



Bio-Terrorism Preparedness:

The Imperative for a Public-Private Partnership

2004 Sam Nunn Bank of America Policy Forum

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General John A. Gordon fields a question from the audience.



Senator Sam Nunn and Georgia Tech President G. Wayne Clough share a light moment at the start of the Policy Forum.



Professor John Endicott of The Sam Nunn School poses a question to the panelists.

Summary of Findings and Recommendations from The 2004 Sam Nunn Bank of America Policy Forum

Principal Findings:

The threat of a major bioterrorism attack in the United States is real, present, and intensifying. In addition, Mother Nature may confront society with highly contagious and lethal new diseases. The life sciences have the potential to produce both startling medical advances and horrific bio-weapons that could threaten the destruction of society as we know it. The knowledge of how to manipulate living organisms is widespread and growing; access to dangerous pathogens is altogether too easy; and many research facilities are “dual-use,” suitable for making toxins as well as vaccines.

Unlike nuclear, chemical, or radiological (“dirty bomb”) weapons, a bioterrorism attack is unlikely to be a “sirens and lights” event; an attack with a highly infectious and contagious biological agent may only become apparent as doctor’s offices and emergency rooms fill up with critically ill patients. At that point, containment of the infectious agent can be very difficult—as last year’s SARS epidemic has shown.

There is a fundamental need for a better public-private partnership. Our business leaders need to become actively involved with public-sector officials in planning responses and reducing vulnerabilities to both terrorist attacks and highly contagious diseases. The general public is largely unprepared for terrorist acts in which they may become involved, directly or indirectly. They have little information about how to become better prepared and are generally fatalistic or apathetic about catastrophic terrorism. These are conditions likely to exacerbate civilian casualties and jeopardize emergency responders in the event of a major terrorist act.

Many in both the business community and the general public seem to regard preparations for preventing or mitigating the consequences of a terrorist attack or contagious new disease as an exclusive responsibility of the federal government. However, the first responders to an emergency will be local police, firemen, and emergency medical technicians, and they will need to work cooperatively with corporations, private groups, and individual citizens while awaiting the arrival of additional help from state and federal sources.

We are not well prepared. Local and state governments already face both declining revenues and numerous unfunded mandates levied by the Congress. While the federal government has responded by creating the Department of Homeland Security and appropriating large sums to support the counter-terrorism effort, much of the funding has yet to reach the local level and be put to productive use.

The business community and individual citizens need to become actively involved in preparing, disseminating, and practicing detailed response plans designed to minimize their business losses due to terrorism, and in educating their workers to help them prepare to minimize the consequences for themselves and their families in the event of a major terrorist act.

The business community can also assist the public health sector in its efforts to educate the public about terrorism preparedness. Through its employees, the business community can help to disseminate information, pass feedback about plans back to public health officials, and offer training measures to avoid panic actions. Moreover, with planning prior to an emergency, businesses can make available some parts of their infrastructures to perform

many needed tasks: receive and store vaccines and medical supplies, feed and house those caught in quarantines, provide logistical assistance, and provide communication links between employees and their families.

Businesses must act now because the economic consequences of a bioterrorism attack or contagious new disease can range from financial hardship (employee absenteeism, quarantining of facilities, loss of suppliers, disruption of distribution channels) to loss of business viability (incapacitation or death of key employees, loss of consumer confidence in products, boycotts or prohibitions on marketing domestically or abroad).

Business leaders also need to focus on civic responsibilities. Hospital beds and emergency room capacity for coping with mass casualties in an emergency are nonexistent in virtually every major U.S. city. The SARS epidemic last year quickly overtaxed hospital capacity in Asia and Toronto. Most hospitals operate at very high capacity and occupancy rates, and have little “surge” capacity. Business must become an advocate for strengthening our public health and security infrastructure.

Recommendations

A first step toward building a solid public-private partnership to improve our preparedness for bioterrorism is to schedule regular meetings with representatives of all of the stakeholders in the event of an emergency, including public health officials, emergency responders, government representatives, high-level corporate representatives of the business community, and academia.

The purpose of such meetings is to discuss plans and best practices as viewed by each of the stakeholder communities, with a view to increased understanding and appreciation by all parties of the areas of agreement and disagreement. Any solution must develop a common understanding of the nature of potential problems posed by terrorism, especially bioterrorism. Regular stakeholder meetings provide one way to begin the process of developing effective plans and mitigation measures.

This year’s Sam Nunn Bank of America Policy Forum generated several recommendations that should be part of the discussions at a “Partnership Roundtable.” Those recommendations include the following:

- Businesses have traditionally approached the prospect of terrorism as a “security” issue, to be dealt with largely by security and legal staffs. But the problems posed by many forms of terrorism, and especially by bioterrorism, go far beyond physical plant and personnel security. Preparedness must become a priority for the entire corporation.
- Businesses, especially those in the food and bioscience sectors, should conduct a thorough and ongoing risk assessment that includes the entire supply chain. The goal should be to reduce the businesses’ vulnerability and to mitigate the consequences of an attack. Scenario analysis and risk modeling may be helpful tools, and the chemical and nuclear industries may provide useful analogues.

Morning Session

8:00 A.M.

Continental Breakfast

8:30 A.M.

Welcoming Remarks:

G. Wayne Clough, President, Georgia Institute of Technology

William J. Long, Chair, Sam Nunn School of International Affairs, Georgia Institute of Technology

Senator Sam Nunn, Distinguished Professor, Georgia Institute of Technology, and co-chair and CEO, The Nuclear Threat Initiative

8:45 A.M.

Keynote Address: "The Bioterrorism Threat"

Speaker: **John A. Gordon**, General, USAF (retired)
Assistant to the President for Homeland Security

9:30 A.M.

Break—Coffee and Hallway Displays

10:00 A.M.

Panel Discussion:

"Bioterrorism Preparedness: Assessment of Capabilities and Deficiencies"

Panel Moderator:

Tara O'Toole, M.D., M.P.H.: CEO and Director, Center for Biosecurity of the University of Pittsburgh Medical Center

Panelists:

Ruth Berkelman, M.D.: Rollins Professor and Director, Center for Public Health Preparedness and Research, Rollins School of Public Health, Emory University

Joseph M. Henderson: Associate Director, Office of Terrorism Preparedness and Emergency Response, Centers for Disease Control and Prevention

Mike Moodie: President, The Chemical and Biological Arms Control Institute

Robert J. Ursano, M.D.: Chair and Professor, Department of Psychiatry, and Director, Center for the Study of Traumatic Stress, Uniformed Services University of the Health Sciences, School of Medicine

12:00 P.M. –1:15 P.M.

Lunch, Georgia Tech Hotel & Conference Center
"How the EU Prepares for Bioterrorism"

Gilles Andreani: Director, Policy Planning, Ministry of Foreign Affairs, Republic of France

- Business disaster plans should consider the ability to shelter and protect employees. Employees must be made aware of their company's emergency plans and consideration should be given to ensuring communication links between employees and their families. These plans must also anticipate post-trauma psychological issues.
- A wide variety of resources are available to businesses seeking to enhance their preparedness for mitigating the effects of terrorist acts. Public health officials, academic institutions, private contractors, terrorism experts, and many other groups can provide assistance.
- Although the public health community possesses extraordinary emergency powers, including the ability to quarantine individuals, limit movements into and out of certain areas, and impose curfews, it needs more input and better communication from the business community. Plans for imposing extreme measures in an emergency may be met with widespread public non-compliance, especially when parents and children are to be kept apart. The public health community needs better input from the public at large and employers and employees as to the acceptability of various contingency plans.
- The public health community needs to focus more on creating a partnership with the business community in order make the general public aware of its plans and preparedness measures. The business community can use public health "best practices" information to educate employees, a measure which also will help to disseminate preparedness information to the general public. This should also provide a feedback mechanism to the public health community and state and local governments.
- The public health community and emergency responders should develop plans in coordination with businesses to use business infrastructure and assets in a major emergency. Many businesses can provide help in solving transport, storage, distribution, sheltering, and communications problems that a major emergency may bring about. However, the willingness of businesses to commit to such emergency assistance has not been well tested by emergency planners.
- Business should be an advocate for creating surge capacity in emergency healthcare in communities, for integration of disaster relief programs within their states, and for coordination with the National Response Plan.



The 2004 Policy Forum attracted a record crowd to the new Georgia Tech Global Learning Center.

Afternoon Session

1:15 P.M.

Panel Discussion:
“Developing Working Partnerships”

Panel Moderator:
Paula Olsiewski, Ph.D.: Program Director,
The Sloan Foundation

Panelists:
James J. Augustine, M.D.: Department of Emergency
Medicine, Emory University; and Medical
Director, Atlanta Fire Department
Thomas E. Bevan, Ph.D.: Director, Georgia Tech
Homeland Security Initiative; and Director,
Center for Emergency Technology, Instruction
and Policy, Georgia Institute of Technology
H. E. (Barney) Burroughs: CEO, Building Wellness
Consultancy, Inc.
Kathleen E. Toomey, M.D., M.P.H.: Director,
Division of Public Health, Georgia Department
of Human Resources

2:45 P.M. -3:15 P.M.

Break—Coffee, Booth Displays, and Demonstrations

3:15 P.M.

