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THE THREAT OF BIOTERRORISM AND THE SPREAD OF INFECTIOUS DISEASES

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THE THREAT OF BIOTERRORISM AND THE SPREAD OF INFECTIOUS DISEASES

WEDNESDAY, SEPTEMBER 5, 2001

U.S. SENATE,
COMMITTEE ON FOREIGN RELATIONS,
Washington, DC.

The committee met, pursuant to notice at 10:00 a.m., in room SD–419, Dirksen Senate Office Building, Hon. Joseph R. Biden, Jr., (chairman of the committee) presiding.

Present: Senators Biden, Boxer, Bill Nelson, Rockefeller, Helms and Lugar.

The CHAIRMAN. The hearing will come to order.

National security, to state the obvious, is the first obligation of every government. And the test of how well we meet that obligation is whether whatever action we take makes us more or less secure in the end.

There are some very difficult decisions with hard choices relating to strategic doctrine, foreign policy, threat assessment and economic constraints that every President and every government has to face.

And just as we would all agree that we would provide for the health care of all if we had unlimited funds, when there are not unlimited funds we have to make difficult choices. We have to make the same kinds of decisions in terms of our national security.

One aspect of our sacred responsibility to our fellow citizens, to provide for the physical security of our Armed Forces and to protect our homeland, is how we go about this process.

This is the first in a series of hearings on what have been termed "Homeland Defense and Protecting U.S. Military Forces," where we will focus on the threats to our homeland and attempt to assess what those threats are and prioritize them to be able to make rational recommendations to our colleagues.

These hearings have taken on an added sense of urgency in my view for two reasons: The most ominous reason is there appears to be an overwhelming focus, I would subjectively characterize as a myopic focus, on national missile defense by the Bush administration.

We appear to be about to jettison 50 years of strategic doctrine grounded on three basic principles: One, reduce the number of nuclear weapons in the world and prevent proliferation to other countries; Two, stop all nuclear weapons testing, because only with new testing can new weapons of mass destruction be developed. And the United States is far ahead of the game.

And, Three, diminish or eliminate the reliance on those nuclear weapons which are most vulnerable and therefore the least stable because they are most likely to be used on short warning. These have been at least three of the basic principles of our strategic doctrine for the last five decades.

But, for example on August 16, Secretary Rumsfeld told the "Lehrer News Hour" that he didn't care if other countries responded to a U.S. missile defense by MIRV'ing or re-MIRV'ing their ICBMs. He added, "What really counts is the total number of weapons."

In doing so, the Secretary threw out decades of rightful concern over crisis stability which lead to the landmark efforts by the Reagan and Bush administrations to get the Soviet Union to give up MIRVed ICBMs. In the interest of missile defense, Secretary Rumsfeld reduced our nuclear strategy to a simple numbers game.

Later last month, Under Secretary of State Bolton suggested that we might withdraw from the ABM Treaty if President Putin does not agree by November to scrap the treaty.

Russian officials had publicly declared their willingness to amend the ABM Treaty. But obviously an amendment does nothing.

The administration and Mr. Bolton then tried to walk back his comments. Maybe they realized the United States won't win any friends by rejecting Russian proposals when we have none of our own, especially on offensive force reductions, which President Bush and President Putin agreed were tied to the issue of missile defense.

But I have yet to hear any serious U.S. proposals or any rational explanation of why we cannot amend the ABM Treaty to permit the testing that the administration wants conducted. And just this weekend there was a bit of a flap in the press—a number of national press people questioned me, and I'm sure the rest of my colleagues, on press reports the administration is willing to let China MIRV its ICBMs and let it resume nuclear testing in response to a missile defense deployment.

The Chinese build-up may, in my view, spark a new arms race involving India and Pakistan. But our withdrawal from the ABM Treaty, the end of the START process and renewed nuclear testing seems to be something that the administration may be willing to pay in order to be able to move forward with an untested, undeclared national missile defense.

A few months ago, and I don't want to get in the middle of this but there is a former famous Senator who may testify today who warned against making missile defense an issue of theology. Looking at recent administration actions, I'm beginning to wonder whether we run into theology or technology.

The second reason for a sense of urgency of these hearings is the state of the budget. We are not where we were 15 months ago with a large surplus. The loss of the surplus and the lack of funding have created new impairments.

It was at least theoretically possible 18 months ago to meet all our defense needs. But because of the state of the economy and arguably some action taken to reduce the surplus, that is no longer possible. So we have to now prioritize.

And we still have no reliable estimates on the full cost of national missile defense, but we know that they range from $60 billion to hundreds of billions of dollars to develop the systems contemplated by the Bush administration and the last administration.

Obviously, we don't have enough money to do everything. The estimates for the 10-year cost for modernizing our conventional forces range from $250 to $650 billion over 10 years. So these are the two reasons for the urgency of these hearings.

Hopefully, when we finish our hearings we'll have a much clearer understanding of the needs we face and which we should address first.

Today's hearing will focus on the threat of bioterrorism and the holes in our homeland defense policy when it comes to combating this threat. We begin with two expert panels on two closely linked issues: Bioterrorism and the spread of infectious disease.

Our globalized world, where people and goods constantly move across borders, is a perfect breeding ground for the spread of disease, whether from natural epidemics or bioterrorism. It would seem to me, and I'm sure the testimony we will hear today will address this, that any steps we take against the threat of biological terrorism could reap benefits in medical efforts to slow future infectious disease epidemics and vice versa.

An improved public health system in the United States would help address this great national security threat as well. But make no mistake, a biological weapon smuggled across a border and the spread of infectious disease are very real threats.

This hearing will give us insight into how well prepared we are to engage those threats and what we need to do if we are not fully prepared, and hopefully we'll have some estimate of the costs of doing all this.

Our first panel will focus on the truly harrowing consequences that a bioterrorist attack would have on our people and indeed on our democratic political system. Former Senator Sam Nunn and former Director of Central Intelligence Jim Woolsey have participated in a chilling simulated exercise called "Dark Winter."

I wish we had the time, and maybe we will see parts of the CD–ROM they produced from that exercise. As I'm sure both Senator Nunn and Mr. Woolsey will emphasize, "Dark Winter" was a nightmare scenario exposing serious flaws in our public health infrastructure's ability to deal with a major disease, whether it be a smallpox attack or a flu epidemic.

I reviewed that scenario last night, and I can tell you that it is harrowing. It was frightening not just for the many, many people around the world who could be felled by a biological weapons attack. Perhaps even more frightening was the risk that if we do not prepare rationally for such an awful event, we may put our democracy at risk.

Our witnesses are: Dr. D.A. Henderson, director of Johns Hopkins Center for Civilian Biodefense Studies; Dr. David Heymann, executive director of Communicable Diseases at the World Health Organization; and the Honorable Fred Iklé, former Director of the U.S. Arms Control and Disarmament Agency, who is now a distinguished scholar at the Center for Strategic and International Stud-

ies; and Frank Cilluffo, senior policy analyst at the Center for Strategic and International Studies.

Before hearing our first panel, I would like to make part of the record two letters to the committee, one by Dr. Joshua Lederberg, a Nobel Laureate and noted expert in infectious disease, and the other by Dr. John Mekalanos, chairman of the Department of Microbiology and Molecular Genetics at Harvard University.

These two scientists are among the most accomplished microbiologists and infectious disease experts in the world. Dr. Lederberg's letter is actually a primmer on what he calls, "a matter of transcendent importance to our security and to global human welfare."

He warns that biological weapons are "Probably the most perplexing and gravest security challenge we face." But he approaches that challenge with both clarity and wisdom. Listen to his description of the dilemma dealing with a biological weapons attack. "The organization of government to deal with mass contingencies is a vexing and still poorly attended problem. It entails the coordination of local, state and Federal assets and jurisdictions; the intersection of law enforcement, national security and public health; and a time of crisis is not the best venue for quarrels over responsibility and authority, over who will pay for it.

"Our main bulwark against direct large-scale attack is a combination of civic harmony and firm retaliation against egregious transgressors."

Dr. Lederberg also discusses the role that primary prevention, including strengthening of our intelligence capabilities, should play in any response.

Dr. Mekalanos presents his findings on the emergence of new infectious agents in nature and the import of the advances in microbiology on the threat posed by bioterrorism.

If, God forbid, America should ever be attacked by biological weapons, it will be the scientists and the public health professionals on the front lines, not just our men and women in uniform. And it's the scientists and public health officials, as well as state and local governments and public services, who will have to be fully prepared to engage the enemy, whomever it is and whatever it is.

On the other hand, U.S. military must have the ability to detect, survive, and maintain operations during biological attack. It must also be prepared to assist at home in ways that buttress, rather than undermine, the authority of state and local officials.

I said that God forbid we should ever be attacked in this manner. But the truth is that such an attack is more likely today than it ever had been in the past, and that the comparable natural epidemic is all too possible in the decades to come.

In my view, the threat from anonymously delivered biological weapons and from emerging infectious disease simply dwarfs the threat that we will be attacked by a Third World ICBM with a return address. I'm not suggesting anyone else agrees with me on that. That is just my view.

Whether you agree or disagree with that judgment, however, it is clear that bioterrorism and infectious diseases are real threats

that demand our attention now. Because there are steps that we can realistically take now to contain them.

If we can come to grips today with the implications of that reality, then this may be the most important hearing we hold this year.

In ending my statement, let me exercise a point of personal privilege, actually, two. When Senator Nunn was the Chairman of the Armed Services Committee, he and I put together a little piece of legislation on antiterrorism. And I can just remember, Sam, the difficulty we had and the inability we had, notwithstanding the consensus we thought we had, to deal with the little thing called *posse comitatus* and how we were going to deal with weapons of mass destruction, the role of the military in dealing with them in a domestic attack that was a terrorist attack.

If I just think of that one debate, that one debate, the concerns you have all raised in "Dark Winter" make that one concern pale by comparison.

[The letters referred to by Chairman Biden follow:]

JOSHUA LEDERBERG, *University Professor-Emeritus,*
THE ROCKEFELLER UNIVERSITY,
1230 YORK AVE., NEW YORK, NY, *August 30, 2001.*

Hon. JOSEPH R. BIDEN, JR.
Chairman, Committee on Foreign Relations,
221 Russell Senate Office Building,
Washington, DC.

DEAR SENATOR BIDEN:

I am honored to have the opportunity to address you and your committee by means of this letter, on a matter of transcendent importance to our security, and to global human welfare. I refer to the threat of use and proliferation of (micro)biological weapons, which will be almost irresistible temptations to malignant persons and states, who would otherwise be intimidated by the U.S. preeminence in wealth and military technology.

To structure your perusal, my outline will be as follows.

- definition, historical note, and assessment of scope of the BW threat
- Countermeasures: diplomatic
- defensive preparations
- deterrence and intelligence
- primary prevention; our clean hands
- inspiring global convergence on health as human aim

• *Definition, historical note, and assessment of scope of the BW threat*

I will define biological warfare as the use of agents of disease for hostile purposes. This embraces attacks on human health and survival, but extends also to plant and animal crops. Far from vague speculation, BW was the focus of billion dollar investments, both by the U.S. and the USSR until President Nixon's unilateral abjuration in 1969. This was followed by the negotiation, ratification and coming into force (in 1975) of the Biological Weapons Convention (BWC). This is a categorical ban of the development, production or use of BW.

The cardinal features of BW are outlined in attached Table 1.

Most important are:

low cost and ease of access
difficulty of detection, even after use, until disease has advanced
unreliable but open-ended scale of predictable casualties
per kilogram of weapon the potential lives lost match nuclear
but would need far less costly and sophisticated technology
clandestine stockpiles and delivery systems—the proverbial suitcase
perhaps concealed in a bale of marijuana.

Published citations to intelligence estimates would place up to a dozen countries in the camp of BW-developers. Considerable harm could be done (on the scale of, say, a thousand casualties) by rank amateurs. Terrorist groups, privately or state-sponsored, with funds up to $1 million, could mount massive attacks of 10 or 100 times that scale. Important to keep in mind: if the ultimate casualty roster is 1000, there will have been 100,000 or 1,000,000 people at risk in the target zone, legitimately demanding prophylactic attention, and in turn a draconian triage. Several exercises have given dramatic testimony to how difficult would be governmental management of such incidents, and the stresses on civil order that would follow from inevitable inequities in that management.

The short bottom line is that, in the current world where major states sustain some equilibrium through mutual deterrence, and positive shared interests, BW offers opportunity for grave harm on the part of lesser actors. Relative to the assets and doctrinal insights available, BW is probably the most perplexing and gravest security challenge we face.

• *Countermeasures: diplomatic*

President Nixon's abjuration of BW as a U.S. military weapon, in 1969, set in motion the most important diplomatic and legal steps towards the eradication of BW globally, laying the groundwork for the BWC treaty. The BWC lacks robust verification machinery, mainly for reasons intrinsic to the technology, and as well that certain parties to the BWC have no intention of complying with it. But BW verification is not the foundation of our own no-BW stance; the U.S. has long since abandoned the idea that it need or would respond in kind to BW attack. Were it not for the BWC we would have seen a gradually escalating technology race, amplifying even further BW's threat to human existence. The BWC does set a consensually, or at least rhetorically, agreed standard of behavior: namely, it has become institutionalized into international law, and infractions open the door to enforcement. Further verification provisions would do little to enhance our actual knowledge of those infractions: they would nevertheless have important symbolic value in reaffirming international attachment to the principles of the BWC. At minimum it behooves us to exercise creative leadership in developing alternative means of bolstering that reaffirmation.

The real problem with the BWC is less verification than it is enforcement. We have all but certain knowledge that Saddam Hussein has continued Iraq's (grudgingly admitted) BW development program, the main sore point in his squabbles with the UN. (We can hardly be certain that his nuclear program has not been revitalized, though that would be more difficult, and from his perspective possibly redundant.) We have failed to convince our allies, much less the diffident "neutrals" and potential adversaries, that halting Iraq's BW is worth turning their back on his oil contracts. To convince them of what is at stake we may have to start with elevating the priority we give to the BW threat generally. We must also become more knowledgeable about the local political and cultural terrain, and more ingenious in the design of punitive and compellent sanctions that will persuade Saddam of his errors without undue hardship to the Iraqi population that he also victimizes! That would carry us further with the international consortia in which we have to invest political capital (and not waste it in other tangents) to be sure this major threat is quenched. If Saddam does develop and effectively use BW even in a purely regional context (the most likely), that will not only be a humanistic catastrophe; it is unlikely we will ever restore the principle of mutual forbearance in resorting to BW.

Our public diplomacy is predicated on the stated proposition that the use of BW is an offense to civilized mankind. That is a major accomplishment of the BWC. It needs to be reaffirmed as well in the attention we give to our own defense, as well as to our stern responses to significant infractions in any quarter.

• *Defensive preparations*

BW threat mitigation is indispensable, so as not to present irresistible temptations to mischief makers, for whom interstate deterrence is irrelevant. Unlike the aftermath of a nuclear or high explosive bombardment, BW attack is amenable to interventions for some hours or days after the event, depending on the agent used. With the best popularized BW agent, anthrax, at feasible dose levels the administration of appropriate antibiotics can protect the majority of those exposed. The other side of the coin is the urgency of recognizing the syndrome within hours of the earliest symptoms. Biosensors are being developed that can be used to confirm suspicions of anthrax. For some decades, we will have to rely on early diagnosis of the first human (or animal) cases to have the basis for focussing those sensors. As a wide list of diseases are in the picture, this entails nothing more nor less than reinvigorating our overall public health infrastructure. In contrast to the explosive rise

of health care expenditures—with universal access to ever more technically sophisticated health care—public health has been allowed to languish, boosted only very recently by public arousal about emerging infections and about bioterrorism. That boost entails people and organizational structures, but improvement also comes down to money—new money, as well as the relabelling of established programs.

Besides the diagnostics, we need organizational and operational doctrines that can confront unprecedented emergencies, we need trained people on call, we need physical assets for logistics, isolation, decontamination and care. We also need stockpiles of antibiotics and vaccines appropriate to the risk—and before that, more careful analysis of what kinds and how much we need. We need research on treatment modalities—how we manage the care of inhalational anthrax with possibly limited supplies of antibiotics (and which kinds?) is not that well understood. And still more fundamental research could give us sharper tools for diagnosis, and more usable ranges of antibacterial and antiviral remedies.

The organization of government to deal with mass contingencies is a vexing and still poorly attended problem. It entails the coordination of local, state, and federal assets and jurisdictions; the intersection of law enforcement, national security and public health; and a time of crisis is not the best venue for quarrels over responsibility and authority, over who will pay for it.

• *Deterrence, intelligence and preemption*

Our main bulwark against direct large scale attack is the combination of a civic harmony, and firm retaliation against egregious transgressors. It is sometimes said, we should not worry about BW attacks, "we'll just 'nuke the perps'" if they dare. Lacking the clear provenience of a missile track to finger the aggressor, that puts us at the mercy either of bafflement, or worse of calculated disinformation as to the source. Good, I have to say better intelligence is the key to retaliation, apprehension, and penal containment and sanctions. This is technically unfamiliar territory for most of the intelligence community; it has nevertheless taken many positive steps, but it still has a long way to go, and once again is resource-constrained compared to what goes on in the collection and analysis against other more familiar threats.

A related vein of opportunity is found in the realm of cooperative threat reduction. Since BW facilities can be so readily reconstituted, it is less important in the long run to destroy production facilities, even stockpiles, than it is to get toxic technical knowledge diverted to constructive purposes. Former weapons scientists in Russia need financial as well as moral encouragement to ply a new trade in vaccine development and other constructive pursuits. This could benefit Russia, and its circle of less developed countries directly, and thus enhance security globally. The alternative is for some few of of the ex-biowarriors to sell their knowledge, and who knows what range of horrific bio-strains, to the highest bidders among the rogues. We do have very modest programs in place: they should be expanded, not put at risk for flimsy excuses as seems to be happening.

• *Primary prevention; our clean hands*

I have already alluded to public diplomacy (starting with firm conviction at home) about the priority needed to be applied to averting any successful BW attack. We have to be careful to behave ourselves fully consistently with abhorrence at the idea of using disease as a weapon. Such attributions will be lodged against the U.S. as part of general America-bashing (witness the ongoing rumor campaign in Africa that the U.S. government had somehow "invented AIDS"). They will also be excuses for continued simmering of the BW pot in other venues.

A particular dilemma is how to study the BW threats in detail, how to develop vaccines and other countermeasures, without attracting such accusations. I believe the executive and legislative branches could develop models of entrusted transparency for oversight of such necessary studies, both for assurance to global publics, and to be certain there are no careless projects oblivious to the reputational or physical harm they could inflict on our polity.

• *Inspiring global convergence on health as human aim*

The central premise of the BWC is that infectious disease is the common enemy of all humankind; and it is a treasonable act to join with that enemy.

Those motives clearly inspired adherence to the BWC, even on the part of (smaller, poorer) countries who might otherwise exploit BW to level a playing field as against a superpower. Having set aside BW as giving small advantage and numerous migraines for our own military power, we should count it fortunate that we share those interests and conclusions. They can only be bolstered if we internalize that ideology, and participate ever more fully in global campaigns for health. The new funds for the scourges of AIDS, malaria, and tuberculosis are right on the

mark! Their levels to date are just tokens—yes compare them to military hardware!—but certainly in the right direction, and it's just about time we assumed leadership of that vector among the nations cooperating with the WHO to bolster global systems of surveillance of disease and coping with outbreaks that promise to threaten all of us.

Besides the global humanitarian, political and economic virtues of this newfound direction, there are good selfish motives as well. What would it pay for us to invest to reduce the likelihood that another AIDS will emerge from a distant continent, and cross the oceans to vex us at home. There will be no stopping the birds, nor the frequent flyers, from disseminating ever more novel risks needing that global surveillance. I do not count West Nile virus as a likely major scourge, but it is just one more exemplary warning!

TABLE 1—GERMS AS ARMS: BASIC ISSUES

BW vs. CW: living germs vs. chemicals might spread; unstable; self-amplify
Underlying science is unalterably dual use licit defensive exploration targetted against natural disease
Likewise production up to point of weaponization vaccines vs. BW agents?
Facilities moderate scale; few external signatures easily concealed or masked by licit programs
Weapons: potent, but unfamiliar and unreliable in military context
Tactical defense is easy: physical barriers (masks, suits)
Latent period up to 36 hours. Disease may be treatable Hence focus on civil health preparedness
Hardly understood until now, these are strategic weapons. . . . At same time, accessible to small powers . . . or groups Seen as answer to a Superpower self confident about the "revolution in military affairs".
Capabilities can scarcely be denied remedial and intelligence focus on intentions

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STATEMENT SUBMITTED BY JOHN J. MEKALANOS, PH.D.

Dear Honorable Committee Members:

Thank you for inviting me to comment on the related issues of biological terrorism and the threat of emerging infectious diseases to the security of the United States. I feel qualified to speak on these topics because of my scientific background. In brief, I have over 27 years of experience in infectious disease research and currently serve as Professor and Chairman of the Department of Microbiology and Molecular Genetics at Harvard Medical School. Our Department consists of a group of outstanding investigators dedicated to understanding and controlling bacterial and viral diseases.

Although awareness of the dangers posed by biological warfare (BW) has increased significantly in recent years, it is my belief that we are still far from prepared to contend with a biological weapons attack. There are many reasons for this, and numerous analyses over the past few years have examined the issues carefully. This letter is intended to provide a brief overview of the scientific aspects of biological weapons development, as perceived from the point of view of microbiological research. I also want to emphasize that many of my comments about BW threats also apply broadly to threats that we face from nature. We have seen numerous examples of this recently: a new highly lethal strain of flu virus, a mysterious prion, multidrug-resistant tuberculosis, HIV, and malaria. Obviously, we are and will continue to be under constant assault by emerging microbes whose origin may be natural but whose spread to the U.S. will take full advantage of modern modes of travel, new human activities, and increased population density.

To begin with, biological weapons are comparatively inexpensive and simple to manufacture. They are therefore accessible and attractive to those that lack sufficient means to pursue costlier weapons programs. One estimate suggests that a significant biological arsenal could be produced with as little as $10,000 worth of

equipment, though other studies have questioned the potential lethality of material produced by such rudimentary operations. Construction of the most sophisticated BW agents would indeed require significant scientific skills and equipment. However, the fact remains that the production of biological weapons is not as limited by technical expertise as that of other weapons. For example, it is fairly easy to introduce new antibiotic resistance genes into bacteria. This does not require extensive technical training, and the relevant methods and materials are widely available from even commercial vendors. Because the medical community is already struggling with the appearance of multi-antibiotic resistant, clinically important microbes, even a simple genetic manipulation such as transferring a single critical antibiotic resistance gene into a single pathogen could have extremely serious consequences.

As far as initial acquisition of pathogens by unscrupulous parties is concerned, it would not be exceptionally difficult to obtain pathogenic strains. Microbial samples are transferred between labs on a daily basis in the normal course of biomedical or pharmaceutical research. It is fortunately not so simple for unauthorized personnel to acquire highly pathogenic strains, as traffic in these is regulated carefully, but it is certainly possible for determined individuals to acquire less virulent strains by fraudulent means or theft. These strains could then be genetically modified to increase their pathogenicity, though this would probably require a higher level of scientific training as well as a longer period of development. Efforts along these lines were vigorously pursued in the former Soviet Union, and since its dissolution, their experts have likely been recruited to a variety of rogue states that openly threaten the U.S. and its allies.

Biological research activity is currently growing at a tremendous rate, and although the potential contribution to human welfare is enormous, it is simultaneously providing additional tools that could be used for the construction and delivery of more powerful pathogens. Much of the information that is being generated by biological researchers is publicly available, either in print or via the Internet. The ease with which any individual can access data relevant to the genetic engineering of pathogenic organisms can only be expected to increase in the future.

Although the Biological and Toxin Weapons Convention of 1972 was ratified by 140 countries, there is no real mechanism for verifying compliance. Monitoring is particularly difficult since many of the components of a biological weapons program can also be used in fully legitimate pursuits. Apparatus employed in the manufacture of food products such as yogurt or beer could be used to grow pathogenic cultures, and yet it hardly seems practical to apply the same stringent restrictions to beer fermenting equipment as to material that is of demonstrable military sensitivity (e.g., explosives or nuclear technology). It is useful in this situation to recall the much-discussed bombing of a baby milk factory in Iraq during the 1990-91 Gulf War. The facility was destroyed because it was suspected of producing biological weapons. I personally am not able to judge whether this facility made baby formula or biological weapons components at any point in time, but this illustrates the potential for confusion.

The conclusion is that it is certainly possible for small nations or terrorist groups secretly to amass sufficient material to present a biological threat, although the seriousness of the threat would depend on the exact circumstances.

I think it is important at this time to point out that the results of biological manipulation are sometimes difficult to predict, even for highly trained professional scientists. Less than a year ago, Australian researchers seeking to develop a biological contraceptive to combat rodent infestation, inadvertently created a strain of mousepox that was more virulent than the original parent strain. Considering that this occurred in the context of perfectly well-intentioned research that was intended to benefit humans, we would do well to remember that the law of unintended consequences also applies to malefactors. The chances of unwittingly creating a "superpathogen" will only be increased by deliberate attempts to enhance an organism's pathogenic potential, and there is no assurance whatsoever that even the producers of such an agent would be able to control it.

Next, I will mention briefly what can be done to combat biological warfare. Measures necessary for countering biological attacks can be divided into several categories: surveillance and early warning systems, treatment, and prevention. In this letter, discussion of prevention will deal only with biological considerations such as vaccine development and usage, since military concerns do not lie within my area of expertise. I will also leave aside consideration of pathogens that target agriculture, focusing instead on those that affect humans directly.

Clinical surveillance and early warning measures are critical not only because timely treatment of affected individuals often means the difference between life and death, but also because infection must be prevented from spreading to other individ-

uals and regions. Depending on the actual agent employed, the impact of a biological weapon can extend far beyond the initial point of attack. This is especially true with highly communicable agents (e.g., smallpox), but it applies to all infectious agents that demonstrate a delayed onset of symptoms. Victims may not know that they are infected and so not seek treatment or take precautions against spreading the disease to others. Unfortunately, it may be extremely difficult to detect an attack. Unlike nuclear or chemical weapons, the delivery of biological agents need not be accompanied by telltale explosions and could be quite stealthy. The initial symptoms of bioweapons infections are often nonspecific, and anthrax and smallpox are so rare in the U.S. that the majority of physicians might not recognize even the characteristic symptoms of these diseases. In addition, current systems for reporting cases of infectious disease would likely not uncover the presence of a covert attack before significant damage had occurred.

Treatment of BW victims typically consists of antibiotic or vaccine therapy and supportive care. Obviously, this requires an adequate supply of effective drugs and appropriate clinical facilities. In this respect also, the U.S. is poorly prepared. Not only are there serious logistical questions regarding distribution of drugs and supplies in a crisis situation, but studies of U.S. hospital facilities have concluded that there is significant pressure with regard to space and staff. While this may not result in serious problems under typical conditions, hospitals clearly cannot cope with epidemics.

Of all possible treatment strategies, preventive vaccines often offer the most advantages. Since they can be administered in advance of infection, and immunity may be long-lived, vaccines can to a great extent alleviate the need for rapid diagnosis and administration of therapeutic agents. Vaccines have certifiably saved millions of lives and account for some of our greatest medical successes. Nevertheless, preventive vaccines are not available for all diseases, and those that are available may suffer from a variety of problems. For example, the current anthrax vaccine must be administered in 6 doses over 18 months, with annual boosters for prolonged protection. In this case, development of immunity is slow and logistically complex. In addition, there are insufficient quantities of existing vaccines. Recent reports have described the rapid diminution of U.S. anthrax vaccine stocks, as well as the delays and difficulties associated with obtaining more. It has been estimated that the worldwide supply of smallpox vaccine is only 60 million doses, and there is currently no facility for smallpox vaccine production.

For these reasons, my opinion is that the U.S. medical infrastructure is regrettably inadequate for dealing with biological warfare.

Finally, I would like to call attention to the fact that the legitimate development of therapies against biological agents is extremely time-consuming. With any new medical treatment, exacting rules are required to ensure safety and efficacy. This is absolutely necessary and desirable, but those who intend to use biological weapons offensively are of course not similarly constrained. This is not in any way to argue against existing or future regulations regarding research, but merely to emphasize the fact that offensive strategies are simpler to develop than therapeutic or preventive ones. While exciting new therapeutic approaches for treating infection by some of the more important BW agents have been recently described, funding for their development has been inadequate. This is in part because the usual incentives that motivate the pharmaceutical industry are in many cases lacking for such products. We have therefore all the more reason to press forward on all fronts to provide adequate funding and resources for all types of defensive measures against biological warfare and infectious disease threats.

It is always far easier to cause harm than to prevent or treat it. This is particularly well illustrated by the issues at hand. Throughout human history, some of our finest and most impassioned efforts have been devoted to the eradication of infectious disease. We have had many brilliant successes, and yet infectious disease still accounts for millions of deaths worldwide. Many of these occur in wealthy, industrialized nations that possess the most advanced medical infrastructures ever developed. Due to multi-drug resistance and the emergence of new pathogens, plus the logistics of clinical treatment, we are already facing difficult problems whose existence is attributable solely to natural processes. How much more frightening is it to contemplate the situations that may arise if conscious effort is directed towards using infectious agents, which we have spent centuries combating, for the dark purposes of mass destruction? Our hard-won understanding of pathogens is helping us to meet the challenges of infectious disease, but it can easily be overwhelmed under circumstances that are alarmingly possible. We must always be vigilant regarding all aspects of biological weapons development and the threat posed by infectious diseases, or we will certainly be punished by the direst of consequences.

The CHAIRMAN. In another point of personal privilege, and I'll have more to say at an appropriate time, but I want to say a brief word about an announcement made by Senator Helms just last month.

Jesse, I know I speak for the members of this committee and all whom have ever worked with you that we know there's another 15 months fortunately we are going to get to work together, but that assuming, and I am speaking only for myself and I'm back here, and that's not at all certain whether my constituency will decide that that is going to happen, it will be a very different place, a less friendly place, and a less accommodating place without you being here.

I have truly enjoyed working with you. I think it's been to the surprise and to some chagrin of your supporters and mine that we have such a close personal friendship. I remember telling the press when I chose to take over the ranking position on this committee for the Democratic Party and leaving Judiciary in that position, that you and I will get along very well.

And the press, both national and local, were incredulous. They thought that was not possible. Not only did we know it was possible, we had done it for 26 years prior to that. And I'm happy of one thing, Jesse, and that is all those who follow politics can see that we can disagree in this place without being disagreeable. You have been one of my close friends. You continue to be.

And I'm truly going to miss, assuming that I am back, I'm truly going to miss having you as a colleague.

Senator HELMS. Mr. Chairman, thank you. And I feel the same way about you. And I just take a note there are three members of the Class of 1972 here today: You and Sam Nunn and I. We are glad to see you, Sam.

Well, anybody who might draw the foolish conclusion that this is a routine hearing maybe got a wake-up call with an item hidden on page umpteen of the paper the other day about Russia developing a new anthrax virus for possible delivery to other nations.

Mr. Chairman, I'm grateful, therefore, for your having scheduled this hearing this morning. It's very important; because the threat of bioterrorism is very real, and it is growing as is evident by the things we have seen almost every day.

This threat is driven by the increasing capabilities and the violent intentions of rogue states and terrorist groups seeking to harm the United States or to make themselves able to do so.

Now, the sooner this very real peril is recognized, the sooner we can begin to deal with it in a more direct and deliberate way. These issues are of enormous importance.

How the United States prepares to deal with the consequences of an attack employing deadly viruses and toxins would impact countless thousands and possibly millions of lives. And planning for such catastrophe is obviously an essential government responsibility.

However, I would much prefer to prevent and defend against the threat in the first place rather than to have to deal with the chaos and the death and destruction after the fact. And I know that is a common feeling among all of us.

A bioterrorism attack can be prevented, but it requires strong export control and nonproliferation regimes. Both are essential to ensure that terrorist groups and rogue states cannot acquire the technology and the know-how to build and deliver these horrible weapons so dangerous to the United States.

For that reason I am disappointed that the Senate is now considering the Export Administration Act, legislation designed to liberalize our national security export controls. That will obviously do great harm to our national security by assisting countries like Communist China to modernize their military, improve their strategic capabilities, and facilitate the dangerous proliferation of ballistic missile and other weapons of mass destruction technologies to rogue nations be it Iraq, Iran, North Korea or whomever.

It is important that we never lose sight of the fact that the United States and our allies can prevent a bioterrorism attack with a robust missile defense system. I may be a voice crying in the political wilderness about this, but I firmly believe it.

A missile defense system can provide three benefits. No. 1, it can deter rogue nations from building ballistic missiles capable of delivering weapons of mass destruction; No. 2, it can prevent rogue nations from threatening the United States and/or our allies; and, No. 3, it can shoot down these missiles if they are ever used against the United States or our allies.

Iran, Iraq and North Korea are among many others that are building long-range missiles. A report this past January by the National Intelligence Council indicated that these same nations are also actively pursuing biological warfare capabilities.

Some have already weaponized these deadly pathogens and placed them in missile warheads. They are doing all of this to threaten and to blackmail and to intimidate the United States and our allies by exploiting our greatest vulnerability—which is our lack of ballistic missile defense.

Now, Mr. Chairman and members of the committee and those listening elsewhere, we must avoid the false choices that are so often presented to policymakers, for example that some of these threats are more likely than others and therefore that they demand the lion's share of resources. I disagree with that.

When it comes to America's security, we must be prepared to deal with all threats. We must not continue to spend nearly $10 billion a year to combat terrorism and defend against weapons of mass destruction while we are spending far less annually on a national missile defense.

To this end I'm convinced that the Bush administration's decision to spend more on missile defense is the right decision and that Congress should unhesitatingly support this decision. The American people I think expect no less and would surely ask embarrassing questions in the aftermath of an attack, if the people were to discover that their government had had the means in the first place to defend them but did not choose to do so.

I'm grateful to our witnesses for being here today. And I look forward to their testimony. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you very much. What we'll do is we'll start off. Hopefully we'll be able to have more than one quick round but with 7-minute rounds see if we can get through everyone first

and ask questions. Because everyone is anxious to hear what you have to say.

Senator Nunn, the floor is yours, and welcome back.

STATEMENT OF HON. SAM NUNN, CO-CHAIR AND CHIEF EXECUTIVE OFFICER, NUCLEAR THREAT INITIATIVE, WASHINGTON, DC

Senator NUNN. Thank you very much, Mr. Chairman. Senator Helms, let me join Senator Biden in thanking you for your service to the United States Senate and to our country. It was a great pleasure for me to be elected at the same time as you and Senator Biden were, and when I look around the committee and I see relative newcomers, like Senator Dick Lugar, it reminds me of the Class of 1972.

In a matter of interest, Jim Woolsey, my companion here at the table was the General Counsel of the Armed Services Committee when I arrived. So really we have four of us here that were there at that stage. Of course it's a great pleasure for me to be before this committee and come back to an institution that I truly love and have spent a great deal of my life in.

So to you and Senator Biden and Senator Lugar and Senator Hagel and Senator Boxer, thank you for having us and thank you for focusing on this very important subject.

The CHAIRMAN. I don't understand why you didn't thank Senator Rockefeller. He's in a different county down there.

Senator NUNN. I see him. He's down at the end. A man with that much wisdom I thought would be closer to the front of the table.

But Senator Helms, I know how hard it is to decide to leave voluntarily. I'm sure that you have been through a lot of your thinking. But my very best to you and your whole family.

Senator HELMS. Thank you, Senator.

Senator NUNN. Biological terrorism, Mr. Chairman, is one of our greatest national security threats—one that cannot be addressed by the Department of Defense standard operating procedures. The specter of a biological weapons attack and the parallel peacetime threat of a naturally occurring infectious disease outbreak—I want to emphasize that these two go together.

The things we need to do to protect against bioterrorism are also things we need to do with our public health system, even if we never have a bioterrorist attack.

These are unique challenges and they deserve the time and focus you are devoting to them today.

Mr. Chairman, Senator Helms, members of the committee, as you may know this past June at Andrews Air Force Base I was a participant in the exercise "Dark Winter" which simulated a biological weapons attack on the United States. It's a lucky thing for the United States that this was just a test and not a real emergency.

Mr. Chairman, members of the committee, our lack of preparation is a real emergency from my perspective. I think my colleague Jim Woolsey will agree with that.

"Dark Winter" simulated a series of national security meetings dealing with a terrorist attack involving the covert release of smallpox in three American cities. The exercise was conducted by the

Center for Strategic and International Studies, the Johns Hopkins Center for Civilian Biodefense Studies, and the ANSER Institute for Homeland Defense, under the leadership of John Hamre, Tara O'Toole and Randy Larsen, respectively.

