

## Preface

**T**he term weapon of mass destruction (WMD) describes munitions or other agents that have the capacity to kill and destroy on a massive scale. The phrase—first coined during the Spanish Civil War to characterize extensive German air raids—now generally refers to chemical, biological, radiological, and nuclear (CBRN) weapons.<sup>1</sup>

Relatively speaking, chemical and biological weapons are not new, but nuclear and radiological weapons are. Chemical “toxic fumes” were used by combatants in India as early as 2000 B.C. The first known use of biological warfare was in 1346 at Caffa (now Fedossia, Ukraine), where the bodies of Tartar soldiers who had succumbed to plague were catapulted over the walls of the besieged city.<sup>2</sup> The British were accused of distributing smallpox-infected blankets during the French and Indian War in North America, waged from 1754 to 1767. The use of mustard gas in World War I is well known. During World War II, the Japanese produced biological weapons and used them in 1942 at Congshan, China—the only confirmed air attack with biological weapons in modern history.<sup>3</sup> Iraq and Iran used chemical weapons during the Iran-Iraq war that stretched through the 1980s. For example, on March 16, 1988, approximately 5,000 civilians were killed and 10,000 injured when Iraqi air forces bombarded Halabja with mustard and other poison gases. Thirteen years after the attack, the people of Halabja still suffer from very high rates of cancer, neurological disorders, birth defects, and miscarriages.<sup>4</sup>

In June 1990, the Liberation Tigers of Tamil Eelam (LTTE) became the first group to use chemical agents in a guerilla campaign, when they attacked a Sri Lankan Army encampment in eastern Kiran with canisters filled with chlorine.<sup>5</sup> On June 27, 1994, the first modern act of chemical terrorism took place in Japan, when six members of the Aum Shinrikyo cult dispersed sarin nerve agent out of a van parked in a residential neighborhood of Matsumoto, killing seven people and seriously injuring 144 others.<sup>6</sup> Then on March 20, 1995, members of Aum Shirikyo used sharpened umbrella tips to pierce plastic bags filled with sarin onboard five trains converging at Tokyo’s Kasumigaseki station. Twelve people died and 1,039 were injured in what remains the largest nonconventional terrorist attack in history.

More recently, when Bob Stevens, a tabloid photo editor in Boca Raton, Florida, died of anthrax poisoning in the months following the 9/11 attacks, he became the first U.S. casualty in a new era of bioterrorism threats. In the days and weeks to follow, four others succumbed to anthrax after handling tainted mail—two postal workers in Washington, D.C., a New York City hospital stockroom employee, and an elderly Connecticut woman. At least 17 others fell ill but survived this post-9/11 bioterrorism attack.<sup>7</sup>

Radioactivity was discovered in the 1890s, but its potential danger was not fully recognized until much later. Brief contact with low-level radioactive material causes little harm; however, extended exposure increases the likelihood of cellular destruction and illness. To date, a radioactive device—a so-called “dirty bomb”—has not been used as a weapon. However, the materials necessary to build a radiological device are readily available at hospitals, research facilities, and industrial and construction sites. The dispersal of

even modest quantities of radioactive materials by a conventional explosion in a populated area would have psychological consequences beyond the potential physical effects, potentially creating panic, overloaded hospitals, and widespread anxiety.

By comparison, nuclear weapons are recent phenomena, and their effects well known. In the history of warfare, nuclear weapons have only been used twice: on August 6, 1945, when the first atom bomb was dropped on Hiroshima, Japan, and then on August 9, 1945, when another atom bomb destroyed Nagasaki, Japan. The estimated number of deaths resulting from the two detonations is not entirely clear, but most estimate the immediate effects of the blasts killed 70,000 in Hiroshima and 40,000 in Nagasaki. Countless others were sickened and later died due to after-effects of the explosions, including fires and radiation.<sup>8</sup>

Chemical and biological weapons are not always distinguished in popular discourse, but there are several important differences between them. Agents used in biological weapons are “living organisms or infective material derived from them, which are intended to cause disease or decay in man, animals, and plants, and which depend for their effects on their ability to multiply in the person, animal or plant.”<sup>9</sup> Agents used in chemical weapons are gaseous, liquid, or solid chemical substances that cause death in humans, animals, or plants and depend on direct toxicity for their effect.<sup>10</sup>

Biological weapons are strategic. They can kill huge numbers of people if used properly, and their effects are not limited to one place or a small target.<sup>11</sup> By contrast, chemical weapons are considered tactical rather than strategic; they can be used for mass-casualty attacks in confined areas, but it is almost impossible to concentrate enough chemicals in the air to kill a great many people over a large territory. Biological weapons are more difficult to acquire and manufacture than chemical weapons, and chemical and biological attacks require different responses. An hour after a chemical attack, those who are going to survive do, and those who are not, do not. Once decontaminated and removed from the incident site, victims of chemical attacks can be dispersed to hospitals. Biological attacks are comparatively more difficult to manage. The victims must be immediately isolated and quarantined to prevent the agent from spreading. Unfortunately, given today’s detection capabilities and the incubation period of biological agents, it is difficult to know who is—and who is not—contaminated. This possibility highlights the “diabolical genius” of biological attacks: targeted groups become the unwitting vehicles for further transmission.<sup>12</sup>

