. 18, 2003.

²³ Although Iran is not a party to the CTBT, it had supplied data in the past to confirm it was not engaging in activities that would violate the treaty, but stopped doing so in 2002. “China, Iran Have Stopped Providing Complete Reports On Test Ban”, *UN Wire*, Mar. 12, 2002.

²⁴ This idea is one of the propositions of George Shultz, William Perry, Henry Kissinger, and Sam Nunn in their article “Toward a Nuclear-Free World,” *Wall Street Journal*, Jan. 15, 2008.

²⁵ The establishment of direct negotiations with Iranian leadership is a position supported by five former U.S. secretaries of State. See “Shut Jail, Ex-Diplomats Say”, *Los Angeles Times*, Mar. 28, 2008.

²⁶ Gates, “Nuclear Weapons and Deterrence in the 21st Century,” op. cit., pp. 5 and 14.

²⁷ Recently, the United States thwarted a suspect shipment from North Korea to Iran by persuading the Indian government to deny clearance for the North Korean flight to travel through Indian airspace. Glenn Kessler, “U.S. Efforts Divert Iran-Bound Cargo,” *Washington Post*, November 4, 2008. Although India is not a PSI partner, the incident reveals the counter-proliferation benefits of the cooperative PSI strategy.

²⁸ While Al Qaida remains the main terrorist organization susceptible of attempting to acquire nuclear capabilities, other groups on the U.S. Foreign Terrorist Organization (FTO) list such as Hezbollah, Hamas, Jemaah Islamiya, or Abu Sayyaf could conceivably contemplate resorting to nuclear attacks against U.S. citizens and interests at some point in the future. The FTO list is available at <http://www.state.gov/s/ct/rls/fs/37191.htm>.

²⁹ However, a National Research Council study stated that “the basic technical information needed to construct a workable nuclear device is readily available in the open literature. The primary impediment that prevents countries or technically competent terrorist groups from developing nuclear weapons is the availability of [special nuclear materials], especially HEU.” See National Research Council, *Committee on Science and Technology for Countering Terrorism, Making the Nation Safer: The Role of Science and Technology in Countering Terrorism* (2002), p. 40, at <http://www.nap.edu/catalog/10415.html>.

³⁰ Equally, if not more plausible, is for terrorists to obtain radiological materials for “dirty” bombs.

³¹ The November 2007 attack by four gunmen on the Pelindaba (South Africa) nuclear facility is a stark illustration of the vulnerability of many nuclear sites.

³² See the speech delivered by the IAEA Director-General, Mohamed Elbaradei, before the UN General Assembly on Oct. 27, 2008, at <http://www.iaea.org/NewsCenter/Statements/2008/ebsp2008n010.html>.

³³ See Graham Allison, *Nuclear Terrorism – The Ultimate Preventable Catastrophe* (2005), pp. 8-11.

³⁴ *Global Trends 2025*, op. cit., p. 31.

³⁵ *Ibid.*

Nuclear Weapons

³⁶ See *CRS Report for Congress – Nuclear Weapons in Russia: Safety, Security, and Control Issues* (Apr. 12, 2002), at <http://www.fpc.state.gov/documents/organization/9580.pdf>.

³⁷ See the *Testimony of Matthew Bunn for the Committee on Homeland Security and Governmental Affairs of the United States Senate* (Apr. 2, 2008), at http://hsgac.senate.gov/public_files/040208Bunn.pdf.

³⁸ The infamous Pakistani network led by A.Q. Khan is a telling example of nuclear scientists selling their expertise to the highest bidder.

³⁹ Nuclear know-how is spreading so rapidly that, according to some experts, the fabrication of at least a “crude” nuclear device is already within Al-Qaida’s capabilities *if* it could obtain fissile material. The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, *Report to the President* (2005), p. 276, at <http://www.wmd.gov/report/>.

⁴⁰ A 1-kiloton nuclear device (equivalent to 200,000 sticks of dynamite) exploded in a large city such as Los Angeles, New York, or Washington D.C. is likely to lead not only to significant destruction within an approximately .25-mile radius from the epicenter of the blast, but also to a high number of casualties. To visualize the consequences of a nuclear blast in a major U.S. city, see the information available at <http://www.nuclearterror.org/blastmaps.html>.

