

# The Lugar Survey On Proliferation Threats and Responses



**Richard G. Lugar**  
**United States Senator for Indiana**  
**Chairman, Senate Foreign Relations Committee**

Photographs clockwise from top left:

Two of the more than 150 decaying decommissioned Russian nuclear submarines in the Barents Sea; Radioisothermic generators in Georgia that contain dirty bomb material in newly installed safe storage provided by the United States; Storage box containing dangerous biological pathogens secured with a wax seal in Ukraine; A shed filled with chemical weapons canisters in Albania.

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**By United States Senator Richard G. Lugar  
Chairman, Senate Foreign Relations Committee**

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# The Lugar Survey on Proliferation Threats and Responses

Since the fall of the Soviet Union, vulnerability to the use of weapons of mass destruction has been the number one national security dilemma confronting the United States and much of the world. After many years, the events of September 11, 2001, and the subsequent public discovery of al-Qaeda's methods, capabilities, and intentions brought our vulnerability to the forefront.

The War on Terrorism proceeds in a world awash with nuclear, chemical and biological weapons and materials. Most of these weapons and materials are stored in the United States and Russia, but they also exist in India, Pakistan, Iran, Libya, North Korea, Syria, Sudan, Israel, Great Britain, France, China, and perhaps other nations.

We must anticipate that terrorists will use weapons of mass destruction if allowed the opportunity. The minimum standard for victory in this war is the prevention of any terrorist cell from obtaining weapons or materials of mass destruction. We must make certain that all sources of WMD are identified and systematically guarded or destroyed.

With this in mind, I am hopeful that this study will contribute to the discussion inside and outside of governments about how we can strengthen non-proliferation efforts, improve safeguards around existing weapons and materials, bolster intelligence gathering and interdiction capabilities, and expand international cooperation in dealing with a threat that should deeply concern all governments and peoples.

## **Building on Existing Non-Proliferation Efforts**

The post-Cold War era of non-proliferation policy began in 1991 with the conception of the Nunn-Lugar Cooperative Threat Reduction Program to combat the WMD proliferation threat in the former Soviet Union. At that time, the vast nuclear, chemical and biological arsenal of the former Soviet Union had become an immediate and grave proliferation risk. Many weapons sites lacked basic defenses and safeguards. Soldiers and personnel guarding weapons and materials were poorly paid. The entire Russian economy was in shambles, increasing incentives for bribery and black market activity. Moreover, many weapons sites were located outside of Russia, in newly independent states such as Belarus, Ukraine and Kazakhstan. This created the possibility of an expansion of nuclear powers with unpredictable results.

Former Senator Sam Nunn and I came together to write and promote legislation to establish a program that devoted American technical expertise and money for joint efforts to safeguard and destroy these vulnerable weapons and materials of mass destruction. We received invaluable encouragement, support and insight from leaders in the United States and the former Soviet Union who recognized the dangers of inaction.

The program has demonstrated over the last thirteen years that extraordinary international relationships are possible to improve controls over weapons of mass destruction. Since enactment of the Nunn-Lugar Program in late 1991, the United States and Russia have worked together to destroy 6,624 nuclear warheads and dismantle hundreds of bombers, missiles, and submarines of the former Soviet Union that were built to deliver them. The Nunn-Lugar Program is employing in peaceful pursuits tens of thousands of Russian weapons scientists whose knowledge of weaponry is a prized commodity on the black market. The program also has made progress toward protecting nuclear material, biological weapons laboratories and chemical weapons stockpiles. Nunn-Lugar facilitated the removal of all nuclear weapons from Ukraine, Belarus and Kazakhstan. After the fall of the Soviet Union, these three nations emerged as the third, fourth, and eighth largest nuclear powers in the world. Today, all three are nuclear weapons free as a result of cooperative efforts under the Nunn-Lugar Program. With the passage of the Nunn-Lugar Expansion Act in 2003, the program can be targeted at proliferation problems beyond the borders of the former Soviet Union.

These successes were never a foregone conclusion. Even today, constant vigilance is required to ensure that the Nunn-Lugar Program is not encumbered by bureaucratic obstacles or undercut by political disagreements. Nevertheless, we have achieved a rough political consensus on the need for non-proliferation programs. Perhaps as important, a much higher percentage of policymakers are taking an intense interest in the Nunn-Lugar Program and other non-proliferation efforts.

The proliferation of weapons of mass destruction is not just a security problem. It is the economic dilemma and the moral challenge of the current age. On September 11, 2001, the world witnessed the destructive potential of international terrorism. But the September 11 attacks do not come close to approximating the destruction that would be unleashed by a nuclear weapon. Weapons of mass destruction have made it possible for a small nation, or even a sub-national group, to kill as many innocent people in a day as national armies killed in months of fighting during World War II. Beyond the initial horrific loss of life, efforts to advance the standard of living throughout the world would be undercut by the uncertainty and fear that would follow a catastrophic terrorist attack.



Even if we succeed spectacularly at building democracy around the world, bringing stability to failed states, and spreading economic opportunity broadly, we will not be secure from the actions of small, disaffected groups that acquire weapons of mass destruction. Everything is at risk if we fail in this one area.

The bottom line is this: for the foreseeable future, the United States and other nations will face an existential threat from the intersection of terrorism and weapons of mass destruction. Preventing terrorists from obtaining weapons or materials of mass destruction is a far more exacting arms control goal than existed during the 1970s and 1980s, when a successful agreement might allow for thousands of new nuclear weapons.

I believe that we can develop the international practices and norms that can almost guarantee that terrorists will not have access to nuclear weapons. In doing so, we can transform our world into a place that is more secure and more connected than it has ever been.

As part of the global war against terrorism, the United States and its allies must establish a worldwide system of accountability for nuclear, biological and chemical weapons. In such a system, every nation that has weapons and materials of mass destruction must account for what it has, safely secure what it has, and demonstrate that no other nation or cell will be allowed access. If a nation lacks the means to do this, the international community must provide financial and technical assistance.

The American people expect their government to be working day and night to find and eliminate weapons of mass destruction. So do I. Our political leadership and non-proliferation experts must engage Russia to unlock the last doors to the dismantlement of its weapons programs. Further, they should scour the globe to identify and create opportunities to dismantle dangerous weapons programs outside the former Soviet Union. Persistent diplomacy at the highest levels of our government is needed each day if we are to succeed.

## The Survey

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I have been indebted to the work of numerous scholars, policy makers, diplomats, and technicians who have devoted themselves to the study and practice of non-proliferation. Some have operated on the frontlines of our country's defense against these hideous weapons. They have accepted the risks and hardships that go with this task, because they are committed to making the world a safer place and protecting the American people. Others have provided indispensable research and ideas about how we can most effectively prevent the spread of weapons of mass destruction.

In this report, I have sought to collect the opinions of non-proliferation and national security experts whose opinions I value and respect. I sent out 132 surveys in late 2004 and early 2005 with the expectation of receiving at least 50 responses. I received completed surveys from 85 of those polled. Given the provocative nature of some questions and other factors, officials who were serving in the Administration were not surveyed. However, some members of the group filled out the survey prior to taking jobs in the government.

Members of the group were informed that their names would be listed in this report, but that their individual responses would not be attributed to them. Survey group members were allowed to leave answers blank if they did not feel that they had an informed opinion. In a small number of cases (fewer than 10), specific answers to individual questions were not included in overall calculations due to discrepancies or miscommunications.

I would underscore that this study is not meant to be a scientific poll of the entire national security community. Rather, my intent was to discover consistencies and divergences in attitudes about non-proliferation among a large and diverse group of well-informed experts. Effort was made to recruit many experts from both the right and the left. Surveys were also sent to several dozen experts in foreign nations.

I believe that the results of this survey will be useful in helping to define the parameters of the risks that we face, assessing the current state of non-proliferation and counter-proliferation efforts, and identifying issues of concern that require more attention. I am hopeful that it will provide a point of reference for scholars and practitioners, as well as those who do not follow proliferation issues on a daily basis.

## The Survey Group

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I thank the following experts for sharing their thoughts and estimates in this survey. Many of these men and women have dedicated their professional careers to the study and practice of preventing weapons of mass destruction and materials from falling into unauthorized hands. Others have been national security leaders within their countries. As a group, they possess enormous experience in the fields of non-proliferation, counter-proliferation, diplomacy, military affairs, arms inspection, intelligence gathering, and other national security fields relevant to the questions asked.

Nobumasa Akiyama	Edward P. Djerejian	Fred C. Ikle	William C. Potter
Richard V. Allen	James Dobbins	Bobby Ray Inman	Mansour Abo Rashid
Graham Allison	Robert J. Einhorn	Josef Joffe	Joseph Rotblat
Jeff Bergner	Rolf Ekeus	Robert Joseph	Roberto Russell
Christopher Bertram	Amitai Etzioni	Arnold Kanter	Gary Samore
Hans Binnendijk	Richard Falkenrath	David Kay	Martin Schram
Nils Bohmer	Peter D. Feaver	Tommy T.B. Koh	H. Norman Schwarzkopf
Stephen W. Bosworth	Charles D. Ferguson	Franklin Kramer	Radek Sikorski
William Burns	Richard W. Fisher	Michael Krepon	Walter B. Slocombe
Richard Butler	Lawrence Freedman	Ronald F. Lehman, II	Amy Smithson
Frank C. Carlucci	Robert Gallucci	Robert S. Litwak	Richard H. Solomon
Ashton B. Carter	Asha George	Kenneth Luongo	Noordin Sopiee
Eric Chivian	Reuel Marc Gerech	Morten Bremer Maerli	Gerald M. Steinberg
Joseph Cirincione	Jozef Goldblat	Maurizio Martellini	Strobe Talbott
Patrick Clawson	James E. Goodby	Michael L. Moodie	Marianne Van Leeuwen
William S. Cohen	Rose Gottemoeller	William L. Nash	Paul F. Walker
Anthony H. Cordesman	Donald P. Gregg	Norman P. Neureiter	Jusuf Wanandi
Arnaud de Borchgrave	Richard N. Haass	Sam Nunn	John S. Wolf
Therese Delpech	John Hamre	Don Oberdorfer	R. James Woolsey
Stephen J. Del Rosso, Jr.	Siegfried S. Hecker	Masakatsu Ota	Ichita Yamamoto
Rut Diamint	James F. Hoge, Jr.	Matt Petersen	

## Review of the Results

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According to the experts surveyed, the possibility of a WMD attack against a city or other target somewhere in the world is real and increasing over time. Even within the short time frame of the next five years, the risks of such an attack were judged to be substantial. The median estimate of the risk of a nuclear attack during the next 5 years was 10%. The average estimate was 16.4%.