Panel Discussion:
“Securing the Food Chain from Bio-hazards”

Panel Moderator:
Judith Reppy, Ph.D.: Professor, Department of
Science and Technology Studies and Associate
Director, Peace Studies Program,
Cornell University

Panelists:
Corrie Brown, D.V.M., Ph.D.: Professor and
Coordinator of International Activities,
Department of Pathology, College of Veterinary
Medicine, University of Georgia
Michael Carakostas, D.V.M., Ph.D.: Director,
Corporate Scientific and Regulatory Affairs,
The Coca-Cola Company
Caroline Smith DeWaal, J.D.: Food Safety Director,
Center for Science in the Public Interest (CSPI)
Michael P. Doyle, Ph.D.: Regents Professor and
Director, Center for Food Safety, University
of Georgia

4:45 P.M.

Program Wrap-up: **Senator Sam Nunn**

5:00 P.M.

Adjourn

Abridged Conference Report

On March 23, 2004, former U.S. Senator Sam Nunn convened the 2004 Policy Forum at the Georgia Tech Hotel and Conference Center in midtown Atlanta.

Approximately 350 people attended the Forum, including approximately 50 top corporate officers of major U.S. corporations. The 2004 Policy Forum addressed the nation’s current state of preparedness for a bioterrorist attack and explored what more can and should be done to improve our readiness. This Forum occurred against the somber backdrop of significant numbers of influenza cases in the United States, significant increases in avian flu in Asia, and the recent experiences of the 2003 SARS epidemic in Asia and Canada and the still-unsolved anthrax attacks of late 2001. A major focus of the Forum was to make corporate leaders more aware of the extent to which a bioterrorism attack could threaten the profitability and continuity of business operations, and to explain the need for greater public-private coordination of plans and activities to anticipate and mitigate the effects of a bioterrorism attack or a serious disease outbreak.

Morning Session

Welcoming remarks

Professor William Long, chair of the Sam Nunn School of International Affairs and co-chair of the 2004 Forum Planning Group, called the Forum to order, welcomed the audience, and introduced Georgia Tech President Wayne Clough. President Clough also welcomed the audience to Georgia Tech’s new conference facility and announced that Senator Nunn will be in residence at The Sam Nunn School on a more frequent basis. He then introduced Senator Nunn to establish the context for the Forum.

Senator Nunn

Bioterrorism is a grave threat to the United States of America, in part because of the widespread availability of dangerous pathogens and the knowledge to prepare and deliver such pathogens. I had the rare opportunity to experience the devastating nature of the threat during a simulation of a bioterrorism attack called *Dark Winter*. The scenario began with simultaneous smallpox infections in three different locations, from unknown sources, and ran for three simulated weeks. I was playing the role of the president, with other former government officials playing cabinet members, state and local government officials, and members of the public health community. We found that bioterrorism has not received high priority in planning at any government level, and there are few trained government officials, virtually no coordination among plans, inadequate public health plans and resources, no prepared public information or education, insufficient vaccine supplies, and no plans for requesting or receiving international assistance. By the end of the three simulated weeks, the outbreaks had reached devastating epidemic proportions. This exercise took place two months before the 9/11 attacks in New York and Washington, D.C.

Although I am not an expert on bioterrorism, this experience leads me to offer several observations. First, the bio threat is different in many respects from that posed by other weapons of mass destruction (WMD): nuclear, chemical, and radiological

(or so-called “dirty bombs”) weapons. It lends itself to stealth attacks. An attack with any of the other WMD weapons will be immediately evident as the result of an explosion or a cloud of chemical agent. But a bio attack may give no such warning signal; we may only recognize it once infections begin to mount, and the public health system sees many atypical cases. Second, it may be very difficult to attribute the origins of the attack and to identify those responsible.

Third, any such attack is likely to overwhelm the public health infrastructure in the localities where it begins. Prior to its recognition, a contagious disease may infect many individuals, including many medical staff, first responders, and other key personnel, further reducing the capacity to cope. Quite literally, millions of lives may depend on the speed with which an attack is recognized, then characterized and acted upon with the full weight of medical assistance. Fourth, the drive for healthcare cost containment has led to very high rates of hospital occupancy, and utilization of special isolation rooms and equipment is necessary to deal with major outbreaks of contagious diseases. The first responders will always be the local authorities, but the local healthcare infrastructure may become saturated quickly.

Neither the federal government nor state nor local governments can deal with the threat alone. Thus, the first partnership needs to be among these governmental bodies, sharing information, plans, and capabilities. We also need to focus on securing dangerous pathogens in secure, well-guarded laboratories, and keeping them out of the hands of those who should not have them. Another badly needed partnership is between the intelligence and public health communities, to ensure that agents know what to look for, and that the public health community is better informed about increasing threats.

There is a fundamental need for a better public-private partnership. Ordinary citizens have little understanding of, or information about, the nature of WMD threats and measures that might reduce their vulnerability, and nearly none about bio threats. Our business leaders need to get more involved with public-sector officials in both the planning processes for responding to terrorist attacks, and in reducing both their vulnerabilities to attack and the consequences to their employees of various attacks. This is a bottom line issue and a continuity issue for businesses, yet too few of our business leaders have begun addressing this difficult subject. SARS was the “wakeup call” for all of us. We hope today to convince you to make a start, and we will share some of the many forms of assistance that are available to help you.

Our Keynote Speaker is General John Gordon, USAF (retired). During his career in the Air Force and since his retirement, he has served the nation in many key posts: deputy director of the Central Intelligence Agency, administrator of the National Nuclear Security Agency in the Department of Energy, Undersecretary of Energy, and now as assistant to the President for Homeland Security. I am delighted he has agreed to tell us about the status of our country’s plans and capabilities to deal with the bioterrorism threat.

General Gordon

The WMD terrorism threat to America is real, it is present, it is here. Bioterrorism is but one facet of this terrorism. I want to begin by talking about the Administration’s broad efforts against WMD threats and then deal in more detail with the bioterrorism threat. We are making a large effort to cope with terrorism threats

and to get ahead of them. Every day, intelligence arrives on new threats, new individuals, new capabilities, and new tactics. I think the fight against terrorism is much like the Cold War—it will last a long time, and we need to develop the capabilities that will provide some sustainable “normalcy” for people to go about their daily tasks feeling reasonably secure. This is a challenging task, as the terrorists can fail many times in order to achieve a single success, whereas we need to intercept or interrupt their efforts every time, since their “success” is our “failure.” Terrorists are sophisticated, smart, learning individuals enabled by modern technologies and fueled by financial networks provided by or through zealous supporters. The terrorists are diligently seeking WMD while continuing to employ with considerable effectiveness conventional high explosives.

Our counter-terrorism efforts involve both offensive and defensive activities. For the last two years, we have been very much on the offensive. More than 3,000 terrorists have been arrested in some 90 countries. Al-Qaeda and the Taliban have been removed from power in Afghanistan. Some two-thirds of the top leadership of al-Qaeda have been killed or captured. Together with 29 other nations, we have confiscated more than \$200 million and closed some 1,400 terrorist bank accounts and conduits. While I believe we will eventually eliminate al-Qaeda entirely, this will not end the war on terrorism. There are many small groups trained by al-Qaeda and motivated by “Radical Islam” or other radical causes; our intelligence has already identified more than 100 terrorist groups around the world who are prepared to use violence. Dealing with these small, shadowy groups will be more difficult than dismantling al-Qaeda. This assessment, if correct, has important implications for our future plans and actions:

- First, it puts even greater importance on cooperative relations with our allies, including intelligence and law enforcement functions. These other countries are likely to have a better chance of identifying small fragmented terrorist groups based far from our shores.
- Second, we need to integrate intelligence gathered domestically from local and state sources, as well as federal.
- Third, we need more effective border controls, so we know who is seeking entry to this country, and how long they stay.
- Fourth, we need to mine what are called “transactions data,” to identify who is doing what and where. This is hugely controversial and runs up against privacy issues. I do not want to characterize it as “finding a balance,” since that suggests that more “security” means less “privacy.” I believe that advanced information technologies can make it possible to have more of both, “connecting the dots” to find would-be terrorists without building massive permanent dossiers on law-abiding private citizens.

On the defensive side, we have been working hard for the last two years and have made the United States more secure as a result, but much remains to be done. Our objectives are three-fold: to prevent terrorist attacks, to protect our most valuable targets, and to minimize loss of life and property damage should an attack occur. Many new laws and regulations have been enacted, the Department of Homeland Security has been created, and major revamping of priority missions is occurring at all levels of government. We have improved border controls, port and container security, and airport and airline security, and have invested in R&D for a wide array of

new sensors and devices to enhance security. In sum, in the last two years, we have made significant progress on both offensive and defensive measures, and our safety has been increased. But much more remains to be done to enhance security. Let me now address some of the specifics of the bioterrorism threat.

The bio threat is serious, real, and must be dealt with. We need to do all we can to prevent an attack, and prepare as best we can to deal with the consequences should it happen. In my view, the bioterrorism threat is not that much more likely than other forms of WMD terrorism, but the preparations for a bio attack are so hard to detect, the onset of the attack may well be missed, the effects of an attack are so frightening, and the difficulty of attribution is hard. In sum, there is no area of security where we are doing more, but there also is no area where we have farther to go.