⁴¹ *Global Trends 2025*, op. cit., p. 42-44.

⁴² See also the report on nuclear terrorism published in September 2008 by the *Partnership For A Secure America*, at http://hps.org/hsc/documents/NUCLEAR_Terrorism_Report.pdf.

⁴³ For a detailed discussion of the CTR programs, see <http://www.dtra.mil/oe/ctr/programs/>. A Nunn-Lugar Scorecard is available at http://www.armscontrol.org/act/2004_03/Lugar.

⁴⁴ A detailed discussion about the MPC&A program is available at <http://www.nti.org/db/nisprofs/russia/forasst/doe/mpca.htm>.

⁴⁵ See Department of Energy, *Global Threat Reduction Initiative Highlights*, p. 1, at <http://www.energy.gov/media/ViennaGTRFactSheetFINAL1052604.pdf>.

⁴⁶ An overview of the goals of the initiative is available at <http://www.whitehouse.gov/news/releases/2005/02/20050224-7.html>.

⁴⁷ A quick overview of the GICNT objectives is available at <http://www.state.gov/t/isn/c18406.htm>.

⁴⁸ The text of the resolution is available at <http://daccessdds.un.org/doc/UNDOC/GEN/N04/328/43/PDF/N0432843.pdf?OpenElement>. Additional information on GNEP is available at <http://www.gneppartnership.org/>.

⁴⁹ Scenario 3 also paints a bleak picture of the effectiveness of the U.S. domestic institutions charged with defending the country against nuclear terrorism, such as the Domestic Nuclear Detection Office (DNDO), the National Counterterrorism Center (NCTC), the National Counterproliferation Center (NCPC), or the National Nuclear Security Administration (NNSA).

Nuclear Weapons

⁵⁰ See the *Testimony of Matthew Bunn for the U.S. Senate Committee on Energy and Natural Resources* (Nov. 14, 2007), at <http://energy.senate.gov/public/files/BunnTestimony111407.doc>.

⁵¹ *Global Trends 2025*, op. cit., p. 99.

Conclusion

The scenario-based analysis used in this report indicates that the United States will continue to face serious challenges concerning chemical weapons, biological security, and nuclear weapons in the next 20 years. The scenarios in all three WMD areas capture key global trends for 2025 identified by the NIC, suggesting that the global transformations the NIC anticipates appearing by 2025 will have significant impact on U.S. policy concerning WMD.

WMD-Specific Global Trends

Applying the NIC's global trends for 2025 to the various scenarios used in this report reveals that these trends may help to:

- Increase the motives of State and non-State actors to develop, obtain, enhance, or use WMD capabilities;
- Expand physical, economic, and technological access to the means of engaging in WMD activities—the materiel, know-how, and technical capabilities;
- Multiply opportunities for using or threatening to use WMD capabilities; and
- Deepen the vulnerabilities of national societies and the international community to WMD-related politics and activities.

Motives

Many scenarios in this report involved State or non-State actors seeking, enhancing, or using chemical, biological, or nuclear capabilities. Motives for this behavior are complex, but one aspect of increased motivations involves cost-benefit perceptions. If actors perceive that the political and economic “transaction costs” of moving to obtain, enhance, or use chemical, biological, or nuclear capabilities are trending lower, their interest in such capabilities might increase. A number of the global trends applied to our scenarios suggested that such transactions costs may well be on a downward trajectory (e.g., easier access to technologies in the globalized economy; diminishing political costs arising from ineffective multilateral regimes).

Means

A common theme across the chemical, biological, and nuclear scenarios is the projected expansion of State and non-State actor access to WMD capabilities. Such expanded access ranges from the development and global diffusion of new “dual use” technologies (e.g., chemical microreactors) to the increased physical availability of

Conclusion

weapon agents (e.g., more biotechnological labs working with pathogenic agents; more nuclear and radiological materials in use or storage). The increased accessibility occurs in both the licit and illicit contexts, giving transnational activity by non-State actors (corporations, terrorist groups, and organized crime) more traction than the contexts of the past when chemical, biological, and nuclear activities were less globalized and, thus, more within the control of national governments.

