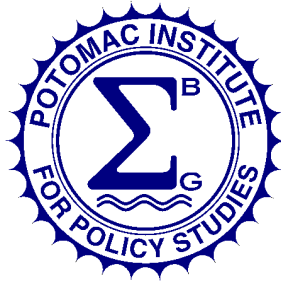


POTOMAC INSTITUTE FOR POLICY STUDIES

**SEMINAR ON  
EMERGING THREATS OF BIOLOGICAL  
TERRORISM: RECENT DEVELOPMENTS**

**PROCEEDINGS REPORT**

PIPS-98-3

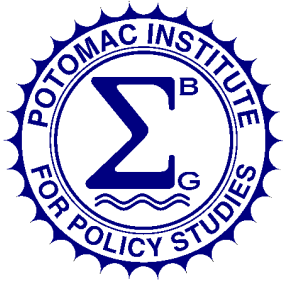


16 JUNE 1998

POTOMAC INSTITUTE FOR POLICY STUDIES  
1600 WILSON BOULEVARD, SUITE 1200  
ARLINGTON, VIRGINIA 22209

AND

THE TERRORISM STUDIES PROGRAM  
THE GEORGE WASHINGTON UNIVERSITY  
2029 K STREET, N.W., SUITE 501  
WASHINGTON, D.C. 20006

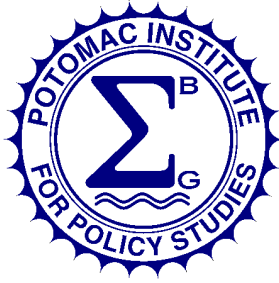


## **PREFACE**

This Seminar was co-sponsored by the Potomac Institute for Policy Studies and the Terrorism Studies Program at The George Washington University. The seminar or these proceedings do not purport to be an in-depth analysis of Biological Terrorism. Views expressed in the following Proceedings Report are those of the individual speakers, and do not necessarily reflect the opinions of the other participants, the Potomac Institute for Policy Studies, or the Terrorism Studies Program at The George Washington University.

Please note that for academic purposes, this transcript has been edited and is not a verbatim representation of the Seminar.

Both co-sponsors thank the presenters for their participation and contribution to the Seminar.



## **Emerging Threats of Biological Terrorism: Recent Developments**

Co-Sponsored by  
**The Terrorism Studies Program at The George Washington University**  
and  
**The Potomac Institute for Policy Studies**

- Date:** Tuesday, June 16, 1998 **Time:** 10:00 a.m. - 4:45 p.m.
- Place:** Dworetzky Auditorium- Fungler Hall, Room 103, On the campus of The George Washington University  
2201 G Street, NW, Washington, DC
- Co-Chairs:** Professor Yonah Alexander, Director, The Terrorism Studies Program, The George Washington University  
Professor Edgar H. Brenner, National Law Center, The George Washington University
- Program:**
- 10:00 a.m. - 10:05 a.m.: Welcome and Introductions**  
Professor Yonah Alexander  
Mr. David Siegrist, Research Fellow, Potomac Institute for Policy Studies
- 10:05 a.m. - 10:45 a.m.: Biological Warfare and Biological Terrorism: An Overview**  
Dr. Gordon Oehler- Senior Fellow, Potomac Institute for Policy Studies  
Former Director, Central Intelligence Agency Non-Proliferation Center  
Mr. David Siegrist- Study Director, Biological Terrorism, Potomac Institute for Policy Studies  
Dr. Brad Roberts- Research Staff Member, Institute for Defense Analysis  
Chairman, Research Advisory Council, Chemical and Biological Arms Control Institute
- 10:45 a.m. - 11:45 a.m.: The Bacterial and Viral Terrorist Threat**  
Dr. William Patrick- Former Chief of Product Development, Ft. Detrick  
Mr. John Huggins- Virology Division, US Army Medical Research Institute of Infectious Diseases (USAMRIID)  
Dr. Ken Alibek (Kanatjan Alibekov)- Former Soviet Biopreparat Deputy Chief
- 12:00 p.m.- 1:30 p.m.: Luncheon: First Responders**  
Mr. William Nagle - Emergency Planning, New York City Mayor's Office
- 1:45 p.m.- 2:30 p.m.: Conventional Countermeasures**  
Mr. Mike Maloof- Director, Defense Technology Security Administration  
Mr. Rinaldo Campana- Federal Bureau of Investigation, WMD Countermeasures Unit
- 2:30 p.m. - 4:00 p.m.: Advanced Countermeasures**  
Dr. Larry Dubois- Defense Advanced Research Project Agency, Biological Defense Program  
COL Gerald W. Parker- Commander, US Army Medical Research Institute of Infectious Diseases (USAMRIID)  
Dr. Anna Johnson-Winegar- Director for Environmental and Life Sciences, Deputy Director for Research and Engineering, OSD  
Dr. Steven Hatfill - National Institutes of Health
- 4:00 p.m. - 4:45 p.m.: Closing Remarks**  
Professor Yonah Alexander - Director, The Terrorism Studies Program, The George Washington University

## **WELCOME AND INTRODUCTIONS**

**Professor Yonah Alexander**

*Director, The Terrorism Studies Program at The George Washington University*

**Mr. David Siegrist**

*Study Director, Biological Terrorism, Potomac Institute for Policy Studies*

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**PROF. ALEXANDER:** Ladies and gentlemen, we have a very tight schedule, so we would like to begin. My name is Yonah Alexander, and I would like to welcome you on behalf of the sponsors, the George Washington University Program on Terrorism Studies and the Potomac Institute for Policy Studies (PIPS), and we will have David Siegrist to welcome you on behalf of the Potomac Institute for Policy Studies.

I would like to also mention that recently, academically, we established an Interuniversity Center for Terrorism Studies, which is a consortium of universities and economic institutions throughout the world, that is trying to identify future threats, and what's more important, to propose recommendations for action. And that new organization is also involved in some of these aspects. In addition, I'd like to mention the International Task Force for the Prevention of Super Terrorism: Biological, Chemical, and Nuclear.

In the past 40 years, we have seen many changes in the forms of terrorism. In the 1970s, for example, we witnessed what one calls "propaganda by the deed:" physical attacks, hijacking and bombing and assassination. Then in the 1980s, we had a new development in terms of the deed by propaganda, psychological warfare, misinformation, and disinformation. And now, in less than a decade of the 20th century, we're witnessing ethnic, racial, and religious intolerance and violence and the escalation to super terrorism -- biological, chemical, and nuclear. We have to look also at the cyber terrorism, as well as information warfare in general.

So I think that the academic community has an intellectual obligation to identify the nature of the threats, and then as I indicated before, propose some steps to reduce the risks to bring it to some manageable levels. And we're doing it despite the views and the school of thought that we should not even touch this particular subject of super terrorism of biological, chemical and nuclear, because of the fear of self-fulfilling prophecies.

And I think that, basically, this is a wrong approach. I recall in the early 1980s during the Cold War that some of us organized the International Task Force on Prevention of Nuclear Terrorism, and we had members like Senator Sam Nunn and others who participated in our work. We proposed the very specific

recommendations to the governments to try to somehow look at the terrorist dimension.

We reached a full circle when we witnessed in the past few weeks, the nuclear explosions, and testing in the sub-Indian continent. So everyone is focusing attention to the nuclear threats once again, and I'm afraid we'll have to look at the terrorist dimension both in the conventional as well as the nonconventional level.

In the past number of years -- I would say the past actually 10 years -- George Washington University, at least prior to that, Georgetown, the Center for Strategic and International Studies, we focused attention on some of these problems, and fortunately, we joined together the past two years or so with the Potomac Institute to deal with some of the aspects of super terrorism, particularly the issue of biological terrorism and the project that they administer in this area.

So first I would like to call on my colleague, David Siegrist, who was invited to speak. Last March we had a conference on super terrorism, and we focused on biological terrorism. He's going to speak on this issue later on, but at any rate, to welcome, the audience, on behalf of the Institute.

**MR. SIEGRIST:** I want to welcome you all here today on behalf of the Potomac Institute for Policy Studies. We're very pleased in our cooperative relationship with The George Washington University and the Interuniversity Center for Terrorism Studies. I'm extremely pleased that all of you could come today; it's a very distinguished audience. We have set aside time at the end of the day for focused discussion with the audience, in addition to your questions for the individual panelists as we proceed.

I wanted to tell you a little bit about Potomac Institute for Policy Studies since you may not be familiar with us. We have been around since 1994. We deal with issues at the intersection of society, government, technology, and policy. I'm pleased that we have our chairman of the Board of Regents here today, Howard Schue, who could take time out to be with us.

We've had a number of studies over the last several years. Our general model is to have a core staff that deals especially with so-called dual use technologies -- technologies that have both military and civilian applications. And then for individual studies, we contract with subject matter experts in various fields. This is one of the reasons that we've been able to do

studies in a number of different areas to include biological terrorism, dual use, civilian military tech base integration, the commercialization of the space station, and of U.S. shipyards, trying to make them internationally competitive. So that's a little bit about PIPS, and again, I'd like to welcome you all here, and I look forward to this day because I think it's a very important and timely topic. I think we have excellent speakers, and I'm glad you could all be here. Thank you.

**PROF. ALEXANDER:** Thank you, David. Before I introduce my colleague, Professor Edgar H. Brenner, who is going to cochair the conference today, I would like to make a few points in regard to the general topic. I don't think that this audience needs any greater details about the subject matter, but I think recently this subject has attracted a great deal of attention in Washington.

And at a speech at the U.S. Naval Academy back in May, the president called for improving the U.S. protection of civilian population from the threat of germ warfare. I would like to suggest that the possibilities of a super terrorist incident are many.

For example, conditions that produce incentives to raise the ante in terrorist acts include ethnic differences which might allow religious fanatics to feel that their cause is lost, and therefore, they must resort to the ultimate weapon -- the biological weapon.

I don't have to tell the audience that biological terrorism really has a long history itself. As we move into the 21st century, I think we're witnessing turning the clock back to the time of antiquity and the time of the Middle Ages when we did have incidents related to what one can call biological terrorism.

And there is a longer catalog in history as well as contemporary history in the end of the war period in the 1930s and then during World War II all the way to the Japanese Air Force to Iraq Air Force, Soviet Air Force, East German Air Force, and so forth. And recently, there was a report in the press about the thought that commission in regard to the activities of South Africa, and it seems to me that this is only one kind of threat that we have to consider in the future in terms of state-sponsored terrorism.

But we have to look also at organized groups, and we identified over the years a variety of groups all the way from left-wing and right-wing groups and religious fanatics and religious cults and, of course, the Aum Shinrikyo case is one of the most dramatic illustrations of an effort by a group to utilize both chemical as well as biological terrorism. Recently, an article in the *New York Times* described these efforts.

I'm afraid that we have to look at the future with great concern. Our first task, it seems to me, is to dispel some of the illusions about the nature of terrorism and the threats of terrorism. And I'd like to mention various

misperceptions which would relate to what our discussion is going to be about today:

(1) the misconception that democracies are immune from terrorism.

(2) that one can separate domestic from international terrorism.

(3) that all terrorism can be prevented.

(4) that terrorism is a problem or challenge for law enforcement.

(5) that terrorism is not a national security challenge.

(6) that terrorism would continue in the future on an unconventional level.

And it seems to me, again, that these assumptions should be reconsidered, particularly in regard to biological terrorism. So in short, I would say that in the future, we're going to witness both continuity and change: continuity in terms of the conventional threat, change in terms of the escalation to the biological, chemical, and nuclear threat; but in the short term, the biological and chemical threat.

In terms of the perpetrators, obviously we're going to see states as well as organized groups and individual freelancers engaging in terrorism. The victimization, unfortunately, is going to be global. No one is going to be immune, and the impact in terms of the impending doomsday clearly is there.

So the challenge is going to be to individuals, ordinary citizens, to states, to democracies, and to the very existence of civilization itself. Today's conference is going to focus on two aspects: (1) the nature of the threat of biological terrorism, and (2) what can be done to reduce the risks.

I would like to call on my colleague, Professor Edgar H. Brenner with George Washington University, the National Law Center, as well as the Terrorism Studies Program, and Ed and I have been working on this, I would say, for the past two decades. Professor Brenner, please.

## **BIOLOGICAL WARFARE AND BIOLOGICAL TERRORISM: AN OVERVIEW**

### **Dr. Gordon Oehler**

Senior Fellow, Potomac Institute for Policy Studies  
Former Director, Central Intelligence Agency Non-Proliferation Center

### **Dr. Brad Roberts**

Research Staff Member, Institute for Defense Analysis  
Chairman, Research Advisory Council, Chemical and Biological Arms Control Institute

### **Mr. David Siegrist**

Study Director, Biological Terrorism, Potomac Institute for Policy Studies

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**PROF. BRENNER:** Thank you, Professor Alexander. One or two minor but important housekeeping details: We are making an electronic recording of this session, so I will request the panelists to speak using a microphone either at the table or the lectern here, and audience participation should be through the microphone you see on the left side of the hall.

I'll commence by introducing the three people on the first panel. The first presentation will be by Gordon C. Oehler. He has a bachelor of science in electrical engineering and a Ph.D. in physics. He joined the CIA in 1972 and served in a variety of political and managerial positions involving weapon systems and foreign policy analysis. In 1992 he was appointed director of the Central Intelligence Agency's Nonproliferation Center. In October of last year, he resigned from the CIA and joined the Potomac Institute for Policy Studies.

The second panelist will be Bradley H. Roberts. He is a research staff member for the Institute of Defense Analysis in their Strategies and Resources Division. He is an expert on proliferation, nonproliferation and counterproliferation issues. He has served as editor of the *Washington Quarterly*. He has a Ph.D. in political science from Erasmus University in the Netherlands. He is an adjunct professor at the Elliott School of International Relations here at The George Washington University. He is the editor and author of numerous publications, including *Terrorism with Chemical and Biological Weapons: Calibrating Risks and Responses*.

The third presentation will be by David W. Siegrist who just welcomed you on behalf of the Institute. He's a research fellow with the Potomac Institute for Policy Studies and has directed their studies about countering biological terrorism. Recently, Mr. Siegrist served as executive secretary of the senior panel dealing with countering transnational threats. That panel was chaired by General Al Gray, former Marine Corps Commandant.

Mr. Siegrist is a former principal staff member of BDM Federal, and has been a long-term consultant to

the Defense Department on national security and technology issues. He has a degree from Georgetown University where he is now on the adjunct faculty. So we will start now with Gordon Oehler.

**DR. OEHLER:** Thank you very much. The title is "An Overview of BW Terrorism." If you look at the schedule, you'll see that there's a lot of overview of the BW threat, and the speakers who are following me have a lot more information, a lot more knowledge to present on the nature of the threat.

I'm very happy with today's presentation that we are getting into what are we going to do about this threat. I think if you read the newspapers in the last six months, you will find that there's a general appreciation, finally, that the biological terrorism threat is a serious threat that we need to focus on.

The President has allocated some more money on that here in just the last week or so. I would like to say that we aren't over the hump here yet. We still need to do some more work, some better work on defining the threat, but more particularly, if we want to do something for this threat, we need to understand the threat and its vulnerabilities.

I think we need to spend some time on what the vulnerabilities are on this. It takes a lot more work to understand the vulnerabilities to approach the solution. I think that's true with many problems we end up addressing. The Aum Shinrikyo case that we're all familiar with shows that quite a large group in this case having an awful lot of money still didn't get things right when it came to release of biological materials.

The piece that was in the *New York Times* by Judith Miller and Bill Broad, who both happen to be in the audience here today, a couple of weeks ago laid out all of the problems that they had in trying to produce and disseminate the biological materials shows that this isn't something that's particularly easy. It is something we do need to investigate and to understand to see where groups like this can go wrong so that we can exploit those vulnerabilities and attack the problem.

It doesn't do us any good to synthesize some scenario of BW use, in which there's no way to attack it. What we need to do is to take a look at programs that

have more realism factored into it and try to look at where we can put together counter-defensive programs to deal with that. I would like to say that -- and this is an oversimplification -- you can think in some sense that if a group has all of the technologies, including the weaponization technologies, to make a very effective biological program, then it's probably a pretty big group. It should be approachable from counterterrorism efforts, counterterrorism intelligence efforts, and try to get people infiltrated in the group and then eventually bring in law enforcement or others to break up the group.

If it's a small group that's maybe just a few family members or a few close associates that's very hard for you to infiltrate, then it's probably going to be small, isolated, and not have a lot of the capabilities they're going to need to carry off a successful attack. So you can approach the vulnerabilities that that type of group would have.

That's something that I hope we would see some discussion on today, not just here's another threat presentation and how terrible this is, but we really need to get on in the business of stopping the threat and putting together programs to ensure that the worst of these scenarios that are postulated never happen. Thank you very much.

**DR. ROBERTS:** I saw my mandate in looking at the lengthy and full agenda as being to touch a little bit -- to put the bioterrorism subject in a little broader context. The title of this panel, after all, also mentioned biological warfare, and I think as we try to create a picture for ourselves for how to think about this problem, we need to understand the overlaps among the various elements of the problem and not expect that there be tight and clear dividing lines among the major pieces.

I think that as somebody who has tilled the soils of chemical and bio-warfare for almost two decades, biological weapons in the terrorism study community, in the policy community, and the strategic affairs communities, have always been, if you will, the Rodney Dangerfield of weapons. These just get no respect. These are always a footnote in our discussions and our thinking about the problems of public policy and the security community. This has an awful lot to do with our American past.

It has to do with a decision that was made to abandon biological weapons in 1969. It has to do with the very long shadow cast over our strategic thinking by the nuclear factor, and it has to do with our relative lack of experience with terrorism over recent decades. I think there's something wrong with this picture that we have that these are merely an historical footnote that we come to occasionally in order to have a complete picture of things.

The more we learn about the past, the more we learn that this picture is just wrong. The number of states armed with biological weapons is roughly double

the number of states armed with nuclear weapons. This pattern of proliferation was discovered in the late 1980s. Don't infer from that that it happened in the 1980s. Some of these programs may have begun much earlier. Iraq, for example, came upon the public screen with the bio program in the late '80s early '90s, but the more that we have uncovered about this, the more it's clear that dated back into the early 1970s.

We tend to look at that program through the eyes of our experience and think that they would have made the same biological warfare agents that the United States did, that they would have weaponized them in the same way. And the more we learn, the more it's clear that Iraq went off and did its own thing producing some weaponizations that we probably wouldn't have thought of and utilized production and testing techniques that weren't in our experience, at least not all of them.

Now we can't, in looking in the Iraqi program, conclude that this is representative of all of the other proliferation states. It may be a more sophisticated program; it may be more reliable. It may also be less old, less sophisticated than other programs. Yonah referenced the Truth and Reconciliation Hearings in South Africa. What's come out there, clearly, is that the South Africans employed genetic manipulation techniques in order to create very exotic kinds of race-oriented weapons, or at least they tried to do that.

So what we know about proliferation is that there is a pattern of proliferation. We really don't know how quite big it is, and we know that these states are probably doing things that are not quite exactly what the United States did when it had an offensive program early in the Cold War. But the bio problem is not just a problem of proliferation. It's also a problem of the major states.

We tend to forget that most of the major powers in the 1930s were engaged in biological warfare programs, some of them on a crash basis, and at the end of the second world war, there were a number of biological arsenals in the hands of the major powers. We will hear a little later today from Ken Alibek who tells a chilling story about just what the Soviet Union continued to do during the period that the United States abandoned biological weapons and during the period that the Soviets signed the Biological Weapons Convention, and we really have had in the public affairs community no sense of the scale and purpose and sophistication of these programs. So far, they were of a qualitative and a quantitative character entirely different from our own experience.

