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The Nuclear Terrorism Threat: How Real Is It?

Two Views by Brian Michael Jenkins and John Lauder



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Nonproliferation Policy Education Center

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Cover images, left to right: 1) a nuclear security guard and 2) an ISIS terrorist.

Nonproliferation Policy Education Center

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INTRODUCTION

How Real Is Nuclear Terrorism?

After the Cold War and nearly 70 years of waging war against communism, the United States and its key allies have adopted the war against terror as their new organizing principal. The king of terrorist threats, however, is nuclear terrorism. As Vice President Dick Cheney once argued, “if there is a one percent chance” of a terrorist developing a nuclear weapon, “we have to treat it as a certainty in terms of our response.”¹

This raises the question, though, just how real is the threat of nuclear terrorism. This working paper presents two opposed views. The first is by Brian M. Jenkins, A RAND analyst and one of the world’s leading experts on nuclear terrorism. He argues that the threat of nuclear terrorism is overblown. He recommends officials see it as a lesser included threat to that of the acquisition and possible use of nuclear weapons by states. What we need to do to prevent states from getting nuclear weapons and to secure existing nuclear weapons and fissile materials against sabotage or illicit seizure will largely take care of the more distant prospect of terrorists making nuclear bombs.

A second and opposing view is offered by John Lauder, former director of the Central Intelligence Agency’s Nonproliferation Center, who argues that the threat of nuclear terrorism is growing and we need to be hedging against this now.

It would be a mistake to think either of these views is wrong. The trick is figuring out which to emphasize and how much. This set of questions are worthy of discussion and debate.

Henry D. Sokolski
September 2016

1. Michiko Kakutani, “Personality, Ideology and Bush’s Terror Wars,” *The New York Times*, June 20, 2006, available at http://www.nytimes.com/2006/06/20/books/20kaku.html?_r=0.

CHAPTER 1

Nuclear Terrorism, the Last 40 Years: What Has and Has Not Happened

Remarks before the NPEC Fellowship Retreat—February 27, 2016

Brian M. Jenkins

In late 1974, I was invited to present a paper on nuclear terrorism at a meeting on nuclear proliferation in Los Alamos, New Mexico. Of course, I was terrified by the prospect. Many of the people attending this meeting were nuclear physicists and engineers—individuals who had designed and actually built nuclear weapons. My academic degrees are in fine arts, history, and the humanities—classical stuff. My colleagues teased me, saying, “Brian, you wouldn’t know the difference between a diagram for a hydrogen bomb and a Coca-Cola vending machine.” I shot back that “I would—one takes quarters.”

The more important question is why the organizers of this meeting decided to include an assessment of nuclear terrorism. To answer that, it is necessary to recall what was going on in the late 1960s and early 1970s. Nuclear proliferation was clearly a concern. During the 1960s, China and France had become nuclear weapons states. Israel was presumed to have nuclear weapons. In 1974, India detonated what it described as a peaceful nuclear explosion. Analysts worried that if nuclear proliferation was not slowed, the world could see as many as 20 or 30 new nuclear weapons states by the end of the century.

Nuclear power also was expanding rapidly at the time. That raised the likelihood of increased reprocessing and a worldwide traffic in nuclear material. The spread of nuclear power prompted a significant anti-nuclear movement that reflected a variety of concerns. Some opposed the planned location of specific nuclear power plants. Others feared that reliance on nuclear energy would facilitate proliferation or require extraordinary security measures that would imperil democracy itself. One of the leaders of the movement was a former RAND colleague of mine, Dan Ellsberg, who previously had been deeply involved in the anti-Vietnam War movement.

Political violence also seemed to be on the rise. The war in Vietnam continued. India had fought one war with China in 1962 and two wars with Pakistan in 1965 and 1971. Israel had fought wars with its Arab adversaries in 1967 and 1973. China was wracked by the Cultural Revolution. In 1975, civil wars and insurgencies were ongoing in 30 countries in Latin America, Africa, and Asia. Terrorist campaigns were underway in Germany, Italy, Spain, France, and the United Kingdom. The United States itself faced growing political violence with 50 to 60 terrorist bombings a year. It was against this background that the Los Alamos conference met to discuss issues of proliferation.

