

Why States Won't Give Nuclear Weapons to Terrorists

Keir A. Lieber and
Daryl G. Press

For the last two decades, U.S. leaders have focused on the possibility of nuclear terrorism as a serious threat to the United States. In the wake of the terrorist attacks of September 11, 2001, those fears grew even more acute. In his State of the Union Address four months after the attacks, President George W. Bush warned a worried nation that rogue states “could provide [weapons of mass destruction] to terrorists, giving them the means to match their hatred.”¹ Both Vice President Dick Cheney and National Security Adviser Condoleezza Rice amplified the president’s warning in order to justify the war against Iraq. According to Rice, “Terrorists might acquire such weapons from [Saddam Hussein’s] regime, to mount a future attack far beyond the scale of 9/11. This terrible prospect could not be ignored or wished away.”² Such fears continue to shape policy debates today: in particular, advocates of bombing Iran’s nuclear facilities often justify a strike based on the idea that Iran might give nu-

Keir A. Lieber is Associate Professor in the Edmund A. Walsh School of Foreign Service and the Department of Government at Georgetown University. Daryl G. Press is Associate Professor of Government at Dartmouth College.

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1. President George W. Bush warned, “States like [Iraq], and their terrorist allies, constitute an axis of evil, arming to threaten the peace of the world. By seeking weapons of mass destruction, these regimes pose a grave and growing danger. They could provide these arms to terrorists, giving them the means to match their hatred.” Bush, “State of the Union Address,” January 29, 2002. See also White House, *The National Security Strategy of the United States of America* (Washington, D.C.: White House, September 2002), pp. 13–16.
2. Condoleezza Rice, speech given to the Chicago Council on Foreign Relations, Chicago, Illinois, October 8, 2003. Rice repeatedly connected Iraq’s alleged pursuit of nuclear weapons with terrorism. She explained the case for war against Iraq by arguing, “The problem here is that there will always be some uncertainty about how quickly he [Saddam Hussein] can acquire nuclear weapons. But we don’t want the smoking gun to be a mushroom cloud. . . . There is certainly evidence that al-Qaida people have been in Iraq. There is certainly evidence that Saddam Hussein cavorts with terrorists. . . . We know that he is acquiring weapons of mass destruction, that he has extreme animus against the United States.” Rice, interview by Wolf Blitzer, *Late Edition with Wolf Blitzer*, CNN, September 8, 2002. Similarly, in the lead-up to the invasion, Vice President Dick Cheney asked rhetorically, “Where might these terrorists acquire weapons of mass destruction, chemical weapons, biological weapons, nuclear weapons? And Saddam Hussein becomes a prime suspect in that regard because of his past track record. . . . We know he’s trying once again to produce nuclear weapons and we know that he has a long-standing relationship with various terrorist groups, including the al-Qaida organization.” Cheney, interview by Tim Russert, *Meet the Press*, NBC, March 16, 2003.

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clear weapons to terrorist groups.³ Even President Barack Obama, who as a senator opposed the war against Iraq, declared, "The American people face no greater or more urgent danger than a terrorist attack with a nuclear weapon."⁴ For U.S. leaders, the sum of all fears is that an enemy might give nuclear weapons to terrorists. But are those fears well founded?

The concern that a nuclear-armed state might transfer weapons to terrorists is part of the foundation of U.S. nonproliferation policy. Nonproliferation is pursued for a variety of reasons, including the fear that new nuclear states will use their weapons directly against adversaries, even in the face of a clear risk of retaliation; lose control of their nuclear weapons or materials through regime incompetence, corruption, or instability; trigger regional proliferation cascades among nervous neighbors; or be emboldened to use nuclear weapons as a "shield" for undertaking aggressive diplomatic and military actions, confident that other states could thus be deterred from responding forcefully.⁵ The concern that a state might transfer nuclear weapons to terrorists, however, is among the greatest of these worries, and to many analysts it is the most compelling justification for costly actions—including the use of military force—aimed at preventing proliferation.

Despite the issue's importance, the danger of deliberate nuclear weapons transfer to terrorists remains understudied.⁶ Scholars have scrutinized many

3. Emblematic of this concern is Norman Podhoretz's depiction of "the menacing shadow of an Iran armed with nuclear weapons, and only too ready to put them into the hands of the terrorist groups." He continues, "Even if [President Mahmoud] Ahmadinejad did not yet have missiles with a long enough range to hit the United States, he would certainly be able to unleash a wave of nuclear terror against us. If he did, he would in all likelihood act through proxies, for whom he would with characteristic brazenness disclaim any responsibility even if the weapons used by the terrorists were to bear telltale markings identifying them as of Iranian origin." Podhoretz, "The Case for Bombing Iran," *Commentary*, June 2007, pp. 17–23, at p. 19.

4. White House, *The National Security Strategy of the United States* (Washington, D.C.: White House, May 2010), p. 23. For the views of other U.S. leaders, see also the 2004 and 2008 presidential candidates' statements by John Kerry, George W. Bush, John McCain, and Barack Obama in Francis J. Gavin, "Same As It Ever Was: Nuclear Alarmism, Proliferation, and the Cold War," *International Security*, Vol. 34, No. 3 (Winter 2009/10), pp. 7–37, at p. 7.

5. An additional potential consequence of proliferation is not emphasized in the literature or in policymakers' statements: that an adversary's nuclear weapons will be used to stalemate U.S. conventional military power, and hence complicate the United States' global national security strategy. See Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs*, Vol. 88, No. 6 (November/December 2009), pp. 39–51.

6. For an analysis focusing on Iran and arguing that the risk of deliberate transfer of chemical, biological, or nuclear weapons to terrorists is low, see Daniel L. Byman, "Iran, Terrorism, and Weapons of Mass Destruction," *Studies in Conflict and Terrorism*, Vol. 31, No. 3 (Spring 2008), pp. 169–181. See also the discussion in Daniel L. Byman, "Do Counterproliferation and Counterterrorism Go Together?" *Political Science Quarterly*, Vol. 122, No. 1 (Spring 2007), pp. 25–46. For a more pessimistic assessment, see Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, eds., *America's Achilles' Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack* (Cambridge, Mass.: MIT Press, 1998), which concludes that the risk of states using terrorists to de-

other proliferation concerns more extensively. Analysts have investigated the deductive and empirical bases for claims that new nuclear states would be deterrable;⁷ the likelihood that Iran, in particular, would behave rationally and avoid using nuclear weapons recklessly;⁸ and the risks of proliferation cascades,⁹ “loose nukes,”¹⁰ and nuclear-armed states using their weapons as a shield for aggression or blackmail.¹¹ To the extent that analysts have debated

liver weapons of mass destruction is a significant and growing threat to the United States. See also Michael A. Levi, *Deterring State Sponsorship of Nuclear Terrorism* (Washington, D.C.: Council on Foreign Relations, 2008).

7. Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate Renewed* (New York: W.W. Norton, 2002); Kenneth N. Waltz, “Nuclear Myths and Political Realities,” *American Political Science Review*, Vol. 84, No. 3 (September 1990), pp. 731–745; Kenneth N. Waltz, *The Spread of Nuclear Weapons: More May Be Better*, Adelphi Papers, No. 171 (London: International Institute for Strategic Studies, 1981); and Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Nuclear Armageddon* (Ithaca, N.Y.: Cornell University Press, 1989).

8. Kenneth N. Waltz, “Why Iran Should Get the Bomb: Nuclear Balancing Would Mean Stability,” *Foreign Affairs*, Vol. 91, No. 4 (July/August 2012), pp. 2–5. Evidence suggests that the Iranian government’s leadership is “rational” in the sense that its leaders are goal oriented and do not seek their own destruction in pursuit of religious or ideological goals. On how Iran’s postrevolution leadership has modulated its behavior in response to costs and risks, see Brenda Shaffer, “The Islamic Republic of Iran: Is It Really?” in Shaffer, ed., *The Limits of Culture: Islam and Foreign Policy* (Cambridge, Mass.: MIT Press, 2006), pp. 219–239. See also Juan Cole, *Engaging the Muslim World* (New York: Palgrave Macmillan, 2009), chap. 6.

9. Empirically, evaluations find that nuclear acquisition by one country barely increases the odds that any of its neighbors or enemies will acquire nuclear weapons. See William C. Potter, with Gaukhar Mukhatzhanova, eds., *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*, Vol. 1 (Palo Alto, Calif.: Stanford University Press, 2010), especially Philipp C. Bleek, “Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons,” in *ibid.*, chap. 8. See also William C. Potter, with Gaukhar Mukhatzhanova, eds., *Forecasting Nuclear Proliferation in the 21st Century: A Comparative Perspective*, Vol. 2 (Palo Alto, Calif.: Stanford University Press, 2010); Moeed Yusuf, “Predicting Proliferation: The History of the Future of Nuclear Weapons,” Brookings Institution Foreign Policy Paper Series, No. 11 (Washington, D.C.: Brookings Institution, January 2009); William C. Potter and Gaukhar Mukhatzhanova, “Divining Nuclear Intentions: A Review Essay,” *International Security*, Vol. 33, No. 1 (Summer 2008), pp. 139–169; Jacques E.C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (New York: Cambridge University Press, 2012); and Johan Bergenas, “The Nuclear Domino Myth,” Snapshot, *Foreign Affairs*, August 31, 2010, <http://www.foreignaffairs.com/articles/66738/johan-bergenas/the-nuclear-domino-myth>. John Mueller takes “cascadological hysteria” to task in Mueller, *Atomic Obsession: Nuclear Alarmism from Hiroshima to Al-Qaeda* (New York: Oxford University Press, 2010), pp. 90–95.