When the time frame was extended to 10 years, the median response doubled to 20% and the average response almost doubled to 29.2%. The estimates of the risks of a biological or chemical attack during the same time periods were each judged to be comparable to or slightly higher than the risk of a nuclear attack.

The group saw the risk of a radiological attack as significantly higher. The median and average estimates of risk were 25% and 27.1% respectively over the next five years. Over ten years, both the median and the average estimate of risk jumped to 40%. The median estimate of the probability of a radiological attack over ten years was twice as high as the estimate for a nuclear or biological attack during the same period.

If one compounds these answers, the odds of some type of WMD attack occurring during the next decade are extremely high. Because the risks of each individual type of WMD attack are not statistically independent, one cannot calculate the risk of a WMD attack by just compounding through mathematical formula the median or average percentages for a nuclear, biological, chemical, and radiological attack. But the survey responses suggest that the estimated combined risk of a WMD attack over five years is as high as 50%. Over ten years this risk expands to as much as 70%.

There was broad agreement within the group that nuclear weapons will proliferate to new countries in the coming years. Estimates of how many countries would be added to the nuclear club over the next five and ten years were extremely consistent. Large majorities judged that one to two new nuclear nations would be added during the next five years and that two to five would be added during the next ten years. Answers diverged somewhat when the group was asked to estimate how many new nuclear states would emerge over 20 years, but almost three-quarters estimated a number between four and ten.

There was strong, though not universal, agreement that a nuclear attack is more likely to be carried out by a terrorist than by a government in the next ten years. The group was split 45% to 55% on whether terrorists were more likely to obtain an intact working nuclear weapon or manufacture one after obtaining weapons grade nuclear material. The results underscore the need to improve security around tactical nuclear weapons and nuclear material in Russia and expand our ability to detect transfers of weapons or materials from rogue states to terrorist organizations. A majority of the group designated a black market purchase as the most likely method by which terrorists could obtain nuclear weapons or fissile material.

Almost four-fifths of the experts surveyed said that their country was not spending enough on non-proliferation objectives. None of the experts believed that their country was spending too much on non-proliferation. More than half of the experts recommended an increase of 50% or more in their nation's non-proliferation budget.

A plurality said the top non-proliferation priority should be to secure and dismantle weapons and materials of mass destruction in the former Soviet Union. More than a quarter of the respondents either listed by name the Nunn-Lugar Program, saying the top priority should be to implement, strengthen or expand it, or listed as the top goal a particular Nunn-Lugar objective, such as securing former Soviet weapons, employing former weapons scientists, or gaining access to Russia's biological weapons labs. The second most frequently listed 'top goal' was containing the nuclear threats from Iran and North Korea. The experts had a number of different ideas about which area of non-proliferation work was most in need of more attention. The most commonly cited area, by about 10 per cent of respondents, was the need to expand efforts to prevent terrorist use of chemical and biological weapons. Others said we should do more to prevent weapons scientists from selling their knowledge, to shut down black market networks, or to secure ports and shipping.

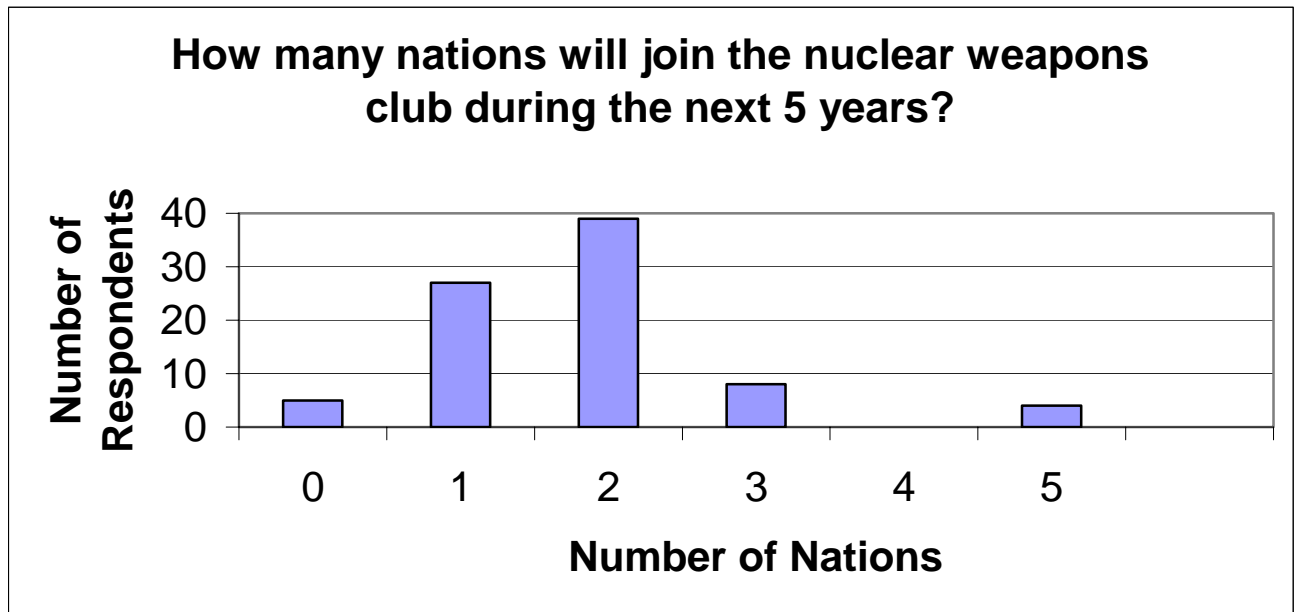


# **Part I: Assessing Proliferation Threats**

## Nations Added to the Nuclear Club during the Next 5 Years

**Question 1:** In your estimate, how many nations that do not currently possess a working nuclear weapon will be added to the nuclear weapons club during the next 5 years?

More than 78% of respondents (65 of 83) agreed that one or two new nations would acquire nuclear weapons during the next five years. More than 89% (74 of 83) agreed that between one and three new nuclear nations would emerge during this period. Only four respondents believed that more than three new nuclear powers would be added, and only five said that no new nuclear states would emerge.



**Average Response: 1.8 | Median Response: 2**

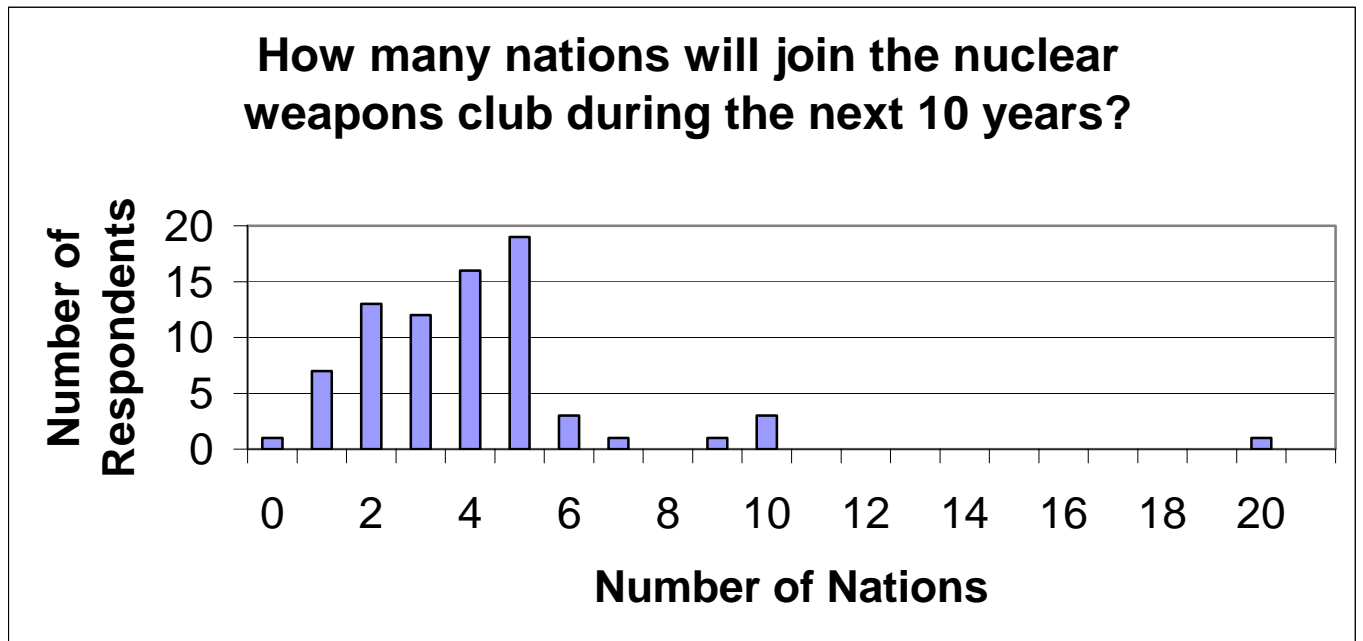
**Number of Responses: 83**



## Nations Added to the Nuclear Club during the Next 10 Years

**Question 2:** In your estimate, how many nations that do not currently possess a working nuclear weapon will be added to the nuclear weapons club during the next 10 years?

Even when the time frame was extended to ten years, there was substantial agreement among respondents on the number of new nuclear weapons states that would emerge. About 78% (60 of 77) agreed that between two and five new nations would acquire nuclear weapons during the next ten years. Eight experts believed the number would be less than two. Nine believed the number would be greater than five.