The prospect of increased traffic in nuclear material had already raised concerns about nuclear safeguards. In 1967, an Advisory Panel on Safeguarding Special Nuclear Material, also known as the “Lumb Panel” (after its chairman Dr. Ralph Lumb), concluded that “safeguards programs should also be designed in recognition of the problem of terrorist or criminal groups clandestinely acquiring nuclear weapons or materials useful therein. Although such illegal groups are more likely to steal finished components of weapons than divert materials from peaceful programs, criminal organizations may be attracted to divert such materials if a black market develops, as it is likely to.”¹

That fascinating conclusion preceded the rise of terrorism in the late 1960s. When I was writing my paper in 1974, I called Dr. Lumb and asked him what terrorists or criminal groups did the panel have in mind? He responded that one of the panel’s members had experience involving commodity diversions. If the world was moving toward the widespread large-scale production of plutonium, as seemed likely in the mid-1960s, why would nuclear material not be vulnerable to the same kind of diversions? But who were the terrorist groups? I asked. The panel had no particular terrorists in mind. “We just took a shot,” he said. Keep that in mind, because it is important—nuclear theft by terrorists was a hypothesis.

Theodore Taylor, who worked at Los Alamos National Laboratories, also worried about the spread of nuclear power in the 1960s. He feared that nuclear reactors could become targets of sabotage or wartime bombing, and that the rapid spread of nuclear technology would undermine safeguards. Taylor was a talented nuclear weapons designer who had designed the largest yield fission bomb ever exploded and the smallest fission bomb ever made. He was especially fascinated by very simple nuclear bombs—primitive devices that might be fabricated without the need for vast Manhattan projects.

These were technical design exercises, but in 1973, John McPhee profiled Taylor in a series of articles published in *The New Yorker*.² To lift his musings out of the technical realm, Taylor offered a narrative that the public could readily understand. With a small improvised nuclear device with a yield of a half-kiloton to a kiloton, strategically placed, terrorists could knock over the newly completed tallest building in New York—the World Trade Center.

Taylor did not specify which terrorists, how they might obtain fissile material, whether they could actually build such a device, or what their motives might be. A hypothetical scenario was superimposed on a theoretical design—terrorists were added simply as a dramatic device, although no one doubted that terrorists would, of course, do such a thing.

Why then didn’t terrorists do some of the things we knew they had the capability to do? I asked in my Los Alamos briefing. There had to be some kind of self-imposed constraints—fear of alienating their constituents, provoking public backlash, lack of strategic purpose, even moral considerations. This led to my observation that “Terrorists want a lot of people watching, not a lot of people dead,” which summarized a more complex chain of thought.³

That was more than four decades ago. In those four decades, nuclear proliferation has not been as bad as we thought it might be. Three new nuclear states have emerged since 1975—South Africa, Pakistan, and North Korea. If one accepts the pretension that India’s “peaceful nuclear explosion” in 1974 had nothing

1. Ralph F. Lumb, et al., *Report of the Advisory Panel on Safeguarding Special Nuclear Materials*, Washington, DC: Atomic Energy Commission, 1967.

2. John McPhee, “The Curve of Binding Energy,” *The New Yorker*, December 3, 1973, available at <http://www.newyorker.com/magazine/1973/12/03/i-the-curve-of-binding-energy>.

3. Brian M. Jenkins, *Will Terrorists go Nuclear?*, RAND Paper Series, no. P-5541, Santa Monica, Calif.: RAND, 1975, p. 5.

to do with nuclear weapons, which the country now has, it is the fourth country. South Africa dismantled its nuclear weapons in 1989.

Suspected nuclear weapons programs have been thwarted or put on hold in several countries, including Iraq, Syria, and Iran. We did not come close to the several dozen nuclear weapons states that people worried about.

The Soviet Union collapsed, but held onto its nuclear weapons. There were no thefts or attempted thefts of nuclear weapons that we know about, and no major thefts, or attempted thefts of significant quantities of fissile material—again that we know about.

Insofar as we know, there is no nuclear black market although there have been numerous attempts to sell tiny quantities of fissile material, which often turns out to be scams involving low-enriched or depleted uranium. Buyers often turn out to be undercover police agents. There were potential terrorist buyers.

During the four decades, we know that several terrorist groups contemplated—and *contemplated* is the operative term here—acquiring nuclear weapons. The dark nuclear war dreams of Shoko Asahara drove his followers in Aum Shinrikyo, a strange Japanese cult, toward the acquisition of weapons of mass destruction. One of the group's officials wondered how much it might cost to buy a nuclear weapon in Russia and the group acquired a license to mine uranium in Australia, but that was as far as it got. Aum's scientists instead pursued easier to manufacture chemical and biological weapons, and in 1995, dispersed a crude version of the nerve gas Sarin in Tokyo's subways.

Al Qaeda made several attempts to acquire fissile material, but fell victim to scams. The group's leaders also approached Pakistani scientists for advice in making a nuclear device, but reportedly were told they could not. Failure did not prevent Al Qaeda's leaders from claiming that they could easily acquire—or had already acquired—nuclear weapons from Russia. This was propaganda calculated to excite followers and alarm foes, and it worked. Without an ounce of fissile material, Al Qaeda was widely perceived as a virtual nuclear terrorist power.