Opportunities

The impact of multipolarity appears across each WMD category and in each scenario analyzed, and one aspect of this prominence is the manner in which it opens political space for countries to maneuver not present in the rigid bipolar system of the Cold War or the hegemonic post-Cold War international system. Various scenarios depict States seizing opportunities to obtain, enhance, or use a WMD capability in some fashion (e.g., in armed conflict; for deterrence). Increasing opportunities to act in this fashion may well feature in a world characterized by multipolarity, and even more so by an unstable multipolarity agitated by transnational forces that may generate more traditional inter-State conflict and violence between States and non-State actors.

Vulnerabilities

The scenarios across all three areas also reveal frightening levels of vulnerabilities that societies have to the development, dissemination, and exploitation of WMD capabilities. Societal vulnerability is recognized today, and policy moves to address it with respect to chemical, biological, and nuclear threats represent a pillar of U.S. strategies against WMD. The global trends projected by the NIC, as applied to our scenarios, envision those vulnerabilities increasing rather than decreasing nationally and globally.

The Future of American WMD-Specific Policies

Our analysis found these WMD-specific global trends equally relevant to chemical, biological, and nuclear weapons. We did not attempt to determine from these findings whether one WMD threat posed greater dangers than another. In fact, our analysis of chemical weapons—the WMD category most often marginalized—suggests that the ability to develop and use chemical weapons in more limited ways may actually raise their threat profile compared to biological and nuclear weapons, which experts often perceive as more dangerous threats.

In addition, a few scenarios developed ways of looking at the WMD problem that suggest the policy challenges are not entirely addressed by specific non-proliferation or counter-proliferation policies nested inside each WMD category. The scenario involving nuclear proliferation triggering potential interest in biological weapons capabilities focused on a cross-category proliferation problem. The scenario in which China attempts to achieve MAD status did not involve proliferation of nuclear weapons, but described a return to nuclear strategy and rivalry between two great powers. The scenario focusing on the politics of pandemics depicted a security threat not involving

Conclusion

biological weapons but an outbreak of pandemic influenza, which put U.S. preoccupations with bioterrorism in a harsh light vis-à-vis the biological threats of greater likelihood and of greater concern to developing countries and potential rival States.

The four WMD-specific global trends described above move in the opposite direction from where U.S. and international policy has been trying to push WMD issues since the 1990s. Therefore, our analysis presents a rather sobering perspective on the prospects for the ability of the United States and multilateral collective action to affect these WMD-specific trends in constructive ways over the next 20 years.

At this point, skeptics of U.S. policy in the WMD arena might assert that the United States has, itself, manifested and fostered these very WMD-specific global trends by:

- Threatening “regime change” against suspected nuclear proliferators (e.g., North Korea and Iran) while signaling interest in retaining nuclear primacy by modernizing U.S. nuclear forces and building strategic missile defenses;
- Undermining multilateral efforts to strengthen the BWC while developing expanded, less transparent biodefense programs, partly designed to discover where new biotechnological advances could take biological weapons; and
- Failing to comply with CWC deadlines on chemical disarmament, and opposing CWC deliberations on chemical incapacitating agents while expressing interest in the potential uses of such agents.

This conclusion is not the place to enter into discussion of the controversies surrounding U.S. policies on WMD over the past 10-15 years. However, the thrust of the skepticism about the United States in the WMD realm serves as a warning that the United States is not a passive by-stander in terms of how global trends affect chemical weapons, biological security, and nuclear weapons in the next 20 years.

Even with more limited influence in a globalized multipolarity, the United States will remain a force with which to be reckoned in this realm. In addition to peering beyond the horizon of tomorrow to imagine how global trends may affect chemical, biological, and nuclear security, the United States needs to find clarity of purpose in how it wants to be reckoned with.

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