Last summer, an Interagency Task Force conducted an end-to-end review of our programs and plans in this area, focusing on four key areas: awareness, prevention, surveillance and detection, and responses. This review led to the identification of several priority areas for additional spending: attack warning, mass casualty care, response planning, medical countermeasures development, and bioterrorism intelligence.

- On the issue of *Awareness*, we are funding development of new bioterrorism expertise: developing a national biodefense analysis and countermeasures center to consider future bio threats and countermeasures, enhancing our protection of food and livestock channels, and increasing the number of technical experts in the intelligence community.
- *Prevention* of bioterrorism attacks is the most cost-effective area. Internationally, we are seeking to limit access to pathogens, improving our ability to detect and impede terrorists, and strengthening nonproliferation efforts including assisting other countries with border control efforts. We have also tightened controls on pathogen access in this country.
- In the area of *Surveillance and Detection*, we need better early warning and detection capabilities, comprehensive detection of the introduction of pathogens into humans or livestock, improved speed of laboratory testing, and better means to attribute responsibility through advanced bioforensic methods.
- As for *Response*, we are building an enlarged national stockpile, we have established a dozen “push packs” of medical supplies and antibiotics that can be sent anywhere in the United States within 12 hours, and we are requiring state and local plans to be integrated and consistent with national plans, which should help to accelerate responses from outside the local area. There will be a massive shortfall of hospital beds in the event of a large-casualties attack, and we are developing pilot plans to test some augmentation possibilities. We are also conducting a lot of R&D on both vaccines against diseases and new anti-viral medicines.

As all this suggests, the Administration and the Congress are providing major resources to enhance our counter-terrorism capabilities across the boards. In closing, let me mention my two major priority areas for increased effort. My first concern is the need to develop improved rapid and accurate assessment tools. We need to increase the speed of assessment and reduce the false-positives. How many times can the New York City subway

shut down some of its lines when a “white powder” is discovered, waiting for hours while lab tests are being run? Even if it is a hoax, what does the inconvenience of the shutdown cost, both financially and in terms of public confidence in our leaders?

My second concern is for better proactive medical care planning for mass casualties and for better integration of federal assistance into those plans. This must start with the realization that the threat is upon us. Such awareness, however, has not set in everywhere, and in some places the magnitude of the problem has led to a sense of hopelessness. There is much that local government and business leaders can do to address many of these pressing problems. This is where the focus of Senator Nunn’s efforts and focus in this Forum, and in his many other ongoing activities, is so important to all of us. I thank the Senator and the Forum organizers for giving me the chance to speak to you today.

PANEL DISCUSSION: Assessment of Capabilities and Deficiencies

Dr. O’Toole

Bioterrorism is the major threat of the twenty-first century. Biodefense is the highest priority, but this effort will require the development of whole new systems. I would re-emphasize General Gordon’s message that there is much more that needs to be done, and that business and citizen participation in this process will be vital. Like nuclear weapons, bioterrorism can be massively lethal, even jeopardizing our existence as a nation. For example, 100 kilograms of weapons-grade anthrax distributed over the District of Columbia would produce about the same lethality as would be expected of a one-megaton nuclear detonation; if someone can produce 100 kilograms, then 1000 kilograms is scarcely harder, which would raise the specter of follow-on attacks after an initial release. Biomaterials and knowledge are widespread, the bioterrorism threat is not linked to al-Qaeda or any single terrorist group, and the dual-use nature of bioresearch and development will make the threat difficult to control. Unlike 9/11, a bioterrorism attack will not be a “lights and sirens” event; it will not be over quickly, and its social and economic dislocations may be severe, widespread, and sustained. Estimates of the total economic costs of the SARS epidemic last year run as high as \$30 billion.

Contagious diseases can have huge effects—the 1918 influenza pandemic killed ten percent of all Americans between the age of 25 and 35. The mega-cities of the developing world are “Nature’s Petri dish” for the development of new human diseases. We have no rapid diagnostic techniques available, so new diseases are likely to have a “running start.” A thinking enemy could outdo Mother Nature’s worst diseases. The explosive growth in the biosciences means that there are large numbers of people around the globe with the knowledge and facilities needed to manipulate living organisms.

The United States of America faces a number of vulnerabilities. The U.S. medical system is fragmented and largely in private sector hands. Our public health departments have been underfunded for years and are grossly understaffed. The nature of the threats and the nature of the response capabilities needed are not well understood, nor are they a priority for local government or

business leaders. Furthermore, countermeasures for twenty-first century threats—new drugs and vaccines—are either nonexistent or not in adequate supply.

Despite the gloomy recitation above, there is some potential good news. First, preparedness matters and can make a significant difference. Effective response systems can reduce the toll from near-term threats, and, in the longer term, can render bioweapons obsolete as agents of mass casualties, as well as reduce global mortality from natural infections and diseases. Attaining this objective will not be easy or cheap, however; it will require an Apollo-scale effort and a greater international commitment both to eradicate diseases and to control access to dangerous pathogens.

What can the business community do to help? First, develop your disaster plans. Second, you can help to link communities together, through the places where your employees live, and to link them to governments. You can enrich the national debate, and you can serve as a conduit for information from governments about response plans. Senator Nunn, when he was playing the President during the Dark Winter exercise, observed, “There is no force on earth that can make 280 million Americans do something they think is not in their best interest or the best interest of their families.” You can help planners to come to grips with this issue.

Mr. Henderson

Until 9/11, bioterrorism was on the backburner at CDC—something we worried about at the end of a long day of coping with infectious diseases and the public health system, which was our overwhelming concern then, and all that we were funded to do. After 9/11, CDC’s budget jumped from \$189 million to \$2.3 billion in 2002, and the amount for public health preparedness and response went from \$50 million to about \$1 billion. It’s been hard to handle that kind of increase, given the then-current state of public health departments across the United States of America. With expanded funding, we have been moving rapidly to support the public health community in developing better bioterrorism response plans. The business community must be a large stakeholder in this process, but it has not been one to date. Business Executives for National Security (BENS) has been active in Atlanta and several other metropolitan areas, but there is much more to do.

Our focus for the past two years has been both to expand efforts on infectious diseases and to strengthen community public health and hospital capabilities to deal with bioterrorism. CDC’s missions now encompass: bioterrorism preparedness; safe storage and handling of, and access to, dangerous pathogens; tools to develop countermeasures; better diagnostics and vaccines; establishing better early warning systems; improving response capabilities; and improved plans for post-attack mental health intervention. My main concern is that the bioterrorism threat seems so scary and carries such drastic consequences that the public just doesn’t want to think about it. This apathy appears to extend through much of the business community as well. We really need you to become more engaged with us in planning, developing more effective response strategies, and providing solid information to your workers.

Dr. Berkelman

Use of biological agents was once unthinkable; but during the 1990s the acquisition or use of such agents by criminals and terrorists increased, and that trend has continued post-9/11. The threat is real and growing. How can you lead your business through dangerous waters? I see several areas to emphasize:

- First is preparedness and response planning within your company and for your employees and your industry.
- Second is your role as a watchdog, advocate, and partner with governments, especially public health, to ensure that government has the capacity to provide the services and societal infrastructure critical to your business.
- Third is to assume your role as a civic leader, locally and globally.

You need to develop systematic plans and procedures that reach well beyond mere disaster plans or product tampering issues. While parts of those plans may be relevant to the bio threat, other aspects pose new and different problems:

- Can you shelter employees in place, if necessary?
- Do you have potable water? Food? Each business needs to undertake a detailed self-assessment of its critical dependencies.
- How dependent are you on various infrastructures?
- Do you have plans for off-site operations if necessary? The anthrax attacks have cost the U.S. Postal Service hundreds of millions of dollars to clean up, deal with, or acquire temporary facilities.
- What can you do to harden your business?
- How would an attack on some other business—a supplier, a distributor, a service provider—affect your operations?
- What about your employees—what kind of training for a bioterrorism attack have they had? How about the safety of their families?
- How well can you communicate with both employees and their families?
- Will your employees show up for work if there has been an incident near your business? How much do you know about the public health response plan for a bioterrorism contingency?
- Do you even know who your public health officials are?
- Have you met Dr. Kathleen Toomey, the Georgia Director of Public Health, who will be a panelist this afternoon? Her people will have the vaccines or drugs you may need, and their decisions on issues like quarantines may have a real impact on your business operations.

And, yes, Dr. Toomey needs your help. The business community can be a valuable conduit for passing important information to the public through your employees. Governments alone cannot cope with bioterrorism threats. They need your help and support.

Mr. Moodie

Senator Nunn’s Nuclear Threat Initiative Foundation has supported a study by our organization to examine the deficiencies and needs in our bioterrorism preparedness plans. We have been looking at four areas: leadership, strategy, resources, and partnerships. General Gordon addressed the leadership plans and the proposed resources, but a lot of that money is only just being obligated, and there still seems to be no real overarching strategy. What I want to

discuss today, given the audience, is the role of partnerships in developing counter-terrorism plans. In the bio area, the risk spectrum runs from the naturally occurring diseases to accidents and incidents to deliberate introduction of deadly pathogens. Moreover, as already noted, much of the life sciences knowledge and facilities are “dual-use.” They can be used to eradicate diseases or to enhance them. Before 9/11, most governments—including ours—had lumped the bio threats with the chemical and nuclear threats. But solutions to the bio problem will be markedly different than those for nuclear or chemical weapons.