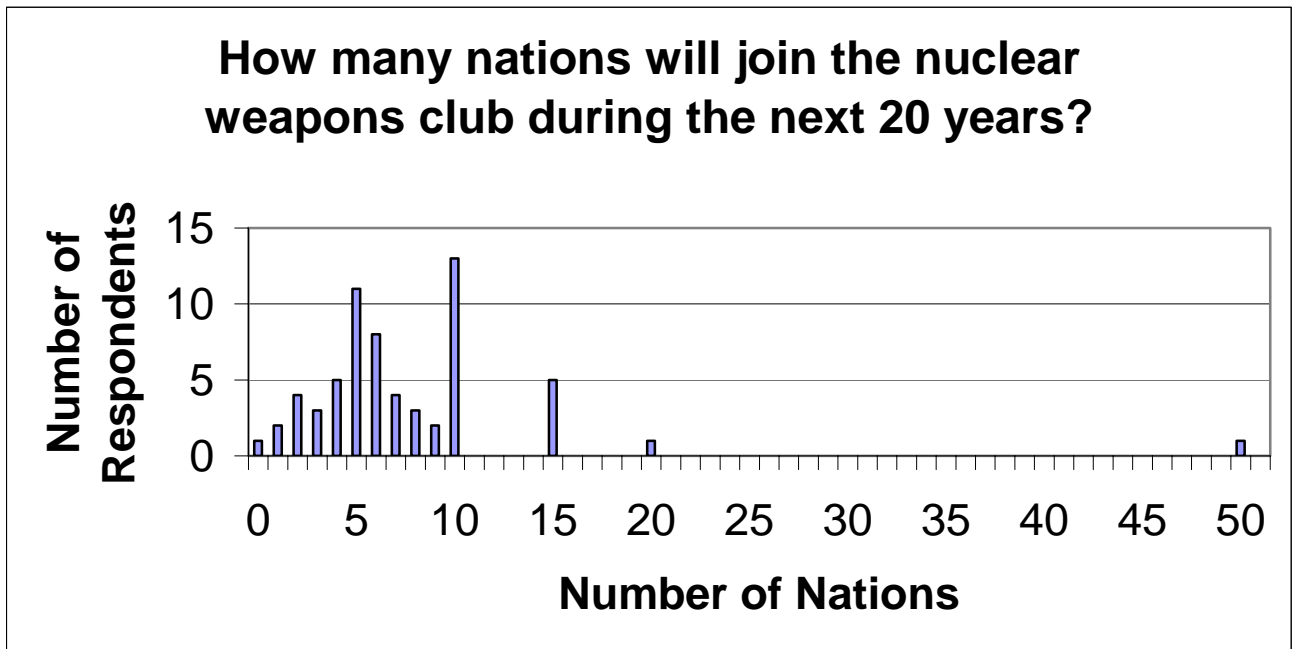
**Average Response: 4.0 | Median Response: 4**

**Number of Responses: 77**

## Nations Added to the Nuclear Club during the Next 20 Years

**Question 3:** In your estimate, how many nations that do not currently possess a working nuclear weapon will be added to the nuclear weapons club during the next 20 years?

Although the range of responses broadened when the time frame was extended to 20 years, almost three-quarters of respondents (46 of 63) agreed that between four and ten new nations would acquire nuclear weapons during the next two decades. Only three respondents predicted that fewer than two new nuclear weapons states would be added during this period.



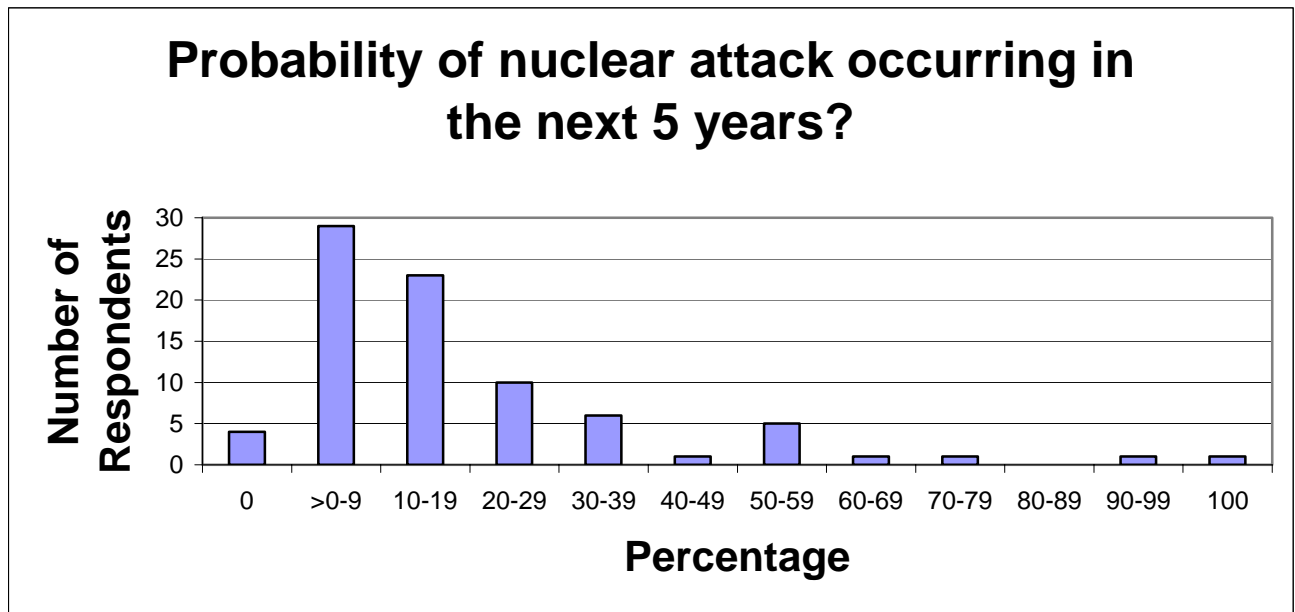
**Average Response: 7.5 | Median Response: 6**

**Number of Responses: 63**

## Risk of Nuclear Attack during the Next 5 Years

**Question 4:** In your opinion, what is the probability (expressed as a percentage) of an attack involving a nuclear explosion occurring somewhere in the world in the next 5 years?

Almost 60 percent of respondents (49 of 82) judged the risk of a nuclear attack during the next five years to be at least 10%. Almost a third of respondents (26) thought the risk was 20% or more. Nine experts thought the risk was at least 50%. At the optimistic end of the scale, six experts answered that the chances of a nuclear attack during the next five years were at or near zero. Overall, 39% (32 of 82) put the chances at 5% or less.



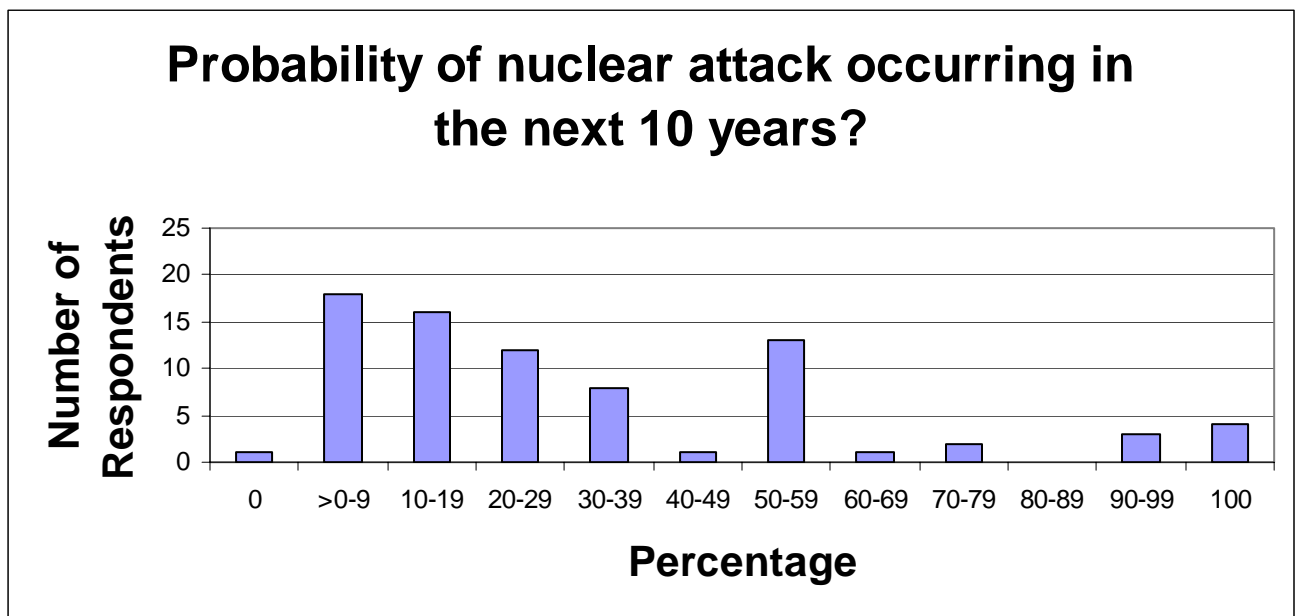
**Average Response: 16.4% | Median Response: 10%**

**Number of Responses: 82**

## Risk of Nuclear Attack during the Next 10 Years

**Question 5:** In your opinion, what is the probability (expressed as a percentage) of an attack involving a nuclear explosion occurring somewhere in the world in the next 10 years?

When the time frame for a nuclear attack was extended to ten years, the respondents were much more pessimistic. The median answer doubled from 10% to 20%, while the average response nearly doubled to 29.2%. Only one of the 76 respondents thought the risk of a nuclear attack was zero. At the other end of the spectrum, four respondents judged the risk to be 100%. Overall, 62% of respondents (49 of 79) estimated the risk of a nuclear attack over the next ten years to be between 10% and 50%.



**Average Response: 29.2% | Median Response: 20%**

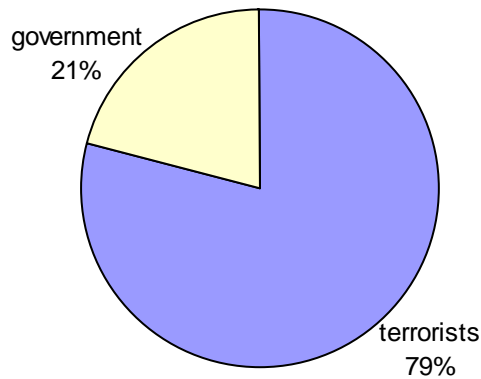
**Number of Responses: 79**

## Nuclear Attack Scenario: Government or Terrorists?

**Question 6:** In your opinion, if a nuclear attack occurs during the next 10 years, is it more likely to be carried out by terrorists or by a government?

Underscoring the need to safeguard and account for all nuclear weapons and material, almost 79% of respondents (67 of 85) said that if a nuclear attack occurs during the next ten years, it is more likely to be carried out by a terrorist group than by a government.

