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Today's nuclear dilemma

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Abstract

As part of the *Bulletin of the Atomic Scientists'* 70th anniversary issue, author and investigative journalist Eric Schlosser surveys a nuclear landscape full of dangers, from worldwide nuclear weapons modernization programs and heightened nuclear rhetoric to burgeoning stockpiles of fissile material and shortsighted changes in nuclear doctrine. These dangers are not front-and-center in the public consciousness, as they were in the immediate aftermath of World War II when the *Bulletin* warned that "all we can gain in wealth, economic security, or improved health will be useless if our nation is to live in continuous dread of sudden annihilation." But even though the widespread fear of nuclear weapons has diminished, Schlosser writes, "the danger is far greater now than when those words were written. And the choice between one world or none is even more urgent."

[disarmament](#) [humanitarian movement](#) [nuclear accidents](#) [nuclear mistakes](#)
[nuclear modernization](#) [nuclear weapons](#)

Not long ago, the movement to abolish nuclear weapons had strong momentum. It was endorsed by a bipartisan mix of retired civilian, military, and foreign policy officials in the United States. They included George H. W. Bush and Jimmy Carter, two former presidents; Henry Kissinger, James Baker, and George Shultz, former secretaries of state; Colin Powell, a former secretary of state who'd also served as head of the Joint Chiefs of Staff; Robert McNamara, Frank Carlucci, and William Perry, former secretaries of defense; Sam Nunn, a former chairman of the Senate Armed Services Committee; and a long list of retired colonels, generals, and admirals. Former officials of similar rank added their support in other countries. The presidents of Russia and China backed the idea of a world without nuclear weapons, and so did a newly elected US president. "Some argue that the spread of these weapons cannot be stopped, cannot be checked—that we are destined to live in a world where more nations and more people possess the ultimate tools of destruction," Barack Obama said on April 5, 2009, calling for nuclear abolition before a crowd of 20,000 in Prague. "Such fatalism is a deadly adversary, for if we believe that the spread of nuclear weapons is inevitable, then in some way we are admitting to ourselves that the use of nuclear weapons is inevitable" ([White House, 2009](#)).

Six years later, the momentum seems headed in the opposite direction. As Hans M. Kristensen and Robert S. Norris of the Federation of American Scientists have noted in these pages, all of the countries that possess nuclear weapons are now modernizing their arsenals ([Kristensen and Norris, 2014](#)). Russia is introducing new land-based and submarine-based missiles. China is not only increasing the number of its nuclear weapons but also deploying missiles that can carry multiple warheads. France is adding new missiles to its submarines, as well as new warheads. The United Kingdom is investing in an expensive replacement for its Trident submarines. Israel is adapting its nuclear cruise missiles to be carried by submarines. India is building new long-range missiles and a new reactor for making plutonium. Pakistan is developing tactical weapons that can be used on the battlefield. North Korea recently claimed to be increasing the size of its nuclear stockpile. And the United States is in the early stages of a nuclear modernization program that will commission new land-based missiles, new ballistic missile submarines, and new long-range bombers. According to one study, over the next 30 years that program will cost about one trillion US dollars (\$1,000,000,000,000).

Thanks to Vladimir Putin, the rhetoric surrounding nuclear weapons has changed too. They are once again being celebrated as symbols of national power. Putin has boasted about the size of Russia's nuclear arsenal. One of his ambassadors said that nuclear weapons would be aimed at Denmark if it participated in NATO's missile-

defense scheme. And Putin's chief propagandist, the head of an official news agency, reminded his television audience that Russia was still "the only country in the world capable of turning the USA into radioactive dust" (Mackey, 2014). More than two decades after the end of the Cold War, Russia's nuclear threats increasingly resemble those made by North Korea—whose government released a propaganda video in 2013 titled "Firestorms Will Rain on the Headquarters of War" (Guardian, 2013). It showed the United States Capitol being destroyed by a nuclear strike.

The patriotic meaning ascribed to nuclear weapons too often obscures an important fact. These weapons are not merely symbols; they are machines. Indeed, they are the most dangerous machines ever invented. And like all machines, they can go wrong. We now know that during the Cold War a number of accidents involving American nuclear weapons could have destroyed large areas of the United States—most notably when a pair of hydrogen bombs was inadvertently released over North Carolina in January 1961. As one of the bombs struck the ground, a firing signal was sent, and the failure of a single safety switch could have led to a full-scale nuclear detonation. That type of switch was later found to be defective in other weapons and removed from service. Glitches in both the Soviet and American early-warning systems could have prompted the launch of ballistic missiles in retaliation against a nonexistent surprise attack. During the Cuban Missile Crisis, misunderstandings, miscommunications, and flawed command-and-control systems almost led to a full-scale nuclear war, even though both sides were desperate to avoid one.