For bioterrorism, much of the capability lies with private life science companies, not government laboratories. Therefore, the life sciences industry has a vested interest in helping to devise solutions; it has much to offer. It also has much at stake, and the public will expect the industry to cooperate in mitigating problems. The chief executive officer of Pfizer said recently, “If we are seen to be part of the problem, then we will be treated as part of the problem, and not part of the solution.” This could mean onerous new rules and regulations designed to tighten access, methods, information sharing, and collaborations. If carried to an extreme, of course, this legislative approach could make the problem of control worse, by driving life sciences research and scientists to countries where rules are less onerous. The life sciences industry should begin by looking at the history of regulation and control in both the chemical and nuclear industries for approaches to adapt and pursue. The scope of the problem is international, as even small U.S. research firms typically have research or other ties to entities or institutions abroad. This dilemma will require our government to work closely with other governments to establish international security controls.

Dr. Ursano

We need to remember that the goal of terrorists is to induce terror throughout the nation. Thus, our response and mitigation plans should be based in part on reducing the perceived terror. The psychological goals of terrorism include: erosion of the sense of national security; disruption of society; and the destruction of social capital—morale, cohesion, and shared values. Terrorism opens up fault lines in society and in business—in your communities and your businesses. Your business disaster plans must be prepared to deal with psychological issues among your workforce, and mental health must be part of your plan. Polling shows three-fourths of Americans already fear another major terrorist attack is likely. However, 70 percent of workers would not evacuate their workplace even if directed to do so; that drops to 50 percent if the employees can confirm that their families are safe. More than a third of all employees have no understanding of, or are unaware of, their company’s emergency plans. Your plan should cover preparedness, consequence management, and response behavior for markets, and strategic partners.

Moreover, disaster experience makes plain that your plans must take account of group psychology effects. Large groups of people take longer to decide collectively whether to evacuate a building; the higher the location of the group above the ground floor, the longer it takes to decide, and the more familiar the members of the group, the longer they delay. Remember also that most acts of terror in the United States occur in workplaces—that is, where the crowds are found. Your plan should take this into account.

Your plan should emphasize the three “R”s.: Redundancy, Reliability, and Resiliency. Redundancy is not always affordable, however; machines are inherently more reliable than humans, especially under stress, but people are far more resilient than organizations. Your corporate continuity requires a plan for people, functions, and communications. Communications are especially important, and not just to your employees, but also from them, and to and from their families. Workplace preparedness must be a public-private partnership. You need to involve not just security and human resources personnel in your planning; you also need your medical personnel and your employee assistance personnel. This is not easy, as each of these organizations may have “stovepipe” reporting channels. But they are all necessary elements for a complete plan to assure workforce continuity.

LUNCHEON SPEAKER: How the EU Prepares for Bioterrorism



Mr. Andreani

Let me begin by noting the critical role of international cooperation in the fight against terrorism. For France, the European Union (EU) is our first level of international cooperation, as it now embraces 25 countries. Our next

level of cooperation is trans-Atlantic. Ten years ago, bioterrorism was a non-existent issue. No longer; last week, as a result of the recent train bombings in Madrid, France raised its terrorism warning level to “Red,” and the TV news routinely reported that the chlorine level of the Paris water supply was being increased as a precaution against a possible bioterrorism attack.

How does the EU approach the terrorism threat in general, and the bio-threat in particular? First, the EU is a borderless region within which one can travel without restriction. Its decision making on counter-terrorism is complicated by the need to coordinate within the 25 member countries. The EU has been a strong supporter of nonproliferation activities to control access to WMD weapons, materials, and dual-use technologies. The EU has contributed more than \$700 million to the Nunn-Lugar threat reduction programs since their inception. The EU also pledged through the G-8 process to contribute approximately \$4 billion to threat reduction efforts, and member countries are even now appropriating funds to begin to fulfill these pledges. Aid from EU member countries to other countries will now only be offered subject to conditions that include strong end-use restrictions on exported dual-use WMD equipment (including re-exports), and will include sanctions on recipients who fail to abide by these restrictions. The EU is also mobilizing terrorism preparedness among its member nations and seeking to develop a common policy on criminal

sanctions for individuals or groups trading in WMD weapons and materials. There are already many national efforts to deal with the terrorism threat, and the EU is playing a coordinating role in developing information-sharing systems and stocks of medicines and vaccines, and it is developing guidance and rules for mutual aid. The EU will also oversee creation of a European Center for Disease Control, not as a new institution, but by coordinating the efforts of member countries to avoid both gaps and duplications.

While this may seem less impressive than what you have heard of the U.S. efforts this morning, it is an important start for the EU, and we will hope to learn lessons from what the United States is doing. We are facing much the same threats on both sides of the Atlantic, and the threats are growing. Clearly, it is in all of our interests to enhance international cooperation on bioterrorism. I will raise three issues here:

- First, I believe there is still a role for arms control. The Biological Weapons Convention may not be all that effective, but it still has value in committing the civilized nations to a regime outlawing bioterrorism. This is useful even against non-state actors. We should try to salvage the important parts of the Protocol.
- Second, the biotechnology industry needs to become part of the solution. Just as the chemical industry worked with the drafters of the Chemical Weapons Convention, and decisively supported its ratification, the biotech industry now needs to become equally responsive.
- Finally, while France (and much of the EU) disagreed with U.S. policies leading up to Iraq, we are not in any disagreement about the need to cooperate to combat bioterrorism.

PANEL:

Developing Working Partnerships

Dr. Olsiewski

I congratulate the Forum organizers for their impressive program. I want to take just a moment to address another kind of “partnership,” one that each of us needs to establish. If you are at all concerned about the possibility that you may find yourself caught in or near a terrorist event, then, “What are you waiting for?” Let’s get prepared. Every individual should have a small emergency kit with them wherever they go; and every individual should have a plan for communicating with family, and a pre-planned emergency meeting place for family members to gather, should evacuations be directed. For more information, you can visit the Department of Homeland Security website and visit the section on *Citizen Preparedness*, which the Sloan Foundation helped to develop.

If you think this kind of preparedness is overkill, let me tell you that my daughter was on spring break in Madrid when the train bombings took place. Our whole family was very concerned, but my daughter finally got through to me on her cell phone, assured me she was all right, and I was then able to relay the message to all our other relatives using our communications plan.

Dr. Augustine

There have been many success stories in public health over the past 50 years; most have become successes in large part because of the backing of public-private partnerships. Examples include radiation exposure during the 1950s and 1960s; trauma, burns, and cardiac arrest during the 1970s; hazardous material exposure and accidents in the 1980s; and AIDS and hepatitis in the 1990s. Now we face new problems—terrorism, SARS, and who knows what else in the first decades of the twenty-first century. Huge reductions in incidence levels for all of these earlier problem areas came about because individuals and groups made finding, funding, and implementing solutions a priority activity.

A recent cover of *Newsweek* magazine proclaimed, “Crisis in the Emergency Room;” ironically, the date of that issue was September 10, 2001. There is a crisis in emergency rooms today, but not because of what we normally think of as “emergencies”—industrial accidents, heart attack victims, and the like. Thirty years ago these problems made up about half of all emergency room cases; today, they are less than 15 percent of the workload. Industrial safety practices, better car designs, defibrillators, and other solutions have greatly reduced these causes. Of course, we still see cardiac cases, but, for the most part, they are older people with progressive heart disease who, before defibrillators and other advances, would have been at great risk of a fatal attack at a much younger age.

Today, emergency rooms are flooded by sick people, most of whom are uninsured or underinsured. One area where we need a partnership between the business community and the medical community is liability reform. The emergency room is a high-stress, rapid-decision environment for medical professionals, and that translates to a high-liability environment. Rising malpractice rates are driving more and more doctors to decline to work in emergency rooms. How can we be prepared for a major emergency if we have limited emergency room capacity and few vacant beds?

By the way, you may be interested to learn that Georgia is one of the few states that does not have an integrated statewide trauma system. Ohio, where I helped to develop a partnership between business and the trauma system, has had one for more than 20 years. If you are in an auto accident there, you are seldom more than 20 minutes from a fully capable emergency trauma center; not so, for rural areas in Georgia.

Bioterrorism presents new challenges: delayed recognition, possibly multiple attacks, first responders at high risk, lack of rapid identification of the agent, and the thin line between Botulinum Toxin and BOTOX. How shall we approach this problem?

- First, planning and preparedness measures—this takes both effort and money to fund areas of shortfall; the trauma system provides a good model. We do need more funding for hospital capacity, along the lines of the Hill-Burton Act.
- Second, prevention measures; here we should look to find service models and other best practices, including the area Mr. Burroughs will address. For surveillance, we have a variety of monitoring devices and stations, and we need to develop rapid detection and classification measures.
- And, finally, we need to work with the business community to better understand which of your “lessons learned” might be adapted to the medical preparedness issue. The business community needs to be part of the solution to medical preparedness.

Dr. Bevan

The Center for Emergency Response Technology, Instruction, and Policy (CERTIP) was established in 1999. We began with partnerships among academia and the first responder communities, and added the public health community as bioterrorism planning matured. At CERTIP, we develop new inexpensive technologies for first responders, provide a variety of courses for first responders and HAZMAT teams, and work to provide incident commanders useful tools to help them deal with complex emergency situations. From this background, let me offer a few suggestions to the business community for how to establish partnerships and with whom to partner.