10. This hypothesis has been intensely debated. See John Mueller, “Think Again: Nuclear Weapons,” *Foreign Policy*, No. 177 (January/February 2010), pp. 38–44; Micah Zenko and Michael A. Cohen, “Clear and Present Safety,” *Foreign Affairs*, Vol. 91, No. 2 (March/April 2012), pp. 79–93; Kenneth N. Luongo, “Loose Nukes in New Neighborhoods: The Next Generation of Proliferation Prevention,” *Arms Control Today*, Vol. 35, No. 4 (May 2009), pp. 6–14; Graham T. Allison, Owen R. Coté Jr., Richard A. Falkenrath, and Steven E. Miller, *Avoiding Nuclear Anarchy: Containing the Threat of Loose Russian Nuclear Weapons and Fissile Material* (Cambridge, Mass.: MIT Press, 1996); Matthew Bunn, *Securing the Bomb 2010: Securing All Nuclear Materials in Four Years* (Cambridge, Mass.: Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, 2010); Mueller, *Atomic Obsession*, pp. 165–168, 208–210, 238; Gary Millhollin, “Can Terrorists Get the Bomb?” *Commentary*, February 2002, pp. 45–49; and Karl-Heinz Kamp, “An Overrated Nightmare,” *Bulletin of the Atomic Scientists*, Vol. 52, No. 4 (July/August 1996), pp. 30–34.

11. See Todd S. Sechser and Matthew Fuhrmann, “Crisis Bargaining and Nuclear Blackmail,” *In-*

the possibility of covert state sponsorship of nuclear terrorism, however, the arguments have consisted mostly of competing deductive logics—with little empirical analysis.

This article assesses the risk that states would give nuclear weapons to terrorists. We examine the logical and empirical basis of the core proposition: that a state could surreptitiously transfer a nuclear weapon to a like-minded terror group, thus providing the means for a devastating attack on a common enemy while remaining anonymous and avoiding retaliation. The strategy of nuclear attack by proxy hinges on one key question: What is the likelihood that a country could sponsor a nuclear terror attack and remain anonymous? We examine this question in two ways. First, having no data on the aftermath of nuclear terrorist incidents, we use the ample data on conventional terrorism to discover attribution rates. We examine the fraction of terrorist incidents attributed to the perpetrating terrorist organization and the patterns in the rates of attribution. Second, we explore the challenge of tracing culpability for a nuclear terror event from the guilty terrorist group back to its state sponsor. We ask: How many suspects would there be in the wake of a nuclear detonation? How many foreign terrorist organizations have state sponsors? Of those that do, how many state sponsors do they typically have? And how many state sponsors of terrorism have nuclear weapons or sufficient stockpiles of nuclear materials on which to base such a concern?

We conclude that neither a terror group nor a state sponsor would remain anonymous after a nuclear terror attack. We draw this conclusion on the basis of four main findings. First, data on a decade of terrorist incidents reveal a strong positive relationship between the number of fatalities caused in a terror attack and the likelihood of attribution. Roughly three-quarters of the attacks that kill 100 people or more are traced back to the perpetrators. Second, attribution rates are far higher for attacks on the U.S. homeland or the territory of a major U.S. ally—97 percent (thirty-six of thirty-seven) for incidents that killed ten or more people. Third, tracing culpability from a guilty terrorist group back to its state sponsor is not likely to be difficult: few countries sponsor terrorism; few terrorist groups have state sponsors; each sponsored terror group has few sponsors (typically one); and only one country that sponsors terrorism, Pakistan, has nuclear weapons or enough fissile material to manufacture a

ternational Organization, Vol. 67, No. 1 (Winter 2013), pp. 173–195; and Kyle Beardsley and Victor Asal, “Nuclear Weapons as Shields,” *Conflict Management and Peace Science*, Vol. 26, No. 3 (July 2009), pp. 235–255. For earlier analyses, see Barry R. Posen, “U.S. Security Policy in a Nuclear-Armed World (Or: What If Iraq Had Had Nuclear Weapons?),” *Security Studies*, Vol. 6, No. 3 (Spring 1997), pp. 1–31; Jervis, *The Meaning of the Nuclear Revolution*, chap. 1; and Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, D.C.: Brookings Institution Press, 1987), chaps. 1–3, 6.

weapon. In sum, attribution of nuclear terror incidents would be easier than is typically suggested, and passing weapons to terrorists would not offer countries an escape from the constraints of deterrence.¹²

This analysis has two important implications for U.S. foreign policy. First, the fear of terrorist transfer seems greatly exaggerated and does not—in itself—seem to justify costly measures to prevent proliferation. Nuclear proliferation poses risks, so working to prevent it should remain a U.S. foreign policy goal, but the dangers of a state giving nuclear weapons to terrorists have been overstated, and thus arguments for taking costly steps to prevent proliferation on those grounds—as used to justify the invasion of Iraq and fuel the debate over attacking Iran—rest on a shaky foundation. Second, analysts and policymakers should stop understating the ability of the United States to attribute terrorist attacks to their sponsoring states. Such rhetoric not only is untrue, but it also undermines deterrence. States sometimes exaggerate their capabilities to deter an enemy's attacks;¹³ but U.S. analysts and leaders, by understating U.S. attribution capabilities, inadvertently increase the odds of catastrophic terrorist attacks on the United States and its allies.

The remainder of this article is divided into five main sections. The first section examines the logic that might tempt foreign leaders to give nuclear materials to terrorists. The second section uses data from thousands of terrorist incidents to determine historical rates of attribution and critical patterns in these data. The third section explores the challenge of linking terrorist groups with their state sponsors. The fourth section rebuts several counterarguments, and the conclusion discusses the implications of this analysis for U.S. foreign policy.

12. The danger of nuclear attack by proxy has two requirements: (1) that states be willing to transfer such weapons or materials; and (2) that terrorist groups seek to carry out such destructive attacks. In this article, we puncture the first proposition. Other analysts debate the second, articulated in Brian Jenkins's classic statement that "terrorists want a lot of people watching and a lot of people listening and not a lot of people dead." See Jenkins, "International Terrorism: A New Mode of Conflict," in David Carlton and Carlo Schaerf, eds., *International Terrorism and World Security* (London: Croom Helm, 1975), p. 15; Bruce Hoffman, *Inside Terrorism* (New York: Columbia, 2006); Mueller, *Atomic Obsession*, pp. 199–216; and Byman, "Iran, Terrorism, and Weapons of Mass Destruction," pp. 173, 179.

13. Two examples of leaders intentionally overstating their military capabilities are Nikita Khrushchev's exaggerated claims about the Soviet nuclear arsenal in the 1950s and, more recently, Kim Jong-un's faux intercontinental ballistic missiles (ICBMs) on parade in Pyongyang in 2012. On the former, see John J. Mearsheimer, *Why Leaders Lie: The Truth about Lying in International Politics* (New York: Oxford University Press, 2011), pp. 31–32. On the latter, see Markus Schiller and Robert H. Schmucker, "A Dog and Pony Show: North Korea's New ICBM," *Arms Control Wonk*, blog, April 18, 2012, http://lewis.armscontrolwonk.com/files/2012/04/KN-08_Analysis_Schiller_Schmucker.pdf; Jeffrey Lewis, "DPRK ICBM Items," April 19, 2012, *Arms Control Wonk*, <http://lewis.armscontrolwonk.com/archive/5150/dprk-icbm-items>; and Jeffrey Lewis, "Real Fake Missiles?" *Arms Control Wonk*, blog, May 1, 2012, <http://lewis.armscontrolwonk.com/archive/5198/real-fake-missiles>.

The Logic of Nuclear Transfer to Terrorists: Assessing the Challenges

If a state were undeterrable—that is, if its leaders did not fear retaliation—it would presumably conduct a nuclear strike itself rather than subcontract the job to a terrorist group, ensuring that the weapons were used against the desired target at the desired time (not against a target ultimately chosen by terrorists). The calculated, “back-door” approach of transferring weapons to terrorists makes sense only if a state fears retaliation. The core of the nuclear-attack-by-proxy argument is that a state otherwise deterred by the threat of retaliation might conduct an attack if it could do so surreptitiously by passing nuclear weapons to terrorists. Giving nuclear capability to a terrorist group with which the state enjoys close relations and substantial trust could allow the state to conduct the attack while avoiding devastating punishment.

Some analysts are skeptical about such sponsored nuclear terrorism, arguing that a state may not be willing to deplete its small nuclear arsenal or stock of precious nuclear materials. More important, a state sponsor would fear that a terrorist organization might use the weapons or materials in ways the state never intended, provoking retaliation that would destroy the regime.¹⁴ Nuclear weapons are the most powerful weapons a state can acquire, and handing that power to an actor over which the state has less than complete control would be an enormous, epochal decision—one unlikely to be taken by regimes that are typically obsessed with power and their own survival.