Now, I think that Ken, not least of all, has doubts about how much that program has closed down, the old Soviet programs, but I wouldn't want to just pick on the Soviet Union, or Russia. The Arms Control Verification Statements issued every year by the U.S. Government every year charged that China is not in

compliance with its arms control commitment in this area.

So again, in the major power area as much as - in the proliferation area, there is a pattern of BW experience that somehow hasn't crept up on our screen very well. But to the nonstate actor, again, the past weighs very heavily in our thinking about this. In the past, we haven't seen terrorists use biological weapons except on a limited basis with the salmonella poisoning in Oregon, but essentially, nonuse. How do we understand this?

What we hear today are many people telling us that technology has changed to make this easy. Well, it's never been very difficult, and it's still not very easy. And the truth is somewhere in the middle there. A well-funded, scientifically adept group could have done better at bio than has been done by terrorist groups, so I'm a little skeptical of the arguments that say this problem of the terrorist use is changing because it's the underlying context that's changing. It seems to me we have to look elsewhere to understand this pattern of prior nonuse so that we can make some projections about the future.

Why nonuse in the past? I think it has much more to do with the motivations of terrorists than the capabilities of terrorists. Classically, as we came to understand terrorism in the Cold War period, we came to understand groups organizing themselves to elicit some change in the underlying political circumstance who utilized violence in order to generate fear, in order to extract the political concession from the targeted political body.

For groups like that, you have to be pretty careful about calibrating how much fear to generate. Too much fear warrants a strong overreaction, if that's the right word, a strong reaction from the targeted entity. Too little fear and you fall off the screen. Brian Jenkins' famous statement here is that these groups use violence like a volume control knob: crank it up loud enough to be heard, but too loud is dangerous.

I think it's clear that if the IRA or the PLO had used mass casualties attacks on their targets, they wouldn't be where they are in the political process today, at least that's my guess. And the question today is are terrorists still bound by this type of constraint? Well, it seems to me that there are still plenty of terrorist actors who are bound by that constraint. Organized groups that utilize violence to extract a political concession still face this inhibition against mass casualties.

And potentially new groups that compete over pieces of turf that want political concessions -- they, too, fight over this -- must be attentive to the thresholds of pain and tolerance in their targeted societies. But these aren't the only actors anymore, if they ever really were. But in contrast to the classical actors, we see a variety of new actors.

It's hard to call Aum a group. How many, 40,000 people, something like that, an official

government, by their likes official ministers assigned for various functions, over a billion dollars in assets. That's not a classically defined terrorist group. That's something else. Using violence for a very different purpose may be a purpose that fits more closely with our understanding of the anarchists of a hundred years ago approaching the end of the century the movements utilized violence for the purpose of bringing about more of an anarchic period from which more of these violent groups could emerge as successor entities.

Though from the point of view of the United States, I think we have four types of terrorist actors to worry about. We have the classical groups. They haven't gone away. We have the foreign groups operating in the United States, or foreign quasi-groups. It's useful to remember that the Ramzi Yousef group that attacked the World Trade Center Tower was a handful of people.

But these groups, the foreign groups operating in the United States, may not be bound in the way that the classical groups were by the inhibitions against mass casualties. Ramzi Yousef stated in his sentencing hearing, he was pressed on "Weren't you trying to kill 50,000 people in the World Trade Center that day?" His answer was no. "We thought we could kill 250,000 people that day, and if we could have figured out a way to do that, we would have."

This is not our experience of terrorism. Aum Shinrikyo, according to the trial records, allegedly developed two techniques for smuggling biological agents into the United States and practiced raids on Disneyland. So foreign groups operating in the United States is the second category we need to be concerned about.

Third, our own domestic sources of violence: the militia movement, very much on everyone's mind. More will be said about that in the program. It's not just the militia movements. There are a lot of other sources of violence in our society. I recently had the opportunity to go through the evidence room in Scotland Yard of the counterterrorism unit, and on one side of the wall were all the IRA bombs reassembled. And on the other side of the wall was all of the bombs of the Animal Rights Movement, and they're killing more and more people in larger numbers.

Motivated by the same constraints as the IRA? Not at all. Interested in mass casualties against humans? I don't know. But my point is it's not the classical kind of problem that we thought about. We certainly have animal rights activists in the United States. We have a lot of people willing to use violence to press some kind of cause. And lastly, the fourth category, the state-sponsored use by cells in near war or wartime situations. The allegations that Iraq was trying to pump biological agents into the UK two months ago through the duty-free outlets, this is something that also has to be a part of our picture and that we may well see North Korea or Iraq or

other states that find themselves in asymmetric conflicts with the United States seeking to manipulate our strategic behavior by generating fear in our populations or those of our allies.

I think Japan is greatly concerned about such manipulative attempts like North Korea and, certainly the UK and Germany is about groups trying to target American allies in Europe so that they would press Washington to concede to a term of peace short of our full war aims. So I began with Rodney Dangerfield. Let me close with Chicken Little.

We all have to make sense of this problem. We have plenty people in our business willing to tell us this is a terrible problem; the sky is falling. But there have been people in our business running around for decades saying that the sky is falling and that the next big terrorist attempt is just around the corner. I think we need to be careful to sift through all of the facts to look to trends. While we recognize the possibility of catastrophic mass casualty events, or as Freddie Clay has written in that essay, the next Lenin campaign-style attacks that inflict mass casualties across America in sequence in order to bring about the collapse of our society, or our will to govern ourselves as we do.

We need to keep those in our mind, but we needn't focus on them exclusively and be distracted by them. I think between the complacency which characterized our debate for decades on this to the hysteria that has gripped us over the last year, there's a middle ground, and we have to find it. And the proper fairy tale is not Chicken Little, but it's the Boy Who Cried Wolf.

We need to be careful to speak clearly enough about this problem so that the policy community can find useful things to do about it and not simply turn away from the Boy Who Cried Wolf one too many times. I'd like to stop at this point and turn the microphone over to you.

**MR. SIEGRIST:** I'd like to prevail on everyone's patience to show a few vugraphs again. (Fig. BWBT-1) In the plan of the conference, my colleagues here were talking about the threat, and they made some very important and disturbing points. I've been asked to reprise the Potomac Institute findings of our initial study of this topic. This will set the stage for what you're going to hear the rest of the day, and hopefully raise some issues that will be discussed more fully by others later in the day.

Speaking to points raised by both my colleagues here, the Institute believes that the weapons of mass destruction attacks are becoming more likely against the United States for two very important reasons: (Fig. BWBT-2) One, as Brad has just talked about, is the religious or what the FBI calls single-issue terrorists. For instance, the Aum Shinrikyo group was a pseudo-

religious doomsday cult that went out and actively sought technical folks to enable them to pursue their mass destruction dreams as we, again, learned about in the *New York Times* in detail after a lot of their digging into the records.



## Countering Biological Terrorism in the US

David Siegrist  
Potomac Institute for Policy Studies  
June 16, 1998


### BWBT-1

My impression after a brief study of Aum Shinrikyo was that they never met a weapon they didn't like. They were into electromagnetic guns, chem, bio, and they were in negotiation with some Russians for nuclear, I understand. They had offices in New York City where they were trying to buy germ design software and hardware. So, a very scary group. We don't appear to have a group such as this in the U.S. today. There are various militias, that are interested in ricin, botulism, toxin-type areas within the biological area. However, they seem to be interested in targeting small groups or individuals, rather than truly mass casualties like Aum. However, we found that there seemed to be a disturbing trend in some terrorist groups now. Again, as Brad said, that instead of in Brian Jenkins' memorable phrase, "wanting a lot of people watching and not a lot of people dead," if you have a religiously-based terrorist, his main audience may be his supreme being as he sees it. That is the audience that that terrorist wants to please, rather than an earthly one.

**Countering Biological Terrorism  
Initial Study Findings**

- **WMD Attacks Against US Becoming More Likely**
  - ◆ Religious/Ethnically Based "Super" Terrorism
    - ✦ E.g., *Aum Shinrikyo* Cult
  - ◆ Asymmetric Threat by Rogue States
    - ✦ US Conventional Superpower
    - ✦ Libya May Already Have Conducted Covert Campaign
- **Why *Biological* WMD Attacks?**
  - ◆ Combination of Lethality Density and Ease of Acquisition, Use
  - ◆ Latency Facilitates Clandestine Employment
  - ◆ Several Levels of Threat
- **New Security Emphasis Needed**
  - ◆ Potential State Sponsors
  - ◆ Subway Defense

**Potomac Institute for Policy Studies**



## BWBT-2

And what we saw with Ramzi Yousef ñ I don't know which category in which to put him in here ñ as well as Aum Shinrikyo, their stated goal was to wage war on society. It was not to change society but to wage war on society and hurt society. And that's an aspect of the new terrorism that concerns us most here. What we find is that the technology has proliferated such that it may be used not only by non-superpowers and rogue states, but even by nonstate actors at the Aum Shinrikyo level and perhaps below. These entities could now have the means and perhaps the will to execute mass-casualty attacks on the United States.

The second major trend that may lead to biological attacks on US population centers is a change in the nature of warfare itself. As the U.S. is the sole remaining superpower, if nations wished to challenge the United States in a deadly quarrel, they're probably not going to do it by assembling large inventories of trailing-edge technology: tanks and planes that the U.S. already counters pretty well. They may choose as their model the Cold War, in which direct attacks on the U.S. population centers with strategic weapons were planned. Now delivery would not necessarily be by planes and missiles, but by the little man with the heavy suitcase, or what have you.

The Institute was particularly concerned about biological weapons. Of the types of weapons of mass destruction, nuclear, biological, and chemical, it seemed that biological had the most potential for devastation along with a combination of accessibility and relative ease of use of those, so we centered on biological weapons. Chemical weapons, to include nerve gas, just don't have the firepower, if you will, that a well executed biological attack could have.

Another aspect of biological weapons that was of particular concern was their latency, that it takes a while to incubate these diseases. That's one reason why the military tended to find biological weapons not useful in a tactical setting, because of the delayed onset of effects. However, this can be an advantage for various

terrorist groups who wish to perpetrate their act clandestinely and then flee.

There are several levels of biological threat. Liquid slurries are easier to make, but harder to disseminate. Dry powder threats are difficult to make, they may take a state sponsor, but are much easier to disseminate. We believe the liquid threat you might get from, I'll say, perhaps a disgruntled terrorist with a home laboratory. This represents a different level of threat than the dry agent threat, where you have the sophistication and the security to be able to derive the powder, get it to the right particle size, and put it in the proper weaponization and dissemination means. So going along on those two gross levels of threat, the Institute was particularly concerned for countering, if you will, the best ways to counter the each of them. For the naive threat of the disgruntled low-level individual who gets a hold of some anthrax culture and brews it up, we thought they would most likely attack through subway systems because it's a little less demanding technically than coming up with aerosols and proper particle size, because in the subway, the trains act as pistons. The subways are a common place suggested that chemical and biological agents might be disseminated.

Against the more sophisticated state-sponsored threat, there's usually 10 to 17 states that are judged to have biological weapons. Because of particular concerns about state sponsorship, those nations, especially rogue nations, should form a focus for renewed efforts within the intelligence community to find innovative means to monitor what they're up to. Several of these states are so-called denied areas in the intelligence community, and we believe enhanced means need to be found to monitor their biological developments -- because those are now of particular interest within the emerging strategic context.

Speaking of a differing strategic context, we agree on the need for a paradigm shift. Looking at U.S. national security as compared to what was so successful in the Cold War, we believe that the paradigm needs to be reexamined in the light of the new strategic context. (Fig. BWBT-3)

### National Security Study Finding

- Traditional Cold War Security Approach Limited in Utility
  - ◆ Deterrence
    - ✦ Religious Terrorist May Not Be Rational Actor, Deterred
    - ✦ Event Attribution Delayed, Demanding
  - ◆ Arms Control
    - ✦ Biological Agents, Equipment Have Legitimate Civilian Uses
    - ✦ Limited Verification Success in Iraq Case
  - ◆ Overhead Imagery
    - ✦ Biological Weapons May Be Prepared Covertly in Small Places
  - ◆ Forward Presence Abroad
    - ✦ Homeland Defense Needed as Well
      - Civil-Military/ Federal-State-Local Coordination
  - ◆ National Security Paradigm Requires Reexamination

**Potomac Institute for Policy Studies**



#### BWBT-3

I'd like to review several of our major national security approaches which were successful in the Cold War, and discuss how we need to reexamine them and do them in new improved ways. The first is deterrence. It used to be that no one who struck first in a nuclear war should expect that they would be in a better state of peace, if you will, after that. If the person is a rational actor, he would realize that being the first to strike wouldn't make any sense, and therefore, no rational actor would strike first.

However, if your only audience is a supreme being who you feel is encouraging you to some supreme effort, perhaps at the millennium to help the supreme being end the world, threats that been mentioned in FBI testimony, that's not necessarily your traditional rational actor that can be deterred in the same ways. There are also many more possible actors that may need to be deterred, including subnational groups.

Another traditional Cold War approach, overhead imagery systems, worked well to count numbers of missile silos, but it is not the best way to help overcome people making biological agents. They do it inside. Obviously, the combination of U2 flights and satellite reconnaissance over Iraq has been extremely useful in trying to account for Saddam Hussein's weapons of mass destruction. That represents the new ways that traditional methods need to be exploited to counter the new threats in the emerging environment.

Traditional arms control approaches also must be reexamined. Even in the U.S. where we have a law, the Antiterrorism and Effective Death Penalty Act or Terrorism Prevention Act of 1996, it outlaws having a biological agent for a certain purpose. The intent of the owner must be determined, rather than simple possession of a controlled substance, that must be measured. Arms control can't simply ban certain substances, because there may be many legitimate reasons and uses for a lot of these very dangerous substances that are widely available.


Continuing comparing security approaches, foreign deployment abroad. This is the view that we in the United States used to have that there were people in uniform who would go abroad and perform defense over there. If we're thinking about the new strategic environment, that isn't it. Clandestine WMD attacks on US population centers may take place that require a coordinated response from military and civilian, government and civilian entities across all levels. We're going to need some form of combination of civil and military strategic alliance to protect our homeland in the future. We're thinking in terms of a strategic partnership of some kind, rather than some kind of command and control, top down relationship. Instead, a strategic partnership is needed, with appropriate cooperation, and coordination between the government and civil sectors. This also affects the federal, state, and local level, not to mention the international implications. So there is a need for a different organizational structure, or coordinated structure, than we had in the Cold War. And again, our conclusion from identifying those differences is that an entirely renewed national security paradigm needs to be generated.

Along these lines, the President has just signed Presidential Decision Directive 62, which we think is a very constructive policy step, which tends to rationalize the policy coordination and resource allocation functions within the Government. I believe that's all to the good. (Fig. BWBT-4) And one hopes that they will start to develop a more comprehensive strategy for trying to deal with a new strategic environment that takes account of the possibility of weapons of mass destruction attacks on the U.S. using unconventional means of delivery.

### Conclusion

- PDD-62 a Constructive Policy Step
  - ◆ Rational Allocation of Limited Resources
  - ◆ Need for Comprehensive Strategy
- New Technologies Show Promise
  - ◆ Unconventional Pathogen Countermeasures
    - ✦ Anthrax Needs Special Attention
  - ◆ Sensors, Decontamination, Diagnostics, Information...
- New Study Plans
  - ◆ Technology Roadmap
  - ◆ Wargame/Exercise

**Potomac Institute for Policy Studies**



#### BWBT-4

Einstein said politics is harder than physics. There may be technologies at hand that will ease some of the policy dilemmas associated with preventing and defeating WMD threats. The Institute was very pleased with some of the technologies that it found being demonstrated, especially some of those at DARPA, the

Defense Advanced Research Project Agency, particularly on unconventional pathogen countermeasures.

As you know, existing vaccines and antibiotics can be beaten by the enterprising and knowledgeable terrorist. DARPA is working on some things that render these threats impotent and obsolete, to use a phrase, even once they have started to colonize the host. You will hear more about that later in the medical panel, and I'm looking forward to that discussion.

We were particularly concerned about anthrax because that's what I call the canonical threat, a natural hardy spore with a devastating impact. Its potency may last centuries, and it's terribly destructive once it colonizes the host. There has been work done to recognize the binding sites of anthrax, where its protective antigen attaches within the body. They've identified receptor sites on CHO-K1 cells, and I believe there are ways that could be pursued to develop small molecules that would bind to those sites preferentially within the human lymph nodes that would stop anthrax's pathogenesis. Then you could give somebody medicine effectively after they've been infected, something that's difficult to do now. Once victims show symptoms even powerful antibiotics may not stop the progress of the disease. Other needs for technology include pathogen sensors, decontamination equipment, diagnostics, information infrastructure, and many others.

During the Cold War the US found that technology could be harnessed and leveraged to overcome brute numbers and a militarized society on the other side. We think that technology also has some powerful approaches to overcoming security challenges in the emerging strategic environment. America must leverage its asymmetric advantage in biotechnology to help overcome its current asymmetric vulnerability to biological attack.

In our future study plans, we hope to identify a high level technology road map, and test our ideas in a war game, perhaps out at FEMA and Mount Weather featuring operational users who will prioritize the technologies that will be the most helpful to them in countering a biological attack. That concludes what I planned to say, and I think I'll open it up to the panel.

## **THE BACTERIAL AND VIRAL TERRORIST THREAT**

**Dr. William Patrick**

*Former Chief of Production Development, Ft. Detrick*

**Dr. Ken Alibek** (*Kanatjan Alibekov*)

*Former Soviet Biopreparat Deputy Chief*

**Mr. John Huggins**

*Virology Division, US Army Medical Research Institute of Infectious Diseases (USAMRIID)*

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**PROF. BRENNER:** The first panelist is William C. Patrick, III. From 1965 to '72 he was Chief of the Product Development Division, in the Engineering Directorate at Fort Detrick, Maryland. From 1972 to '86 he was involved in program analysis at high levels at the Army Medical Research Institute of Infectious Diseases. Dr. Patrick has 47 years experience in the field of biological warfare, devoted both to its offensive and defensive aspects. Since his retirement, he has served as a consultant to the U.S. Government and private parties. He was involved in inspecting, after the Gulf War, Iraqi plants capable of making biological warfare agents. Dr. Patrick.

**DR. PATRICK:** Thank you very much for those kind words. Ladies and gentlemen, I feel very strongly that the major threat that we have today for biological warfare is going to come from a terrorist that's state supported, and he comes into the country with 100 grams of dry anthrax powder, and he places it on the railroad tracks or the metro system.

And based on the old vulnerability studies that we had in the 1960s, you will generate large numbers of infections. As far as I know, all of the home-grown terrorists that have used BW have tried it through the aerosol route, and Raymond Zacharis has done a remarkably good job at summarizing a report -- I think he has it published now -- in which that's the way that the terrorist has tried to use BW effectively thus far.

Now, why hasn't the terrorist used biological aerosols successfully in the route in which you get so many more casualties? Well, I hope by the end of my short presentation that you'll have a better appreciation as to why the BW terrorist, particularly the home-grown BW terrorist, has not been successful.

I want to remind you that BW has been around for a long time. This is the siege of Kaffa in 1346, and some medical experts believe this siege in which the attackers catapulted bodies of plague victims over the city walls, led to the pandemic outbreak of the plague back in the 1300s that killed a third of Europe.