Russia's Chechen rebels probably had the best shot at acquiring nuclear weapons or material. They were closest to the source of so-called "loose nukes" that everyone worried about. Some of them had served in the Soviet army; some had even served in the Soviet Union's strategic forces—they knew where nuclear weapons were stored and how they were guarded. The Chechens had the capability to carry out large-scale commando-style operations, some involving scores of attackers. And they had motive. The Chechens ultimately did construct a "dirty bomb" containing a small quantity of radioactive material, which they buried in a park in Moscow. However, in their minds, the purpose of the operation was to create terror, and instead of detonating the device, they informed the news media of its location.

More recently, attention has shifted to whether ISIS (the Islamic State of Iraq and Syria) is acquiring nuclear weapons. According to media reports, ISIS militants have stolen radioactive material from university research facilities in cities they control, which they could disperse in a dirty bomb. A British militant serving with ISIS warned on social media that such a device could wreak havoc in London.

Nothing that we have learned since from captured documents or interrogation efforts indicates that any of these groups had fissile material or the requisite technical knowledge to make a nuclear bomb—a radioactive dispersal device, yes, but not a nuclear bomb. Indeed, the material uncovered at Al Qaeda's training camps indicates that Al Qaeda would not have known how to fabricate a nuclear bomb. And while there is evidence of interest, there is no evidence of a serious sustained nuclear program, which would be

prerequisite to fabrication. It is clear, however, that terrorists see nuclear boasts and threats as means of creating terror.

There have been a number of disturbing revelations about things that did happen during this 40-year period. Over time, there has been a significant accumulation of bomb-grade nuclear material unaccounted for. This is not to say that it has been diverted, but simply that we cannot say with certainty where it is. With a fair degree of certainty, we know now that a major diversion of nuclear material took place in the 1960s, which was inadequately investigated. Several hundred pounds of highly enriched uranium disappeared from the NUMEC plant in Apollo, Pennsylvania, and probably went to the Israelis.⁴

We know now that AQ Khan led a rogue operation in Pakistan to sell nuclear weapons know-how and provide other assistance to clandestine state nuclear programs. Owing to a fascinating project led by Henry Sokolski, we know now that in several instances during revolts, coups, civil wars, or other periods of political turmoil, government control of nuclear weapons was challenged or temporarily lost. We know now that the United States accidentally lost control of some of its nuclear weapons, although these were recovered.

We know now that there were some close calls, not just the Cuban missile crisis in 1962, but in 1983 and other times when we had come closer to nuclear confrontation than we knew at the time. Terrorists were not involved in any of these episodes.

In trying to assess the threat of nuclear terrorism, we face the same analytical challenge today that we faced 40 years ago. We are dealing with an event that is of terribly high consequence and, therefore, cannot be ignored. We have some indications of interest by several terrorist groups, but these cases are arguable, and do mere expressions of interest indicate a serious acquisition effort? We have a couple of examples of terrorist boasting about nuclear capabilities—these appear to be propaganda. We have reports of low-level thefts of small quantities of nuclear material and numerous scams, but little evidence that these are connected or that they reflect a trajectory towards nuclear terrorism.

The debate about whether terrorists could actually build a nuclear bomb continues. Personally, I can't add a lot here. People who design and build nuclear weapons debate among themselves about how easy or how difficult it is. When I wrote my book on nuclear terrorism in 2008, I conducted an informal survey of experts. By "experts" I meant people at the national laboratories in Los Alamos, Sandia, and Livermore, similar people overseas, as well as some in the intelligence community who dealt with these issues. My survey asked a simple question: What is the likelihood that terrorists will detonate a nuclear device—a bomb, not a dispersal device—or attempt to do so in the next ten years? The responses ranged from a probability of one—not if, but when—to one in ten million. And there was no bell curve. The distribution of odds was pretty flat right across the spectrum.⁵

Even without a bell curve, you can still count to the middle. It turned out to be 10 percent. I don't know what validity this number has—it is the median of a bunch of guesses. If the Americans and European responses are counted separately, the median for the Europeans is one percent while the median for the Americans rises to 20 percent. We Americans obviously worry more about this.

4. Victor Gilinsky and Roger J. Mattson, "Did Israel steal bomb-grade uranium from the United States?" *Bulletin of the Atomic Scientists*, April 17, 2014, available at <http://thebulletin.org/did-israel-steal-bomb-grade-uranium-united-states7056>.