Perhaps the most important reason to doubt the nuclear-attack-by-proxy scenario is the likelihood that the ultimate source of the weapon might be discovered.¹⁵ One means of identifying the state source of a nuclear terrorist attack is through “nuclear forensics”—the use of a bomb’s isotopic fingerprints to trace the fissile material device back to the reactors, enrichment facilities, or uranium mines from which it was derived. In theory, the material that remains after an explosion can yield crucial information about its source: the ratio of uranium isotopes varies according to where the raw uranium was mined and how it was processed, and the composition of weapons-grade plutonium reveals clues about the particular reactor used to produce it and how long the material spent in the reactor.¹⁶ The possibility that the covert plot could be dis-

14. See, for example, Bunn, *Securing the Bomb 2010*, p. 20.

15. For examples of these arguments, see Mueller, *Atomic Obsession*, pp. 163–164, and sources cited therein; and Falkenrath, Newman, and Thayer, *America’s Achilles Heel*. Note that even analysts deeply concerned about the problem of nuclear terrorism arising from other sources (e.g., theft or black-market purchase of nuclear materials) can be more sanguine about the possibility of deliberate state transfer. See Bunn, *Securing the Bomb 2010*, p. 20; and Matthew Bunn, “A Mathematical Model of the Risk of Nuclear Terrorism,” *Annals of the American Academy of Political and Social Science*, Vol. 607, No. 1 (September 2006), pp. 103–120, at pp. 115–116.

16. Nuclear weapons use uranium or plutonium as fissile material—that is, the material that is

covered before being carried out also acts as a deterrent. For these and other reasons, some analysts argue that nuclear terrorism is unlikely.

Other policy analysts are more pessimistic. Many find the attribution problem particularly significant, largely because of the technical and political challenges involved in trying to pinpoint the source of nuclear material after a detonation. They argue that the United States has not developed a reliable and credible attribution capability, and they highlight the difficulty of building and maintaining strong nuclear forensic capabilities. A 2010 report by the National Research Council, *Nuclear Forensics: A Capability at Risk*, found the U.S. ability to identify the source of nuclear explosive debris to be “fragile, under-resourced and, in some respects, deteriorating.”¹⁷ The technical challenge of post-explosion forensics has been described as “among the most difficult problems in physics.”¹⁸ In practice, significant challenges arise from the many bomb designs that could be used, as well as from the challenge of building a comprehensive “library” with samples from all the world’s uranium mines, centrifuges, reactors, and related sites. These challenges make it daunting to determine with a high degree of confidence the origin of nuclear material through physical forensics.¹⁹ As a result, some analysts conclude that nuclear attribution currently provides little deterrent value for countries that might consider diverting nuclear weapons or materials to terrorists.²⁰

split to release the energy associated with a nuclear detonation. The uranium used in nuclear weapons is typically U-235, a rare isotope that is acquired by separating the desired isotope from the vastly more plentiful U-238. This separation (i.e., “enrichment”) can be done using various methods; currently, feeding uranium hexafluoride gas through cascades of spinning centrifuges is the most common approach. Plutonium is an element that does not exist in meaningful quantities in nature; it is created in nuclear reactors as a by-product of fission.

17. National Research Council, *Nuclear Forensics: A Capability at Risk*, as cited in William J. Broad, “Nuclear Forensics Skill Is Declining in U.S., Report Says,” *New York Times*, July 29, 2010.

18. Michael Miller, “Nuclear Attribution as Deterrence,” *Nonproliferation Review*, Vol. 14, No. 1 (March 2007), p. 41.

19. Charles D. Ferguson, *Preventing Catastrophic Nuclear Terrorism* (New York: Council on Foreign Relations, 2006), p. 6; and Miller, “Nuclear Attribution as Deterrence,” p. 40. The political obstacles to establishing an effective nuclear attribution capability may be as challenging as the technical ones. As one analyst observes, “The main problem with relying on nuclear forensics to identify those responsible for a nuclear explosion . . . is the need to secure the cooperation of the same countries that could be targets of a nuclear attribution investigation.” Richard Weitz, “Nuclear Forensics: False Hopes and Practical Realities,” *Political Science Quarterly*, Vol. 126, No. 1 (Spring 2011), pp. 54–55. Specifically, the likelihood of securing widespread participation by countries in an international database of nuclear materials—which would entail contributing nuclear samples and divulging highly sensitive information—is remote, given that the ultimate purpose of the enterprise is to identify and punish them if they misbehave or allow material to be stolen. This fundamental problem is compounded by additional practical factors: states that have previously shared nuclear materials with other states have an incentive not to release samples that would implicate them in these proliferation activities; states could submit false information or misleading samples to hide past activity or frame a rival state; and states that legitimately sell or lease nuclear reactor fuel to other countries would fear wrongful accusation if that material were used in an attack. *Ibid.*, pp. 55–66.

20. Broad, “Nuclear Forensics Skill Is Declining in U.S., Report Says.” Although the National Re-

Other pessimistic analyses highlight an important conundrum limiting the ability of nuclear forensics to deter attack: deterrence would be bolstered if the United States made more of its nuclear forensic capabilities public, but greater transparency would give terrorists and their potential sponsors greater knowledge of weaknesses.

In sum, pessimism about post-explosion attribution abounds. If one cannot pinpoint those states responsible for the materials used in a terrorist nuclear attack, the ability to deter those states by threatening nuclear retaliation is greatly weakened. The future sounds dire—but are these threats overblown?

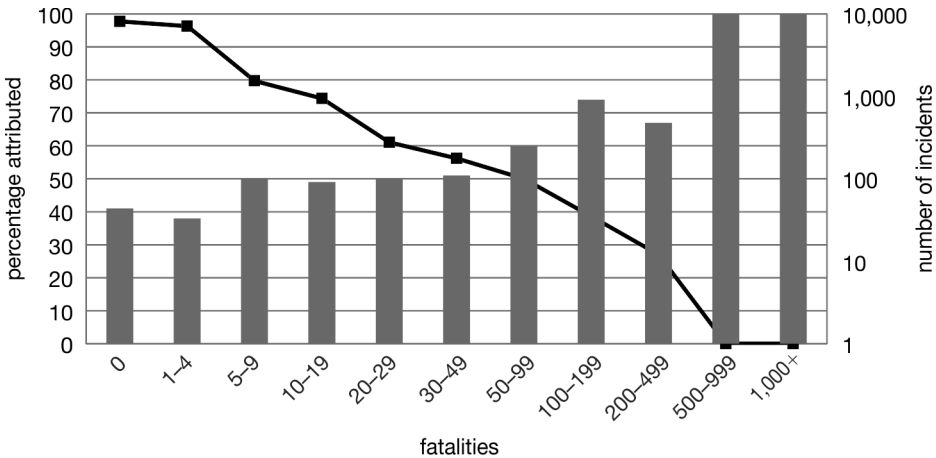
Empirical Evidence from Terrorist Attacks

There have been no nuclear terror attacks, so it is impossible to directly test the proposition that terrorists could conduct such attacks and remain anonymous. In the past few decades, however, there have been thousands of conventional terrorist incidents. It is thus possible to explore rates of attribution after those incidents and seek patterns in the data that might shed light on the prospects for attributing nuclear terrorism.²¹

search Council report is generally sanguine about the potential contribution of nuclear forensics to the attribution mission, the report highlights several major areas of concern about U.S. capabilities, stemming from issues of organizational complexity, lack of direction, and lack of consensus; declining funding; skilled personnel spread too thin and working in outdated facilities; and outdated equipment and procedures. National Research Council, *Nuclear Forensics: A Capability at Risk* (Washington, D.C.: National Academies Press, 2010). On other technical and political obstacles to effective U.S. nuclear forensic capabilities, see Weitz, "Nuclear Forensics," pp. 53–75; Michael M. May, Reza Aberdin-Zadeh, Donald Barr, Albert Carnesale, Philip E. Coyle, Jay Davis, William Dorland, William Dunlop, Steve Fetter, Alexander Glaser, Ian D. Hutcheon, Francis Slakey, and Benn Tannenbaum, *Nuclear Forensics: Role, State of the Art, and Program Needs* (Washington, D.C.: American Association for the Advancement of Science Center for Science Technology and Security Policy, February 2008); National Academy of Sciences, *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism* (Washington, D.C.: National Academies Press, 2002); and Debra Decker, "Comments Provided for the Subcommittee on Oversight of Government Management, the Federal Workforce, and the District of Columbia of the U.S. Senate Committee on Homeland Security and Government Affairs Regarding the Status of U.S. Response Following a Nuclear or RDD Attack," November 15, 2007. Michael Miller, however, argues that the flaws in nuclear forensic capabilities are "such that nuclear attribution currently provides little deterrent value." Miller, "Nuclear Attribution as Deterrence," pp. 33–60, at p. 33. For a balanced analysis of the link between improved nuclear forensics capabilities and the problem of deterring nuclear terrorism, see Caitlin Talmadge, "Deterring a Nuclear 9/11," *Washington Quarterly*, Vol. 30, No. 2 (Spring 2007), pp. 21–34.