Many of the participants in "Dark Winter" had served previous Presidents in cabinet or sub-cabinet positions. And most knew how the NSC, the National Security Council, worked. They were all individuals with considerable experience and perspective in either the security field, law enforcement field or the health field or the emergency field.

I will not take the committee's time with charts. I planned to do that at one time but then I started looking at the time and I know we want the time to discuss the conclusions. I decided to just try to briefly summarize this but the charts and CD–ROM are available. And I'll just cover the highlights this morning.

In the opening minutes of "Dark Winter," we learned from the Secretary of Health and Human Services that cases of smallpox had been diagnosed by the Center for Disease Control. Given the infectious nature of the disease, we were facing the start of a smallpox epidemic, an event with devastating, if not catastrophic potential.

Like all of you, I received a smallpox vaccination when I was a child. But I had forgotten the horror of the disease. In the 20th century, more than 300 million people died from smallpox; more than those killed in all the wars of the century combined, which is an astounding figure.

Thanks to a massive and highly collaborative international health campaign, smallpox as a naturally occurring disease was eradicated. But once eradicated, the consequences of an outbreak of smallpox today are more dangerous because each passing year brings generations of unvaccinated citizens and also citizens who have been vaccinated whose vaccinations have worn off, which would probably include all of us. So the potency of the previous vaccinations have diminished with time.

Unfortunately, we know that smallpox was made into a weapon by the Soviet Union. What we don't know is whether other nations or groups either derived some smallpox from the Soviet Union or whether they have pursued a similar goal with success. And this should be a matter of keen intelligence focused by this committee as well as other committees.

Over a 24-hour period at Andrews Air Force Base, our National Security Council "war gamers" dealt with 3 weeks of simulated shock, stress and horror. I was given the role of President of the United States, and I wouldn't describe it in this case as being an honor.

Jim Woolsey was my Director of Central Intelligence. I'm sure he was frustrated too. I said to Jim several times that what I got from him in that 18-hour period was an awful lot of opinion and not one damn bit of intelligence. Nevertheless, he did the best he could with the circumstances we had.

We learned that on December 9, 2002, some dozen patients reported to the Oklahoma City Hospital with a strange illness confirmed quickly by the CDC to be smallpox. While we only knew about the Oklahoma cases the first day, we later learned the scope

of the initial infections and the sites of three simultaneous attacks in shopping centers in Oklahoma, Georgia, as well as Pennsylvania.

The initial infection quickly spread to five states and three thousand victims, although most infected individuals had not displayed symptoms or gone to the hospital in the first few days. And we did not know at that time how many had been infected.

We didn't know how many. We didn't know how, how many there were. We didn't know where they were. We didn't know who they were. We did know that probably many people had been infected.

We quickly learned we had only two tools available to deal with a smallpox attack: vaccination and isolation. And we had only enough vaccine for 1 out of every 23 Americans, which is the state today.

At the very beginning of the National Security Council meeting, I denied the Secretary of Defense's adamant demand that all 2.3 million U.S. military personnel be immediately vaccinated wherever they were in the world.

Instead, we administered the vaccine to U.S. military, including the National Guard and security and medical personnel who were on the front lines locally, and who also were in areas of the world where a smallpox attack was most likely to occur.

We could not allow all the vaccine to go to the military right off the bat, or at least 2.3 million which would be probably one fourth, one third of the total supply, because the front line shifted. It wasn't the battlefield. It was back home.

The troops that were engaged were most of all medical personnel whether they were local or whether they were military or whether they were shipped in on emergency from around the country or the world.

Our initial decision was to use our limited supply of vaccine to protect health care workers, local police and fire officials, National Guard on the scene and local, state and federal officials who were in the line of fire.

We also devised a strategy to try and put a firewall around the infections that were being reported. But that strategy was largely ineffective because of the rapid spread of the disease. Because we didn't know where it had spread, where they were, and because we had a very limited supply of vaccine. If you had enough vaccine, you could put fire breaks around every suspicious area.

The CHAIRMAN. Senator, would you for the record indicate if you can how the disease is spread?

Senator NUNN. It's spread from person to person.

The CHAIRMAN. Physical contact?

Senator NUNN. The health experts tell me that you basically—through breathing. Doesn't have to be direct contact, in close proximity. And the health officials tell me that until you actually show some signs, you can't really spread the disease. But showing signs, a lot of people confuse it with other things so they don't know they have got it to begin with.

The CHAIRMAN. Thank you.

Senator NUNN. On the first night of decisionmaking, Mr. Chairman, we designed a vaccination strategy. And we ordered accelerated production of new stock. We ordered it on an emergency basis.

We asked the Secretary of State to call his counterparts around the globe and try to find supplies in other countries and began to feel other countries out about whether they would engage with us in trying to stop the disease before it spread all over the world.

I will skip the agonizing details now and get on to the conclusions. On day 6 of the crisis, we had very little vaccine left. We quickly faced the only alternative, forced isolation, with large numbers of exposed citizens whose locations and identities remained guesswork. We were down to really tough questions.

Do we force whole communities and cities to stay in their homes? How? With force? How much force? Does it include lethal force? Do we physically prevent citizens in high risk areas from fleeing their communities with their children even though they themselves may already be infected?

Who provides food and care for those in forced isolation, particularly when we can no longer provide vaccine to the essential providers? Who's going to make the health care people show up when you don't have any vaccine for them and for their families?

On day 12 when our war game ended and my brief tenure as President concluded, we were beginning the next stage of the epidemic, those who caught smallpox from the original 3,000 people who were infected in the initial terrorist attack. Our health experts told us that every 2 to 3 weeks the number of cases would increase ten-fold.

To give you a glimpse of how the exercise ended, here are a few highlights from a simulated CNN broadcast quoting that.

> On day 12 of the worst public health crisis in America's history, demonstrations for more vaccine in hard-hit communities disintegrated into riots and looting around the nation. Interstate commerce has stopped in several regions of the nation. A suspension of trading on America's stock exchanges takes effect tomorrow. International commerce with the United States has virtually ceased. The Centers for Disease Control reports that efforts to stem the smallpox epidemic have depleted America's inventory of smallpox vaccine. While the CDC may be out of vaccine, at least 45 Internet Web sites are offering what they claim are safe, effective vaccines from previously forgotten stocks. These claims have not, repeat not, been independently verified, and authorities urge serious caution.
>
> At least 25 more states and 10 foreign countries are reporting smallpox infections. At the United Nations, China has sponsored a resolution to censure the United States, blaming America for reintroducing smallpox to the world. It is demanding that the United States supply the world with vaccine.

I could go on and on, Mr. Chairman, but that I think captures the essence of what we were faced with. In summary, I determined from that experience that public health has become a national security issue and that we are unprepared.

We were out of vaccine. We were discussing martial law. Interstate commerce was eroding rapidly. The members of our simulated NSC, as well as state and local officials, were desperate.

We came to realize too late that our country had not produced sufficient vaccine; had not prepared top officials to cope with this new type of security crisis; had not invested adequately in the planning and exercises absolutely necessary for coordinated response; had not ensured that the public health infrastructure was adequate, with built-in surge capacity; had not educated the American people on developed strategies to constructively engage the media in educating the public about what was happening and what they could do to protect their families; had not practiced what few plans there were in place; had not ranked biological terrorism or infectious diseases as high national priorities.

Before I detail the lessons learned in this particular exercise, we should keep in mind that the results of biological effect would vary greatly according to the specific agent used. Technology and training for early recognition of the type of pathogen, that kind of training and technology is absolutely essential and must be a high priority.

This exercise gave us valuable lessons about a possible smallpox attack. The circumstances would be very different in the case of an anthrax attack. In the event of an attack using anthrax, vaccination and isolation would not be the tools, but antibiotics would need to be administered on the scene and in large quantities immediately.

For the participants, the "Dark Winter" exercise instilled in all of us that there is much work to be done and needs to be done quickly.

Number 1, clearly measures that will deter or prevent bioterrorism are the most cost-effective means to counter threats to public health and social order. We need to prevent the proliferation of biological weapons in part by strengthening intelligence-gathering against such threats, but also by providing peaceful research options to scientists in the former Soviet Union who know how to make these pathogens and who have had plenty of experience making these pathogens but don't know how they are going to feed their children today with legitimate enterprises.

Two, we need to focus more attention, concern and resources on the specific threat of bioterrorism, understanding that it is different from the other threats we face. Biological weapons must be countered with new protocols for securing dangerous pathogens with increased vigilance and surveillance, as well as with increased supplies of medicines and vaccines and significantly increased training.

Three, we need to recognize the central role of public health and medicine in this effort and engage those professionals fully as partners on the national security team. We must act on the understanding that public health is an important pillar in our national security framework.

Four, we need to identify and put into practice the mechanisms by which all levels of government will interact and work together. It is critical that we understand our differing roles, responsibilities, capabilities and authorities, and plan on how we will work together before an act of terrorism occurs. I must add that Governor Frank Keating of Oklahoma was part of this exercise. I think he will

strongly echo that from a state government and a local government point of view. He made a very valuable contribution.

Five, we need to reexamine and modernize the legal framework for epidemic control measures and the appropriate balance with civil liberties. Mr. Chairman, your reminder on *posse comitatus* is right down that line because there would be all sorts of questions this society has not faced, at least in modern times.

Six, there should be a clear plan for providing the news media with timely and accurate information to help save lives and prevent panic.

Seven, we need to increase the core capabilities of our public health system to detect, track and contain epidemics by providing resources for effective surveillance systems, diagnostic laboratory facilities, and communication links to other elements of the response effort here and abroad.

Eight, the national pharmaceutical stockpile must be built to capacity, including extra production capability for drugs and vaccines, with heightened security at various dispersal sites. We must not fall victim to a twin attack that releases a bioagent and simultaneously destroys our key drugs and vaccine supplies.

Nine, we need to develop plans for a surge of patients in the nation's hospitals to make the best use of existing resources in the event of an emergency.

Ten, we need to increase funding for biomedical research to develop new vaccines, new therapeutic drugs and new rapid diagnostic tests for bioweapon agents.

Eleven, we need to encourage the scientific community to confront the sinister potential of modern biological research, and help them devise systems and practices that ensure the safe, secure storage of and access to dangerous pathogens.

Twelve, officials at highest levels of the Federal, state, and local government need to participate in exercises like this one to understand the importance of advanced not only planning but preparation. Plans must be exercised, evaluated and understood by decisionmakers if they are to prove useful in a time of crisis.

Mr. Chairman, finally, I have a new role now that relates to what we call the Nuclear Threat Initiative (NTI). It's a new foundation funded by Ted Turner very generously and headed by a board of experienced people including Senator Lugar among others.

We are trying to encourage and help our government to deter, prevent and defend against biological terrorism. That's a central part of our mission as well as the nuclear side of it and the chemical side of it.

We are dedicated to reducing the global threat from biological, nuclear, and chemical weapons by increasing public awareness, encouraging dialogue, catalyzing action, promoting new thinking about these dangers in this country and around the globe.

We fully recognize that only our government can provide the leadership and resources to achieve our security and health priorities. But within that context, NTI is seeking ways to reduce the threat from biological weapons and their consequences; exploring ways to increase education, awareness and communication among public health experts, medical professions, and scientists, as well as among policymakers and elected officials.

We are considering ways to improve infectious disease surveillance around the globe, including rapid and effective detection, investigation, and response.

This is a fundamental defense against any infectious disease threat, whether it occurs naturally or is released deliberately, stimulating and supporting the scientific community in its efforts to limit inappropriate access to dangerous pathogens and to establish standards that will help prevent the development and spread of biological agents as weapons.

NTI is searching for ways to help our Government and the Russian Government to facilitate the conversion of Russian bioweapons facilities and know-how to peaceful purposes, and to improve security of dangerous pathogens worldwide. And I know that my colleague and partner Senator Lugar can well identify with that because he has been right out in front in that effort.

Finally, Mr. Chairman, in concluding, enemies don't normally attack us where we are strong; they target us where we are weak. Enemies of the United States are not eager to engage us militarily. They saw what happened in Desert Storm and other conflicts in recent years, and they know the awesome capabilities we have.

They will, however, attack us where they believe we are vulnerable. Today, we are vulnerable to biological terrorism. Those who perpetuate such an act are not likely to be quickly identified or leave a return address. I emphasize that. That makes a huge difference in terms of the incentives of the game.

It is critical that we prepare with all possible speed; because if an attack occurs and succeeds, there will be others. Preparing is deterring. Our first priority, as Senator Helms mentioned, must be prevention.

Whether the enemy achieves its objectives in an attack that may take place depends to a large extent on how the American people respond. Panic in our citizens would be just as great a danger as the disease itself.

Some citizens will respond like saints, doing whatever they can to meet the needs of their family as well as consider the community. Others will respond with panic, perhaps even using violence to obtain vaccines and drugs or try to protect themselves or their loved ones at the expense of others.

How most of our citizens will respond will depend largely on what they hear from the President and their elected leaders, and how they see our Government respond. This means we must be prepared.

Thank you.

[The prepared statement of Senator Nunn follows:]

PREPARED STATEMENT OF HON. SAM NUNN

Chairman Biden and members of the committee, it is a privilege and honor for me to come back to the United States Senate where I spent so much of my life. I thank you for dedicating the first of these hearings to the threats of bioterrorism and the spread of infectious diseases. Biological terrorism is one of our greatest national security threats, and one that cannot be addressed by Department of Defense standard operating procedures. The specter of a biological weapons attack—and the parallel peacetime threat of a naturally occurring infectious disease outbreak—are unique, and they deserve the time and focus you are devoting to them today.

Mr. Chairman and members of the committee, as you may know, this past June at Andrews Air Force Base, I was a participant in the exercise *Dark Winter*—which

simulated a biological weapons attack on the United States. It's a lucky thing for the United States that this was just a test and not a real emergency. But, Mr. Chairman and members of the committee, our lack of preparation *is* a real emergency.

During my 24 years on the Senate Armed Services Committee, I saw scenarios and satellite photos and Pentagon plans for most any category of threat you can imagine. But a biological weapons attack on the United States fits no existing category of security threats. Psychologist Abraham Maslow once wrote: "When all you have is a hammer, everything starts to look like a nail." This is not a nail; it's different from other security threats; and to fight it, we need a different set of tools than the ones we've been using.

Our exercise involved an intentional release of smallpox. Experts today believe that a single case of smallpox anywhere in the world would constitute a global medical emergency. As Members of this committee know, a wave of smallpox was touched off in Yugoslavia in 1972 by a single infected individual. The epidemic was stopped in its fourth wave by quarantines, aggressive police and military measures, and 18 million emergency vaccinations to protect a population of 21 million that was already highly vaccinated.

Mr. Chairman, we have effectively only 12 million doses of vaccine in America to protect a highly vulnerable population of 275 million that is essentially not vaccinated. The Yugoslavia crisis mushroomed from one case; our *Dark Winter* exercise began with 20 confirmed cases in Oklahoma City, 30 suspected cases spread out in Oklahoma, Georgia, and Pennsylvania, and countless more cases of individuals who were infected but didn't know it. We did not know the time, place or size of the release, so we had no way of judging the magnitude of the crisis. All we knew was that we had a big problem and a small range of responses. One certainty was that it would get worse before it would get better. Our medical experts told us that we had only two strategies for effective smallpox containment: (1) isolating those who are sick, and (2) vaccinating those who have been exposed. Isolation is difficult when you're not sure who has it; vaccination cannot stop the spread if you don't have enough of it.

DARK WINTER OVERVIEW

Dark Winter simulated a series of National Security Council (NSC) meetings dealing with a terrorist attack involving the covert release of smallpox in three American cities. The exercise was conducted by the Center for Strategic and International Studies, the Johns Hopkins Center for Civilian Biodefense Studies, and the ANSER Institute for Homeland Defense, under the leadership of John Hamre, Tara O'Toole and Randy Larsen, respectively. Many of the participants in *Dark Winter* had served previous Presidents in cabinet or sub-cabinet positions. Most knew how the NSC worked, and they were all individuals with considerable expertise and perspective in the security, law enforcement and health fields.

I will not take the committee's time with a complete replay of the events, but will share with you the highlights.

In the opening minutes of *Dark Winter,* we learned from the Secretary of Health and Human Services that cases of smallpox had just been diagnosed by the Centers for Disease Control. Given the infectious nature of the disease, we were facing the start of a smallpox epidemic—an event with devastating, if not catastrophic, potential.

Like all of you, I received a smallpox vaccination when I was a child, but I had forgotten the honor of the disease. In the 20th century, more than 300 million people died from smallpox—more than those killed in all wars of the century combined. Thanks to a massive and highly collaborative international campaign, smallpox as a naturally occurring disease was eradicated. But once eradicated, the consequences of a smallpox outbreak has become more dangerous with each passing year as new generations of unvaccinated citizens are born and the potency of the previous vaccinations diminishes with time. Unfortunately, we know that smallpox was made into a weapon by the Soviet Union; we do not know if any other nations or groups have successfully pursued a similar goal, and this should be a matter of keen intelligence forces.

Over a 24-hour period at Andrews Air Force Base, our NSC "war gamers" dealt with three weeks of simulated shock, stress and horror. I was given the role of President of the United States, and Jim Woolsey was the Director of the Central Intelligence Agency.

We learned that on December 9, 2002, some dozen patients reported to the Oklahoma City Hospital with a strange illness confirmed quickly by the CDC to be smallpox. While we only knew about the Oklahoma cases the first day, we later

learned the scope of the initial infections and the sites of three simultaneous attacks in shopping centers in Oklahoma, Georgia and Pennsylvania. The initial infection quickly spread to five states and 3,000 victims although most infected individuals had not displayed symptoms or gone to the hospital in the first few days so we did not know who they were or where they were.

We quickly learned that we had only two tools available to deal with a smallpox attack—vaccination and isolation, and we had only enough vaccine for one out of every 23 Americans.

I denied the Secretary of Defense's demand that all 2.3 million of U.S. military personnel be immediately vaccinated wherever they were in the world. Instead, we administered vaccine to U.S. military, including the National Guard, and security and medical service personnel who were on the front lines locally and also those who were in areas of the world where a smallpox attack was more likely to occur. Our initial decision was to use our limited vaccine supply to protect health care workers, local police and fire officials, National Guard on the scene and local, state and federal officials in the line of fire. We also devised a strategy to try and put a firewall around the infections that were being reported, but that strategy was largely ineffective because of the rapid spread of the disease and our limited supply of vaccine.

So, on the first night of decision-making, we designed a vaccination strategy, and we ordered accelerated production of new stock. We asked the Secretary of State to try to find surplus stock from other countries. I will skip the agonizing details and get to the conclusions.

On Day Six of the crisis, we had very little vaccine left. We quickly faced the only alternative—forced isolation with large numbers of exposed citizens whose locations and identities remained guesswork. We were down to the really tough questions. Do we force whole communities and cities to stay in their homes? How? With force? Do we physically prevent citizens in high-risk areas from fleeing their communities when they themselves may already be infected? Who provides food and care for those in forced isolation, particularly when we can no longer provide vaccine to essential providers?

On Day Twelve, when our war game ended and my brief tenure as President concluded, we were beginning the next stage of the epidemic—those who caught smallpox from the original 3,000 people who were infected in the initial terrorist attack. Our health experts told us that every two to three weeks the number of cases would increase ten-fold. To give you a glimpse of how the exercise ended, here are a few highlights from a simulated CNN broadcast:

> On Day Twelve of the worst public health crisis in America's history, demonstrations for more vaccine in hard-hit communities disintegrated into riots and looting around the nation. Interstate commerce has stopped in several regions of the nation. A suspension of trading on America's stock exchanges takes effect tomorrow. International commerce with the U.S. has virtually ceased.
>
> The Centers for Disease Control reports that efforts to stem the smallpox epidemic have depleted America's inventory of smallpox vaccine. While the CDC may be out of vaccine, at least 45 Internet websites are offering what they claim are safe, effective vaccines from previously forgotten stocks. These claims have not—repeat not—been independently verified, and authorities urge caution.
>
> At least 25 more states and 10 foreign countries are reporting smallpox infections. At the United Nations, China has sponsored a resolution to censure the U.S., blaming America for reintroducing smallpox to the world. It is demanding that the U.S. supply the world with vaccine.

In summary, Mr. Chairman, I determined from our war game that public health has become a national security issue, but that we are unprepared. We were out of vaccine. We were discussing martial law. Interstate commerce was eroding rapidly. The members of our simulated NSC, as well as state and local officials, were desperate. We came to realize too late that our country:

- *Had not produced* sufficient vaccine.
- *Had not prepared* top officials to cope with this new type of security crisis.
- *Had not invested* adequately in the planning and exercises absolutely necessary for coordinated response.
- *Had not ensured* that the public health infrastructure was adequate, with built in surge capacity.

- *Had not educated* the American people, or developed strategies to constructively engage the media in educating the public, about what was happening and what to do.
- *Had not practiced* what few plans there were in place.
- *Had not ranked* biological terrorism or infectious diseases as high national priorities.

DILEMMAS AND INSIGHTS

Most participants in our exercise would have been much more in their element if we had been dealing with a terrorist bombing. The effects of a bomb are bounded in time and place. After the explosion, the nation's leadership knows the geography and the extent of the damage. You know where to start, and how much it will take to respond and rebuild. Smallpox, on the other hand, is a silent, ongoing, invisible attack. It is highly contagious, and spreads in a flash—each smallpox victim can infect ten to twenty others. It incubates for two weeks before physically appearing—it comes in waves.

The most insidious effect of a biological weapons attack is that it can turn Americans against Americans. Once smallpox is released, it is not the terrorists anymore who are the threat; our neighbors and family members can become the threat. If they've been exposed, they can kill you by talking to you. The scene could match the horror of the Biblical description in Zechariah (8:10): "Neither was there any peace to him that went out or came in . . . for I set all men every one against his neighbour."

A biological weapons attack cuts across categories and mocks old strategies. For more than two thousand years the most important rule of war has been to know your enemy.

In military language, this means that when you face a battlefield scenario, you draw up an order of battle—you estimate the number of enemy tanks and planes and troops, their intelligence and logistics capabilities, and other resources. A biological weapon, however, is an invisible killer. An attack may go unrecognized for days, only becoming evident after large numbers of people become sick. In the case of a contagious disease, our own people would become the enemy's weapons as they transmit the disease to others, creating ever-widening circles of exposure.

Even after you know there has been an attack, there still are few reliable numbers—because you don't know who initially released it, how much more they have, or where they are. And the usual responses to an attack are impossible: "Engage the enemy; open fire; stop their advance; bring out the wounded." You can hardly know who is wounded.

For the participants, this exercise was filled with many such horrible dilemmas and unpleasant insights.

Number one: We have a fragmented and under-funded public health system—at the local, state, and federal levels—that does not allow us to effectively detect and track disease outbreaks in real time.

Two: Lab facilities needed to diagnose the disease are inadequately supported and laboring with outdated technology.

Three: There is insufficient partnership and communication across federal agencies and among local, state, and federal governments.

Four: The only way to deal with smallpox is with isolation and vaccination, but we don't have enough vaccines, and we don't have enough dedicated facilities, resources, or information for effective isolation.

Five: A biological weapons attack will be a local event with national implications, and that guarantees tension between local, state and national interests. In our exercise, Governor Keating of Oklahoma asked for vaccine for every one of his citizens—as he had to in the interests of his state. The President said no, as he had to in the interests of the nation. Naturally, this demands a high degree of advanced planning and coordination, because of the diverging interests, and because key players and partners are answerable to different leaders.

Six: Most hospitals run at or near full capacity all the time: a surge in patients from smallpox, combined with the inevitable infections of hospital personnel, and the flight of some fearful health care professionals, would create a catastrophic overload.

Seven: There will be a dearth of information on this kind of event. My staff and cabinet could not tell me ten percent of what I wanted to know: "How many cases are there right now? How many more cases can we expect? Will there be more attacks? When and where did the first infections take place? Who released it? What's the worst-case scenario? Is our vaccine supply secure and safe for use? Will other

countries loan us emergency vaccine to keep the disease from spreading all over the world?

There are many tradeoffs. One of the biggest: We have 12 million vaccines; that's enough for *one* out of every 23 Americans. How do we decide whom to vaccinate?

Do we take power from the Governors and federalize the National Guard? Do we seize hotels and convert them into hospitals? Do we close borders and block all travel? What level of force do we use to keep someone sick with smallpox in isolation? Do we keep people known or thought to be exposed quarantined in their homes? Do we guarantee 2.3 million doses of vaccine to the military; or do we first cover all health care providers? Do we take strong measures that protect health, but could undermine public support or destroy the economy?

Finally: How do you talk to the public in a way that is candid, yet prevents panic—knowing that panic itself can be a weapon of mass destruction? My staff had two responses: "We don't know" and "You're late for your press conference."

I told people in the exercise: "I would never go before the press with this little information," and Governor Keating—who knows about dealing with disaster, said: "You have no choice." And I went, even though I did not have answers for the public's most urgent questions: "How do you plan to protect our families?" "How rapidly and how far will it spread?" And "Why isn't there enough vaccine?"

Naturally, there are some skeptics anytime you describe a dire threat to the United States. I want to tell the committee: I am convinced the threat of a biological weapons attack on the United States is as urgent as it is real. As Secretary Rumsfeld said in his confirmation hearings: "I would rank bioterrorism quite high in terms of threats . . . It does not take a genius to create agents that are enormously powerful, and they can be done in mobile facilities, in small facilities." An experiment some years ago showed that a scientist whose specialty was in another field was able to weaponize anthrax on his first attempt for less than $250,000.

Hundreds of labs and repositories around the world sell biological agents for legitimate research—and the same substances used in legitimate research can be turned into weapons research. In addition, the massive biological weapons program of the former Soviet Union remains a threat, at least to the extent that materials and know-how could flow to hostile forces. At its peak, the program employed 70,000 scientists and technicians and made twenty tons of smallpox. One Russian official was quoted some years ago in *The New Yorker* saying: "There were plenty of opportunities for staff members to walk away with an ampule." There still are.

According to a very prominent press report, former Soviet biological weapons scientists have been aggressively—and in some eases successfully—recruited by Iran. And Ambassador Rolf Ekeus, who headed the United Nations special commission that investigated Iraq's arsenal after the Gulf War, and who we are lucky to have on the Board of Directors of NTI, had testified before Congress that in 1991 Iraq had 300 biological bombs.

So the ability of people to acquire or create biological weapons should be clear beyond any doubt. And no one should doubt how lethal biological weapons could be. In 1979, a small amount of anthrax escaped from a Soviet biological weapons lab in Sverdlovsk. Seventy-seven cases of human anthrax occurred in the city surrounding the lab. Sixty-six died, and new cases were appearing as late as 47 days after the leak. All this resulted from only a tiny amount of anthrax being released—on the order of ounces. It doesn't take much imagination to envision the catastrophe that would result if someone deliberately released a much larger quantity.

It is important not to overstate this threat. But it is not an overstatement to say it is real, it is dangerous, and if it occurred today, it would catch us unprepared.

Michael Osterholm and John Schwartz, in their book *Living Terrors,* told about the experience of one doctor who knew his state was one of the best-trained areas of the country for a biological weapons attack. One day he conducted some unscientific research. He discovered that the total city stockpile for dealing with an anthrax attack would not cover even 600 patients. He found that a doctor trained in biological weapons failed to diagnose anthrax when the classic symptoms were described; a doctor in the radiology department failed to recognize inhalation anthrax when shown an X-ray; and a voice mail message describing a bioterrorism concern went unreturned by the state health department for three days.

NEXT STEPS

In fairness, we are making progress. The Clinton administration deserves credit for recognizing that a biological weapons attack is different from warfare or other terrorist threats and for targeting funds to address it. That initiative includes strengthening the public health infrastructure, creating a pharmaceutical stockpile for civilian use, a contract to develop and produce a new smallpox vaccine, research

to develop new and improved diagnostics, drugs and vaccines, programs to train first responders (police and fire departments as well as public health and medical professionals) across the United States, and investments in new technologies to help detect biological agents.

Under the Bush administration, these efforts are continuing and in some eases, funding is increasing. It is also heartening that Secretary Thompson has named a senior advisor on bioterrorism who previously directed the program on bioterrorism at the Centers for Disease Control and Prevention. These are positive steps. Still, we have to do more—and quickly.

Before detailing the issues that I believe deserve the greatest attention, we should keep in mind that the results of biological attacks would vary according to the specific agent used. Technology and training for early recognition of the type of pathogen are essential. This exercise gave us valuable lessons about a possible *smallpox* attack. The circumstances would be very different in the case of an anthrax attack, for example. In the event of an attack using anthrax, vaccination and isolation would be irrelevant, but antibiotics would need to be administered on the scene immediately.

For the participants, the *Dark Winter* exercise instilled in all of us that there is much work to be done:

Number one: Clearly, measures that will deter or prevent bioterrorism are the most cost effective means to counter threats to public health and social order. We need to prevent the proliferation of biological weapons, in part by strengthening intelligence gathering against such threats, but also by providing peaceful research options to scientists in the former Soviet Union. Efforts to fight proliferation require a global approach, including finding a way to strengthen and enforce the Biological Weapons Convention.

Two: We need to focus more attention, concern and resources on the specific threat of bioterrorism—understanding that it is different from other threats we face. Biological weapons must be countered with new protocols for securing dangerous pathogens, with increased vigilance and surveillance, as well as with increased supplies of medicines and vaccines and significantly increased training.

Three: We need to recognize the central role of public health and medicine in this effort and engage these professionals fully as partners on the national security team. We must act on the understanding that public health is an important pillar in our national security framework. In the event of a biological weapons attack—millions of lives will depend on how quickly doctors diagnose the illness, communicate their findings, and bring forth a fast and effective response at the local and federal level. This means, clearly, that public health and medical professionals must be part of the national security team. Planning for an event like this is not the exclusive purview of the Department of Defense, the National Security Council, the CIA and the Department of Energy. The Department of Health and Human Services (CDC, FDA, NIH, etc.) must also be included.

This may seem obvious enough. But several years ago, when administration officials were meeting to discuss supplemental funding legislation for defense against biological weapons—the presiding official from the Office of Management and Budget greeted the officials from the NSC, and FBI and CIA and DOD, then saw the Assistant Secretary from Health and Human Services at the table, did a double-take and said: "What are you doing here?" Health officials should not need to be given directions to the White House Situation Room in an emergency.

Four: We need to identify and put into practice the mechanisms by which all levels of government will interact and work together. It is critical that we understand our differing roles, responsibilities, capabilities, and authorities, and plan on how we will work together before an act of terrorism occurs.

Five: We need to reexamine and modernize the legal framework for epidemic control measures and the appropriate balance with civil liberties—the laws that would apply if we were to find ourselves managing the crisis that would come with a biological weapons attack. These laws vary from state to state and many are antiquated. We need to make sure that they are up-to-date, consistent with our current social values and priorities, and we need to reacquaint high-level officials in all areas of response with the specific authorities these laws provide, and how they can implement them.

Six: There should be a clear plan for providing the news media with timely and accurate information to help save lives and prevent panic.

Seven: We need to increase the core capacities of our public health system to detect, track and contain epidemics, by providing resources for effective surveillance systems, diagnostic laboratory facilities, and communication links to other elements of the response effort.

Eight: The national pharmaceutical stockpile should be built to capacity, including extra production capability for drugs and vaccines, with heightened security at the various dispersal sites. We must not fall victim to a twin attack that releases a bio-agent and simultaneously destroys our drugs and vaccines.

Nine: We need to develop plans for a surge of patients in the nation's hospitals to make the best use of existing resources in the event of an emergency. This will require careful advance planning, including how to utilize ancillary facilities such as gymnasiums or armories, since most hospitals are operating at or near capacity right now.

Ten: We need to increase funding for biomedical research to develop new vaccines, new therapeutic drugs, and new rapid diagnostic tests for bioweapon agents.

Eleven: We need to encourage the scientific community to confront the sinister potential of modern biological research, and help them devise systems and practices that ensure the safe, secure storage of, and access to, dangerous pathogens.

Twelve: Officials at the highest levels of the federal, state, and local government need to participate in exercises like *Dark Winter* to understand the importance of advance preparation. Plans must be exercised, evaluated, and understood by decision-makers if they are to prove useful in a time of crisis.

I know how difficult it is to find funding for new initiatives, and public health is often left behind. We need to think about supporting public health activities in the same way we think about our national defense. Congress and the public should understand that expanding disease surveillance, creating additional lab capacity and enhancing vaccine production capabilities will benefit the United States not only in responding to a biological weapons attack, but also by improving our responses to natural disease outbreaks. We have a chance to defend the nation against its adversaries and improve the public health system with the same steps.

THE NUCLEAR THREAT INITIATIVE—A NEW FOUNDATION

Mr. Chairman and members of the Committee, encouraging and helping our government to deter, prevent, and defend against biological terrorism is a central part of our mission at the Nuclear Threat Initiative (NTI)—the organization founded by Ted Turner and guided by an experienced board that Ted and I co-chair. We are dedicated to reducing the global threat from biological, nuclear, and chemical weapons by increasing public awareness, encouraging dialogue, catalyzing action, and promoting new thinking about these dangers in this country and abroad.

We fully recognize that only our government can provide the leadership and resources to achieve our security and health priorities. But within that context, NTI is:

- Seeking ways to reduce the threat from biological weapons and their consequences.
- Exploring ways to increase education, awareness and communication among public health experts, medical professionals, and scientists, as well as among policy makers and elected officials—to make sure more and more people understand the nature and scope of the biological weapons threat.
- Considering ways to improve infectious disease surveillance around the globe—including rapid and effective detection, investigation, and response. This is a fundamental defense against any infectious disease threat, whether it occurs naturally or is released deliberately.
- Stimulating and supporting the scientific community in its efforts to limit inappropriate access to dangerous pathogens and to establish standards that will help prevent the development and spread of biological agents as weapons.
- And finally, NTI is searching for ways to help our government and the Russian government to facilitate the conversion of Russian bioweapons facilities and know-how to peaceful purposes, to secure biomaterials for legitimate use or destruction, and to improve security of dangerous pathogens worldwide.

CONCLUDING REMARKS

Mr. Chairman, enemies don't normally attack us where we are strong; they target us where we are weak. Enemies of the United States are not eager to engage us militarily; they saw what happened in Desert Storm. They will attack us where they believe we are vulnerable. Today, we are vulnerable to biological terrorism and those who perpetuate such an act are not likely to be quickly identified or leave a return address. It is critical that we prepare with all possible speed, because if an attack occurs, and succeeds, there will be others. Preparing is deterring.

Our first priority must be prevention. Whether the enemy achieves its objectives in an attack depends, to a large extent, on how the American people respond. Panic is as great a danger as disease. Some will respond like saints—doing whatever they

can, exhibiting brave and selfless patriotism—to meet the needs of family and community. Others will respond with panic, perhaps even using violence to obtain vaccines or drugs, or try to protect themselves or their loved ones from exposure. The distance between these two is broad. How most of our citizens will respond will depend largely on what they hear from the President and their elected leaders, and how they see our government respond. This means we must be prepared.

When America faced possible financial panic in March of 1933, President Roosevelt did three things immediately upon taking office: he ordered the banks to close temporarily, he proposed emergency banking legislation, and he explained his plan to the public in the first of his regular national radio broadcasts.

If he had not talked reassuringly to the American people, his plan might not have worked. But if he had talked, and had no plan, his talk would not have been reassuring. In the event of a biological weapons attack, no President, no matter how great his natural gifts, will be able to reassure the public and prevent panic unless we are better prepared than we are right now.

If we are well prepared—with the ability to detect the disease quickly, report it swiftly, and implement the appropriate infection control measures, including the provision of necessary drugs or vaccines for all those who came in contact with it—then the President of the United States will address the American people with knowledge, with courage, and with confidence, and the people will respond in kind. Whether this or a future President will exert this essential leadership will depend in large part on how we all address this issue now.

I commend the Committee for tackling such a difficult but important matter. Our country's protection and safety depend on your leadership. Thank you.

The CHAIRMAN. Thank you very much, Senator.

Mr. Woolsey.

STATEMENT OF HON. R. JAMES WOOLSEY, FORMER DIRECTOR OF CENTRAL INTELLIGENCE, AND PARTNER, SHEA & GARDNER, WASHINGTON, DC

Mr. WOOLSEY. Thank you, Mr. Chairman. I have a three-and-a-half-page statement with some attachments. If it's all right, I will just submit it for the record.

The CHAIRMAN. Without objection. That will be placed in the record.

Mr. WOOLSEY. I will just use it as notes to give a briefer summary. I will not attempt to duplicate Senator Nunn's testimony regarding our "Dark Winter" exercise. I have three broad points to make with respect to trying to avoid a disaster of the sort that we faced in this game.

First, 5 years ago the CIA and the Energy Department via Lawrence Livermore Laboratory asked me to co-chair a review of the country's capacity to deal with terrorism using weapons of mass destruction.

