

**THE THREAT OF BIOTERRORISM AND THE
SPREAD OF INFECTIOUS DISEASES**

HEARING

BEFORE THE

COMMITTEE ON FOREIGN RELATIONS

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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 Bio-defense 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.

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 airconditioning 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

¹To 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 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 Service; 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 country-wide 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 underfunded 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 cases 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 bioterrorism alone.

Second, we need to mount a robust research and development program for bio-defense. 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 are 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 bio-weapons 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

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 usually produced 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