The differences between nuclear and radiological weapons are also often confused. Nuclear weapons use nuclear fission—the splitting of atomic nuclei—to produce enormous amounts of energy. The destructiveness of a nuclear weapon ranges from the equivalent of several thousand to several million tons of TNT,<sup>13</sup> an impact well documented in film footage of Hiroshima and Nagasaki. Radiological weapons—dirty bombs—use conventional explosives to scatter powdered radioactive material over the area surrounding the detonation point. Dirty bombs’ immediate destructive power is not physical unless a victim is in the immediate vicinity of the detonation; the real impact of a dirty bomb is psychological. Nuclear weapons present considerable challenges to anyone trying to procure them without state support. They require fissile material in quantities that are beyond the reach of terrorists seeking to produce them from scratch.<sup>14</sup> Dirty bombs, properly called radiological dispersal devices, are conventional explosives wrapped in radioactive debris—debris which is unfortunately readily available in hospitals, research centers, and industrial sites, leading one website to comment, “The *really* shocking thing about dirty bombs is that no one has used one yet, considering how easy it is to get your hands on radioactive garbage.”<sup>15</sup>

The use of WMD as a terrorist weapon is also a relatively new phenomenon. In the 1980s, the security community was primarily concerned with the proliferation of small arms, explosives (particularly plastique), rocket-propelled grenades, and the occasional, shoulder-fired anti-aircraft missile as terrorist weapons of choice. Today, the concern is about nuclear, radiological, chemical, and biological weapons—all dangerous and, with the possible exception of a low-yield radiological device, all potentially catastrophic and capable of massive casualties.

Still, there is a debate among analysts and scholars about the severity of the threat posed by WMD. Many, like Ambassador Robert A. Joseph, Undersecretary of State for Arms Control and International Security, believe that “the spread of WMD by rogue states and terrorists is widely recognized as the greatest security threat that we face as a nation.” Similar characterizations of the threat can be found in speeches made by President Obama and many of his senior administration, as well as in the recently released *National Strategy for Combating Terrorism*.<sup>16</sup> Some, such as Steven Flynn, are even more fatalistic, believing it is a question of “when, not if” terrorists will attack the United States with WMD.<sup>17</sup> Many others, however, are not so sure. William Arkin believes the threat of WMD has diminished and the danger has declined.<sup>18</sup> Likewise, Shawn Choy believes it would be too difficult for terrorists to employ WMD:

In reality, weapons of mass destruction present considerable challenges to anyone trying to procure them without state support. Nuclear weapons, which are the only type of WMD that can cause death on the scale of the September 2001 attacks, require fissile material in quantities that are beyond the reach of terrorists seeking to produce them from scratch. That leaves biological and chemical possibilities, whose manufacture and delivery demand technical savvy, abundant resources, and specialized facilities that non-state groups are not likely to possess.<sup>19</sup>

Others believe that “off the shelf” weaponry and conventional approaches will likely remain terrorist’s primary means of attacking the United States and other Western targets.

Our view is somewhat more pragmatic. The provable and strong interest among terrorist groups such as al Qaeda in acquiring WMD capabilities does not allow us the luxury to ignore the risks of WMD attack.<sup>20</sup> While the risks may be low, the catastrophic consequences of a WMD attack (massive casualties, societal disruption, and financial losses) are so severe that even the slightest possibility that terrorists might acquire and use WMD warrants serious concern and preparation. To dismiss the risks of WMD use by terrorists seems simplistic and dangerous. Understanding the real threat of WMD requires in-depth and expert interdisciplinary analysis of terrorists’ motivations and intentions, their technical capabilities, and anticipated means of attack. *Weapons of Mass Destruction and Terrorism* helps the reader understand the strengths and weaknesses in deterring, defeating, and, if necessary, managing a WMD attack.

## Organization

*Weapons of Mass Destruction and Terrorism* is composed of five units. Unit One explains how the new forms of terrorism affect the post-9/11 security environment and introduces the notion that weapons of mass destruction could give terrorists short-term, asymmetric attack advantages over conventional military forces. This section also provides several analytical perspectives on how experts study and frame the threat of WMD terrorism. Unit Two offers detailed

accounts of the characteristics, availability, and dangers of chemical, biological, radiological, and nuclear weapons. Five case studies complement this section by associating theory with practice—an important feature of this text. Unit Three, new to this revised edition of the textbook, addresses key dimensions of the WMD threat against critical infrastructure protection.

Unit Four considers responses to the WMD threat and the potential aftermath of such an attack. In the first section on local and federal responses, several new articles in this revised edition address the specific threat of bioterrorism, focusing on critical issues like immunization, decontamination and using forensic science for post-attack attribution. The second section, on international dimensions, covers nonproliferation regimes and export controls, among other key topics. Three case studies complete Unit Four and provide the reader with “how to respond” guidance and policy advice. Learning from past events and mistakes, and projecting future WMD threats, are addressed in Unit Five. As a whole, the volume represents the most current and in-depth scholarship on these critical WMD threat and response issues, our understanding of which has become increasingly necessary for the evolving twenty-first century security environment.