Most of that review is classified, but Joe Nye, my co-chairman, and I did write an op-ed, which I've attached, in which we stress that we believe that it is the case that terrorism using weapons of mass destruction—and we thought at the time and I think still biological is the most difficult of these—ought to be the very highest priority in U.S. National Security Policy.

Biological weapons in terms of number of people killed could match a nuclear attack. And in terms of simplicity, unfortunately, it is far simpler to work with biological agents than even chemicals in many cases, particularly as far as scope and volume of equipment is concerned.

Often you don't need to smuggle anything. Anthrax grows in many cow pastures of the world, and much of the equipment that one would need to weaponize it is transportable. Some of it is little

more complex than that for, say, a microbrewery attached to a restaurant, which in fact the equipment rather resembles in some ways.

Happily, there are some very difficult parts of this process which led Aum Shinrikyo to forsake biological weapons and move to chemical weapons for their attack in Tokyo. But there are good reasons to believe that one of the reasons, for example, Iraq has been able to hide almost all of its biological weapons, even when UNSCOM was in the country operating somewhat effectively, was because it was moving both biological agents and the equipment around, perhaps with the Special Republican Guard that protects Saddam. This should give you some idea of the mobility and size of this type of equipment.

Second, I served on a National Terrorism Commission chaired by Ambassador Jerry Bremmer that reported to the Congress of last summer. And we said in that report that although consequence management is of course vitally important, and that's much of what we dealt with in "Dark Winter," intelligence really is not only the first line of defense but the best weapon against many aspects of terrorism. Because the consequences are so horrible trying to contain them once an attack has occurred, as we showed in "Dark Winter," is extraordinarily difficult.

Now, one reason for example is that vaccines and antibiotics may be made ineffective by genetic modification of the biological agents. We know that the Russians were involved in doing this with anthrax. We learned about it in 1997. And for 4 years we have been asking the Russian Government for samples of their genetically modified anthrax. So far we have not received any. This may have spawned some of the work late in the Clinton administration that has been reported in the press recently to try to figure out how to deal with a genetically modified biological agent used in a terrorist attack.

Back in the cold war, we could keep pretty good track of some of the major threats to our country, Soviet ICBMs and the like, submarines, with satellite reconnaissance. That tends not to be the case with something like biological agents, whether used by governments or by terrorists or by some combination.

As Senator Nunn pointed out, biological agents lend themselves to deception. I would say if a terrorist attack using biological agents against the United States occurred and it seemed at first as if the Government of Iran or Shiite groups might be behind it, we should look very closely at Iraq because it might be a false flag operation.

And conversely, if it seemed initially as if it might have come from Iraq, we should perhaps look to Iran.

With respect to difficulties and problems with collecting intelligence, I want to highlight two that we stressed in our terrorism Commission report last summer.

First of all, the CIA has in effect certain guidelines issued in late 1995, I hasten to say after I stepped down from the job in the Agency, in response to a highly publicized case in Guatemala. Those guidelines make it considerably more difficult than it needs to be to recruit agents inside terrorist organizations because rather cumbersome procedures apply to the recruitment of any spy who

may have a violent background or any history of human rights violations.

Mr. Chairman, these rules may be defensible when one is recruiting spies inside governments. There are a lot of good people trapped inside bad governments who have over the years volunteered to work for the CIA or other parts of Western intelligence.

But in my judgment and in the unanimous judgment of our Commission, these rules make absolutely no sense with respect to terrorist groups, because the only people that are in terrorist groups are people who want to be terrorists. And that means they have a background in violence and human rights violations.

If you make it difficult for a CIA case officer in, say, Beirut to recruit spies with this sort of background, he'll be able to do a dandy job of telling you what's going on inside, for example, the churches and the Chamber of Commerce in Beirut. But we don't really care what's going on there. He'll have no idea, however, what's going on inside Hezbollah.

The CIA today says that they have turned down no recruitments because of these guidelines. But with all due respect, that's not the problem. The problem, as we were told on the Commission by a number of current and former intelligence officers, is the number of approaches that are not made to recruit people inside terrorist organizations because of the cumbersome nature of these guidelines.

The Commission also looked at the FBI guidelines for domestic work. I use the word work because the FBI strictly speaking does not conduct domestic intelligence operations. It's not an intelligence agency. It's a law enforcement agency. It investigates individual crimes.

Here I want to stress that we are dealing with the civil rights of Americans, and I think we should all agree that special care is needed in making any changes. But let me state the following hypothetical.

A conscience-stricken member of a militia group affiliated with Christian Identity, as these groups call themselves—many people just call them Identity groups, but they call themselves Christian Identity—comes to an FBI office somewhere in the United States. He says that at last night's meeting of the group they were discussing the importance of preparing for Armageddon between the Children of Adam, Aryans, in this group's belief, and the Children of the Devil, everybody else.

One member reportedly stood up and shouted, "Anthrax for Armageddon" and everybody began to take up the same chant. The conscience-stricken member was worried that some of the group might act on its enthusiasm.

I believe it would be surprising to most people to realize that in this hypothetical case the FBI would not be permitted under current guidelines to open a full investigation or to apply to a Federal court for warrants to conduct electronic surveillance or wiretaps, nor would it be permitted to recruit new informants beyond the conscience-stricken individual. It could only follow the matter as best it could without using these tools.

And finally, Mr. Chairman, on this intelligence point, a particular *bete noire* of mine, often CIA case officers and FBI Special

Agents who work in the terrorism area in these litigious times are forced to buy personal liability insurance for fear of being sued individually for steps taken pursuant to their authorized duties when combating terrorism.

Under a recent statute, Federal agencies need reimburse only one half of cost of this insurance. The rest of the premium is paid by the Special Agents or case officers out of their pockets.

It would seem the very least we could do is pay the full cost for premiums of liability insurance that FBI and CIA employees in the front ranks of the war against terrorism have to take out in order to have the privilege of protecting us without risking bankruptcy.

Third and final point, Mr. Chairman, I know this is not a hearing on ballistic missile defense, about which I testified before this committee in late July, and I fully agree that this country's more likely to be subjected to attack using biological agents via terrorism, state-sponsored or otherwise, than via ballistic missiles.

But in my view that in no way diminishes the importance of planning for and deploying ballistic missile defense, including particularly those that would deal effectively with missiles carrying biological weapons.

Dr. Richard Garwin, among others, has pointed out that a missile carrying sub-munition packages filled with biological agents could defeat defensive missiles that intercept in mid-course because the sub-munitions could be released early, immediately after the missile's boost phase and prior to interception. There would be too many of them to be intercepted by mid-course defenses. This is one of the reasons I've been particularly attracted to boost-phase intercept as an approach toward missile defense since it would intercept attacking missiles before the deployment of decoys or such sub-munitions.

Of the five states with biological weapons programs, in addition to Russia and China, that were listed in last January's National Intelligence Council assessment of the biological warfare threat, three, North Korea, Libya and Syria, are susceptible to having any missile launched from their territory intercepted by sea-based boost-phase intercept.

One, Iraq, would probably be susceptible to such a defense, although one might need a site in eastern Turkey; and only one, Iran, would require a substantially innovative approach such as boost-phase interceptors based in Russia or in space.

I think there are two reasons, Mr. Chairman, why this threat of ballistic missiles armed with biological weapons should concern us. One is blackmail. The threat that we would be deterred or that our potential allies would be deterred from protecting the Kuwaits and the South Koreas in the future if we or our allies were vulnerable to attack from a rogue state such as Iraq or North Korea with ballistic missiles carrying biological weapons.

The second is a risk that, as he lost in a crisis and faced removal from office or worse, a rogue state's leader might opt for a Gotterdammerung rather than graceful degradation. We know from Russian memoirs that this was the mind-set of both Fidel Castro and Che Guevara in 1962 when they urged Mikoyan to demand a nuclear attack on the United States at the height of the Cuban Missile Crisis.

And we know from many accounts of the incredibly destructive orders that Hitler gave, that happily were not carried out, in May of 1945.

We know of accounts of drug use by national leaders such as Mao and Hitler, of reliance on soothsayers such as by Saddam today, and on astrology by the former Chief of the Soviet Strategic Rocket Forces.

These types of accounts are simply too numerous through history for us to be confident that as the number of countries with ballistic missiles and biological weapons continues to grow, we will always be blessed with rational and reasonable adversaries.

We should not have been forced to decide in 1940 between having effective local police and having a navy. England should not have been forced to decide in 1587 between protecting itself against civil insurrection and an Armada from Spain. And we should not be forced, today, to choose between defending against terrorists and against ballistic missiles. Both types of defenses in my view are badly needed. Thank you, Mr. Chairman.

[The prepared statement of Mr. Woolsey follows:]

PREPARED STATEMENT OF HON. R. JAMES WOOLSEY

Mr. Chairman, members of the Committee, it is an honor to be here today to testify before you on the important subject of biological weapons and terrorism.

I will not duplicate Senator Nunn's testimony regarding *Dark Winter*, wherein I served as President Nunn's Director of Central Intelligence. Let me address just three additional points about the threat of biological weapons.

I. LIVERMORE STUDY

Five years ago the CIA and DOE, via Lawrence Livermore National Laboratory, asked me to co-chair a review of U.S. preparations to deal with terrorism using weapons of mass destruction. My co-chairman was Joseph Nye, the Dean of the Kennedy School at Harvard, who had served as the Chairman of the National Intelligence Council when I was DCI in 1993-95. Our report was classified, but we published an op-ed (attached) that reflected the main points of our review. We put terrorism using weapons of mass destruction as the highest priority in U.S. national security policy.

Generally we determined in the Livermore study that the biological weapons threat was the most serious because destructiveness, at least in terms of people killed, could match that of nuclear weapons but the technological and industrial challenges to a terrorist were considerably less daunting. Happily, there are some real difficulties in some parts of the weaponization process for biological agents, but compared to fissionable material many biological agents are far more readily available—anthrax, e.g., grows in many cow pastures in the world. Further, the equipment for much of the process of producing biological weapons is transportable, as are the biological agents themselves, and indeed the equipment is little more complex than that for a microbrewery, which it rather resembles. There is good reason to believe, for example, that one of the reasons Iraq was able to hide almost all of its biological weapons work from UNSCOM was that it was moving equipment and biological agents around, quite possibly under the control of the Special Republican Guard that protects Saddam.

II. NATIONAL COMMISSION ON TERRORISM

Second, I served on the National Commission on Terrorism (Chaired by Amb. L. Paul Bremmer) that reported to the Congress last summer. Although consequence management is a terribly important part of the national response to terrorism, as we pointed out in that report good intelligence is not only the first line of defense against terrorism, but the best weapon against it—because it is the best way to prevent a terrorist act from occurring. I have attached six pages from our report that make several points I believe relevant to your deliberations today.

There are serious flaws, we found, in both the CIA guidelines for penetrating terrotist groups abroad and in the FBI's guidelines for dealing with terrorist groups in this country.

CIA 1995 Guidelines

As far as the CIA is concerned, new guidelines issued in late 1995 in response to a highly publicized case in Guatemala make it considerably more difficult than it needs to be to recruit agents inside terrorist organizations because special cumbersome procedures apply to the recruitment of any spy who may have a violent background or any history of human rights violations.

Mr. Chairman, these rules may be defensible when one is recruiting spies inside governments—there are a lot of good people trapped inside bad governments who volunteer to work for the CIA. But they make absolutely no sense at all with respect to terrorist groups. The only people in terrorist groups are people who want to be terrorists—hence they will virtually all have a history of violence and human rights violations. If you make it difficult for a CIA case officer in, say, Beirut, to recruit spies with this sort of background, he will be able to do a dandy job of telling you what's going on inside, e.g., the churches and the Chamber of Commerce there, as if we cared, but he will have no idea what Hezbollah is planning.

The CIA today says that they have turned down no recruitment because of these guidelines, but with all due respect that is not the problem. The problem, as we heard from a number of current and former case officers who communicated with the Commission, is the number of *approaches* that are not made to potentially useful agents inside terrorist organizations because of these guidelines. Our Commission recommended unanimously that these guidelines "no longer apply to recruiting terrorist informants."

FBI Guidelines

The FBI guidelines, our Commission found, are lengthy, complex, and difficult for FBI Agents in the field to understand (they were also difficult for Commission members to understand). They too have been heavily influenced by past controversies, such as some of the lamentable excesses of the COINTELPRO program of many years ago. Here we are dealing with the civil rights of Americans and I think we would all agree that special care is needed. Still, take the following hypothetical case:

> A conscience-stricken member of a militia group affiliated with Christian Identity (as they call themselves) comes to an FBI office somewhere in the U.S. He says that at last night's meeting of the group they were discussing the importance of preparing for Armageddon between the Children of Adam (Aryans, in the group's belief) and the Children of the Devil (everyone else). One member reportedly stood up and shouted "Anthrax for Armageddon," at which point all began the same chant. The conscience-stricken member was worried that some of the group might act on its enthusiasm.

It would be surprising to many, I believe, to realize that in this hypothetical case the FBI would not be permitted, under current guidelines, to open a full investigation and apply to a federal court for warrants to conduct electronic surveillance or wiretaps. Nor would it be permitted to recruit new informants beyond the conscience-stricken individual. It could only follow the matter as best it could without using these tools.

Full Cost of Liability Insurance

One further small but illustrative point about the way we conduct the war against terrorism: FBI Special Agents and CIA Case Officers in the field are, in these litigious times, often forced to buy personal liability insurance for fear of being sued individually for steps taken pursuant to their authorized duties when they are combating terrorism. Under a recent statute federal agencies need reimburse only one-half of the cost of this insurance. The rest of the premium is paid by the Special Agents and Case Officers out of their pockets. It would seem that the very least we could do is pay the full cost of the premiums for the liability insurance that FBI and CIA employees in the front ranks of the war against terrorism have to take out in order, without risking bankruptcy, to have the privilege of protecting us.

PRIORITIES

Mr. Chairman, I know that this is not a hearing on ballistic missile defense, about which I testified before this Committee in late July. But just a word about priorities, if I might. I fully agree that we are more likely to be subjected, in this country, to an attack using biological agents via terrorists—state sponsored or otherwise—than by ballistic missile. But in my view that in no way diminishes the importance of planning for and deploying ballistic missile defenses, including particularly those that would deal effectively with missiles carrying biological weapons.

Dr. Richard Garwin, among others, has pointed out that a missile carrying sub-munition packages filled with biological agents could defeat defensive missiles that intercept in midcourse because these sub-munitions could be released early, immediately after the missile's boost phase, and prior to interception. There would be too many of them for the mid-course defensive system to deal with. This is one of the reasons I have been particularly attracted to the boost-phase intercept approach toward missile defense, since it would intercept attacking missiles before the deployment of decoys or such sub-munitions. Of the five states with biological weapons programs (in addition to Russia and China) listed in the National Intelligence Council's assessment in January of this year, "The Biological Warfare Threat," three (North Korea, Libya, and Syria) are susceptible to having any missile launched from their territory intercepted by sea-based boost-phase intercept. One (Iraq) could be susceptible to such a defense if the intercepting missile were fast enough, although augmentation from a land-based site in Eastern Turkey might be necessary. Only one (Iran) would require a substantially innovative approach, such as boost-phase interceptors based in Russia, or in space, to defend against attacks from its territory.

I think there are two reasons, Mr. Chairman, why this threat of ballistic missiles armed with biological weapons should concern us.

One is blackmail—the threat that we would be deterred, or potential allies would be, from protecting the Kuwaits and South Koreas in the future if we or our allies were vulnerable to attack from a rogue state such as Iraq or North Korea with ballistic missiles carrying biological weapons.

The second is the risk that, as he lost in a crisis and faced removal from office or worse, a rogue state's leader might opt for Gotterdammerung rather than graceful degradation. We know from Russian memoirs that this was the mind-set of both Fidel Castro and Che Guevera in 1962, when they urged Mikoyan to demand a nuclear attack on the U.S. at the height of the Cuban Missile Crisis, and from many accounts of the incredibly destructive orders that Hitler gave in May 1945. And the accounts of drug use (Mao and Hitler), of reliance on soothsayers (Saddam) and astrology (former Chief of the Soviet Strategic Rocket Forces) are simply too numerous throughout history for us to be confident that—as the numbers of countries with ballistic missiles and biological weapons continues to grow—we will always be blessed with rational and reasonable adversaries.

We should not have been forced to decide, in 1940, between having effective local police and having a Navy; England should not have been forced to decide, in 1587, between protecting itself against civil insurrection and an Armada from Spain. And we should not be forced, today, to choose between defending against terrorists and against ballistic missiles. Both types of defenses, in my view, are needed badly.

[From the Los Angeles Times]

PERSPECTIVE ON TERRORISM

DEFEND AGAINST THE SHADOW ENEMY

(By Joseph S. Nye, Jr. and R. James Woolsey)

The destruction of the federal building in Oklahoma City and the bombing of the World Trade Center in New York shocked Americans. But those tragedies would have been far worse if nuclear, biological or chemical materials had been involved. After co-chairing a year-long study for the government, we believe it is increasingly likely they will be.

For 40 years Americans lived under the fear of Soviet nuclear attack. The end of the cold war reduced the prospect of a nuclear holocaust, but ironically, prospects of a nuclear explosion inside the United States probably have increased. And it is not just the nuclear threat. Terrorists worldwide have better access to anthrax or sarin than to nuclear materials. So far, we have been lucky. But we should not wait for another Pearl Harbor to awaken us to the fact that there is no greater threat to our security than terrorism involving weapons of mass destruction.

Skeptics may call us alarmists. Nuclear technology has been around for 50 years and chemical and biological agents for nearly a century, yet terrorists have rarely turned to them. Conventional high explosives are easier to obtain. Moreover, terrorists seeking to promote a cause run the risk of a moral and political backlash if the destruction they wreak is disproportionate to their cause.

But recent years have seen the rise of a new type of terrorist less interested in promoting a political cause and more focused on retribution or eradication of what

they define as evil. Their motives are often a distorted form of religion and their imagined rewards are in the next world. For them, weapons of mass destruction, if available, are a more efficient means to their ends.

Such devices are becoming more available. The breakup of the Soviet Union and the rise of the mafias in Russia have increased the smuggling of nuclear materials. Chemicals and biological agents can be produced by graduate students or lab technicians. General recipes are readily available on the Internet.

Our overriding recommendation is to give the threat of terrorism with weapons of mass destruction the highest priority in U.S. national security policy. Of the threats that could inflict major damage to the U.S., such terrorism is the threat for which we are least prepared.

The nation needs a national response program, directed by the White House. The program must be coordinated and integrated across the entire federal bureaucracy. And end-to-end systematic strategy to encounter this threat must address all phases of a potential terrorist attack, from detection and prevention to response. Such a strategy must include and coordinate program initiatives by all involved departments and agencies.

To this end, we recommend that:

- Policy direction be clarified at the White House level by a committee chaired by the Vice President.
- Interagency and interdepartmental coordination and integration be handled by deputies of the involved organization.
- The program be supported by a long-term funding strategy.
- The program be managed by a single director and supported by a technical and systems planning staff.
- An independent advisory board of outside experts be appointed by the President to monitor and advise the program.
- A joint legislative oversight committee be appointed.

The very nature of U.S. society makes it difficult to prepare for this security problem. Within recent memory, we have not had to battle a foreign invading force on U.S. soil. Because of our "Pearl Harbor" mind-set, we are unlikely to mount an adequate defense until we suffer an attack. Because the threat of terrorism with weapons of mass destruction is amorphous (rogue states, transnational groups, ad hoc groups or individuals) and constantly changing, it is difficult to make predictions and preparations. However, given the current geopolitical state of the world, there is every indication that terrorism will be the most likely physical threat to the U.S. homeland for at least the next decade.

Only if we go beyond business as usual and respond in a broader and more systematic manner do we stand a chance of dealing with this problem before the horror of another Pearl Harbor.

Joseph S. Nye, Jr., was Assistant Secretary of Defense and R. James Woosley was the CIA Director in the first Clinton administration.

GOOD INTELLIGENCE IS THE BEST WEAPON AGAINST INTERNATIONAL TERRORISM

Obtaining information about the identity, goals, plans, and vulnerabilities of terrorists is extremly difficult. Yet, no other single policy effort is more important for preventing, preempting, and responding to attacks.

The Commission has identified significant obstacles to the collection and distribution of reliable information on terrorism to analysts and policymakers. These obstacles must be removed.

In addition, this information, often collected at great risk to agents and officers in the field, must be safeguarded. Leaks of intelligence and law enforcement information reduce its value, endanger sources, alienate friendly nations and inhibit their cooperation, and jeopardize the U.S. Government's ability to obtain further information.

"Nothing should be as favorably regarded as intelligence; nothing should be as generously rewarded as intelligence; nothing should be as confidential as the work of intelligence." Sun Tzu

ELIMINATE BARRIERS TO AGGRESSIVE COLLECTION OF INFORMATION ON TERRORISTS

Complex bureaucratic procedures now in place send an unmistakable message to Central Intelligence Agency (CIA) officers in the field that recruiting clandestine sources of terrorist information is encouraged in theory but discouraged in practice.

Inside information is the key to preventing attacks by terrorists. The CIA must aggressively recruit informants with unique access to terrorists plans. That sometimes requires recruiting those who have committed terrorist acts or related crimes, just as domestic law enforcement agencies routinely recruit criminal informants in order to pursue major criminal figures.

CIA has always had a process for assessing a potential informant's reliability, access, and value. However, the CIA issued new guidelines in 1995 in response to concern about alleged serious acts of violence by Agency sources. The guidelines set up complex procedures for seeking approval to recruit informants who may have been involved in human rights violations. In practice, these procedures have deterred and delayed vigorous efforts to recruit potentially useful informants. The CIA has created a climate that is overly risk averse. This has inhibited the recruitment of essential, if sometimes unsavory, terrorist informants and forced the United States to rely too heavily on foreign intelligence services. The adaption of the guidelines contributed to a marked decline in Agency morale unparalleled since the 1970s, and a significant number of case officers retired early or resigned.

Recruiting informants is not tantamount to condoning their prior crimes, nor does it imply support for crimes they may yet commit. The long-standing process in place before 1995 provided managers with adequate guidance to judge the risks of going forward with any particular recruitment.

Recommendations:

- The Director of Central Intelligence should make it clear to the Central Intelligence Agency that the aggressive recruitment of human intelligence sources on terrorism is one of the intelligence community's highest priorities.
- The Director of Central Intelligence should issue a directive that the 1995 guidelines will no longer apply to recruiting terrorist informants. That directive should notify officers in the field that the preexisting process of assessing such informants will apply.

The Federal Bureau of Investigation (FBI), which is responsible for investigating terrorism in the United States, also suffers from bureaucratic and cultural obstacles to obtaining terrorism information.

The World Trade Center bombers and the foreign nationals arrested before the millennium sought to inflict mass casualties on the American people. These incidents highlight the importance of ensuring that the FBI's investigations of international terrorism are as vigorous as the Constitution allows.

"The FBI has a right, indeed a duty, to keep itself informed with respect to the possible commission of crimes; it is not obliged to wear blinders until it may be too late for prevention."

The FBI's terrorism investgations are governed by two sets of Attorney General guidelines. The guidelines for Foreign Intelligence Collection and Foreign Counterintelligence Investigations (FI guidelines), which are classified, cover the FBI's investigations of international terrorism, defined as terrorism occurring outside the United States or transcending national boundaries. Domestic terrorism governed by the Attorney General guidelines on General Crimes, Racketeering Enterprise and Domestic Security/Terrorism Investigations (domestic guidelines). The domestic guidelines would apply, for example, to an investigation of a foreign terrorist group's activities in the United States if the FBI does not yet have information to make the international connection required for the FI guidelines.

Both guidelines set forth the standards that must be met before the FBI can open a preliminary inquiry or full investigation. The domestic guidelines authorize a preliminary inquiry where there is information or an allegation indicating possible criminal activity. A full investigation may be opened where there is a reasonable indication of a criminal violation, which is described as a standard "substantially lower than probable cause."

The domestic and FI guidelines provide the FBI with sufficient legal authority to conduct its investigations. In many situations, however, agents are unsure as to whether the circumstances of a particular case allow the authority to be invoked. This lack of clarity contributes to a risk-averse culture that causes some agents to refrain from taking prompt action against suspected terrorists.

In 1995, largely in response to the Oklahoma City bombing and indications that confusion was inhibiting investigations, the Department of Justice (DoJ) issued a memorandum to the FBI field offices attempting to clarify the circumstances that would merit opening a preliminary inquiry and full investigation under the domestic guidelines. Nonetheless, there is still considerable confusion among the FBI field

agents about the application of the guidelines. Neither the DoJ nor the FBI has attempted to clarify the FI guidelines for international terrorism investigations.

Recommendation:

- The Attorney General and the Director of the Federal Bureau of Investigation should develop guidance to clarify the application of both sets of guidelines. This guidance should specify what facts and circumstances merit the opening of a preliminary inquiry or full investigation and should direct agents in the field to investigate terrorist activity vigorously, using the full extent of their authority.

The Department of Justice applies the statute governing electronic surveillance and physical searches of international terrorists in a cumbersome and overly cautious manner.[1]

Pursuant to the Foreign Intelligence Surveillance Act (FISA), the FBI can obtain a court order for electronic surveillance and physical searches of foreign powers, including groups engaged in international terrorism, and agents of foreign powers.

Applications from the FBI for FISA orders are first approved by the Office of Intelligence Policy and Review (OIPR) in the Department of Justice before being presented to a judge of the FISA Court for approval. OIPR has not traditionally viewed its role as assisting the FBI to meet the standards for FISA applications in the same way that the Criminal Division of DoJ assists the FBI investigator to meet the standards for a wiretap. For instance, the Criminal Division works with the investigating agents to identify and develop ways to obtain the type of information needed to satisfy statutory requirements. OIPR has traditionally not been that proactive.

The Commission heard testimony that, under ordinary circumstances, the FISA process can be slow and burdensome, requiring information beyond the minimum required by the statute. For example, to obtain a FISA order, the statute requires only probable cause to believe that someone who is not a citizen or legal permanent resident of the United States is a member of an international terrorist organization. In practice, however, OIPR requires evidence of wrongdoing or specific knowledge of the group's terrorist intentions in addition to the person's membership in the organization before forwarding the application to the FISA Court. Also, OIPR does not generally consider the past activities of the surveillance target relevant in determining whether the FISA probable cause test is met.

During the period leading up to the millennium, the FISA application process was streamlined. Without lowering the FISA standards, applications were submitted to the FISA Court by DoJ promptly and with enough information to establish probable cause.

Recommendations:

- The Attorney General should direct that the Office of Intelligence Policy and Review not require information in excess of that actually mandated by the probable cause standard in the Foreign Intelligence Surveillance Act statute.
- To ensure timely review of the Foreign Intelligence Surveillance Act applications, the Attorney General should substantially expand the Office of Intelligence Policy and Review staff and direct it to cooperate with the Federal Bureau of Investigation.

The risk of personal liability arising from actions taken in an official capacity discourages low enforcement and intelligence personnel from taking bold actions to combat terrorism.

FBI special agents and CIA officers in the field should be encouraged to take reasonable risks to combat terrorism without fear of being sued individually for officially authorized activities, however, government representation is not always available to such agents and officers when they are sued. As a result, FBI special agents and CIA officers are buying personal liability insurance, which provides for private representation in such suits.

By recent statute, federal agencies must reimburse up to one half of the cost of personal liability insurance to law enforcement officers and managers or supervisors.

Recommendation:

- Congress should amend the statute to mandate full reimbursement if the costs of personal liability insurance for Federal Bureau of Investigation special agents

[1] Commissioner Kayyem did not concur with the content of this section.

and Central Intelligence Agency officers in the field who are combating terrorism.

The CHAIRMAN. Thank you. Let me begin quickly by saying I was in a couple of these conferences and groups with the former CIA Director. I agreed with him in that I had the same attraction to, as he knows, boost phase interceptors. And the reason is all the countries you have named, to the extent they may gain the capacity to launch an intercontinental ballistic missile against the United States, the likelihood of them doing it with a nuclear weapon is much lower because of the throw weight required than it is for the biological weapon.

And I don't know how—parenthetically, I don't want to get in this debate, I want to get off it—but I don't know how a test bed in Alaska has a damn thing to do with any of this, which I think is foolhardy. But at any rate, that's a different question. Let me go straight to the issue of what was learned from your exercise, gentlemen.

In terms of prioritizing, it seems to me that what we are going to have to do to do this intelligently, were we to run another exercise, were we to say to the same group that you assembled, and that wouldn't be a bad thing by the way, from my perspective, were we to assemble the same group, and say there's a different exercise; the exercise is we have *x* amount of dollars and we have the following threats.

We want you all to prioritize for us how we should spend those dollars. What is the most urgent threat? How much of the threat, Sam, in real terms, I don't know how you characterize it, but in real terms, is this threat of biological weapons attack or use of pathogens?

I mean, where does it rank in your mind as requiring our attention in relative terms? Leave missile defense out for a minute—I don't want to get into the middle of that. But give us a sense of how big a deal this is. How much do we have to worry about this?

My dad, God help him, he's 86 years old. And at the time I was a kid, I can remember him saying, "Joey, if everything is equally important to you, nothing is important to you. If everything is equally important, nothing is important."

Everything can't be equally important. Tell me about it. Talk to me about it. Talk to us about it. How important is dealing with your recommendations on this issue relative to, you know, moneys we are going to have to spend for a joint strike fighter; those kinds of practical decisions that you had to make when you sat here.

Senator NUNN. That's the toughest of all questions. And that's the reason we likewise lead us to sort out these priorities. But I would say that there needs to be a process by which this is done. And I think the process starts with the intelligence assessment.

I believe the intelligence community has to be charged with some sense of priority in terms of various threats, in terms of both likelihood and consequence. Because something is not likely to happen and yet the consequences are just so horrendous you can't even contemplate them has to be given some weight against something that is much more likely to happen but with less consequence.

There needs to be a process. This may be a time, Jim Woolsey and I have both lived through several B teams, may be the time

for an intelligence assessment with a B team of outsiders that basically would parallel it or follow it.

Missile defense would be part of this, and not just missile defense but also what parts of missile defense. Are we going to try to guard against the troops in the field? That's to me the highest priorities, the troops in the field. That's the most likely kind of attack with a ballistic missile.

That's a different counter system probably, although it could lead to a system with National Missile Defense. If terms of biological, as Jim Woolsey said, I think he said it well, the access of so many people, so many would-be perpetrators of this kind of horrible act to the materials is much higher.

The access is much higher because so many of them are in the mails. They are in laboratories all over. They are used for legitimate purposes. You can basically borrow these kinds of materials because of the commercial side of it. The information that is now on the Internet on how to both secure materials as well as make weapons, not just biological but also nuclear, that has gone way up.

The futility of many of our adversaries to believe they could really harm the United States in a conventional war has gone way up. And that frustration and futility has gone up. The knowledge that for instance I think we have to put this in the equation, the knowledge that if they did fire a missile at the United States, we know where it came from and they would be committing suicide. That has to be put into the equation whether it's a biological missile or whether it's a nuclear missile—versus the knowledge that they have a reasonable chance of getting away with it if they spray aerosol in three shopping centers with a smallpox vaccine. That's 2 or 3 weeks before we even know it happened.

If you are a perpetrator and you are not suicidal, what's your most likely course of action. For all those reasons, I put biological near the top of the list. I'm not sure whether it ought to be at the top of the list, but it's very close, if it's not.

The consequences are so horrendous, not just in terms of loss of life but loss of confidence, loss of confidence that an American people in that of their own government.

One of the most frustrating things, and Jim will attest to this, we had some of our most esteemed and wise members of the news media sat in on these exercises. And we were later having a news conference. Talk about unfairness, they sat in on the NSC meeting. And then I went out and faced them and they knew everything that we did. They knew as much as I did.

But the most frustrating thing I had to deal with this as President was the fact that I knew that I had to retain the credibility of the Federal Government. What we said had to be proven later. You ruin your credibility in this sort of horrible situation, you really would cause chaos. And yet I did not have any answers.

I couldn't tell how much material was out there. I couldn't tell where it came from. I couldn't tell from law enforcement whether we had a reasonable chance of apprehending the culprits. I couldn't tell whether they were launching other attacks simultaneously.

I had no way of knowing where the victims were. I had no way of isolating them. I had no way of basically telling people frankly that we were going to have enough vaccine. All of a sudden, one

of the things that played in here, Russia offered us a huge dose of vaccine to help about the second week of the attack.

Immediately on one hand we were saying wonderful. That's wonderful. On the other hand, we were saying is it safe. Can we test it? Do we have time to test it? Can we afford to go out there and put out this kind of vaccine in millions of people knowing not whether it might itself kill them.

All those things led me to the conclusion that I could not accurately describe with honesty to the American people what was happening. So I feared the loss of the credibility of the United States Government; not me as President, but of the whole Government. And that was the most frustrating part of this.

The CHAIRMAN. I have some very detailed questions for the scientists who will be coming up after you, and I am sure my colleagues are going to cover some of the areas that I would like to get into. But let me conclude by saying that our present intelligence director, CIA Director, indicates on a classified basis that this is a very, very high concern, that this is more probable, this kind of occurrence is more probable than most any other.

But I will get into that later. And I'm sure others will want to speak to some of these issues. I yield to my friend.

Senator HELMS. Thank you, Mr. Chairman. Let me make a proposition to you. You be Sam Jones sitting there having made the testimony you just made. And you are Sam Nunn, Senator, still in the Senate. What would you do as a result? What would you recommend to the Senate that we do specifically? What kind of legislation would you draw?

I have an idea, Senator, that a lot of people are frightened, and justly so. And I appreciate you doing it by what you have just said.

Senator NUNN. Chairman Helms, I think I would start with an inventory of what's being done. I don't have a good sense, I know we are spending more money than we were, and if you read some people are saying we are spending a higher rate on biological; it's growing faster than others; but it's from such a low baseline. I would try to see how we are spending the money now.

Because a lot of this is not being spent in my view in the most high priority areas. And the second thing is I think that the public health service has to be part of the national security team. And I think you may not do that by legislation. Maybe you do that by getting the head of HHS up here with the head of Department of Defense, with the head of the CIA and have a poll on people that show across the board. It's going to take a whole team.

You have to ask the public health service out there, what is it that would prevent you from dealing with this situation? Do you have enough surge capability in the medical system?

We are trying to get more efficient in the medical system. The more efficient we get, the less surge capability we are capable of handling. And the third thing I would look for every overlap between infectious disease and biological terrorism. Because we've got to make this a global issue. It can't just be the United States.

We have got to involve the World Health Organization. We've got to work with people around the globe. We've got to work with the Russians. They have the biological scientists that could make this.

We've got to find a way to get those people employed. All of those things relate to money more than they do specific law.

On the legal side, and particularly legislative changes, I think you have to contemplate emergencies and how you would isolate people. And look at your laws and see right now whether we can anticipate those kind of steps or whether we would be trampling all over everyone's civil liberties and have a huge cry while we are doing it.

Can we anticipate this and deal with it? As Joe Biden said, we had a huge problem on the *posse comitatus* contact to allow military to come in, in a nuclear emergency or biological and chemical emergency and deal with this. They do have that limited authority.

So there are certain safeguards you could put in place. Otherwise, when this happens people aren't going to be concerned about civil liberties that much. They are going to say whatever it takes, do it. And I think we'll lose a lot of control in that perspective.

That would be my higher priority, take an inventory of what we are doing now, look at the resources, see if they are being defended, and call some public health witnesses up here, some people who really are experts.

I know we have some on the panel coming. This is not something the Pentagon is accustomed to thinking about. One of the things that Jim will recall in the middle of our exercise, two or three people who served in the Department of Defense said, "I don't know how to think about this. We've never thought about this."

Senator HELMS. That's the point. We could just talk about it and we could scare the hell out of each other with testimony. And you have. And I thank you for doing it.

But Mr. Chairman, let's suggest a bipartisan approach, you and I, on behalf of the committee with the committee's approval as to how to proceed on this. Because I think that every day we delay we are running a bad risk in this country. Thank you, Senator.

Senator NUNN. Early detection is one of the early things, and to have the technology that would tell us what is this pathogen that's been released. Because if you don't know that, you don't have a chance of dealing with it; and training of doctors and nurses so they recognize it.

That right now is a new technique, not new, but it's called a symptom survey. So instead of waiting until a doctor comes to CDC and says I've got smallpox, you have got the pharmacists around the country alerted.

You have computer systems so that when they start seeing people come in for certain problems, whether it's a series of chronic headaches or whatever, that they don't recognize, that there's some reporting system, some early alert system about symptoms.

Senator HELMS. Maybe some of the pharmaceutical companies can make some recommendations about how to deal with some of these things.

Mr. Woolsey, let me ask you something. The January 2001 National Intelligence Council report on biological warfare threats said that there are 25 missile warheads with biological agents in Iraq alone, and they are unaccounted for.

Now, do we have any idea about the possible targets of these missiles, and is it possible for Iraq to develop similar warheads for longer range missiles?

