

SCHOOL OF ADVANCED INTERNATIONAL STUDIES

GLOBALIZATION & DISEASE:

INSTITUTIONS, POLICIES AND THE THREAT OF BIOTERRORISM

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MR. ELIOT COHEN: My name is Eliot Cohen and I direct the Strategic Studies Program here at SAIS. I'll be chairing this panel, which has a somewhat odd title, "Biological Terrorism and Biological War, Is The Threat Real?"

And although there is an unintentional bit of humor in that, I think the title which was obviously picked well before the events of the last two months poses a lot about how far we've come because I think for many of us, and I will certainly speak for myself on that, there was always something a little bit unreal about the idea of large-scale biological terrorism or biological warfare until the events of the last few weeks.

We have two panelists. Let me introduce--I'll introduce them each before they speak. They'll speak for about 20 to 30 minutes and then we'll have a question and answer until shortly after five o'clock. Our first speaker is Dr. Ken Alibek. He's the Corporate Vice-president of Hadron, Incorporated. He has a long and distinguished career with degrees in medicine, medical microbiology, industrial biotechnology.

He was of particular interest to us, the first deputy chief of the civilian branch of the Soviet Union's Offensive Biological Weapons Program, defected into the United States in 1992. The author of many technical papers and a book, which I found I think most unsettling that I've read and that is Biohazard, published a number of years ago.

And, Dr. Alibek, we're very glad to have you with us.

DR. KEN ALIBEK: Thank you. Okay, I hope you see the screen. You know, given 20 or 30 minutes just for such a presentation of course it's not enough but I hope--I'll try just to compress my presentation in such a way that you will get the main points of this presentation. You know, the idea to have this presentation happened many months before the actual anthrax event.

In this case of course in my opinion, today's title for this presentation is not--it was not appropriate because when we talk about whether or not it's real, unfortunately, we know something already happened.

In this case--but you know of course what we need to understand with this specific case whether or not it's the end of the story. Is it--was it the big event or we should expect something else and in what form? You noticed one of the--I would say the most difficult issues when you speak about this is just to find a good balance between describing the biological weapons capabilities. And just not to scare people and not to provide with some information, you would not to share with any possible perpetrators.

And in this case of course a general idea for today's presentation is not let me say, to discuss our real capabilities with biological weapons. So we discussed this several times.

You know a general idea, what are the real suggestions about biological weapons? Whether or not it's--I will spend more time to discuss whether or not we're prepared for such events. In this case, let me start.

You know, one of the biggest problems is an understanding of biological weapons threat. You know, I don't want to speak much about what kind of biological weapons could be used and what kind of agents could be used. But, generally speaking, what we saw now we saw first let me say, a more or less successful biological weapon or bioterrorist attack using one of the agents could be used in biological weapons.

When we talk these agents, of course, the number of agents is quite large. And just let me give you some examples. You know, in this specific case, I'll be just naming actual weapons, not just something exotic or fantastic and nobody has done something like this with that.

Now when we talk about bacterial agents and bacterial weapons, it's what we need to keep in mind - anthrax, plague, some people say it's not the case. Unfortunately, it's the case - brucellosis, glanders tularemia, amyloidosis and some other agents - bio-agents and biological weapons. Small pox, of course, is one of the biggest concerns.

But unfortunately, in addition to this, several other agents could be used in biological weapons. We know some studies have been done with humogous fever and specifically amolic bullock [sp] hemologic fever, lots of fever, Bolivian, Argentine and chem bio fevers, some encephalitis and syphomyolitis [sp] and you name them.

The case for biological weapons, it's epidemic typhus key fever. Now we consider the key fever not a getso [sp] agent, we say bacterial agent. But for the weapons standpoint, of course it's not so important when it was developed by some countries. It was developed and unfortunately it showed very high effectiveness even though it was not lethal, it was considered an incapacitating biological weapon - fungal weapons, toxemic causes, blastomic causes and some other agents.

Toxins, it's quite a significant problem when we discuss military deployment of toxins. They're not highly effective, but when--today we're talking about bioterrorism. In this case, of course, toxins could be considered as possible agents for deployment.