21. Important works on "conventional" terrorism include Bruce Hoffman, *Inside Terrorism* (New York: Columbia University Press, 2006); Daniel Byman, *Deadly Connections: States That Sponsor Terrorism* (New York: Cambridge University Press, 2005); Robert A. Pape, *Dying to Win: The Strategic Logic of Suicide Terrorism* (Ithaca, N.Y.: Cornell University Press, 2005); Michael E. Brown, Owen R. Coté Jr., Sean M. Lynn-Jones, and Steven E. Miller, eds., *Contending with Terrorism: Roots, Strategies, and Responsibilities* (Cambridge, Mass.: MIT Press, 2010); Audrey Kurth Cronin, *How Terrorism Ends: Understanding the Decline and Demise of Terrorist Campaigns* (Princeton, N.J.: Princeton University Press, 2011); and John Mueller and Mark G. Stewart, "The Terrorism Delusion: America's

Figure 1. Terrorist Incidents and Rate of Attribution by Number of Fatalities



To explore the history of terrorist attribution, we use the Global Terrorism Database (GTD), a widely referenced dataset compiled by the National Consortium for the Study of Terrorism and Responses to Terrorism, which includes incidents dating back to 1970.²² The version employed here ends in 2008 and includes more than 87,000 terrorist events. We use a subset of the GTD data that includes 18,328 terrorist incidents that occurred from 1998 to 2008.²³ We rely on this portion of the data because GTD first started recording whether terror groups claimed responsibility for an attack in 1998, an important consideration in assessing the data on attribution rates.²⁴

Figure 1 shows the number of terror incidents that occurred from 1998 to 2008, and the rate of attribution, organized by the number of fatalities. The

Overwrought Response to September 11," *International Security*, Vol. 37, No. 1 (Summer 2012), pp. 81–110.

22. National Consortium for the Study of Terrorism and Responses to Terrorism (START), Global Terrorism Database (GTD), 2011, <http://www.start.umd.edu/gtd>.

23. The GTD dataset includes 20,234 incidents from 1998 to 2008. For two reasons, however, our consolidation of the data left us with 18,328 data points. First, a large number of the attacks in the GTD dataset are reported more than once. The GTD is designed to capture detailed information on the weapons and tactics of terrorist groups, so an attack in which, for example, terrorists detonated a bomb outside a building and then armed men stormed the facility would be recorded as two incidents. For our purposes, it would introduce bias if we "double-counted" complex attacks, so we consolidated the data to generate a single data point from each single attack. Second, because a key variable we explore is how attribution varies with fatality level, we ignored the roughly 2.5 percent of incidents for which the number of fatalities is not reported in the dataset.

24. We replicated our analysis with the Worldwide Incidents Tracking System (WITS) database, another major source for data on terrorist acts, and all the major findings reported here are confirmed. We have replicated figures 1 and 2 in this article using WITS data; they are available from the authors upon request.

solid line, corresponding to the logarithmic scale along the right y-axis, indicates the number of terrorist incidents for each level of fatalities.²⁵ The columns, corresponding to the left y-axis, reveal the rate of attribution per fatality.

The data in figure 1 yield two key findings. First, of the 18,328 attacks conducted from 1998 to 2008, GTD researchers identified the attacker 42 percent of the time. That estimate of the “attribution rate,” however, implies greater precision than is warranted, because the researchers who coded the data did not have all the information then or currently available to intelligence and law enforcement agencies. Therefore, some cases that the researchers coded as “un-attributed” may, in fact, have been attributed; and on the other hand, some of the perpetrators identified in the GTD data set may have been incorrectly accused. Despite the possibility of errors in both directions, the data suggest that the perpetrators of terror attacks are identified slightly less than half the time.

The implication of a 40–45 percent attribution rate is subject to competing interpretations. On the one hand, states that seek to retaliate after terrorist attacks may desire a much higher rate of attribution. On the other hand, from the perspective of a potential perpetrator, knowing that a covert nuclear terror attack has only about a 60 percent chance of remaining anonymous should be sobering.

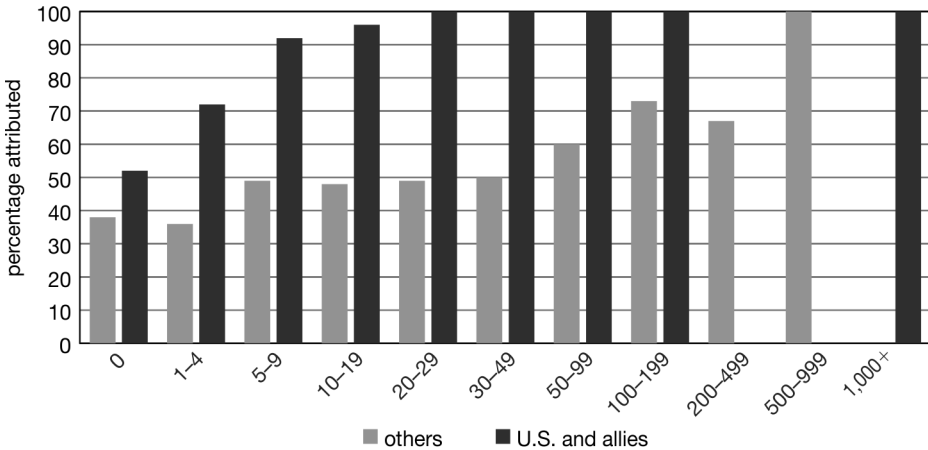
The second principal finding reflected in figure 1 is that the rate of attribution is strongly tied to the number of fatalities caused by the attack. Most terror attacks kill relatively few people. In fact, most of the incidents in the sample caused 0 to 4 deaths; and only 40 percent of those were attributed by GTD to the perpetrator. But as fatalities increase, so does the rate of attribution. Of the 49 attacks that killed more than 100 people, the guilty party was identified 73 percent of the time. Based on these data, a terror group contemplating a mass casualty attack should not expect to remain anonymous.

While figure 1 reveals a link between the level of fatalities and the likelihood of attribution, most of the underlying data are derived from events unlike the kind of incident that drives U.S. fears about proliferation and terrorism: an anonymous nuclear terror strike on the United States or a U.S. ally. The 18,000-plus cases in the dataset are mostly failed attacks, in foreign lands, against target countries with less-capable intelligence agencies than those of the United States and many key U.S. allies.

To shed more light on the prospect of attributing nuclear terror strikes on the

25. We use a logarithmic scale to allow readers to see the number of attacks, and how they decline, as a function of fatalities. Because the data are skewed toward the low-fatality side of the distribution, a linear scale would obscure the number of incidents that killed thirty or more people and the variation among the high-fatality categories.

Figure 2. Attribution Rates by Number of Fatalities: “U.S. and Allies” and All Others



Summary	All cases	Attribution %	10+ Fatality Cases	Attribution %
U.S. and allies	2,089	57%	37	97%
All others	16,239	40%	1,510	50%

United States or a key U.S. ally, we focused on a narrower subset of the GTD data composed of attacks against the United States or its principal allies.²⁶ We also restricted the analysis to attacks on those states’ home territory—thereby excluding incidents such as roadside bombings against military convoys in distant lands. By focusing on attacks on the home soil of these countries, we created a sample of 2,089 cases that provides greater leverage for evaluating whether the United States or a close ally could be struck anonymously.

Figure 2 compares the attribution rates for attacks against the United States and U.S. allies to attacks on the rest of the world. Two major observations emerge from the data. First, across all fatality levels, the United States and its allies substantially outperform the “average” country in attributing terrorist incidents. Second, the rate of attribution for the United States and its allies increases as a function of fatalities—as do the aggregate data in figure 1, but more steeply and reaching higher levels. Specifically, the United States and its allies suffered thirty-seven homeland attacks that killed ten or more people and identified the perpetrators in thirty-six of those cases (97 percent). One should not infer from this that the United States and U.S. allies are the best at

26. For this group, we counted the United States; other NATO members; and Australia, Israel, Japan, and South Korea. Some countries became members of NATO during the decade in question; we counted attacks on their territory starting the year in which they joined the alliance.

attributing attacks—some other countries (e.g., Russia) also have high attribution rates. The claim is merely that when terrorists kill even a moderate number of Americans or citizens of U.S. allies on their home soil, the perpetrators are almost always identified.

The data presented in figures 1 and 2 include cases in which terror groups claim responsibility for their attacks and those in which they do not. Even the cases in which the guilty terror group takes responsibility should be considered “successful attribution,” because successful attacks often induce multiple groups to take credit—requiring the victim to evaluate the competing claims and also look for possible culprits among those who have not taken credit. Furthermore, in some cases the attacks were attributed before the claims of responsibility were issued (for example, the September 11 attacks were attributed to al-Qaida before the group claimed responsibility). For both of those reasons, removing the “claimed” cases from the dataset may exclude many cases of successful attribution.

Nevertheless, figure 3 displays data on the subset of cases in which the guilty party never claimed credit for the attack. As the figure reveals, the unclaimed cases look similar to the claimed ones: the likelihood of attribution increases with the number of fatalities, especially for attacks on the “U.S. and allies.” Furthermore, even when incidents produced only moderate fatalities (5-plus people killed), the United States and its allies identified the perpetrators 83 percent of the time—a rate that should chasten those who might pass nuclear weapons to terrorists.