Mr. WOOLSEY. I believe it is possible for them to develop warheads for longer range missiles, Mr. Chairman. It is both, in terms of weight and in terms of technology, rather simpler as the Chairman suggested than for nuclear weapons. I don't believe we know or have any samples of the biological agents that Saddam had produced——

Senator HELMS. That would be my next question.

Mr. WOOLSEY [continuing]. Or of any of the warheads. The Iraqis simply said these have been unilaterally destroyed, and UNSCOM was not able to get hold of any of these. So we are really rather crippled by the absence of UNSCOM, I think, from knowing a great deal more about the Iraqi program than we do today.

And of course one great fear is that if Russian scientists were working with the Iraqis, some of these biological agents that are in the hands of Iraq, and could conceivably through Iraq be given to bin Laden or other terrorist groups, may be genetically modified so that standard vaccines and antibiotics would not operate against them.

I mentioned earlier we know that the Russians genetically modified anthrax. And so if that were used and we don't know exactly how it was genetically modified, we conceivably could have lots of vaccinated servicemen and women in the Mideast or vaccinated people in the United States who would be no better off if they were subjected to an attack from that type of genetically modified anthrax.

Senator HELMS. Thank you, Mr. Chairman.

The CHAIRMAN. Gentlemen, for the record, we will be spending $182 million on bioterrorism preparedness, a $1 million increase. So we all have a number, it's $77 million for state and local preparedness; $52 million for a national pharmaceutical stockpile; $22 million for an upgrade capacity at CDC; and $18 million for continued evaluation of the anthrax vaccine.

We are going to spend $94 million with the World Health Organization; $344 million for DOD and $8.3 billion for additional moneys for national missile defense.

According to the Hart-Rudman Commission, biological weapons are the most likely choice of means for disaffected states or groups in the 21st century. That may or may not be right but this is what the assessment in the allocations is so far in dollars.

Senator HELMS. May I say, is that enough?

Senator NUNN. Well, I don't think it's anywhere near enough. I'm not sure how we pay for all of it but somebody's got to increase the hospital capacity. Somebody's got to train the doctors and nurses to recognize this.

Somebody's got to do the research and development. Problem is the government is the only one on how you recognize these pathogens very quickly. Someone has to try to figure out a way to hire the Russians who might otherwise end up in Iraq making these weapons. There's a lot to be done. I don't think this is enough.

The CHAIRMAN. Thank you.

The Senator from California.

Senator BOXER. Thank you so much, Mr. Chairman, for holding this hearing. I fully agree with Senator Helms that this has been a wake-up call. I want to thank both of our wonderful panelists for their contribution.

I want to say that, Senator Nunn, I thought your testimony is so clear. I particularly feel on page 3 where you just come right down to it as you tried to deal with this in this mock exercise you found out certain things: One, we had not produced sufficient vaccine; we had not prepared top officials to cope with this new type of security threat; we had not invested adequately in the planning and exercises necessary for coordinated response.

We had not ensured the public health infrastructure was adequate, and so on. We had not educated the American people to it. We had not practiced what few plans were in place. We had not ranked bioterrorism or infectious diseases as high national priorities, which is of course is what Senator Biden's message is to us.

So I think that you lay out here for us a road map to the deficiencies that need to be fixed. And I support the call for a bipartisan approach to this, Mr. Chairman, and our ranking member.

In my remaining couple of minutes, I wanted to talk about infectious diseases because I can't stay because of a conflict for the next panel. Because whether you get the disease through an act of terrorism or it happens because it's just naturally occurring, it confronts both. And that's why I'm glad you do have the second panel.

But I wanted to take this opportunity to talk about a particular threat that Senator Gordon Smith and I have been working on in a bipartisan way. MDR TB which is the multidrug resistant tuberculosis, far more difficult and hundreds of times more expensive to treat than the standard TB and even in the United States kills half of its victims.

It cost New York City a billion dollars to quell an epidemic of this multidrug resistant TB in the early 1990s, Mr. Chairman. TB is invisible. It's transmitted through the air. If untreated, it disables and then kills a person.

Someone with active MDR TB in a developing country is estimated to infect ten to fifteen others in a year. TB rates have skyrocketed in regions with high AIDS burdens such as sub-Sahara in Africa.

In regions like Russia where the incidence of MDR TB is so high, as HIV rates also increase, their risk of an uncontrollable global epidemic is very real.

So what I wanted to take advantage, if you will, in close of this opportunity, Mr. Chairman, to call to the committee's attention that because of your help and Senator Helms' help last year Senator Smith and I worked and we got triple the funding for TB programs. We got that funding up to $60 million.

It is still if I might say, too small a sum. And this year we are looking at an increase up to $200 million. And I mention that because this is a situation where the best way to treat this, if you will, is called D-O-T-S, DOTS, directly observed treatment short course.

So that is expensive and has to be done. And I wanted to tell my friends on this committee on both sides of the aisle that Gordon

Smith and I will be talking to you about this because we are very concerned.

Two questions, have you looked at this problem with TB in what you did and also, Senator Nunn, when you say the most important thing for us to do is to have a review, which I think we should do, would you then say that we should then move to go to your points where you just say we were not prepared, we did not do this, to change the reality.

Because even though the funds might be there, as the chairman pointed out we are expending dollars, it seems to me on my sense out there we have a lot to do.

Senator NUNN. Senator Boxer, we did not get into any other diseases other than this hypothetical with smallpox. But each one would be different. I would only make the point again that whatever we do to improve the public health system to deal with any kind of infectious disease, we also help ourselves with biological terrorism and vice versa and particularly surge capability, early recognition, training of medical personnel; and in the case of bioweapons certainly vaccine and new methods of treatment.

Senator BOXER. And what about that second question? In other words, after the review would you be willing to put yourself out there a little further? If the review shows that we are spending an adequate fund or maybe we need to spend a little more but getting to your—you are dealing with an exercise where you are coming in pretty strongly and saying we were just not ready. So it seems to me even if we have the money there's not a mindset there.

Senator NUNN. That's right. There's a thin line here. You have to think real seriously as Senator Helms alluded to, do you cause people to panic? Do you cause despair? Or do you basically point out problems?

I don't know any other way to deal in a democracy like ours where thousands and thousands of people have to make decisions, particularly in public health, to be able to bring these things to their attention without getting vivid about it and talking in realistic terms. This is a democracy and that's the way we act. But what you don't want to do is cause despair.

Senator BOXER. Right. Thank you.

The CHAIRMAN. Thank you very much.

Senator Lugar.

Senator LUGAR. Thank you very much, Mr. Chairman. I want to join your comments and those of Senator Nunn about our colleague Senator Helms. I appreciate the friendship you expressed and the way in which this committee has been able to move with the two of you as chairmen during this Congress.

Let me just say I despair with the fact that Sam Nunn is not here as a Senator because I miss him as a partner. But fortunately he is active around the world and with the Nuclear Threat Initiative.

Ten years ago a bipartisan group of Senators met for breakfast, Ash Carter, who had come from Harvard, and Bill Perry from Stanford, began to help us fashion what became the Nunn-Lugar bill and the Cooperative Threat Reduction program. We've been working on this effort for 10 years, haltingly at first because the people did not really see how we could be effective with Russia.

But in due course we have seen increasingly effective. And at this point 5,600 nuclear warheads have been separated from missiles. There are still many left, and there is still much work to do.

Chemical weapons, the second part has not moved as quickly. And we still have work to do with our colleagues in the House Representatives this year to destroy really the first pound of the 40,000 metric tons of chemical weapons they have stored in seven depots in Russia.

But there has been progress, and we should get a program going. The Russian Duma now has also appropriated funds for this purpose. So we must get started.

In the biological arena, it was not until November 1998 that Sam Nunn and Carl Levin and I were invited to meet with thirteen Biopreparat laboratory directors who had been working on the former Soviet biological weapons program, under the auspices of the International Science Technology Center (ISTC).

At this meeting these directors revealed a lot to us. And later Sam and I were able to go in November 1998 to Obelinsk which to my knowledge is the first time Members of Congress entered one of these former biological weapons facilities.

We visited an eight-story building at the Obelinsk complex. The third story held the facility's strain library, and it had anthrax in it. The laboratory director told me they had many different strains of anthrax. I viewed anthrax under a microscope. And I wouldn't know what I was looking at but nevertheless that's as close as I want to get to that dangerous pathogen.

Now, that visit was the first step in the process of opening the facility to the outside world. Obelinsk today is having seminars for scientists around the world. They have brochures of the peaceful work they are working on and the guests they have invited into this place. But at the time that we visited, the security had a little bit of barbed wire and one guard. The first hour of our discussion was on how the United States could secure the facility and safeguard the deadly pathogens.

In the last couple of years it has been my privilege to also visit Pokrov and just a week ago Kazan. Now these are so-called agricultural facilities. And ostensibly the purpose of these are dual use.

They work on vaccines that can help protect livestock herds, and that was the reported Russian's purpose as they gave it to us. But you could turn the facilities around and use them to develop weapons to eliminate somebody else's herds.

They had gone as far as Africa for exotic pathogens. And when I asked why, they assumed that we had done that and were prepared to poison their cattle or to go after them.

These facilities have large stocks of pathogens. They store it in iceboxes that they have shown to us. Now, the reason we got into the iceboxes or into Pokrov or Kazan was essentially because of the Nunn-Lugar program. We have inserted ourselves into these facilities. And it's been to the extent of it that Russian military and civilian people thought they needed help that they got us in there.

The problem is that ISTC has identified tens of thousands of Russian scientists who may have been involved in these weapons programs. The United States provides maybe 50 or 60 percent of the money. There is also an international component.

These scientists trade e-mail with laboratories in the United States as well as elsewhere around the world. It's sort of a hearts and minds project in many ways. But there are prospects they will expand their work with us.

Now, why, because the dangers for Russians are profound from all of this. In Pokrov there is a bunker. It's a bunker because they feared, according to their authorities, nuclear attack. Whatever was happening there they felt was significant enough that they would be targeted by the United States of America. And there are stores there of whatever they produced there.

The desperation of the situation is seen all around, disheveled buildings that are falling down. Electricity is sometimes questionable, as well as the sanctity of the infrastructure of these facilities. And yet, at Polrov, the facility's right on top of the bunker occupied by a commercial firm called Green Mama Shampoo where shampoo is being produced in the same vehicles that could be used for the anthrax or for the other purpose.

Because they are desperate for the money. They are renting it out to all comers. This is a situation which cries out for activity.

The Nunn-Lugar program has been most successful in establishing some ties with these people.

Now, Nunn-Lugar is not the solution to our whole problem. But if you look at it in terms of addressing these threats at their source whether it's nuclear, chemical, biological, the best avenue is still a relationship with Russians who have similar views as our own. And I would just say at the highest levels they do.

Now, there's a dispute in Russia. We did not get it in this trip I just described into one place that I thought that I'd been promised by a Russian general because some of the military people still are resistant to seeing Americans entering these facilities. And there are some laboratories still receiving orders to keep producing more while the scientists are producing less and looking for peaceful jobs and looking out for their own financial security.

But it's a fertile ground to at least try to understand who has done what and where it is.

Now, all of the work that Nunn-Lugar has been doing is only a $17 million project. This doesn't denigrate any of these efforts, and I am a strong proponent of the Nunn-Lugar program as most of you are. I also believe the Nunn-Lugar-Domenici program, which has helped 120 cities in America understand what might hit them if something does and assisting first responders with training and table top exercises with policemen and sheriffs, hospital staff. So if our cities are attacked with biological weapons we can respond effectively.

These efforts are tremendously important to avert panic and have credibility. But I just plead for a continued bipartisan quest on this. It is not going to work if these issues are politicized. But we all need to try to think through this by utilizing our country's best minds to determine what needs to be done and how we can enlist Russians.

I just conclude by saying I suggested to Vice President Gore, when they had the Gore-Chernomyrdin meetings, that we seriously consider having some of our pharmaceutical companies or chemical companies purchase these laboratories, actually incorporate them

with the scientists and all of the techniques and whatever else they have in the vaults.

This is not a farfetched suggestion. But one reason it has not been appealing to the companies that I've talked to is just simply the general business conditions in Russia. The fact that they, really their legal system cannot support the contracts that would be required, property rights, the rest of it.

So in a way we are hung up by the facts of real life in terms of commerce even while we are talking about the deadliness of these threats. But it's to be seen what we can do down the trail.

It could very well be that we will come together in a commercial sense long before we come together in a security one because of the desires of these scientists, the assets they have.

So I appreciate this hearing very much, Mr. Chairman. It's a profound subject upon which we can visit for days, because we are just scratching the surface of something that's terribly important. I think that responsible people can make a difference and are doing so really in this area, and I congratulate both Sam and Jim for wonderful testimony.

Senator NUNN. Thank you very much. Mr. Chairman, if I could just throw out a gratuitous thought here in response to Senator Lugar's comments which I agree with and subscribe to 100 percent. Front page story of *New York Times* yesterday and *Washington Post* in the last 2 or 3 days about the United States taking defensive steps to be able to guard against an attack by creating some offensive possibly what may be interpreted as offensive weapons.

First of all, it's a tricky field the line between offense and defense. It's extremely difficult. And I do think we need to do some defensive things. So you have to know what you are going to be possibly hit by.

But radical thoughts, some might call creative, some might call radical. We know we can't deal with biological threat. Those of us who have been to Russia know you can't deal with it without the cooperation of Russia.

They have got the scientists. They have got the know-how. They probably know more about it than we do. They've developed the weapons.

We also know that these scientists are in demand. We also know they don't have jobs. And we also know it's going to be hard to do it commercially, although we need to try.

If we are going to do this kind of biological defensive work that some might suspect is offensive in other parts of the world, I think erroneously so, but nevertheless they might, and if they were doing it, we might, why not engage the Russians? Why not have President Bush say to President Putin, let's put some of our biological teams together and let's determine what you know and what we know. And let's work together to develop defenses. And let's employ your scientists while we are doing it.

And then if that works, we could add allies and we could possibly even add China at some point. We've got to understand this is international and we are not going to solve it ourselves. And we've got to engage the Russians. And they know more about it than we do.

Some of the very experiments we are trying to conduct I suspect, although I have not been briefed on this and I have not been provided except what I've read in the news reports—some of these pathogens we are trying to develop the Russians probably already have.

So radical thought but I would hope that your bipartisan-type approach you might pose this and think about it. Because there to me is a real need here that we could turn it into a real opportunity.

The CHAIRMAN. Senator, let me say and be just transparent about this, one of the reasons why I wanted to do this series of hearings after consulting with my colleagues on both sides of the aisle was that absent an awareness of the extent of the danger, there is the ability to continue to indulge ourselves on both sides of the aisle in our ideological folly and remain unwilling to cooperate, unwilling to deal with the Russians or deciding that we are going to focus only on one thing.

The second thing is that I hope what will flow from this, and we have five of these hearings scheduled, and I want to thank you for your advice. In the interest of full disclosure, I had asked you, front end, unrelated to this hearing, how, if you were doing this, would you approach this whole series of hearings. There's a need for transparency here.

One of the things that worries me the most, and I realize I'm a broken record on it—I apologize to my colleagues for this intervention—is that the unintended message that we are arguably sending to the rest of the world about our leadership in containing the spread of weapons of mass destruction is at best right now mixed.

You can make very strong arguments against the ABM Treaty. You can make very strong arguments against the Biological Weapons Treaty. You can make very strong arguments against the Chemical Weapons Treaty. And they are all legitimate arguments.

But the culmination and the accumulated effect worldwide of us focusing only on that part of the equation which we have been of late, I think, is frightening. Because I think what it does is send messages to other countries that say now our only alternative is to move in the direction that's counter intuitive and against our interest and their interest.

I think one of the reasons for this series of hearings is hopefully people like both of you and others will come up with some far reaching ideas and notions and maybe even some of us that we can begin to change the atmospherics here. But they have got to be changed rapidly.

The idea that we are only spending several million dollars or tens of millions of dollars on the Nunn-Lugar initiatives to me is mindless, absolutely mindless. And initially there was a cut in what we were going to spend in this area. A cut.

Hopefully this will generate enough interest, take it out of the totally political realm. The fact that the chairman is suggesting that we do this in a bipartisan way we may be able to get some traction here. At least that's the hope. But anyway, no more editorial comment. I yield to my friend from Florida.

Senator NELSON. I'm going to defer to my colleague from West Virginia, but let me just say, your radical suggestion, Senator

Nunn, is common sense. This is why we are here. I yield to the gentleman.

The CHAIRMAN. Senator Rockefeller.

Senator ROCKEFELLER. Thank you, Mr. Chairman. I thought that, Senator Nunn, your statement that they don't go after where they think you are strong but they go after where they think you are weak is a point. And in fact I think that it's nonclassified material from the intelligence organization sees at this point that there is a likelihood of chemical and biological attacks by the year 2015 some think 2010.

I don't think it's in other words in the realm of we can't talk about it, which leads me to my second point which you also have made. And that is in a democracy you can have your leadership, you can have your Senate Foreign Relations Committee, Intelligence Committee, whatever, you can have them working on this. You can have people trying to come up with public policy.

But until you have engaged the American people in as you call it the thin line between what is a reality of what we are facing as opposed to the problems of panic, I would tend to come down on the side of the former, that in a democracy where you fail to inform people of something which is likely to happen within a relatively short period of time is an enormous failure of leadership in and of itself.

Which leads me to a couple of thoughts, and then your responses from both of you. There's been a lot of talk about Russia, and for good reason. But it was also true that when Aum Shinrikyo did their number back in 1995, 1996, whichever it was, they ended up using sarin. But it was not because they wanted to. They wanted to do biological, but they couldn't do it.

That was 6 years ago. I don't know whether they could today. You know the Japanese Government went in and took out some of their stuff and they couldn't blow sarin from high and all that they wanted to do. But what they really wanted to do was biological.

Japan is the most ordered society in the world. That's the opposite of everything we've been saying about Russia. Everything what we haven't been saying about what goes on when you have people that feel that they have nothing to lose in life, that the prospects of their future don't exist. They become desperate. The whole sort of little cells, the massive need for intelligence gathering that boggles the mind in and of itself, probably human intelligence.

How do you possibly do that? But that you could have that in the most ordered society in the entire world and have them fail to do it, what they really wanted to do. What they did was bad enough but what they wanted to do they couldn't do. But that was a long time ago.

So what would happen? The question I would pose to you, and I also can't stay for the second panel which grieves me because public health and the way we train doctors is an area of great interest of mine—the way we don't train doctors is an area of great interest of mine.

We don't do geriatrics in half of our medical schools. We don't do compassionate care the last 6 months in half of our medical schools. You talk about preparing people to do this. I mean, you are really talking about a medical revolution in terms of their syllabus,

one which I'm not sure they are prepared to take at this point; one, because they don't know that this is out there.

I mean those who testified will, but that gets into the whole sort of leadership of it, and at this point or other elitist leadership; relatively small group. Seems to me the problem or the challenge is to get it out there to make it an attractive enough this lugubrious approach but to make it attractive enough so that it becomes either the subject of sitcoms or the subject of specials.

It becomes the subject of speeches by all of us as a matter of public duty. When our constituents look at us and say what in heavens name are you talking about. When we are trying to get card of H-bill through the West Virginia eastern mountains to Washington, DC when you are talking about this stuff. Well, it may be that we not only have to do that but you also have to set up what you did on a 50 state basis.

So there are 50 presidents. So they find out how they are not prepared. Now they are all strapped for cash. In my state all the cash that exists is going to flooding, and flooding in comparison to the consequences of all this in West Virginia would seem to me to be relatively small.

I think that my people have, as do yours, the people have perfectly good sense to understand that if presented with this potential, and it's more than that, probability of this happening.

The concept of somehow engaging the American process, the public health process, the medical association of American medical schools, the state governments in the same kind of scenario that you went through so that local press as well as the national press—which is loathe to cover things other than scandals—seems to me to be a terribly important part.

We really don't have the time. One of the questions I want to ask you is how do you motivate people to create vaccines for needs which don't yet exist but will? Some you have said let's work with the Russians, and I agree with all of that.

But it seems to me that gauging the American people in the probability of this happening and what it means to them and what has to happen all the way from public health to rural health clinics to National Guard and all the rest of it really strikes me as the most important thing we can do at this time. I would be interested in both your comments.

Senator NUNN. I believe that public information is absolutely essential, and I think that we have to engage the health community. I agree with you completely. I think it has to be done by state by state and local community by local community.

CSIS is thinking of ways now; John Hamre is not here today, but he was one of the real leaders in this, and I'm sure Tara O'Toole and the others are willing to work on this to take this war game on the road with some modifications and let others at the state level play this war game. Because it does bring home not only the need for planning but the need for coordination in advance.

There's no question about that. On Aum Shinrikyo, when I was chairman of the Department of Investigations, we did 2 years of work on that and sent people to Japan. One of the things that is still a challenge is that we have great relationship with the Japa-

nese military and with the foreign policy team in Japan, but we don't have very much communication with their police force.

The police force knew about Aum Shinrikyo. Their intelligence and military people, if they knew, didn't tell us.

Here you have a huge organization, something like a billion dollars in assets, having conducted experiments against sheep in Australia, on land in Australia, having sent people to Africa to try to pick up the Ebola virus so they could use it; they had helicopters in compounds; they had already carried out chemical attacks in other parts of Tokyo; they had an office in New York City trying to get U.S. technology.

All of that was going on. We had I don't know how many thousand members of the Russian—and it had never, ever come to the attention of our CIA or our FBI. You would think that would be almost impossible, but it happened. And in a country as you observed that would be the least likely for it to have happened.

So we really got to focus on these things more. I think we are in a new security environment but we haven't gotten rid of some of the old security environment. We can't get rid of them. Some of the challenges are still there. So we are straddling in between.

But we really have to focus more on these items. And it's a different kind of definition of security now than it was when I came to the United States Senate.

Mr. WOOLSEY. I agree with Sam Nunn's answer substantially, Senator Rockefeller. I think that your comparison between Russia and Japan makes the main point. If something like Aum could happen in Japan, it's so much more likely that you are going to have leakage from these Russian laboratories to, let's say, Mideast terrorist groups or to Government of Iraq than would have occurred in this very ordered Japanese society.

That states the essence of the problem. I certainly also agree that trying to get the Russians involved in offensive and defensive cooperative work to my mind is an excellent suggestion; and it illustrates a difference, if I may say so, between this biological threat and a lot of other areas that we are used to dealing with.

Just as a lot of the things that people do wrong in their lives are not necessarily susceptible to legislation, not everything that goes wrong in international affairs is susceptible to verifiable arms control agreements.

I've been an advisor, delegate or ambassador and chief negotiator five times in negotiations with the Soviet Union and other countries on arms control during the cold war. But I've got to say I think this biological weapons issue and the verification of it is an extraordinarily difficult matter.

It may make more sense to focus our effort on things like what Senator Nunn suggested in working with the Russians than on trying to split the hairs of how we could have some type of effective verification for something that can be carried around in trucks by Saddam's guards. So I very much agree with the thrust of your comments and also Senator Nunn's answer.

The CHAIRMAN. Thank you.

Senator NELSON. Mr. Chairman, I'm ready to go to work. I'm sufficiently in the crisis mode as a result of what's been said here, and I guess this was brought home to me a couple weeks ago when I

got on the airplane to go to Johannesburg and all of a sudden the flight attendants were walking up and down the aisle with spray cans.

That hasn't happened to me in a long time on a closed airplane. It brought home some of the things that you have suggested. So let's start with something that we could try to do right now about this.

The administration has requested $182 million for bioterrorism preparedness and another $94 million for the contribution of our country to the World Health Organization.

What would you all recommend that that be boosted to? And then, Mr. Chairman, let's talk about how we go about getting that into the appropriations bill.

Mr. WOOLSEY. Senator Nelson, I am not real up to speed on exactly what the funds are being used for, but I want to stress one thing; there are some very important things to do that don't take much money. Changing the CIA guidelines that I described would help us be able to penetrate the terrorist groups better; having a hard look at the FBI guidelines; passing a statute which bans possession, not only transmittal of some of these biological agents; establishing relationships with industry in this country and overseas, so that you learn whenever someone orders a fermentor of a particular type or something is ordered to go to a destination that is new and different. What you really want to do is enlist the marketing and sales people of companies that deal in some of these types of equipment as friendly colleagues of the United States Government, so when they get a strange order they call up and say, "you know, this one just doesn't seem quite right to me." And then someone can look into it.

There are a number of steps like that that need to be taken that don't cost a lot. Some of them cost a bit, added people, but if you are looking at major programs and increases for major programs, I can't think of any area that's more important than the area that Senator Nunn and Senator Lugar pioneered and which came out of this colloquy earlier about dealing with Russian science.

Russia is a democracy. It's a troubled democracy; but, so far at least, it's on this side of the line. It has an elected Duma; it has an elected President, and it has the mother of all cold war arsenals for weapons of mass destruction.

Everything in one way or another has been generated in its laboratories. Of course people like the North Koreans pick it up and pass it on, and the Chinese, and so on. But Russia is the font of most of the technology that we are worried about.

One needs, as was said in a different context some years ago, to go to the source. One needs to start working as closely as possible with President Putin and the Russian Government and spend the money to do it in a lot of these areas of cooperation—keeping the Russian scientists and Russian technology out of the channels which they might otherwise tend toward, be it via organized crime or otherwise, to supply to Iraq, to North Korea, to Iran and the like.

To my mind that ought to be the focus of where the new money goes. But that's off the top of my head. I have not made a thorough study of this.

Senator NUNN. I would agree with Jim Woolsey on that, Senator Nelson. I would also add that I think the next panel will probably have thought more about budgetary aspects than this panel.

But I do believe that one thing that's probably not a Federal Government budget but I think government could encourage it. When we had Three Mile Island in this country, the nuclear industry came together and formed a group to do peer reviews on nothing but safety.

They themselves took the initiative, not government money. When Chernoble happened, they formed a similar organization in Moscow that is worldwide on the nuclear side, peer review safety.

To my knowledge there's no such thing in the pharmaceutical community around the globe. Now I'm sure that the initial reaction would be to the pharmaceutical industry probably we don't want it, don't need it, so forth, so on. But I'm talking about a voluntary association.

The first time we have a biological attack, people are going to be demanding that government solve it. It would seem to me that our friends in the pharmaceutical industry would be wise to have their own organization now that deals with safety and peer review and standards and best practices to deal with these pathogens. Because there's not that now.

It's hit and miss. So that's one area that doesn't necessarily require government money. On the government money side, I think public health. I think infectious disease problem is here.

My experts tell me that for 20 years infectious disease rates went down in the United States. The last 15 years they have gone up 2, 3, 4 percent a year. I'm not sure of the statistics.

We've got this problem even beyond biological terrorism. I think surge capability in hospitals, as we move toward more efficiency in hospitals without any excess beds where we can avoid it, and that makes sense economically, somebody has got to step in and say we need surge capability.

The government's probably going to have to pay for it to deal with this kind of emergency or other kinds of emergencies. That's another probably big budget item.

We already are doing research on vaccines. We certainly need to accelerate in every way possible the vaccine supply, the smallpox vaccine supply as well as others. We need to make sure we have the kind of stockpile that would allow us to deal with emergency. And only the government can do that.

There are a whole list of things here that I think only the government can do. We need much better training, public health and doctors and nurses and people in drugstores so that when they see symptoms recurring, they report them. We need a communication capability in this country to begin with so that we have somebody who collects this data, knows when something goes wrong. Then we need to plug it into the World Health Organization to make sure WHO is doing their job around the globe and helping with resources where they are not.

We need to get other countries involved. All of those things to me are on the must list.

Mr. WOOLSEY. Senator, also could I mention one more point that I think is quite relevant here. A relatively low cost but very impor-

tant thing to do is to get clear all of the legal authorities that the Federal, state and local governments have so this is readily accessible to people.

Who can close airports? Who can do what with respect to quarantines and the like? Because the problem here is when things get out of hand—and they did in "Dark Winter," you had this feeling that the country was panicking.

In spite of everything President Nunn could do with his ineffective advisors such as the Director of Central Intelligence, nonetheless——

Senator NUNN. Let's face it. We were failures.

Mr. WOOLSEY [continuing]. We were in bad shape. When people panic they do really bad things. My favorite illustration of this is what was probably the principal action by the Federal Government in the 20th century that in retrospect was the greatest infringement on civil liberties of Americans—the incarceration of the Nissei, the Japanese Americans, in 1942.

Three people who were very heavily responsible for that were Franklin Delano Roosevelt, Earl Warren, then Attorney General of California running for Governor, and Hugo Black, who wrote the decision that upheld it. Those were probably the three greatest names in supporting civil liberties in the 20th century in America.

Even people who are strong supporters of civil liberties, when they get scared, can do some really bad things. If in advance we can get clear what the legal authorities are, who can act, when they can act, what added authority they need, the Constitution is flexible enough to permit people, the President and others, to have extraordinary powers in extraordinary circumstances.

But it needs to be thought through ahead of time. If you let it get to the point where people panic, even good people can do some really terrible things.

Senator NELSON. Mr. Chairman, following up to Senator Nunn's comments about the pharmaceutical companies, I was quite intrigued to hear Senator Lugar talk about the possibility of developing some kind of incentive program for American pharmaceutical companies and working with our counterparts in Russia.

As we continue to deliberate on this, I would like to pick up on Senator Lugar's comments. And let's examine that as well.

The CHAIRMAN. Thank you. Gentlemen, we have a thousand questions for you. Let me just ask you a generic point, ask for your help. I'd like to be able to—we'd like to be able to seek advice from you as to who on the team that did "Dark Winter" can give us some really nuts and bolts recommendations, for example, or outlining in detail the problems for example on legal authority.

You know, if you can tell us who we can talk to, we can avoid dropping all this on each of you. I am going to seek to have the administration come and testify on this issue and others at the culmination of these hearings. Because quite frankly all that we talked about, there needs to be leadership from the top here. I'm not laying this on the administration. I'm not making that case.

But somewhere along the line, the Secretary of Defense, the Secretary of State, the National Security Advisor, the President of the United States have to get a sense of and state the sense of there's

a lot of urgency that exists here, and what they think should be done.

We, Senator Lugar and I, I think they expected it from me and they were shocked at Senator Lugar—how exercised he became—when administration witnesses were here and we looked at the Nunn-Lugar figures in the budget. They didn't pay much attention to me but they paid very close attention to Senator Lugar very quickly.

But there are numbers that we can put in here, without a whole lot of additional thought, that cost a lot of money but that we know from past experience are needed now.

We also know that there are needed changes as you say, Jim, on guidelines. For example I introduced a bill last year, I don't want to turn this into who did what, but just to give you an idea like *posse comitatus* debates, we found people we never thought were going to be our major, you know, opposition.

We have a black helicopter crowd suddenly emerge. Well, I introduced a bill, I'm not joking. That was literally true. I introduced a bill last year on pathogen control. And right now, I mean, I thought it was a slam dunk.

I've been the chairman of the Judiciary Committee for years. I introduced it, thought I'd get a hearing. Why wouldn't I get a hearing? I've been here 28 years. I know this stuff pretty well.

Every major criminal justice piece of legislation I've either authored or co-authored for the last 15 years. Didn't get a hearing. The only law on the books deals with the development of possession of toxin agents for, quote, use as weapons, end quote. That's all.

So, I just had a little bill to amend the Federal Criminal Code to make it unlawful to possess these biological agents, toxins or delivery systems, handling such items in a manner that would grossly deviate from accepted norms and knowing that communicating false information, trying to get for example these various companies to say, hey, look, we've got these funny calls, these salesmen saying I've got twelve calls from someplace in the middle of wherever and all of sudden, nothing happened.

It's a little bit like that, I mean, all it did was create a maximum penalty of 10 years. It wasn't like this was rocket science, no pun intended. So I think, and that's why I came around to this whole thing. I just warn everybody in the press and everybody in the Congress, this committee is going to spend a lot of time talking about this and similar issues. Because it seems there's nowhere else to raise the profile of good citizens and experts like all of you who are out there doing these exercises and trying to get public awareness. It seems to me we've got to get awareness here.

We've got to get awareness downtown. We've got to get awareness up here. Democrats and Republicans, by the way. This has nothing to do with partisanship.

And so I'm going to be spending a lot of time because I can learn a lot, I'm not being solicitous, from Senator Lugar as to what it is that we should be trying to put in to the appropriation bills that deal with what we know.

What we know right now are big holes that don't require new thinking, just require funding. And we are going to be having, God

willing, the creek not rising, the administration willing to come up here and have the Secretary of Defense, I realize, Sam, you can't have the Secretary Defenses come before the Foreign Relations Committee, but he's going to come. We are going to ask him to come. There's going to be an embarrassing situation if he dosen't come.

Senator NUNN. It wouldn't bother him as much now as it might have years ago.

The CHAIRMAN. And I'm willing to do these jointly with the Armed Service Committee. But the bottom line is you have continued to perform a great public service, both of you. And I will, from time to time, more than you might want, be contacting you fellows. And I'm sure, and we are going to try to do this jointly, so we don't make repetitive requests of you as to figure out how to just get this up on the agenda.

Everybody knows it's there. It's like everything else in public life. Until there's a crisis, until something terrible happens—I don't know whether it's conscious avoidance or subconscious avoidance—but we just don't focus on it. And I think we are sending a message to the rest of the world that all of a sudden this nation that has been the leader for three decades, Democrat and Republican Presidents, in dealing with nonproliferation, dealing with all these issues; we seem to, I think unintendedly, I think it's unintended, we seem to have walked away.

I mean the perception, I don't know about you, Senator Lugar, and you guys travel all over the world. I'm going to tell you, every place I go from my recent trip to the Far East to Europe, first question that I get from my counterparts, allies and adversaries alike is, "What's going on?" What's going on.

And I think the perception matters. Because it amazes me as you both know how every other nation in the world thinks we don't do anything by accident. They think everything we do is calculated and thought out. They think we are capable of things we don't think we are capable of.

And they ascribe motivations to what we are doing that I think exceed what is intended, but they become self-fulfilling. So anyway. Do you have any comments?

Senator LUGAR. Just a short comment of support, Mr. Chairman. I appreciate your having this hearing and the ones you are going to have. In defense partially of the administration, my impression again and again is that they are still engaged in planning.

The quadrennial review or large strategic planning and therefore have not been prepared to visit with us and answer our questions. But I would certainly work with you to encourage them to do that. Because I found this anecdotally, and I mention this because the Russians have much the same problem.

I was invited by Secretary Rumsfeld, and I appreciated this, to the luncheon for the Russian group discussing missile defense, led by General Baluyevsky. We laid out the national missile defense architecture and our view of the world and threats facing our country.

And the Russians took this in. And they took this in again when Secretary Rumsfeld and Mr. Bolton visited Moscow. This was the third round consultations. And they are prepared to do more.

But at the same time when I saw General Baluyevsky in Moscow and I saw General Dvorkin, who's retired but is well-known to all of you, they said they are waiting to know how many nuclear warheads we are prepared to destroy. And this is an interesting issue at least for them, because they want to reduce their nuclear weapons very substantially.

It means a lot more Nunn-Lugar activities and expenses, because the cost of going from 6,000 warheads to 1,500 is huge. And it's not just pushing pencils over paper and strategic thinking. This gets to the nitty-gritty efforts to physically remove warheads from missiles, disassembling the missiles, storing the material, keeping it safe from whomever, and all the rest of this.

But the Russians are prepared to talk about that. Now, our country is not prepared for these discussions at this point. Our Department of Defense will report on this issue later this year.

So I would just say that in due course during this fall we will be debating these issues, and this will be of immense interest to the Senate as well as to the Russians. And I would just say finally, General Dvorkin in a moment of candor after a long dinner was even prepared to analyze the ABM Treaty and how you do boost phased intercepts within the ABM Treaty.

Now this is a much more extensive proposal than I have heard in the past. I don't know if it's possible. But the fact that General Dvorkin who is advising Marshall Sergeyev who is advising Putin, despite the fact that Marshall Sergeyev is no longer head of defense, he's at the ear of the leader about this whole business.

It is interesting that Russia has done this degree of analysis, a good bit more than we have in this committee or maybe even in our Department of Defense has been doing. So I find this to be encouraging that there are people to talk to here and there.

I appreciate an opportunity for one more interlude with this, Mr. Chairman. Your leadership in calling this together is much appreciated.

The CHAIRMAN. Well, as Director Woolsey may remember, I appeared before a group of which he's a member and indicated that I had been the contact with the Russians and I thought they were interested in boost phase and they would actually entertain it if we were serious. And the irony is here we are now beginning the negotiation that is contingent upon, agreed it is, contingent upon reduction of offensive forces as well as eliminating or amending the ABM and we don't have a number yet.

And we are now saying, unless they come up with an agreement quickly, we are going to maybe have to act unilaterally. I just caution a little patience here, a little patience.