5. Brian M. Jenkins, *Will Terrorists Go Nuclear*, New York: Prometheus Books, 2008, p. 294.

In one sense, nuclear terrorism is an invention. In pointing to theft of nuclear material by terrorists, the Lumb Panel took a shot. Theodore Taylor created a terrorist scenario to make a point about design. Neither was offering a threat assessment. The threat of nuclear terrorism floats above the concrete evidence. That does not mean nuclear terrorism can never happen. It does give the debate a theological quality.

Arguments about the likelihood of nuclear terrorism reflect belief systems. At one end of the spectrum stand the “Apocalypticists”, who subscribe to a kind of Murphy’s Law of human behavior—if something bad can be done, someone bad will eventually do it. At the other end are the disbelievers who argue that we have worried about this for decades and it hasn’t happened and we have no evidence that anybody even seriously tried—there has to be a reason. The comeback to this observation is that the absence of evidence is not the evidence of absence. All one can say is that it hasn’t happened *yet*. The other response can be found in the more lurid offerings by the conspiracy theorists who claim that terrorists already have nuclear weapons, but “your government isn’t telling you.”

The 9/11 terrorist attacks had insidious effects on the analysis of nuclear terrorism. They confirmed the disturbing escalation of terrorism—a long-term trend. The median of the deadliest terrorist incidents in the 1970s was 72 fatalities. This ascended to 224 in the 1980s, and 263 in the 1990s. On 9/11, 2,977 people died—an increase of two orders of magnitude. Extrapolating that trend would mean terrorist incidents with tens of thousands of fatalities in the following decade or so. Terrorists could achieve those body counts only with biological or nuclear weapons. Fortunately, thus far 9/11 has proved to be not an elbow in an ascending arc, but a statistical outlier. The median of the deadliest terrorist incidents in the 2000s turned out to be 331, and for the 2010s, so far, it is 286—but we did not know that at the time.

In the immediate shadow of 9/11, things looked a lot different. For one thing, 9/11 fundamentally altered our perceptions of plausibility. Scenarios that had been dismissed as far-fetched before 9/11 became operative presumptions the day after. At the same time, the threshold for concern was lowered. If something had even a one percent chance of occurring, it had to be preempted. This was nonsense since all such estimates are still guesses rather than quantifiable indicators. Could anyone seriously claim that this scenario has a two percent chance of occurring so we should worry while we can dismiss this other scenario, which has only a half a percent chance of happening. Operationally it meant that there was nothing that we could dismiss.

The intelligence was seen to have failed on 9/11. Worse, not anticipating the attacks was seen as a failure of imagination. The country could not tolerate another failure of imagination. Imagination here is the key word. Our perception of terrorist threats was being driven by not wanting to have a failure in the realm of imagination. Fear of nuclear terrorism achieved its independence of evidence of nuclear terrorism. These became independent and disconnected domains.

In Renaissance religious paintings, angels and saints, lifted by faith, float above the ground. Similarly, nuclear terrorism, lifted by fear, became gravity free. It was not the intelligence that propelled the fears, but the fear that compelled intelligence analysts to seriously consider often dubious reports. The one percent doctrine and fear of imagination failure made it impossible to dismiss any threat with high confidence. High confidence does not often appear in intelligence estimates, and if you hear someone say, it’s a “slam dunk,” reach for your pistol.

Freeing the fear of nuclear terrorism from evidence enabled media savvy terrorists to play upon those fears. Al Qaeda, for example, pretended that they could get or had nuclear weapons. Al Qaeda’s online followers embellished these fantasies. That created an aura of nuclear capabilities, which were in fact mere assertions. Our own anxieties filled in the blanks. There is probably not a terrorist scenario that

hasn't been discussed in detail on national television—prospects of doom get attention. Terrorists read what we write and listen to what we say. Then they start talking about it. In turn, we listen to them, completing a feedback loop that confirms our own worst fears.

Freeing nuclear terror from evidence of nuclear terrorism also enables the threat to be manipulated to achieve other ends. A lot of the terrorist threat literature is agenda driven. Raising the specter of terrorism can help persuade governments to adopt better security measures to protect both fissile material and other radioactive substances. Nuclear terrorism can be used to slow nuclear proliferation, advance nuclear disarmament, or increase international pressure on states suspected of developing nuclear weapons.

While we should not dismiss the threat of nuclear terrorism, nuclear states may be the bigger problem. I would argue that nuclear proliferation is undesirable. The more nuclear weapons states there are, the more fissile material, the more transport, the more possibilities that governments will lose control of their arsenals and rogue actors or terrorists will get their hands on them. It sounds imperialist to say so, but the United States, the former Soviet Union, Great Britain, France, and perhaps today's China are reliable actors. The same cannot be said of some of the more recent acquirers or aspirants who currently are embroiled in civil wars or confront stability issues. International concern about the security of Syria's chemical weapons arsenal during its ongoing civil war, ISIS's possible acquisition of nuclear material in Iraq, and the continuing chaos in Libya—all once nuclear weapons aspirants—underscores the point.