There are two necessary steps to outreach. One is an internal partnership—you need to integrate terrorism response plans into an overall security risk management process that feeds into your business plans. The second approach is through organizing in ways that will allow you to support the National Response Plan, which is based on the “Incident Command” model originally developed in fire services, with much borrowing from military doctrine and organization.

For the first approach, recognize that most businesses already have quality control systems in place, based on standards like Total Quality Management (TQM) and ISOs, in which the goal is “continuous quality improvement.” You need to conduct an overall risk assessment, looking at all aspects of the threat to your personnel, critical infrastructure, supplier networks, customer networks, etc. This assessment needs to be a continuous process, within which you will seek to improve the ability of your business to reduce its vulnerability and mitigate the consequences of an attack. Moreover, funding for these activities and improvements must become a regular part of your normal business budgeting process. You can use scenario analyses and risk models, and you should also look at human reliability issues—activities where a disgruntled employee or internal terrorist could do significant harm.

As for the incident command system, it’s part of the National Response Plan. It is how the state of Georgia, Fulton County, the city of Atlanta, and emergency responders deal with emergencies, and it is a practical approach for your own internal plans for managing emergencies. As an aside, CERTIP offers a course on the incident command process. You need to find out, and get to know, the likely incident commanders for various kinds of emergencies that may occur near or in your business. As for bioterrorism, the likely incident commander will be Dr. Kathleen Toomey, the director of the Georgia Department of Health, who is a member of this panel.

Mr. Burroughs

My topic is to give you an overview of what proactive owners can do to protect indoor air from contaminants. Let me begin with a few rules we practice:

- First, do no harm. If you don’t understand your building’s air distribution system, do not plan to turn off the ventilation in an emergency; this may be a bad idea.
- Second, buildings differ in many respects; “one size” solutions do not fit all.
- Third, for every reaction, there is an equal but opposite reaction.
- Fourth, in the workplace, air is an incompressible fluid.
- Fifth, air follows negative pressure.

- Sixth, a one-micron particle remains a one-micron particle.
- Finally, protection against the introduction of chemical or biological agents will also improve your indoor air quality, and significant protection will improve it markedly.

The greatest need you have is to understand in detail how your air circulation actually works, not what your building plans show. This means an end-to-end review. Then, you need to look at your building from the viewpoint of an invader. Remember, every person who enters your building, and every delivery, brings inside a “bubble” of outside air.

Once you have a complete understanding of your air flows, then it is time to consider improvements. Improvement number one is to seal all of the air distribution system, which will both prevent leakage and improve the efficiency of your system. Only then is it time to look at filtration, and at what it can contribute against your threat array. Now, the smallest particle size for finely-milled weapons grade anthrax is 0.3 microns. Does your business really need a filtration system that can provide that level of protection? Might you be better off by setting up an isolated mail handling and package delivery area and training your mail handlers in proper procedures for handling suspicious items? Then, lesser degrees of filtration elsewhere in your building may be quite adequate against a wide range of HAZMAT, chemical weapons, and bio weapons. Moreover, you can usually begin with incremental improvements to your existing system, rather than an expensive overhaul.

Salesmen will tell you that their HEPA and HEGA filters (the top of the line in filtration technology) are 100 percent effective. Don’t believe it and don’t spend your money on top-of-the-line filtration. Some level of filtration may well be necessary to meet your risk assessment goals, but it is entirely possible that your existing system can be upgraded to deal with many possible threats. This is a complex subject, and it is best to get professional assistance in these kinds of analyses, but it is also possible to make major improvements at relatively minor cost.

Dr. Toomey

I am sure some of you in the business community didn’t know that Georgia has a state Health Department; we do. I am the leader of the other public health institution located in Atlanta, although Dr. Julie Gerberding at CDC is much better known than I. My job is to protect the health and well-being of every Georgian, including all of those public health researchers at CDC, whose job it is to protect the health of citizens nationwide. So, if I do not do a good job, then CDC may be unable to do its critical missions. Or so I argued recently to Senator Zell Miller, while we were seeking more homeland security funds. You will not be surprised to learn that his response was “Nice try, Kathleen.”

My department had its orientation drastically altered by 9/11. I now spend nearly 90 percent of my time on public health issues related to homeland security, including the preparations for the G-8 Summit at Sea Island in June. I want to assure you that I need to partner with the business community to better do my job. Collectively, we can improve public health and homeland security. Our homeland security preparations and activities will have benefits for public health well beyond added security.

My department is already working with Business Executives for National Security (BENS) here in Georgia. They are helping

us develop the support of a number of businesses which will be focal points for receiving those “push packs” from the national stockpile in the event of a terrorist attack. These companies will receive, store, and help distribute the medicines, vaccines, and supplies to other public health facilities and emergency centers that may be opened. BENS is also helping us in the preparation of a public health manual on preparedness measures to deal with terrorism that will be ready for distribution shortly to businesses and workers. We hope other members of the Atlanta metropolitan area business community will be willing to partner with us to maintain and expand programs like this.

PANEL:

Securing the Food Chain from Biohazards

Dr. Reppy

We have four experts who will discuss various aspects of this important area. We need to bear in mind that the consequences of bioterrorist attacks against the food chain can range from significant economic losses and consumer loss of confidence to very serious public health problems.

Dr. Brown

Securing our livestock, fisheries, and farms from terrorist attack is a tall order, and, as Dr. Reppy indicated, the consequences can be either economic or health-related. Some examples follow. Foot and mouth disease in livestock—which is highly contagious—can have enormous economic costs. The epidemic in the United Kingdom last year is estimated to have cost nearly \$12 billion; an outbreak here in the United States has been estimated to cost between \$25 and \$80 billion, depending on the economic models used. “Mad cow” disease is more dangerous. Unlike foot and mouth disease, it can spread to humans through consumption of infected beef. The United Kingdom had an outbreak in 1987; to date, 153 known human cases of Variant Creutzfeldt-Jacob Disease, which is inevitably fatal, have occurred. The mad cow disease spread through much of Western Europe via U.K. feed stocks that had been contaminated by ground-up parts from infected cattle. In May 2003, mad cow disease was found in Canada, also caused by contaminated feedstocks; and in December 2003, a single cow imported from Canada to a farm in Washington State was also found to have the disease. There are no vaccines against these diseases; the only control mechanism available is to kill the entire herd, and, usually, neighboring herds, to prevent the disease from spreading.

Two other diseases are of note. You have heard a lot in the last two years about West Nile fever, which infects birds, which infect mosquitoes, which can, in turn, infect humans. You have probably not heard of Rift Valley fever, an African disease that has also migrated via mosquitoes to humans. While the death rate for West Nile fever is only about one in a thousand of those infected, the mortality rate of Rift Valley fever ranges from 14 to 26 percent of those infected. It is probably only a matter of time before it reaches North America. The second worrisome disease is called Highly Pathogenic Avian Flu—most of you have heard about it as “poultry flu.” It was first observed to have crossed over to humans in 1997. There have been major outbreaks in at least ten Asian countries in

the last year, resulting in some 100 million chickens being killed in an eradication effort. So far, there have been 33 human cases, with 23 deaths. A different strain of this flu was also detected on a single ranch in Texas, which was also controlled by massive killing of poultry in the region. If this flu ever reaches Georgia, it will likely be the end of the poultry industry in this state.

All of the cases I described above are naturally occurring diseases; they are Mother Nature’s handiwork, not bioterrorism. What can we say about deliberate terrorism directed against animal husbandry? In short, it is a huge problem. How do you “harden” a ranch or poultry farm against the introduction of any of the diseases discussed earlier? It would be almost impossible. Therefore, we will need to rely on vigilance, rapid identification of any outbreak of disease, and the quick application of culling methods to try to limit the spread.

Dr. Doyle

My subject is assuring safety in the food processing industry. This industry is large and widely distributed. There are more than 57,000 food processors, and more than 6,000 meat, poultry, and egg processors in this country. In addition, 11 percent of the food consumed in this country is imported from other countries. This means there are many opportunities for contamination to occur.

Cases of unintended contamination on a large scale have already occurred. In 1985, about 170,000 people in the Midwest were infected by *salmonella typhimurium*, which was resistant to at least nine different antimicrobials. This outbreak was caused by contaminated pasteurized milk from a single dairy plant. In 1994, some 224,000 people were infected by *salmonella enteritidis* in ice cream. The culprit was contaminated pasteurized ice cream mix transported in large tankers. This ice cream was distributed nationwide, resulting in one of the biggest recall efforts in U.S. history.

What are the characteristics that would create the greatest potential for adverse, widespread effects on human health? A short list has been developed. It begins with virulent gastrointestinal pathogens capable of causing severe illness; and a food product where such pathogens can prosper. Foods that are consumed raw

I do not recommend this. Have you ever had occasion to smell a wet dog? Well, irradiating to the level to kill most pathogens results in food that smells like a wet dog; that puts me off enough that I have never tested to see what the food tastes like.