Now, since I've retired, I've been going through the country delivering lectures on what I believe to be the principles which make for a successful BW attack or an unsuccessful BW attack. There are four components to

this situation. The agent, most people have focused on the agent and its properties, but equally important is the munition system, how you deliver that munition and agent. That is a classified lecture, and I'm not going to get into that today. It takes about four hours to give that lecture.

But I want to make the point as I've gone through the countryside, I carry with me my visual aids to aid me in this lecture. My green bag has been through airports all over the country. I first started doing this a few years ago, and I carry a sample of *Bacillus* with free-flowing properties that looks exactly like anthrax. This is what I prepared for the aerosol that I deposited on the tracks of the New York subway system. It has very good secondary aerosol properties, and that's the type of materials that you want for the dispersion. The energy of the train is going over it and the power creates the secondary aerosol.

Anyway, going through these airports, I don't know what heroin looks like, but nobody's ever stopped me and I have all sorts of goodies. Here's a nice little powder, very small particle size. But even though you dry something, it doesn't necessarily mean you're going to be effective in disseminating it.

Having said that, more recently, I've been carrying around another little device, a two-foot nozzle that I got from the local store, and this is a very important point. Although a liquid is easy to make, is very difficult to disseminate and get into that right particle size. So a terrorist can make a product, but he's going to have one hell of a time disseminating it into that small particle size. Again, nobody has stopped me at the airports and asked me what the devil I'm doing carrying around something like this.

And most recently I decided, well, I'll push my luck, and I'll use this device that my wife uses to take care of her roses. And the point is this: I don't know how well you can see that, but isn't that a beautiful aerosol?

Again, nobody is stopping me at the airport. We've learned to look for things that go bang in the night: pistols, explosives, and what have you, but people at the airport security points don't have a clue as to what to look for in terms of the BW agent.

When we talk about dissemination, we've got to look at either a liquid or a dry powder and also what are the characteristics that we look forward to in a munition? And if we're talking about a liquid, some of the things that we want to look at is viscosity, and we have a great deal of range there. If you're considering a dry powder, one things we look for in building a product would be particle size, bulk density, and agent stability.

And then the munition side of the house, which I think we've overlooked until recently, is a type of energy that we use. The easiest way of disseminating a BW agent is to put it into an explosive munition. And ladies and gentlemen, that does one hell of a good job of tearing up the organism.

Not only do we think in terms of the type of energy used but the amount of energy being used. In those spray devices they were using to spray the liquid, in order for that truly to be effective, you have to get up to high pressure. That gives the terrorist another problem. We've got to consider when we are building an agent and a means of distributing it.

Particle size, very important. And I think that some of our would-be terrorists do not have the technology to get us down to that particle size.

We have in our audience today two highly intelligent and very effective investigative reporters from the *New York Times*. We have Miller and Broad here in our audience, and just last week or the week before, May 26, they did a beautiful job of outlining the failures of the Aum Shinrikyo cult. Here's a cult that has a large amount of money and fully staffed and they failed miserably to infect a single person after nine episodes.

We know they sprayed anthrax from the rooftop of an eight-story building in downtown Tokyo. We know that according to Miller and Broad they sprayed germs from trucks around the imperial palace. They attacked the American base in Yokosuka headquarters of the Navy's Seventh Fleet. In all, nine attacks were made, but none were successful. At the same time, the Japanese and U.S. authorities had no idea that the attacks had been made. Not a clue.

Liquid cultures--I think I have demonstrated that point -- are very easily made but are very different because of the type of requirements to get them into a small particle size. And the agent concentration, poor agent concentration combined with a low disseminating efficiency of the device, I think is a true recipe for failure. And of course they overlooked the meteorological conditions of the target.

How, as a nation, can we protect ourselves in addition to gas masks? In the early 1900s, Frank Lloyd Wright designed a hotel in downtown Tokyo that had positive pressure. Now, we who work in the hot laboratories use negative air pressure to keep the organism within the building, within the confines of the hot lab. For example, the hot lab is negative to the

hallways. The hallways are negative to the administrative areas. The administrative areas are negative to the outside.

Why don't we reverse that? Why don't we use our technology today and filters in our air conditioning systems so when you open a door or window, there's a little puff of air going out and that keeps the organism from coming in. I would like to see our government seriously consider spending some money on developing the transition technology necessary to put HEPA filters onto our air conditioning systems so we have positive pressure on our critical buildings. Thank you.

**PROF. BRENNER:** You will next hear from Dr. Kenneth Alibek. Prior to arriving in the United States in 1992, Dr. Alibek was the first deputy chief of the civilian branch of the Soviet Union's offensive biological weapons program.

I'll quote now from a story by Tim Weiner in the February 25, 1998 edition of the *New York Times*. "Washington. A defector from the former Soviet Biological Weapons Program said in an interview Tuesday, that Moscow's Cold War programs for World War III included preparing hundreds of tons of anthrax bacteria and scores of tons of smallpox and plague."

Quoting from later in the same piece, "After Alibek arrived in the United States, he was debriefed for the Central Intelligence Agency by Bill Patrick," whom you just heard, "who helped run the U.S. Biological Weapons Program from 1948 to 1969." It's a pleasure to welcome Kenneth Alibek.

**DR. ALIBEK:** Thank you. I'll try to say something about this issue, but I'll try to spend more time just discussing some medical issues in this area. Because you know, I don't want to repeat what was done in the Soviet Union, because probably a lot of people now know what the Soviet Union's program was.

Actually, it was a huge program: a lot of production facilities, a lot of agents developed to support a concept to use biological weapons. And what I would like to say, the Soviet Union considered biological weapons strategic weapons, and they could be used as nuclear weapons. There's a very high destruction capability. And we now realize that, in my opinion, Russia is no longer a threat anymore for the United States. We've got some concerns regarding current Russian activities, but I hope we'll be able to resolve this concern, because recently I received a couple of calls from the Russian embassy and they suggested to organize a round-table discussion and maybe some steps just to solve this problem, this concern about Russian biological capabilities.

Now I'd like to discuss some different issues. What do we know about biological weapons? And what do we know about biological terrorism? Because that's a very serious issue. In many cases, people usually say -- a lot of people say -- why we are so concerned about

biological terrorism, because we haven't seen a lot of cases of biological terrorist attacks.

But you know that's not correct, as Bill just mentioned, there are some cases. We know that in 1984, there was practically a biological terrorist act here in the United States by contaminating some food, and this type of thing.

But what I'd like to say, this is just a logical development of any weapon. It's not a matter of if. I'm saying all the time, it's a matter of when. If we look through the case history of weapon development, we can see that any weapon development invented in this century, in the 20th century, was finally used, including nuclear weapons.

Now we see the concern about nuclear weapons. Why be concerned about biological weapons? First of all, because they're very easy to develop, very easy to manufacture. Why are biological agents so attractive to people interested in biological terrorist acts? It's very easy to escape undetected, not just from a place of application, even from a country for application.

And if one or another highly contagious or highly infective agent was used, the amount of cases would be enormous. We're not talking about a couple of people. We're not talking about dozens. We're talking about thousands, possibly hundreds of thousands of people.

You know, again, it's a matter of definitions. It's not a political issue. It's a scientific issue. Some very knowledgeable scientists here in this country say biological terrorism is not very important because it's very difficult to develop a sophisticated weapon.

Unfortunately, these scientists use quite obsolete knowledge in this area. Let's just look through all the developments made for the last eight, ten, years. What do we see? We see that it's possible just to manufacture even very complicated weapons using pretty simple techniques. I'll give you a short example, a very small example.

It's a hemorrhagic fever. We [Soviets] tested it in 1990 using explosive chambers, tested its destruction capacity, and just to infect. In 1977, we had about 40, 50 percent contact rate.

For a long time, people thought it would be impossible to develop such biologic weapons, because it's still pretty complex to develop this technique using a so-called reactor technique, and such and such.

But just recent developments show it's very easy to manipulate this fever. Using high concentration, 800 grams could cover a territory killing a great many people regardless of density of population. This is just an example. If this agent is used in the subway system, we can imagine what kind of consequences we can expect and our preparedness for such an event.

We don't know how to contain this type of thing. This is just one of the examples. You know, when we're

talking about -- you know, again, it's not a matter of overestimating or underestimating. Mostly we're scientists. We don't have to discuss whether or not we'll see such an attack in the future. We need to be prepared as a nation, and just see where we're prepared and not prepared.

Unfortunately, we're not prepared yet. In the last four or five years, we did a lot. We started developing new data bases just to get a better understanding of what biological weapons are, what biological terrorism is, what are the characteristics of one or another biological agent, what kind of techniques would be used to infect with agents and such and such.

For example, we started to develop some manuals. I spent a day just to review this military manual, this handbook. I found about 100 errors and misleading information and misperceptions. Probably you can imagine that cholera cannot be used in aerosol form, but we see one of the most appropriate forms of application of cholera is wrong. If you have this type of mistake, it's very difficult in the future just to contain such epidemics.

Another example, smallpox. We know about an incubation period, as you know. Smallpox, people contacted with smallpox become contagious even in the incubation period. But what we see in this manual is that military people could be on duty until they show symptoms. This is a mistake because in this case, in a couple of days, this particular person becomes contagious and starts infecting other people.

Again, one more problem. When we are discussing biological terrorism, it's a very sophisticated and difficult problem because the amount of agents that could be used in biological terrorist acts is huge. According to our estimation, somewhere between 50, 70 possible agents, some of them big agents, some of them little agents. For example, if anthrax or a hemorrhagic fever were used, we would see a lot of deaths, unfortunately.

But with most incapacitating agents, you would see a lot of diseased people, and these people would need a lot of treatment, a lot of involvement of physicians and nurses just to treat people. Now we can say we don't have a well-developed understanding of how to contain that situation.

Another issue, for example, is if smallpox is used. In the case of smallpox, the epidemic focus is different. Again and again, our understanding has to be improved just to understand what we need to do, what kind of consequences we need to expect, and what kind of measures to take just to contain one type of epidemic, to reduce the possible severe consequences of biological terrorism.

But the most serious problem, in my opinion, is in the area of treatment. There is always a difference between biological weapons when we're talking about

military applications of biological weapons and biological terrorist devices. Just to pick an example, we've heard a lot about anthrax vaccination in the United States Army troops just a couple of months ago.

And we're talking just about a single agent, anthrax. But we knew that anthrax was one of the agents developed by Iraq. Maybe they've developed something else too. But if our intelligence works perfectly and is able to get the information, we can say we are able just to protect our forces.

But when we're talking about preparing the civilian population -- we don't know which agent could be used in biological terrorism -- how to contain the situation. If this agent is used in massive amounts, how would we organize measures just to contain the situation? It's a serious problem, and we need to start a discussion.

In my opinion, we need to start spending more funding to develop better medical protection. Because you know, our final goal, our ultimate objective is to protect people's lives. With current vaccination technology it's not possible.

It's just not possible to vaccinate everybody in the United States. It's not possible because of many reasons. What agents? Who to vaccinate? 260 million people, it's not possible. We need to focus our attention toward developing so-called nonspecific immune protection. A human body has two immune systems: the so-called nonspecific immune system and specific immune system. When we develop vaccines, we are working with a specific immune system. But what is particular to the specific immune system to protect against a particular agent in most cases or in a couple of cases, when what we need is to increase the competence of the nonspecific systems.

If we start researching this area, to develop some approaches to increase humans' concentration of specific complement, it would be possible to defend against any agent possible. We know it's a long way off. We know it will take years and years just to solve the problem. But you know, what can we say? We can develop all political measures, technical measures, physical protection. But you know, finally we need to develop medical approaches to solve this problem.

You know, I've got a lot to say, but it looks like it's time to close. In any case, if you've got questions, I would love to answer those questions. But finally, we start developing my idea and our company's idea. We've been working with the Presidential Advisory Board. I presented this idea before one of the congressional committees.

We want this idea to become common knowledge. We would like to invite everybody who is interested in this issue to join us in this effort, and we will be glad to share our knowledge and get more and more support in this area, from private sources and from the government, and from any company that would be

interested. But it may take time, it will take years, but it's our ultimate goal and, of course, we would love to solve this problem. Thank you.

**PROF. BRENNER:** The final presentation on this panel will be by Dr. John W. Huggins, chief of the Department of Viral Therapeutics, Biology Division, U.S. Army Medical Research Institute of Infectious Diseases. Dr. Huggins has a Ph.D. in biochemistry. He's been responsible for development of antiviral drugs against viral diseases of military significance. That means he's had a hands-on experience with a wide variety of viruses and has worked on such dangerous substances as the Ebola, Marburg, and smallpox. It's a great pleasure to introduce Dr. Huggins.

**DR. HUGGINS:** Thank you. When I came here, I would normally speak on medical countermeasures, and knowing that I was following two real experts in the field: Bill, that I've known for many years, and Ken I met only once, who was on the other side of the fence, but who I know a lot about. I decided that you didn't need another threat talk. You certainly didn't need to know what a well-organized organization which set about doing bioterrorism or biowarfare could do.

What I thought I would do is ask the question what other skills might, in fact, lead you to make a successful biological attack. We've just talked about how it's been fairly difficult. As somebody who has worked with this field, and frankly, cheated a little bit because I do know the other side. I've had access to the information. I know what's probably feasible, but I ask myself the question: How would a potential bioterrorist do this?

From the perspective of a person who's worked to essentially develop antiviral drugs no different than people have done with other aerosol viruses, like influenza, tuberculosis, or other things. What do we do? We need to establish conditions on how to grow the virus, to grow it well in high concentrations for our experiments. We need to select strains for maximum pathogenesis so we can make a model of particular types of human disease.

We need to develop animal models for drug vaccine evaluation, and that means we need to learn to enhance the virulence of a particular virus, in my case, to make a hundred percent lethal model, because when you're doing experimentation, you really need those models to be precise.

But the fact is that we know how to enhance virulent organisms. All people that do research on viruses and vaccines learned how to do these things. So what does this mean? Is it just me? No. There are an awful lot of people who have acquired the skills to infect by the aerosol route, because their similar research approach is to develop a treatment for influenza or

tuberculosis means that they also have to master these same types of skills.

So what I'm going to do is go over some of the issues, and I'm going to use a couple of examples from my own research to show you what those of us on the other side of the fence know how to do and where we've trained people in doing this. Facilities, clearly university or research labs, contain the biocontainment and the other necessary equipment to do this. I think a person working in those could do it.

Potentially of even more concern might be biotechnology companies, because of the products that they're working on. They have biocontainment. They also have production facilities, and they're bought and sold on a very frequent basis. You may track something going into one biotech company and find that that has been sold several times. For a number of things I'm going to describe, you don't really need a laboratory. If you're some distance away from most populations, you're probably all right.

I think we all think of biocontainment as a potential production hurdle. We think of things like USAMRIID. These are large very complicated engineering suites designed to provide absolute protection not only for the workers but for the community with multiple redundant systems because we're unwilling for the communities to accept any risk. That's probably not true for a bioterrorist. They're primarily concerned about keeping themselves protected and not being detected for a short period of time while they produce the munition. So they might, in fact, need much less of a biocontainment facility. For many of these agents, vaccination of the terrorists, rather than biocontainment, is quite good enough.

It will protect the worker who is working with the agent. In that case a remote facility far away from a population center might be able to work for some reasonable period of time without the virus getting into the environment and letting people know that there's something going on.

The other thing we've learned is flexible isolation technology -- this is plastic sheeting glued together with a negative pressure source -- has been used to construct large biocontainment facilities using off-the-shelf pieces of equipment, and clearly I think I could put together a flexible field system where I could comfortably work with even Ebola virus.

As far as the production goes, we all have talked about virus growth. Cell culture in small quantity is something that most research facilities can easily do. Large-scale production is very specialized, but there are university facilities. There are certainly biotech facilities, but I think we all forget that embryonated eggs is the way the bio programs used to grow these agents. They're very good. They grow bacteria and viruses. They give high concentrations, and they are exceedingly low tech.

The local farm store will sell you -- along with 500 farmers in your area -- everything that you need to grow embryonated eggs. And we can grow almost all of these. Ken just talked about growing virus in animals. There are multiple examples of animal models like that where clearly, you can produce what you need to using a fairly low-tech environment.

Delivery, I'm not going to go a large part on this because I think, in fact, these two gentlemen have talked about some of the difficulties, but I'll show you that, in fact, that we at least in the laboratory have solved these by multiple methods. Animal experimentation for infection models is well known. Dry powder delivery of pharmaceutical products is another way of delivering small amounts of liquids or powders. I think most pharmaceutical companies know that technology quite well.

As far as testing, there's equipment to make sure you got the particle in the right size, or you can use animal models. I'll show you a little bit of that. And I think we have to recognize that limited human testing is probably a possibility. People that are going to use weapons of mass destruction may not have the same ethical concerns that we do on that.

And for some of these organizations for which we'll say there are no good animal models, that may be the way around it. Let's talk more. Storage, some of these viruses can be stable for only a few hours. Some can be stable for weeks and months. The delivery system I think has already been talked about here. Let's go on to an example of what we're really talking about here.

Some of you have probably seen it before; it's a classic example of a smallpox spread. In January 1970, a single person coming back from Pakistan was admitted to a hospital and was immediately taken to an isolation ward with a diagnosis of typhoid fever, what at that time would have been normal nursing procedure to isolate that patient, was put in place.

The patient did not have a rash but developed it on the third hospitalization day, and bells and whistles went off. They confirmed it by the fifth day, and that case was transferred to a specific smallpox hospital. Immediately after that, all the staff within the hospital were either vaccinated or given an MIG, an immunoglobulin preparation. In spite of that case, there were 19 cases of smallpox generated from this single person.

You see that every place that air flowed, you got infected patients. Probably the scariest one was patient 8. This visitor entered an administrative area in the hospital, spent 15 minutes and left. That person was still infected with smallpox.

So clearly, these are incredibly infectious aerosol agents, and they can flow with the air very nicely even when naturally generated. So what is the pathology of these diseases? We've all seen the typical smallpox

lesions, and I think we think about that as being the disease when we think about smallpox.

Even when the person has the same amount of lesions that you see up there, bottom line, it's not the skin lesion that causes the pathogenesis. What is it? It is a bronchopneumonia. This is a lung infection. It grows to high concentrations, and that's what you're actually dealing with. Because you have lots of virus in the lung, you have a built in secondary spreader for these infections.

A lot of people have skills that I think perhaps have dual use applications, and I don't know that that necessarily means that it's possible to perpetrate biological terrorism, but I think that perhaps the fact that it hasn't worked so far is the fact that maybe they've gotten the wrong mix of skills involved in trying to do this, and I think there clearly are people who have perfectly legitimately acquired dual use skills that could probably do a much better job than what people have done so far with these things. Thank you.

## **LUNCHEON: FIRST RESPONDERS**

**William Nagle**

*Mayor's Office of Emergency Management, New York City*

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**PROF. BRENNER:** Mr. Nagle is going to go first because he has to take a train back to New York this afternoon, and we thank him for coming down to be with us. One of the things we expect and hope he will cover is the overview of the Office of Emergency Management in New York, what their mission is, who they work with and their accomplishments today. Mr. Nagle.

**MR. NAGLE:** I used to think that concern about WMD terrorism was endemic to New York but as I travel around the U.S., I find it's pretty pervasive throughout the country, unfortunately, because when it comes to chemical and biological terrorism, the response we found has got to be a very coordinated, very cooperative, and a very controlled response. Otherwise, the first responders are going to lose their lives. If they lose their lives, they're not going to be able to help anyone else, so we're working very hard to get over some of those humps.