The Senator is correct. The review is on the way. I have not been publicly critical of this administration, because I think it's overwhelmingly difficult for them to try to assess where they are and what they should do and what need be done.

What I am critical of is assertions made with such definitiveness about what they are going to do before they have done their assessment. And so I just caution a little patience here, a little patience.

We shouldn't be discarding or amending a doctrine that's worked relatively well for us unless we know a little bit about what we are going to put in its place. So we should just tone this down just a

little bit. But anyway, you guys didn't need to hear that editorial comment, and I hope you'll continue to not only editorialize but recommend to us what you think we should be doing.

We need help. We need help. And I think it's the time for calm, cool, collected surveillance of what's out there and a decision on how to approach it and the bipartisan attempt to deal with it. And I can think of no two better guys. And, Sam, thanks for your overall help on this. I warn you I'll be back on this. I need a lot more. Thank you both.

Mr. WOOLSEY. Thank you.

Senator NUNN. Thank you, Mr. Chairman, Senator Lugar, for your continued excellent leadership on behalf of our Nation and the world. Both of you have been stalwarts for a long, long time. Mr. Lugar is a relative newcomer but he has been here a few years.

Mr. WOOLSEY. I completely second all that except the business about the newcomer.

The CHAIRMAN. Well, thank you both.

We now have the distinguished expert panel. A second panel will discuss the strengthening of the domestic and international capability to prevent and defend against intentional and natural disease outbreaks.

Our group of witnesses today include some of the foremost experts in bioterrorism, the threat of infectious disease and homeland defense.

Dr. D.A. Henderson, director of the Center for Civilian Biodefense Studies at Johns Hopkins University, led the World Health Organization campaign in the 1970s to achieve the virtual eradication of naturally occurring smallpox.

For that, Dr. Henderson deserves the heartfelt thanks of the entire world for stopping one of humanity's greatest scourges. Today he is focusing his energies on the growing threat of bioterrorism and what we as a Nation can do to respond to that threat.

Dr. Fred Iklé, a distinguished scholar at the Center for Strategic and International Studies, is a former Under Secretary of Defense for Policy under President Reagan. He has also served as Director of the Arms Control and Disarmament Agency.

Dr. Iklé can and will discuss with the committee the challenge of the homeland defense as they relate to tackling the threat of biological terrorism.

Dr. David L. Heymann is the Executive Director for Communicable Diseases in the World Health Organization and can share with the committee comments on how the international community can better mobilize the prevention and containment of natural epidemics and infectious diseases. I'm sure Dr. Heymann will note that the strategies that work against naturally occurring outbreaks can also work against manmade epidemics.

And our final witness will be Dr. Frank Cilluffo, a senior policy analyst with the Center for Strategic and International Studies, who authored a very impressive report last year on combating nuclear and chemical and biological terrorism. The quality of our witnesses today should ensure a lively discussion on what steps the United States should take in concert with the international community to combat the threat of bioterrorism and the natural spread of infectious diseases.

Before we begin, allow me to make part of the hearing record the statement of the Pan American Health Organization on the threat posed right here in our own hemisphere by emerging infectious diseases, including cholera and the bubonic plague. This statement also lays out the strategies needed for greater hemispheric cooperation.

[The statement referred to follows:]

PREPARED STATEMENT OF THE PAN AMERICAN HEALTH ORGANIZATION

The Pan American Health Organization (PAHO) would like to thank the members of the United States Senate for allowing the Organization to submit a statement today on emerging and reemerging infectious diseases surveillance and control.

The Pan American Health Organization is the oldest continuously operating health agency in the world. It was founded in Washington, D.C. in 1902. It has 35 Member States from the Americas, three Participating Governments, and one Associate Member Government. The United States is an original founder. PAHO cooperates with Member States, individually and collectively, in designing and implementing measures to improve the health of their populations.

We would like to provide you with information about the present capacity of countries in this Region to prevent and control disease outbreaks and of strategies and activities in place for improvement.

The ability to detect risks and diseases, and access and respond to data is an essential public health function for establishing a line of defense and response to infectious diseases. An effective public health infrastructure is required. For health systems in the Region, especially in developing countries, with difficulties in implementing routine and sentinel disease surveillance, the challenge of detecting and responding to the emergence of new organisms, disease outbreaks, and anti-microbial resistance is substantial.

The tremendous advance in communications technology is playing an increasingly important role. Many more people are aware of disease outbreaks occurring all around the world. The variety of sources of information increases the potential for distortion of the situation and the misunderstanding of risks.

The globalization of infectious diseases is not a new phenomenon. However, increased population movements, whether through tourism or migration, or as a result of disasters, growth in international trade of food and biologicals, social and environmental changes linked with urbanization, deforestation and alterations in climate, and changes in methods of food processing, distribution and consumer habits have made infectious disease events in one country a potential concern for the entire world.

In the Americas, an adult pulmonary distress syndrome and its etiological agent, the *Sin nombre* virus, later recognized as a hantavirus, provoked an outbreak in the State of New Mexico, United States, which attracted great media attention. Other hantaviruses causing disease and death have been identified in the Southern Cone. These events are widely known to the public. However, other such threats remain ignored. Since 1993, mass media outlets have provided the public all over the world with information on new and old threats of disease: Ebola virus in Africa and plague in India have dominated the news for several weeks. By comparison, a cholera epidemic in the Americas during that same year—some three years after cholera was introduced to the Americas following an absence of a century—received little attention. Likewise, the press reported little on outbreaks of bubonic plague that have affected Peru since 1992. In fact, the latter epidemic remained ignored by the media as late as 1995, by which time there were already 2,000 cases with 90 deaths. In the 1980s, *Aedes aegypti,* the mosquito vector of dengue, returned with a vengeance and was responsible for an epidemic in Cuba that caused thousands of cases of dengue and hundreds of deaths from dengue hemorrhagic fever. Since then, over 2 million cases of dengue have been reported in the region, with countries such as El Salvador and Ecuador in 2000 and Venezuela in 2001 declaring national states of emergency.

Other significant emerging and reemerging conditions include Lyme disease, diarrhea caused by cryptosporidia, and illness caused by *Escherichia coli* O157:H7 in the United States; yellow fever in Brazil; drug-resistant *Plasmodium falciparum* malaria in areas of the Amazon, and wide-spread antibiotic resistance in several species of bacteria.

Epidemics become urgent events of national and international public health importance as the result of a combination of factors, including insufficient national ca-

pacity to recognize disease events in a timely manner, to deploy trained personnel to investigate and confirm suspected reports, to identify the causal pathogen in the laboratory, and to contain the spread of the disease. Hence, the absence of correct information, misinformation and inconsistency in the information available to the public and other national governments result in overreaction to media coverage and subsequent internal pressure on governments to respond. Moreover, fear of costly repercussions if disease events are notified has hindered the opportunity for collaboration in addressing emergency situations efficiently.

Health sector reform and the political and administrative decentralization that accompanies it are under way in most countries of the Americas and is affecting the response capacity of countries. This process profoundly alters the management, organization, provision and financing of the health services, redefining the functions of the central, regional and local governments for both individual and collective health care. This transition has exposed capacity weaknesses in regulatory and policy issues, and the quality control of services. It has also revealed management deficiencies at central and provincial levels and resulted in the non-replacement of aging physical infrastructure, including laboratories and information/communication systems.

Countries have recognized the need for creating early warning and rapid response systems for acute communicable diseases of high epidemic potential. However, multiple factors of political, technical, and financial nature have resulted in limited progress in countries' capacity to detect, investigate, diagnose, and control those diseases. The repeated occurrence of outbreaks or epidemics caused by a multiplicity of agents poses new challenges to the health services in the majority of the countries.

A core of technical competencies is needed for epidemic alert and response at country level, which in turn strengthen regional and global surveillance mechanisms. The Pan American Health Organization is promoting a three-pronged approach to deal with the health threats of emerging infectious diseases: emerging disease/syndrome surveillance; outbreak detection and response; and antimicrobial resistance surveillance and prevention. Strengthening of public health laboratory infrastructure will provide support to this approach.

The strategies adopted foster horizontal cooperation and coordination, especially among countries in the same subregion. Three subregional networks for surveillance of emerging and reemerging infectious diseases have been established, one in the Amazon region, one in the Southern Cone and another in Central America (including the Dominican Republic and Haiti). These are subregional initiatives, which have been sponsored by the Organization in collaboration with the United States Centers for Disease Control and Prevention (CDC). A fourth network specifically for the surveillance of anti-microbial resistance is also operational.

At country level PAHO has proposed a strategy geared to strengthening national, provincial and local institutions responsible for infectious diseases surveillance, and response policy and practice. Fulfillment of this essential public health function requires in-country coordination among various services and health institutions responsible for epidemiology, laboratory, medical care, quality control of water, food safety, disaster preparedness, human resources training, health information and social communication.

Countries are being stimulated and supported by PAHO and partner agencies to assess the current capacity of their public health services for surveillance and response to epidemic situations and to prepare and implement national plans of action to improve the performance of national public health systems to detect, investigate, confirm, intervene and disseminate information.

The above mentioned assessments will serve as review of each country's vulnerability to the occurrence of epidemics caused by the emerging and reemerging diseases, identifying areas and populations at risk and determining the strengths and weaknesses for surveillance, prevention and control. This will lead to plans that address these identified deficiencies in the infrastructure of the clinical, epidemiological and laboratory services in terms of: a) norms and procedures (regulations and guidelines); b) administrative management; c) coordination and communication; d) training; and e) technology (information, diagnostic equipment and supplies).

As part of our work, the International Health Regulations (IHR), the legal framework for global surveillance and response, is being revised and updated, in accordance with the World Health Assembly (WHA) resolution of 1995, so it will be more applicable to the epidemiology of communicable diseases and the scale of international traffic and trade in the 21st century, and go further to prevent the international concern and uncertainty which has occurred during the epidemics of cholera, yellow fever, plague, dengue hemorrhagic fever and avian flu. The new IHR will contain functional and effective templates for national surveillance as well as re-

sponse processes for international disease threats and the harmonization of control measures. The IHR builds on the inexorable link between national and global surveillance for diseases. The WHA was fully aware that the strengthening of epidemiological and laboratory surveillance and of disease control activities at national level (i.e., where diseases occur) is the main defense against the international spread of communicable disease.

In confronting infectious diseases we must not fail to recognize that diseases formerly under control are reemerging because of complacency—dengue is one example—and a revival of others has been triggered by the collapse of public health systems because of economic and social crises. When we add the potential for disease occurrence from such factors as ecological change, climate events such as the El Niño Southern Oscillation, natural disasters such as Hurricanes Mitch and Georges, and the increased flow of refugees and displaced persons, the resurgence and emergence of infectious diseases is indeed a threat to us all. Only with a concerted, serious regional and global effort can we continue to build the structures we need to identify, prevent and control these threats and work together to build a safer world in the 21st century.

The CHAIRMAN. Now in the order of protocol, and because he's probably testified before this committee more than anyone on the panel, the order should be Dr. Iklé, Dr. Henderson, Dr. Heymann and then Mr. Cilluffo.

Dr. Iklé.

STATEMENT OF DR. FRED C. IKLÉ, DISTINGUISHED SCHOLAR, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES, WASHINGTON, DC

Dr. IKLÉ. Thank you. Mr. Chairman, I can be very brief for two reasons. It's late in the hour but more importantly the previous testimony has made all the points I agree with. I think there's so much value in there that I can totally support what has been said by Senator Nunn and Jim Woolsey. So I will mention just a few selected points from my short opening statement which has been submitted for the record.

One point, the difference between biological weapons and nuclear weapons in this context. First, we know much more about the nuclear weapons effects than we know about the effects of biological weapons. Some of us remember the thick handbooks on nuclear weapons effects that were put out by the U.S. Government. Scientifically these effects are easier to predict. It's more precise. And there were many, many tests on nuclear weapon effects in the 1950s.

And also, second, once a nuclear detonation has started, there's nothing you can do to escape the deadly energy that escapes from a detonation unless you are far away or deep underground. By contrast, as we discussed in the previous testimony, after the biological attack has started, there's a great deal you can do, if you are prepared for it, to mitigate the disaster.

Moreover—another distinction—it is easier to detect nuclear weapons than biological ones, both in the manufacturing process and development, and importantly if they should be smuggled. We have good equipment, not enough of it but good equipment, to detect smuggled nuclear weapons. It's almost impossible to do that for biological agents.

Now let me shift to what can be done. A few points, and again I support what has been said before, so I can be brief. We must not expect much from arms control but we must not trash every arms control treaty in this connection. I have argued against what

I consider a deeply mistaken attempt to make a Biological Weapons Convention verifiable with the so-called Protocol, which the administration has now said that the United States would not proceed on.

But I am prepared to argue the value, the limited value, of the two treatises that do prohibit biological warfare. The 1925 treaty which is one of the best arms control treatises, only half a page long—the Geneva protocol that prohibits biological warfare as well as prevents gas warfare. And then the 1972 treaty, the Biological Weapons Convention.

I took that treaty to the—I submitted that treaty on behalf of the Ford administration in 1974 to this committee, then chaired by Senator Fulbright. The committee debated about it for 2 minutes. And I did mention that it was not verifiable, but recommended without qualification that it would be a useful treaty to have. I still feel that is the correct point to make.

The other need is remedial measures. Many have been discussed and the ideas are around; but action on it has been hesitant. I think we should realize (a hint has been made to this effect) that not much will happen till we have experienced a disaster of this kind, that our country and our society has to take this in two stages.

We try to do what we can do now, but we surely must be prepared that if something happens and we have the shock and then the willpower, and also the experience what ought to have been done before, to do more after the first, hopefully not so large attack. We must be ready to surge ahead immediately, prepared to pick up on the things we knew we should be doing; but for some reason couldn't get the budget, couldn't get the will power, or couldn't get the organization to do it.

So now if I talk to people in government on this issue I recommend a two-stage approach. Do what you can put together now, but in particular work on the surge capability so you have taken care of the long lead items and you can then respond at a time when obviously public anxiety would be much greater but probably also the danger would be greater because the fire break has been crossed.

The last point I will make is on the question of legal authority, *posse comitatus,* etc. I have a small piece of good news; CSIS had a study going, and an excellent lawyer has worked on this. That senior lawyer happens to have now a very senior position in the administration. I'm trying to get the publication finished in the next few weeks. Given that it's the thinking that is represented in the administration and will be made public, I think it will have an impact.

I think it will once and for all dispose of this phony problem of *posse comitatus* and related legal restrictions. The legal powers that the U.S. Government has under the Constitution are sufficient to cope with all the emergencies that have been discussed. So we'll have the publication to you as soon as possible.

Senator Biden, you had to step out.

The CHAIRMAN. I apologize.

Dr. IKLÉ. One piece of good news, we had the publication prepared by senior competent lawyers on the legal authority. And the

punchline is there's enough legal authority existing under the Constitution to cope with all these situations. The *posse comitatus* question is a phony argument.

[The prepared statement of Dr. Iklé follows:]

PREPARED STATEMENT OF HON. FRED C. IKLÉ

COPING WITH THE THREAT OF BIOLOGICAL ATTACKS

Mr. Chairman, thank you for the opportunity to testify before your committee. The previous witnesses have reminded us of the horrible suffering, deaths, and disease that might be inflicted with biological weapons. I will address how the United States should cope with this threat, and I will focus on the danger of such attacks on the territory of the United States, rather than on U.S. forces deployed overseas. The threat to our military forces that are deployed overseas is a vital concern for the Defense Department, and it has received more attention than the risk of biological attack somewhere within U.S. territory.

During the last ten years a great many studies about biological attacks have been produced, Congressional committees have held hearings, and increased funding has been provided to cope with this risk. Also, the Clinton administration has taken some organizational steps. Doubtless, the present administration will seek to advance our preparedness further.

First, let me start with the problem of anticipating the effects of biological attacks—the medicinal, psychological and social effects. Exercises, like the one on which you were briefed this morning, warn us of the horror and social chaos that might result from such an attack. The difficulties of predicting these effects are greater than for nuclear weapons. In the 1950s, our government published thick handbooks on the effects of nuclear weapons, based on extensive tests and scientific calculations. A nuclear detonation is a physical event of brute force with many predictable consequences. The dispersal of biological agents that might spread illness or death among a population is much less predictable, in terms of the area into which effective doses of the agent would spread, as well as in terms of the actual medical effects. And very few scientific tests have been conducted that shed much light on these gruesome possibilities.

Second, how can we know the capabilities for such attacks in potentially hostile hands, can they be discovered by our intelligence community? We have learned from the United Nations inspection effort in Iraq how difficult and unreliable the knowledge is likely to be about hostile bio-capabilities in a tightly controlled dictatorship. And that UN inspection effort initially benefited from an unusual degree of access within Iraq. No international inspection effort in North Korea was ever given that much access. Furthermore, in the future, our intelligence assessments will probably face growing uncertainties regarding new agents that could be bio-engineered to cause even greater havoc than natural agents, such as anthrax or smallpox.

Third, what can be done to avert or to cope with this awesome danger? Basically, our government has four types of tools: intelligence, the threat of retaliation to deter, diplomacy (including arms control), and remedial measures to mitigate the impact.

(A) *Intelligence* is, of course, critical, to intercept an attack that's in progress and to render it harmless. It helps if the enemy makes mistakes, by giving us advance warning or by stumbling in the attempted execution of the attack. And some good luck helps us, too, as was the case with the terrorist high explosive attacks that had been planned to hit the celebrations for the new millennium, January 1, 2000.

(B) *Deterrence* cannot work, unless the perpetrators fear that our intelligence capabilities might succeed in identifying them, at least after the attack, if not before. An unknown perpetrator cannot easily be destroyed. Also, if our intelligence leaves too much room for doubt as to the ultimately responsible perpetrators, and if the tentatively accused are not easy to reach, such uncertainties might dissuade us from trying to retaliate. We all have heard much speculation about Osama bin Laden who allegedly was responsible in recent years for nearly every foreign terrorist act against U.S. interests. According to the last public reports, he is still alive and well somewhere in Afghanistan.

(C) The usefulness of *additional arms control measures* is even more uncertain than the success of deterrence. I say "additional" arms control because two treaties are in force that ban biological warfare—the 1925 Geneva Protocol and the Biological Weapons Convention of 1972. The latter treaty, as you know, also prohibits the development and stockpiling of such weapons. Both treaties have been violated repeatedly, always with total impunity. There has been no enforcement of these trea-

ties, none at all, and the so-called "Protocol" to the Biological Weapons Convention (that the previous administration supported) would have made matters worse. It was prudent for the Bush administration to withdraw support for this misconstrued enterprise.

(D) That leaves the fourth type of measures—*the remedial measures*—steps that can usefully be taken after a biological attack has occurred. Obviously, to count on remedial measures, our federal government has to set up an effective organization beforehand and must prepare effective tools. The State and Federal public health authorities, the hospitals, fire departments, and police, can't be asked to fight a biological weapons attack with their bare hands. Increased funding is needed for work on vaccines that could routinely and safely be administered to the whole population (like the smallpox vaccinations of the past) and for other medical counter measures that could help contain the disaster after an attack had begun.

Let us take note of a significant difference here between nuclear and biological weapons. Once a nuclear detonation has been started within a bomb, there is nothing that can protect people from the immense energy that will instantly escape, except being at a safe distance or in a deep underground shelter. But biological agents, once they have been released, might be vulnerable to sun light and other factors, might be kept out of buildings by special air-conditioning filters or over-pressure systems, be sufficiently diluted by simple face masks, and finally be made less harmful (or even harmless) by medical interventions.

To close, I want to make an organizational recommendation that is of utmost importance. We need to recognize a spectrum of possibilities regarding biological threats, from domestic terrorism, terrorist acts in the United States by a foreign organization, and attacks within the United States in time of war by enemy powers. Until now, U.S. military planning has been based on the implicit assumption that U.S. territory would remain a sanctuary (except in a large-scale nuclear war). Hence, the Defense Department has stayed on the sidelines. While the Justice Department with the FBI are correctly designated as the lead agency for terrorism, DOD will have to prepare to take the lead to defend U.S. territory against biological attacks in a warlike situation.[1]

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[1] To address this issue, the Center for International and Strategic Studies has published the report: *Defending the U.S. Homeland, Strategic and Legal Issues for DOD and the Armed Services* (1999).

The CHAIRMAN. Thank you very much.

Dr. Henderson, thank you for being here.

STATEMENT OF DONALD A. HENDERSON, MD, MPH, DIRECTOR, CENTER FOR CIVILIAN BIODEFENSE STUDIES, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD

Dr. HENDERSON. Thank you very much. In all, I spent 11 years in eradicating smallpox and have some feel for the disease. I can say that the scenario in "Dark Winter" which some have suggested may have exaggerated the risk, is based on a rather conservative set of estimates that were provided and a conservative set of assumptions—that, indeed, the tragedy of "Dark Winter" could be every bit as bad as depicted and in fact far worse.

There are of course other organisms which we are concerned about, anthrax, plague, many others. There is certainly a likelihood of biological terrorism or use of biological weapons now that is different from what we were experiencing not 10 years ago or what we were concerned about when I was in the White House as advisor to the President. We perceived it very differently then.

What I think is not appreciated at this time is that the 21st century, as we move into it, is a quite different era with regard to biology and our concern about the threat of microorganisms.

Fifty years ago the science of nuclear physics dominated. Now I think everyone would agree that this is the era of biology, with a great deal of research going on, with enormous promise for treat-

ment and prevention; but at the same time we are experiencing potentially some of the greatest international security threats that we have ever known.

This is not yet understood. We are only beginning to get some comprehension of this.

The fact is that the threat of new and emergent epidemics is very real. Let us recall that AIDS was discovered only 20 years ago. It is devastating Africa. It is a real threat globally of a magnitude we have not experienced in a very long time.

In 1918 we had the swine-flu epidemic which killed somewhere between 20 and 40 million people. The death rate for that flu was approximately one to two percent. Just in the last few years we have dealt twice with a strain of flu in Hong Kong called H5 and N1 in which there were six deaths among the 18 infected—a death rate of 33 percent and understandably a tremendous concern on the part of all of us that this might spread beyond the bounds of Hong Kong.

Drastic measures were taken to try to control it. We will see many more new diseases, as this past year we have seen foot and mouth disease.

But there's another problem which is also complicated. With the advancements that we have seen in biology, scientists are doing many different things with many different organisms than they have done before. And they are able to do it with a facility that we had not appreciated before.

Only within the past month the Imperial College in London was fined 50,000 pounds for combining hepatitis C virus genes with those of Ebola virus and working with the product without any particular protection.

There are other activities of this sort going on in many places. Why? Because in the course of trying to understand the pathogenesis of organisms—for example, how they infect—many experiments that are done for good, scientific reasons have a potential dark side. At this time we have no mechanisms in place for looking at this and monitoring it. We wonder what would happen if an organism escapes. That certainly is a real problem.

Senator Nunn has indicated very clearly where we are at this point in time. Our Center is now some 3 years old. We've have been working diligently, looking at a lot of problems. It's quite clear that the weakest points in our system are: No. 1, the public health system which is greatly understaffed, very weak, very unprepared (and the $77 million being provided by the Federal government averages a little more than a million dollars a state—it isn't even a respectable Band-Aid, I'm sorry to say); and No. 2, our hospitals have very little flexibility. One can't appreciate how little flexibility until you realize that in Baltimore our hospitals are on ambulance bypass regularly now. It's doubled this past year. The year before it doubled again. And that is occurring——

The CHAIRMAN. For the record, Doctor, explain what ambulance bypass means.

Dr. HENDERSON [continuing]. It means that the hospital is full up. It cannot take any more patients, and if you have an emergency patient, you will need to bypass the hospital and go somewhere else.

The CHAIRMAN. In my little state of Delaware, in our largest city, not a week has gone by that at least one major hospital has not been on ambulance bypass; in some weeks, all the major hospitals were on bypass at the same time.

Dr. HENDERSON. This is not generally understood by the public, nor is there a plan to address this. We also looked at the question of dealing with casualties in the city of Baltimore when we had the recent problem with the tunnel, and pretty much concluded that 75 acute patient casualties would overwhelm the capacity of the city of Baltimore, so short are we of beds and facilities.

This is true across the country. So these are two major areas where we are not in a position to even cope with casualties should they occur. To rectify this will require a major input of resources. Senator Nunn has also spoken eloquently of the need to put money into research and development. Certainly this is true.

If we have new organisms that appear, we want to be prepared immediately to move quickly to develop vaccines and/or antibiotics. We are not now prepared to move quickly.

In fact right now we are using an influenza vaccine production method that is 30 years old. If we get a new strain today, it would take us 9 months before we could produce a new vaccine. By that time the epidemic would be over. We've got a lot of work to do.

Clearly the important thing is to identify new disease threats as quickly as possible. The global surveillance system obviously would make a great difference if we could make that much better. Efforts are now being made and Dr. Heymann has certainly played an important role. There are elements in our own government who are contributing to it. Again, though, very little is yet being done compared to what needs to be done.

It's going to be very difficult from everything we've looked at to determine how we can deal with biologic weapons. They are not nuclear. They are not chemical.

That which we learned from dealing with nuclear weapons seems to have little if any applicability with regard to controlling the biological weapons. For production, for example, the technology is dual use, so that one cannot monitor specialized production equipment. You can't see production facilities from the air. Monitoring is a real problem.

One thing that we feel is important is a strong moral commitment on the part of the science community to condemn anyone and any laboratory involved in offensive weapons development. We are exploring with the American Medical Association and the World Medical Association what can be done in terms of a very strong official statement. Is it going to be effective? Nothing is going to be 100 percent effective, but it is a step.

The bottom line is that we are in a new era dealing with biologic threats of a very different character than we have dealt with in my 40 years in public health. We are not prepared for this. We haven't really thought about it very carefully.

As we've looked at bioterrorism, it illuminates the problems we have with the new and emerging infections, the problems we are going to face with scientists using different organisms as recombinants. In that sense the bioterrorism threat is helpful but we

really have to take it very seriously. And we have not done so as yet. Thank you.

[The prepared statement of Dr. Henderson follows:]

PREPARED STATEMENT OF DONALD HENDERSON, MD, MPH

Mr. Chairman, distinguished Members of the Committee, thank you for the opportunity to appear before you today to discuss the realities of the threat posed by biological weapons, our capabilities to secure an early warning of an attack, our potential for response and, finally, measures that might be taken nationally and internationally to lessen the probability of an attack.

It is generally agreed that the 21st century brings with it a new era in the biological sciences with advances in molecular biology and biotechnology that promise longer, healthier lives and the effective control, perhaps elimination of a host of acute and chronic diseases. The prospects are bright but there is a dark side—the possibility that infectious agents might be developed and produced as offensive weapons; that new or emergent infections, like HIV/AIDS, might overwhelm available preventive and therapeutic measures or that laboratory scientists, perhaps inadvertently, might create and release a new and lethal agent. These concerns are as relevant to Europe, to Africa, to Asia as they are to America, In today's world of rapid travel and large migrant populations, epidemic disease, wherever it occurs and of whatever origin, threatens the security of all nations. We are, today, ill-prepared to deal with these challenges.

Throughout the 45 years of my professional career, my principal concern has been the control of infectious diseases both in the United States and abroad. My experience has included 20 years with the Centers for Disease Control, including assignments as Chief of Surveillance and Chief of the Epidemic Intelligence Serve; 11 years with WHO as Director of the Smallpox Eradication Program; and 16 years as Chairman of the Pan-American Health Organization's Technical Advisory Group which counseled PAHO experts on the design and development of the polio eradication program. Enormous strides in epidemic disease control have been made over the past quarter century and more is promised. Four years ago, however, it became apparent to me that these accomplishments and more were jeopardized by the growing threat of biological weapons as well as by new and emergent infections. This led to our founding three years ago of the Hopkins Center for Civilian Biodefense Studies. Our energies are directed ultimately toward preventing biological disasters that potentially could become global in scope, such as epidemic smallpox could readily be and which AIDS is rapidly becoming.

The Threat from Biological Weapons

Nothing in the realm of natural catastrophes or man-made disasters rivals the complex problems of response that would follow a bioweapons attack against a civilian population. The consequence of such an attack would be an epidemic and, in this country, we have had little experience in coping with epidemics. In fact, no city has had to deal with a truly serious epidemic accompanied by large numbers of cases and deaths since the 1918 influenza epidemic, more than two generations ago.

Senators Hart and Rudman, chairs of the United States Commission on National Security in the Twenty-first Century, singled out bioweapons as perhaps the greatest threat that the U.S. might face in the next century. Admiral Stansfield Turner pointed out that, besides nuclear weapons, the only other weapons with the capacity to take the nation past the "point of non-recovery" are the biological ones.

The *Dark Winter* scenario dramatizes the catastrophic potential of smallpox as a weapon. It is, of course, not the only possible organism that might be used. In 1993, the Office of Technology Assessment estimated that 100 grams of anthrax released upwind of a large American city—the model being Washington, DC—could cause between 130,000 and 3 million deaths, depending on the weather and other variables. This degree of carnage is in the same range as that forecast for a hydrogen bomb. Although there is legitimate concern as well about the possible use of chemical weapons, they are far less effective pound for pound and extremely difficult to deploy over large areas. Ten grams of anthrax can produce as many casualties as a ton of a chemical nerve agent.

The insidious manner by which a biological attack would unfold is itself alarming. The fact of an attack using an explosive or chemical weapon would be recognized immediately and resources summoned quickly to deal with the consequences and to begin to remediate the situation. A biological agent would, in all probability, be released clandestinely as an aerosol spray, odorless and invisible, which would drift slowly throughout a building or across a city. Not until days to weeks later would people begin to fall ill; new cases would continue to occur over a period of one to

several weeks. Some of those exposed, in all likelihood, would be hundreds of miles away when they develop symptoms—in other cities, in other countries. Thus, the consequence of the attack would extend well beyond the immediate area of release.

Biological weapons have not been used since WWII but this is not because of concern that they might not work. The U.S. program was abandoned in 1969 not for technical but for political reasons. As Gradon Carter has pointed out, the utility of bioweapons had been demonstrated by all possible means short of war. By the 1960s, the U.S. knew how to grow and process many microorganisms in a form usable for mass casualty biological weapons. Trials that modeled dispersion of simulant agents as aerosols were conducted in many cities and scores of tests with live biological agents using animals as targets were performed at the Johnson Atoll from 1963 to 1969. There is now no doubt and there was then no doubt, of the capacity of these weapons to cause widespread casualties. A World Health Organization (WHO) analysis, now 30 years old, supported the belief that biological weapons are strategic, population-destroying weapons. Since then, the technology needed to create and disperse these weapons has advanced significantly.

The year 1972 was a significant one in the history of bioweapons. That year, the Biological Weapons Convention was agreed upon, calling for all signatory countries to cease research on biological weapons and to destroy existing stocks. The Soviet Union and Iraq were both parties to the Convention. The Soviet Union, however, began immediately to greatly expand and modernize its existing biological weapons program and to develop genetically engineered pathogens and other organisms that could serve as strategic weapons. A new organization was created called Biopreparat. Ostensibly a civilian operation, it recruited some of the most capable of Russian biologists. At its peak, it employed over 30,000 persons. There was also a military program of at least 15,000 people and an agricultural program making crop pathogens that employed 10,000 people. The overall complement of staff was equivalent in size to that of its nuclear program. Biopreparat's agenda included the manipulation of viruses and micro-organisms to render them capable of surviving delivery on missile warheads; the development of particularly virulent strains of organisms that are resistant to vaccines and antibiotics; the creation of peptides that could alter moods and heart biorhythms; and the manufacture of tons of anthrax, as well as smallpox virus and antibiotic-resistant strains of plague.

Although the Soviet program was of prodigious size and sophistication, the infrastructure that is actually necessary to make a biological weapon is, in fact, comparatively simple and inexpensive, especially compared to that required to make a nuclear weapon. To make one kilogram of plutonium requires 100 tons of uranium ore; a substantial quantity of specialized equipment; and an enormous facility readily visible from the air. A biological weapon can be produced with the same equipment one uses to produce an ordinary vaccine; it can be readily housed in a building the size of a two-car garage; nothing on the exterior would identify its use. Moreover, the room and the equipment could be sufficiently cleansed within 24 hours so that no one, on inspection, would be able to determine whether it had been used to make vaccines or biological weapons.

The intelligence agencies have estimated that at least a dozen states possess or are actively seeking an offensive biological weapons capacity. Most of these states are those named by the State Department as sponsors of terrorism. Expertise for operating these facilities is readily available from now poorly funded laboratories of the Russian biological weapons complex. For these countries, biological weapons have a special appeal. They are inexpensive, they occupy little volume, they are readily transportable from place to place and they are capable of being disseminated covertly so that attribution may be impossible.

It is also important to appreciate that the technologies needed to build biological weapons are available in the open literature and on the Internet. This is not knowledge that is limited to a few hundred scientists isolated in a laboratory in the western desert. There are many scientists who have this knowledge and are capable of putting together a biological weapon. Some have argued that preparing a biological weapon is complicated and have been mistakenly reassured by the failure of Aum Shinrikyo's efforts to aerosolize anthrax throughout Tokyo. In fact, although the sect did include some with experience in microbiology, those who actually worked on the project were not well-trained microbiologists. Nonetheless, they came very close to succeeding.

Implications of Advances in Biotechnology

A key reason for being concerned about biological weapons is the remarkable progress now being made in biotechnology and genomics research. Bioscience is moving at a much faster pace than did physics in the 1950s, partly because of computers and the more ready accessibility of knowledge, and partly because of the

money that is being invested by large corporations in the biological sciences. In 1998, the U.S. biotechnology industry employed 150,000 people and had a market capitalization of $97 billion with product sales of $13.4 billion. Last April, the Harvard Business Review predicted that the ability to manipulate the genetic codes of living things will dwarf the business transformation propelled by the Internet. Indeed, it is generally acknowledged that the life sciences will be the most important technology of this century.

But, as the understanding of molecular biology increases and as we develop the ability to manipulate cellular processes, we are also creating the tools and knowledge for building more powerful and more diverse weapons. When we discover why a particular virus or bacteria is especially virulent or why it has become resistant to antibiotics, we create an opening for building a new drug or a new vaccine. At the same time, we facilitate the creation of tools needed to build more virulent weapons.

The Effects of a Biological Weapons Attack

The consequences of a biological weapon attack would be an epidemic, most likely following an unannounced attack. In all probability, we would know that something had happened only when people started appearing in the emergency rooms and doctors' offices with strange maladies. Depending on the biological agent and its incubation period, it could be days or weeks after release of the organism before people first became ill. Identification of the cause could be problematical. American physicians today are not trained to diagnose illnesses due to the pathogens thought to be the ones most likely to be used as bioweapons. Few physicians have ever seen cases of anthrax or smallpox or pneumonic plague.

It is difficult to imagine how the public might respond in today's world to a fast-moving lethal epidemic. In recent decades, there have been few such epidemics in industrialized cities. One of the more recent occurred in India in 1994. Plague broke out in the diamond-polishing district of Surat. It was reported by the media as a deadly, mysterious fever, possibly plague. Within hours, panic reigned. People began streaming from the city. Many in the medical community were among the first to leave. Eventually half a million fled, leaving the city a ghost town. It is estimated that India lost some two billion dollars in lost trade, embargoes, and production as a consequence of this outbreak. How many actually died of plague is still not clear but the total was not more than 50.

Epidemics have the potential to spread internationally as we have observed with the HIV/AIDS epidemic. The disease is contagious but it is not easily transmitted from one person to another. Nevertheless, it spread across the globe and is changing the population demographics in some African countries to a degree comparable to that caused by the Black Death of the 1300s, which killed a third of the European population.

Addressing the Biological Weapons Threat

The status of national preparations to deal with bioterrorism is difficult to summarize. The diverse initiatives taken by different agencies of government are not well coordinated, even within the agencies themselves and many have been designed with little comprehension of what is implied for the civilian population when a biological weapon is used. Beginning in 1995, when the first Presidential Decision Directive was issued, preparations to respond to terrorism focussed almost exclusively on training and equipping "first response" teams to counter the effects of a nuclear or conventional explosive device or a chemical attack. Training programs in 120 cities were targeted to include police, fire and emergency rescue personnel in a "lights and sirens" type of response and special full-time units of the National Guard were constituted whose function is not clear but certainly have little to do with bioterrorism.

Not for several years was there a beginning comprehension that the consequences of use of a biological weapon would be an epidemic and that those first detecting its presence and those primarily responsible for controlling the disease would be public health personnel and physicians. Accordingly, in most cities, public health, medical and hospital personnel were not included either in planning or training. Finally, in FY 99, significant funds began to be made available to the Department of Health and Human Services, primarily the Centers for Disease Control (CDC), whose traditional responsibility, with state and local health departments, has been the surveillance and control of infectious diseases. Some two years ago an Office dealing with Bioterrorism was established at CDC; modest funds began to be made available to the states for development of programs both for response and surveillance; stockpiles of antibiotics were procured; smallpox vaccine was ordered; and a national network of laboratories was established that is capable of diagnosing the

organisms of principal concern. Unfortunately, little has yet been done to provide for the training of public health and medical professionals and hospitals remain woefully unprepared.