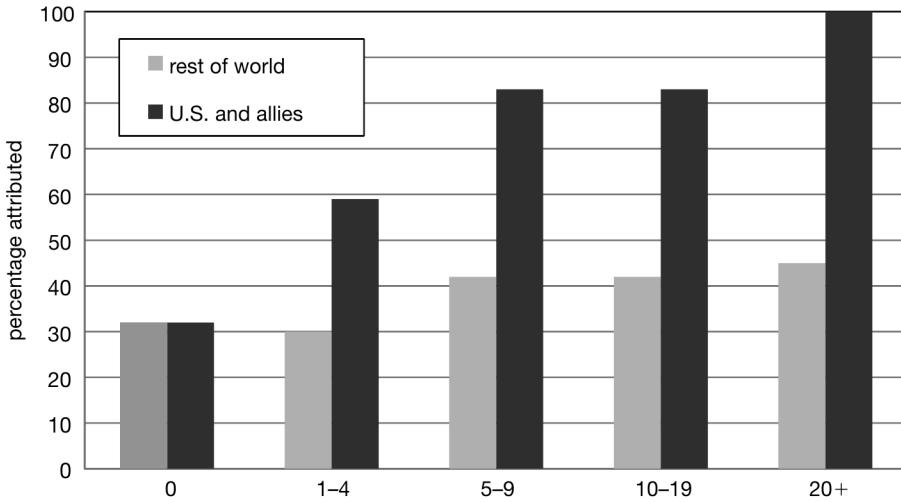
Taken together, the data on conventional terrorism suggest that nuclear attacks—especially those that target countries with sophisticated intelligence agencies—would not remain anonymous for long. In fact, both because of its shocking nature and because of fears of an additional follow-up nuclear terror attack, any instance of nuclear terror would trigger an unprecedented global investigation. The data in this section, therefore, likely understate the probability of attribution. For a state leader contemplating giving a nuclear weapon to terrorists, the implication is clear: your proxy will very likely be identified.

Linking Terrorists to Their Sponsors

The data presented above reveal that devastating attacks are usually attributed to the responsible terrorist organization. But to deter states from passing nuclear weapons or materials to terrorists, one must also be able to connect the terrorists to their state sponsor. How difficult would it be to do this?

Passing nuclear weapons or material to a terrorist group under any circumstances would be a remarkably risky act. A leader who sponsored nuclear ter-

Figure 3. Attribution after Unclaimed Attacks



Summary	0-4 Fatality Cases	Attribution %	5+ Fatality Cases	Attribution %
U.S. and allies	1,358	36%	30	83%
All others	11,939	31%	2,625	43%

rorism would be wagering his life, the lives of family members, his regime, and his country’s fate on the hope that the operation would remain anonymous. If the terror group used the weapon against a different enemy or revealed the source of the weapon, or if the terror group’s operatives or senior leadership were penetrated by foreign intelligence, the consequences could be catastrophic for the sponsor.

Given the enormous risks involved, it is difficult to imagine a state’s leaders placing so much faith in a terrorist organization unless they already had a long-running, close, and trusting relationship with that group, and unless that group had repeatedly demonstrated its reliability, competence, and ability to maintain secrecy. Furthermore, leaders considering giving nuclear weapons to terror groups would need to find a group with the demonstrated capability to conduct complex operations across international borders.²⁷ Many violent nonstate groups can plant roadside bombs or conduct small-scale ambushes against unsuspecting targets, but those relatively simple attacks do not imply an ability to conduct complex international operations involving training,

27. For a thorough discussion of the task, see Mueller, *Atomic Obsession*, pp. 161–198.

travel, visas, finances, and secure communications.²⁸ In short, both the complexities of the mission and the need for unwavering trust mean that a state seeking to orchestrate a nuclear attack by proxy would be limited to collaborations with well-established terrorist organizations with which it has existing relationships, simplifying the task of connecting terrorist perpetrators to their state sponsors.

To assess the difficulty of connecting terrorists to their sponsors, we compiled a list of terror organizations—focusing on those with close relationships to one or more countries. We began with the U.S. State Department's list of foreign terrorist organizations (FTOs), which we then adjusted, as described below, to account for potential omissions.²⁹ The adjustments generally involved adding state-sponsored terror groups to the State Department's list, which, by itself, would make it harder to establish our claim that victims could trace attacks from guilty terrorists to their sponsors.

According to the State Department, there are fifty-one FTOs, only nine of which have state sponsors.³⁰ Furthermore, according to the State Department, only four countries actively sponsor terror groups: Cuba, Iran, Libya, and Syria.³¹

28. For example, a complex international terror operation, such as the September 11 terrorist attacks, requires loyal and competent operatives who can travel to the target state. This often involves gaining entrance visas, establishing secure communication procedures, training the operatives to conduct the mission, moving money across borders, and moving the weapon itself to the victim state. As the September 11 attacks illustrate, sophisticated terrorist groups such as al-Qaida can execute complex operations such as these, but the organizational requirements are far more advanced than the capabilities of local militias and most terrorist groups.

29. U.S. Department of State, "Foreign Terrorist Organizations," September 28, 2012, <http://www.state.gov/j/ct/rls/other/des/123085.htm>. For a description of each foreign terrorist organization (FTO), see U.S. Department of State, "Country Report on Terrorism, 2011" (Washington, D.C.: U.S. Department of State, July 31, 2012), chap. 6, <http://www.state.gov/j/ct/rls/crt/>. The State Department defines an FTO as a group that either engages in terrorism or retains the capability and intent to do so and whose terrorist activities threaten the citizens or interests of the United States. The last criterion means that the list principally includes anti-American terrorists, but it is nevertheless useful for two reasons. First, even though the list excludes terror groups whose interests align with those of the United States, unless "anti-American" terrorist groups have, on average, significantly fewer or significantly more state sponsors than pro-American terror groups, the State Department list offers good insight into the number of state sponsors per terrorist group. Second, although one purpose of this article is to explore the challenge of terrorist attribution generally, a related goal is to explore the challenge of attribution for the United States. The terrorist organizations excluded from this list would not be prime suspects in a nuclear terror strike against the United States.

30. The number of FTOs comes from U.S. Department of State, "Foreign Terrorist Organizations." The number of FTOs with state sponsors is culled from U.S. Department of State, "Country Report on Terrorism, 2011."

31. The State Department also lists Sudan on its list of state sponsors of terror, but only because of Sudan's inability to adequately police its territory (and hence to effectively combat terrorist groups on its own territory). The State Department does not claim that Sudan funds, arms, or gives safe haven to any FTO.

Table 1. State-Sponsored Foreign Terrorist Organizations (FTOs)

	Syria	Iran	Libya	Pakistan	Venezuela	Cuba
Popular Front for the Liberation of Palestine	✓					
Abu Nidal Organization	✓	✓	✓			
Hamas	✓	✓				
Hezbollah	✓	✓				
Palestinian Islamic Jihad	✓	✓				
Popular Front for the Liberation of Palestine—General Command	✓	✓				
Al-Aqsa Martyrs Brigade		✓				
Kata'ib Hezbollah		✓				
Al-Qaida		✓				
Haqqani Network				✓		
Indian Mujahideen				✓		
Jaish-e-Mohammed				✓		
Lashkar-e-Tayiba				✓		
National Liberation Army					✓	
Revolutionary Armed Forces of Colombia					✓	✓

NOTE: Shading indicates the only FTOs that have multiple sponsors. Pakistan is the only sponsor of terrorism that has bomb quantities of fissile material. No FTO has multiple nuclear-capable sponsors, which would remain true even if Iran acquires nuclear weapons.

We made three significant adjustments to this list. Some experts argue that the State Department understates Pakistan’s and Venezuela’s roles in supporting various FTOs, so we added four FTOs that are alleged to have close ties to Pakistan and two that are often linked to Venezuela.³² Furthermore, several terror experts note that al-Qaida has meaningful ties with Iran, even if their relationship is plagued by substantial distrust.³³ (For example, Iran has held

32. In 2008, Pakistan was described as “perhaps the world’s most active sponsor of terrorist groups.” Daniel L. Byman, “The Changing Nature of State Sponsorship of Terrorism,” Saban Center Analysis Paper Series (Washington, D.C.: Brookings Institution, May 2008), p. 7. On Pakistan’s more recent support for terrorists, see Peter Tomsen, “Pakistan: With Friends Like These . . .” *World Policy Journal*, Vol. 28, No. 3 (September 2011), pp. 82–90. The Pakistan-linked groups are Lashkar-e-Taiba, Jaish-e-Mohammed, the Haqqani Network, and the Indian Mujahideen. The groups linked to Venezuela are the Revolutionary Armed Forces of Colombia and the National Liberation Army. See Mark P. Sullivan, “Venezuela: Issues for Congress” (Washington, D.C.: Congressional Research Service, October 12, 2012).