**If a nuclear attack occurs within 10 years,  
are terrorists or a government more likely  
to be responsible?**

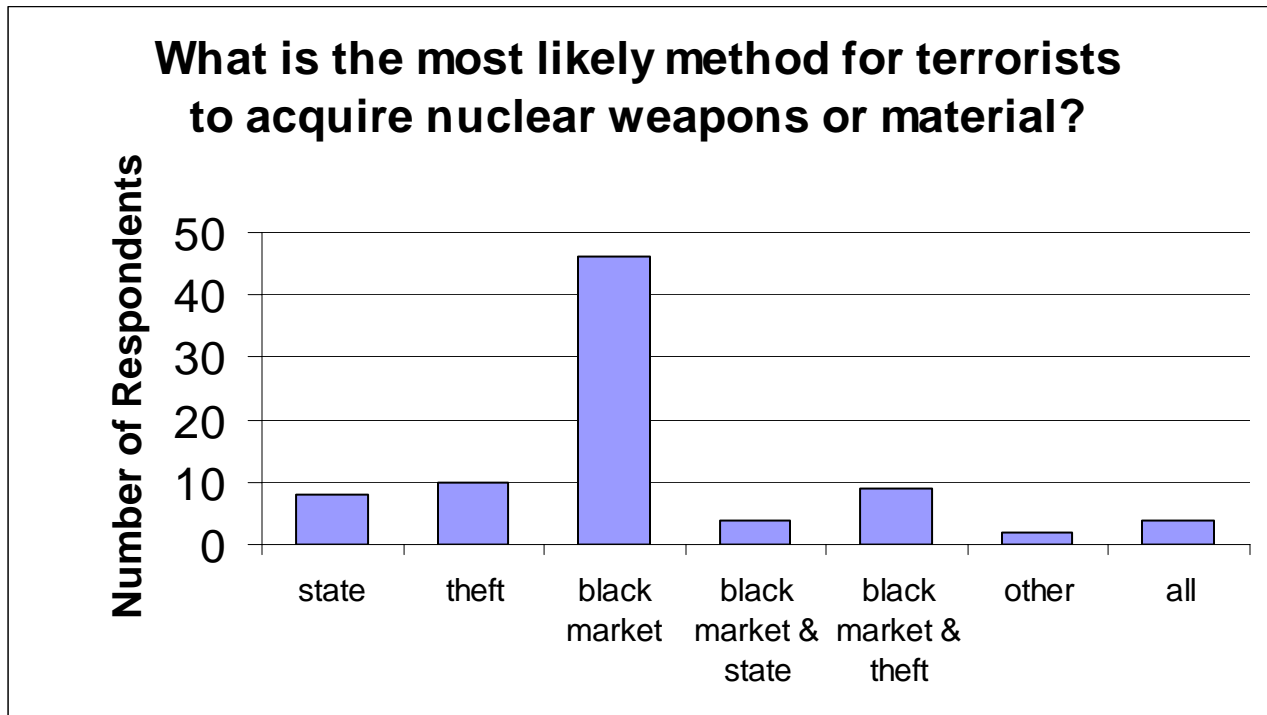


**Number of Responses: 85**

# Most Likely Method of Terrorist Acquisition of Nuclear Weapons

**Question 7:** What is the most likely method through which terrorists would acquire nuclear weapons or weapons grade nuclear material: a) theft; b) black market purchase; c) transfer or sale from a nuclear weapons state; d) other?

The group judged a black market purchase to be the most likely means through which terrorists would acquire nuclear weapons or weapons grade material. About three quarters (63 of 83) of respondents selected “black market purchase” either exclusively or in combination with one of the other answers. The prospect that a nuclear weapons state might deliberately transfer nuclear weapons or materials directly to a terrorist was seen as the least likely method cited in the question. Less than 10% of respondents (8) selected this answer exclusively, with another 8 respondents citing it in combination with another answer.

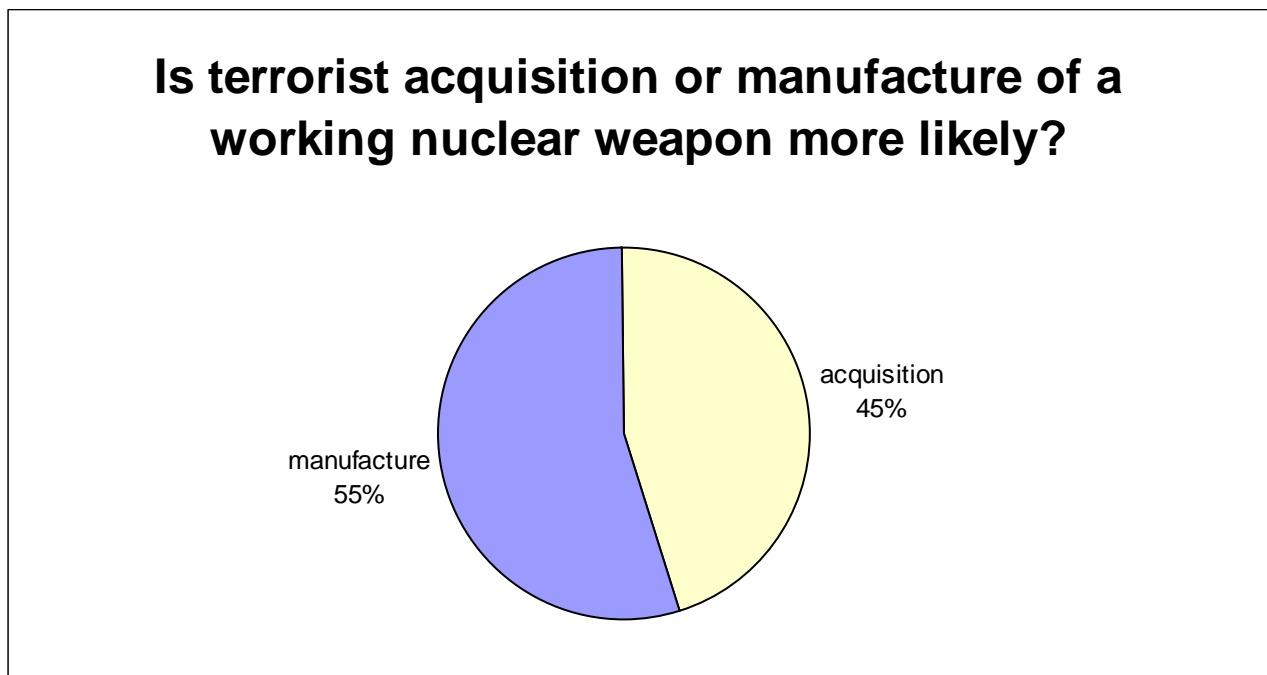


**Number of Responses: 83**

## **Terrorist Acquisition: Working Nuclear Weapon vs. Manufacture**

**Question 8:** In your opinion, which proliferation scenario is more likely: terrorist acquisition of a working nuclear weapon or terrorist manufacture of a nuclear weapon after obtaining weapons grade nuclear material?

The opinion of the survey group was closely split on the question of whether terrorists were more likely to acquire a working nuclear weapon or manufacture one after obtaining weapons-grade material. Generally, security around working nuclear weapons is presumed to be tighter, making fissile material an easier target for terrorist acquisition. However, if terrorists obtained weapons grade material, they would still have to overcome the additional technical challenges of manufacturing their own weapon. A 55% majority of those responding (45 of 82) saw terrorist manufacture of a nuclear weapon after obtaining material as more likely, while 45% (37 of 82) believed that terrorist acquisition of a working nuclear weapon was the more probable scenario.

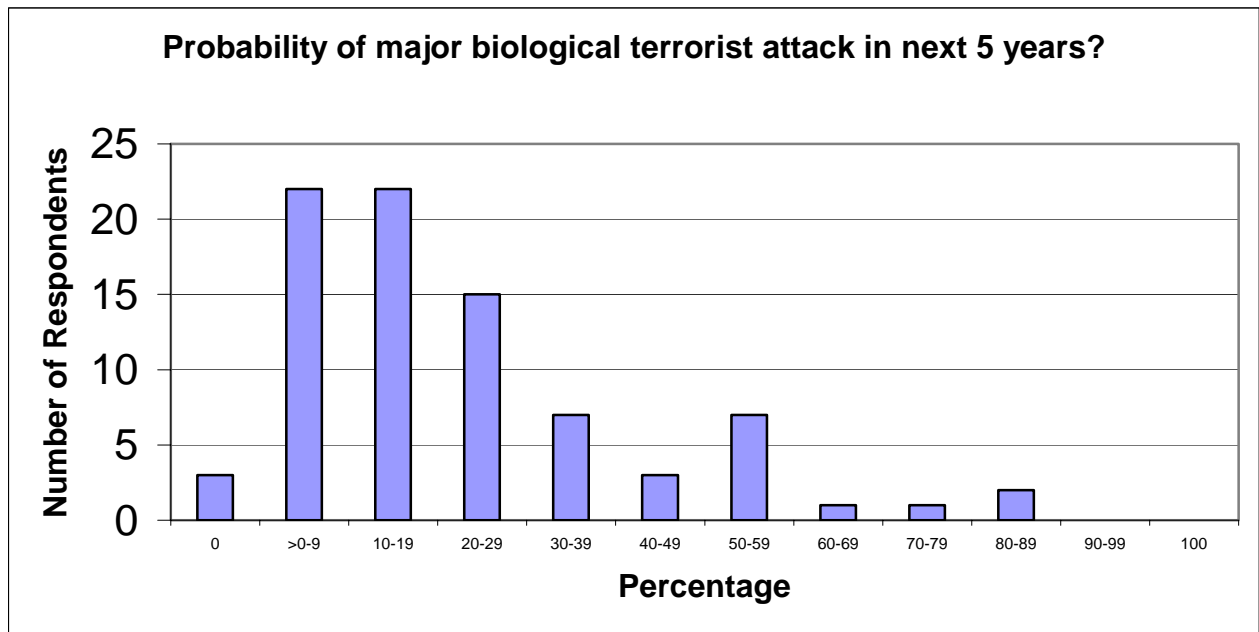


**Number of Responses: 82**

# Risk of Biological Attack during the Next 5 Years

**Question 9:** In your opinion, what is the probability (expressed as a percentage) of a major biological terrorist attack that inflicts numerous fatalities in the next 5 years?