Current Vulnerabilities

We are today ill-prepared to deal with an epidemic of any sort. There is, as yet, no comprehensive national plan nor an agreed strategy for dealing with the problem of biological weapons. There is little inter-agency coordination at the federal level and nationally funded programs appear to be as often competitive as cooperative. Particularly serious are the vulnerabilities in our medical health care system and our public health infrastructure.

Hospitals

When Americans are seriously ill, they expect to be cared for in hospitals. If the hospitals became overwhelmed and were paralyzed by chaos, it would have serious implications for public morale and for the potential for containing an epidemic, let alone treating those who were already sick. The likelihood of public anxiety rising to civil disorder would rise substantially.

Hospitals are under serious pressure today. Of the 5000 hospitals in the U.S., 30% are losing money; over the last decade, 1000 have closed because of financial reasons. They face a host of regulatory issues including those dealing with health insurance portability, safer needles, medical and medication error reduction, limits on medical device reuse, ergonomic standards for employees, requirements for patient restraints and seclusion, and many more. At the same time, the numbers of the uninsured are increasing and the population is aging and in need of more medical services. The hospitals have struggled to become ever more efficient but, in their quest to eliminate inefficiencies, they have basically wiped out their surge capacity. Even minor increases in patient demand, such as that of the 1999 brief and mild flu season strained most hospitals.

This lack of elasticity is also seen in the pharmaceutical field as companies have focussed on just-in-time production and delivery. The result is that reserve supplies are few and temporary problems in production are regularly manifested in countrywide spot shortages of such as antibiotics and other critical drugs.

There is an increasing shortage of emergency rooms what with the loss of a thousand hospitals in the past decade and a desire on the part of hospitals to close ERs, if possible, because of their drain on resources. The amount of time that Baltimore's hospitals have been on "diversion" of ambulances because of over crowding has doubled every year for the past three years. Ventilators to aid respiration are in short supply. Baltimore, home to two major medical centers and medical schools, could not handle an acute situation that produced as many as 50 casualties requiring ventilators. A handful of highly contagious patients would cause havoc, there being in the Baltimore-Washington area, no more than 100 beds in negative pressure rooms that could handle highly contagious patients.

However, the most intractable problem for hospitals is likely to be staffing. As we have been told, only half of all nurses work in hospitals and the average age of a nurse in America is 53. More are now retiring than are being recruited to the field. Hospital administrators report that, even if they had more open beds, they doubt that they would have staff to care for the patients.

The Public Health System

The public health system is in even worse shape. Public health is a long-neglected stepchild to modern medicine. It is a sector that has been understaffed and under funded for several decades.

It is believed that, in most states, there is ample authority for public health officials to respond aggressively and effectively to protect the public health. However, many of the relevant laws were written between the time of the Civil War and the 1930s. A more critical problem is knowing what to do and how to do it. With sharp reductions in the number of cases of the major infectious diseases, processes and knowledge about when and how to use quarantine and isolation procedures, how to organize large scale vaccination programs and how to communicate effectively with a concerned public have been lost.

A major problem is that there really is no public health "system" for dealing with infectious diseases in this country, but, rather, a fragmented pattern of activities. The federal system, which for the most part is in the federal Centers for Disease Control and Prevention is itself comprised of a number of Centers and activities that are themselves independent fiefdoms. State and local health departments reflect a similar pattern and there is a major disconnect between the public health and medicine. Doctors rarely communicate with local public health officials and often, when they try to do so, they find no one with needed competence. In New York City, a

city with one of the best public health departments in the country, the report of two eases of encephalitis to the health department led to the unraveling of the West Nile epidemic. This was a laudable and important response. However, it was later discovered that at the time the first two cases were reported, there were 20 other patients already hospitalized with encephalitis, a clearly recognizable and legally reportable disease.

In most areas, public health is not treated as an emergency service as are police, fire and utilities. The concept of a 24 hour per day, 7 day per week "hot line" is little known. Yet, public health officials will be the ones who will be obliged to organize a response to an epidemic, to communicate with the public and to orchestrate a city and state's response resources

Increasing Preparedness

What can be done to diminish our vulnerability to bioweapons.

First, we have got to better prepare our public health and medical care services to respond to outbreaks and epidemics and to mass casualty situations whatever their origin. They are at the core of any response and yet, only recently have they even begun to be involved in the necessary planning and training activities. Significant resources will be required for this purpose, perhaps one billion dollars per year or more. Although a large sum, this would represent less than 10% of government expenditures for counter-terrorist activities. This investment, however, would serve a far broader utility than bioterroism alone.

Second, we need to mount a robust research and development program for biodefense. It would seem logical for this to be a joint DOD-DHHS effort. We need to engage the genius of the universities, the pharmaceutical firms and the biotechnology companies, few of whom are now involved. The bioscience community does not have a history of engagement with defense projects and, by and large, they have not been eager to work with government in this field. For this to happen will require inventive structures and incentives. Three areas of research and development would be especially important: (1) More definitive, rapid, automated means of diagnosing major pathogens, basically building microchips that could identify specific pathogens by deciphering the molecular genomes. (2) Mechanisms for being able to rapidly develop and produce new antibiotics and antiviral drugs for new and emergent diseases. (3) Mechanisms for enhancing the immune response generally, so as to get beyond the one organism-one drug approach.

Third, public health has to identify those critical capacities that are needed to fight epidemics of contagious disease. These include surveillance and reporting systems, particularly the ability to track an epidemic once it occurs. But what we must do, even in normal times, is to track outbreaks once they arc identified. Communications systems that connect health care providers and the public health system are critical.

Fourth, in cooperation with WHO and other countries, we need to strengthen greatly our intelligence gathering capability. A focus on international surveillance and on scientist-to-scientist communication will be necessary if we are to have an early warning about the possible development and production of biological weapons by rogue nations or groups and, likewise, to have the earliest possible warning and longest possible lead time to develop drugs and vaccines to deal with new or emergent organisms.

Fifth, a concerted effort by the medical, public health and, broadly, the biological sciences community to condemn participation in research or development of biological weapons is clearly indicated. Such a response would provide no certain guarantees that misbehavior would not occur but then, there is as yet no other satisfactory deterrent to deal with these troublesome weapons.

Summary

Biological weapons are a significant threat, and because of the rapidly growing power of biotechnology and biological knowledge, the urgency and the diversity of this threat will only increase. The nature of biological weapons and the epidemics that they could create is such that preventing them will be far more challenging than preventing the catastrophic use of chemical or nuclear weapons. It is going to be hard to detect biological weapons production facilities, it is going to be hard to track the weapons before they are used, and it is going to be very hard to interdict them before they are released.

If we do nothing more than strengthen the public health and medical care systems, we can significantly decrease the suffering and death that would follow a bioweapons attack. By being able to mitigate the consequences of such an attack, we can make ourselves less attractive targets to would-be perpetrators. As important,

we could improve the everyday functioning of the health care and the public health system for the general good.

The CHAIRMAN. Thank you, doctor.

Dr. Heymann.

STATEMENT OF DAVID. L. HEYMANN, MD, EXECUTIVE DIRECTOR, COMMUNICABLE DISEASES, WORLD HEALTH ORGANIZATION, GENEVA, SWITZERLAND

Dr. HEYMANN. Thank you, Mr. Chairman. I have provided a written statement that I would appreciate being put in the record.

The CHAIRMAN. The entire statement will be placed into the record. You are welcome to bring that all the way up here if you would like, if that's good, or wherever is convenient.

Dr. HEYMANN. As you said earlier, Mr. Chairman, and as Dr. Henderson has just emphasized, naturally occurring outbreaks can cause equal amounts of havoc as can intentionally caused outbreaks. We have seen this in outbreaks in India with plague and with various other outbreaks throughout the world.

This map [*see Figure 1 on page 81.*] shows a selection of the over 800 outbreaks which have occurred between 1996 and 2001. They occur on every continent. But what's very important is that they occur with such frequency that it's almost impossible to keep the map up to date.

In the United States, for example, here in August just last month West Nile fever occurred in humans now in Florida and in Georgia. And at the same time, Canada reported to WHO that they had just isolated the West Nile virus from birds in that country.

Three days after we received the report from Canada we see the report from Venezuela whose President announced a national health emergency after confirmation of more than 24,000 cases of dengue which is also a mosquito-borne virus.

So we can see that infectious diseases are a very important issue today. And as you noted, their phenomenal increase is due to travel and trade which is increasing in the world today.

These diseases spread in apparently healthy humans around the globe. They spread in food, in animals, in cargo, or in insects stowed away in cabins and luggage holds of jets.

Because of our world's growing interconnectedness, outbreaks of infectious diseases in any country today are a health security risk for us all. This has been clearly said by Dr. Hughes from CDC many times. It's clear that this is the case.

One of the strategies to protect populations against the international spread of outbreaks is the WHO global network of alert and response. This poster [*See Figure 2 on page 82*] illustrates the geographical distribution of haemorrhagic fevers, that is Ebola, Lassa and Marburg, just one of the category of diseases which are watched over and reported through this network.

The Global Outbreak Alert and Response Network is actually a network of 72 different networks that have spread throughout the world and continuously report outbreaks to WHO. The laboratories

and the regional surveillance networks of the Centers for Disease Control and Prevention in Atlanta are major members of this network as is the U.S. Department of Defense Global Emerging Infections Surveillance and Response Network. A unique member in this global network——

The CHAIRMAN. Excuse me. On that chart, does the red indicate those states where the fever has been reported or are they the——

Dr. HEYMANN [continuing]. Reported.

The CHAIRMAN. Are they the members of the global surveillance system?

Dr. HEYMANN. Those are countries from which the disease was reported.

The CHAIRMAN. How many countries are members of this global surveillance system?

Dr. HEYMANN. We estimate that most countries are in some way involved because we have 141 WHO offices in countries. And those offices sit in Ministries of Health and are a source of information for us.

The CHAIRMAN. Thank you.

Dr. HEYMANN. In addition to the networks that are occurring from industrialized countries, there are also WHO networks. But a unique member of this network is the Global Public Health Intelligence Network, called GPHIN which has been developed by Health Canada for WHO.

This network is constantly crawling the Web looking at all open sites such as news wires, public health and e-mail services, electronic discussion groups including the U.S. based Pro-MED discussion group, and local on-line newspapers for information about outbreaks.

At the close of each day, Health Canada packages the information that they have obtained and sends it over to WHO in Geneva. And in the morning that information is reviewed by the outbreak verification team and verification on the ground is done through the network of networks.

This system has been very effective. And as you can see on the next poster [*See Figure 3 on page 83*] 56 percent of all the reports to the WHO network are coming from in the GPHIN, the Global Public Health Intelligence Network, while 27 percent come to WHO through our usual country reporting mechanisms.

The verification done each day at WHO is therefore extremely important, because improperly handled information can have disastrous economic consequences for tourism and trade.

An example of how information can be mishandled is shown in an article in the *Bangkok Post*. A single death from a pulmonary embolism on a tourist travelling from Thailand to Vienna was inaccurately reported in the press as due to an infectious disease.

It was only through verification through the network that we were able to inform the press that this death was not due to an infectious disease.

A more recent example of the importance of the network was during the largest reported outbreak of Ebola which began in

Uganda in October of last year. The WHO network was informed as soon as the first suspected cases were detected by Uganda, and the WHO coordinating containment team—of which CDC was a predominant member—began to arrive within 24 hours to contain the outbreak over the next 5 months.

The containment exercise in Uganda is just one of many such activities in the alert and response network since 1998. Others are shown on the next poster [*See Figure 4 on page 84*] and occurred in Afghanistan, Bangladesh, Egypt, Ethiopia, Kosovo, Saudi Arabia, Sierra Leone, Sudan and Yemen.

It's very important on this map to note that although outbreaks occur on every continent that you saw in the first map, and in every country, it is those in Africa and southern Asia which require an international response in most instances. As we speak today, Mr. Chairman——

The CHAIRMAN. Why is that?

Dr. HEYMANN [continuing]. Because they have the weakest public health infrastructure. As we speak today, WHO coordinated teams are working to stop outbreaks in South Asia of a disease which has not yet been identified (this is the second outbreak this year) an outbreak of urban Yellow Fever in West Africa in Abidjan, and in the Horn of Africa where another yet unidentified infectious disease is causing high mortality.

To facilitate and better coordinate the work of the network, WHO has developed protocols for containing outbreaks of known and unknown cause, including protocols for the infections shown on the next poster [*See Figure 5 on page 85*] that names the biological agents of feared intentional use by terrorists or in warfare. These names have been provided to us by the protocol group meeting in Geneva on the Biological Weapons Convention.

These protocols are against diseases, and all the protocols have been used in outbreaks recently. So far all such outbreaks that we have investigated have been of natural cause. But these outbreaks could be intentionally caused as well. The WHO network we feel is clearly well placed as one of the global mechanisms for detection and containment of intentionally caused outbreaks.

WHO will soon be issuing an updated edition of its standard guidelines for health aspects of chemical and biological weapons shown on this poster. In view of the devastating impact on the populations that such weapons could have, the guide urges governments to strengthen public health infrastructure and develop nationally response plans for a biological attack as an integral part of existing national emergency plans.

With this in mind, WHO's 191 member states adopted in May of this year a consensus resolution on global health security.

During the debate that preceded the adoption of this resolution, developing countries continually emphasized the weakness of their public health systems and the need for more input to these systems. Mr. Chairman, the U.S. Government and many other agencies are valuable partners in helping us strengthen the infrastructure in developing countries.

This of course is at the basis of good global surveillance and response. In addition to the annual assessed contribution to WHO that the United States gives each year and which has been referred to here, the United States also contributes to WHO in global surveillance and response through USAID, through CDC, through the National Institutes of Health, the Departments of Defense and Agriculture, NASA Goddard Space Flight Center, and the many U.S. universities from which we draw both technical and in some cases financial support.

As you can see from this wide range of agencies, the world today must draw on a broad base of agencies in order to support global surveillance and response. Infectious diseases are a threat to our national and global security. And the battle lines must include defense through strong public health in all countries. Thank you very much.

[The prepared statement of Dr. Heymann follows:]

PREPARED STATEMENT OF DR. DAVID L. HEYMANN

STRENGTHENING GLOBAL PREPAREDNESS FOR DEFENSE AGAINST INFECTIOUS DISEASE THREATS

By their very nature, infectious diseases have the potential to spread internationally. Throughout most of human history, isolation and quarantine were the only measures available for protection. As a result, the course of human history was frequently altered by epidemics that swept unchecked across continents, claiming more lives and creating more social devastation than wars.

With the development of vaccines and the discovery, during the previous century, of potent classes of antimicrobial drugs, humanity could, for the first time in history, prevent many infectious diseases and cure many others. The risk that epidemics might again sweep across continents seemed remote. The defenses were in place, the threat was considered under control, and the world relaxed its guard.

The Magnitude of the Problem

The microbial world is complex, dynamic, and constantly evolving. Microbes proliferate rapidly, mutate frequently, and adapt with relative ease to new environments and hosts. They will also eventually develop resistance to the drugs used to treat them. Numerous factors, including those linked to human activities, can accelerate and amplify these natural phenomena, as has happened in recent years. Moreover, when a complacent world relaxes its vigilance and lets down its defenses, the consequences can be dramatic as well as rapid. Microbes are quick to exploit new opportunities to spread, adapt, and resist.

As a result of several recent trends, the world now finds itself in a situation where epidemics are again spreading around the globe unchecked, but this time at unprecedented speed. New or newly recognized diseases are being reported at the rate of approximately one per year. AIDS emerged as an important infectious disease in the early 1980s and is now entrenched on a scale that threatens global security. Other emerging diseases, such as Ebola haemorrhagic fever and new variant Creutzfeld-Jakob disease, illustrate the severe damage caused by lethal new agents that cannot currently be curbed by vaccines or drugs. In 1997 and 1999, when influenza viruses previously confined, respectively, to birds and swine suddenly appeared in humans, experts voiced fears of a pandemic on the scale of the deadly Spanish Flu of 1918, which some believe was caused by an avian virus that first crossed the species barrier to swine before jumping to humans. Altogether, over 30 new infectious diseases have emerged over the past 25 years.

The phenomenal recent increase in global travel and trade has given microbes multiple opportunities to spread around the global in novel ways and with unprecedented speed. Microbes can incubate in apparently healthy travellers, hide in food, animals, or cargo, or be carried by insects stowed away in the cabin and luggage holds of jets or in the pots of exotic plants. In the UK alone, 1,128 cases of malaria were imported into the country by travellers in 2000. Cases of "airport malaria," in persons who live or work near international airports yet have not travelled, are detected regularly in cities such as London, Paris, Brussels, Geneva, and Oslo as well

as in the United States and Canada. In just the past two years, unexpected outbreaks of relatively new or previously rare diseases have taken populations on every continent by surprise. Legionellosis and leptospirosis in Australia, Lassa fever, yellow fever, hantavirus, listeriosis, and new variant CJD in Europe, and yellow fever, West Nile fever, cryptococcosis, and *E. coli* O157 in the U.S. are just some examples. In the face of such highly mobile, microscopic, and easily disguised threats, national borders are porous. An outbreak anywhere in the world must now be considered a threat everywhere else.

Once an infectious disease, or the insects and animals that carry it, invades a new country or continent, it can prove difficult—if not impossible—to control. This has been the case with West Nile fever, which made its initial appearance on the American continent in 1999 and is now firmly entrenched and spreading, and with Rift Valley fever, which crossed the Red Sea from East Africa to the Arabian peninsula for the first time in 2000. The aggressive tiger mosquito, capable of spreading dengue, yellow fever, LaCrosse encephalitis, and other diseases, and able to breed in any container large enough to hold water, entered the U.S. in a shipment of used tires in 1985 and has since spread to 25 states.

Apart from the need to cope with the emergence and spread of new diseases, public health infrastructures are further burdened by the dramatic resurgence of older epidemic-prone diseases such as malaria, dengue, tuberculosis, cholera, and yellow fever. Cholera, for example, is now causing epidemics in parts of Latin America where it had previously been quiescent for over 100 years. The global spread of dengue, which began in Southeast Asia in the 1950s, has intensified dramatically, showing a four-fold increase with unprecedented numbers of its deadly haemorrhagic form. On 23 August 2001, Venezuela's President declared the country's current dengue epidemic, with more than double the number of cases seen in the previous year and over 600 cases of its potentially lethal form, a national emergency.

The costs can be enormous. In recent years. wealthy nations have been stunned by outbreaks of foodborne disease causing economic losses in the billions of dollars. Some experts place losses associated with the emergence of mad cow disease in Europe at close to $38 billion. In New York in the early 1990s, the emergence of multidrug-resistant tuberculosis, with a death rate of up to 80%, incurred costs associated with the failure to prevent its spread estimated at over $1 billion. In the Russian Federation, the re-emergence of tuberculosis, including multidrug-resistant forms, is estimated to have cost over $4 billion in 1999 alone. Initial costs associated with cases of West Nile fever in New York have been placed at almost $100 million.

The Spectre of a "Post-Antibiotic" Era

As yet another especially serious and costly problem, resistance to inexpensive and effective antimicrobial drugs is emerging and spreading era at an alarming rate. The bacterial infections which contribute most to human disease are also those in which emerging resistance is of most concern: diarrhoeal diseases such as dysentery, respiratory tract infections, including common pneumonia and multidrug-resistant tuberculosis, sexually transmitted infections such as gonorrhoea, and a host of hospital-acquired infections that are notoriously difficult and expensive to treat. Among the other major infectious diseases, the development of resistance to drugs commonly used to treat malaria is of particular concern, as is the emerging resistance to anti-HIV drugs.

The development of resistance is a natural phenomenon that occurs, sooner or later, with every antimicrobial. In the past, medicine and science were able to stay ahead through the discovery of potent new classes of antimicrobials, a process that flourished from 1930–1970 and has since slowed markedly, partly because of misplaced confidence that infectious diseases had been conquered, at least in the industrialized world. In just the past few decades, the emergence of resistant microbes has been greatly accelerated due to several concurrent trends. These have worked to increase the number of infections and thus expand both the need for antimicrobials and the opportunities for their misuse. Important trends include urbanization with its associated overcrowding and poor sanitation; pollution, environmental degradation and changing weather patterns, which can affect the incidence and distribution of infectious diseases and the habitats of the insects and animals that carry them; and a growing proportion of elderly people needing hospital-based treatments and thus at risk of exposure to highly resistant pathogens found in hospitals.

Additional trends include the resurgence of malaria and tuberculosis, causing millions of infections each year, and the AIDS epidemic, which has greatly enlarged the

population of immunocompromised patients at risk of opportunistic infections and thus in need of treatment. Moreover, the enhanced food requirements of an expanding world population have led to the widespread routine use of antimicrobials as growth promoters or preventive agents in food-producing animals and poultry flocks. In North America and Europe, an estimated 50% in tonnage of all antimicrobial production is used for these purposes. Such practices have contributed to a rise in resistant microbes which can be transmitted from animals to humans.

The associated costs are high. For example, treatment costs for tuberculosis can vary between $15 and $40 per person to achieve a complete cure, whereas treatment costs for multidrug-resistant tuberculosis can be up to $3,000 per person. Most alarming of all are microbes that have accumulated resistance genes to virtually all currently available drugs and have the potential to cause untreatable infections, thus raising the spectre of a post-antibiotic era. Even if the pharmaceutical industry steps up efforts to develop new drugs immediately, current trends suggest that some diseases may have no effective therapies within the next ten years. Moreover, if current trends continue, many important medical and surgical procedures, including cancer chemotherapy, bone marrow and organ transplantation, and hip and other joint replacements, could no longer be undertaken out of fear that the associated compromise of immune function might place patients at risk of acquiring an untreatable and ultimately fatal infection. Opportunistic infections in AIDS patients would likewise be untreatable.

The Need for Global Solutions

Antimicrobial resistance is a global problem requiring a global solution. No single nation, however effective it is at containing resistance within its borders, can protect itself from the importation of resistant pathogens. The enormous growth of global trade and travel means that a resistant microbe can spread from its place of origin to almost anywhere else in the world within 24 hours.

Taken together, the threats posed by emerging and re-emerging infectious diseases, and by the emergence and spread of antimicrobial resistance are serious, steadily growing, and universally costly. Their nature is inherently global, with causes related to the world's growing interconnectedness, and with consequences that must be addressed by global solutions, ideally aimed at prevention.

WHO's Capacity for Alert and Response

As an international health agency with over 50 years of experience, and the World Health Organization is well placed to gather global disease intelligence and coordinate the rapid, multifaceted response needed to contain outbreaks quickly and prevent their international spread.

• *Privileged access.* WHO staff, consultants, and expert advisers have privileged access to all countries. This privilege allows WHO, in the interest of safeguarding international health, to transcend the prevailing political reality in which access to critical expertise might be denied because of one country's political relationship with others. On many occasions, the Organization's ability to secure laissez-passer status has proved decisive in getting CDC and other U.S. experts quickly and smoothly into countries where, for diplomatic reasons, entrance might otherwise be delayed if not denied. This ability to obtain privileged status is extended to all of the many security-cleared partners who may be needed to mount an effective international response.

• *Geographical resources.* WHO has unique and permanently positioned geographical resources. These include six regional offices and an additional 141 country offices, located within or in close proximity to ministries of health, and concentrated in areas where epidemics are most frequent and new diseases are most likely to emerge. Although the size of these offices varies according to the disease situation in the country concerned, all offices are staffed with medical experts and often with epidemiologists, and all have the essential logistic equipment, including vehicles mid local communications, needed for the prompt on-the-scene investigation of a suspected outbreak. When outbreaks occur, country offices facilitate the arrival of international assistance by arranging flights, customs and immigration clearance, and accommodations. All offices are now linked electronically to WHO and thus to its global network of institutional resources and collaborators.

• *Collaborating centres.* WHO's disease control activities are supported by a network of over 250 laboratories and institutions formally designated as WHO Collaborating Centres. These centres provide the expertise and facilities needed to conduct field investigations, handle dangerous pathogens, test samples, identify unknown

agents, and confirm the diagnosis of cases. Many additional laboratories and public health institutes also collaborate with WHO on a regular basis. The ability to draw assistance from top experts and facilities is vital given the fact that most previously unknown and highly lethal diseases, including Ebola and other viral haemorrhagic fevers, tend to emerge in those countries that lack the requisite laboratory and epidemiological capacity to detect an unusual disease event and identify its causative agent. Apart from its close working relationships with CDC, which includes the direct secondment of staff, WHO draws considerable technical support from agencies such as USAID and from overseas laboratories included in the U.S. Department of Defense Global Emerging Infections Surveillance and Response System (DoD-GEIS) as well as their counterparts in other WHO member states. Such collaboration with leading experts and institutes lends added authority to WHO's efforts to identify and track outbreaks accurately and keep the world reliably informed.

• *Surveillance networks.* WHO coordinates a large number of electronic "detective" systems and databases for keeping experts alert to changes in the volatile infectious disease situation. These networks, most of which now operate in real time, keep watch over disease-related events ranging from new strains of influenza virus, through outbreaks of salmonellosis and dengue, to the emergence of drug-resistant pathogens. Most of these networks also include quality assurance and training components to ensure that data submitted from all parts of the world are comparable and conform to established standards. The oldest of these, FluNet, was established over 50 years ago and has served as the prototype for the design and implementation of subsequent systems. It now draws support from 110 collaborating laboratories in 84 countries. The sensitivity of FluNet has recently proved vital in the early detection of cases where influenza virus strains have crossed the species barrier from animals, such as swine and poultry, to infect humans.

These surveillance networks all operate within the framework of the International Health Regulations, which provide the only international legally-binding instrument, implemented by WHO, governing the reporting of epidemic-prone diseases and the application of measures to prevent their spread.

• *Welcomed assistance.* WHO is politically neutral, and often greatly needed in the developing world. Ministries of health in such countries have repeatedly gone on record to state their reliance upon WHO as their single most important source of authoritative advice and technical assistance, particularly in matters pertaining to the control of infectious diseases. As a result, direct assistance from WHO to control infectious diseases is frequently requested and warmly welcomed with the best support the country can offer.

• *Deep experience.* WHO has over 50 years of experience in coordinating the field operations needed to control infectious diseases. Current campaigns, which include global initiatives aimed at eradicating or eliminating eight diseases, build on the epidemiological approaches and logistic infrastructure that contributed to the successful global eradication of smallpox. These mechanisms, which have been refined over time, have proved robust and effective even under difficult conditions. The successful containment of the largest recorded outbreak of Ebola, which began in Uganda in October 2000, was coordinated by WHO and involved over 500 local staff and volunteers, supported by some 120 international staff from 22 institutions and agencies, including CDC. WHO coordinated the considerable efforts and logistics needed for the identification and confirmation of 425 eases and the surveillance of approximately 5,600 contacts in an area in which 70% of the population was internally displaced because of civil disturbances. As part of the drive to eradicate polio, mass immunization campaigns have been successfully conducted in the midst of complex emergencies and considerable civil unrest, with CDC providing strong and needed support.

THE FRAMEWORK FOR DISEASE SURVEILLANCE AND RESPONSE

A Three-Pronged Approach

As WHO maintains only a small number of staff at its headquarters in Geneva and its six regional offices, the framework for global disease surveillance and response is based on the use of a large number of partners, including government agencies, non-governmental organizations, the private sector, and industry. Such partnerships allow WHO to magnify the impact of its efforts considerably.

The framework relies on a three-pronged approach, with different strategies for combatting known risks and unexpected events, and for improving both global and national preparedness.

• *Containing known risks.* Epidemic-prone diseases, such as cholera, dengue, influenza, measles, meningitis, shigellosis, and yellow fever, and foodborne diseases pose a constant threat to human populations. They are well adapted to transmission in human populations either directly from person to person, through transmission by insects and other disease vectors, or by contamination of the environment or food. These diseases are generally well understood and, in most cases, effective measures are available for their control.

WHO maintains numerous programmes for the monitoring and control of these well-known and almost constant risks to public health. Disease-specific networks of partners help WHO mount a rapid response when outbreaks occur, at times following a breakdown in standard public health control measures in the country concerned. Established protocols, based on extensive experience, facilitate prompt, coordinated action. For some of these infections, such as epidemic meningitis, influenza, and yellow fever, WHO also collaborates with researchers and industry to anticipate future outbreaks and ensure that adequate emergency vaccine supplies are available when needed. Other known risks monitored by WHO include those caused by foodborne diseases and the emergence and spread of drug resistance.

• *Responding to the unexpected.* Unexpected or unusual disease events can be caused by previously unknown infectious agents, agents that have crossed the species barrier from animals to humans, agents appearing in a new geographical area, and agents that may be deliberately engineered and introduced by acts of bioterrorism. Novel pathogens are usually poorly understood in terms of their source and mechanisms of transmission, and many have the potential to cause large outbreaks. Fortunately, some of these pathogens are not well adapted to human populations and lack the potential for sustained, epidemic spread. As experiences with the AIDS epidemic have demonstrated, however, sustained epidemic spread is a distinct possibility that can have a major impact on societies and economies as well as on the life expectancies of countries. While novel pathogens may not always cause major outbreaks, they are often associated with high death rates, as they are poorly understood as they emerge, and initial prevention or treatment strategies are absent or ineffective. Examples include hantavirus infections, Ebola and, most recently, Nipah virus.

WHO has recently established innovative mechanisms for responding to previously unknown diseases and unexpected or unusual disease events. These mechanisms take full advantage of the powerful new opportunities for heightened vigilance and rapid response that have been created by the widespread use of electronic communications. To heighten vigilance, WHO takes advantage of a semi-automatic electronic system, developed for WHO by Health Canada, that continuously and systematically crawls Web sites, news wires, public health e-mail services, electronic discussion groups, including the US-based Pro-MED, and local online newspapers for rumours of outbreaks. In this way, WHO is able to scan the world for informal news that gives cause for suspecting an unusual disease event. A WHO team responsible for outbreak verification investigates suspicious reports each morning to determine whether they pose a threat of international health concern. When appropriate, WHO uses its technical and geographical resources to verify the presence of an outbreak. Since 1998, WHO has used this system to verify over 800 outbreaks of potential international importance.

To ensure that heightened vigilance is accompanied by a rapid response, WHO enlarged and formalized its procedures for outbreak detection, verification, and response in April 2000, when the Global Outbreak Alert and Response Network was formed. The Network draws together 72 existing networks, including several maintained by agencies such as CDC and DoD as well as those operating under WHO's responsibility. The Network reports and verifies information, on a daily basis, from a wide range of formal sources, including ministries of health, national institutes of public health, government and military health facilities and laboratories, and nongovernmental organizations, such as the Red Cross, having a strong presence in epidemic-prone countries. When an outbreak is judged to require international assistance, as agreed upon in confidential consultation with the affected country and with experts in the Network, WHO uses the latest electronic communication tools to coordinate quick and appropriate assistance. Since early 2000, the network has launched effective international responses in Afghanistan, Bangladesh, Egypt, Ethiopia, Kosovo, Saudi Arabia, Sierra Leone, Sudan, Uganda, and Yemen.

The work of coordinating large-scale international assistance, which can involve many agencies from many nations, is facilitated by operational protocols, developed by WHO, which set out standardized procedures for the alert and verification process, communications, coordination of the response, emergency evacuation, research,

evaluation, monitoring, and relations with the media. WHO has also issued guidelines for the behaviour of foreign nationals during and after field operations in the host country. By setting out a chain of command, and imposing order on the containment response, such protocols help protect against the very real risk that samples of a lethal pathogen might be collected for later provision to a terrorist group.

• *Improving preparedness.* WHO conducts a number of activities aimed at helping countries strengthen their laboratory and epidemiological capacity and take advantage of new tools such as HealthMap (an interactive information and mapping system), and remote sensing data from NASA and other satellites. In collaboration with CDC, WHO formed the Training Programmes in Epidemiology and Public Health Interventions network (TEPHINET), another global network utilized by the Global Outbreak Alert and Response Network, which seeks, through shared resources and expertise, to enhance the effectiveness of national training programmes. In February 2001, WHO opened a new office in Lyon, France, to provide two-year specialized training for epidemiologists and laboratory specialists from developing countries where the epidemic risk is greatest. The training, which includes a six-week course in Lyon, is followed by specially tailored field work and support in the home country, supervised by Lyon-based staff. In so doing, the new programme is working to strengthen disease detection and response activities in those countries where epidemics and unexpected disease events are most likely to occur.

As another example, a working group on long-term preparedness for outbreak response was recently established to help ensure that the energy and resources that are provided to a country for the investigation and containment of an outbreak do not vanish after containment, but are instead harnessed in the form of long-term technical assistance. During 1998 and 1999 major epidemics, including outbreaks of haemorrhagic fever, cholera, and meningitis, caused a significant increase in morbidity and mortality in southern Sudan and necessitated major international assistance. In 1999, a WHO-coordinated international team responding to an outbreak of relapsing fever set up an Early Warning and Response Network (EWARN) in partnership with nongovernmental organizations present in the field. With support from several sources, EWARN has been expanded to cover seven diseases and a wide geographical area, and now ensures that epidemics are rapidly detected and investigated while responses are launched quickly using prepositioned materials. This international partnership in the field has already saved thousands of lives and is sustained by systematic capacity building among the local communities.

Capacity building for national epidemic detection and response is far more cost-effective than mounting an international response. During the Ebola outbreak in Uganda, containment activities left behind permanent improvements in the form of isolation wards at two hospitals in Gulu district, a community-based early warning surveillance and response system for priority infectious diseases, and sustained improvements in civil administration through the establishment of a community registry of births and deaths. In June 2001, a new focus of three suspected cases of haemorrhagic fever was detected by local staff within three days of onset, patients were immediately isolated in the recently established ward, and specimens were despatched for testing at the WHO Collaborating Centre in South Africa, where results fortunately proved negative, in this case, strengthened national capacity made it possible to defend global health security through local vigilance, without the need for costly international assistance.

Preparedness for a Bioterrorist Attack

WHO will soon be issuing an updated edition of its standard guide to health aspects of chemical and biological weapons, initially published in 1970. In view of the devastating impact on civilian populations that use of such weapons could have, the guide urges governments to prepare response plans as an integral part of existing national emergency plans. The strengthening of public health infrastructure, particularly for surveillance and response, is singled out as a major contribution to preparedness. The establishment of routine, sensitive, and near real time disease surveillance systems enhances preparedness for deliberate as well as natural outbreaks. National systems are important as experience has shown that many region-wide and global systems are inadequately sensitive to pick up local outbreaks quickly.

National surveillance systems need to be in place well in advance of possible intentional use of a biological weapon, as adequate data on the prevalence of background diseases are needed to aid recognition of an unusual and possibly deliberately caused disease. Moreover, the epidemiological techniques needed to investigate deliberate and natural outbreaks are the same. Since many of the agents that

can be used as bioweapons cause disease in animals, countries also need to establish mechanisms for the routine exchange of information between the public health and veterinary sectors.

Within the context of its outbreak alert and response activities, WHO has developed protocols for containing outbreaks of diseases, such as anthrax and viral haemorrhagic fevers, which could result from the intentional use of biological agents. As part of its official mandate for dealing with smallpox-related issues in the post-eradication era, WHO is responsible for ensuring the security of the remaining stocks of smallpox virus and overseeing their final fate.

A More Proactive Role for WHO

Traditionally, one of the main factors undermining the effectiveness of infectious disease surveillance has been the reluctance of countries to report outbreaks due to fear of the negative impact this news would have on travel, trade, and tourism. This traditional reluctance is now beginning to change. In line with the growth of electronic media, approximately 65% of the world's first news about infectious disease events during the past four years has come not from official country notifications but from informal sources, including press reports and the Internet. Transparency about outbreaks and prompt reporting have therefore become increasingly important: unverified rumours of an outbreak or unusual disease can have a negative impact on travel and trade in the country and its neighbours even though the rumour may be totally unjustified or grossly exaggerated.

In May 2001, the World Health Assembly, the supreme governing body of WHO, adopted by consensus a resolution on global health security that considerably strengthens WHO's capacity to act in response to outbreaks and epidemics. WHO is now in a position to investigate and verify rumoured outbreaks even prior to receipt of an official notification from the government of the country concerned. Though WHO continues to confer, in confidence, with governments and secure their agreement to mount an international response, this strengthened capacity allows WHO to act with unprecedented speed.

In the new order of the electronic era, countries are increasingly aware of the advantages of prompt outbreak reporting and official verification, accompanied by prompt international aid when needed, and prompt advice from WHO to the international community concerning the associated risks and the realistic need for restrictions on travel and trade. For example, during the Ebola outbreak in Uganda, WHO was informed as soon as the first suspected cases were detected, and a WHO-coordinated investigative team was on the spot within 24 hours. Throughout the five-month long epidemic, WHO issued 42 updated reports on the epidemic via its Web site. The country's borders were never closed.