Diphtheria [sp] is a completely new type of weapons so-called biodegraders. And, in this case, I wouldn't spend much time because it's quite a sophisticated agent. Some countries started stocking biodegraders, but I hope, let me say, these terrorist groups wouldn't be able to develop weapons based on biodegraders in the near future.

(inaudible) agents and we know something about them already. And then what we need to keep in mind, there are three major types of techniques to deploy biological weapons. One of the techniques, so-called vector application, vector deployment, it was under development by many countries from the standpoint of let me just--from today's world through the 21st Century to consider one or another country deploying biological agents using mosquitoes or fleas or lice, of course, it's highly unlikely. But for terrorists purposes they still have, what you say, have some, maybe I would say value.

Contamination of the water--food and water supplies. You know, it's still the case and it could be used by some groups. And unfortunately, what we saw when we heard this situation with anthrax, the so-called accidental aerosol deployment when we talk about some people who got contracted--who contracted infection at some postal service facilities. Of course, we saw a real aerosol deployment. Maybe these perpetrators didn't have in mind just the aerosol agent but actually it has been done.

And you know, major bolts [sp] of deploying biological weapons and bioterrorism. You know when we discuss what are the major goals? In my opinion, you know, sometimes we, you know, don't pay attention to some important issues. And you know maybe to be absolutely precise when we discuss this case to deploy anthrax, I will call it most--maybe not biological weapon attack. I would call it a psychological attack - psychological attack using biological agents. And you know, if we can calculate how many casualties we had and what was the real impact of this attack and how many people and what--let me say, what economic damage, what psychological damage we've got after these attacks, of course, you can understand that four major, let me say, first plan's just panic, fear, paralyzing the nation of a real medical shortages.

And you know, just one of my talks with some physicians working in the Washington, DC, we were really overwhelmed. You know, just to develop, even just having no many casualties. Just to develop a system just to take care of people who are scared who think they've got infection, people who needed to get antibiotics and so on and so forth. It's a logistical problem; it's a psychological problem.

And you know, in many cases what was obvious to people, who when warned that even the small number of cases would result in very significant, let me say, significant consequences. And this case with anthrax was a good example how the entire the nation, a very powerful nation could be, if not paralyzed, but enough to be in what we say in the status of fear, scare and let me say anxiety. Let me say viability was a small number of even--even having a small number of casualties.

And, you know, the question whether or not the threat is real. In this case, I don't want to repeat this, but what we need to keep in mind, many countries, unfortunately, many countries have been interested in researching and developing biological weapons. Some countries have been involved in the

manufacturing of biological weapons. Unfortunately, we know not much about actual efforts of many countries. We know about something about the Soviet Union's offensive biological weapons program. We know about Iraq. We know about all the American problem terminated in 1969. And unfortunately, this--we know something done by Japan in 30's and 40's and this unfortunately, a number of countries involved in this activity in reality is much bigger.

And you know, but what kind of activity? Of course, nobody can answer this question. These are either just research work, development works or they manufacture the actual biological weapons. It's--there is no answer and we know, for example, when we talk about measles, it's in context. It's sort of obvious that countries like Iraq, Iran, we will see this human warfare business. And you know, just to think that there is no threat, in my opinion would be a significant mistake.

Biological terrorism, and you know it's September 11, so, you know, before September 11, you know, again, it's sort of--my own experience talking to many people, you know, you cannot even imagine how many discussions we've had for the last four or five years. And you know, it's just a lot of things and some people were saying can—and were this innocent big redeciation [sp] like having hundred of casualties. And, you know, Oklahoma City was sort of, let me say, an accident that nothing like this would happen in the future.

But you know this date was a sort of, let me say, sort of border with--in our understanding of what actually could happen if something is done by committed people. And you know, nobody could imagine that our own planes would be turned into, let me say, closed, powerful closed missiles to destroy our own, let me say, our own building, our own businesses. And you know that we have no idea how long we will be recovering from this event.

But at the same time, what's important in my opinion, to understand, when we talk about such events, they just--they happen for example, it was a very powerful, it was a very striking event, psychological event, let me say, very, you know, I remember the day and you know I remember how people were shocked. And you know, but time goes by, of course, and we start getting used to it. And that's a problem.