The group judged a major biological attack to be slightly more likely than a nuclear attack. More than half of respondents (43 of 83) saw the risk of a biological attack in the next five years as between 10% and 30%. Three respondents thought the risk was zero, while three others saw the risk as above 75%.



**Average Response: 19.7% | Median Response: 10%**

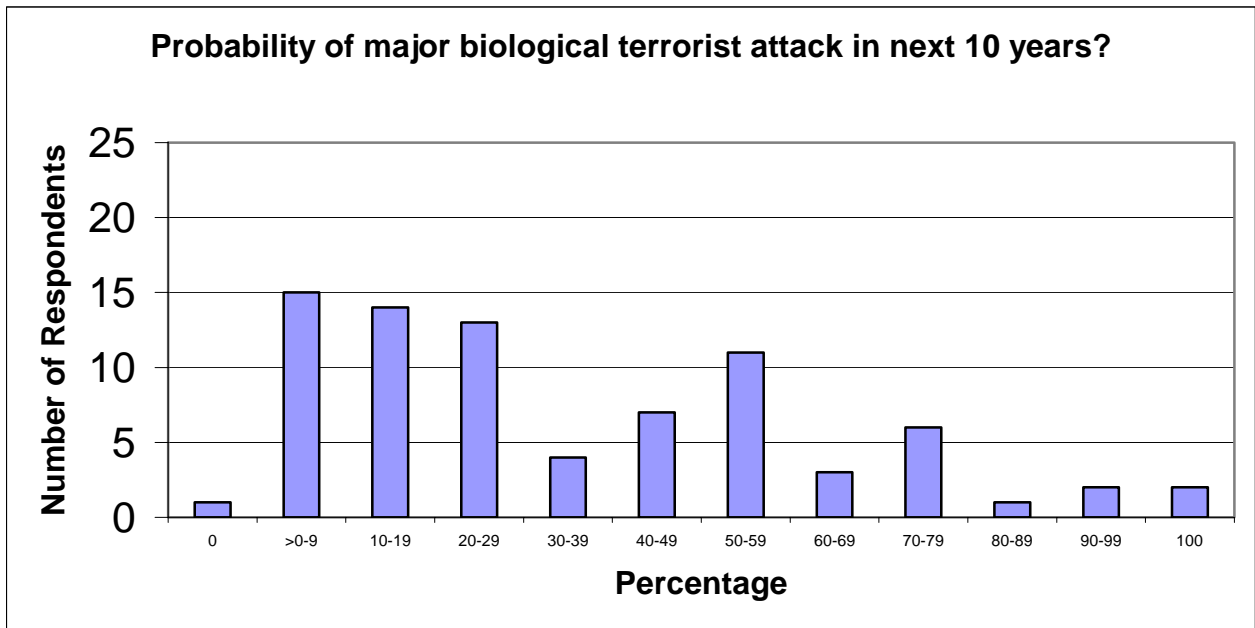
**Number of Responses: 83**



# Risk of Biological Attack during the Next 10 Years

**Question 10:** In your opinion, what is the probability (expressed as a percentage) of a major biological terrorist attack that inflicts numerous fatalities in the next 10 years?

Expectations of a major biological attack over the next ten years were widely dispersed. Overall, 62% of respondents (49 of 79) saw the risk of such an attack as at least 20%. More than 40% of experts (32 of 79) estimated the risk as 40% or greater. Only three respondents believed the risk was less than 4%, while four judged it to be 97% or greater.



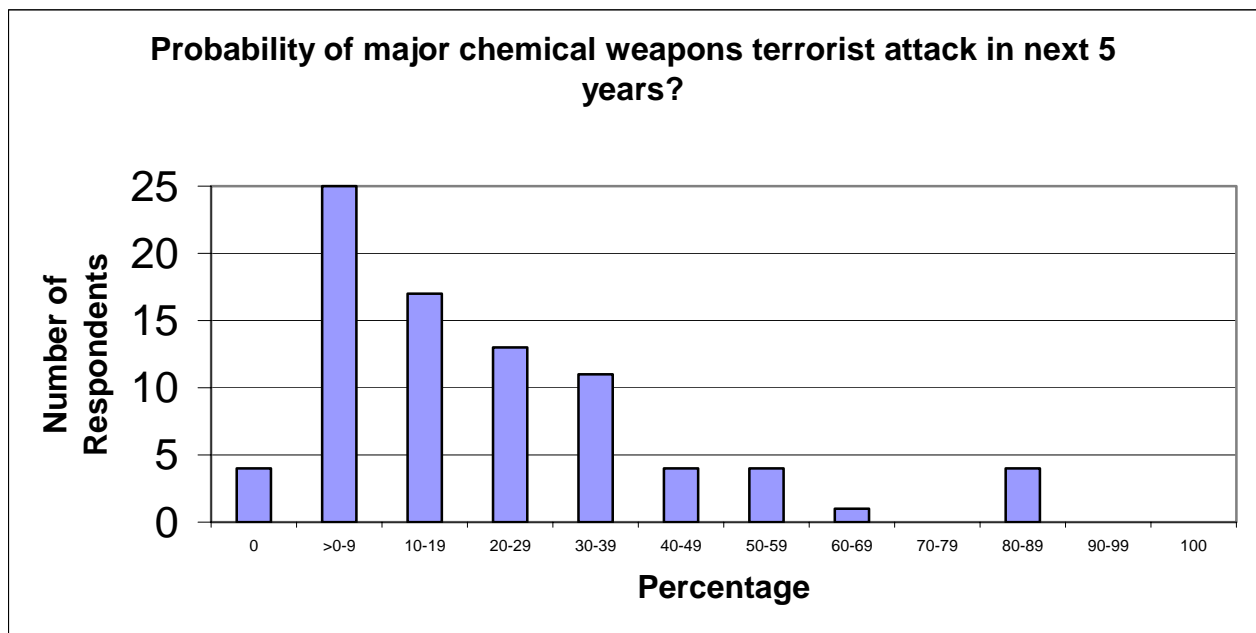
**Average Response: 32.6% | Median Response: 20%**

**Number of Responses: 79**

## Risk of Chemical Attack during the Next 5 Years

**Question 11:** In your opinion, what is the probability of a major chemical weapons terrorist attack that inflicts numerous fatalities in the next 5 years?

The risk of a major chemical attack was judged to be similar to the risk of a biological attack over the same period. As with a biological attack, about half of respondents (41 of 83) estimated the risk of a deadly chemical attack over the next five years to be between 10% and 30%. The median response of 15% for the chemical attack was higher than the 10% median for a biological attack, though the average response for chemical and biological attacks over this period were both about 20%.



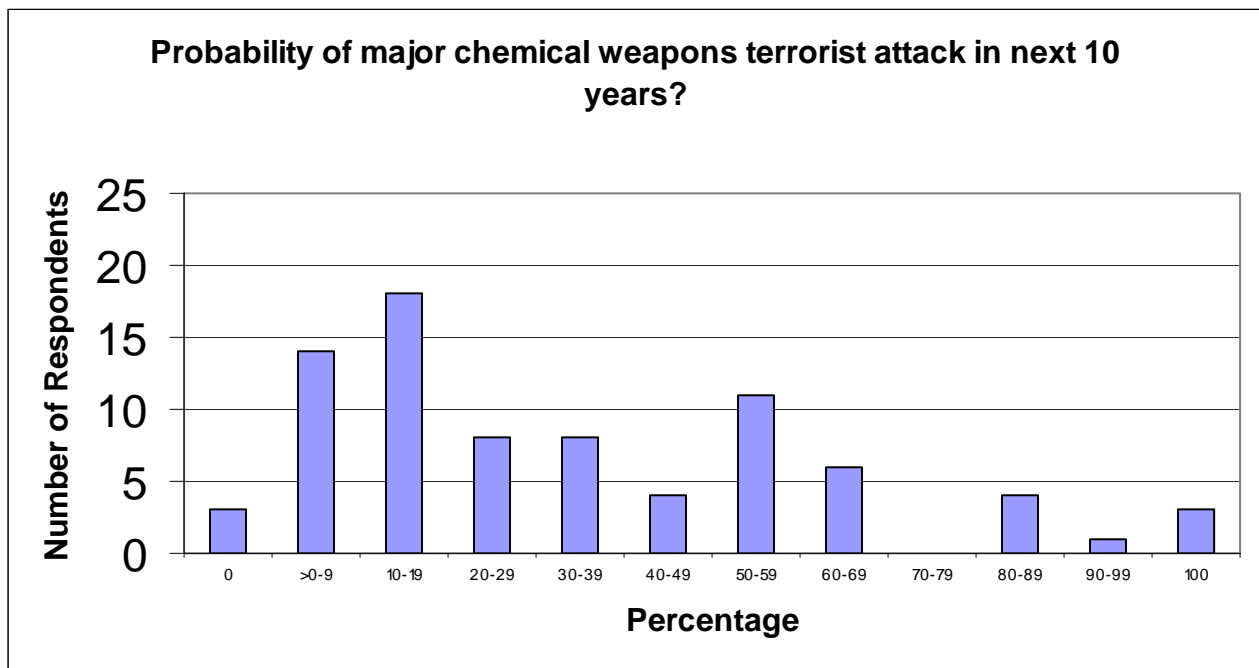
**Average Response: 20.1% | Median Response: 15%**

**Number of Responses: 83**

## Risk of Chemical Attack during the Next 10 Years

**Question 12:** In your opinion, what is the probability of a major chemical weapons terrorist attack that inflicts numerous fatalities in the next 10 years?

This question produced one of the most evenly dispersed set of responses in the survey. The number of respondents who thought the risk was zero (three) was identical to the number who judged it to be 100%. The number who thought the risk was 5% or less (14) was identical to the number that judged it to be 60% or more. Both the average (30.5%) and median (15%) responses were lower than the corresponding figures for the risk of a biological attack over ten years.