During the May debate that preceded adoption of the resolution on global health security, delegations from developing countries repeatedly urged WHO to help them strengthen the laboratory and epidemiological capacities needed to detect outbreaks quickly, identify their cause, monitor their spread, and introduce containment measures. Both the need to act and the will to do so are present. The risks are known, immediate, alarming, and relevant to every country in the world. WHO and its many partners and member states know what needs to be done.

Mechanisms for monitoring and containing these risks exist, but need to be strengthened. Above all, the multiple threats posed by infectious diseases—whether well known or unexpected have global causes and consequences that can only be addressed through global solutions. Strengthening of national capacities and public health infrastructures represents one of the surest, most sustainable, and most cost-effective measures for preventing the international spread of diseases and thus defending global health security for the benefit of all.

U.S. Support

The U.S. government is a valuable partner for WHO in building up global alert and response capabilities for combatting the threat posed by infectious diseases. Various U.S. government agencies have contributed to this effort, in line with the multifaceted nature of the threat. Most extensive is WHO's long tradition of reliance on the practical experience, technical expertise, and staff resources of CDC to conduct a range of fundamental activities needed to contain the international spread of epidemics. This collaboration has become even closer and more vital as the number of outbreaks requiring an international response continues to escalate. At times, such as during the simultaneous outbreaks of Ebola and Rift Valley fever in 2000, the resources of both agencies have been stretched to the limit. As with the strengthening of national capacities and infrastructure elsewhere, any U.S. decision

to strengthen CDC benefits WHO as well as a large number of countries where populations and governments have been weakened by repeated outbreaks and epidemics. Any decision to strengthen CDC would likewise count as a sure, sustainable, and cost-effective measure for defending world security against the mounting threat of infectious diseases. The recent establishment of DoD-GEIS is another especially welcome resource for expanding essential laboratory capacity.

U.S. contributions extend to many other fronts. WHO draws support from USAID, whose financial assistance contributed greatly to the development work and expert consultations needed to reach consensus on the first Global Strategy for Containment of Antimicrobial Resistance, which will be officially launched on 11 September 2001. Ongoing efforts to uncover what triggers an Ebola outbreak, and thus help anticipate future outbreaks, are being conducted in collaboration with the NASA-Goddard Space Flight Center, the National Centers for Environmental Prediction, DoD-GEIS, and other U.S. agencies. The National Institutes of Health, through its Fogarty International Center, provides training aimed at helping laboratory scientists and public health workers, in developing countries and the U.S., conduct research on emerging and re-emerging infectious diseases and strategies for their prevention and control. Further NIH and CDC support comes in the form of grants to WHO Collaborating Centres and other U.S. institutions included in the Global Outbreak Alert and Response Network.

As yet another notable example, the U.S. State Department's Bureau of Population, Refugees and Migration (PRM) has funded WHO malaria control activities in complex emergencies. PRM is considering expanding this support to cover additional diseases that can complicate the management of complex emergencies. The establishment of strong mechanisms for the surveillance and control of infectious diseases in countries affected by conflict is of particular importance, as such situations provide both ideal conditions for natural epidemics and a likely setting for epidemics of deliberate origin.

Conclusions

The resurgence of infectious diseases and the emergence and spread of antimicrobial resistance have unleashed threats whose magnitude is almost certain to grow. Epidemics are again sweeping across continents. The tools needed to control emerging diseases are, in many cases, non-existent. The control of re-emerging and epidemic-prone diseases likewise suffers from the spread of resistance to inexpensive first-choice drugs. Nonetheless, today's world is better equipped to protect itself, through preventive measures, than in the past, when isolation and quarantine comprised the sole measures for control. Aided by powerful electronic communication tools, key defense strategies now include early alert, through sensitive global networks for realtime outbreak detection and verification, and rapid national and international responses once outbreaks are confirmed. The strengthening of infrastructure in epidemic-prone countries is vital to the successful and cost-effective implementation of both strategies.

In a world that is now closely interrelated in matters of health as well as in economics and trade, defense against the threats posed by infectious diseases requires a collaborative, multifaceted, global response. WHO wishes to express its gratitude for the support provided on so many fronts by the U.S. and its agencies as part of this global response. WHO also wishes to express its strong desire to stay in close dialogue with the U.S. as we continue to track the evolving infectious disease situation, sound the alarm when needed, share expertise, and mount the kind of response needed to protect us all from the consequences of epidemics, whatever and wherever their origin might be.

[The figures referred to in Dr. Heymann's testimony follow:]

Emerging/re-emerging infectious diseases 1996 to 2001

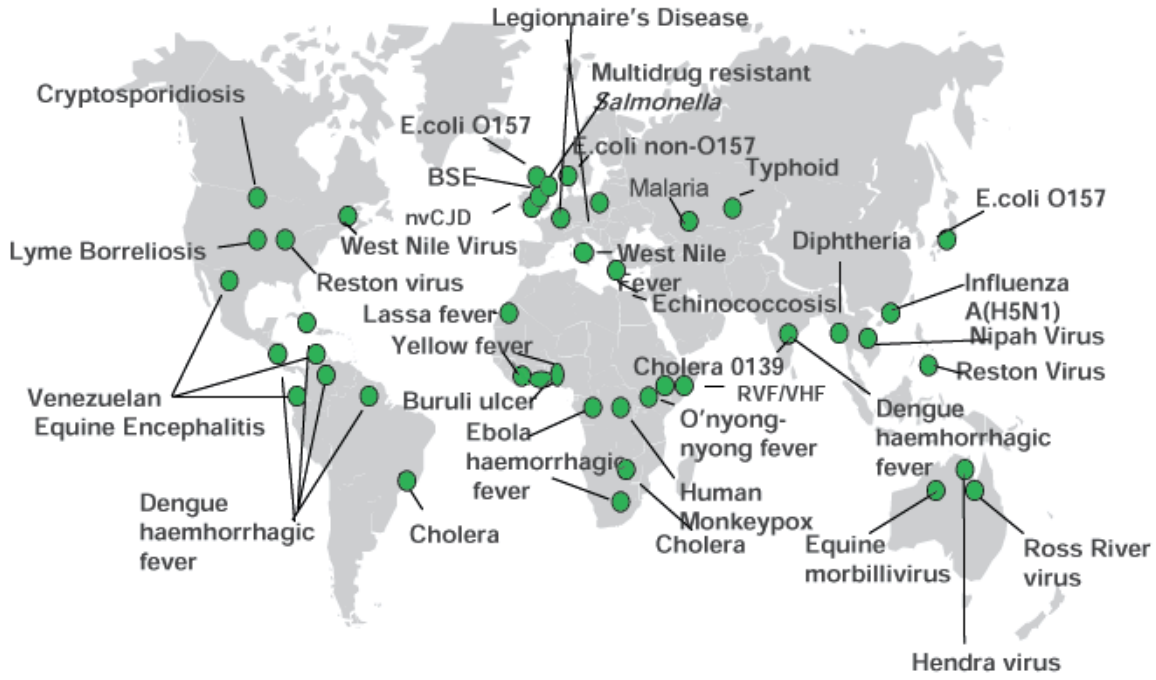

Figure 1

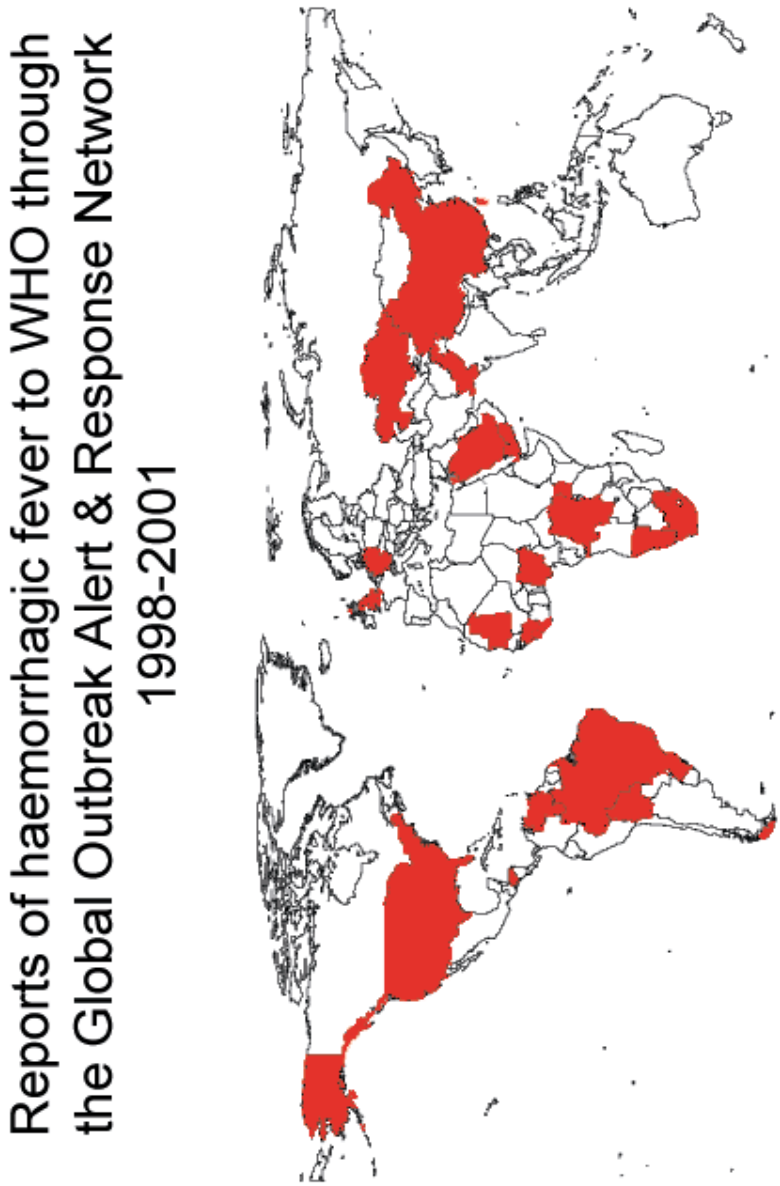
Reports of haemorrhagic fever to WHO through
the Global Outbreak Alert & Response Network
1998-2001

Figure 2

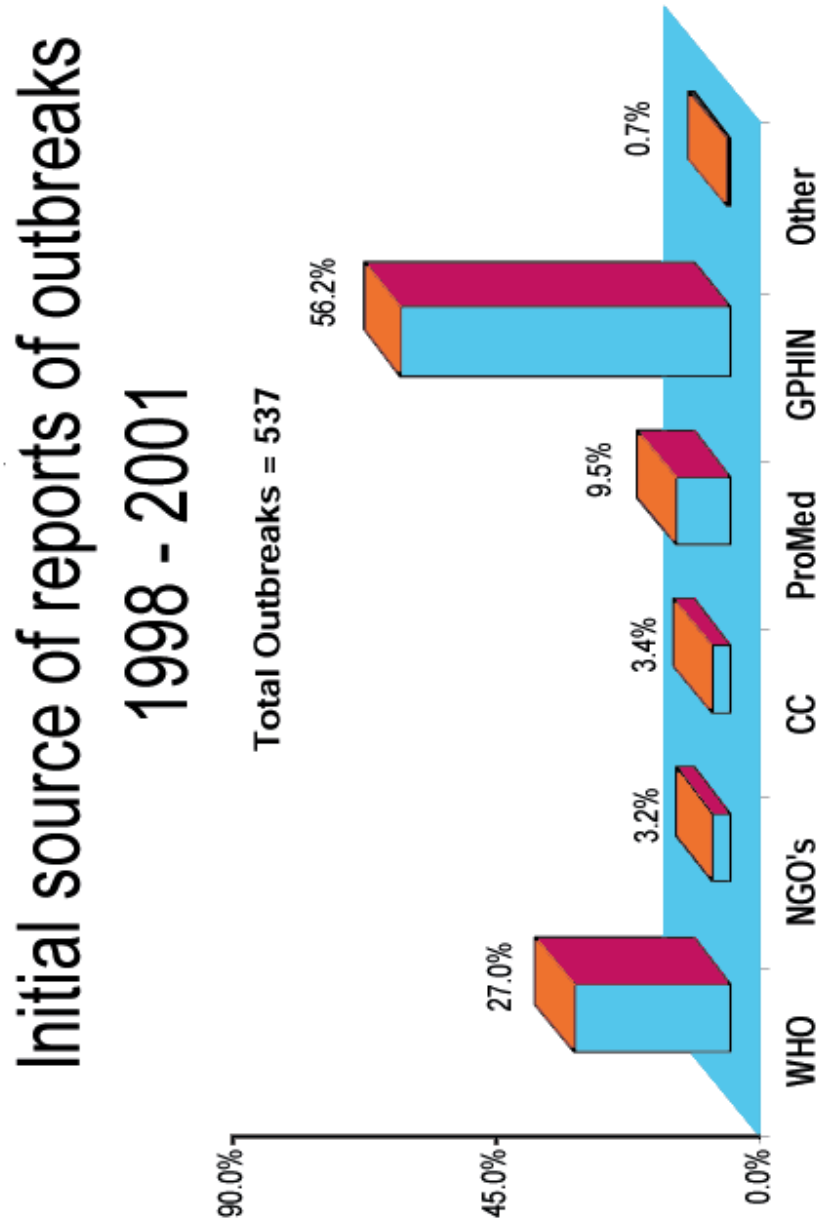
Initial source of reports of outbreaks
1998 - 2001
Total Outbreaks = 537
90.0%
45.0%
0.0%
27.0%
3.2%
3.4%
9.5%
56.2%
0.7%
WHO
NGO's
CC
ProMed
GPHIN
Other

Figure 3

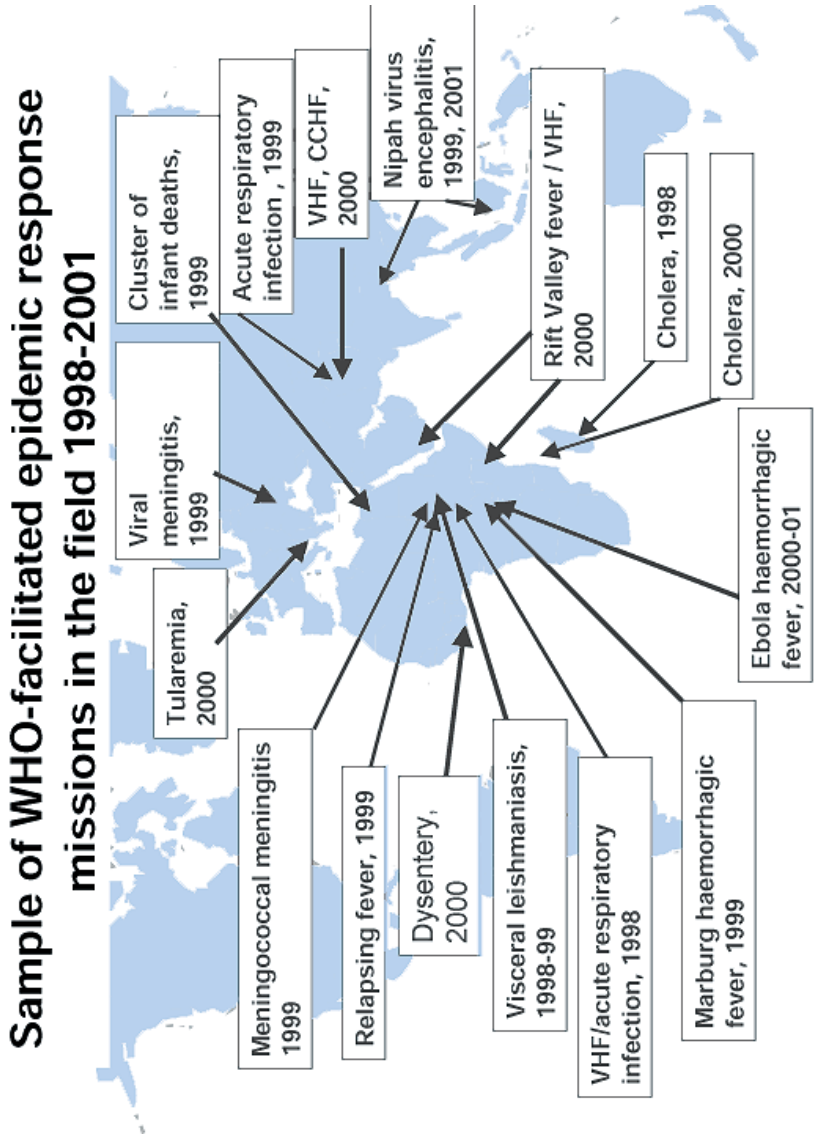
Sample of WHO-facilitated epidemic response missions in the field 1998-2001
Cluster of infant deaths, 1999
Viral meningitis, 1999
Tularemia, 2000
Acute respiratory infection , 1999
VHF, CCHF, 2000
Nipah virus encephalitis, 1999, 2001
Rift Valley fever / VHF, 2000
Cholera, 1998
Cholera, 2000
Ebola haemorrhagic fever, 2000-01
Meningococcal meningitis 1999
Relapsing fever, 1999
Dysentery, 2000
Visceral leishmaniasis, 1998-99
VHF/acute respiratory infection, 1998
Marburg haemorrhagic fever, 1999

Figure 4

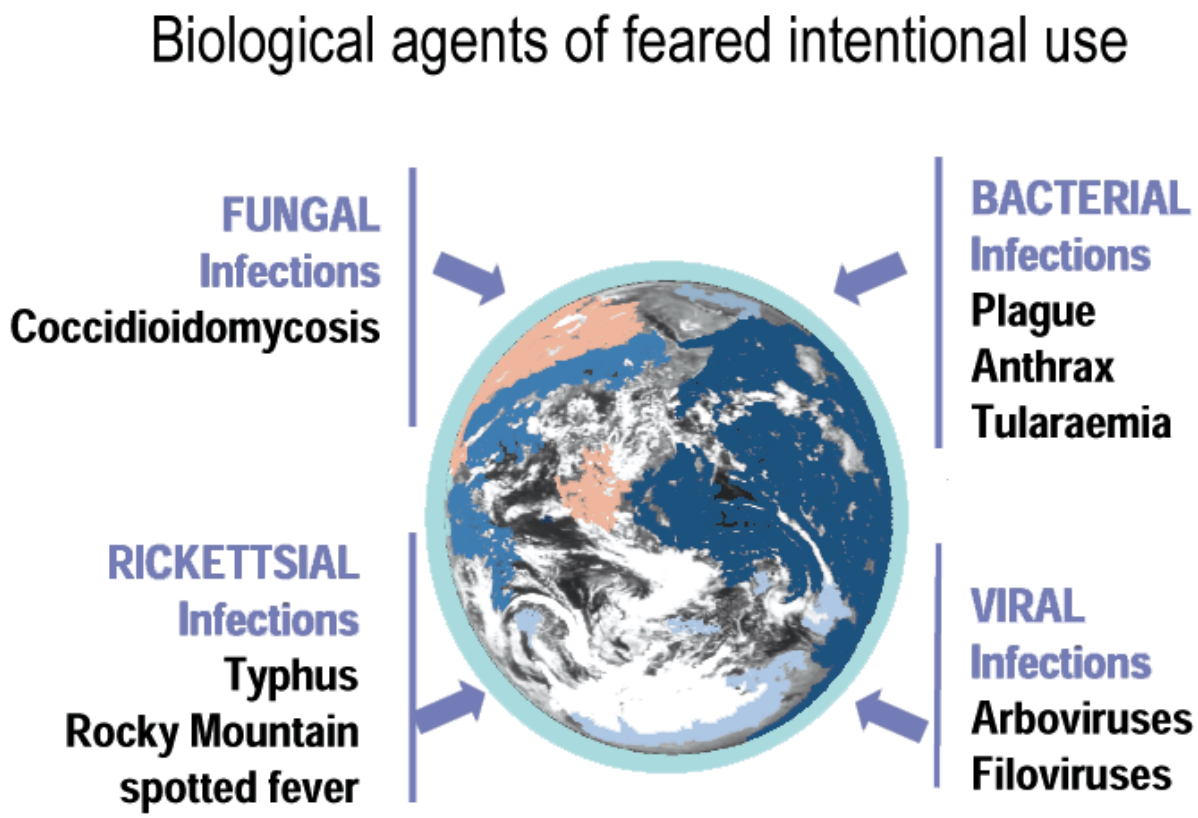
Biological agents of feared intentional use
FUNGAL
Infections
Coccidioidomycosis
BACTERIAL
Infections
Plague
Anthrax
Tularaemia
RICKETTSIAL
Infections
Typhus
Rocky Mountain
spotted fever
VIRAL
Infections
Arboviruses
Filoviruses

Figure 5

The CHAIRMAN. Thank you very much.
Mr. Cilluffo.

STATEMENT OF FRANK J. CILLUFFO, SENIOR POLICY ANALYST, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES, WASHINGTON, DC

Mr. CILLUFFO. Mr. Chairman, Senator Lugar, thank you for the opportunity to appear before you today and to discuss such an important matter. A major terrorist incident inside our borders involving conventional explosives, chemical weapon, or most glaringly biological warfare agents, would undoubtedly put our emergency management response to the test at the local, state and Federal levels.

There's a real danger of being overwhelmed. Two simultaneous bombings of the magnitude of Oklahoma City or a large-scale release of sarin or VX nerve gas, could strain our current system to the point of bursting.

In both cases, however tragic, there would be an immediate explosion or toxic effect to respond to. As Senator Nunn brought up earlier, not necessarily so for a covert attack in which biological weapons were used.

In the case of a biological attack, the first responder, the very tip of the spear, is likely to be your primary care physician, your veterinarian, your agricultural services inspector or perhaps even an entomologist.

Given the unheralded nature of these silent killers, it would fall upon the public health and medical communities to detect the attack, contain the incident, and ultimately treat the victims. Biological weapons can be delivered through several different means, ranging from using people as carriers of the disease, covert dissemination such as aerosolization, or via missile.

As the recent "Dark Winter" exercise illustrated, a successful BW attack of major consequences could be a transforming event. It potentially threatens our American way of life, tearing at the very fabric of our society.

According to a recent report on biological warfare by the National Intelligence Council, over a dozen states are known to possess or are actively pursuing offensive BW capabilities. Perhaps not surprisingly, a majority of the rogue nations populate this list.

By way of example, during the gulf war, Iraq had warheads containing biological weapons produced and ready for use. I'm sure we'll be hearing a lot more about that from Judy Miller's book which will be coming out in the not-so-distant future.

Also according to a forthcoming book by arms control analyst, Jonathan Tucker, the Soviet Union deploy warheads with smallpox weapons on at least four ICBMs. These missiles as gruesome as it may sound, were intended to kill off any remaining survivors after a nuclear attack in the United States.

One cannot over generalize about the intentions and possible use and of course delivery of BW capabilities which do differ from state to state. And research and development vary greatly in terms of pathogen type, associated virulence, toxicity, stability, resistance to detection and/or treatment, quantity of agents, and of course the sophistication of delivery.

For states not inclined to cause mass casualties, and with more discriminate aims, namely to wreak economic havoc, we must also consider agro-terrorism against our Nation's livestock and/or crops. And I look to Senator Lugar and applaud his efforts in this area.

But just imagine the consequences in your home state if wheat, corn, citrus fruit, potatoes, tobacco, livestock, just to name to a few, were the target of a BW attack. As the recent European hoof and mouth outbreak demonstrated, pathogens that target agriculture not only cause massive losses to the cattle industry and to farmers, but also disrupted tourism and the entire economy for that matter.

And certainly our borders are porous to bacteria, fungi, viruses, and insects, all of which could be used to attack our food supply.

While bullets and bombs, not bugs and gas, will remain the weapon of choice for most non-state actors, some, including Osama bin Laden, had expressed interest in acquiring or developing a BW capability.

And while it is more likely to be a crude device and means of delivery, non-state actors may not be overly concerned about retaliation, making them more likely to actually use biological agents. After all, it's hard to retaliate to a bomb actor with no address.

While the likelihood of a catastrophic BW attack on the U.S. homeland, whether committed by state or non-state actors, whether delivered covertly or by missile, remains relatively low in the foreseeable future, the consequences are simply too high to be ignored.

Though I say all of this in terms of threat and the like, that I believe since the end of the cold war, political forecasting and threat forecasting for that matter has made astrology look respectable.

While there is general consensus that we are inadequately prepared to deal with bioterrorism, we are not starting from scratch. We now need to ask ourselves what policies, programs, and procedures have worked to date. What are the centers of excellence that can be built upon and leveraged.

What has not worked. And what are the major gaps and shortfalls that have not been adequately addressed at all. This in turn lays the groundwork to proceed to the next step of crafting an effective national strategy to defend against bioterrorism.

Although Federal, state and local governments have made some impressive strides, regrettably the whole remains less than the sum of its parts. Let me very briefly explain.

We are now at a crossroads. While credit must be given where it is due, the time has come for cold-eyed assessment and evaluation to get to Mr. Helms' point earlier. We must recognize that we don't have a comprehensive strategy for countering this threat or the larger challenges of homeland defense. And I commend the chairman for tackling this issue in its entirety.

As things presently stand, there is neither assurance that we have a clear capital investment strategy nor a clearly defined end-state, let alone a clear sense of the requisite objectives needed to reach this goal.

Notably, no single Federal agency owns this strategic mission completely. For the moment, however, many agencies are acting independently in what needs to be a coherent response. My vision of a comprehensive strategy incorporates a full spectrum of activi-

ties from prevention and deterrence, our first objective should always be to get there before the bomb goes off, to interdiction and prosecution, to domestic response preparedness and retribution.

All too often these elements of strategy are treated in isolation. This is a cross-cutting issue, yet we are still organized along vertical lines. This to me is the greatest challenge from the organizational standpoint.

Any strategy must incorporate both marshaling of domestic resources and the engagement of international allies and assets. It requires monitoring and measuring the effectiveness or benchmarking of the many programs that implement the strategy so as to lead to common standards, practices, and procedures.

In short, our capabilities and organizations must be strengthened, streamlined, and then synergized so that effective prevention will enhance domestic response preparedness and vice versa.

I'm not going to get into what the prevention side as I had planned, because I think Mr. Woolsey addressed those issues very, very well. But multi-disciplinary intelligence collection is crucial to provide indications and warning of a possible attack, and also to illuminate key vulnerabilities that can be exploited and leveraged to disrupt an attack before they occur.

We need to be able to tap in, the IC, the intelligence community, needs to be able to tap in to the scientific and biomedical research communities, something they have been having some troubles with. Indeed some of most critical intelligence related to bioterrorism may be derived through organizations such as the WHO which aren't really though of as intelligence collectors.

Clearly our first line of defense should not be at our shores or at our water's edge which is why I'm happy this committee is taking on this issue. If you just look at the pre-empted bombings during the millennium celebrations by the Jordanians, endless American lives were saved. The discussion we'd be having today would likely be very different if those bombings had succeeded.

Let me just turn briefly to domestic response preparedness. We must expand the national security planning table to include the medical, public health and human services communities. They must have a front row seat at this table as this is both a matter of national security and public health.

Yet to be blunt, as we have already heard, these communities are under-equipped, under-informed and ill prepared for the threat. And in our recent report we had a veritable laundry list of recommendations which I won't bore you with, but I'm just going to touch on three general priorities.

In these priorities as a backdrop I think it's important to ensure that we receive a national security return on investment, a counterterrorism bang for our counterterrorism buck. It's not just throwing money at these issues but making sure there is an ROI.

First we must capitalize the public health structure. Core public health functions, disease surveillance and laboratory capability will be the foundation of detection, investigation, and response for bioterrorist threats. This targeted approach would also have secondary and tertiary benefits to the public health community as a whole.

Second, we must develop a national bioterrorism surveillance capacity. Surveillance is the touchstone of public health and organizes the other capacities within the public health sector that allows public health and emergency managers to monitor the general health status of their population, to track outbreaks and serve as an alerting vehicle for a bioterrorist attack.

Third, we need to expand the provisions on biological terrorism in the Terrorism Annex of the Federal Response Plan. It is absolutely critical we lash up emergency management with public health, most notably to build a strong FEMA-HHS partnership.

Further, and with specific regard to the private sector who I believe are at the leading edge of technology, we need to incentivize them to pull them into this war.

Much of the forgoing discussion centers on the organization of the Federal, state and local governments. It is applicable whether a biological weapon is delivered covertly by terrorists or by missile. Unfortunately, somewhere in the course of discussions, these two distinct issues became mutually exclusive.

It is not an issue of either or, rather we can and I feel must defend against both. The U.S. cannot be like the proverbial ostrich with its head in the sand and act surprised when we get kicked in the most obvious place. Moreover, if we concentrate on only one method of delivery at the expense of another, we merely displace risk and may even encourage attack in those other areas.

I think it's clear that President Bush has made this one of his priorities. I think we need to give him and Vice President Cheney time to come up with their plan as well as to see how the Office of National Preparedness comes together.

But I think if we look at it backwards, the President must never turn to the cupboard and find it bare. He should never be placed in a position where he must step up to the podium and address the American people to explain what he could have, should have, would have, but did not because this or that inside the beltway debate.

And, yes, policy without resources is rhetoric. Despite the magnitude of the challenge, there is no doubt that our great country can rise to it. But to do so requires not only vision but also political will.

Presidential and congressional leadership and follow-through are needed to marshal our wherewithal in order to turn concepts into capabilities, to move from nouns to verbs, as you ably addressed earlier, Mr. Chairman.

Developing and implementing and sustaining such a strategy and plan must be one of the highest priorities for U.S. national security.

Thank you for the opportunity to share my thoughts with you today. As a carrier of foot-in-mouth disease, I've rarely had an unspoken thought. I'd be pleased to try to answer any questions you may have at this point. Thank you.

[The prepared statement of Mr. Cilluffo follows:]

PREPARED STATEMENT OF FRANK J. CILLUFFO

Chairman Biden, Senator Helms, distinguished committee members, it is a privilege to appear before you today to discuss this important matter. I would like to commend you for squarely facing this complex challenge.

Although there is no way to predict with certainty the biological warfare threat to the homeland in the short-term or the long-term, it is widely accepted that unmatched U.S. power (economic, cultural, diplomatic, and military) is likely to cause America's adversaries to favor "asymmetric" attacks over direct conventional military confrontations. These strategies and tactics aim to offset our strengths and exploit our weaknesses. Against this background, military superiority in itself is no longer sufficient to ensure our nation's security.

A major terrorist incident on U.S. soil involving chemical weapons, conventional explosives or most glaringly, biological warfare (BW) agents, would put our emergency management response to the test at the local, state, and federal levels.

There is a real danger of being overwhelmed—two simultaneous bombings of the magnitude of Oklahoma City or a large-scale release of sarin or VX nerve gas—could strain our current system to the point of bursting. In both cases, if no advance warning was available, local and state emergency responders such as firefighters, police, and paramedics would arrive on the scene first. They would be followed by federal assets hours or perhaps days later. It would be a race against time to turn victims into patients. In the case of a chemical attack the window is likely small, the so-called "golden hour," to administer life saving antidotes. It may take months to complete decontamination, recovery and reconstitution efforts, and decades for the community to come to grips with the tragedy and begin healing. In both cases, however tragic, there would be an immediate explosive or toxic effect to respond to, not necessarily so for a covert attack in which biological weapons were used.

It could take days, or even weeks, for the symptoms of a biological agent to begin to manifest themselves. In the case of a BW attack, the first responder, the very tip of the spear, is likely to be a primary care physician, healthcare provider, veterinarian, agricultural services inspector, or perhaps an entomologist. Given the unheralded nature of these *silent killers,* it would fall upon the public health and medical communities to detect the attack, contain the incident, and treat the victims. The delayed onset of symptoms, coupled with the fact that it is difficult to discern a deliberate BW attack like smallpox from a naturally occurring infectious disease outbreak, makes attribution and identification of the perpetrators exceedingly difficult. Moreover, this type of attack can wreak havoc with the public, which must confront fear of the unknown.

Biological weapons can be delivered through several, different means, ranging from using people as carriers of the disease (including person to person infections), covert dissemination such as aerosolization, or via missile.

As the recent "Dark Winter" exercise illustrated, a successful BW attack on the United States, could be a transforming event. Beyond the physical damage and the loss of life, a major BW attack could shake the confidence of our citizens in our government to the core. It potentially threatens our American way of life, tearing at the very fabric of our society. We must grapple with difficult issues such as whether we are protecting America or Americans. Ideally, we are defending both, but no matter how robust our defenses, we will never be able to protect everything, everywhere, all the time, from every potential adversary.

In a recent report on biological warfare by the National Intelligence Council, it is stated that over a dozen states are known to possess or are actively pursuing offensive BW capabilities. Perhaps not surprisingly, a majority of the "rogue nations" populate this list.[1] States have a variety of reasons for developing biological weapons: to augment conventional war fighting capabilities, for blackmail, for deterrence/compellence, and/or for prestige.

By way of example, during the Gulf War, Iraq had warheads containing biological and chemical agents produced and ready for use. Also, according to a forthcoming book by arms control analyst Jonathan Tucker, the Soviet Union deployed warheads with smallpox biological weapons on at least four ICBMs—the SS–11, SS–13, SS–17, and SS–18. These missiles were intended to kill off any American survivors in the aftermath of a nuclear attack.

One cannot over-generalize about state intentions and possible use and delivery of offensive BW capabilities (research and development vary greatly in terms of pathogen type and associated virulence, toxicity, stability, resistance to detection/treatment, quantity of weaponized agents, and sophistication of means of delivery), which differ from state to state. While the resources available to states to develop

[1] As many BW agents can be developed clandestinely, detection of BW programs and/or acquisition of BW capabilities is vexing. Furthermore, given the dual-use nature of biotechnology it is possible to cloak offensive BW efforts to appear to be legitimate research. Nations engaging in camouflage, concealment and deception programs could ramp up a BW capability with little or no warning to U.S. intelligence collection efforts.

biological weapons are much greater than those available to non-state actors, they remain constrained to an extent by the possibility of retribution and retaliation.

For states not inclined to cause mass human casualties and with more discriminate aims, namely to cause economic havoc, we must also consider agricultural bioterrorism (agroterrorism) against our nation's livestock and/or crops.

Imagine the consequences in your home state if wheat, corn, citrus fruit, potatoes, tobacco, or livestock (to list a few) were the target of a BW attack. As the recent European hoof-and-mouth outbreak demonstrated, pathogens that target agriculture not only cause massive losses to the cattle industry and farmers, but also impact a nation's ability to feed its citizens and disrupt the economy. In addition it upsets free travel and tourism, which are secondary effects, but equally costly. Certainly U.S. borders are porous to bacteria, fungi, viruses, and insects, all of which could be used to attack the nation's food supply.

While bullets and bombs, not bugs and gas, will remain the weapon of choice for most non-state actors or terrorist organizations, some have expressed interest in seeking to acquire from other states or develop their own offensive BW capability. In my eyes, this represents more of an evolving threat, and although much has been written on the subject, the scientific sophistication needed to sustain and deliver BW agents, if not insurmountable, is substantial, nonetheless the fabrication of a crude BW device and means of delivery, on the other hand is very realistic and difficult to detect or preempt at any time. Moreover, conventional explosives continue to become more lethal and for the most part have been effective in achieving their terrorist aims.

But unlike their state sponsored counterparts, non-state actors are much freer from the constraints of retaliation, making them more likely to use biological agents. After all it is hard to retaliate against an actor if there is no return address. Modern terrorism trends also highlight a propensity toward indiscriminate violence and greater casualties. For example, a *hamas* training manual expounds that it is foolish to hunt a tiger when there are plenty of sheep to be had. And Osama bin Laden has publicly pronounced that acquiring weapons of mass destruction, chemical, biological, radiological, and nuclear (CBRN), is a religious duty. Whereas traditionally terrorism was a political tactic, an attempt to get to the negotiating table, some of today's groups motivated by radical religious or nationalist beliefs, no longer seek a seat at the table, but rather want to blow the table up altogether and build their own in its place.

While the likelihood of a catastrophic BW attack on the U.S. homeland, whether committed by state or non-state actors, whether delivered covertly or by missile, remains relatively low in the foreseeable future, the consequences are too high to be ignored.

As a general matter, we need to approach this problem holistically. We must strike the proper balance between protecting our citizens and preserving our liberties and must not destroy our way of life in an effort to save it. Achieving this balance demands clearheaded prioritization of interests and resources, and thinking the unthinkable while we have the time to work out the problems that may arise.

While there is general consensus that the United States is inadequately prepared and under-equipped and resourced to deal with bioterrorism, we are not starting from scratch. In determining how to proceed as a nation to defend against bioterrorism, we must ask ourselves what policies, programs, and procedures have worked to date (what are the centers of excellence that can be built upon)? What has not worked? And what are the major gaps and shortfalls that have not been adequately addressed? This in turn, lays the groundwork to proceed to the next step of crafting an effective national strategy for defending against bioterrorism.