The Mayor's Office of Emergency Management is composed of numbers of people from different agencies, myself from the fire department, we have several from the fire department. Everybody in the agency is detailed from their parent agency through the mayor's office. We have fire, EMS, housing, we have a couple of lawyers, we have one representative from the mayor's office for people with disabilities, who is also a lawyer. She brings a very sharp focus to the disability issues, probably the only time to my knowledge that it's been done throughout the country.

So we have several different perspectives represented in the office, and that helps us with the different agencies in getting all these agencies together. As the professor mentioned, for the last couple of years during my active duty in the fire department, I was involved in planning major events. From the fire department's perspective, when it came to the office of emergency management, my perspective was broadened immeasurably. Now I had to look at things from every agency's perspective and how the city could most effectively coordinate its resources in responding to all kinds of emergencies, whether man-made or natural. About the first week we were in existence, we started a real vulnerability assessment for the city to see where we were going to start with our planning.

Obviously, terrorism was right up there. We started right from the get-go, and we've been at it ever since. Unlike other speakers you're going to hear from today who have devoted much of their lives to this issue, I've only devoted the last two years. In the last two years,

I've learned more about terrorism than I ever wanted to know.

My perspective is from a first responder's point of view. We've used many of the papers and the research material that some of the speakers here have published. We've gone into a very in-depth review. Looking at it from how do we keep first responders alive? How do we respond to these events when they occur? Everybody says it's just a matter of time before a major terrorist event. How do we do it effectively and efficiently, and how do we keep our cops and our firemen and our EMTs and our docs and our nurses alive? So I would like to bring the discussion, if I may, down to the street level for a few minutes and tell you some of the things we've done in the city.

I mentioned earlier our planning perspective is one of inclusion. We bring every agency that can possibly add to or bring something to the table in on the planning process.

We get everybody's okay on that plan. Then we exercise that plan. We've held several exercises over the past two years, and we've learned a lot from every one of them. The main thing we've learned is that it's got to be a cooperative effort. There's no room for interagency squabbles, whether it's at the local, state, or federal levels.

I wrote down a couple of notes from a couple of the speakers earlier I would like to address first before I get into this. One thing that was brought up was what I've heard recently several times, is why do we bother doing this because if a biological terrorist event occurs, hundreds of thousands of people are going to die, and there really isn't anything we can do about it. There really is a lot we can do about it. It starts with training, awareness, recognition, no matter what the event is. The quicker we know what we're dealing with on a local level, the quicker we're going to be able to deal with it effectively.

For instance, if it's anthrax, the first wave of people who start showing up at hospitals and doctors' offices are going to be probably treated for flu. They're going to be sent home, get some rest and drink plenty of fluids. In 24 or 48 hours later, they're going to be back in the hospital. Then it's going to be in their lungs. From what I understand, once it's in your lungs, no amount of treatment is going to do you any good. So early recognition is the key.

We have developed, based on one of the lessons learned from an exercise we did a couple of months ago, a way to do a surveillance of the city's health on a daily

basis. Every morning at seven o'clock in the morning, my boss gets statistics: how many EMS runs were there for the previous 24 hours, how many hospital admissions, and a few other parameters.

What we're doing is developing a baseline, so that if we get hit with, say, an anthrax attack and the hospital admissions or the people responding to hospitals, self-referrals, people calling EMS for referrals to hospitals, first thing we're going to see is a sharp increase in the EMS runs. We know that EMS does approximately 3,000 runs a day in New York City. If that all of a sudden spikes to 5,000, we're going to be looking for something. If the hospital admissions, for some reason, spike, we're going to know it, and we're going to start looking. Again, the quicker we know what we're dealing with, the quicker we can deal with it effectively.

Some of the other things we've done in the city, basically it's training, awareness. We've got to get our ER docs, our nurses, all our hospital personnel more aware of the potential for this type of event, to think about it, to become more suspicious.

Excuse me, I'm not a public speaker. I'd much rather be running into a burning building. We've got to get our people more suspicious to be aware that there is a potential for this type of event and to know what to do when they see it.

One of the other terms that was mentioned earlier was a paradigm shift. The most important paradigm shift in this country right now when it comes to keeping civilians alive in the event of one of these incidents is a paradigm shift of your emergency responders. Every one of your cops and firemen and EMS persons, your ER docs and nurses, anywhere in the country, they're all trained to do one thing: to run in and help.

If they do it with a chemical or biological incident, we're going to lose them. So we've got to get them thinking more along the lines of if you see 10 or more people sneezing, don't run right in. Assume the worst, and step back and get some definition of what we're dealing with.

Biologics, I was talking to a gentleman earlier, he said there are some really interesting research projects going on as far as identifying biological problems. It's absolutely necessary. One of the things we've done in the city is we've bought what they call smart tickets. They're capable, I'm told, of identifying four or five different agents in about five minutes in the field. It gives us a little bit of an edge. Some of the other things we've done in the city is we're stockpiling antibiotics.

Antibiotics: If there's a biological attack such as anthrax, it's going to require tons and tons of medication. Nobody's got it available, so we're starting to stockpile it. We're equipping two response vehicles with chemical

and biological equipment, antidotes, medicine, all kinds of stuff.

Suits: We're equipping all of our HazMat people and are getting better equipped with more suits, more training. This was one of the things we identified early on, and as in any planning process, we identified what's the problem; what do we have to do to respond to it; and what do we need? What we have in the city is a plethora of resources.

We have a 44,000-member police department. We have a 14,000 member fire department. Every member of the fire department is trained at the HazMat level of operations. They're increasing that daily. EMS, the same way. The police department used to have an emergency services unit of about 350 people who were trained in HazMat. They're bringing all their EMTs up to EMTDs. Every fireman can use a defibrillator. So there are so many programs underway right now in the city to bring the level of training and awareness up for all of our first responders. If we lose them, we've lost the war.

Another thing that we found out very early on -- and I'll make this very quick -- is that the city, whatever city it is, whether it's New York or Washington, or L.A., wherever this event occurs, that city is going to be on its own for at least 12, 24, maybe 36 hours. If it's a chemical event, that delay is critical. If it's a biological event, hopefully we'll be treating people early if our detection system works.

What we'll use the federal resources for is if it's a massive medical problem. So we're going to need doctors. We're going to need nurses. We're going to need the Disaster Medical Assistant Teams, and so on. The earlier we can recognize the fact that we have a problem, the quicker we can get these assets on the way, and every city should be looking at that.

Research is always on everybody's mind. The federal government hopefully has the money and is putting some more money into it. We've got to get stuff in the field that our first responders can use that can give them quick, efficient, accurate information so that they can base their decisions on it. And if we put all of this together, we can make a difference. We can keep people alive if we act quickly on the right information and our people are well trained and well equipped. But it all costs money. If there's anything else I can answer, I'll be here for a few more minutes. I don't want to take up any more time. I have a whole bunch of more stuff.

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## Questions and Answers

**PROF. BRENNER:** Let me remind people if they have questions for Mr. Nagle to please state your name and affiliation and that will help us prepare the record of this proceeding. So I'm sure there must be some questions and possibly some answers.

**Q.** David Eisenburg, Dyn Meridian. You spoke of the criticalness of early detection, which I think everybody understands, and you spoke of the smart ticket system. It could be that some of them can operate in as little as five minutes, some take hours and there are problems that they require regions that have to be refilled, et cetera.

From the viewpoint of first responders on the ground, have you guys been able to identify any?

If you had the luxury of telling a funding agency where to direct money for research, what voids in the area of early detection would you say they should be throwing money at? Have you ever been able to determine what level of technologies would be most promising?

**A.** I'm not qualified to answer that, but I'll tell you what we've done. We've taken that list of biological agents we feel we're most likely to be exposed to. So my feeling is that any kind of detection equipment that can be aimed at that list that would give us the most information or the most bang for the buck, that would be the thing.

One of the doctors earlier talked about different types of treatments. We're looking at that also. Penicillin does the job. Then maybe something else can do it job, too. We're going to run out of medication very quickly. In the city, we're making arrangements with pharmaceutical companies if we call them and say, "This is it. Put yourself on surge manufacture." I think there's only one manufacturer in the country that makes the drug for this. There must be something else that can be substituted.

**Q.** How was your organization preparing to prevent panic?

**A.** We have a press officer, and she works directly with the mayor's press officer. And it's set up very closely. Everything is held for the best. We want one story going out. We want to get the right information going out to the public as quickly as possible to avoid panic if it's possible to avoid panic, tell people what to do, what it is. For instance if it's anthrax, I think for myself, the best thing you can tell somebody about anthrax -- the only good thing about anthrax is that it's not contagious person to person, basically, as opposed to smallpox which would really be a big problem.

**Q.** Bill Patrick. I must admit that you guys are very impressive, those that I've met. You and others that have participated in some of these scenarios we've generated, real nasty little scenarios. Would you like to comment on building security?

**A.** Building security is one of our big issues, too. When you're talking about first responders, everybody thinks you're talking about cops and firemen.

Building security people are important, also. If they can keep these guys out of there by doing their job -- for instance, if I were a prospective terrorist, that guy is

going to come back with the real stuff. If, on the other hand, he may get questioned and stopped, he may make pick someplace else. So security has a big impact.

**Q.** You said that you're stockpiling antibiotics?

**A.** Yes.

**Q.** Are you also stockpiling chemical weapon antidotes?

**A.** Yes. Well, we're attempting to. The idea is to have not only stockpiles strategically located throughout the city but to have a couple of mobile response vehicles, as well.

**Q.** Howard Schue, Potomac Institute. You made the profound statement that if you lose your first responders, you're going to lose the war. I'm interested in how you quickly identify and diagnose the problem and then communicate that out. Tell me about your command and control.

**A.** We're spending a lot of time on awareness training in both chem and bio. Chem is a little easier, if you will. That's going to be an immediate effect. You're going to end up with a 911 response. Hopefully, the first responders, a light bulb will go off. We're going to realize that something big is going on here, and they're going to communicate that right up the line immediately.

One of the ways we in the Mayor's Office of Emergency Management have done to disseminate this information, whatever we get and we know is verified as quickly as possible, we have an 800 radio system. At last count, I think we had 50 different agencies online, and we communicate with these people on a daily basis.

And it's not only in New York City, it's the surrounding area. So we can share whatever information we get very quickly as soon as it's accurate and hopefully get the ball rolling. And we've developed a very extensive incident command system. The chemical plan is out now. All the agencies in the city have basically concurred with it. It's a very controlled environment.

Bio is a different animal altogether, as you guys well know. Our first recognition is going to be when the health system becomes taxed, and that just doesn't leave much of a window of opportunity.

**Q.** Are you the same command control system as the disaster structure that was just talked about in the news?

**A.** Yeah. And that's why Jerry's not here.

**Q.** Have you considered putting an embargo on news vehicles for satellite capabilities so that something which is not completely diagnosed or understood is not put out, or would you not like to talk about it?

**A.** No. We're making arrangements for the news media to have access to the control center. In fact, that's gone into the design so they can easily hook in downstairs. They will, and we're dealing with the higher echelons in the news media to get their cooperation. There's a fine line between scaring the hell out of people

and getting people the right information so that they can act appropriately, and that's just good journalism. If we don't get cooperation there, shame on them.

**Q.** Brad Roberts, Institute for Defense Analysis. Can you talk about your interaction with the National Guard?

**A.** So far it hasn't been very much because the National Guard really is too far away from us to do us much good. I was at a conference just last week, and I was talking to a fellow who put me on to a colonel in the National Guard, as far as where they intend to pre-position a National Guard unit in New York that's going to be trained under this new program.

We would obviously like to have it a lot closer to the city than what they're thinking about. They have a lot of assets. They have a lot of resources. We have a good rapport with them. They've told us what they have. They're more than willing to help. The problem is getting the assets to us in a timely fashion, especially when you figure that most National Guardsmen are cops and firemen and may already be working.

**Q.** Have you studied the cost of stockpiling antibiotics in terms of those expiration dates, and is that a feasible thing to do?

**A.** Yes, it is feasible, because to not do it is not feasible. There's going to be a rotational basis. They're working with the pharmaceutical companies, and I want to say the FDA, but I'm not sure, but whoever the governing body is that decides what the expiration dates are, they're looking to take a little longer.

**Q.** Do you care to comment on anything as far as evacuation or quarantine? I think with all the publicity, if a lot of people see their fellows getting sick they may panic and flee.

**A.** That'll all come under the Public Information Office's responsibility. Once we decide and know what we're dealing with, somebody is going to have to make a decision as to whether we shelter in place; do we tell people to evacuate? If we do, where do we evacuate them to? If you're talking about a smallpox epidemic, I'm sure Nassau County is not going to open the gates to people from the city, but it's a big issue and it's one that we're dealing with.

**PROF. BRENNER:** Well, thank you very much.

## **CONVENTIONAL COUNTERMEASURES**

**Professor Edgar H. Brenner**, *Introductions*

**Mr. Mike Maloof**

*Director, Defense Technology Security Administration*

**Mr. Rinaldo Campana**

*Federal Bureau of Investigation, WMD Countermeasures Unit*

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**PROF. BRENNER:** It's time now to begin the afternoon session. We have a busy afternoon. We intend to have questions and discussion after the formal presentation, and I will remind people again to use the standing mike if they're speaking from the audience and to identify themselves and their affiliations. The first panelist is F. Michael Maloof, Director of Technology Security Office of the Secretary of Defense. The mission of his office is to halt a diversion of sensitive technology involving weapons of mass destruction and conventional weapon systems to proscribed countries.

His staff determines what technologies are being targeted and by whom and develops an appropriate response. During his distinguished career, he's been involved in the forfeiture of a high temperature furnace to Iraq. He was also involved in the Toshisha case involving the former Soviet Union gaining knowledge of submarine propellers, to quiet them to prevent their detection. Mr. Maloof is a recipient of the Department of Defense's Distinguished Civilian Service Award, which is the highest peacetime award bestowed on a civilian.

**MR. MALOOF:** It's great to be back here since 1973 when I finally graduated. It's good to be here and to be here with such a distinguished crowd. Since I only have minutes, I'm going to give you a data burst of some of the things we do in the Department of Defense.

For those of you who are not aware of what we do, I work with the Defense Technology Security Administration in the office of Secretary of Defense. My organization is called the Technology Security Operations Directorate. Some of the functions that we do at DTSA is licensing, whether we have statutory requirement both for dual use, and we also look at munitions. These are for controlled technologies, controlled dual use items under the Export Administration Act for the State Department.

My job is to work with the intelligence and the enforcement community to stop diversions and catch things that may go wayward. What I'm going to do on this chart is to show our relationship among the policy, the enforcement, and the intelligence community, and our interaction is very, very intense on a daily basis.

In fact, I have a customs agent and a naval service agent attached to my staff, and we also have very close working relationships with the intelligence community on a daily basis. As far as other agencies are

concerned, we interact with State -- and I will get into some of the working groups that we attend from our standpoint on diversions -- and of course, we work with the enforcement community quite regularly, including the FBI, the CICT people.

We also work with foreign counterparts, and we do this as a result of having to get action quickly in some events when we have to use our own channels both from the intelligence, the enforcement, and I would add the defense attache channels, depending on the situation. In terms of our duties, we analyze intelligence and try to identify particular policy issues. This is a very serious thing because finished intelligence isn't always finished the way we'd like to see it to accommodate us on a particular policy issue.

So to help me along with this, I have about a 50-person naval intelligence unit. Half of them belong to the intelligence agency. We have a tremendous resource of talent there in the reserve component, and I applaud them because they've helped us identify some very critical things that were not evident and apparent to the community oftentimes. We also look at export license applications. We are the Bad News Boys. We tell them why end users are not good, and if that shipment goes, that is a policy decision and they can reap the consequences.

We also do a lot of analytical work, and I think this is where our challenge is to understand what the networks are, who the suppliers are, and then work with the other agencies to go out and stop them. Of course, we also sit on a variety of working groups and we have provided a lot of assistance and we continue to assist the U.S. attorneys in the custom services in preparing their cases for grand juries, and what have you.

As far as working groups that we sit on, you don't hear about them, but they are proactive in nature to go out and stop things. We have what is called the NEVWG, technologies for nuclear weapons purposes. We have a shield which handles our chemical bio violations working group, the MTAG, which handles our missiles, then TTWG is a group that looks at technologies that have application for those other areas but the technologies are not proscribed. And they also look at technologies which apply to conventional weapons development.

And since we're in the Defense Department, the field of conventional weapons and technologies are very

critical to us. And just coincidentally, we are seeing the rogue countries of concern looking for these types of technologies for their conventional weapons alongside the technologies and everything else that they need for unconventional weapons development programs.

We've discussed the threat. You know the threat: chemical, bio, and from our standpoint, conventional weapons. There won't be a test, but I thought I'd include this chart. This is intriguing. This shows ongoing proliferation programs today from various countries. I would suggest that the whole issue of proliferation, particularly in missiles, is getting worse. And we're seeing also increased efforts in the chemical-bio research area by countries which we regard as rogue countries.

And countries down here are what we would call suppliers. We see a three-tier process, if you will. We originally saw a lot of Russian, China assistance. Now we're beginning to see -- we've seen increased Chinese assistance to the have-nots or the rogue countries as well as Russian assistance. Now we're beginning to see for the first time among these countries cooperation among themselves. Because now they've become net proliferators, and I would suggest Iran is principally one of those.

They've got a base sufficient to now assist other countries in their development programs. They just acquired the technology. Now they've got a development base that allows them to work with the Syrians or the Libyans or whomever to develop additional programs as well as, for example, with the Indians.

The top five, six countries are known as declared terrorist countries. They also happen to be countries that are considered rogue countries, which suggests something. We're seeing a blurring of the line between terrorists and rogue countries that are developing unconventional weapons programs. Now, these countries are going to use cutouts; they're going to use other entities in order to have plausible denial, and we know that.

We work to try to identify those entities, and what is becoming startling to us is that these terrorists are sophisticated, very sophisticated. They are trained. They may be teachers or businessmen; they also may be engineers; they also may be, in fact, rocket scientists. We have actually seen episodes where a person will have his business hat on, order nuclear technologies, and then when we trace the name of that individual, we find that he's actually a member of Hezbollah.

We're beginning to see those kinds of trends. In that particular case, we suspected that particular individual from another Middle East country was probably acquiring these things on behalf of the Iranians, in this case, for their nuclear reactors. That's the kind of stuff that we have to go out and reach.

There are a number of cutout countries involved, so what we're also working on are a number of countries where we can develop bilateral relationships and help them set up programs and devise regulations and laws internally to help us to stop those things if we have information that we can give to them so that they have that legal structure in place in order to legally stop those items if we have that information provided to them.

As you're all probably aware, we work under various multilateral regimes: Missile Technology Control Regime, Australia Group for Chemical-Bio, and the Wassenaar region, which most people probably haven't heard of. It's sort of the stepchild of COCOM, which went away back in '94. This is for conventional arms technologies, and we're seeing increasingly now with the downsizing of our defense installations more and more of our service equipment getting out there and getting in the hands of bad guys, particularly neutral countries who don't have the rules and regulations set up to stop these things.

So in terms of transshipment -- and this is probably one of our biggest challenges that we're dealing with right now -- we think that this problem is now being compounded by the fact that terrorism is international. We're seeing more of a coordinated effort. We are seeing semblances of terrorists looking for items that might have nuclear or even chemical and bio -- and also some missiles, some RPGs and stuff like that.

They are trying to acquire conventional items of concern. We're not seeing targeting of necessarily entire weapon systems, but we're seeing components. We're seeing enabling technologies that will go into a country to develop its infrastructure for dual use. That's our challenge; to see whether it's really applicable to bad end use or good end use. Iraq comes to mind. We were very much involved in trying to stop production running from Libya to there. It was brokered by an Iraqi out of Austria. It never went through Austria. The same technology was there for some kind of pharmaceuticals.