But with biological weapons you'd remember what was happening for the last month. You know, it was a continuous, let me say, for months the entire country was in a state of anxiety and a state of fear. People didn't want to open the mail. And, you know, that's what we need to keep in mind, one of the--let me say, the most, let me say, the worst declarity of biological weapons is to create a constant, let me say, feel of anxiety, fear, scare. That's a problem and we need to keep this in mind.

You know, when we talk about even small event because you're uncertain. You don't know what's going to happen next. You don't know what's going to happen to your children. You don't know what's going to happen to your family. That's in my opinion, is one of the biggest problems when we're dealing with these biological agents because they force, sort of prolong, let me say, consequences. That's a big problem with biological weapons. And we need to pay attention, significant attention to this declarity of biological weapons and biological terrorism.

Are we prepared? You know, unfortunately, after a lot of thinking, I decided to put no. You know, it's--again, It's absolutely the same situation and just take a look what we see here. Two grams of anthrax, I do consider the amount was bigger than two grams. And then could you imagine how two grams could, let me say, disrupt the entire county, two grams from a biological agent.

And you know when we talk about something different, when we talk about not 2 grams, 100 grams, kilograms or something like this, what kind of consequences? You've--something is deployed in several locations. You've got a different deployment technique and so on and so forth. In this case, of course, the situation would be completely different.

And notice one of the biggest problems, because it's--I don't want, what we say, to cause any, let me say, constant feel of anxiety. But you know what's important for us to understand. We need to understand it's not something, which already happened, it's our past. Unfortunately, everybody gets lessons. And we got our lesson. But you need to keep in mind that they got their lesson. And they know, for example, how the entire country could be put, let me say, in a constant status of fear, anxiety and so on. That's the problem with biological terrorism.

And you know, another area of great concern and that is how much we know about biological terrorism. What is actually our real understanding of biological terrorism. What kind of treatment, what kind of prophylaxis we've got. What kind of knowledge base we've got, let me say, it was in our medical community, and whether or not we need to education our general public.

You know, that's the biggest problem, it's a great big deal of discussion whether or not we need to inform general public. You know some people say let's stop talking about this because everybody's going to get scared, but in my opinion, we should discuss something else. Maybe we should start educating our general public. Because if you are informed, if you're educated, it's half--let me say, if you informed, let me say, you prepared, you want another form, what was half prepared? In this case, we need to think about this and think very carefully.

And, you know, just medical countermeasures. I decided because we're talking about our preparedness. You know, what I don't like, of course it's--I'm not going to say this approach is good and this approach is bad. But you know when we focus, let me say, all our attentions, for example, on the development of vaccines, we make a very significant mistake. I'm not against vaccines, let me say, in general because vaccines are, let me say, it's perfect protection against many diseases. But when we talk about naturally occurring diseases, you know that's good.

But when we've got a situation, when we could talk about several dozens of possible agents, we need to discuss--you can take a look and see how many actual vaccines we've got developed. And do we just--we need to understand even develop a vaccine, for example, what is the time point for many vaccines. I'm not talking about a smallpox scare but about some other diseases. When, let me say, it's a sort of point and who's going to make a decision to vaccinate the entire country. You know, it's a very significant problem. You know somebody needs to make the decision.

It means there is not a problem, for example, when we talk about smallpox, we know that smallpox vaccine is not absolutely safe. And if you make a decision to vaccinate, for example now, the entire population of the United States and here we see several cases of death after vaccination. Unfortunately, it's reality. Of course, who's liable? And you know its just--you know, let me say, you need to analyze this decision very carefully before you make decisions.

And again, when you talk about, it is a medical defense but since applicable just take a look is what we need to keep in mind when agent known in advance, when a vaccine developed and available for the agent, and the target population known in advance.

These are major, let me say, three factors, when we can say it looks, yes, it seems appropriate than a drug prophylaxis treatment, applicable when agent identified and prophylaxis treatment developed and available for this agent.

But just it's--I know there are many people whose biological background here was medical background. It was just a general understanding of course because I'm not let me say, discovering America here. But you know when we develop our medical defense and when we treat people for--against infectious diseases, develop treatment for a number of infectious disease, actually we've got three major targets, what we need to keep in mind.

For example, when you talk about spectrum of different agents, we know that some treatment - prophylactic agents they work on the principle to disrupt the pathogen, antigen or constructive metabolism. And this approach is a broad spectrum or a highly specific. Some products, they work on the principle to block pathogen or each various specters from entering to whole target cells.