33. Daniel L. Byman, “Unlikely Alliance: Iran’s Secretive Relationship with Al-Qaeda,” *Iranian Sponsorship of Terrorism*, IHS Defense, Risk, and Security Consulting, July 2012.

key al-Qaida members and their families hostage, perhaps in order to deter al-Qaida from attacking Iran or to gain release of Iranian hostages held by the organization.³⁴ But because ties between the state and the group exist, we include al-Qaida on our list.) We are thus left with fifteen terror groups and six states that sponsor terrorism (see table 1).³⁵

Table 1 appears to present a daunting list of FTOs and states, but the data show that tracing an attack from a terror group to its sponsor would be relatively simple. First, nearly all of the terror groups listed have only one or two sponsors: nine FTOs have a single sponsor; five have two sponsors; and only one—the Abu Nidal Organization—has three (and it might soon have only a single sponsor).³⁶ Furthermore, only one of the sponsors has nuclear weapons or bomb quantities of fissile material (Pakistan). If Pakistan were to consider giving a weapon to terrorists, it would not turn to Hezbollah or Hamas, with which it has weak connections. Nor, for the same reason, would Iran give nuclear weapons or material to Jaish-e-Mohammed. The implication is clear: if a terrorist group is identified in a nuclear attack, the list of possible sponsors will be short. In almost every conceivable case, a single nuclear-armed suspect will stand out.

Finally, table 1 does not capture the momentous changes under way in the Middle East. It is unclear whether post-Qaddafi Libya will continue to sponsor terrorism or whether Syria (currently enmeshed in civil war) will remain a sponsor for long. If those two states were to cease supporting FTOs, then no FTO would have more than a single sponsor—making it simple to trace an attack from an identified group to the country that supplied it.

This discussion highlights the fundamental conundrum for a country seeking to sponsor nuclear terror: given the incredible risks, it must collaborate with a group that it trusts completely. At the same time, it must choose a terror partner with whom it has weak (and hence untraceable) ties. These two goals are fundamentally contradictory. Only a terrorist group with a long association and deep ties (and a record of effective operations) could be trusted with a nuclear weapon; such a group, however, would be unlikely to stay below the radar of Western intelligence agencies and hide those close ties.

34. Mark Hosenball, "Documents Show Tense Al Qaeda Relationship," Reuters, May 3, 2012.

35. Other critics question North Korea's absence from the State Department's list of FTOs. On the decision to remove North Korea from the list, see Helene Cooper, "U.S. Declares North Korea off Terror List," *New York Times*, October 12, 2008. Although the North Korean government has carried out numerous attacks against South Korea over the past five decades, the North Korean military conducted those attacks, not terrorist groups. For a discussion of these attacks, see Jennifer Lind, "Why North Korea Gets Away With It," Snapshot, *Foreign Affairs*, April 12, 2012, <http://www.foreignaffairs.com/articles/137399/jennifer-lind/why-north-korea-gets-away-with-it>.

36. Given regime change in Libya and the civil war in Syria, it is unclear whether the organization will continue to receive significant support from those states.

Counterarguments

Critics of our analysis might offer several counterarguments. First, the problem of “loose nukes” might give state sponsors of nuclear terrorism an opportunity for avoiding responsibility for their actions. Second, one might discount empirical evidence about the attribution rate of conventional terror attacks because attributing a nuclear attack would be different—and harder—than attributing an act of conventional terrorism. Third, one might argue that some states will still be tempted to resort to nuclear attack by proxy because the threat of retaliation by the victim would lack credibility given the inherent uncertainty that would persist even in a case of so-called successful attribution.

COUNTERARGUMENT #1: CAPITALIZING ON “LOOSE NUKES”

In the wake of a nuclear detonation, investigators would need to consider the possibility that the nuclear device or fissile materials were obtained without the consent of any state. The attack might not have resulted from a state’s attack-by-proxy strategy, but rather from the problem of “loose nukes”—poorly secured nuclear weapons or materials falling into the wrong hands through illicit means. Knowing that a victim would need to at least consider the possibility of nuclear theft, a state sponsor might hope to succeed with its nuclear handoff under one of two logics. First, a state might give nuclear weapons or materials to a terrorist organization with full awareness that it would be identified as the source, but then try to avoid responsibility by claiming that the weapons or materials had been stolen from its stockpiles. Second, a state might give nuclear weapons or materials to a terrorist organization and try to avoid responsibility by claiming that the weapons or materials were stolen from a different foreign stockpile.

The first strategy—giving nuclear weapons to terrorists and then pleading guilty to the lesser charge of maintaining inadequate stockpile security—is highly dubious. Any state rational enough to seek to avoid retaliation for a nuclear attack would recognize the incredible risk that this strategy entails. In the wake of an act of nuclear terrorism, facing an enraged and vindictive victim, would the state sponsor step forward to admit that its weapons or materials were used to attack a staunch enemy, with the hope that the victim would believe a story about theft and grant clemency on those grounds? If that logic does not appear implausible enough, recall that no state would be likely to give its nuclear weapons or materials to a terrorist organization with which it did not have a long record of cooperation and trust. Thus, a state sponsor acknowledging that it was the source of materials used in a nuclear attack would be doing so in light of its enemies’ knowledge that the terrorists who allegedly

stole the materials happened to have been its close collaborators in prior acts of terrorism. This strategy would be nearly as suicidal as launching a direct nuclear attack.³⁷

The second strategy—giving nuclear weapons to terrorists and then hiding behind the possibility that they were stolen from some unspecified insecure foreign source—deserves greater scrutiny. The list of potential global sources of fissile material seems long. Nine countries possess nuclear weapons, and eleven more have enough fissile material to fashion a crude fission device.³⁸ In 2011 the world's stockpile of highly enriched uranium (HEU), the fissile material most likely to be sought by terrorists,³⁹ was about 1.3 million kilograms, meaning that the material needed for a single crude weapon could be found within the rounding error of the rounding error of global stocks. Perhaps, therefore, nearly all twenty countries with sufficient stocks of fissile material would need to join the lineup of suspects after a terrorist nuclear attack, not as possible sponsors but as potential victims of theft. And if enough fissile material to make a nuclear weapon could be purloined from any of these countries,

37. For example, if Israel suffered a nuclear attack, and Tehran admitted that the weapon used was Iranian but blamed Hezbollah for stealing it, it is unlikely that Israel would believe Iran's story. It might not temper its response even if it did, because it could be argued that Iran's long history of support for Hezbollah makes Tehran responsible for Hezbollah's actions.

38. The nine states with nuclear weapons are China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom, and the United States. The eleven states with at least 15 kilograms of highly enriched uranium or about 5 kilograms of plutonium—the minimum threshold considered necessary to build a crude nuclear device—are Belarus, Belgium, Canada, the Czech Republic, Germany, Italy, Japan, Kazakhstan, the Netherlands, Poland, and South Africa. On fissile material thresholds, see International Panel on Fissile Materials, *Global Fissile Material Report 2011* (Princeton, N.J.: Program on Science and Global Security, Princeton University, 2011), p. 27. On the countries meeting these minimum thresholds, see *ibid.*; James Martin Center for Nonproliferation Studies, "Civil Highly Enriched Uranium: Who Has What?" http://www.nti.org/media/pdfs/HEU_who_has_what.pdf; and Office of the Press Secretary, "Fact Sheet: Ukraine Highly Enriched Uranium Removal," Washington, D.C., March 27, 2012, <http://www.whitehouse.gov/the-press-office/2012/03/27/fact-sheet-ukraine-highly-enriched-uranium-removal>. Although we credit any state with 15 kilograms of HEU as having bomb quantities of fissile material, a uranium-based weapon constructed by terrorists would likely be a simple design (perhaps a "gun-type" weapon) that would require substantially more than 15 kilograms of HEU—possibly in the 50-kilogram range. See, for example, Union of Concerned Scientists (UCS), "Weapon Materials Basics" (Cambridge, Mass.: UCS, April 2004), http://www.ucsusa.org/nuclear_weapons_and_global_security/nuclear_terrorism/technical_issues/fissile-materials-basics.html; and "Nuclear Terrorism 101" (Cambridge, Mass.: Belfer Center for Science and International Affairs, Harvard Kennedy School, n.d.), http://nuclearsummit.org/nuclear_terrorism_101.html.

39. HEU is less radioactive than plutonium and is therefore easier to handle and harder for sensors to detect. HEU can also be used in a crude gun-type fission bomb, a relatively simple device to build. Plutonium, by contrast, is highly radioactive and therefore difficult to handle without inducing debilitating radiation poisoning; it is easier to detect; and it must be detonated through a sophisticated implosion device, which is technically demanding to build—probably beyond the capabilities of terrorist groups.

then perhaps the victim would be unable to rule out all possible sources and thus be unable to punish the real culprit.