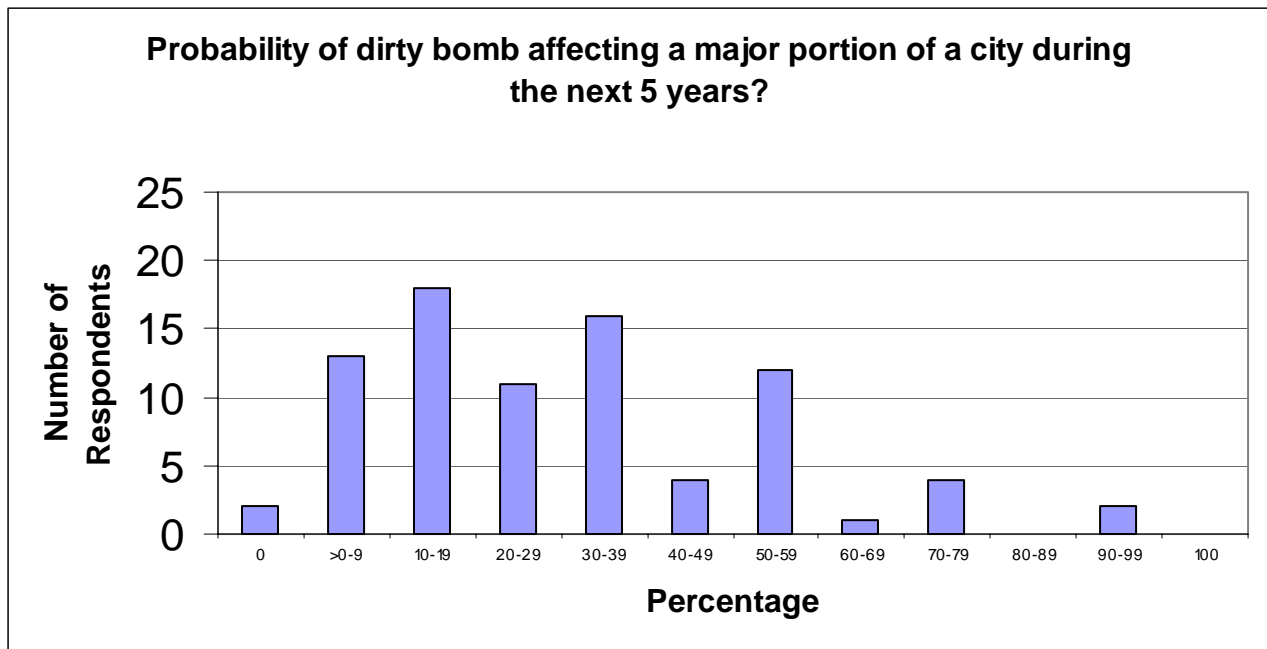
**Average Response: 30.5% | Median Response: 15%**

**Number of Responses: 80**

# Risk of Radiological Attack during the Next 5 Years

**Question 13:** In your opinion, what is the probability of a terrorist attack using a radiological dispersal device (dirty bomb) that affects a major portion of a city during the next 5 years?

In general, respondents judged the probability of a major radiological attack over the next five years to be greater than the probability of a biological, chemical, or nuclear attack over the same time period. The average and median responses (27.1% and 25%) were higher for a radiological attack than for the other three types of WMD attack. Even within the limited time span of five years, 82% (68 of 83) said that there was at least a 10% chance of a radiological attack that affects a major portion of a city.



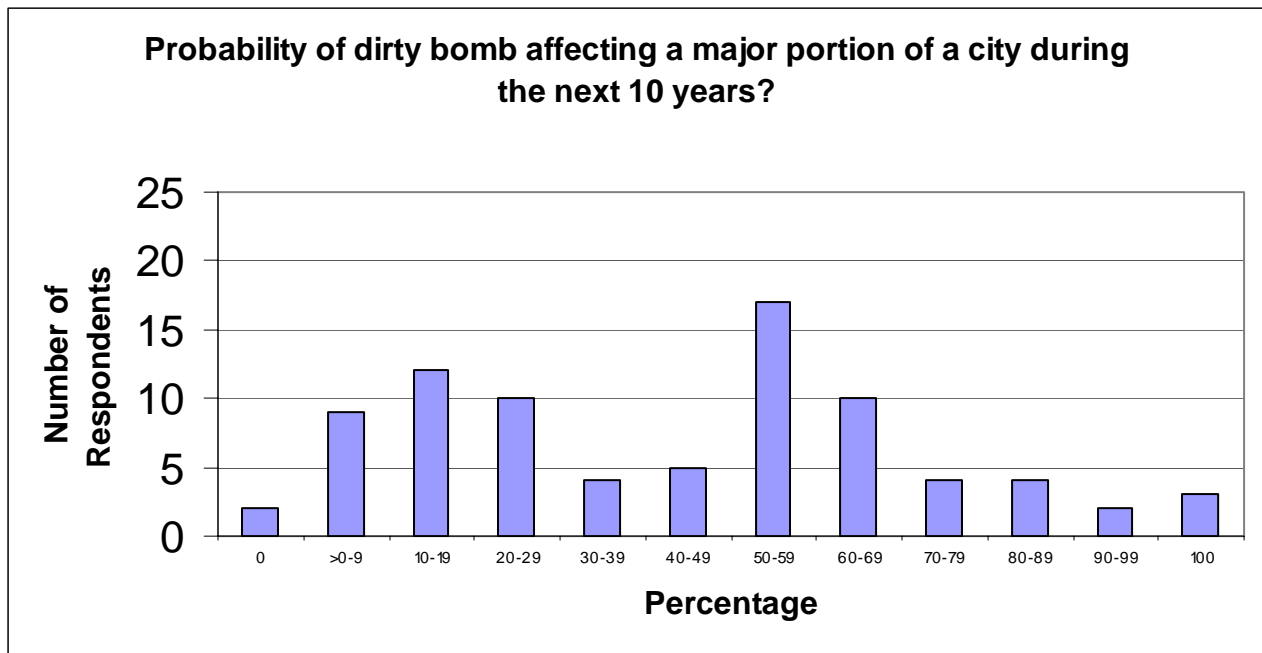
**Average Response: 27.1% | Median Response: 25%**

**Number of Responses: 83**

# Risk of Radiological Attack during the Next 10 Years

**Question 14:** In your opinion, what is the probability of a terrorist attack using a radiological dispersal device (dirty bomb) that affects a major portion of a city during the next 10 years?

The average and median response of the experts jumped to 40% when the timeline for a radiological attack was extended to 10 years. Almost half of respondents (40 of 82) judged the risk of such an attack as 50 percent or greater. More than 30% of respondents placed the risk of a radiological attack over ten years in the narrow window between 50% and 60%. The number of respondents (nine) who put the risk at or below 3%, was identical to the number who saw it as 80% or greater.



**Average Response: 39.8% | Median Response: 40%**

**Number of Responses: 82**

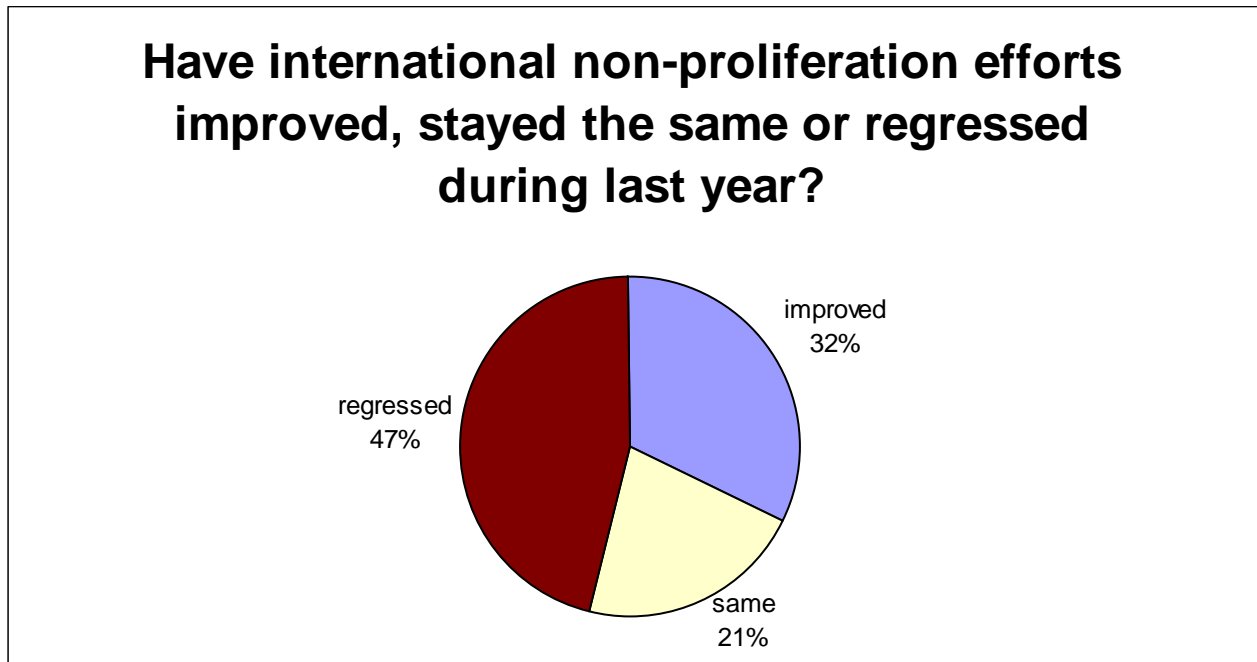


## **Part II: International Non-Proliferation Responses**

## Status of International Non-Proliferation Efforts

**Question 15:** In your opinion, have international non-proliferation efforts improved, stayed about the same, or regressed during the last year (2004)?

A 46.4% plurality of experts believed that international non-proliferation efforts regressed during 2004, though almost a third believed efforts had improved.