Ms. DeWaal

Let us begin by making clear what is at stake in economic terms. If terrorists successfully contaminate the U.S. food supply and cause major illness, consumer confidence in the integrity of the food system and its governmental overseers will plummet even faster than it did for airline security on September 12, 2001. That's why this administration is addressing the problem and seeking to develop methods to improve controls.

The problem is large and growing larger. Since 1994, food imports to the United States have increased five-fold. In November 2001, Health and Human Services Secretary Tommy Thompson said in testimony, "Am I satisfied with the [food] inspections we are doing? No, I am more fearful about this than anything else." Earlier this year, the Food and Drug Administration admitted it inspects less than one percent of this flow. Small wonder, since they have far too few inspectors and no budget with which to add more.

In addition to the cases Dr. Doyle mentioned, let me add a few more. In Oregon in 1984, members of the Rajneeshee cult introduced salmonella into a small town salad bar, hoping to sicken townspeople just before an election; they caused 751 illnesses. More recently, in the winter of 1996-97, Guatemalan raspberries contaminated by *Cyclospora cayatanensis* caused 2,477 cases of illness in 21 states. And just last year, contaminated Mexican scalions caused 555 cases of Hepatitis A, with three deaths.

In sum, what happens in a farm field far away can have serious consequences for U.S. consumers. In 2002, the World Health Organization reported, "The malicious contamination of food for terrorist purposes is a real and current threat, and deliberate contamination of food at one location could have global public health implications." This study identified numerous areas of vulnerability such as production and harvesting, food processing and manufacture, storage and transport, distribution, and food service. It also noted deficiencies in both trace-back and recall capabilities, and in the forensic capabilities of laboratories to identify contamination in timely fashion. The study noted that laboratory shortcomings could lead to delayed recognition, that many labs do not have a full range of tests or do not routinely use them, and that labs in general have heavy workloads, with little "surge" capacity.

Here in the United States, reporting of outbreaks by states to the CDC is mostly voluntary, and CDC does little checking to monitor timely reporting. Because of this faulty reporting system, outbreaks in several states might not be linked or immediately reviewed for possible terrorist origins. In addition, U.S. federal agencies do not have the authority to mandate a food recall; such powers are largely vested in the individual states.

Dr. Carakostas

The Coca-Cola Company has been a target of product tampering both domestically and internationally for many years. Internationally, attacking our business is a kind of a surrogate for attacking the United States directly. So security has been, and continues to be, vital for us. Our security system is largely imbedded in our very substantial quality assurance system.

We do have our own HACCP system as a starting point, and we do very careful pre-employment screening of all new hires, since the most likely failure of a control point is the action of a disgruntled employee rather than a true outsider. Not that we do not worry as well about outsiders; we have many suppliers, and we carefully inspect their quality control and security systems to assure ourselves they meet our standards. We also have very extensive product distribution chains and product that is available at point-of-sale locations to worry about.

We begin with a detailed risk assessment throughout our supply chain, and we try to detect or anticipate new risks. We do have an incident command management system, and we use continuous process improvement methods. We view the threat less as one causing mass casualties than as an incident that can cause worldwide panic and aversion to our products. The economic cost of a panic can be substantial.

We also try to test a lot, but testing is difficult. No company can put up with tests that have a high false-positive rate for long; you cannot afford to stop lines while you re-test. So, we have developed and use test methods that have low false-positive rates. But that brings a new problem: now the false-positive and the real-positive rates are similar, so that each false-positive signal must be taken very seriously. This puts a real premium on developing tests that can be rapidly repeated, to avoid major disruptions to operations.

Forum Wrap-up

Senator Nunn

After a daylong discussion of threats, vulnerabilities, and deficiencies, it is easy to feel depressed and discouraged. People feel overwhelmed by the scope and peril of global terrorism. Yet, we, our parents, and our grandparents have confronted and survived other grave perils: the Depression, World War II, and the Cold War with the Soviet Union, where Armageddon was a scant 30 minutes away. We need to remember that, today, all of the world's major powers are aligned in general terms, unlike the past 50 years. Russia, China, Japan, our European friends and allies, and many other countries all have the same substantial stake in the current global system, and, in general, that stake extends to countering global terrorism. Yes, we face many serious problems and challenges, but, on the whole, this is a fortunate generation.

I thank all of the participants in today's program for your excellent presentations. Now our challenge is to determine how best to follow up on this conference, so we can collectively have an effect on bioterrorism preparedness in Atlanta, in Georgia, perhaps even nationally. I would welcome your thoughts and suggestions.

Participant Bios

Gilles Andreani

Gilles Andreani is the director of the Policy Planning staff of the French Ministry of Foreign Affairs and is a policy advisor to the Foreign Minister. He has previously served as a senior auditor of the Court of Auditors, Senior Fellow at the International Institute for Strategic Studies and the London School of Economics, Deputy Permanent Representative to the North Atlantic Council, and director for Disarmament in the Ministry of Foreign Affairs.

James Augustine

James Augustine, M.D., is an emergency physician from Atlanta. He serves on the Clinical Faculty in the Department of Emergency Medicine at Emory University. He also serves as medical director for the Atlanta Fire Department, which includes operations at Atlanta Hartsfield-Jackson International Airport. Dr. Augustine is past president of the Ohio Chapter of the American College of Emergency Physicians and served as first chair of the Ohio Emergency Medical System Board. In that role, he worked for 15 years to help Ohio develop its State Trauma System. He has served for 23 years as a firefighter and EMT-A. He has published numerous articles on emergency services and participated in national and state leadership activities on emergency and trauma systems.

Ruth Berkelman

Ruth Berkelman, M.D., is the Rollins Professor and director, Center for Public Health Preparedness and Research at the Rollins School of Public Health, Emory University. She holds appointments in the departments of Epidemiology and International Health and in the School of Medicine, and is board certified in pediatrics and internal medicine. She is nationally and internationally recognized for her work on infectious diseases and disease surveillance. She is currently a member of the Board of Life Sciences of the National Academies of Science, the Forum on Emerging Infections for the Institute of Medicine, the Policy and Scientific Affairs Board of the American Society of Microbiology, and the Board of Trustees of Princeton University.

A native of Atlanta, Ruth Berkelman received her A.B. in history from Princeton University in 1973. Following graduation from Harvard Medical School and residency training, she returned to Atlanta in 1980, entering the U.S. Public Health Service and serving in various positions as a medical officer at the Centers for Disease Control (CDC). She was the deputy director of the National Center for Infectious Diseases, CDC; and later the senior advisor to the Director, CDC. She retired as an Assistant Surgeon General in the U.S. Public Health Service in 2000. She has also consulted for the Biologic Program of the Nuclear Threat Initiative.

Thomas Bevan

Dr. Thomas Bevan is the director of the Georgia Tech Center for Emergency Response Technology, Instruction, and Policy (CERTIP) and director of the Georgia Tech Homeland Defense Initiative. Dr. Bevan started CERTIP in 1999 to provide innovative, affordable solutions for emergency managers and first-responders to address the problems associated with natural and

man-made disasters, especially chemical and biological agent incidents. CERTIP has acquired more than 50 regional and national partners and has developed and demonstrated technologies with financial support from the U.S. Marine Corps. He is also a Georgia Tech Research Institute (GTRI) Fellow.

Prior to coming to GTRI, Dr. Bevan was the founder of the Ukrainian Land and Resource Management Center that was to provide remote sensing and geographic information system solutions to environmental problems in Eastern Europe, especially following the Chernobyl nuclear power plant accident.

After receiving his B.A. from Dartmouth College, and M.S. and Ph.D. from Princeton University, Dr. Bevan served on active duty in the U.S. Army at the Wood Biomedical Laboratory, where he conducted experiments on the physiological and behavioral effects of chemical agents antidotes.

Corrie Brown

Dr. Corrie Brown is professor and coordinator of International Activities, Department of Pathology, College of Veterinary Medicine at the University of Georgia. She is coordinator of International Veterinary Medicine for the College. Her professional interests are in infectious diseases of food-producing animals, emerging diseases, and international veterinary medicine. She has published or presented more than 250 scientific papers and has served on numerous federal and industrial panels regarding infectious and emerging diseases. She has testified to Congress on issues involving agroterrorism and is a member of the Secretary of Agriculture's Advisory Committee on Foreign Animal and Poultry Diseases.

Dr. Brown was an assistant professor of pathology at Louisiana State University briefly before joining the U.S. Department of Agriculture at Plum Island, where, as head of the Pathology Section, she specialized in the diagnosis and pathogenesis of foreign animal diseases. In 1996, she joined the University of Georgia College of Veterinary Medicine as professor and head of the Department of Veterinary Pathology.

She received her B.Sc. in Animal Behavior from McGill University and her D.V.M. from Ontario Veterinary College at the University of Guelph (1981). She completed a combined residency/Ph.D. in Comparative Pathology at the University of California at Davis. Board certification (ACVP) and Ph.D. were both attained in 1986.

Barney Burroughs

H. E. Barney Burroughs is a technical consultant in the field of indoor environmental quality and is a recognized expert in indoor air quality (IAQ) and air cleaning. He is the president and chief executive officer of Building Wellness Consultancy, Inc., an Atlanta consulting firm specializing in IAQ diagnostics and mitigation, filtration, and related IAQ and building health issues. He is a prolific author of numerous papers and articles and is a lecturer on IAQ and related subjects.