That's our challenge: to be able to recognize and figure out and do the analysis of where this is going and for what purpose. That was a major initiative to try and figure that out as well as the subsequent facilities that Libya, for example, was building.

We are seeing a proliferation of front companies developing just as we did during the Cold War when the former Soviet Union was setting up front companies in the West. We see a plethora of front companies developing. The challenge there is not only in enforcement, but also in intelligence gathering. Things are moving too quickly. These programs are coming together very quickly, and oftentimes we have the analysis almost after the fact, that at least we get the analysis and try to figure it out.

In these WMD programs, the things that we're looking for are what I call choke point technologies.

With the end of the Cold War, there was so much decontrol of technologies that they became more readily available. So our challenge now with export controls virtually eliminated for most parts of the world is to figure out what is that component or item they need without which they can't go to the X level of development. That requires us to know where those countries are in their various development programs.

Every country is different. Every program within that country is different. Consequently, we have to bring together all of the resources we can muster not only in the enforcement but in the intelligence community and what other information we can impart from the policy standpoint in order to bring that data together and work in a rather symbiotic relationship to figure out what it is, because the challenge is very daunting.

I have listed here enabling technologies without which you couldn't have a successful proliferation program. We have focused on machine tools, metal alloys, chemicals, fuels, electronics, telecommunications, and biotechnologies -- those areas that we feel that these countries are acquiring for an infrastructure for their own production. And here again, we have to weigh whether it's for legitimate purposes or not. And to countries such as China, it becomes extremely challenging, particularly a country that will not allow us to do any prelicensing/postdelivery shipment checks; certainly in Iran where we have no diplomatic relations; Syria, where we have diplomatic relations, but it's so critical to the peace process that it's a very shaky area when you want to come down and talk to them very bluntly.

I have a list of technologies that we see being targeted, both for conventional and unconventional weapons. They cover an array of areas, including computer technologies, optics, sensors, structural materials such as advanced composites, power generation, and directed energy. Again, we're seeing these applications both in conventional and in unconventional weapons development programs.

On any given day, this is what we're looking at: interrelationships; interregional relationships: one country's relationship to another, what programs that they're actually working on, in the cooperation (for example, the whole China-Pakistan episode, the continuing technology flow between Russia and China and then how that technology comes down into a Pakistan or to an Iran or to a North Korea).

So it's interregional. So what we have to do in between those countries is set up relationships, and we are doing this through our export control outreach programs to work with other governments to help us try to stem this proliferation as much as we can, particularly for goods that go through. And frankly, the challenge is very daunting. Every country has its own rules. They all

have their own outlook on what should or should not be covered, and they all add their particular interests. So we have to take all of those into account, and it becomes very challenging for us and we're constantly on the road.

This is another example of China and its interrelationships with other regional countries. Between Russia and China, for example, we've seen nuclear missile, advanced, conventional, surface to air missile support to China.

In turn, China has provided Iran missile technologies, CW precursors, as well as production technology. As far as we're concerned, that's still ongoing, not withstanding planes, nuclear, M-11s to Pakistan. Pakistan, of course, has been working closely with North Korea to acquire this type of missile. And we're seeing an increased working relationship in missile technologies between Iran and Syria.

So you can see how intense this ongoing effort is, not withstanding our efforts to try and stop this flow. Frankly, it's very, very challenging, as I said. In order for us to determine what's good or what's bad or what's benign and what's a critical program, we devised this little scale called an acquisition network model so that we can begin to judge if we know what the program is that the country is working on.

In this case, it was Iraq where we have no access, even though they may obtain export licenses. This was obviously before the Gulf War, and it may soon happen again. We can tell approximately from what type of technologies that they're ordering that we can thereby determine where they are in that development program. We're hoping to get more of that type of analysis done in time so at the time of review, we can then figure out precisely what it's going to be used for and make a determined judgment on that.

**PROF. BRENNER:** Thank you for a very interesting presentation. The next panelist is Renaldo A. Campana. He is the Unit Chief of the FBI's Weapons of Mass Destruction Countermeasures Unit. He was born in Switzerland, attended Queens College in New York and Loyola College in New Orleans. He's been assigned to FBI field divisions and FBI headquarters where he had supervisory responsibility for foreign counterintelligence. He has been involved with the FBI legal attache offices in Paris, Madrid, and in Caracas, Venezuela. In April of 1997, he was named as the Unit Chief of the Weapons of Massive Destructions Countermeasures Unit. Mr. Campana.

**MR. CAMPANA:** First of all, I'd like to thank Professor Alexander and Professor Brenner for inviting the FBI for this very important symposium. I usually don't lecture. I usually like to ask questions because it connotes that the FBI or anybody that speaks to you is really an expert, and I don't profess to be an expert by any means.

The closest I've ever come to biological-chemical issues is when the toilet on the 37th floor gets backed up. So let's keep it in the right kind of perspective. The job of the FBI is really to deal with the crisis when it involves weapons of mass destruction.

I think it's very important to put things in the right kind of perspective, and when we use the term "weapons of mass destruction," what we find is that a lot of people use it as if it was just another thing that we're looking at, that it's just an ordinary examination, an intellectual exercise. And I think what we need to do is get the right perspective on what we're talking about.

In the FBI, the tack we've taken, there's certain axioms that we follow when we talk about weapons of mass destruction. The first axiom is change. Everything we do today in the weapons of mass destruction arena involves change, and the best example of that is the FBI. If you characterize the FBI in the past, we were reactive to an incident. We responded to a crime. Well, I could give you the good news. The good news is the FBI has changed.

The FBI has taken a proactive stance with regard to weapons of mass destruction. We have engaged in developing response plans, but we still react. That's not going to change because our ultimate responsibility is to take and prosecute those individuals that commit these crimes. Now, how else has change occurred?

When you realize the term WMD, change occurs. As soon as I leave this room, things can happen out there that will create change within the structure, the national infrastructure that we have, or how the FBI or other individuals in this community respond. For example, the FBI just recently--about a year ago--went out to Congress and asked for \$60 million, not for the FBI, but for the first responders, the emergency responders, so that they who are on the front lines should have the type of equipment that will allow them to do the job, to save their lives. That's an incredible thing for us to be doing. We didn't ask for that money for us.

How else has the FBI changed? Well, we've changed by actually including fire, emergency medical service personnel, police personnel, actually assigned to FBI headquarters. We have the former Chief of the Oklahoma City Police now on board as an employee of the FBI. We have Michigan State Police actually working in the countermeasures unit.

We're going to have a battalion chief from Fairfax County working for us. We have a former professor at the Fire Academy of Fairfax County Medical Center to the Hazardous Material Response Unit. So what I'm telling you here is change is one of the axioms as far as WMD work and investigation and coordination is concerned.

The second axiom is interagency. Everything that we do in WMD, you cannot deal with the WMD community without including interagency. And when I mean interagency, I don't just mean the federal family, I mean a national infrastructure that includes the private sector. Just recently on the Hill, papers were signed on a national consortium that includes LSU, New Mexico Tech, Fort McClellan, Nevada Test Site, all of these institutions contribute to one aspect or another of interest that must be infused into a national infrastructure.

What do I mean by national infrastructure? That's the third axiom. It's multi-tiered. Anytime you talk about WMD, don't talk to me about research. Talk to me about the first responders, the state responders, the federal responders, because that's an integral part. Anything less than that means you really don't know what you're talking about.

That doesn't mean what your contribution might be in an area of research is not very relevant and meaningful, but it has to be maintained. It has to be integrated into the totality of what we consider WMD arena. Anything short of those three axioms, you're not talking about WMD, something meaningful to save lives.

Remember, I'm an FBI agent. My primary function, my objective is to put somebody in jail. But no. My first job is to ensure that we mitigate and preserve lives. Don't forget that. That's each and every one of your jobs, because without your contribution, we cannot do that.

Now, fourth axiom, and I opened with that and I said there are no experts. Because if you profess to be an expert, I can guarantee you and as soon as we walk out of here, somebody is going to use a nuclear improvised device. Hypothetical. And every data point that you have studied over the years and everything that I'm going to present right now goes out the window.

So there are no experts, and we include the FBI in that. Every single day as soon as I left the office, somebody handed me a different way, different procedures to affect a better management of a crisis. Every single day we address new issues. Look at the Attorney General. Do you think the Attorney General's job is to talk about issues of public health? The Attorney General goes to Congress. Change. We're talking about change.

She advocated to issue a biological stockpiling of antigens and vaccines. She took it upon herself, because she viewed what was important and critical to the American people. So what I'm saying to you is that if the Attorney General feels that it's so important to engage in change, that we'll have the ultimate effect of saving lives and present an infrastructure in the United States that is critical to the survival of our citizenry, then it is each and every one of our jobs to do that. And that's what should be in the back of our minds when we do our

job. Each and every one of us is contributing to the success of dealing with a WMD incident.

I'd like to address what the FBI does and how we're structured. First of all, the FBI in the WMD arena is only about two years old. Approximately two years ago we had a Weapons of Mass Destruction Operations Unit which basically dealt with all aspects whether it be planning, investigations, crisis management. But what has developed now is we have two units: One is the operational unit, and one is the Weapons of Mass Destruction Countermeasures Unit. The Countermeasures Unit does everything to prepare federal, state, and local responders to deal with a weapon of mass destruction incident.

That means we make sure, by developing plans, integrate contingency plans with local cities, states, that we are prepared to deal with a WMD incident. That means developing crisis plans. Now, why is the FBI engaged in this? Under Presidential Directive Number 39, the FBI was designated as the lead operational agency with the Department of Justice to manage crisis or WMD incidents, terrorism incidents.

So that is our job. Everything that we're doing right now is to prepare for that eventuality. The other thing that it's important to recognize, and I asked a few questions of some of the colleagues that are here from the press, what do you consider to be -- let's get our feet back on the ground -- the largest and most important threat to the United States today? Please. Who do you think? Foreign-directed terrorist, individual, white extremist, black extremist? Please, somebody take a guess. Anybody.

Let me tell you. Let's get back to reality. It isn't the Middle Eastern people. It isn't white supremacists. It is the lone individual, lone unstable individual. That, statistically, from the cases that we have, is the biggest threat right now. Why can I say that? We have to look at the cases. Next question. Out of 100 cases, how many of those cases do you believe are credible threats and how many are hoaxes? Somebody take a guess. We have a whole bunch of experts here.

**PARTICIPANT:** 50-50?

**MR. CAMPANA:** Well, I'll tell you: ten. Ten out of 100. So we're preparing for 90 percent hoaxes and 10 percent credible threats. What do we have to, in fact, as technicians, develop? Our ability to discern the threat, hoaxes, from reality. How do we do that? Well, the FBI -- and I talked about interagency coordination -- and what I'd like to do is also give you a better perspective on the types of threat spectrum that we have.

On the one end, you have a low nuclear weapon threat. Why nuclear weapons? More difficult, more technical knowledge is required to develop that weapon, and in fact, we have not had any incidents of a nuclear arena in the FBI. The next one would be chemical weapons. By that, I mean actual chemical weapons

would be the next highest threat in that spectrum. Then radio isotopes, and then biological pathogens. By that, I mean anthrax and plague. And then industrial chemicals, and then biological toxins.

Now, I'm going to repeat myself. There have been no credible threats to date involving a threat to obtain or deploy a nuclear weapon and the complicated nature of this type makes it extremely unlikely. Now, as soon as I say that and I walk out of here, as I told you, change is one of those axioms.

You know, it's only as good as what I'm saying right now, and the new data points or new system, something that comes up, makes me look like a fool. Also, as far as experts are concerned, we hired the person from Oklahoma City, and you just heard Bill Nagle in the lunchtime talk about New York City. I can assure you, the way those things were handled, the places they were handled, he's an expert on New York City. He's definitely not an expert on Oklahoma City and how we respond to that.

It's important to understand the nature of the threat, the type of incidents that we're dealing with. The next thing is to be able to discern which is a credible threat and which is not. Before I go on, I'd like to give you a better idea of how we have changed in the FBI.

I told you about the Weapons of Mass Destruction Operations Unit. I talked about the Weapons of Mass Destruction Countermeasures Unit. The other thing I need to talk to you about is we have what they call the Domestic Emergency Support Team, which is a rapid deployable team that goes to the scene wherein the incident occurred to advise the on-scene commander.

Who is the on-scene commander? I told you that under the PDD-39, the FBI is the operational lead federal agency to manage an operation. Who is that person? Well, that person is the special agent in charge, the SAC, of the field office wherein the incident occurs. He is the operational lead. That means he manages the incident whether it's crisis management, operations, or consequence management, either side. And his job is to coordinate that incident to be successful in resolving the incident, mitigating life threatening situations, and eventually hopefully prosecuting someone.

So the DEST is a rapid deployable team that involves a whole federal family. We also have developed another unit within the FBI called the Hazardous Material Response Unit. That unit is part of the laboratory that goes out and deals with the hazardous material and pretty much directs our people and local officials or law enforcement, fire, or EMS people how to deal with that material.

Don't forget, we've only been in the business for about two years, so the level of expertise is constantly being developed and heightened. We also have an Evidence Response Unit that responds to the scene to deal and manage. How do we collect the evidence? We

have a Material and Devices Unit also, again, to deal with these types of material. We have a Critical Incident Response Group, which involves the Hostage Rescue Team that would respond to an incident where we have to use force to get where the weapon is.

So all of these units have to work in concert with state and local people. Let me make something very clear here, and Bill Nagle said it at lunch: Where the rubber meets the road is the first, or as I always like to say, emergency responders. I would say from four, six, maybe twelve hours, the FBI and the federal family may not come onto the scene.

So we have to do everything -- and that's what my unit does -- everything possible to make sure that those first responders have the ability to identify the products that may injure them or kill them, have the equipment to do that, have the equipment to mitigate the injury and death. And everything that the federal government is doing right now is to try to move in that direction. And that's what Janet Reno has done by asking for additional funding to get that type of equipment and provide that to the first responders.

The other important thing to remember is that within the federal family, you have not only the FBI, but FEMA, Federal Emergency Management Agency; DOD; Department of Energy; EPA; and Public Health. That whole group, if an incident occurs, would be notified, and we would move and decide whether it's a credible threat or not.

I'd like to sort of go through, if I may, how a threat release of a biological agent would be handled, and the question would be: Who says what; who does what? And let me just run through this kind of fast, and please stop me if I'm going too fast or if something's not clear.

Okay. Here we go. Upon notification by local officials of a threat, the FBI special agent in charge would notify FBI headquarters. That's number one. The FBI Weapons of Mass Destruction Operational Unit would conduct an initial assessment of the threat, and the threat assessment process relies on expertise of several agencies as well as on the information received from state and local agencies.

First, we would discern the technical feasibility of the threat. Are they technically capable of doing this? Is it operationally practical and feasible to carry out this threat -- that's the second one -- and behavioral resolve. Does the subject have the behavioral resolve to carry out this act?

Using these three criteria and the interagency community in a biological, the emphasis would be on DOD and all of its components and expertise and Public Health Service to decide whether this is a credible threat. Now, the FBI special agent in charge, who would become the on-scene manager and is responsible for the federal response, and that means he coordinates all entities.

Now, here I'm going to introduce a little bit of a controversy. You heard Bill Nagle mention the Incident Command System. The Incident Command System is something that's utilized throughout the United States by local and state authorities. Take a guess what the FBI uses. Do we use the Incident Command System? No. Why? We're always asked that. We used a JOC, and a JOC to us -- Joint Operations Center, by the way -- is a structure very similar to the Incident Command System, but the structure is set forth in such a way that it permits management of multiple incidents by many agencies and integrates the local and state people into that system, which makes it very unique.

Now, it would be very easy for us to just adopt the Incident Command System, but it doesn't serve the objective of what the mission is for the FBI and what our responsibility is under PDD-39. Please stop me here if you have any questions as I go along. I prefer dealing with the questions as we go along.

So in this capacity, the special agent in charge is responsible for preventing carrying out the terrorist act, to stop them, ensuring that planning is undertaken at the onset, to address all potential consequences, and identifying and apprehending the perpetrator. To do this, we created the Joint Operations Center, and basically it's just a structure that allows all of the entities either on the crisis side or the consequence side to contribute, and it allows the Incident Command System from local and state people, which is the Emergency Operations Center that is so controversial I understand in the *New York Times* article, but those are very basic infrastructures that are critical to the success of handling a WMD incident and saving lives.

The issue of establishing a press office, well, we call it the Joint Information Center, and there is only one voice that speaks as far as the press is concerned, and that's the on-scene commander through the Joint Information Center, but there is nothing to stop local and state politicians from making press conferences. But hopefully, we are going to establish procedures and coordinate our response, and that's why we are engaged in a voluminous exercise program at a local, state, and federal level. That has increased nearly 300 percent, because how we practice, that's how we're going to really do our job, and we want to get all the kinks out before that happens.

Now, I mention the Hazardous Material Response Unit. They will assess the capabilities, and they will assess what's on the scene and provide input to the local people. The DEST will be employed and serve as an advisory team to the on-scene commander. What usually happens is that DEST is integrated with the Joint Operations Center, and through this process, the special agent in charge will continue to work on mitigating and saving lives at the same time, hopefully, eventually prosecuting that person.

The critical component here is the integration of all -- I'm going to repeat it -- the integration of all aspects of an incident. And by that, we mean in a biological, the critical issue, I'll tell you right now, is -- and Bill Nagle mentioned it and I don't think he was as forthright; possibly he didn't want to be -- but I think the important thing is to realize in a biological, if you don't have the state health officer establish an intelligence, an integrated intelligence system to have those physicians in the emergency rooms know the difference between anthrax, smallpox, and maybe a virus or a cold, you've got some serious problems.

Where's the biggest link or the missing link or the weakest link? I'll tell you right now. The Attorney General saw it. It is in the physicians' side. The hospitals, the physicians who are not really trained; they're not trained under Nunn-Lugar; they're not being trained under the Justice Department programs; they're in the front lines.

They're the person you're going to see when you have "that disease," that biological infection. The Attorney General is seeing -- and she has used her office in a very strong way to go to Congress -- and when we briefed her, we talked about the preparation of antigens and vaccines and so forth. Bill didn't tell you. I'll tell you right now. New York City and the pharmaceutical companies couldn't produce enough stuff to deal with an incident. You know why? There just isn't enough there.

And the more quickly you can identify this -- that's why I'm saying this is the critical component -- is those physicians that can identify that, to treat the rest of the population, including smallpox, for example, then you're going to save lives. What are we doing? Within the community, we're ensuring that those antigens, vaccines, are stockpiled, but on top of that, what else do we have to do? As I just told you, there's no way we can produce enough and get it to one location. We have to set up pipelines of supply.

That means we have to rely on other countries, possibly Canada, other countries in Europe, to make sure that if an incident does occur, that we have that support. Let me assure you that's the direction we're going. A tremendous amount of progress has been made -- and I keep saying this -- it's change. Each and every one of you here are addressing an issue that is critical to the survival and success of what we do in the FBI. But more so, you are serving the American public in developing the possibility and potential to deal with these issues. If you keep that in the back of your mind, I think you're going in the right direction.

It is very important to remember there are certain things that are occurring right now in the community that are controversial. There are certain issues currently going on that I think are very important to address.

The key criticism of what's going on in the federal community is the integration of first responders and providing the equipment that they need and integrating their system of dealing with an incident with the federal family. Well, the FBI is working very closely, as I told you, by getting first responders involved in contingency planning. That means actually hiring people on, having interns from these institutions and planning.