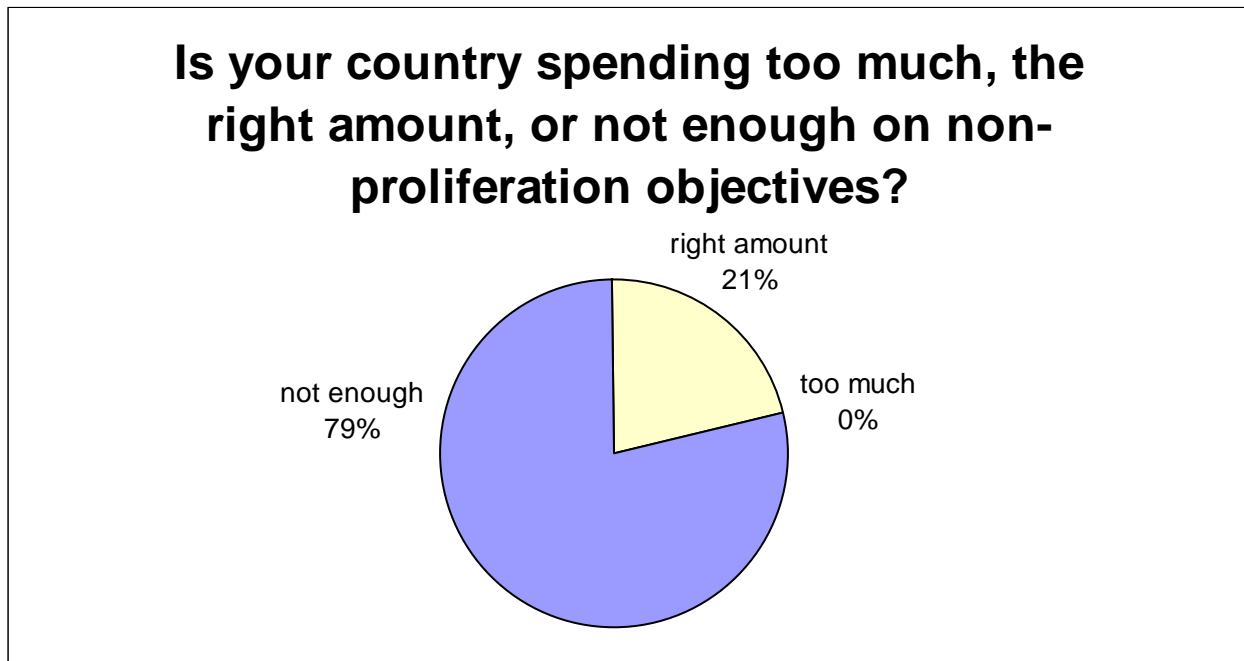
**Number of Responses: 84**



## Government Spending on Non-Proliferation Programs

**Question 16:** Do you think your own country is spending too much, about the right amount, or not enough on non-proliferation objectives?

Respondents strongly supported the expansion of funds devoted to non-proliferation programs. More than 78% of the experts (66 of 84) indicated that their countries were spending too little on these programs. No respondent said that their country was spending too much on non-proliferation objectives.

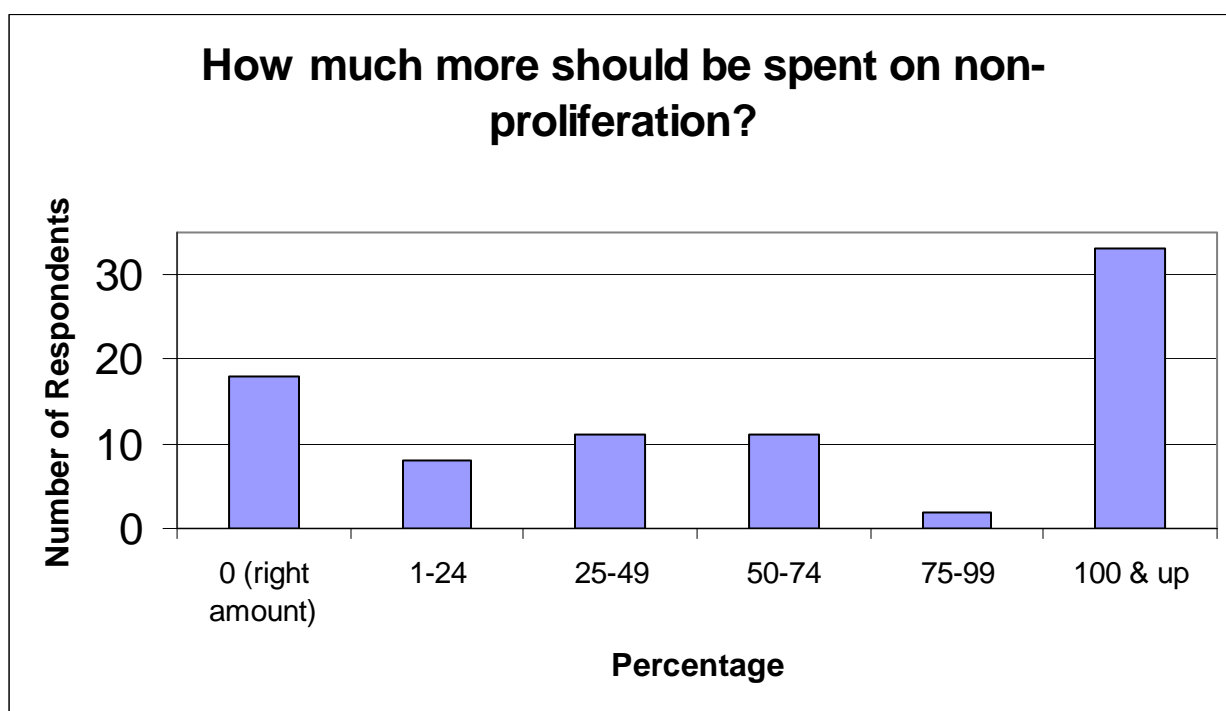


**Number of Responses: 84**

## Recommended Spending Increases

**Question 17:** If you answered too much or not enough spending by your government, what percentage decrease or increase would you recommend?

Almost 70% of those surveyed (57 of 83) indicated that their governments should be spending at least 25% more on non-proliferation projects. Almost 40% of the experts (33 of 83) recommended an increase of at least 100% in such funds.



**Median Response: 50%**

**Number of Responses: 83**

## Encouraging Developments in Non-Proliferation Capabilities

**Question 18:** During the past year, a number of important steps were taken to enhance international non-proliferation cooperation. What do you regard as the most encouraging development that enhances global non-proliferation capabilities?

- Passage of UN Security Council Resolution 1540 on WMD proliferation?
- Reaffirmation of the G-8 Global Partnership at Sea Island?
- Expansion of the Proliferation Security Initiative?
- Authorization of the first use of the Cooperative Threat Reduction program outside the former Soviet Union (to address chemical weapons in Albania)?
- Formation of the Global Threat Reduction Initiative at the U.S. Department of Energy?
- Other?

Respondents gave substantial support to each of five recent positive developments cited in the question. Although respondents were asked to choose a single answer, many checked multiple boxes. The expansion of the PSI received the most support, cited by 27 respondents (20 of whom checked that box exclusively). Passage of UN Security Council Resolution 1540 was second with 23 citations (15 of which were exclusive). The use of the Nunn-Lugar Cooperative Threat Reduction Program in Albania was third with 20 citations (10 of which were exclusive). The formation of the GTRI at the Energy Department was fourth with 14 citations (6 of which were exclusive). The reaffirmation of the G-8 Global Partnership was fifth with 12 citations (six of which were exclusive). Seven respondents wrote in other positive developments, though only one – the disruption of the A.Q. Khan network – received two citations.

**Number of Responses: 83**

## Non-Proliferation Priorities

**Question 19:** In your opinion, what non-proliferation goal should receive the highest priority of the United States and the international community?

Dismantling, securing and destroying nuclear, biological and chemical weapons and materials in the former Soviet Union and elsewhere should be the world's top non-proliferation priority, based on the number of responses in the survey. More than a quarter of the respondents (27 of 85) either listed by name the Nunn-Lugar Cooperative Threat Reduction Program, saying the top priority should be to implement, strengthen or expand it, or listed as the goal a particular Nunn-Lugar objective, such as securing former Soviet weapons, employing former weapons scientists, or gaining access to Russia's biological weapons labs.

The Nunn-Lugar program, started in 1991, works with Russia and other former Soviet states to secure, deactivate and destroy elements of the Soviet arsenal, including nuclear warheads, missiles, bombers and submarines, as well as chemical munitions and biological weapons. In 2002, the G-8 Global Partnership Against Weapons and Materials of Mass Destruction promised an additional \$10 billion over 10 years from our major partners for this effort. In 2003, President Bush signed the Nunn-Lugar Expansion Act, allowing Nunn-Lugar funds to be used outside the former Soviet Union, and new legislation is pending to further expand and strengthen the program.

One survey participant wrote: "A top priority is to tighten loose nukes in the former Soviet Union and Eastern European countries. We need to set up a more formal international regime to facilitate dismantling nuclear weapons and securing custody of unnecessary nuclear materials and related devices...The U.S. has been the biggest contributor for cooperative threat reduction thanks to the Nunn-Lugar program, but now it is time for other economic powers like Japan and other G-8 countries, and perhaps China, to take aggressive steps for CTR." Said another, "If we can guarantee that there is no motivation for Russian leadership to proliferate, that proliferation entrepreneurs in the FSU are thwarted, and that alternatives are provided to states that might/could/would seek nuclear weapons, then we have a good chance to prevent major proliferation."

The number two goal that emerged was ending the nuclear programs of North Korea and Iran, which was cited as the top non-proliferation goal by 14 respondents. The two were usually named together. One participant noted that Iran's program "will have a highly destabilizing impact on the region, and accelerate similar efforts by Egypt, Syria, Saudi Arabia, Algeria and other regimes."

The third most commonly cited goal (by nine respondents) was to seek the worldwide control of fissile material, which is the essential component of a nuclear weapon and one that is virtually impossible for terrorists to create themselves. Along similar lines, three others said the main goal should be controlling the nuclear fuel cycle that produces enriched uranium and plutonium.

Eight respondents cited maintaining and strengthening the Nuclear Non-Proliferation Treaty. Several called for closing “loopholes” in the NPT that allow countries legally to assemble most of the components of a nuclear weapons program as they receive outside assistance to pursue ostensibly peaceful nuclear electricity development. Seven of the respondents said that a top goal should be nuclear disarmament by the nuclear weapons states, a step which several said was important for dissuading other countries from seeking nuclear weapons.

Other goals which each received mention by four participants included:

- Supporting and strengthening the administration’s Proliferation Security Initiative to interdict illegal shipments of weapons and materials of mass destruction.
- Focusing on the proliferation threat from chemical and biological weapons.
- Rooting out the black market networks, like that of Pakistani scientist A.Q. Khan.

Other suggestions for the top priority included: implementing the Comprehensive Test Ban Treaty; implementing United Nations Security Council Resolution 1540 on WMD proliferation; developing sensors to detect smuggled nuclear material; developing better human intelligence on militant Islamic groups, and doing more to understand and counter the mindset of militant Islam; strengthening the International Atomic Energy Agency, the U.N.’s nuclear watchdog; acknowledging Israel’s possession of nuclear weapons; concentrating on the links between organized crime and proliferation; and protecting chemical plants near populated areas from terrorist attack.