Mr. Burroughs is an outside director of Environmental Design International, Ltd., a building performance, communications and security, and environmental engineering firm based in Atlanta. He is also an outside director of Building Diagnostics Research Institute (BDRI), a Washington, D.C., non-profit research organization. He is a past international president (1987/88) and Fellow

of ASHRAE (The American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.) and remains active in its activities.

Michael Carakostas

Dr. Michael Carakostas is director, Corporate Scientific and Regulatory Affairs (SRA), at The Coca-Cola Company, where he and his scientific and regulatory affairs staff provide ingredient safety assessments and manage scientific issues. Dr. Carakostas earned a bachelor's degree and doctor of veterinary medicine degree concurrently at Michigan State University in 1975, and a Ph.D. degree in veterinary laboratory medicine and comparative pathology from Kansas State University in 1980. He is a diplomate of the American College of Veterinary Pathologists in veterinary clinical pathology.

Following an internship and brief stint in private practice in New York City, Dr. Carakostas served on the veterinary school faculties at Louisiana State University and Tufts University. In 1985 he joined DuPont's toxicology laboratory as a staff pathologist, and in 1991 he joined SmithKline Beecham, where he eventually served as the head of drug safety assessment for its animal health division. While working for these companies, he also held an adjunct professorship at the University of Pennsylvania's veterinary school.

Dr. Carakostas joined The Coca-Cola Company in 1995, first serving as the SRA director for the North American business unit until being named in 1999 to the corporate position he now holds. In addition to his work at The Coca-Cola Company, he also holds an adjunct professorship at Georgia State University in the College of Health and Human Services.

Caroline Smith DeWaal

Caroline Smith DeWaal, J.D., is the director of the food safety program for the Center for Science in the Public Interest (CSPI) and co-author of *Is Our Food Safe? A Consumer's Guide to Protecting Your Health and the Environment*. She represents CSPI in Congress and in the regulatory arena on such issues as meat and poultry safety, seafood safety, food additives, pesticides and sustainable agriculture, and animal drugs.

Ms. DeWaal is the leading consumer analyst on reform of laws and regulations governing food safety. Since 1999, she has maintained and annually published a listing of food borne illness outbreaks organized by food source. She has presented CSPI's outbreak database, which now contains more than ten years of outbreak reports, at numerous scientific conferences, including the American Public Health Association, International Association for Food Protection, and the American Society for Microbiology.

Ms. DeWaal has testified before numerous committees of Congress and has participated in the World Health Organization Strategic Planning on Food Safety meetings and other international conferences. She was a member of the National Advisory Committee on Meat and Poultry Inspection from 1997-2000. She is currently on the Editorial Board of the *Food and Drug Law Journal* and a member of the International Association of Food Protection.

Michael Doyle

Dr. Michael Doyle is a Regents' Professor of Food Microbiology and Director of the Center for Food Safety at the University of Georgia. He is an active researcher in the area of food safety and security and works closely with the food industry on issues related to microbiological safety. Dr. Doyle is a graduate of the University of Wisconsin-Madison, where he received his B.S. degree in Bacteriology, and M.S. and Ph.D. degrees in Food Microbiology. He serves on food safety committees of numerous scientific organizations and has served as a scientific advisor to many groups, including the World Health Organization, the Institute of Medicine, International Life Sciences Institute-North America, the Food and Drug Administration, the U.S. Department of Agriculture, the U.S. Department of Defense, and the U.S. Environmental Protection Agency.

Dr. Doyle has published more than 400 scientific publications and has given more than 500 invited presentations at national and international scientific meetings. In addition, he has received several research awards from academic and national scientific organizations. Dr. Doyle is a Fellow of the American Academy of Microbiology, the International Association for Food Protection, and the Institute of Food Technologists; and was recently elected to the National Academy of Sciences-Institute of Medicine.

John Gordon

General John Gordon is the President's Homeland Security Advisor and an Assistant to the President. In this role he is responsible to the President for developing interagency homeland security policy, advising him during domestic incidents involving terrorism and natural disasters, and leading the Homeland Security Council staff. Before joining the Homeland Security Council, General Gordon was the Deputy National Security Advisor for Combating Terrorism at the White House.

General Gordon came to the White House after serving as the administrator of the National Nuclear Security Administration (NNSA) and Under Secretary of Energy. Prior to assuming his post at the Department of Energy, General Gordon served as Deputy Director of Central Intelligence, from October 1997 until June 2000, and earlier had been the associate director of Central Intelligence for Military Support at the Central Intelligence Agency.

During President George H. W. Bush's Administration, General Gordon served with the National Security Council in the areas of defense and arms control, including the oversight and completion of the START II negotiations. He then became a senior member of the Secretary of Defense's staff and later, the director of operations, Air Force Space Command. He later served as special assistant to the Air Force chief of staff for long-range planning, where he was responsible for restarting and integrating a long-range planning process in the Air Force.

Joseph Henderson

Joseph Henderson is currently the associate director of Terrorism Preparedness and Emergency Response at the Centers for Disease Control and Prevention. In this capacity Mr. Henderson is responsible for all of CDC's public health emergency preparedness and emergency response activities, which are currently supported by a budget of \$2.3 Billion. Prior to serving in this position, Mr. Henderson had a short hiatus in the private sector as the vice

president and chief public health officer for Scientific Technologies Corporation. In the aftermath of September 11, 2001 and the subsequent anthrax attacks, Mr. Henderson served as the deputy director of CDC's Bioterrorism Preparedness and Response Program helping to coordinate CDC's response efforts.

Mr. Henderson has been with the CDC since 1992. During that time he has served as the New York State Immunization Program director, the Southeast regional consultant for the National Immunization Program, and the team leader for the National Immunization Registry Initiative for the National Immunization Program. Mr. Henderson spent ten years in the U.S. Air Force developing medical capacities to respond to the consequences of nuclear, biological, and chemical warfare.

Michael Moodie

Michael Moodie is co-founder and president of the Chemical and Biological Arms Control Institute (CBACI). In this capacity, he is responsible for all aspects of CBACI's activities, including oversight of programs, design and implementation of projects, public outreach, administration, and publications.

In government, Mr. Moodie served as assistant director for Multilateral Affairs at the U.S. Arms Control and Disarmament Agency (ACDA), where he was responsible for, among other issues, chemical and biological arms control. He has also served as special assistant to the Ambassador and assistant for Special Projects at the U.S. Mission to NATO.

In the policy research community, Mr. Moodie has held senior research positions at the Foreign Policy Research Institute, the Institute for Foreign Policy Analysis, and the Center for Strategic and International Studies, where he was also senior advisor to the president. He has been a visiting lecturer at Georgetown University's School of Foreign Service and a consultant to the President's Foreign Advisory Board, the U.S. Navy, and American Commodity Distribution Association.

Paula J. Olsiewski

Dr. Olsiewski, in her position as program director, is leading the Alfred P. Sloan Foundation's program to reduce the threat of bioterrorism. Since joining the Foundation in 2000, she has created a collaborative network from the public, private, and government sectors that has become critical to the nation's civilian biodefense movement. The Foundation's bioterrorism program currently focuses on civilian terrorism preparedness and issues related to dangerous research. Grantees working in these areas include the Advertising Council, the Center for International Security Studies at the University of Maryland, and the National Academy of Science. Olsiewski continues to seek unique opportunities in bioterrorism prevention, detection, and preparedness.

Prior to joining the Sloan Foundation, Olsiewski served in many capacities in the biotech and biomedical community. She is president of the MIT Alumni Association and a member of the MIT Corporation.

Olsiewski received a B.S. in Chemistry from Yale College, and a Ph.D. in Biological Chemistry from MIT.

Tara O'Toole

Tara O'Toole, M.D., is chief executive officer of the Center for Biosecurity of the University of Pittsburgh Medical Center. Dr. O'Toole previously was director of the Johns Hopkins University Center for Civilian Biodefense Strategies. She has also served as a member of the Dodd Defense Science Board, the National Academy of Engineering Committee on Combating Terrorism, the National Academy of Sciences Working Group on Biological Weapons, and the Maryland Department of Health and Mental Hygiene Steering Group on public health response to weapons of mass destruction events.

From 1993 to 1997, Dr. O'Toole served as assistant Secretary of Energy for Environment, Safety, and Health, and was the principal advisor to the Secretary of Energy on matters pertaining to protecting the environment and worker and public health from Department of Energy operations. During her tenure, Dr. O'Toole conducted four major vulnerability studies that identified major safety and environmental hazards at the nation's nuclear weapons complex and focused resources on the most serious threats.

From 1989 to 1993, Dr. O'Toole was a senior analyst at the Congressional Office of Technology Assessment, where she directed and participated in studies of health impacts on workers and the public due to environmental pollution resulting from nuclear weapons production. Dr. O'Toole is a board-certified internist and occupational medicine physician with clinical experience in academic settings and community health centers.

Judith V. Reppy

Dr. Judith Reppy is a professor in the Department of Science and Technology Studies and associate director of the Peace Studies Program of Cornell University, with which she has been associated since 1973. She is an adjunct member of the Department of Government. She has been a visiting fellow at Science and Technology Studies at Manchester University in the U.K., the Science Policy Research Unit at Sussex University in the U.K., and the Center for International Studies at Massachusetts Institute of Technology. She is a past co-chair of U.S. Pugwash and a member of the Council on Foreign Relations.