## Notes

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3. John Ellis van Courtland Moon, “Dubious Allegations,” *Bulletin of The Atomic Scientists*, (May/June 1999): 70.
4. Christine M. Gosden, “The 1988 Chemical Weapons Attack on Halabja, Iraq,” *Super Terrorism: Biological, Chemical, and Nuclear*, by Yonah Alexander and Milton Hoenig, Editors. (Ardsley, NY: Transnational Publishers, Inc., 2001).
5. “Sri Lankan Tamil Tigers Use Poison Gas Against Government Troops, Says Senior Officer,” The Xinhua General Overseas News Service (06/18/90). Also, please see Bruce Hoffman, “CBRN Terrorism Post-9/11” in Unit One of this volume.
6. David E. Kaplan, “Aum Shinrikyo,” in Jonathan Tucker ed. *Toxic Terror* (London: MIT Press, 2000) p. 207. Also, please see the article by Robyn Pangi in Unit Two of this volume.
7. Peter Franceschina, “Anthrax Attacks Remain Unsolved,” *Baltimore Sun*, October 15, 2006, p. 1.
8. Leonard A. Cole, “WMD and Lessons from the Anthrax Attacks,” *The McGraw-Hill Homeland Security Handbook*, by David G. Kamien, Editor. (New York: McGraw-Hill, 2006): 159.
9. Jessica Stern, *The Ultimate Terrorists* (London: Harvard University Press, 1999) p. 21.
10. Ibid.
11. Richard Preston, “Annals of Warfare—the Bio Weaponers,” *The New Yorker*, March 9, 1998. p. 56.
12. Chris Seiple, “Consequence Management: Domestic Response to Weapons of Mass Destruction,” *Parameters*, (Autumn 1997), p. 120.
13. Bill Charlton, “Bill Charlton is a Nuclear Engineer, not a Diplomat,” *Texas Engineer Research Magazine*, vol. 1, no. 1 (2006). Available at <http://engineering.tamu.edu/research/magazine/2006/policytech/>.
14. Shawn Choy, “No Apocalypse Now,” *Columbia Political Review*, vol. 2, no. 1 (October 2001): 1.
15. See [www.rottent.com/library/crime/terrorism/terror-tactics/dirty-bomb](http://www.rottent.com/library/crime/terrorism/terror-tactics/dirty-bomb).
16. A copy of this document is provided in the appendix of this volume.
17. This is a catch phrase used—some may say abused—by several government officials, security experts, academics, and comedians to discuss the likelihood of the use of WMD against the United States. Stephen Flynn, in his book *America the Vulnerable*, (HarperCollins: 2004) spoke of containers as “the poor man’s missile” and implied that the question is “when, not if” such containers will be used to deliver WMD into the United States.
18. William Arkin, “The Continuing Misuse of Fear,” *Bulletin of Atomic Scientists*, vol. 62, no. 5 (September/October 2006): 45.
19. Shawn Choy, “No Apocalypse Now,” *Columbia Political Review*, vol. 2, no. 1 (October 2001): 1.
20. For example, see Rolf Mowatt-Larssen, “Al Qaeda Weapons of Mass Destruction: Hype or Reality?” Belfer Center, Harvard University (January 2010). Online at: [http://belfercenter.ksg.harvard.edu/publication/19852/al\\_qaeda\\_weapons\\_of\\_mass\\_destruction\\_threat.html](http://belfercenter.ksg.harvard.edu/publication/19852/al_qaeda_weapons_of_mass_destruction_threat.html)

# Acknowledgments

**T**his volume represents another milestone in a collaboration that began in 2005, while we were both serving on the faculty of the United States Military Academy, and demonstrates our commitment to making a long-term contribution to the education of current and future generations of security professionals throughout the United States. We are inspired to do so every day by the many men and women who serve their country, state and city in a wide range of security-related efforts. The sacrifices these people make every day on our behalf often go unrecognized, but it is through their combined efforts that we remain the greatest country in the world. Our intention in this and other McGraw-Hill volumes we have produced is to provide them with new tools for thinking about contemporary and emerging security threats, and ways of responding to them with increasing sophistication and success.

Each of the chapters in this volume is the product of thoughtful research and analysis, and we offer our sincere thanks to the authors for their hard work and commitment to excellence. The insights and suggestions they have provided in these pages will undoubtedly inform discussions and debate in a variety of policymaking and academic settings for the foreseeable future. Margaret Nencheck played a critical role in helping identify and secure important research articles to include in the volume, and we extend our sincere appreciation for her assistance.

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James J.F. Forest  
Russell D. Howard

*Second Edition*

# WEAPONS *of* MASS DESTRUCTION

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## *and* TERRORISM

James J.F. Forest  
*University of Massachusetts, Lowell*

Russell D. Howard  
*Brigadier General USA (Ret.)*

*Foreword by*  
Ambassador Michael Sheehan