Some key places: New York City, very closely linked to the FBI in developing contingency planning; California, tremendous cooperation, because we have joint terrorism task forces in those areas so we're sitting with local law enforcement people, instant contact, instant relationship, to deal with the issues, and we don't stand on formality. I can assure you I've been in some heated debates, but among friends, among professionals, a very critical step in the right direction. We've got to address the key issues. We can't sidestep them.

Another issue that was brought up was the National Guard. Let me tell you: The FBI embraces any enhancement of resources from any -- let's be realistic folks. If there is a biological incident, a nuclear incident, a chemical incident, do you think that there's anybody in government that would tell anybody else to sidestep the issue of providing support for the American public?

If there's anybody here that believes that, then I think you're dreaming. So if we're saying, "Do we object?" No. We embrace the participation of all support, and that includes the National Guard. But there are certain protocols within the military that we have to follow. The National Guard, being a state agency in support of "consequence management" works under the on-scene commander. So we have no problem.

For example, in Washington the adjutant general in Maryland said to the FBI, "What do you want us to do to make things work better?" You know what he said? "How about us helping you logistically set up the job?" By God, they hit a sore point, and a difficult one for us, to set up a JOC. It's a difficult thing to do. So they served to resolve that incident by providing a service, by supporting the whole integral process, that infrastructure that we have to establish.

And I think it's more critical in any biological incident to expand that infrastructure to deal with a WMD incident, because you're talking about the people that are going to find out about it -- unless you get a note -- are going to be the physicians that are going to treat people in the emergency room. And it's not going to be when the incident occurs, but it may be anywhere from 8 to 12 to, you know, 24 hours, and God help us if it's smallpox.

So any other research that's being done in this area is very critical, absolutely critical, and you're to be commended for doing this, and I commend you for

raising this to the level that it really needs to be, because it is probably one of the weakest links in the WMD arena. Either be it for sensors or any other way that you can imagine.

We are attempting to develop -- GAO criticized Nunn-Lugar for not doing assessments, and I'm going to address some of these issues. The issue on the GAO study, we agreed to do a pilot study. Even like New York City, as Bill mentioned, does an assessment of what the threat is. The fact that you assess a city as being at a higher risk does not mean that that's the city that's going to be hit.

If we had done an assessment of Oklahoma City, we probably would have put them down real low and probably New York very high. That's what I'm saying. The data points here are very critical, but they don't answer the question that if I had done a risk assessment study, it probably would have been low, and yet Oklahoma City was a victim in this case. Is a risk assessment a good idea? Of course, and we're going to do a pilot study, and that's important to always be open to change in a WMD arena.

Remember that axiom, none of us are experts. I'd like to close on this, that we should practice that intellectual exercise of accepting the validity or the value of anybody's idea in this arena to save lives, to form better infrastructures, to create better crisis management tools, to develop new sensors for biological that can identify certain DNA material that are critical, anything that is going to offer a possibility of saving lives.

If you want to be in this WMD arena business and -- I'm an FBI agent, not a researcher -- but I guarantee you I embrace each and every one of you, because there's somebody out there doing some research that will save maybe not my life but maybe my grandson's life. Thank you.

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## Questions and Answers

**PROF. BRENNER:** I think our schedule will accommodate five minutes of comments or questions from the audience, and may I ask you to use the standing mike over here on the midlevel.

**Q.** First I'd like to congratulate an excellent presentation about WMD. I'd like to get some clarification about Oklahoma City. Was that a WMD? What's the difference between a critical incident and WMD, because until you can clarify that I find that organization a little confusing.

**A.** Let me make something very clear. I did mention this, and I did it at lunchtime but it skipped my mind a little bit. In WMD, the most conventional weaponry, bombs, are the weapons that are going to be used most likely; not biological, not chemical. Bombs. And Oklahoma City was a weapons of mass destruction issue.

Critical Incident Response Group consists not only of the Hostage Rescue Team that goes in, but it also involves people that do behavioral analysis as far as the threat assessment. It also involves all of the components: the crisis management community that's going to come on the scene and try to manage a crisis. So the Critical Incident Response Group is a component within the FBI that supports what's going on at an incident in those various areas.

Let me put it another way: We draw from the expertise throughout the community, and that means if you're an institution of higher learning and you're next door and you can contribute as far as biological aspects, we're in fact actually expanding the number of institutions that are going to provide us that support. So you may be called upon to provide us some assistance.

**Q.** Yes. If you could continue, you're very clear in talking about the WMD incidents that the FBI special agent in charge is the local on-scene commander. Even after, for instance, the release of a biological agent and also to supervise consequence management.

**A.** The on-scene commander has the overall operational responsibility, but the continuum occurs, and the reason we do that is when an incident occurs, there's no reason to believe that there may not be a secondary. Now, FEMA is in charge of the consequence management aspect, the cleaning up, and so forth. And as soon as an incident occurs, they're on board and they're notified and working with us in the joint operations.

**Q.** That was the nature of my question. How you related it both to the consequence management side of this and, in biological, FEMA would delegate a lot to the Public Health Service?

**A.** Absolutely.

**Q.** Could you comment on two questions: One on the relationship, then, of the special agent in charge to, say, the mayor or the elected official, and then what happens if there's no warning?

**A.** An incident actually occurs? First of all, the relationship between the on-scene commander and the mayor is within the structure of the Joint Operations Center. He's a political entity, but in a command structure and a Joint Operation Center, he is part of that command group, so he is included. That's another distinction in between.

And SAC, let me point out, would not ever make any decisions. You know the President, under the coordinating subgroup of the National Security Council, would always be involved in any of these incidents. Let's ratchet it up. I didn't go through the whole sequence, but in an incident like that, the President would be involved as to whether we're going to go in and diffuse a weapon. What risk are we going to run? Who makes that decision? The mayor is involved in that. That's a political decision, too.

The on-scene commander would never make any decision without coordinating within his command group and participate in that. Now, your other question was on the threat.

*Q.* If the incident just started to develop.

*A.* If an incident just started to develop, with the consequence management people involved, the whole federal community's involved, and everybody is brought in from the get-go. Actually, Public Health would ensure that aspect of it under the consequence management aspect of it, but there would also be advisors as far as the operationally how to deal with a crisis.

*Q.* If I could give a little follow-up on that. So the Public Health Service would already be there presumably because of the crisis in the hospitals, they would start to develop the fact that it was an intentional

release. So the FBI would come in, presumably, at that point?

*A.* First of all, it's always the local people. Public Health would probably be called by the locals and Public Health would call us or the locals would call us.

*Q.* And then the FBI would establish its command center?

*A.* Exactly. Joint Operations Center. It isn't really over. It is inclusive, not exclusive. It is all the components to make good decisions in a structured environment to deal with the crisis. That's the way we address it. We're not over, but we have the responsibility to oversee that all the resources are properly used from local all the way up to federal.

**PROF. BRENNER:** I want to thank you, Mr. Maloof, and Mr. Campana for interesting presentations.

## **ADVANCED COUNTERMEASURES**

**Dr. Larry Dubois**

*Defense Advanced Research Projects Agency, Biological Defense Program*

**Dr. Anna Johnson-Winegar**

*Director for Environmental and Life Sciences, Deputy Director for Research and Engineering, OSD*

**COL Gerald W. Parker**

*Commander, US Army Medical Research Institute of Infectious Diseases (USAMRIID)*

**Dr. Steven Hatfill**

*National Institutes of Health*

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**PROF. BRENNER:** The first panelist is Lawrence Dubois. He has a Ph.D. from the University of California at Berkeley. In 1996 he was promoted to Director of the Defense Sciences Office at the Defense Advanced Research Project Agency. His office is responsible for an annual investment of over \$300 million in various developmental projects, including medical and non-medical countermeasures for biological warfare defense. He's also involved in advanced biomedical technologies for combat casualty care. Dr. Dubois.

**DR. DUBOIS:** The program at DARPA in the development of technologies to counter the threat of biological warfare is about a 100 million-dollar a year program. So in the next few minutes, I can't do justice to the entire program, but I'd like to give you a brief overview of the program, a couple of examples of the technologies that we're developing and how we're trying to get these technologies out into the field.

If you look at the spectrum of biological warfare and what needs to be done to defend against it, you can look at this in terms of a time line. And clearly before a viral event, we have to worry about trying to prevent it and prevent the proliferation of biological agents.

Then after the event, we need some sort of a sensor to detect the form, we need to protect towns, deal with the consequence management issues, finally be able to diagnose the exposure and then treat it and ultimately to decontaminate the area. This is a very broad spectrum, and each one of these points as a technological solution or technological development can enhance our ability to respond.

And DARPA, within the Department of Defense, is really geared towards looking out into the future and taking those potentially high risk solutions to problems. We've decided to tackle a number of different areas along this time line. We've put together a fairly extensive program really to thwart the use of biological warfare agents. This is for both military and terrorist components.

We define biological warfare agents broadly. We have the traditional bacterial and viral threats, but

they also include bioengineered threats, which is a real problem we're going to have to deal with in the future; as well as toxins. There are four major thrusts within our program.

The first is pathogen countermeasures, which is primarily developing therapeutics to deal with the problem, advanced diagnostics, to tell us whether people have been exposed to biological warfare agents or whether they happen to have the flu. We have a fairly extensive program in sensors, and finally one in consequence management. And the two that I would focus on today are the areas of pathogen countermeasures and sensor development.

So our medical countermeasure program has several different aspects to it from immunization to antibacterials, antivirals, and antitoxins. It's a three-pronged attack on the problem. The first is really to defeat the pathogen's ability to enter the body and reach target tissues. So we try to fight the presence of pathogens.

We're also still looking at targeting common methods of pathogenesis, and the reason for that is the following: There are dozens, some people would say hundreds, of different potential agents. If you throw in all of the bioengineered threats, there are literally an innumerable amount of potential agent threats we have to deal with. If you have to deal with an individual therapeutic or individual vaccine for every single one of those threats, it would be an impractical amount of work.

So we're trying to look at common tableaux. Are there ways of developing therapeutics that attack all classes of pathogens?

Finally, we're interested in modulating humans' own biological response to the presence of pathogens. In many cases, what happens is our human body kills our own cells while responding to the presence of a pathogen, as opposed to the pathogen itself actually killing us.

Let me give you a couple of examples of the kind of far-reaching technological advances we're looking at. First is the development of modified red blood cells, and the idea is the following: We have lots of red blood cells circulating through our system constantly

and clearly performing very, very useful functions, but most of the surface of the red blood cell isn't being used for much. So one of the projects that we have going with the University of Virginia is to modify the surface of a relatively small number of these red blood cells by attaching a heteropolymer.

This heteropolymer has two different linker groups on either end of it. One is a linker that bonds specifically to the red blood cell, and the other linker group is one that bonds to a specific target pathogen. What happens is you can inject this heteropolymer into the bloodstream. A simple shot will do, either pre-exposure or post-exposure.

The antibody on the surface of this heteropolymer can bind very tightly to the pathogen, and as the red blood cells circulate throughout the body, the target pathogen is destroyed in the liver and the spleen. What's been demonstrated is a million-fold reduction in the amount of virus in the bloodstream in an hour. That's shown by the figure in the lower corner there.

What we're looking at here in the upper micrograph is an activated Marburg virus that's been attached to the red blood cell. These heteropolymers that are bound to the red blood cells are stable for over seven days, and as I said before, you can either give them pre-exposure or post-exposure.

The studies to date have worked on inactivated species, things like Ebola, Marburg, dengue, viruses. We've started the work now, and there are a lot of agents being pursued in collaboration with the drugs at USAMRIID, and the work that's shown here has been done in nonhuman primates.

So we're very, very close to taking this technology and transitioning it out and starting to look at real species and then ultimately in human clinical trials. So that's one example of the kinds of things that we're doing that's really far-reaching, actually to use your blood cells to scrub out infection.

Other areas we're working on. This is one that's decontamination as well as one that could be used against agents that are within the human body. It's actually like liposomes, like a soap, if you will, that does a superb job of actually killing a wide variety of agents. It's harmless to plants and animals and humans, but it does a great job on pathogens.

And as you can see here, a very dilute solution of this particular liposome or soap solution will kill 99 plus percent of various spores in just a few hours. As I said, it can be used internally or externally.

Well, okay. So we've got some therapeutics that one can use when one is exposed, but ideally what we'd like to know is whether we've been exposed in the first place. We have a fairly extensive bio sensor program with the goal of making things smaller, lighter, cheaper, with very high sensitivity, a low false alarm rate, and of course, to be very automated and very fast.

You can see the comparison here between the current technologies and the directions that we're going. Let me give you a couple of examples of the kinds of things we're doing there. A number of detection schemes today use DNA as a basis of determining what the pathogen is.

The problem is there's only one copy of DNA in an individual pathogen cell. So we've taken a different attack, and that's to look at the RNA. In this case, there are maybe 60,000 copies of the RNA in an individual cell. So you don't have to go through the somewhat time-consuming process of amplifying or increasing the number of DNA molecules.

We've developed very relatively small integrated chips, integrated circuits, that have a variety of different antibodies on the surface, and with fluorescent markers it can be used to determine what kind of a pathogen we have.

It actually determines things like the genus of the species. It can determine if something's pathogenic or not pathogenic. It's also relatively rapid and small, and ultimately when it gets developed, it will be a relatively low-cost way of determining whether one has been exposed to pathogens.

Ultimately, humans are the final sort of detector, if you will, of pathogens much the way that back in the old days when miners went down into the mines, people got sick or started falling down from being unable to breathe, they started saying, "There's a problem here. We ought to get out of the mine," and they had this idea of taking a canary with them because they're very, very sensitive to the lack of oxygen and the presence of CO and things like that.

We have the a similar concept now that we're working on for detectors for biological warfare agents, and that is can we use individual cells or tissues as sensors for biological or chemical agents, not actually carrying little canaries around, but in this case, carrying around individual cells and using them with the idea that if something is harmful to these cells, then it will be harmful to us as humans. And ultimately, they should be small and compact and robust since they're, again, cell size.

And the interesting thing about cells -- and this is an example of some of the work that's gone on in nerve cells -- is they can be sensitive to a wide variety of different species. Each species changes the pathway of how the cell operates in a slightly different way. This happens to be nerve cells that are living on small microelectronic circuits. They can live there for a couple of weeks. Clearly, we need to make them live longer and improve a number of robustness or viability issues, but the concept, I think, is sound.

There are cells that can react to a wide variety of different species and actually can be used for detection of signals. This is just a real brief overview of the kinds of

things that we're working on. For the most part, the DARPA charter is to do long-range far-thinking research. There are some things, however, that we are looking at in the relatively near term, and that is prototyping.

This is a list of some of the areas that we're working in the four major areas and how they're getting out in the user community. One that we're doing on consequence management tools, for example, is actually getting out and being used now, we're working with it now. They're prototyping those tools now.

The sensors are in prototyping and field trials starting in the next couple of years. Some of them have already transitioned out of DARPA and into other organizations. It will take a little while for some of these tissue-based or cell-based sensors to come out. Diagnostics, which I did not talk about, will probably come out of the DARPA enclave in the next few years because we're working very, very closely with the biotechnology community.

And finally, I think the most far-reaching efforts that we're working on in pathogen countermeasures and development of advanced therapeutics will take a couple of years before we really start getting complete confirmation of our animal models and then ultimately commercial and military production is going to take quite a few years after that, because we're going to need to go through FDA licensure.

**PROF. BRENNER:** I think we can take one or two questions, and then we will go on to the next speaker. Dr. Alibek.

**Q.** Thank you. What's your opinion? We know there is a specific immune system in a human body. Therefore, we suggest to increase a defense of difference of the human body, so-called recombinant attacking proteins, C5, C6, et cetera. Would you consider to analyze this approach to develop some new techniques against any possible biological agent?

**A.** I just gave you a couple of examples of the kinds of things that we're doing in the program. We're doing work with a wide variety of other species. We're looking at a number of different therapeutics, for example, that will block all type-three secretion systems by stopping transmission through the cell membrane. We're doing a wide variety. This is just a couple of examples.

**PROF. BRENNER:** The next presentation will be by Dr. Anna Johnson-Winegar. She is the Director of the Environmental Life Sciences in the Office of Defense Research Engineering. That office monitors and coordinates all DOD research and development in the areas of medical and life sciences.

It's also involved in training, environmental sciences, environmental quality, civil engineering, and most specifically, chemical and biological warfare defense. She also serves as the primary DOD

representative to a number of interagency groups that deal with these issues.

**DR. WINEGAR:** Thank you for the invitation to be here, and I apologize for my speaking voice. I'm trying to recover from a cold. I'm going to focus my remarks today primarily on the biomedical technology area which is one of 10 technology areas that the DOD is investing in. The investment for this fiscal year for the DOD is in the neighborhood of \$7 billion in all our Science and Technology programs.\*

Biomedical is one of the smaller ones of those being less than \$1 billion overall. And biomedical, as you can see from this chart, is divided into six sub-areas. So what I'd like to talk to you a little bit about today are those efforts listed under the medical biological defense program, and you'll see a number going along with each of those.

Those are merely identifying numbers that we use, and these can be found in a document known as the Defense Technology Area Plan and the Defense Technology Objectives. And these documents are available on the web, or if you need hard copy, you can talk to me about it afterward.

Across the board, the Defense Department has about 300 Defense Technology Objectives. These are, in essence, the highest priority efforts that we are funding in our S&T programs, and of those, 21 DTOs, Defense Technology Objectives, are in the biomedical program, and you can see those portrayed on this chart.

Just a little bit of history for you about why we have a medical biodefense program, what our goals are, and you can see that the goals are threefold, and please bear in mind as I talk to you that we're talking primarily on developing things for the Defense Department. So we have a little bit different scenario to think about than the bioterrorist. However, I feel that there's a tremendous amount of overlap and consolidation and coordination that could go between those communities.

The vast majority of our investment in biomedical is in the area of vaccine development, and again, perhaps we in the Defense Department have the luxury of being able to make decisions that we will have made with anthrax, for example. And I realize, as one of the previous speakers said, nobody is going to recommend that we vaccinate the entire U.S. population for any one of these potential biological threat agents even if we have the best vaccine available.

So we do have to think about it in a different context. I do think there will be some instances, however, that vaccines that have been developed by the Defense Department are very useful in the civilian community and in a terrorist situation. For example, to

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\* Viewgraphs referenced by Dr. Winegar are located in Appendix A.

prevaccinate those first responders, a lot of the medical treatment staff, and also to act as a preventative for, if you will, a possible second wave of the attack.

These are some of our recent accomplishments over the last three years, and you can see that we have a relatively broad spectrum approach in the program. We are looking at recombinant vaccines. Obviously, as Larry mentioned, if you were to set out to develop one vaccine for every possible agent on everybody's threat list, that would be a pretty big job for everybody. So we are looking at the possibility of recombinant technology to develop multivalent vaccines which can be directed or especially targeted to a broad range of pathogens.

Just for comparison's sake, this is the funding profile in biomedical, and you can see that it's sort of been on a downslope. We certainly hope that the renewed interest across the board will result in some additional funding for our programs.

And I think this chart is even more to the point. These are the six defense technology objectives in our medical biological defense program, and the funding that's applied to each of those, and I think by any stretch of the imagination we would all agree that that's modest. And you might ask why there are zeroes in some of the years.

That is because that particular technology effort is scheduled to end in a particular year. For example, the second one, the medical countermeasures for staphylococcal enterotoxin B is charted for the fiscal year 2000, because our projections at the moment are that we will have to develop a candidate program at that time.