The technical and administrative controls governing nuclear weapons have been designed by human beings—and therefore remain imperfect. The danger of accidents, mistakes, false alarms, blackmail, theft, and sabotage has not been eliminated. In 2007, the Air Force misplaced half a dozen cruise missiles with nuclear warheads for a day and a half. The following year, a fire at a Minuteman III silo in Wyoming wasn't detected until five days after it had extinguished itself. One high-ranking American nuclear commander was recently fired for using counterfeit chips at a casino in Council Bluffs, Iowa; another, for his drunken behavior with young women in Moscow. Dozens of Air Force missile launch officers have been caught cheating on their exams. At least two were court-martialed for using illegal drugs. And a third was given a 25-year prison sentence for drug-dealing and rape, prompting a newspaper headline straight out of *Dr. Strangelove*: "US Air Force Nuclear Missile Officer was Leader of Violent Street Gang." In 2010, 50 Minuteman III missiles suddenly went offline, and for almost an hour launch crews could not communicate with their missiles. The problem was later attributed to a circuit card improperly installed in a computer. The Air Force vehemently denied that its command-and-control systems had been hacked. But during a speech in June 2015, General James Cartwright, a former head of the US Strategic Command, argued that the ongoing threat posed by cyberattacks was one reason that the United States and Russia should take all of their missiles off alert. "You've either been hacked and not admitting it, or you're being hacked and don't know it," Cartwright said (Cirincione, 2015).

The United States is by no means the only country having problems with the management of its nuclear arsenal. In December 2011, a submarine caught fire in the Russian port of Murmansk and burned for hours. According to the Foreign Minister of Sweden, the missiles on that sub were carrying nuclear weapons. An investigation by a newspaper in Brittany found major security problems at Ile Longue, France's ballistic-missile-submarine base. During an exercise there, French commandos managed to sneak into the base, put an explosive device inside a sub loaded with nuclear warheads, and leave without being detected. A Royal Navy whistleblower has claimed that the United Kingdom's Trident submarines are obsolete and poorly managed, a "disaster waiting to happen" (Guardian, 2015). Little is known about how the nuclear weapon complexes in India, Pakistan, and North Korea are being run. The high rate of industrial accidents in those first two countries should raise concern about their ability to operate the world's most lethal technological system. Defectors from North Korea claim that major industrial accidents there are routine.

Every country that has a nuclear arsenal faces the challenge of securing not only its weapons but also its fissile materials. At the moment, there are about two million pounds of weapons-grade uranium and about a million pounds of plutonium in the world. The amount that a terrorist would need to build a powerful nuclear device could fit into a gym bag.

Changes in military doctrine have also increased the risk that nuclear weapons may be used deliberately or accidentally. Russia has declared that it will launch a limited nuclear strike in response to "large-scale aggression utilizing conventional weapons," lowering the threshold for first use. The strategy assumes that the detonation of nuclear weapons will "de-escalate" the conflict. Pakistani officials have openly discussed the need for tactical weapons to thwart an attack by India's superior conventional forces. In many ways, the nuclear strategies contemplated by Russia and Pakistan bring to mind those that NATO employed during the Cold War. But the reliance on tactical weapons to deter a Soviet invasion of Western Europe proved to be a dangerous policy. Those weapons had to be dispersed to frontline units—and the authorization for using them was delegated to relatively low-level officers. A strategy meant to de-escalate a war could have the opposite effect, President John F. Kennedy was told by his national security advisor, McGeorge Bundy. "[A] subordinate commander faced with a substantial Russian military action," Bundy wrote in a classified memo, "could start the thermonuclear holocaust on his own initiative if he

could not reach you (by failure of communication at either end of the line)" ([Bundy, 1961](#)). For the next 30 years, American presidents tried to resolve the inherent contradictions of a nuclear strategy dependent on both strategic and tactical weapons—without success.