Also worrisome are rogue operations driven by profit or fanaticism. We do not yet have what I would call a nuclear underworld. In the future, states may try to clandestinely acquire nuclear weapons without large Manhattan Projects. The proliferation of secret nuclear weapons programs raises the possibilities that Ralph Lumb and his colleagues were worried about.

The spread of fissile material and nuclear weapons know-how will require increasingly stringent security measures, not just at nuclear facilities, but affecting all of society. Even without nuclear terrorism, we see disturbing trends in this direction. This is not an original thesis. Robert Jungk, in his 1977 book, *Der Atom Staat* (in English, *The Nuclear State*, but the title, which evokes Nazi Germany's *polizeistaat*, is much more powerful in the original), warned that the spread of nuclear technology would bring with it an increasingly oppressive state. Such concerns are a pale shadow now, but even an attempt by a non-government adversary to acquire or use a nuclear weapon will change the world dramatically. The rules won't be the same. While much will depend on the scenario, the occurrence of such an event could bring in its wake extraordinary security controls, preemptive military action, even other desperate measures to prevent repetition.

CHAPTER 2

Nuclear Terrorism: The Sum of All Fears

Remarks before the NPEC Fellowship Retreat—February 27, 2016

John Lauder

Where does nuclear terrorism fit in the context of all the other threats and potential calamities about which we have to worry? How significant is the prospect of nuclear terrorism compared to the impact and likelihood of other concerns about weapons of mass destruction and compared to the full range of other national security problems? Answering such questions would help provide insight about whether the prospect of nuclear terrorism is overhyped or insufficiently addressed. The reflections below suggest that concerns about nuclear terrorism have waxed and waned over the past few decades. The strength of the concerns has often been driven by non-nuclear factors and the rise and fall in other priorities rather than direct evidence related to the prospect of nuclear terrorism itself.

To assess nuclear terrorism within the broader context of other threats, let us look back to the 1990s.¹ Then, the world was dealing with the consequences of the Soviet Union's collapse. It was a failed state with enormous capability and expertise in weapons of mass destruction (WMD). There was great and appropriate concern about the former Soviet scientists and engineers who had detailed knowledge of how to build and employ these weapons—nuclear, chemical, and biological. What was going to happen to the weapons and the precursor material? Was the expertise and material going to bleed out to other states and to non-state actors?

These concerns led to a fertile era of nonproliferation and counterproliferation initiatives, actions, and programs to assist the former Soviet states on dismantling and repurposing many of their WMD facilities and to provide support for redirecting their WMD experts to more benign activities. Traditional arms control agreements played a role, as did broad programs such as the Cooperative Threat Reduction Program and ad hoc efforts such as Project Sapphire, which moved weapons-grade, highly enriched uranium from Kazakhstan to Oak Ridge National Laboratory in the United States.

The U.S. government (USG) reorganized itself as well, to bring greater focus and resources to nonproliferation challenges. One of those reorganizations was the creation of the Defense Threat Reduction Agency, which brought together several elements of the Department of Defense to focus on the WMD problem.

1. For analysis of perceptions of the nuclear terrorism threat going back to 1946, see “Appendix: Evolving Perceptions of the Threat of Nuclear Terrorism,” in Matthew Bunn, Martin B. Malin, Nickolas Roth, & William H. Tobey, *Preventing Nuclear Terrorism: Continuous Improvement or Dangerous Decline*, Cambridge, MA: Belfer Center for Science and International Affairs, March 2016.

Another adjustment was in the intelligence community. We created a larger nonproliferation center that brought more analysts in from across the community to focus on WMD issues, related technology, and transfer networks. One of the challenges that we confronted in the late 1990s as we implemented these reorganizations was the tremendous scope of issues for the new organizations to address. How should these organizations, and the United States government as a whole, prioritize what was on our plate?

It was a particular challenge that engaged me, as the Director of the Intelligence Community's Nonproliferation Center at the time, and equally confronted Dr. Jay Davis, who was the first director of the Defense Threat Reduction Agency. Jay and I would meet regularly to coordinate. During one of those meetings, he reminded me of the title of the 1991 Tom Clancy novel, *The Sum of All Fears*. Jay said we should rack and stack the sum of all our proliferation and WMD terrorism fears, and use that sum of our assessments to assign priorities and allocate scarce resources. This was a noble idea, but it was difficult to implement—largely because the range of threats was broad and perception of the threats was affected by so many factors inside and outside the government.