I would like to explain, also, that the information that I'm providing for you today covers pretty much our research component of the program and does not include the advanced development component of the program, and what I mean by that are the studies required for FDA licensing and approval. Those would be the studies with the S&T-made material in animals to show safety and efficacy as well as the initial Phase 1 and Phase 2 safety and efficacy studies in humans. There is additional funding for that, and that's managed out of a different program. So we do plan to take these products all the way through full licensure and approval.

I'd like to also get back to a point that was made by one of the earlier speakers on what's the role of the DOD, and in this particular chart, we're showing consequence management. And as was mentioned, FEMA is the primary agency responsible for consequence management, but I think we would all agree that a number of agencies have a significant amount that they can contribute, and I think one of the biggest contributions that the DOD can make is our expertise, and in addition, some of the materials that we will have developed through our research programs.

One of the more transferable types of work that we're doing that I think that is of equal interest to both

the military and the civilians is in the area of diagnostics, and we have made a large investment and considerable progress over the last few years in developing hand-held assays for biological warfare agents that can be used in the field, that do not require sophisticated equipment, that do not require extensive training on the part of the operator.

And depicted here is a particular assay, which is sort of modeled after the home pregnancy test kits or the strep throat kits that your doctor can operate in his office. They are relatively small. They are inexpensive to make, and we feel that this is one area where we can leverage work that's going on in the private sector. If they are the ones that are going to develop the membranes and some of the coupling agents, et cetera, then all the DOD would have to do would be to provide the specific antigen into an already existing system.

I think you can see that something of this nature is relatively easy to read, showing that a test and a control when both lines show up, it's a positive; and when only the control shows up, it's a negative test for the particular sample that you're trying to assay. These things are rapid, usually less than 15 minutes. We're working on the sensitivity. We have a lower level of sensitivity for some biological threats than we do for others.

In addition to the medical aspects of the program, my office is also responsible for what we call the non-medical aspects of chemical and biological defense. As is mentioned in the presentation from DARPA, they are doing some work on sensor development, and we have a large investment in developing sensors, too, for biological contamination of environmental samples, primarily looking at air, but also looking at water and another possible means of transmission.

I do not have any information with me today on the sensor program, but would be happy to provide that to you if you are interested. One area that I do think will be important as we think about biological terrorism is the clean-up aspect of that. We are making a substantially larger investment in decontamination starting last year, actually, and continuing over the next few years. We realize that that's a major problem from a number of different aspects.

First of all, things such as sensitive electronic equipment or large things such as airplanes, et cetera, that may become contaminated with either chemical or biological agents, we need to find an effective way to decontaminate them. We're looking very heavily into the area of enzymatic decontamination as an inexpensive and yet environmentally acceptable and safe method of decontaminating.

I'm sure most of you here in the audience are aware of the fact that normal bleach is an effective decontaminant for the vast majority of the biological

agents. However, bleach is not environmentally friendly, it's not people skin friendly, and it's not friendly to sensitive electronic equipment, either, so we do have to make some improvements there.

Another group within the DOD that's working on looking at ways to rapidly accelerate the use of products is the Technical Support Working Group, and they have just this last year developed a new defense technology objective in this area, and as you can see, it's entitled terrorist chemical biological countermeasures.

I think you can see from some of the milestones that they have identified for this program that they have an aggressive program. They are looking across a wide range of technologies. They are clearly an interagency group and are working very hard to leverage things that are going on in the private sector bearing in mind all along that they need to be relevant to our DOD mission, but clearly I think they will have a spin off to the private sector.

I think that's all the charts that I wanted to use. I did want to spend just a few minutes talking to you from the aspect that I think that clearly the public awareness and the increased interest in biological warfare agents and their use by terrorists as well as recognized adversaries to our country has certainly brought a lot of attention to our programs. I think that the investment that the DOD has made over the past 10 or 20 years has put us in a very good position to be the leader in developing the technology and certainly among the leaders in developing the policy on how we're going to handle a number of these different things.

We are in the midst of doing some reorganization within the Defense Department. A new agency, the Defense Threat Reduction Agency, is being established. That will roll together a number of existing agencies that will encompass both the technology side of things as well as the policy side and other organizations such as the on-site inspection agency, and I think that we're attracting a lot of good people to this program. It certainly has the attention of the highest leadership within the Department of Defense.

We are identifying critical areas in which to increase our investment, bearing in mind all along that in addition to those things that will strictly satisfy military need, the DOD has been given an additional roll to work on the terrorist side of things. So I think it's a very promising future, and I look forward to continued interactions with our colleagues from other federal agencies and from the private sector, as well.

**PROF. BRENNER:** Thank you. The next panelist will be Colonel Gerald W. Parker. Colonel Parker is the commander of the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID). He has a doctorate of veterinary medicine, with a degree from Texas A&M University. He served as Chief of the Department of Physiology and Pharmacology, and Chief

of the Toxicology Division. He has also served as Deputy Director of the Combat Casualty Care Program in the United States Army. I'm pleased to present Colonel Parker.

**COL PARKER:** Thank you for the invitation to join you this afternoon to say a little bit about what we do. I'm going to talk you to a little bit more about what we do at USAMRIID, United States Army Medical Research Institute of Infectious Diseases. And we consider ourselves a Center of Excellence as far as the R&D aspect being prepared for biological warfare defense.

And, of course, many of the things that we've been working on over the years, they are directed at military needs and military requirements, but there are going to be some things that we're working on that will have a dual use of applications, such as, medical diagnostics.

This slide depicts several things that they've talked about today. There are many agencies to include the local, state, federal level, that have overlapping areas of responsibility and goals et cetera. But I want to take this opportunity to say that bioterrorism, specifically in a consequence-management mode, when there's that announcement that something is going to be released, this is primarily going to be a public health and medical problem to deal with.

Sometimes I think that's all too often overlooked. But if it's an unannounced event, a release of an agent in a subway system, it may be hours to days before we all of a sudden realize that we have sick individuals. So that responsibility first and foremost is going to fall on the public health community when the medical community recognizes that something is amiss.

Of course, we've been doing a lot of thinking about what are some of the national priorities. Bioterrorism I think caught the attention of everyone now. And certainly that public health infrastructure being able to diagnose something quickly and get that information disseminated is important. Of course, that goes along within consequence management. Vaccines aren't so important for bioterrorism except for a few cases where you want to cut down on the spread of disease. But having therapeutics, having antibiotics, having antiviral drugs is going to be important. Education is a key thing. I'll talk more about that in a minute.

But, of course, having robust R&D centers of excellence that can respond to that unknown pathogen is going to be very, very, very critical. Of course our business at USAMRIID for a number of years has been in that tech base and our job is to develop new and improved medical countermeasures. Here's the home of the medical bioresearch programs and also for the endemic infectious disease research program It's specifically for those viral agents that require BL4, the maximum level containment.

Now, our focus, again, has been on our service members: protecting our soldiers, sailors, Air Force, and Marines. But, of course, from a bioterrorism perspective, we also have to think about more than just people. We have to think about our agricultural economy as well: plants and animals could be a target.

This is where we are, we're located at Fort Detrick, Maryland, in Frederick, Maryland and the large white building on the right, that's the main building of USAMRIID and that building opened up in 1969.

And in the military, of course, we've got to have a chain of command and the Army Surgeon General is dual hatted as Commander of the U.S. Army Medical Command and I'm directly subordinate to the U.S. Army Medical Research and Materiel Command.

Our tech base is our principal strength, but there are also some unique capabilities that we have at USAMRIID, including the ability to do some of the initial Phase One, Phase Two clinical studies for vaccines that need to be developed in the tech base or some of the other laboratories in the DOD. We can either do those as an inpatient study or outpatient study.

But the development of diagnostics and having the reference laboratories are other of our unique capabilities, like having to find a scientist that understands anthrax, understands the role of plague, understands what is required to absolutely with 100 percent certainty identify agents in a myriad of sample matrices.

Operational medicine. Education has been something that's been gaining in importance. It's going to gain a lot more importance in getting the awareness of this problem out to our health care providers and also to the public. And, of course, in USAMRIID, we have one of the only metropolitan containment laboratories, being number 1 or 2 in the nation.

And again, I mentioned some of the new capabilities that have been involved in the medical bio defense program, but some of these same capabilities that it makes sense to leverage for the bioterrorism problem, the unique laboratories and the BL3 and the BL4 laboratory availability. But it's really the cadre of scientists that make up the Center of Excellence no matter where you go or what institute you're talking about.

It's that intellectual knowledge and intellectual agility in having the optimum approach to the problem that's really important. So you put those two together so that the intellectual knowledge and agility along with those facilities and we have a pretty good winning combination.

And just an example of work in a tissue culture laboratory, a BL4 laboratory, and this happens to be one of the laboratories where we do some of the work.

We also have the capability where we can study some of these diseases, pathogenesis of these unique

agents, bio aerosol route. We have to understand first the pathogenesis of animal models by way of inhalation exposure.

And more importantly we have to test whatever countermeasures we're developing to include medical diagnostics from aerosol or aerosol-exposed animals. Often it's much more difficult to be able to develop an effective vaccine for example against the inhalation-challenged than to go beyond the root of infection.

This is where actually some differences are when we look at what's needed for defense against biological warfare agents or bioterrorists-type agents. It really comes down to three things. One, yeah, we'd like to prevent it and that's where we in the military have an advantage. We can identify population.

We have some intelligence on what the threat may be or the worst threats we face. So we can make a decision to immunize and provide that degree of protection. It's going to be very difficult when we talk about protecting the civilian population to try to immunize the civilian population. What's going to become very key and important and voluntary is diagnostics and early diagnostics. And we have two opportunities there, and that's during the incubation period when we offset intoxication or infection to the onset of overt disease.

It's fairly straightforward to make a diagnostic, both a clinical and a laboratory confirmed diagnosis, once you have overt disease. But it's a whole other thing to be able to make a diagnostic during the incubation period. The technology that's being developed really needs to be pushed to that phase where we can make a diagnostic during the incubation period.

So we really have to push the limits of the sensitivity with intensity. That's an extreme challenge. Of course, we're also looking at an improved therapeutics, be it antibiotics, maybe just simply testing available antibiotics so we know which antibiotics are efficacious against the known threat, but we also have to look at the new antibiotics that are coming out and perhaps making an investment in a developing a whole new class of antibiotics. And then there's anabolic drugs.

But we at USAMRIID, to sum it up and try to put it just in one slide, the agents that we're working on, that includes the toxins, vaccines and viruses. We're concerned with viruses we staph ricin. The bacterial agents that we have efforts on include anthrax, plague, and viral agents including the viral hemorrhagic fevers. And of course our priority has been in vaccine development, prevention of the disease, and we have a number of vaccine candidates that are nearing the time where they can enter into the Phase One clinical trials. And of course, diagnostics and then therapeutics.

To sample some of the vaccine candidates that are coming out of the tech base that are pretty mature include a recombinant technology, and most if not all of

these are based on recombinant technology. And why is recombinant technology so important?

They may not be more effective necessarily than a traditional vaccine, but they overcome some of the weaknesses that may be associated with traditional vaccines. They may offer in some cases safer conditions to produce them. You may not have to have – in most of these cases you don't have to have dedicated biolevel containment for these productions, but that gives you more flexibility and options in production of vaccines. It may be cheaper to produce, in some cases, believe it or not, with a new technology vaccine than an old technology because sometimes the issues of biocontainment and having to work with the live agents are eliminated.

We're looking at vaccine delivery systems as are a number of agencies looking at vaccine delivery systems. And two of the areas we're looking at are the vaccine and the one we're most excited about is the vaccine delivery system that has a possibility where we might be able to immunize against several agents with one vaccine delivery system.

Both of these schemes actually have the potential to bypass some of the -- they won't bypass-- regulatory issues, they all have to go through the FDA, but we may have an opportunity to streamline some of the regulatory procedures and be able to respond more quickly with a new vaccine with these vaccine delivery systems. They offer that potential. Whether they'll pan out, time will tell.

Diagnostics. Both just in technology development, trying to push the envelope on the sensitivity and specificity issues. It's incredibly important in diagnostics and agent identification, be it for public health or be it for law enforcement. It would be 100 percent accurate. So we have a number of technologies in development. Plus we also serve as a reference laboratory for several of the unique agents where you have the cadre of scientists that understand those agents and know how -- what's needed to do the battery of tests.

And I submit, there's probably never going to be one simple box that's going to be available to give you the degree of sensitivity and specificity needed; rather it's going to probably be a battery of tests. Again, old fashioned microbiology to get your answers and confirmation.

We serve as a training center but we actually have some of our soldiers, who belong to a deployable unit. They live and work at USAMRIID in our diagnostics systems division and we have some of our officers who work along with those soldiers and when the need arises they can deploy with a deployable laboratory called the Theater Army Medical Lab attached to the 44th Medical Brigade and to provide the biological diagnostics.

And in fact, this team and this unit were both supported for the current operation in Southwest Asia during the spring. In fact they're on their way home right now. This proved to be a very valuable asset and the most cutting edge technologies were able to be fielded in a very harsh environment. Those same technologies are going to certainly have direct dual use application for civilian affairs and modification.

This is a little bit about the interagency role that USAMRIID plays in support of the federal government and others in bioterrorism. And that comes down really to the intellectual knowledge that some of our scientists and divisions bring in being able to provide medical consultation. Medical provides knowledge on the threat and just helping and assisting in the preparing phases of consequence or crisis management.

And just a list of the some of the expertise that can be brought to bear if an incident occurs, and the incident that comes to mind right away is the Larry Wayne Harris incident that occurred in Las Vegas last February.

We can quickly bring the appropriate scientists together, both physicians and diagnosticians, to make representations to whomever we might be supporting at that time, such as the Federal Bureau of Investigation. And then you could also do the laboratory work-up. Our lab was very involved in doing the laboratory analysis for those samples.

Just an example of the operations tempo, I guess, is that we get involved in supporting the interagency. Be it exercises for and being prepared for real incidents such as the incident that occurred in Las Vegas in February.

And again, just the number of agencies that we supported in one way or another but of course the lead federal agencies for crisis or consequence management would be in the FBI or FEMA. We work very closely with the Office of Emergency Preparedness and Public Health Service Centers for Disease Control in Atlanta.

Education, education, education. I think I can't state it more strongly. Education of our health care providers to get the awareness that we need to be thinking about the possibility that this could happen. They're not used to thinking about signs and symptoms and treatment of anthrax or plague.

So getting education, getting that information out there, and just getting the awareness that they need to include this in their differential diagnosis is going to be very key because again unless the would-be terrorist announces he's doing something, it may fall to those in the medical care system somewhere, our public health system somewhere, that all of a sudden we have an increase in a syndrome. And they just need to begin including this in their list of differential symptoms.

At USAMRIID, along with our sister Institute, we've been teaching a course for a number of years called

Medical Management of Casualties. We recently put that course in a distance learning satellite format. We've only had one broadcast. It was last September. We have another broadcast scheduled for this September, the week of 20 September '98. In our first broadcast, we were able to reach over 5000 people at 250 sites. Probably about half of those that tuned into that broadcast were from civilian medical institutions, the other half military institutions.

But it was so popular the first time that the CDC has partnered with us, and this one is going to be not only about medical management of biological warfare casualties but they're going to include public health aspects and bioterrorism on this next broadcast. This is a very effective tool for getting some of this initial awareness put out. And, again, the next broadcast will be 20 September of '98. It's a total of 12 hours over three days, four hours a day. But we try to make it not only informative, but entertaining as well. It's not just a talking head at a podium.

But our core base -- I'm trying to conclude here now -- our core base, our core is our technology, it's our tech base science. But more and more folks have seen us supporting the government agencies in the field, but it's that ability to exploit the tech base knowledge that we have and make it instantly available for today's needs which I think is very important.

And we have become certainly a resource for the DOD but I also submit that we've become critical to our main job and our main focus of developing better countermeasures for our service members. Thanks.

**PROF. BRENNER:** We'll now hear from Dr. Steven J. Hatfill. He's been connected with the National Institutes for Health for some time, working on child health development and the laboratory for cellular and molecular biophysics. He's a medical doctor with certification in hematology and pathology. He has a Ph.D. degree in molecular cell biology. He has a diploma in aviation medicine. He has a diploma in diving and submarine medicine. He has served with the U.S. Army Special Forces. He was on a 14-month duty as medical officer and science team leader at the Antarctic research station. He also conducted research while there for the NASA Johnson Space Center Solar System Exploration Division. He's been involved in research involving serious problems such as Lyme disease, Ebola and the Marburg virus. Dr. Hatfill.

**DR. HATFILL:** We've heard the threat today from Dr. Alibek, Dr. Patrick, and Dr. Huggins for biological threats of biological terrorism. We've heard conventional countermeasures. We've heard of a number of programs of advanced countermeasures. It now becomes necessary to discuss worst-case scenarios and that concerns ways of management, or possible ways of management, of large areas covered by biological agent.

I've been working with Brigadier General Third Army Medical Command in the United States Army Reserve to try to develop a system for flexible and rapid transportation of mass casualties from a contaminated area to a rear area while maintaining life support and critical care functions for the casualties.

When we're dealing with a large area of coverage event, this can be exceedingly complex. A single area of a city may be affected or multiple areas of the city at the same time or closely thereafter, and terrorists may be involved with both chemical weapon release as well as with the biological agent.

One of the most dramatic open source experiments that have been described for a large area of coverage occurred on September 21, 1950, where a naval vessel did an open air simulation test releasing spores of the same size and weight as anthrax, but nonpathogenic to humans, over the city of San Francisco. This was conducted off a naval vessel two miles offshore and the results are illustrated in this diagram. Had this occurred with actual anthrax, there's a possibility that several hundred thousand people could have contracted a fatal pulmonary infection.

These types of dispersal scenarios in the most part are covert. There's no indication that a biological agent release has occurred until the incubation period for the particular disease has expired. This is a typical case history. An emergency department, normal operations and patients begin to appear. The terrorist event has occurred the week before. The incubation period for the agent is now open and these previously healthy individuals start coming in requiring rapid intensive care including mechanical life support, mechanical ventilation.

The situation of a large area of release in many ways would resemble a modern battlefield, disrupted lines of communication, poor coordination. Any changes that were apparent in peacetime would tend to be amplified during their affect during the natural biological agent pattern.

Consequently it is illustrative to look at how massive casualties have been handled on the battlefield before. In the 1850s, we saw the first large-scale systematic development of ways of transporting casualties from a high concentration on the battlefield to a low concentration in rural areas. This was during the Crimean War. The British Army instituted an eight-mile railway line during this conflict. This was also the time when the Florence Nightingale nurses came into effect in the first early field ambulances.

This concept became so effective that by the early 1900s during the Boer War in South Africa, the British army had prepositioned a number of specialized hospital trains all along the areas of fighting. Each of these passenger cars has been converted to handle up to 25 stretcher cases, and these were prepositioned along

different areas of the conflict. Patients were brought to these trains and taken to various treatment centers.

The concept was further developed and by the onset of World War I, was in a highly effective manner. Patients could be taken directly from the trenches in the battlefields moved by an organized ambulance system, and deposited in what had now become hospital trains.

Some of these cars contain surgery units or supporting care to stop bleeding, regain respiration, and resuscitate the patient. There were also provisions for walking cases and for other casualties. The system was so effective that during the four days of the battle of the Somme, there were 13,392 cases that were transported from the front-line battlefields to rural hospital areas in France.

Special frames were developed to cushion the patients as they rode on the trains. This is one of the first hospital trains in operation.