The increased spending on nuclear weapons during the past few years does not reflect a renewed appreciation for their military usefulness. On the contrary, as conventional weapons become more accurate and precise, it is hard to imagine how nuclear weapons might be used effectively in battle. Amid preparations for the first Gulf War, Secretary of Defense Dick Cheney asked for a study of nuclear strike options. It concluded that a large number of tactical weapons would be required to destroy a single Iraqi armored division. "If I had had any doubts before about the practicality of nukes on the field of battle, this report clinched them," Colin Powell later recalled ([Powell and Perisco, 1995](#): 486). A more recent study found that the detonation of a single nuclear weapon at a NATO air base in Italy might cause as many as 250,000 civilian casualties and deposit radioactive fallout on the Ukraine and parts of western Russia ([McKinzie et al., 2014](#)).

The proponents of nuclear weapons argue that a lack of military utility is irrelevant—and that nuclear deterrence has prevented a major power conflict since 1945, thereby saving millions of lives. Their argument is hard to refute. And yet deterrence is a form of psychological, not physical, defense. It is simply a threat: If you attack my country, I will destroy yours. That nuclear deterrence has worked in the past offers no guarantee it will work a year, a month, even a day from now. Unlike the ideologies prevalent during the Cold War, today's religious extremism often champions the mass killing of nonbelievers, the destruction of culturally significant buildings, and a glorious martyrdom on behalf of the cause. For such adversaries, the logic of nuclear deterrence may well be meaningless. And if deterrence fails, the consequences will be horrific. A relatively small-scale nuclear exchange between India and Pakistan, involving about a hundred weapons, could cause a global "nuclear winter" and kill more than a billion people.

In response to the nuclear threats of the 21st century, a new abolition movement has arisen. It emphasizes the potential humanitarian impact of nuclear weapons and their inherent violation of international law. It recognizes that nuclear deterrence is a form of hostage taking—a vow to slaughter millions of noncombatants as an act of vengeance. According to the World Health Organization, no nation on Earth has the emergency medical response capability to cope with the detonation of one nuclear weapon in an urban area, let alone hundreds or thousands. Moreover, the Geneva Conventions prohibit attacks directed at civilians, as well as attacks that do not discriminate between military and civilian targets. The underlying basis of nuclear deterrence and the use of nuclear weapons therefore violates international law. The International Campaign to Ban Nuclear Weapons has persuaded more than 100 countries to sign a Humanitarian Pledge calling for meaningful steps toward abolition. The group is also promoting a treaty to outlaw nuclear weapons, much like the treaties that have banned land mines, cluster munitions, and chemical weapons. The aim is to establish a new international norm and apply pressure on the nuclear powers to eliminate their arsenals. Such a goal may seem unrealistic at the moment. And yet more than 190 countries—including the United States, Russia, China, the United Kingdom, and France—promised to seek "a Treaty on general and complete disarmament under strict and effective international control" when they signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). The recent Iran deal suggests that the spread of nuclear weapons can still be halted; the NPT's insistence that they be outlawed, as well, deserves much more attention.

Although the knowledge of how to build a crude, improvised nuclear device will be difficult to erase from the annals of science, the ability to create a large nuclear weapons program is more easily thwarted and suppressed. The sociologists Donald MacKenzie and Graham Spinardi have written about the importance of "tacit knowledge" and the possibility of "uninventing" nuclear weapons ([MacKenzie and Spinardi, 1995](#): 44). Unlike the sort of information that can be retained in blueprints, diagrams, and documents, tacit knowledge is held solely in the minds of human beings. It can be forgotten. Amid a postwar shortage of plutonium in the United States, scientists at Los Alamos realized that nobody had saved all the plans for building the sort of uranium bomb dropped on Hiroshima. A machinist offered to demonstrate how one aluminum part of that bomb had been forged: He'd wrapped the metal around a Coke bottle. More recently, it took Los Alamos almost a decade to produce "fogbank," the code name for a secret component necessary for modern thermonuclear weapons. Production of fogbank had ended after the Cold War—and years later nobody was exactly sure how to do it. With the passage of time and the absence of nuclear testing, the reliability of an arsenal will become more uncertain. And the value of those weapons will diminish.

Today's advocates of nuclear abolition must contend with low public awareness of the issue and a great deal of complacency. A nuclear weapon has not destroyed a city in more than 70 years. But it is well worth remembering how Americans responded to the destruction of Hiroshima and Nagasaki. Within days of the atomic bombings, *The Nation* magazine outlined the inescapable, existential dilemma: "We face a choice between One World or None" ([Kirchwey, 1945](#)). According to the historian Paul Boyer, the fear of nuclear annihilation "cut across all political and ideological lines [and] ... pervaded all society" ([Boyer, 1985](#): 15). A majority of the American people soon