## Underrated Non-Proliferation Risks

**Question 20:** In your opinion, what proliferation risk or risks are most underrated or in the greatest need of additional resources or attention?

The possible terrorist use of chemical or biological weapons is the proliferation risk most in need of more attention, according to a tally of survey respondents. The threats posed by former weapons scientists who might be tempted to sell their know-how to terrorists or rogue states, (what one participant called “human proliferation”); murky black market networks, such as A.Q. Khan’s; and the weaknesses in port and shipping security were also listed by several respondents as risks that urgently need more attention.

The need for more effort to keep biological and chemical weapons out of terrorist hands was cited by nine respondents. Said one, “Biological advances will make it too easy for terrorists to create weapons.” Another said we currently underrate the risk of “the terrorist theft and use of biological pathogens from an anti-plague institute lab in one of the non-Russian Soviet successor states.” Commented another, “Both the U.S. and Russia are far behind in securing and destroying their chemical weapons stockpiles.”

Because respondents were asked for underrated risks, and perhaps because some wanted to stimulate fresh thinking about proliferation challenges, there was less agreement on the threats that need more attention than there was on what should be the top proliferation goal. Several popular “non-proliferation goals” from Question 19 also received mention in Question 20 as areas that need more attention and resources. For example, various respondents said that more effort and funds should be devoted to Nunn-Lugar activities in the former Soviet Union, to Iran and North Korea, to nuclear disarmament, to controlling fissile material, and to controlling the fuel cycle.

Less familiar issues that one or more respondents thought deserved more attention included a WMD terror attack not linked to Al Qaeda or militant Islam; threats to the food supply; nuclear material in Kazakhstan; a non-destructive but highly disruptive chemical or biological attack; the poor data available on the WMD technology base around and on WMD lethality; the security of nuclear weapons and materials in Pakistan; Russian tactical nuclear weapons; the preparedness of medical responders for a WMD attack on a city; the motivations for countries to seek nuclear weapons in the first place; weaknesses in PSI and the export control regime; the intersections of criminal activity and terrorism; and the failure to match rhetoric with action.

Following is a representative sampling of quotes on the more commonly mentioned “underrated” proliferation risks:

“Weapon scientist redirection in key countries including Russia and the former Soviet Union, Iraq, Libya, and even extending to India and Pakistan.”

“The people problem: keeping track of scientists and engineers with critical WMD-related skills and ensuring that they do not share their expertise.”

“Intelligence to track and contain nuclear weapons materials/scientists emerging out of the current chaos in Iraq.”

“Programs to assist the transition of former Soviet chemical and bio weaponeers and their facilities to peaceful research are not sufficiently mature. In addition, biotech commercialization efforts have met with little to no success.”

“Lack of understanding of the inherent proliferation implications of the ongoing global diffusion of relevant science and technology.”

“There are many clandestine efforts now to acquire nuclear material or weapons. A.Q. Khan was not a one-time-only phenomenon. There will be others. He may have done more damage than anyone has admitted.”

“The true extent of the damage wrought by Dr. A.Q. Khan’s global clandestine nuclear weapons black market for the benefit of America’s enemies, including a full accounting of what members of Pakistan’s nuclear scientists and engineers may be in Taliban-controlled Afghanistan.”

“Russia, China, Pakistan and India must take high-level ownership of the fissile material security problem and they should have zero tolerance for the black market networks in technology and material.”

“Our inability to do distance/passive monitoring of WMD at ports of entry into the United States.”

“Verification of contents of cargo containers and air traffic into and out of rogue states.”

“Preempting a nuclear attack should be accorded the highest priority. We should shift resources and attention to this from trying to harden “soft” and chase down all the terrorists.”

“We need to do far more to attempt to understand the mind-set that causes countries to seek development of nuclear weapons. Iran and North Korea are prime examples of this, as were India and Pakistan before them.”

“If Iran is successful in achieving nuclear weapons status, the non-proliferation regime will almost certainly collapse and the race will be on. This requires more political resources, particularly from the U.S., to try to halt this program.”

“We need to put much more effort into R&D on a proliferation-proof nuclear fuel cycle, since it is almost unavoidable that the world will need more nuclear power plants in the future.”

“Many political leaders, in their rhetoric, understand the risks. What is woefully underrated is the fact that we are not matching actions with the rhetoric.”

“Cooperative Threat Reduction, the Nuclear Cities Initiative and similar programs need more funding.”

“The possession of nuclear weapons by Israel, Iran and Pakistan and new developments by countries like North Korea and Iran.”

“All the proliferation risks are being given due attention. It is the reduction and elimination of nuclear weapons that is being given scant attention, especially by the nuclear weapons states.”

“Additional resources should be put into all the incremental steps that build toward global disarmament.”



## Recommended Non-Proliferation Studies and Commentaries

**Question 21:** What studies or commentaries on non-proliferation issues that have appeared during the last year would you recommend?

Many respondents listed multiple works. A few studies that were recommended were published before 2004. Following is a list of recommended studies and commentaries cited by two or more participants in the survey:

Allison, Graham. *Nuclear Terrorism: The Ultimate Preventable Catastrophe*. New York: Henry Holt & Company, August 2004.

Bleek, Philipp C. *Global Cleanout: An Emerging Approach to the Civil Nuclear Material Threat*. Paper, Cambridge and Washington: Belfer Center for Science and International Affairs and the Nuclear Threat Initiative, September 2004.

Bunn, Matthew, Anthony Wier, and John P. Holdren. *Controlling Nuclear Warheads and Materials: A Report Card and Action Plan*. Washington: Nuclear Threat Initiative and the Project on Managing the Atom, Harvard University, March 2003.

Butler, Richard. "Improving Nonproliferation Enforcement." *The Washington Quarterly* 26.4 (Autumn 2003): 133-145.

Campbell, Kurt, Robert Einhorn, and Mitchell Reiss, eds. *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*. Washington: The Brookings Institution Press, 2004.

Carter, Ashton. "How to Counter WMD." *Foreign Affairs* 83.5 (September-October 2004): 72-85.

Cirincione, Joseph, Jon Wolfsthal, and Miriam Rajkumar. *Deadly Arsenals: Tracking Weapons of Mass Destruction*. Washington: Carnegie Endowment for International Peace, June 2002.

Committee on Research Standards and Practices to Prevent the Destructive Application of Biotechnology. *Biotechnology Research in an Age of Terrorism*. Washington: National Research Council, The National Academies Press, 2004.

Danzig, Richard. *Catastrophic Bioterrorism – What Is To Be Done?* Washington: National Defense University Center for Technology and National Security Policy, August 2003.

Dartnell, Michael. “Weapons of Mass Instruction: Web Activism and the Transformation of Global Security.” *Millennium - Journal of International Studies* 32.3 (2003): 477-500.

Defense Science Board Task Force. *Preventing and Defending Against Clandestine Nuclear Attack*. Washington: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, June 2004.

Duelfer, Charles. *Comprehensive Report of the Special Advisor to the Director of Central Intelligence on Iraq’s Weapons of Mass Destruction*. Washington: CIA, September 2004.

Ferguson, Charles D., et al. *The Four Faces of Nuclear Terrorism*. Monterey, CA and Washington: Monterey Institute Center for Nonproliferation Studies and the Nuclear Threat Initiative, September 2004.

Foreign Affairs Canada International Security Research and Outreach Programme. *Weapons of Mass Destruction Verification and Compliance: Challenges and Responses*. Ottawa: Foreign Affairs Canada, November 2004.

Goodby, James, et al. *Cooperative Threat Reduction for a New Era*. Defense and Technology Papers 4. Washington: National Defense University Center for Technology and National Security Policy, September 2004.

Hoffman, Bruce. “Redefining Counterterrorism: The Terrorist Leader as CEO.” *RAND Review* 28.1 (Spring 2004): 14-15.

The International Institute for Strategic Studies. *North Korea’s Weapons Programmes: A Net Assessment*. Basingstoke: Palgrave Macmillan, 2004.

Jenkins, Brian Michael. “Redefining the Enemy: The World Has Changed, But Our Mindset Has Not.” *RAND Review* 28.1 (Spring 2004): 16-23.

Kudrik, Igor, et al. *The Russian Nuclear Industry – The Need for Reform*. Oslo: Bellona Foundation, November 2004.

Lennon, Alexander, and Camille Eiss, eds. *Reshaping Rogue States: Preemption, Regime Change, and U.S. Policy toward Iran, Iraq, and North Korea*. The Washington Quarterly Reader, The MIT Press, August 2004.

Maerli, Morten Bremer. *Crude Nukes on the Loose? Preventing Nuclear Terrorism by Means of Optimum Nuclear Husbandry, Transparency, and Non-Intrusive Fissile Material Verification*. Diss. University of Oslo, Norway, March 2004.

Moltz, James Clay, ed. *New Challenges in Missile Proliferation, Missile Defense, and Space Security*. Monterey and Southampton: Monterey Institute of International Studies Center for Nonproliferation Studies and University of Southampton Mountbatten Centre for International Studies, July 2003.

National Commission on Terrorist Attacks upon the United States. *The 9/11 Commission Report*. Washington: Government Printing Office, July 2004.

Perkovich, George, et al. *Universal Compliance: A Strategy for Nuclear Security*. Washington: Carnegie Endowment for International Peace, March 2005.

Perkovich, George. "Strengthening Non-Proliferation Rules and Norms – The Three State Problem." *Disarmament Forum: The 2005 NPT Review Conference* 4 (2004): 21-32.

*Public Health Response to Biological and Chemical Weapons: WHO guidance*. 2<sup>nd</sup> ed. Geneva: World Health Organization Press, 2004.

UN Secretary-General's High-level Panel on Threats, Challenges and Change. *A More Secure World: Our Shared Responsibility*. United Nations: United Nations Foundation, 2004.

United States National Academies and Russian Academy of Sciences. *Overcoming Impediments to U.S.-Russian Cooperation on Nuclear Non-Proliferation: Report of a Joint Workshop*. Washington: National Research Council, The National Academies Press, 2004.

Wit, Joel, Daniel Poneman, and Robert Gallucci. *Going Critical: The First North Korean Nuclear Crisis*. Washington: The Brookings Institution Press, 2004.