And one more principle, just recently we started to start it, it's a principle of (inaudible) system response just to eliminate pathogenic microorganisms.

Generally, that's it. Maybe we've got some combinations of these approaches. But when I talk about actual treatment, we're working with these three major fields.

Our suggestion, of course, I'm not saying that this suggestion is the only suggestion in the field of medical defense in my opinion. We start developing new understanding of biological weapons today. If we still talk about a number of biological agents could be used, we need to talk about completely new type of protection. And when we--four years ago, nobody considered incidents like this. Just in 1999, first publication made by the Institute of Medicine was a National Academy of Sciences, they first mentioned broad spectrum defense, mutilation, image system mutilation Then DARPA got into this area saying that they would be interested in some new approaches, a prospect on approaches to (inaudible) system, new system response to activate innate immunity.

But you know just because I'm talking of this to you because many of you are physicians, many of your scientists work in this field. It's a very promising approach and probably we need to start to

collaborating in this. We need to do some study with some focus on modulation of immune neuroendocrine system. You know, at least reactions is giving a lot of (inaudible) would give us a lot of industry discoveries and industry development.

But at the same time, it's not just something we proposed to replace existing approach like vaccines, antibiotics, antivirals. Of course, this is approach, which would compliment existing protection against biological weapons.

And you know, what's important. But in order to develop something as a skill, what's important for us to understand. You know, we know, biological weapons cause infectious diseases. But unfortunately, the problem is this: Our understanding is still coming from the field of naturally occurring infections. You know, what we need to keep in mind there is some difference between infections caused by biological weapons and infections caused by, let me say, by natural causes.

For example, we know Anthrax is mostly a skin infection, a cutaneous infection in nature. But when we're talking about biological weapons, it would be mostly inhalational or in many cases would be systemic or inhalational form of infection.

It's the same I think, with plague. You know, in nature, we mostly face bubonic form of plague, but when we talk about aerosol deployment of plague biological weapon, we would see a number of people with pneumonic plague and so on and so forth. You know, unfortunately, when we talk about how much we know, what we need to keep in mind, there are some areas where we are still--some area of uncertainty. You know, we need to do a significant study to understand the differences between the infections and naturally occurring infections and infections caused by biological weapons.

Now let me give you just again, a very short example. You know, in nature, many infections we know of. They have some shortened transmission worlds. They've got some specific utterance of infections. They've got own reservoirs. They've got, let me say, some vectors obviously, well-known vectors.

But when we talk about biological weapons and bioterrorism, what we need to do, there is a germ, a genus or allergenic infections because all these agents in this specific case that could be delivered by aerosol and the major authorum of infection is always treatable with drug. And then proceeding from these, of course, let me say, incubation period could be different, clinical manifestations could be different, series of infection would be different and treatment could be different.

And, you know, that's some points to say how much we know. And, you know, unfortunately, when we talk about our knowledge, we still suffer of lack of knowledge. For example, just in the field of clinical manifestation of epidemiology, we actually have no--almost no information on symptoms that most paregenic be double infections. I mention this, for example, tularemia, you know in nature, we see mostly a so called is a typhoid form of tularemia or preventative form of tularemia. But when we talk about biological weapons you--it's mostly pneumonic or auto-bubonic or angio-bubonic form of tularemia and they're caused by biological weapons. We don't know much about these forms. And this numeration could be continued.

Then when we talk the epidemiology of biological weapons, absolutely the same picture. And, you know, I have no time to explain for example, differences between naturally occurring epidemics and epidemics caused by biological weapons. You would see differences. Of course, it would depend on the size of the outbreak. But, you know, when we talk about a large deployment, if you double epidemic which we have completely different particularities for development.

Unfortunately, one of the biggest area of one uncertainty is our understanding of pre-dormal periods of these infections. We still call them, here in the United States, we call them flu like symptoms, a period of flu like symptoms. But you know if you start analyzing differences between different infections, I mean, you'd be amazed how many differences you can find because you cannot call this stage flu-like symptoms. You cannot mix influenza, for example, with anthrax because they've got differences even in this stage.