At about the time Jay and I were talking about the “sum of our fears,” somebody recommended to President Clinton a novel called *The Cobra Event*. The book was about a biological terrorist attack—and it had a profound effect on government priorities. The president read the book, recommended it to others in and outside the government, and asked what the government was doing to prevent such an attack.²

At about the same time, we realized that United Nations inspections after the first Gulf War had revealed that the USG had badly underestimated Iraqi biological weapons capabilities beforehand. This realization, combined with the president's interest, gave rise to a widespread understanding that the government was not paying enough attention to the prospects for the development and use of biological weapons. As a consequence, the government became very focused on biological threats as the most dangerous and likely form of WMD terrorism.

This is just one example of the external events that affect where WMD terrorism fits within national security priorities. The most dramatic were the terrorist actions on September 11, 2001 (9/11). Those attacks underscored that terrorists could create a tremendous catastrophe even without the use of WMD. At the same time, 9/11 raised the specter of ever more spectacular terrorist assaults that could possibly employ WMD.

In the wake of these concerns, there were renewed efforts to come up with the sum of all fears and prioritize the threats. One related analytical effort was the Defense Science Board (DSB) summer study of 2005 focused on Reducing Vulnerabilities to Weapons of Mass Destruction.³ We were only a few years removed from 9/11, and the study aimed to examine threats across the broad range of possible WMD attacks. Those of us on the study team considered state actors' use of WMD across the full modalities of chemical, biological, radiological, and nuclear. We addressed state-sponsored terrorism and the possibility that states might use WMD against the United States in non-conventional ways, such as special operations forces introducing a weapon into a city, rather than through a missile or air strike. We also looked at the possibility of non-state actors developing a crude WMD device, especially an improvised nuclear weapon.

2. Richard Preston, *The Cobra Event*, New York: Random House, 1998. Various sources have reported on President Clinton's reading of the book and his tasking of government agencies. See, for example, pp 223-226 in Judith Miller, Stephen Engelberg, and William Broad, *Germs: Biological Weapons and America's Secret War*, New York: Simon and Schuster, 2001.

3. Defense Science Board 2005 Summer Study, *Reducing Vulnerabilities to Weapons of Mass Destruction*, Washington, DC: Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics, 2007, available at <http://www.acq.osd.mil/dsb/reports/ADA471566.pdf>.

The study considered not just a single use, but examined what would happen if a series of attacks took place, or attackers combined different modalities of weaponry. Though we now focus much more on cyberterrorism, even then we asked questions such as: What if there was a cyber-attack that degraded our response capabilities at the same time someone introduced a nuclear weapon into Manhattan? What if somebody exploded a nuclear weapon in lower Manhattan and claimed to have another ready to use—how do you deal with that? Or what if they explode one device in Manhattan, one in DC, and say they have two more ready to use. What are those implications?

The other aspect striking about the timing of that Defense Science Board report was that Hurricane Katrina happened at the end of that summer. One focus of the study was to assess the ability of the U.S. government to do effective and well-coordinated consequence management in the wake of a truly catastrophic event. The study team had received a number of briefings from government agencies about how federal, state, tribal, and local governments would cooperate to respond to a catastrophe; that the right resources would be requested promptly, arrive on time, and be effectively employed.

There was much skepticism on the part of the study team that the necessary operational plans were in place. The team doubted there had been sufficient exercising and detailed planning on how to work together to respond to a catastrophe—how the handoffs would occur among local first responders, state resources, federal civilian agencies, and ultimately the U.S. military if required. Unfortunately, those concerns turned out to be well-placed when the response to Katrina exposed failings in planning and preparation for dealing with a catastrophe.

We looked at nuclear terrorism in the same context. In the course of the study, we came to focus on the bookend of, on one side, prevention—how do you stop an event from happening? On the other end was consequence management—how can you prepare to mitigate and recover? Using the bookend model, we examined how to address the whole range of possible chemical, biological, radiological, and nuclear attacks. For example, how could authorities better secure the materials terrorists might be able to use, such as radiological sources in hospitals? How could the resources and planning of the public health system be improved to deal with both major epidemics and possible biological attacks?

In the most stressing cases, such as the detonation of multiple nuclear weapons by a terrorist group or state actor, the burden would be on the prevention bookend. The consequences of such an attack could overwhelm response, even if well-planned and resourced beforehand. We were particularly worried that in addition to the sheer destruction and casualties, such a catastrophic attack would fundamentally weaken the U.S. economy and undermine confidence in government. What would be the economic impact of losing the financial centers of lower Manhattan to a nuclear attack, especially if other attacks also took place or were threatened? What would be the impact on democracy as we know it?