This gloomy picture overstates the difficulty of determining the source of stolen material after a nuclear terrorist attack. In the wake of a detonation, the possibility of stolen fissile material complicates the task of attribution—but only marginally. At the end of the Cold War, several countries—particularly in the former Soviet Union—confronted major nuclear security problems, but great progress has been made since then.⁴⁰ Although no country has perfect nuclear security, today the greatest concerns surround just five countries: Belarus, Japan, Pakistan, Russia, and South Africa.⁴¹ In addition, not all of those states are equally worrisome as potential sources of nuclear theft. Substantial concerns exist about the security of fissile materials in Pakistan and Russia (the latter if simply because of the large size of its stockpile), but Belarus, Japan, and South Africa would likely be quickly and easily ruled out as the source of stolen fissile material. Belarus has a relatively small stockpile of fissile material—approximately 100 kilograms of HEU⁴²—so in the wake of a nuclear terrorist attack, it would be easy for Belarus to show that its stockpile remained intact.⁴³ Similarly, Japan (one of the United States' closest allies) and

40. Bunn, *Securing the Bomb 2010*, p. 23–59, gives a detailed account of the progress in securing nuclear material and the remaining risks. Note that our focus in this article is on the security of fissile material, not weapons. All nine nuclear weapon states place great emphasis on security at their nuclear weapons storage sites. Even Pakistan, the country that rightfully inspires the greatest nuclear security concerns, keeps its weapons consolidated at a small number of highly defended facilities, and apparently stores its weapons disassembled with each nuclear core located separately from the rest of the device. On Pakistan storing its weapons disassembled, see Hans M. Kristensen and Robert S. Norris, "Pakistan's Nuclear Forces, 2011," *Bulletin of the Atomic Scientists*, Vol. 67, No. 4 (July/August 2011), pp. 91–99; and David Albright, "Securing Pakistan's Nuclear Infrastructure," in Lee Feinstein, James Clad, Lewis Dunn, and David Albright, *A New Equation: U.S. Policy toward India and Pakistan after September 11* (Washington, D.C.: Carnegie Endowment for International Peace, 2002). Furthermore, most nuclear weapons have sophisticated, integrated locks to prevent unauthorized detonation.

41. According to the Fissile Materials Working Group, "The stocks of nuclear weapons or weapons-usable nuclear material that are most likely to fall into terrorist hands today exist in Russia, Pakistan, and countries with research reactors that use large quantities of highly enriched uranium (HEU)—like Belarus, South Africa, and Japan." Fissile Materials Working Group, "Nuclear Security's Top Priority," *Bulletin of the Atomic Scientists*, online edition, June 12, 2012, <http://www.thebulletin.org/web-edition/columnists/fissile-materials-working-group/nuclear-securitys-top-priority>. See also Bunn, *Securing the Bomb 2010*, pp. 27–43, on risks emanating from Russia and Pakistan, and pp. 43–45 on risks at HEU research reactors. Bunn identifies Belarus, Kazakhstan, and South Africa as posing the greatest dangers, as summarized in Bunn, *Securing the Bomb 2010*, table 3.5. Bunn's list of top concerns includes Kazakhstan, but that country has subsequently eliminated almost all of its highly enriched uranium, and its remaining stock—mostly in the range of 22 to 36 percent enrichment—would be inordinately difficult for a terror group to process into material for a nuclear bomb. Bunn's discussion also includes Ukraine, but Ukraine has subsequently removed all HEU from its territory. On Ukraine, see Office of the Press Secretary, "Fact Sheet: Ukraine Highly Enriched Uranium Removal."

42. Fissile Materials Working Group, "Nuclear Security's Top Priority."

43. As discussed above, a crude, gun-type HEU bomb—the type that terrorists might be able to

South Africa would be keen to allow the United States to verify the integrity of their full stocks of materials. (In the wake of a nuclear terror attack, a lack of full cooperation in showing all materials accounted for would be highly revealing.) Iran is not believed to have any weapons-usable nuclear material to steal,⁴⁴ although that could change. In short, a nuclear handoff strategy disguised as a loose nukes problem would be very precarious.⁴⁵

COUNTERARGUMENT #2: CONVENTIONAL VERSUS NUCLEAR ATTRIBUTION

The evidence presented above shows that the perpetrators of terror attacks against the United States or its allies in which ten or more people are killed on home territory are almost always identified. But these data are based solely on conventional terror attacks. Might acts of nuclear terror be harder to attribute than their conventional cousins?

With no actual cases of nuclear terrorism to examine, it is impossible to know for sure how the challenges of attribution after a nuclear attack would compare to the difficult police and intelligence work that led to attribution in the thousands of cases of conventional terrorism. Logic suggests at least one reason why it might be harder to identify the perpetrators of nuclear terrorism, but many other factors suggest that nuclear attribution would be easier than solving conventional incidents of terrorism. Taken together, these arguments suggest that the data presented above may well understate the actual likelihood of nuclear attribution.

Identifying the perpetrators of a nuclear terror attack, as opposed to a conventional terror incident, would be harder because a nuclear detonation would destroy much of the evidence near the site of the attack. In the aftermath of a conventional bombing, investigators check nearby security cameras for images of the attackers, sift through the debris to recover physical evidence, and interview witnesses. This sort of evidence has proved useful in several terror investigations. For instance, investigators found the vehicle identification number (VIN) from the trucks used to bomb the World Trade Center in 1993 and to destroy the Alfred P. Murrah Federal Building in Oklahoma City in 1995.⁴⁶ A nuclear detonation, however, would leave little (if any) of such evidence.

construct—requires roughly 50 kilograms of HEU, approximately half of Belarus's entire stockpile. It would be simple for Belarus to demonstrate its innocence.

44. Bunn, *Securing the Bomb 2010*, p. 21. Iran has roughly 7 kilograms of irradiated research reactor fuel.

45. Similar to the first strategy, this strategy of trying to capitalize on the problem of loose nukes is confounded by the need for the state sponsor to work with terrorist groups with which they have had long-established relations. For example, if a terrorist nuclear attack were attributed to Lashkar-e-Taiba, it would seem impossible for Pakistan to pin the blame for stolen fissile materials on Japan or South Africa.

46. Robert L. Jackson, "Bomb Case Built a Stub, a Shard, a Shell at a Time," *Los Angeles Times*, December 13, 1993; "Turning to Evidence; Axle and Fingerprints," *Kingman Daily Miner*, April 29,

Although investigators always prefer to have physical evidence from the scene of a bombing, in high-profile investigations such evidence is used in conjunction with vast quantities of other data: for example, information about the activities of terror groups already under surveillance before the attack; intercepted cellphone and internet communications; reports from agents embedded with known terror groups; and similar types of information shared by friendly governments. In fact, while the VIN number was useful in solving the 1993 World Trade Center attack, it was far less important in the Oklahoma City bombing investigation, because the key suspect was in custody before the on-site evidence was gathered. Nevertheless, the loss of evidence from the attack site would complicate the attribution of a nuclear terror attack relative to a conventional terror incident.

There are at least five reasons, however, to expect that attributing a nuclear terrorist attack would be easier than attributing a conventional terrorist attack. First, no terrorism investigation in history has had the resources that would be deployed to investigating the source of a nuclear terror attack—particularly one against the United States or a U.S. ally. Rapidly attributing the attack would be critical, not merely as a first step toward satisfying the rage of the victims but, more importantly, to determine whether additional nuclear attacks were imminent. The victim would use every resource at its disposal—money, threats, and force—to rapidly identify the source of the attack.⁴⁷ If necessary, any investigation would go on for a long time; it would never “blow over” from the victim’s standpoint.

The second reason why attributing a nuclear terror attack would be easier than attributing a conventional terrorist attack is the level of international assistance the victim would likely receive from allies, neutrals, and even adversaries. An attack on the United States, for example, would likely trigger unprecedented intelligence cooperation from its allies, if for no other reason than the fear that subsequent attacks might target them. Perhaps more important, even adversaries of the United States—particularly those with access to fissile materials—would have enormous incentives to quickly demonstrate their innocence. To avoid being accused of sponsoring or supporting the attack, and thus to avoid the wrath of the United States, these countries would likely go to great lengths to demonstrate that their weapons were accounted for, that their fissile materials had different isotopic properties than the type used in the attack, and that they were sharing any information they had on the

1997; and Richard A. Serrano, “McVeigh Guilty in Bombing: Death Penalty Trial Next in Oklahoma Tragedy,” *Los Angeles Times*, June 3, 1997, text of infobox.

47. It is possible that the strong positive relationship between attribution rate and fatalities, as shown in figures 1 to 3, is a reflection of the greater investigative resources devoted to higher-fatality terror attacks.

attack. The cooperation that the United States received from Iran and Pakistan in the wake of the September 11 attacks illustrates how potential adversaries may be motivated to help in the aftermath of an attack and stay off the target list for retaliation.⁴⁸ The pressure to cooperate after an anonymous nuclear detonation on U.S. soil would be many times greater.⁴⁹

Third, the strong positive relationship between the number of fatalities stemming from an attack and the rate of attribution (as depicted in figures 1 to 3 above) suggests that the probability of attribution after a nuclear attack—with its enormous casualties—should be even higher. The 97 percent attribution rate for attacks that killed ten or more people on U.S. soil or that of its allies is based on a set of attacks that were pinpricks compared to nuclear terrorism. The data in those figures suggest that our conclusions understate the actual likelihood of nuclear attribution.