Dr. Reppy sits on the boards of the Federation of American Scientists, Economists Allied for Arms Reduction, and the Institute for Defense and Disarmament Studies. She is a member of the Advisory Board of Women in International Security. She served on the U.S. National Academy of Sciences Committee on Research Standards and Practices to Prevent Misuse of Biotechnology Research; the Academy's report, *Biotechnology Research in an Age of Terrorism*, was issued in October, 2003.

Kathleen Toomey

Kathleen Toomey, M.D., came to the Division of Public Health in 1993 as the State Epidemiologist and director of the Epidemiology and Prevention Branch, with responsibility for the STD/HIV and tuberculosis prevention and treatment programs, as well as epidemiology and notifiable diseases investigation and reporting. In 2001, Dr. Toomey was appointed by Governor Roy Barnes to the Georgia Homeland Security Task Force and has continued in this role under Governor Sonny Perdue. This group is working to strengthen Georgia's homeland security in coordination with the

federal Department of Homeland Security. Dr. Toomey is responsible for leading Georgia's medical and public health efforts involving bioterrorism and medical emergency preparedness.

Dr. Toomey is a member of the Terrorism Advisory Committee of the American Academy of Family Physicians, and has served on committees and boards of many other professional and national organizations including the National Campaign to Prevent Teen Pregnancy and the American Public Health Association. Dr. Toomey has lectured frequently about the public health response to bioterrorism and the need for coordination between public health and law enforcement. From 1987 to 1993, she held a number of positions at the Centers for Disease Control and Prevention in the Division of STD/HIV Prevention, including Epidemic Intelligence service officer and associate director.

Robert Ursano

Robert Ursano, M.D., is professor of Psychiatry and Neuroscience and chair of the Department of Psychiatry at the Uniformed Services University of the Health Sciences, Bethesda, Maryland. He is also director of the Center for the Study of Traumatic Stress. In addition, Dr. Ursano is editor of *Psychiatry*, the distinguished journal of interpersonal and biological processes.

Dr. Ursano is widely published in the areas of Post-Traumatic Stress Disorder and the psychological effects of terrorism, bioterrorism, traumatic events and disasters, and combat. He and his team have served as consultants and completed studies on numerous disaster groups such as: disaster rescue workers; motor vehicle accident victims; family violence; and Vietnam, Desert



Dr. Kathleen Toomey, Director of Public Health for the state of Georgia, invites the business community to a working partnership.



Dr. Corey Brown, Dr. Michael Doyle, and Ms. Carolyn Smith DeWaal discuss securing the food chain from bio-hazards.



Dr. Michael Carakostas and Dr. Judith Reppy deliberate food safety issues.

The **2004 Sam Nunn Bank of America Policy Forum** appreciates the Bioterrorism Preparedness displays provided by the following individuals and organizations:

1. **Joshua Barbour**, *Ph.D. Student and Graduate Fellow at the Department of Arms Control and Disarmament and International Security, University of Illinois at Urbana-Champaign*
2. **Courtney Bronner**, *Research Support in Pathobiology, Auburn University*
Kenneth E. Nusbaum, *Associate Professor in Pathobiology, Auburn University*
James C. Wright, *Zoonotic Consultant, Auburn University*
3. **Paul Schlumper**, *Senior Research Engineer, Georgia Institute of Technology Research Institute*
Kevin Kamperman, *Director of Hazardous Materials and WMD Training, Georgia Institute of Technology Research Institute*
Brandon Clifford, *B.Sc. Student in Architecture, Georgia Institute of Technology*
4. **Desmond Stubbs**, *Ph.D. Student in Chemistry and Biochemistry, Georgia Institute of Technology*
5. **Xiuling Wang**, *Ph.D. Student in Mechanical Engineering, University of Nevada, Las Vegas*
Darrell Pepper, *Professor of Mechanical Engineering, University of Nevada, Las Vegas*
Lynn B. Nielson, *M.Sc. Student in Mechanical Engineering, University of Nevada, Las Vegas; and Fire Protection Engineer, City of Henderson, Nevada*
6. **Kathleen M. Carley**, *Professor of Computation, Organizations, and Society, Carnegie Mellon University.*
Alex Yahja, *Ph.D. Student in Computation, Organizations, and Society, Carnegie Mellon University.*
7. **Diane Norris**
Ph.D. Student in Nuclear Engineering, Georgia Institute of Technology
8. **Center for Emergency Response Technology, Instruction, and Policy**, Georgia Institute of Technology
9. **Go2 Gear**, Atlanta, Georgia

2004 Sam Nunn Policy Forum Planning Group

Program Co-Chairs:

- William Long, Chair and Professor, The Sam Nunn School of International Affairs
- William Hoehn, Visiting Professor and Coca-Cola Eminent Practitioner, The Sam Nunn School of International Affairs

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- Carol Silvers, Administrative Assistant, Ivan Allen College
- Katja Weber, Co-Director, European Union Center of the University System of Georgia
- Brian Woodall, Associate Chair, The Sam Nunn School of International Affairs

2004 Policy Forum Student Volunteers

INTAGO:

Amanda Bell
Brecca Berman
Jonathan Burke
Bradley Campbell
Robert Cooper
Paige DePetro
Neal Donaghy
Cécile Edwards
Chima Eke
Stephen Ferguson
Jamal Henry
Omer Khan
Jessica Kirk
Megan Kirk
Adam Mathis
Nick Smythe
Tiffany Turner

Sigma Iota Rho:

Claudia Arniella
Banafsheh Azizi
Cameron Davis
Katherine Foley
Joseph Huntemann
Kimberly Lawson
Donyale Leslie
Ruth Malhotra
Ryan McClanahan
Tara Murphy
Jamie Papa
Whitney Raven
Fran Ruskin
Sanaz Safi
Megan Salomone
Heather Symon
Jennifer Tucker
Jennifer Wu



Dr. Thomas Bevan, Dr. Kathleen Toomey, and Dr. Paula Olsiewski, examine questions of private sector involvement in bioterrorism preparedness.



Audience member poses question to panelists on the safety of the food chain from biohazards.



Dr. Ruth Berkelman, Joseph Henderson, Dr. Robert Ursano, Dr. Tara O'Toole, and Mike Moodie, panel discussion, "Bioterrorism Preparedness: Assessment of Capabilities and Deficiencies."



Researchers from across the nation presented findings at this year's Policy Forum.

The Sam Nunn Bank of America Policy Forum

The Sam Nunn Bank of America Policy Forum is a policy meeting that brings together noted academic, government, and private-sector experts on technology, public policy, and international affairs to address issues of immediate importance to the nation. It was developed from former Senator Sam Nunn's vision of increasing understanding among policy-makers, academic researchers, technologists, and citizens regarding important issues they face. Senator Nunn is a distinguished professor at The Sam Nunn School of International Affairs at Georgia Tech.

The Policy Forum is open to the public and is designed to foster informed discussion of critical issues confronting the United States in the twenty-first century. Offering a significant venue for policy-relevant research and dialogue, the Policy Forum transcends disciplinary boundaries and engages scholars, practitioners, students, and the public. The insights and findings produced at the Forum are shared with policymakers and the broader public through congressional testimony, circulation of proceedings, policy papers, journal articles, and educational television and Internet broadcasts. The Forum connects the academic and policymaking communities to craft effective and creative responses to the critical challenges facing the nation and engages and informs interested citizens on these issues.

The initial Policy Forum series was held annually from 1997 to 2002; was co-sponsored jointly by the University of Georgia, the Georgia Institute of Technology, and Emory University; and was hosted in turn by each institution. The Policy Forum, henceforth, will be held biennially and will be sponsored by and held at the Georgia Institute of Technology. The Policy Forum is funded by a generous endowment provided by Bank of America.

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- Carnegie Corporation of New York
- European Union Center of the University System of Georgia
- King & Spalding, LLP
- John D. and Catherine T. MacArthur Foundation
- Alfred P. Sloan Foundation



Sam Nunn

Sam Nunn is co-chairman and chief executive officer of the Nuclear Threat Initiative (NTI), a charitable organization working to reduce the global threats from nuclear, biological, and chemical weapons. He served as a U.S. Senator from Georgia for 24 years (1972-1996) and is retired from the law firm of King & Spalding. In addition to his work with NTI, Senator Nunn has continued his service in the public policy arena as a distinguished professor in The Sam Nunn School of International Affairs at Georgia Tech and as chair of the board of the Center for Strategic and International Studies in Washington, D.C.

During his tenure in the U.S. Senate, Senator Nunn served as chair of the Senate Armed Services Committee and the Permanent Subcommittee on Investigations. He also served on the Intelligence and Small Business Committees. His legislative achievements include the landmark Department of Defense Reorganization Act, drafted with the late Senator Barry Goldwater, and the "Nunn-Lugar" Cooperative Threat Reduction Program, which provides assistance to Russia and the former Soviet republics for securing and destroying their excess nuclear, biological, and chemical weapons.

Raised in the small town of Perry in middle Georgia, he attended Georgia Tech, Emory University, and Emory Law School, where he graduated with honors in 1962. After active duty service in the U.S. Coast Guard, he served six years in the U.S. Coast Guard Reserve. He first entered politics as a member of the Georgia House of Representatives in 1968.