The concern was that economic and political upheavals following a nuclear attack in the United States would be much more severe and dramatic than 9/11. The public would demand moves toward a much more authoritarian state to deal with the consequences and the possibility of further attacks. These are the types of concerns that underscored the study's analysis of the potential consequences of a nuclear terrorist attack. Such an attack may not be likely, but the consequences would be so severe that actions are required to prevent it from happening.

Now, more than a decade after the DSB study, there are reasons to believe the risk of a nuclear terrorist attack is growing. Let me cite three sets of concerns.

First, time may not be on our side. As somebody who labored in nonproliferation and arms control for many years, our hopeful assumption was that time was on our side. We thought that all we had to do was keep the number of nuclear weapons states low, keep the WMD states in a set of interlocking arms control agreements to limit capabilities and worrisome actions, and over time we could deal with the fundamental security concerns that lead these states to want to have weapons of mass destruction in the first place. We could constrain their WMD programs until that time and then walk them back.

But it is not clear that time works for us in the world of non-state actors who could conduct terrorism using nuclear or other WMD weaponry. For over ten years in various presentations, I have been citing surveys of nonproliferation experts on the likelihood that a weapon of mass destruction would be used. One of those surveys was conducted in 2005 by Senator Richard Lugar, the former Chairman of the Senate Foreign Relations Committee. According to his survey of leading nonproliferation and national security experts, the risks of a WMD attack against a city or other target were judged to be substantial. The average response of the risk of a nuclear, chemical, or biological attack over ten years was about 30 percent. The average response to the risk of employment of a radiological device was about 40 percent.⁴

Should we be comforted or not that such attacks have not happened as the survey was done more than ten years ago? One can argue that counterproliferation and counterterrorism actions and programs are working. A more pessimistic assessment would be that we are living on borrowed time. No domestic WMD attack has happened in the last decade, and no WMD attacks have occurred overseas except for chemical weapons use in Syria. But maybe the survey's assessments were correct and greater WMD use is just right around the corner.

Second, opportunities for states and non-state actors to acquire and use WMD may be increasing. Technology and information relevant to the development of WMD, including at least crude nuclear weapons, are increasingly available. A few years ago, the Nuclear Threat Initiative (NTI) produced a video called *Last Best Chance*, which starred former Senator Fred Thompson as president of the United States. It depicted a fictional but plausible scenario for how terrorists could construct nuclear devices and introduce them into the United States. The intent of the video was in essence the same as the Defense Science Board's 2005 study: anticipate such terrorist use of a nuclear device, deconstruct the steps terrorists would have to take to do so, and act now to prevent those steps when they are still preventable.

How do you convince policymakers and the public that terrorist acquisition or creation of a nuclear device is plausible? That was one of the NTI's intents in producing *Last Best Chance*. One of the challenges when arguing for the plausibility of terrorist use of nuclear weapons is to make sure we are not providing a how-to guide for would-be terrorists. There is a fine line between providing a roadmap and providing enough warning to persuade federal, state, local, and international governments to take necessary preventive action.

For terrorist acquisition and use of nuclear weapons to succeed, there has to be an intersection of four types of individuals or groups. One group is the radicalized terrorists—the worst people who want bad things to happen. Then there are the technically savvy folks—those that know how to put a weapon together and employ it successfully. Third are the people who have access to weapons themselves or to nuclear explosive material. Finally, there are middlemen and networks that bring all this together. There is substantial evidence that these four groups, from time to time, intersect. In fact, there are signs of the demand and supply sides trying to come together through the middlemen.

4. Senator Richard Lugar, *The Lugar Survey on Proliferation Threats and Responses*, June 2005, available at <https://www.gwu.edu/~ccps/LugarSurvey.pdf>.

One of these indications was an article about ISIS's interest in red mercury. Red mercury is an alleged substance that purports to offer a shortcut for building advanced explosives, including nuclear weapons. As C.J. Chivers of *The New York Times* wrote in his article, "*The Doomsday Scam*:"

To approach the subject of red mercury is to journey into a comic-book universe, a zone where the stubborn facts of science give way to unverifiable claims, fantasy and outright magic, and where villains pursuing the dark promise of a mysterious weapon could be rushing headlong to the end of the world. This is all the more remarkable given the broad agreement among nonproliferation specialists that red mercury, at least as a chemical compound with explosive pop, does not exist.⁵

But ISIS is out there, using long-established Middle East smuggling networks, seeking red mercury. The more ISIS and others see scientific literature saying red mercury doesn't work, the more they are interested in it—they are sure the refutations are a disinformation campaign to turn them off of looking. The fact that a group like ISIS is out there trying to find red mercury, and reaching out to smugglers in their effort, provides a reason to worry. How long will it be before they stumble on material that is not a hoax, but useful in the construction of a weapon of mass destruction?