Although federal, state, and local governments have made impressive strides to prepare for bioterrorism, regrettably the whole remains far less than the sum of its parts. Let me briefly explain.

The United States is now at a crossroads. While credit must be given where it is due, the time has come for cold-eyed assessment and evaluation, and the recognition that we do not presently have—but are in genuine need of—a comprehensive strategy for countering the threat of bioterrorism and the larger challenges of homeland defense. It is important to remember that defense against bioterrorism is but one plate in our counterterrorism armor.

As things presently stand, however, there is neither assurance that we have a clear capital investment strategy nor a clearly defined end-state, let alone a clear sense of the requisite objectives to reach this goal.

Make no mistake, though. The dimensions of the challenge are enormous. The threat of bioterrorism by states and non-state actors presents unprecedented planning challenges to American government and society.

Notably, no single federal agency owns this strategic mission completely. For the moment, however, many agencies are acting independently in what needs to be a coherent response, a goal that is not out of reach.

To the contrary, we now possess the experience and knowledge for ascertaining the contours of a comprehensive strategy, a coherent response, and a future year program and budget to implement the strategy. It also bears mentioning that strategy must be a precursor to budget.

In my view, effective organization is the concept that not only lies at the very heart of a comprehensive national counterterrorism strategy but also underpins it—from start (meaning pre-event preventive, preemptive and preparedness measures), to finish (meaning post-event crisis and consequence management, and response).

My vision of a comprehensive counterterrorism strategy incorporates a full spectrum of activities, from prevention and deterrence to retribution and prosecution to domestic response preparedness. All too often, these elements of strategy are treated in isolation. Any strategy must incorporate both the marshaling of domestic resources and the engagement of international allies and assets. And it requires monitoring and measuring the effectiveness ("benchmarking") of the many programs that implement this strategy so as to lead to common standards, practices, and procedures.

In a recent CSIS report on combating CBRN terrorism that was developed from a panel I chaired, we set out a roadmap of near-term and long-term priorities for senior federal officials to marshal federal, state, local, private sector, and non-governmental resources in order to counter the terrorist threat. Our findings and recommendations speak not only to "the usual suspects" at each level of government but also to new actors, both public and private, that have taken on added salience in the current security environment.

In our view, a complete CBRN counterterrorism strategy involves both (1) preventing an attack from occurring (our first priority should always be to get there before the bomb goes off; or better yet, prevent it from being built in the first place), which includes nonproliferation, counter-proliferation, preemption, and deterrence, and (2) preparing federal, state, local, private sector and non-governmental capabilities to respond to an actual attack. In short, our counterterrorism capabilities and organizations must be strengthened, streamlined, and then synergized so that effective prevention will enhance domestic response preparedness and vice versa.

With respect to prevention, a multifaceted strategy is in order. The common thread underpinning all of these, however, is the need for a first rate intelligence capability. The breadth, depth, and uncertainty of the terrorist threat demands significant investment, coordination, and retooling of the intelligence process across the board for the pre-attack (warning), trans-attack (preemption), and post-attack ("whodunit") phases.

Several steps to strengthen the IC need urgent examination and may require significant changes to intelligence programs and budgets. These include:

- *Investing in all-source intelligence capabilities.* Multi-disciplinary intelligence collection is crucial to provide indications and warning of a possible attack (including insights into the cultures and mindsets of terrorist organizations) and to illuminate key vulnerabilities that can be exploited and leveraged to disrupt terrorist activities before they occur.

To date, signals intelligence has provided decision makers with the lion's share of operational counterterrorism intelligence. National technical means cannot be allowed to atrophy further. While a robust technical intelligence capability is important, enhancing our human intelligence capability is even more so.

- *Invest in intelligence analytical capabilities.* The intelligence community, including the FBI, must invest in expertise—linguists, BW experts, and regional specialists—to buttress and synthesize its analytical ability to track terrorists considering using biological weapons. This also requires tightening coordination among the non-proliferation, counter-proliferation and counterterrorism communities . . . not only interagency, but also intraagency.
- *Tap the scientific and biomedical research communities.* Develop relationships between the IC and the scientific and biomedical research communities, whose knowledge of emerging capabilities and of other information gleaned from the open scientific literature, international scientific collaborations, and conferences could prove invaluable to the IC with respect to the bioterrorism threat.

Indeed, some of the most critical intelligence related to bioterrorism may be derived through the ongoing and open-source practice of international public health and surveillance activities, such as those run by the World Health Organization.

In the same vein greater attention to nonproliferation and counterproliferation efforts provide the much-needed stitch in time. We need to think about ways to reassess arms control measures to limit the proliferation of BW agents, material, and expertise. This cannot be monitored like a START agreement or via traditional international conventions, but the United States should take the lead in building international support for multinational activities, while maintaining, and perhaps even codifying, the right to take action, including military action, against violators.

In so doing, though, it must be kept in mind that traditional arms control measures—which assume large state efforts with detectable weapons production programs—are less effective in monitoring smaller proliferation efforts, or even large efforts, as the development of BW capabilities lend themselves to covert production. These will also be more effective vis-a-vis state-sponsors of terrorism than non-state actors. However, by focusing on state actors, we may also capture non-state actors swimming in their wake.

Along with some foreknowledge of the actions of hostile parties, the U.S. should strengthen its partnerships with foreign countries. Bearing in mind the transnational characteristic of the threat, the U.S. would be remiss in trying to address the problem alone.

Diplomacy plays a major role in combating terrorism. Considering the shift away from political terrorism and towards ideologically based terrorism, many countries, the U.S. included, find themselves more at risk. An international interest exists in learning about and dealing with terrorism and there are many states that have already acquired a breadth of knowledge on the subject. The U.S. could draw on many of these countries' experiences, thereby flattening its learning curve.

Moreover, engagement with these nations is critical for antiterrorism and counterterrorism endeavors, where cooperation and understanding provide the keys to success. Most importantly, cooperation works. The Jordanian authorities saved countless American lives during the millennium celebrations by preventing planned attacks on American tourists in the region. Clearly our first line of defense should not be on our shores at the water's edge.

No matter how robust our intelligence capabilities and efforts, we cannot prevent 100 percent of the threat 100 percent of the time. Our emergency responders—those first on the scene of a "no warning" event—are state and local personnel: police, firefighters, and medics—not federal workers. With that in mind, I want to focus on domestic response preparedness because that is where the matter of effective organization figures most prominently.

Organization must come from the bottom up as well as from the top down. This requires that policymakers address the current "crazy-quilt" of doctrine, legal authority, equipment, and training for emergency responders. Bridge-building also involves reaching out to relative newcomers to the national security field—in particular, the medical, public health, and human services communities—who need to be integrated into our counterterrorist effort and our (comprehensive) national strategy. This is simultaneously a national security and a public health concern. In addition, the value of training and exercising must not be underestimated. Hopefully, it will be the closest we get to the real thing. And if not, it allows us to make the big mistakes on the practice field and not on Main Street, U.S.A.

The medical, public health, and human services communities are especially critical to bioterrorism preparedness and response, as they would play a prominent role in detection, management, containment and medical treatment of victims. Here again, however, the need for effective organization stands in marked contrast to the present state of affairs, which is sub-optimal at best. Smart shoppers will want more accountability along the lines of defined core public health capacities for bioterrorism preparedness that deliver functional capabilities. This activity should be expanded and coordinated with other agencies involved in national preparedness.

Put bluntly, the biomedical, public health, and human services communities are under-equipped, under-informed, and ill prepared for a biological attack and for infectious disease in general. Accordingly, our recommendations on the public health/medical side read like a veritable "laundry list."

Even without reiterating our full complement of suggestions, the extensive and sweeping character of what is needed is evident in but a partial list: capitalize the public health structure; develop a national bioterrorism surveillance capacity (epidemiological monitoring capability); develop and distribute rapid and more reliable diagnostic capabilities and systems; develop a comprehensive strategy for assuring surge capacity for healthcare; streamline national pharmaceutical stockpiling efforts; and increase research and development for new pharmaceuticals, vaccines and antidotes.

First we must capitalize the public health structure. Core public health functions (disease surveillance and laboratory capability) will form the foundation of detec-

tion, investigation, and response for bioterrorist threats. In implementing these solutions, we should focus on the terrorist threat. We need to ensure that we receive counterterrorism bang for our counterterrorism buck, and that we do not simply throw money at the public health sector.

This targeted approach would have valuable secondary and tertiary benefits. Strengthening the ability to deal with extraordinary, and especially catastrophic, events provides tools and capabilities that are equally valuable in dealing with "ordinary" situations, e.g; natural outbreaks. Thus preventive measures, designed for the stuff of nightmares, also have utilitarian, day-to-day, functions and benefits.

Second, we must develop a national bioterrorism surveillance capacity. Surveillance is the touchstone of public health and organizes the other capacities within the public health sector. An effective national bioterrorism surveillance system allows public health and emergency managers to monitor the general health status of their population (human, livestock, and crops); track outbreaks, monitor health service utilization; and serve as an alerting vehicle for a bioterrorist attack.

Third, we need to expand the provisions on biological terrorism in the Terrorism Annex of the Federal Response Plan. The current U.S. plan for an organized response must be updated to include preparedness for a biological attack, which presents a host of unique and complicated challenges and requires a re-examination of the lead agency roles and missions. For example, the National Disaster Medical System (NDMS), composed of FEMA, the Departments of Defense, Health and Human Services, and Veterans Administration, has no strategy to rapidly augment medical resources at the state and local levels in the event of a bioterrorist attack. The NDMS has never been properly resourced, or properly focused on the issue of bioterrorism response.

To these (and other) ends, the medical, public health and human services communities must work in greater partnership with each other—and must coordinate more effectively with the larger national security community. Instead, however, we currently have a series of "disconnects."

Within the federal government alone, for instance, we have yet to develop (for counterterrorist purposes) smooth channels of inter-agency and intra-agency coordination and cooperation. Many agencies have had little past experience working together, such as the intelligence community and the Departments of Defense, Justice, Health and Human Services, Agriculture, and Energy as well as the Federal Emergency Management Agency and the National Institutes of Health (NIH). Certainly, we need to envisage a better FEMA-HHS partnership, one capable of galvanizing the public health and medical sector in response to bioterrorism.

Indeed, the core capacity for public health and medical care needs to be greatly enhanced with respect to detection and treatment of infectious disease. Further, and with specific regard to the private sector, the expertise of the commercial pharmaceutical and biotechnology sectors has yet to be genuinely leveraged. This situation must change, and new funding strategies must be explored to "incentivize" engagement of the private sector as a whole in the task of preparedness planning and capability-building.

The United States needs to develop integrated surge capability for the entire health care system. We must first identify all existing assets and how they could be mobilized. Next, we need working strategies to be able to balloon care-giving efforts, at both the regional and national levels.

Again, the United States also needs to look internationally. The United States ought to work with the World Health Organization (WHO) to monitor global infectious disease trends and outbreaks of disease, strengthen international surveillance efforts, and provide advance warning for a bioterrorist attack. Here too is an example of where immediate strengthening of resources for national and international security purposes would have immediate secondary and tertiary benefits.

Once clear recommendations are made and a national strategy exists, the Defense Production Act of 1950 (DPA) provides policymakers with the means of marshaling and mobilizing the resources that would be crucial in the event of a terrorist attack with CBRN weapons. In addition to helping the United States prepare, the DPA provides some necessary authority to implement policies and procedures.

The act's two-fold objective is: to ensure the availability of national defense products, materials, and services that are required to maintain national defense and emergency preparedness requirements, without overly disrupting the normal course of business and to provide U.S. industry with the necessary structure and framework to provide an inclusive response to a national security emergency. Thus the act facilitates both emergency and non-emergency preparation and planning.

It could provide the necessary tools to put programs and people in position to prevent disaster. While proper previous planning prevents poor performance, it may also deter malfeasants, preempting their plans and providing greater security.

However, the DPA must not be used to interfere with the free market and the ebb and flow of commerce. While our nation's security is of great importance to its citizens, fundamental principles of openness and freedom from restraint supersede even that. A dynamic balance exists between the need for defense preparedness and unfettered capitalism. This balance needs to be scrutinized before the government invokes the DPA to ensure that undue weight is not given to one side or the other, and avoid destroying what we hold dear in an effort to protect it.

Much of the foregoing discussion centers on the organization of the federal, state, and local governments. It is applicable whether the delivery of a biological weapon is delivered covertly by terrorists or by missile. Unfortunately, somewhere in the course of discussions these two distinct issues became mutually exclusive. The debate became a question of either defending against bioterrorism or missiles. We can and must defend against both threats. The United States does not have the luxury of treating these two threats as an either/or proposition. They must each be monitored, deterred, and defended against through different mechanisms. We cannot escape the reality that they both exist. The United States cannot be like the proverbial ostrich with its head in the sand, and be surprised when it is kicked in the most obvious place. Moreover, if we concentrate only on one method of distribution at the expense of another, we merely displace risk and may even encourage attack in the other areas.

The President and Vice President's laudable work in this area, creating the Office of National Preparedness and working towards formulating a national strategy, demonstrate that the administration understands the dangers and is actively working to lessen them. The President must never turn to the cupboard and find it bare. He should never be placed in a position where he must step up to the podium and address the American people to explain what he could have, should have, or would have done, but did not because of this or that. After all, policy without resources is mere rhetoric. Formulation of this strategy is a necessary first step in the process.

Despite the magnitude of the challenge, there is no doubt that our great country can rise to it. To do so requires not only vision but also political will. Presidential and Congressional leadership will therefore be needed to marshal our wherewithal in order to turn concepts into capabilities. Developing, implementing, and sustaining such a strategy and plan must be one of the highest priorities for U.S. national security.

Thank you for the opportunity to share my thoughts with you today. I would be pleased to try and answer any questions that you might have.

The CHAIRMAN. Thank you. Thank you all for your testimony. I'm going to try to be as pointed as I can here. Dr. Henderson, we've discussed two problems. One is diseases that naturally occur, that are not a consequence of some maniacal plot on the part of an individual or individuals.

But I'd like to focus on the biological threat as it relates to a conscious decision on the part of an individual, group, a nation state or any subordinate thereof to generate this problem, whatever the problem, smallpox or whatever.

As a scientist, what are those dangerous infectious diseases that have the capacity to spread rapidly and do great damage that are most easily able to be manufactured, produced, stored, and transmitted by bad actors? We heard about smallpox. We've heard about anthrax.

I'd like you to speak to two things. What else is in that group of biological weapons? And what is the degree of difficulty in manufacturing that substance and transporting it for the purposes intended?

Dr. HENDERSON. Thank you, Mr. Chairman. We actually were very concerned about just this question as we formed the centers some 3 years ago. In fact, one could use any organism that could infect as a weapon. But in fact we really aren't concerned about many of them as major threats to the health of the community at large.

What we are really concerned about are organisms that could threaten civil security and the integrity of the government. And we came up with five and a group: smallpox; anthrax; plague; tularemia, or rabbit fever, as it's called, which can spread in an aerosol and cause quite a number of deaths; botulinum toxin which is a poison usuallyproduced in food; and finally, the group of diseases causing hemorrhagic fever—primarily the Lassa fever, Ebola, Marburg—all of which would be treated in a similar manner.

It was our feeling that what we needed was to focus on a small enough group that one could educate physicians about to look out for, what specifically would be problems, because most physicians have seen none of these diseases at all.

Second, what do we do in terms of a response in terms of vaccines, in terms of antibiotics. We focused on a relatively few organisms.

The CHAIRMAN. Now again, I want to make sure I understand. The organisms you have focused on, you indicated why you focused in that, as most physicians haven't seen them, although you theoretically or practically have the ability to deal with them if you are prepared by vaccine, et cetera.

I want to make sure that I understand that it also meets the first criteria. If I am the terrorist, what is that disease, what is that pathogen that is most easily accessible to me and most able to be transported by me with the most devastating impact? Are they the same diseases?

Dr. HENDERSON. No. They are not the same diseases. For example, anthrax is not spread from person to person but it's really quite readily available and rather easily produced in fairly large quantity.

The CHAIRMAN. How is it spread?

Dr. HENDERSON. It is spread, well, let's say in a biological terrorist event it would be by aerosol. You would dry it and distribute it as a spray and let it drift over a community.

It's found in soil and infects animals. It does not normally infect man or, if it does, it infects him on the skin, but inhaled, it can cause very serious problems and a very high death rate.

Now, in looking at this group, we are looking at several things; one, the lethality, the fear of the public to such as plague or anthrax or Ebola. We know that panic is common when these diseases occur. We assessed how easily it would be to disseminate these organisms. By taking all of these different things into account, we eventually reached the list I cited.

Far and away the worst of this group is smallpox, with anthrax probably a cut below and the others coming along behind. But any of them would be a real problem.

The CHAIRMAN. It seems to me that based on what I have been exposed to, taught, listened to, proselytised about—Dr. Iklé knows a great deal about this—is that in order for a terrorist to implement policies, their purpose to be achieved, it has to be something they can take credit for, incredibly take credit for generally speaking.

It is possible we have some group just deciding to do great damage to the United States or somewhere else and never take credit

and make it appear as though it occurred naturally in the environment. But that's usually not the way.

Osama bin Ladin and others, that would not be their *modus operandi* to do that. It's possible that happened. So that's why I asked the question in terms of what the focus is here.

Dr. Iklé, what I wanted to ask you is in your report you speak to a number of these concerns. What is it that you think is the place if you were heading up, and I know this is not your form or function, but I know you know a great deal about it, if you were heading up the intelligence community what would you be looking at and for? Where would you be focusing if your focus was biological threats?

Dr. IKLÉ. I would first start with the recommendations that Jim Woolsey made about opening up the opportunities for collecting the information.

The CHAIRMAN. I got that. What kind of pathogen would you be focusing on?

Dr. IKLÉ. What kind of pathogens? One would have to be entirely advised by the life scientists like Dr. Henderson. It gets you into a delicate situation. I was thinking about that as we were talking a few minutes ago.

If you explain all this in public, you may give guidance to the perpetrators. If you go back to the Aum Shinrikyo story, they obviously didn't invent all this themselves. They read about it and then proceeded to produce these agents.

So there's in this area a delicate boundary between secrecy and public information. I'm basically always in favor of minimized secrecy, because it's used to cover up mistakes.

But this ties in with your previous observation that the perpetrator would want to be known. I could imagine a situation where we are at war overseas, in the Gulf region or what have you, and that country's doing rather badly against our tanks and our fighter aircraft and so on. The enemy may at that point want to weaken the United States with such an attack without being known as the country that caused it for fear of retaliation. So we have to figure in the possibility of clandestine attack.

The CHAIRMAN. I wasn't suggesting that it wasn't a possibility.

Dr. IKLÉ. Sure. I realize that.

The CHAIRMAN. It takes me back to the point made by Mr. Cilluffo that none of these potential, if you will, delivery systems should be viewed as mutually exclusive. I agree, except that we have a problem up here, Mr. Cilluffo; and that gets down to money.

It gets down to prioritizing, it gets down to making judgments about what is the most likely thing that is to happen. It is in the best of all worlds we can spend—if you take a look at a layered missile defense—you are talking somewhere between $100 billion and $.5 trillion depending how layered it's going to be, maybe more.

If you are talking about dealing with public health infrastructure here, we can't even pass a bill introduced by Senators Kennedy and Frist $125 million. Instead, we arrived at the final result of $1 million for the public health infrastructure.

One of the things I'm going to need your help on as we go down the road here, and please do not view this as an introductory op-

portunity for the committee and we'll thank you and goodbye. The bad news is that it's like contributing to a charity. We have your number and we'll be back.

But all kidding aside, one of the things I have to do if I do my job properly as chairman here, and this committee has to do, excuse me for this digression but all committees are intended to do the in-depth look at the policy questions that the entire Senate can't do and make recommendations to the Senate as a whole.

It seems to me part of my responsibility is as I've undertaken this task, and I'm not sure it may be more than I should have undertaken but I've undertaken this task is I eventually have to attach numbers to these initiatives.

The World Health Organization and the global surveillance system to make it work as well as you would like, how much money do you need? I know we say there's a lot of things we can solve without money. There are. But you can't provide more emergency rooms and hospital beds without more money.

You can't deal with the problems that some of you have identified for the research without more money, and so on. So we are going to have to attach some numbers along the line here that are reasonable expectations of cost, which takes me to this.

When I hear—and I'd like any one of you to respond to this—when I hear Senator Nunn say, and I've just explained the whole second rate policymaker here. I'm not a scientist but I've been doing this a long time. And I hear people say, like Senator Nunn and the group that put on the exercise, that we didn't have enough vaccine as they went through this to deal with the crisis.

Well, a logical thing to say would be, OK, if that's a real possibility, why don't we stockpile the vaccine? The reason I asked you the question, Dr. Henderson, that I did, as to what are the most likely agents that if this were to occur would be the easiest and the most devastating pathogens, do we stockpile vaccines or whatever medical response would be required? Do we do that?

In order to do that, we have to identify what we are stockpiling and for what purpose. I know it's obvious why I asked the question. Because eventually we have to get to the point beyond curtailing the availability of those who have the technology and the scientific background to produce these things from going on the free market out there.

We have to begin to figure out how to get our arms around this in terms of policy. And so my question is, does anyone have any sense of what the cost is of what you would list as the first or second most important thing we should be doing?

If I said to each of you the good Lord Almighty came down and sat in the middle here and said, OK, guys, each one of you get to have fully implemented one or two of your recommendations, what would it be that you recommend? Because that's how this place works.

I mean, we could be honest about it. We don't have a holistic approach here. We don't come up and sit down and go through this for a year and say here's the plan and we introduce the entire plan. What is it? What are the first things each of you would do in order to deal with either the intentional spread of or the natural spread

of any of these serious diseases which can wreak havoc upon a society?

Maybe I'll start with you, doctor. And I know that's an unfair question but that's essentially what guys like me end up having to do.

Dr. IKLÉ. It is a key question, Mr. Chairman. And my inclination would be to look at this as a two-stage approach. And I think I mentioned (just while you had to step out) we must work on long lead items to have a surge capability after we had experienced a triggering event that focuses the public and the political consensus on it.

And to that end I would think most of the work would be in the area of preparing vaccines and other pharmaceutical countermeasures, engaging the pharmaceutical industry. And to give you a guess, you asked us properly for a guess of a number—$300 million, $500 million over a spread of the next few years.

The CHAIRMAN. Thank you. Mr. Cilluffo.

Mr. CILLUFFO. And this is not to duck the question, but I really do think there's a need to turn and to look to three criteria which need to be met. And that's authority, accountability coupled with the resources.

Right now we don't know what we are spending on. Right now we don't know how we could leverage other programs that are out there that can be brought into this war.

So I think we really do need some fiscal accountability and responsibility. And it's not only at the Federal level, it's at the state and local levels. And the NGOs and the private sector and then we need to look abroad.

So I think it's a challenge. This doesn't fit in any particular agency's line item. This cuts across everyone's budget. I think intelligence is clearly in my eyes the first area of priority. But again, it's not just an issue of throwing money.

We all know terrorists don't frequent the cocktail circuit. These aren't good people. But we need to have the will to be able to do certain things. I would recommend though that the NDMS, the National Disaster Medical, that there are some capabilities that will need to be brought to bear which need to be leveraged and need to be capable in the time of an event.

This is where the lashing up of FEMA and HHS is crucial, because it's better to make the mistakes through training and exercising on the practice field and not on Main Street, U.S.A.

I would also say in terms of our RDT&E efforts, we should look at a 5-year RDT&E effort as DOD goes through. There's not much, again, accountability. Some of it is with DOD, some of it is here and some of it is there. It's scatter shot. We need to put our arms around this.

The CHAIRMAN. As you have pointed out, and all of you may find this at least interesting if not instructive, for the last 30 years, once a year I get together all the volunteer and paid fire services and emergency responders in my state for a conference.

It's become an event that is taken very seriously throughout my small state, able to get them all together, literally 150 or so people, max. And you know what, they figured this out. They figured out

that they are the ones that are going to be the ones that are going to have to be dealing with this problem.

They are begging now, begging the state and Federal Government. These are mostly blue collar guys and women who are volunteer fire service people or paid fire service people who understand; for example, they just had a little old fire at a place called Motiva relating to sulfuric acid.

They weren't equipped to deal with it. Then they had a little problem with a trailer carrying medical waste material that was very dangerous. They had no idea how to go about it; nobody to call. They had no 911 number.

There's no 911 number that will immediately be on the scene. So it's interesting that this is beginning to seep down to the place where—practically speaking, as the old joke goes—the rubber meets the road, down to these normal people. There's not any sort of celestial body up here of big time Federal folks that is going to come down and say, here's your answer.

But what would you do, Dr. Heymann? What would you have us do if you sat in this seat?

Dr. HEYMANN. Maybe, Mr. Chairman, I could put in perspective a little bit the need for vaccines and for other items which are important today for public health. Today out of Geneva we'll announce that there's an outbreak of urban Yellow Fever in Abidjan, in Cote d'Ivoire.

The last outbreak of urban Yellow Fever occurred in Nigeria in the 1970s and killed over 24,000 people. We have no money to buy the vaccine necessary to vaccinate the 3.5 million people.

The CHAIRMAN. Is there a vaccine?

Dr. HEYMANN. There is a vaccine. It's 17 cents a dose, and we are right now going out to the usual extra budgetary WHO donors to mobilize the money that's necessary to buy these 3.5 million doses of vaccine at the request of the government.

If you look at the major infectious diseases today, AIDS, TB and malaria, there's no vaccine that's effective in any of these. So we have to balance the needs today with the needs that might occur from the intentional use which makes it an even more difficult problem.

As we look over the situation though, there's one thing that's clearly needed. And that is an investment in public health infrastructure. That means in public health laboratories, in epidemiology training, in various activities within countries. There are investments which will deal both with those diseases which are occurring today and the ones that might be caused intentionally.

If we were to look at what it would cost to strengthen the weakest countries that we have now by strengthening their public health laboratory, by starting epidemiology training with their senior level health staff, and by coordinating this outbreak response network until countries can do the job on their own, we estimate about $15 million a year for the next 5 years.

The CHAIRMAN. Fifteen? One-five?

Dr. HEYMANN. Yes, no more than $75 million over 5 years. But even that is very difficult to mobilize.

The CHAIRMAN. Dr. Henderson.

Dr. HENDERSON. Just a parenthetical note that you may be unaware of, Mr. Chairman. There has been smallpox vaccine contracted for—some 40 million doses—by the Centers for Disease Control. This will be delivered some 3 years hence. And there are stocks of antibiotics which have now been provided for that would be immediately available for use for certain of these other diseases.

There is research going on to develop anthrax vaccine which would provide us perhaps a two-dose schedule for protection.

The thing that we are most concerned about, as we look at the whole picture, is that we do not have a national strategy. There are large amounts of money now being spent for programs I'm not going to cite, which are not productive for this program at all.

I believe the national strategy issue is very critical and having an accounting of appropriated funds and how they are being used. If I were to look at selecting only one thing, with your criteria, I'd go back to the public health piece again. The key is that we need an alarm to get at the problem and we need it quickly.

We don't have that now. I think if I were going to invest right now, I would be putting a lot more resources into public health both nationally and internationally in surveillance, in investigation, in laboratories so we get on top of these outbreaks.

The CHAIRMAN. I have many more questions. Unfortunately, I'm supposed to be at a policy meeting at 1 o'clock; although, it's not as important as this. I would like to ask you if you are willing to stay in contact with this committee. Because I have a number of questions I would like to submit.

I'm not trying to make work. And if the questions we submit to you you think aren't worth answering, say so. You are the experts. I'm not being facetious when I say that.

To the extent that you can give us additional guidance, if you were sitting here, how would you proceed to do exactly what you have just said, Dr. Henderson, how do we come up with a national strategy? What should be the locus of that?

I don't know how any of this ever happens without a specific initiative—no matter if it's a Democratic, Republican or Presidential initiative—moving these kinds of things. But how would you go about it? What would you suggest we do?

For example, when we talked about the issue of chemical weapons, we had a Commission that you may—I know you are familiar with, Dr. Iklé, you may have even participated in it. I'm embarrassed to say I don't know.

But it's headed by Senator Baker and Mr. Cutler, among many others. They came back with this very concrete report full of recommendations. For example, with these loose weapons lying around in Russia, they showed us pictures of a clapboard buildings—they looked like old outhouses—with padlocks on them, with enough chemical material in there that if disbursed wouldn't take a missile or anything else to cause devastation to tens of thousands, hundreds of thousands of people.

They came back with a hard recommendation. They said we should be investing $30 billion on very specific initiatives as to how to begin dealing with this. Eventually, this Nation has to come up with a strategy that is, in a sense, bite-sized, that can be trans-

lated to policymakers and justified to our folks back home as to why we just voted to spend *$X* million or billion to do this thing.

And so, we've got to figure out how to get some of this down to that level. This is not the purpose of today's hearing. The purpose of today's hearing is to investigate and to begin a cursory look at what the potential threat is out there. We are going to be having the intelligence community and others come up and tell us about the likelihood of that threat based upon their assessments.

We are going to be having four more hearings relating to chemical and nuclear weapons and so on. So this is the beginning of the process. I don't want you to think that we are foolish enough to think that this is where we are going to be able to come up with a solution or an answer based upon this first hearing.

Part of this is to make my colleagues and myself, beginning with myself, aware of the nature of the problem. Because unless we understand that first, we are not going to get our hands wet.

You all have forgotten more about these issues than we are going to learn. My hope is that you can communicate enough to us and your colleagues in other areas that we can begin to generate a consensus about the willingness to expend money.

The idea that we are unwilling in this environment to spend $125 million on beefing up the public health sector in a bipartisan effort by two Senators, Kennedy and Frist, and we are only able to get a consensus to spend $1 million on it, illustrates the degree of the education that needs to be undertaken here.

So I want to thank you all very, very much, and warn you that, like I said, it's like contributing to a charity. We know where you are. We've called on you Dr. Iklé many, many times, and we will continue to do so as long as you are willing.

But I would like very much to pursue some of this and the specific questions with the other three panelists as well. Thank you all. Sorry to trespass on your time so late, but I appreciate it very much.

Senator Feingold's statement—he was unable to be here—will be placed in the record, and Senator Frist's statement as well.

We are adjourned.

[The statements referred to follow:]

PREPARED STATEMENT OF SENATOR RUSS FEINGOLD

I want to thank the Chairman for convening this important hearing, and all of the witnesses for their time and their insights. Taking a serious look at the U.S. capacity to prevent or respond to a bioterrorist attack is an important part of this committee's broader effort to take a sober look at the varied threats before us and to identify rational policy priorities accordingly.

But as a longtime member and current Chairman of the Subcommittee on African Affairs, I particularly appreciate the second phase of this hearing, which recognizes that Americans' epidemiological security is not guaranteed even in the absence of malicious, deliberate biological threats. As populations shift and international travel increases, people all over the globe are coming into contact with new microorganisms—and, sometimes, new diseases. In fact, according to the General Accounting Office, over the past three decades, more than thirty previously unknown diseases have been identified. I know that this committee will hold hearings focusing on the HIV/AIDS pandemic in the weeks ahead. But whenever I meet with African leaders I am reminded of the devastating effects of other infectious diseases, and of the potential for mutations and treatment-resistance to wreak havoc around the globe. A recent GAO report, which I joined with Senators Frist, Leahy, and McConnell in requesting, reveals that existing international surveillance networks are ill-equipped

to alert us to these emerging threats. These critically important issues that affect a core element of national security—our national health.

U.S. policy choices and priorities should reflect that reality. International disease prevention and control initiatives are important investments in Americans' security, and well-managed, responsible development assistance programs can help governments and civil societies abroad to prevent new outbreaks and conquer persistent scourges. The GAO report indicates that laboratory capacity in the developing world is inadequate, and that investment in infrastructure is desperately needed to help overworked public health professionals function effectively.

This hearing will bring much-needed attention to these issues as the United States considers how best to allocate scarce resources. I look forward to the testimony and to working with my colleagues to make sound investments in improving global epidemiological security.

PREPARED STATEMENT OF SENATOR BILL FRIST

I want to thank Chairman Biden for calling this hearing today on one of the most pressing and disturbing issues of our time—the threat of bioterrorism. I welcome the testimony from our two panels.

Not only will the discussion today focus on steps that have been taken to improve our response to bioterrorist threats, but it will also look at lessons learned from "Dark Winter," an exercise designed to simulate a terrorist attack on the American people with smallpox—a contagious virus that could devastate our country. This exercise taught us about the potential damage such an attack could have on the health, economy and security of our cities, communities and country.

Any threat to the security of the people of the United States from a weapon of mass destruction, even those with low probability of occurrence but high potential consequence, including biological weapons, must be taken seriously through adequate preparation. As we all know, the Bush Administration is committed to a coordinated national effort to deal with terrorist threats. Furthermore, Vice President Cheney will soon be reporting to Congress about the program needs to deal with biological and other weapons of mass destruction. I eagerly await his recommendations.

Whether past or present, bioterrorism remains a significant threat to our country. Exposed individuals will most likely show up in emergency rooms, physician offices, or clinics, with nondescript symptoms or ones mimicking the common cold or flu. Most likely, physicians and other health care providers will not attribute these symptoms to a bioweapon. If the bioagent is communicable, such as smallpox, many more people may be infected in the interim, including our health care workers. Experts say it may take as long as 24 to 48 hours after a bioterrorist attack occurs before federal assistance can arrive, making it the critical time for preventing mass casualties.

To better prepare America, I introduced the "Public Health Threats and Emergencies Act of 2000." This critical legislation, which became law last November, provides a framework for coordinating efforts within the Department of Health and Human Services (HHS) and the Department of Defense to examine our preparedness for a bioterrorist attack. It also requires HHS, the Federal Emergency Management Agency, and the United States Attorney General to review the medical consequences of an attack, and authorizes the National Institutes of Health (NIH) and the Centers for Disease Control (CDC) to develop new vaccines for biological weapons. Funding is authorized to support public health agencies, hospitals, and health care facilities to detect, diagnose, and respond to bioterrorism.

The second panel today will help place bioterrorism in the broader context of preparing for the spread of naturally occurring diseases, such as influenza and West Nile, a flavivirus that primarily relies on migratory birds and mosquitoes for transmission to humans.

Arms control negotiators have used the term "dual use" to refer to biologic production facilities that have the potential to be used by some countries to produce vaccines for children one week and then produce bacteria or viruses for biologic weapons the next. But we can also use the term "dual use" differently: The same infrastructure investments used to prepare our public health communities, doctors and federal agencies to detect, diagnose and respond to smallpox epidemic resulting from a biologic attack can also be used to detect and respond to outbreaks of natural occurring diseases like West Nile.

In addition to strengthening our defenses against a bioterrorist event, the improved public health capacities resulting from preparation and planning will lead

to substantial health benefits in dealing with inevitable natural occurrence of emerging infectious diseases.

Last week the GAO released a report, "Challenges in Improving Infectious Disease Surveillance Systems," requested by Senators Leahy, McConnell, Feingold, and myself. It concludes that global disease surveillance, especially in developing countries, is woefully inadequate to provide advance warning about newly emerged diseases, including antibiotic-resistant tuberculosis, or the suspected use or testing of dangerous organisms as bioweapons. Not only would improving international surveillance networks and capacities help poor countries meet their health care needs, it is in our own security interest to know about emerging threats if we are to appropriately respomd quickly and effectively.

Just this week, a *New York Times* article provided a summary of a recent study documenting strong evidence that HIV/AIDS was a zoonotic disease in chimps that entered the human population around 1930. If we had had the appropriate international public health and surveillance infrastructure in place then, perhaps we could have avoided the epidemic which currently results in 15,000 new cases each day and a death from AIDS every six seconds.

Despite significant medical breakthroughs, our nation faces grave new health threats that could imperil the great medical progress made in the past century. Whether it's biological weapons, microbes resistant to antibiotics, or emerging infectious diseases, a strong front line defense is critical to America's public health infrastructure. By taking steps now to improve our basic capacities to address all public health threats, we ensure our investment in a public health system that keeps our nation safe. The "Public Health Threats and Emergencies Act of 2000" provides a sound policy framework upon which additional measures can be built, and the legislation should be adequately funded.

Biological weapons are but one of the "weapons of mass destruction" for which we must be prepared. And let me be clear, we must adequately fund programs to deter and respond to each of these threats—be they biologic, chemical, or nuclear. All are real. All deserve our attention, our best thinking, and preparation. We must be assured that we are doing all we can to prevent the use of weapons of mass destruction, stop their spread, prevent their delivery by whatever means, and ultimately mitigate their impact should they be used.

The CHAIRMAN. We are adjourned.

[Whereupon, at 1:20 p.m., the committee adjourned, to reconvene subject to the call of the Chair.]

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