By World War II, a number of trains were in operation both on the battlefield and for cities, because of advances in air power, cities now became a target, specifically London. Hospital trains were used to evacuate thousands of casualties from London hospitals to outlying areas, in addition to receiving casualties from across the channel and redistributing it within the country.

This is an interior of one of these trains. It's a three-tiered system to provide adequate access to the patients for their transportation.

This was even continued up until the 1950s with the British Army of the Rhine. This was the advent of federal medical transportation medication; the hospital trains went into disuse. At this time there's only one in use in England which is used by a reserve army medical unit.

With a biological attack, these patients are going to require even more intensive care than trauma management. This is a slide of inhalational anthrax. We only have a few hours once predominantly respiratory symptoms develop. The patient needs to be intubated; they need to be mechanically ventilated. Their blood pressure needs to be supported with medications.

Some cutaneous cases may appear. This is cutaneous anthrax, the vegetative bacteria multiplying in the blood stream and the tissues release a number of toxins, with a massive edema, malignant edema.

Over 50 percent of those exposed to the agent plume end up with inhalation anthrax. Over 50 percent of the inhalation anthrax develop cases associated with hemorrhagic meningitis. This is the membrane covering the brain. A great deal of these patients will be brought in as casualties probably all having epileptic fits. Surrounding area and surface contamination is possible as well as intestinal cases may appear. This is hemorrhagic infection of the lymph nodes and intestines

and a small destruction section of the bowel through disruption of his blood supply.

Until recently, the medical trains would not have been sufficient for the mass evacuation of casualties from a high concentration attack area to rear definitive area treatments. Recently, Northrop Grumman has come out with a specialized stretcher. This is called LSTT stretcher. It stands for Life Support and Trauma Transport. Essentially, this is a self-contained unit with a giant ventilator I.V. fluid infusion pump and with full monitoring capability. Patients put on the stretcher can be intubated, stabilized, and transferred.

The second concept that's become important is that of intermodal transportation. This is the use of containers of goods or contents by a variety of different methods.

This can be by land, air, and sea in standardized containers. There's a whole subsection of the container transport industry, and they will make containers how you want. If you want a bathroom in it, they'll put a bathroom in it. If you want it a certain size, they'll construct it a certain size, economically and standardized. There are some methods for unaccompanied freight, and at the bottom slide you can actually have these on lorries, semi-trailer trucks, that are driven on and then off again.

By combining the systems, it becomes possible to design a disaster car, a disaster evacuation train. The train would look something like this. Head cars are the ones that stay with the containers. They transport the rest of the train. This is a locomotive, a container for medical personnel. Bulk stores, which could feature antibiotic stores or injectors with deployable vaccination stations. And a staff and manned control communications and intelligence sections.

The staff car could act as the nucleus of a command center to coordinate effectively with first responders.

For a proper coordinated response, it's envisioned that the first responders, the fire, police, and ambulances need to be connected with military resources, with government and state resources, and with satellite.

Currently, a piece of technology called the alert system has been developed by the Texas Department of Transportation. Essentially, this is a laptop computer built into the trunk of a patrol car. It's digital and operating on the mobile system. Already digital images have been transmitted from a patrol car in Florida to a patrol car in Alexandria. This allows some interoperability between all first response vehicles.

By linking into the Internet, a commonality can be provided. A previous mass casualty or possible mass casualty incident such as the World Trade Center or Oklahoma City bombing shows that the cellular system tends to go down right after an accident. Everybody's trying to log on and use it, and the system collapses. The

train would carry a useful piece of technology with it. Manufactured by Celltel, this is a mobile system. Unless you have a chip for your cell phone, you cannot talk.

This entire system provides a satellite link to other federal responders in transit to the site as well as coordinating local first responders. This will cover about a 60-mile radius.

Maps of each area can be used so all response forces are clearly in contact with each other. You can play road status, you can put meteorological and weather information on these maps and GPS coordinates are part of the alert system.

Defense Special Weapons Agency have an enormous amount of experience modeling downwind areas. They have computer programs that can model fairly quickly possible downwind affected areas.

The second section of the train would be the intensive care patient cars. The intensive care ward coaches would be specially built containers with a shock absorbing system able to handle the LSTT stretchers. It can be mounted on lorries or it can be driven on and off with a semiattached tractor-trailer. Patients would be brought from out of the WMD site on the LSTT stretchers. They would then be loaded into these special containers. A center monitoring station, this has already been designed, and one doctor and five or six orderlies could effectively monitor 40 or 50 patients. These things can be driven off or taken straight to the facility.

The last portion of the disaster train would consist of cutout cars. These would be left on-site. It features a security element, another command control, communications information element, ambulance trucks with the LSTT stretchers already loaded that can drive into the site and bring the patients back to the side of the train and a deployable field hospital.

The inside of these hospital cars can be made to different sizes. Along with this comes a mortuary embalming station. This was originally developed by Arms Corps in South Africa with the concept that patients are embalmed onsite. This negates mass burials or graves. The remains are preserved. It can handle 800 bodies an hour. The bodies are embalmed, put into body bags, and stored at room temperature for later burial when the incident is over.

The system would work like this: If these trains are placed -- and we'll estimate you'll need somewhere around 27 trains to cover the United States -- but if all other traffic is cleared off of the rails, you'll be no more than four to six hours rail travel to a major metropolitan area.

Notification. We are estimating this will be the Reserves or the National Guard handling these trains. The train would travel to the disaster site to a predetermined spot. It will be loaded. Ambulances and a helipad will be set up back on the train, and an on-site army field site hospital would be deployed. The patients

would be brought out on the LSTT stretchers and then loaded onto the train. From there, the train would leave full.

This is an artist's conception of such an incident. This deploying field hospital is covered with a charcoal and peroxide blanket. Patients are brought out of the area by air or by ambulances on the train on the LSTT stretchers. These can be at a positive pressure or negative pressure. We show the assistants here in Level A gear because a chemical attack could have occurred at the same time, and the patient is loaded onto the containers and we distribute it out of the incident site.

The disaster train concept could provide a number of things. The ability to rapidly transport large quantities of antibiotics, vaccines, personnel and protective equipment to a WMD site within a matter of hours, the ability to rapidly transform sitting stretcher and critical care patients on life support from congested nonfunctional hospital areas to health care facilities outside of the target area.

And this response capability would be independent of normal road transportation. Some scenarios suggest that with a large area of coverage, one third of the population may attempt to flee the city. This could mean both sides of the beltway congested. Bringing these medical facilities in by train, that avoids this traffic jam. The country could be at war at the same time. There could be limited air assets. It provides, above all, a starting point to coordinate other federal response forces. Thank you very much.

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## Questions and Answers

**PROF. BRENNER:** We now commence the discussion period.

**Q.** My question is to the last gentleman. I'm Dave Ruppe with *Defense Week*. How much would this concept that you just described cost for the U.S. to place, and also a more general question for the three of you: Who exactly, what agency is in charge of developing or is currently advocating organizing civilian research and development and equipment purchasing efforts, all of that? I see the military has several agencies doing it for that side, but who's actually responsible on the civilian side?

**DR. HATFILL:** Answer to the first part of your question, we've had some talks with Northrop Grumman, and we estimate that each train would cost approximately half that of an F-14 jet fighter. For two squadrons of fighters, it would cover 27 cities. We'll have 27 trains which would cover a number of cities. It would be state-based. Each train would be responsible for four or five metropolitan areas.

**PROF. BRENNER:** Would any panelist care to comment on the question?

**COL PARKER:** As far as who has the overall responsibility for the programs for everything that might

be directed towards bioterrorism, I think that's difficult to say. I don't know that answer. There are several agencies. The DOD, of course, has had an RD effort in biowarfare defense for a number of years. And now there are other agencies that have been doing good work, The NIH, for example, has a very robust infectious disease R&D program.

So certainly, all of what goes on and a lot of things that go on in an RD program for infectious disease are, of course, some of the technologies that are applicable to bio defense. And some of the basic knowledge that comes out of that is going to be something that should be tapped and is very useful. There are other agencies, the Department of Energy has some efforts, so there's just a number of agencies. We may not be the perfect ones to ask that question to.

**Q.** Who would be a good person to ask that question?

**DR. WINEGAR:** Are you primarily focusing on R&D efforts? It's a very distinct difference.

**Q.** I guess both.

**DR. WINEGAR:** Now, I think there is no one person on R&D efforts. As Gerry indicated, certainly the Department of Energy, Health Services, DOD, a number of agencies each have their own R&D budgets. The procurement side is a whole different issue, and I know that's come to the forefront lately in the aftermath of some of the training and the awareness that's been provided to some of the target cities. People are left with the information, but none of the supplies.

And that's a real deficiency right now, because none of the cities has budgeted for this type of equipment or medical antidotes or anything. Certainly, the DOD has some stockpiles of some particular vaccines and that type of thing but not enough for everybody, and that's clearly, partly, I would think, the responsibility for Public Health Service or Office of Emergency Preparedness, FEMA, a number of different agencies. And I guess the bottom line is we're all sort of working together to identify what the highest priorities are, both in R&D and in procurement.

**COL PARKER:** I think it's important although the answer to the R&D didn't sound very good. On the other hand, there is a lot of interagency communication, collaboration, so that there's not unnecessary duplication. Part of the scientific process is there is going to be some parallel efforts and complementarity. That's just part of the scientific process. There is a lot of communication and collaboration on some of these efforts that at least have some cross areas.

**Q.** Kyle Olson, Research Planning, Incorporated. First of all, my compliments to George Washington University and the Potomac Institute for Policy Studies for sponsoring this session today. There's been a lot of interesting points made and offered. In a

sense, it's a shame that we had to wait till now to discuss them because some of the earlier presenters already had to leave. In fact, most of the points I wanted to make are addressed to issues made this morning.

Let me just toss them out in a hurry. First of all, I think I'd like to challenge the assessment made by Dr. Oehler regarding the likelihood that large groups pose the greatest threat. I think that, in fact, small groups are not likely to have the wherewithal or the technical skill to execute an effective attack. I think we get clouded or confused and to some extent we can, I think, even lead ourselves astray, if we focus on our own example and fail to take the right lessons out of that.

Aum Shinrikyo was a large-scale endeavor, and certainly they had a lot of research to put into a biological terrorism effort. On the other hand, you can argue equally well it was a large relatively well-funded misguided effort which lacked the technical background. Bottom line, Aum Shinrikyo were not strong in life science. They were very good at electronic engineering and other things, but biological science was not an area where they were tremendously successful in their efforts.

I think that another point that was made was that the technology has not suddenly transformed the threat, and I think in a sense that's true. Certainly, nothing that presented itself as a biological threat 20 years ago has been radically changed by some new breakthrough technology, at least not in terms of looking at the anthrax danger or smallpox or any of the others. What has happened, though, is technology has not transformed the problem, but has empowered people that were not potentially a threat before.

As we move into this new century, we have to recognize that technologies that were formerly the province of only the very sophisticated, these technologies are increasingly found in the general environment. And as was presented earlier today, these technologies are available at universities and other centers around the country.

I think that Brad Roberts did a very nice job of citing a number of very useful quotations this morning. Let me cite a noted philosopher, Mel Brooks, in his definitive piece, *Young Frankenstein*, when he said that a riot is an ugly thing, and I think it's time we had one. I think that some of the hue and cry over the bio-chemical threat may be at some times overdrawn, and at the same time, given the total absence of any conversation or discussion or serious evaluation of that threat for the better part of the last two or three decades, I think it's been a very transforming experience in that respect.

Let me point out that one of the inevitable problems that we also have in a setting like this, and there's no way around it, is the collision of military doctrine-based concerns and domestic terrorism-based concerns. What is applicable in one situation does not necessarily have a direct application in another.

Concerns about the ability of terrorists to build weapons capable of delivering a strategic blow do not necessarily correspond to concerns that first responders in the cities have regarding the likelihood that a terrorist could come up with something, even if it's just a pump spray, that could take out a conference room or a symposium or an arena of people.

Going one step beyond that, we also have to recognize that the biological terrorist threat, as we continue to talk about it, I think it serves us well because it alerts us to the danger. There's a potential boomerang there. That is as we raise the flag of terrorism to new heights, we create a situation in which our inability to differentiate between the naturally occurring and the man-made can potentially create a false trigger in people's minds. Case in point, the naturally occurring outbreak of hemorrhagic fever in a major Indian city today would probably raise levels of concern regarding deliberate biological attacks the factor in South Asia to relatively unprecedented levels. Again, thank you for the conference. Thank you for the opportunity to discuss these things.

**PROF. BRENNER:** Any panelist like to respond?

**MR. SIEGRIST:** Kyle, I'm glad you spoke up. Who did you direct that first one to about the size of the group?

**DR. OEHLER:** I obviously didn't make my point clearly. What I was trying to say is we need to look for vulnerabilities. Large groups have different vulnerabilities. I wasn't trying to say that large groups are more dangerous. I'm saying that if a group is large enough that it has all these technologies in it more vulnerable to counter traditional terrorist efforts, such as the counter terrorist center and the FBI and others are specialists at. They're more vulnerable to being penetrated. Small groups, which are harder to penetrate, don't have all the technologies. My point is that we need to look at where the vulnerabilities are, and try to put in place programs to exploit those vulnerabilities.

**PROF. BRENNER:** Other questions. I'll ask one of Dr. Hatfill. Can you give us an explanation of what kind of chain of command we're looking at for these 27 trains? Who do the people report to and who controls them and what's the organization structure? Is it civilian, military or hybrid?

**DR. HATFILL:** It would be hybrid with some qualifications on that. The DOD seems intent in involving the National Guard in that with respect to the rapid assessment teams. A pre-placed train on a siding would be an ideal place for these RAID teams to operate from. You can move three people very rapidly anywhere and in the midst of a WMD crisis in one of our metropolitan areas, it would be useful if the top three people of the RAID team could advise, see what the first responders are doing, is there a need for follow-on forces,

is there a need for greater federal intervention and this -- you're not going to do too much with 22 men in a WMD incident. If it's a small-scale event, local authorities should be able to handle it. If it's a large-area coverage, these RAID teams would be trained in NBC reconnaissance detection and could very rapidly call the disaster train in as a follow-on force.

**PROF. BRENNER:** Do we have additional questions or comments?

**Q.** Yes, David Mahoney with *Defense News*. I have a question. At certain levels it seems with different asymmetric threats, bioterrorism, obviously, being one of them, at what level is there a breakdown between sort of the traditional way the military has looked at threats as over there somewhere before it's projected to start being threats where we really have to start worrying about a mix between civil defense as an aspect of military defense against outside aggression? I'd like to open this up to any of the panelists who spoke today.

**COL PARKER:** It's a good question, and I think a good topic to bring out and talk about and discuss. I guess in my own mind and my own thinking, in fact, I've begun from just the military perspective, we've always thought in our BW defense program about the battlefield scenario, but certainly over the last few years that has also gone into force protection scenarios. You know, we have to provide protection for our troops in their barracks, as an example, and WMD and a bioterrorism event may be something we need to not only think about for the battlefield, but also force protection and that same concept then, also that can be extended in our thinking and planning for protection against a place where civilians live, as opposed to where soldiers are. So where that line is, I think, is going to get fuzzier. The battlefield versus civilian protection and force protection. I think we need to broaden our way that we think about it and not stay in these boxes of battlefield versus civilian protection because there's a lot of overlap. And a lot of that intellectual thinking can be brought to bear for both of those scenarios.

**DR. HATFILL:** We are living as a species at this time in population densities that have never ever been seen before. This brings in the concept of emerging diseases. We're seeing on the average every two to three years one new pathogen we never really recognized before or a variant strain of a known pathogen. And as we live in these terribly increased densities, which are projected to increase even further in the next century, the whole concept of the emerging infectious disease becomes a major public health problem. Anything that we spend on biological weapons defense can have direct transference to the concept of public health and infectious disease management.

**PROF. BRENNER:** Additional comments.

**Q.** Yes. Captain Lisa Forsythe, U.S. Army. My question is for any of the panelists. Have you

analyzed our existing plan such as the Federal Response Plan and how the Emergency Support Functions and those Lead Federal Agencies such as the Department of Transportation has an ESF leadership role and how DOD fits into our current plans and how we support those plans, not necessarily DOD taking a lead such as the railroad system but actually supporting Department of Transportation in those leadership roles that have already been established?

**DR. HATFILL:** The National Security Council has formulated an interagency working group to address these problems. When is the handoff from FBI to FEMA? How will federal assets coordinate with state and local -- there is a working group at present working on this.

**DR. ROBERTS:** There's the broader question of the role of the Department of Defense in supporting a national response to the bioterrorism problem as opposed to the narrow question of the role that it plays in the emergency response plan. I think while it's appropriate to flag the concrete and specific issues in the emergency

response plan, we should also be sure to provide the context here. And that is, as you know, the department originally responded to the first PDD, the Presidential Decision Directive in this area, four or so years ago began to focus more seriously on its role and support of domestic responses to terrorism, and there has been a biocomponent of that I think this was given a big impetus by the Defense Science Board Summer Study a year ago which talked about the transnational threat and spelled out potential new roles for the Department in supporting the larger mission of the nation combating terrorism. There have been various follow-on endeavors to that and most recently re-collected and reorganized in the latest PDDs, which carry forward this process. So I just wanted to make sure that we didn't set aside this question of the larger context within which the Department supports the larger governmental strategy.

**PROF. BRENNER:** I'm going to call on Professor Yonah Alexander to close the proceedings and I'll express my appreciation for you all being a very conscientious and attentive audience.

## **CLOSING REMARKS**

**Professor Alexander**

*Director, The Terrorism Studies Program, The George Washington University*

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**PROF. ALEXANDER:** It has been a very rich day, I think. Obviously, we did not cover many other related areas. I would like to mention four. One of them relates to the question of civil liberties. For example, the question of foreign students coming to the U.S. to get a Ph.D. in biology or engineering or anything like that, particularly from countries that are not exactly "friends of the U.S." or on the list of the terrorist club. I want to include or want to exclude. There's really a question of concern of those that have come out from abroad.

The second aspect relates also to the freedom of information and that is the Internet. On the one hand it is a blessing. On the other hand, perhaps it can be labeled as a curse because it does serve terrorists and state sponsors of terrorism. The training, for example, in this field of how to build a bomb, how to make a biological chemical and nuclear weapons.

The third aspect I think that we did not have a chance to go into in some detail is the need for international cooperation. As some of us know, there is no way that the international community can deal with terrorism unless international cooperation is improved, and there is a commitment to regard an attack against one an attack against all; and clearly this very important field of super terrorism.

Finally, I think the message that ultimately we would like to go away with is that we're not just crying wolf for the sake of crying wolf. The record I think is

there that in the strategic thinking of individuals, organized groups and states, I think there is some sort of a level of commitment to raise their identity if the conditions are appropriate from their perspective. So I think again there is a need to raise our awareness and consciousness.

We cannot allow a situation where the international community or domestically cannot respond to a threat. I mean, we have so many examples that the communities were not prepared. For example, this threat to use anthrax against the B'nai B'rith building, and there wasn't even a tent available at the time for them for decontamination. What I'm really suggesting is that there is a need in the academic community, the community in general, agencies, to take stock, to realistically assess the threat. But what is really critical is that we should not panic. We should not adopt a strategy of surrender. We clearly have to think about the unthinkable. This seminar is the beginning of a dialogue and I hope we are going to continue.

I would like particularly to thank the Potomac Institute for Policy Studies for their cooperation in organizing this conference. A special thanks, I think, goes to Dr. Hatfill for his support and to Professor Brenner. I appreciate your patience. I want to thank the panel for your contribution. We are planning to prepare some sort of publication and we would be delighted to make it available you to. Thank you and good evening.