Third, there has been a decline in the urgency and the number of threat reduction programs that were flourishing in the 1990s. We had the last of the Nuclear Security Summits in March 2016. It happened with little attention outside the nonproliferation community; the Russians didn't even show up.

Former Senator Sam Nunn, the chief executive officer and co-chairman of the NTI, wrote in his foreword to the 2016 NTI Nuclear Security Index that there has been a slowdown in progress toward the goals set in the first Nuclear Security Summit in 2010. The NTI website and the Index's report cited a number of reasons. One is politics, both internationally and within the United States. Policymakers are diverted by other issues and are less concerned about nuclear terrorism. The report also noted the problems of bureaucratic inertia, lack of resources, and cultural issues.⁶

Nuclear terrorism may not be perceived as a near-term urgency, but the consequences of missing warning signs would be enormous. Prudent steps can be taken to assess the risk, even at a time of limited resources and other pressing priorities. We can assess how well the government is implementing recommendations like those of the Defense Science Board. Which recommendations have been implemented, which are still valid, which ones could still be done?

Another step is to identify the intersection points—like the middlemen alluded to earlier. We have to worry about chemical, biological, and nuclear attacks that differ greatly in likelihood, effects, and the type of expertise required. But if we focus on points of intersection, such as those middlemen and networks, the problem becomes more finite. The smuggling networks are known to each other. You can identify them; you can get inside them; you can disrupt them; you can turn them against each other. And you can learn all manner of useful information in the process.

There are other steps as well: strengthening intelligence, exercising consequence management for a catastrophic event, developing more effective attribution and deterrence policies, and being ever more vigilant

5. C.J. Chivers, "The Doomsday Scam," *New York Times Magazine*, November 19, 2015, available at http://www.nytimes.com/2015/11/22/magazine/the-doomsday-scam.html?_r=0.

6. Nuclear Threat Initiative, *Nuclear Security Index: Theft and Sabotage, Building a Framework for Assurance, Accountability, and Action*, Third Edition, January 2016, available at http://www.ntiindex.org/wp-content/uploads/2013/12/NTI_2016-Index_FINAL.pdf; and Bunn et al, *Preventing Nuclear Terrorism*, for further assessment of progress and gaps in nuclear security.

about reducing and safeguarding stockpiles and production of nuclear explosive material. The key is to remain focused on the problem of nuclear terrorism. Steps taken now are much more effective—and far less costly—than waiting for the attack.

About the Contributors

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John Lauder is a leading authority on Weapons of Mass Destruction, Nonproliferation, Arms Control, Homeland Security, and intelligence analysis and collection. He retired from the United States government in the fall of 2004 with over 33 years of managerial, analytical, and policy experience in the Central Intelligence Agency, National Reconnaissance Office, and as an arms control negotiator. He served subsequently for nine years as a senior manager and corporate officer within Arete' Associates, a research and development company. Mr. Lauder continues to be instrumental in advising and shaping nonproliferation, research, strategic planning, and business development activities in the public and private sectors and chairs, or is an active member of, government, academic, industry, and laboratory advisory panels and task forces. He has recently been a leader of efforts to improve monitoring of Iranian nuclear programs, to anticipate new WMD-related trends, to identify and disrupt middlemen and supply networks in illicit activities, and to facilitate data collection and sharing on international health challenges. He has also helped private companies in aligning their capabilities and products to meet vital international and national security needs and in expanding their outreach to the government sector.

Henry D. Sokolski is the Executive Director of the Nonproliferation Policy Education Center (NPEC). He previously served as Deputy for Nonproliferation Policy in the Department of Defense, and has worked in the Office of the Secretary of Defense's Office of Net Assessment, as a consultant to the National Intelligence Council, and as a member of the Central Intelligence Agency's Senior Advisory Group. In the U.S. Senate, Mr. Sokolski served as a special assistant on nuclear energy matters to Senator Gordon Humphrey (R-NH) and as a legislative military aide to Dan Quayle (R-IN). He was appointed by Congress to serve on both the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism in 2008 and the Deutch WMD Proliferation Commission in 1999. Mr. Sokolski has authored and edited a number of works on proliferation, including *Underestimated: Our Not So Peaceful Nuclear Future* (Strategic Studies Institute, 2016) and *Best of Intentions: America's Campaign Against Strategic Weapons Proliferation* (Praeger, 2001).



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