Fourth, the challenge of attribution after a terrorist nuclear attack should be easier than after a conventional terrorist attack, because the investigation would begin with a highly restricted suspect list. In the case of a conventional terror attack against the United States or an ally, one might begin the investigation at the broadest level with the U.S. Department of State's list of fifty-one foreign terrorist organizations. In the case of a nuclear terror attack, only fifteen of these FTOs have state sponsors—and only one sponsor (Pakistan) has either nuclear weapons or fissile materials. (If Iran acquires nuclear weapons, that number will grow to two, but there is no overlap between the terror groups that Pakistan supports and those that Iran assists.)

Finally, any operation to detonate a nuclear weapon would involve complex planning and coordination—securing the weapon, learning to use it, planning the time and location of detonation, moving the weapon to the target, and conducting the attack. Even if only a small cadre of operatives knew the nuclear nature of the attack, the planning of a spectacular operation would be hard to keep

48. James Dobbins, "Engaging Iran," in Robin B. Wright, ed., *The Iran Primer: Power, Politics, and U.S. Policy* (Washington, D.C.: United States Institute of Peace Press, 2010), chap. 47. After the September 11 attacks, Pakistan captured terrorist suspects, allowed the United States to use Pakistani airports and bases for operations into Afghanistan, and provided other kinds of logistical support.

49. The United States invasion of Iraq in 2003 arguably created another incentive for states to cooperate in any investigation. The United States attacked Iraq, toppled its regime, and spent billions of dollars waging a war that devastated the country—even though the evidence connecting Saddam Hussein to September 11, al-Qaida, or the active pursuit of weapons of mass destruction was extraordinarily flimsy. Those actions, despite many other costs to the United States and its interests, likely bought the United States a heavy measure of future cooperation from countries seeking to prove their innocence in the wake of a nuclear terrorist attack. One might argue that some states would withhold cooperation with a future U.S. investigation so as not to be responsible for assisting in the initiation of a massive retaliatory war launched by the United States against the state sponsor. States are unlikely, however, to value these reputational consequences above their own security interests, which would be jeopardized by noncooperation with the United States after a nuclear terror attack.

secret.⁵⁰ For example, six months prior to the September 11 attacks, Western intelligence detected numerous indications that al-Qaida was planning a major attack. The intelligence was not specific enough—or the agencies were not nimble enough—to prevent the operation, but the indicators were “blinking red” for months, directing U.S. attention to al-Qaida as soon as the attacks began.⁵¹

COUNTERARGUMENT #3: UNCERTAINTY AND FAILED DETERRENCE

Skeptics of our confidence in the feasibility of post-nuclear attack attribution might emphasize the role of uncertainty in constraining the response of the victim. Attribution, after all, is not a binary outcome but a matter of probabilities. Each of the cases of “successful attribution” in the data we used reflects a consensus among GTD researchers that a particular group carried out an attack—but there are few cases in which the list of the guilty parties is certain. Without such certainty, a victim of nuclear terrorism would arguably be constrained in its response against a suspected sponsor. Believing this, a state comparing the option of a direct nuclear attack to sponsorship of a terrorist strike might prefer the latter, counting on residual attribution uncertainty to dampen the response.

There are two problems with this counterargument. First, while attribution uncertainty might restrain a state from responding to an act of nuclear terror with a major nuclear retaliatory strike, that option is not the only devastating response available to a country such as the United States or one of its allies. Indeed, regardless of the level of attribution certainty, a nuclear strike might not be the preferred response. For example, in the wake of a nuclear terror attack against the United States thought to be sponsored by Pakistan, Iran, or North Korea, U.S. leaders might not feel compelled to determine those countries’ guilt “beyond a reasonable doubt” or to narrow down the suspect list further; Washington might simply decide that the era in which “rogue states” possessed nuclear weapons must end, and threaten to conquer any country that refused to disarm or that was less than forthcoming about the terror attack.⁵²

Second, this counterargument would be unlikely to carry much weight with a leader contemplating nuclear attack by proxy. A leader tempted to attack because of the prospect of residual attribution uncertainty and the hope that such uncertainty would restrain his victim from lashing out in retaliation would need enormous confidence in the humaneness of his enemy, even at a time

50. Mueller, *Atomic Obsession*, chaps. 12, 13.

51. “The 9/11 Commission Report,” chap. 8.

52. There is precedent for this approach. When Japan attacked Pearl Harbor, the United States framed the attack in a broader context—not solely about the evils of Japan, but the need to stop the Axis—setting the United States down a course to conquer Germany, Italy, and Japan—three far more powerful states in relative conventional terms than Iran, North Korea, and Pakistan today.

when that enemy would be boiling over with rage. For example, could one really imagine an Iranian aide convincing the supreme leader that if Iran gave a nuclear bomb to Hezbollah, knowing that Israel would strongly suspect Iran as the source, Israel's leaders would be too restrained by their deep humanity and lingering doubts about sponsorship to retaliate harshly against Tehran?

In fact, the U.S. response to the September 11 attacks, including the invasions of Afghanistan and Iraq, indicates a willingness to retaliate strongly against those directly culpable (al-Qaida), their associates (the Taliban), and others simply deemed to be troublemakers in the neighborhood (Iraq). There was debate in the United States over the strategic wisdom of invading Iraq, but none of Saddam Hussein's crimes—either known, suspected, or fabricated—were held to an evidentiary standard even close to certainty.⁵³ States that consider giving nuclear weapons to terrorists cannot be certain how the victim will react, but basing one's hope for survival on a victim's reluctance to act on partial evidence of culpability would be a tremendous gamble.

A nuclear terror strike would have momentous consequences. In the case of an attack on the United States, such a strike would draw the full investigative, diplomatic, and military might of the world's only superpower. In that environment, the incentives for allies, neutrals, and adversaries to cooperate would be immense. Therefore, the data offered in figures 1 to 3 (which show attribution rates after attacks that are, by comparison to a nuclear event, mere pinpricks) probably greatly underestimate the odds of attribution. Uncertainties about the full list of possible accomplices might endure, but the notion that a victim of a nuclear terrorist attack would be paralyzed by those uncertainties is far-fetched.

Conclusion

President Obama has identified nuclear terrorism as “the single biggest threat to U.S. security,” describing it as “something that could change the security landscape of this country and around the world for years to come.”⁵⁴ The prospect of an adversary state covertly giving a nuclear weapon or nuclear materials to a terrorist organization has been the animating force in U.S. grand strategy for more than a decade. The scenario was used to justify the invasion of Iraq and toppling of the Iraqi regime in 2003; and in 2012 and 2013, proponents of a preventive military strike on Iran's nuclear facilities frequently argued that such attacks are necessary to eliminate the possibility of Iran trying a

53. For example, according to Lawrence Wright's authoritative account, the Taliban was not complicit in the planning of the September 11 attacks. Wright, *The Looming Tower: Al-Qaeda and the Road to 9/11* (New York: Vintage, 2006).

54. Barack Obama, speech given at the Nuclear Security Summit, Washington, D.C., April 10, 2010.

nuclear attack by proxy against Israel or the United States. We demonstrate here that such fears are overblown. The rationale for state sponsorship of nuclear terrorism lacks sound deductive logic and is empirically unsupported by the most relevant available evidence.

The United States and its allies should be able to deter nuclear-armed states from passing their weapons to terrorists, because a terrorist nuclear strike would not remain anonymous for long and would soon be traced back to the originating state. This conclusion is based on two empirical findings. First, among the relevant past cases of conventional terrorist attacks—those targeting the homelands of powerful states and causing significant casualties—almost all were successfully attributed to the perpetrating terrorist organization. Second, linking the attributed terrorist organization to a state sponsor would not be difficult. Few foreign terrorist organizations have state sponsors; those that do typically have only one; and only one suspected state sponsor of terrorism (Pakistan) has nuclear weapons or sufficient stockpiles of nuclear materials.

Furthermore, potential sponsors of nuclear terror face a wicked dilemma: to maintain distance by passing the weapon to a terrorist group they do not know well or trust, or to maintain control by giving it to a group they have cooperated with repeatedly. The former strategy is mind-bogglingly dangerous; the latter option makes attribution from terror group to sponsor simple.

Our findings have two important policy implications. First, the fear of nuclear attack by proxy by itself does not justify costly military steps to prevent nuclear proliferation. Nuclear proliferation may pose a variety of other risks, and the appropriate level of U.S. efforts to stop proliferation should depend on the cumulative effect of these risks, but the dangers of a nuclear handoff to terrorists have been overstated. For example, Iranian leaders would have to be crazy or suicidal to think that they could give a nuclear weapon to one of their terrorist collaborators and face no repercussions. If leaders were that irrational, the bigger problem would be direct nuclear attack without concern for the retaliatory consequences, not the alleged problem of a nuclear handoff.

A second implication is that instead of publicly stressing the dangers of nuclear attack by proxy and lamenting the limits of U.S. nuclear forensic capabilities (and thus potentially misleading enemies to overestimate the feasibility of an anonymous attack against America), the United States should be advertising its impressive record of attributing highly lethal terrorist attacks. Understating one's own capabilities is a reasonable strategy for luring an enemy into making an unwise attack, but it is a disastrous policy if the goal is deterrence. The most effective way to deter countries from passing weapons to terrorists is to demonstrate the ease of nuclear attribution and the devastating consequences of such attribution to the sponsoring state.