You know you can find pain could be different, locations could be different, major symptoms of prodormal periods could be different. You know, we have lost this, let me say, part of understanding and probably we need to regain this knowledge again.

When we talk about clinical manifestations, in my opinion, again it's a sort of problem. I'm not saying we have no idea, but we need to again, to go back and see, for example, we would know that small pox could be, let me say, mixed or, for example, misdiagnosed in case of having multiples we can put the wrong diagnosis, same with smallpox, (inaudible) or chicken pox since we need to develop a well-defined differential diagnosis for this infections.

Complete information, you know, just for example, I'm not going to, for example, to protect--let me say, to defend my, let me say, understanding of small pox. But, you know, when we compare, of course, we know defenders and very respectable scientists in the field of smallpox. They have done just for education of smallpox.

But we've got some differences in, let me say, in our—let me say, in our understanding of small pox. For example, we've got just a general knowledge in the United States, one well accepted understanding is the incubation period from 7 to 17 days, correct?

But, you know, if you go back, for example, in this country and find, for example, Henderson internal medicine handbook, 11th edition and compare, for example, the--with 14th edition. In 14th edition, you would find nothing, but in the 11th edition, you would find that the incubation period from 4 to 17 days. Is it important? In my opinion, it's very important.

But, you know, just when we go back, for example, to Russian science we've done, it was this incubation period even was shorter. We're talking about three days incubation period, two days incubation period because the problem is this. In my opinion, I'm not going to discuss and protect my position here. But, you know, we need to do some additional study, some additional analysis because

the problem is there is a difference between droplet infections and difference between allergenic infections. This, in my opinion, is the biggest difference.

When we talk about naturally occurring infections we talk about droplet infections, not aerosol allergenic infections. With allergenic infections concentration could be much higher, let me say, particle size is completely different and it could result in clinical manifestation of these infections. You know, there's a problem and it needs to be, in my opinion, it needs to be addressed again.

And you know it's forensics, again, one of the biggest problems. You know, when we talk about biological agents, for example, a recent example - anthrax. And we were talking about you remember every single day, we're getting some information, weaponized, very important agent, Russian technique, American technique, Iraqi technique, silica, no silica, bentonite and so on and so forth, every single day. Information was, let me say, you know, so confusing.

And you know, but at the same time there was some information we should have paid attention to. Of course, I have no idea what size of, let me say, what was the amount of samples we had in these letters. But, you know, just for example, even understanding how anthrax is developing when you grow it, for example, it's got several stages to development.

And just let me give you an example: spores, vegetative stage, stage of creating endospores--forming endospores within vegetative cells. And next stage, a release of spores from vegetative cells, then stage of premature spores and stage of mature spores. We've got at least five stages. And, do you know, for example even if this work is done by a professional, for example, you would see the great majority of culture in the stage of mature spores. There is some techniques how it could be done.

But if you see the whole spectrum of this agent, I mean, just, of course, your first clue is it was done, not, let me say, highly professional people. And this is just one of the examples. But, you know, such examples we can find large, but, you know, it's a matter of, let me say, creating knowledge, knowledge of biodefense science.

All right. You know, again, there's such pathogenesis research. You know, just I know my time is--let me say a couple of words and I will finish it.

You know, anthrax, you know it's the biggest problem. And you know when they read now, for example, you take a look at all, let me say, textbooks we are reading now. You take a look at, let me say, multiple publications and scientific journals and you would see a very interesting thing. Everybody's starting anthrax lethal toxin. And, you know, we've got some groups of perfect scientists working at Harvard University, working at NIH, USAMRID. And you know what they do and some day, I have no idea when, you know, we lost our main focus.

And, you know, now our main focus is how little toxin is interacting with immuno competent cells. I'm not going to say what's wrong in this because it's interesting. It's interesting as a basic science. But

whether or not it's going to resolve in actual products, you take anthrax, you know it's a big, big question.

And, you know, in this case, why it's a big question? Because our study we've done, I mean, just--I was shocked when we started doing our first experiments. We've done hundreds of experiments and we found out that anthrax toxin cannot be called lethal toxin. It has no significant lethal activity. There's the problem. And we still consider lethal toxin as a major cause of death, But, you know, in this case, for example, our data suggests that the major of death is severe bacterial anemia resulting in hypoxemia, and then let me say, destruction of anthrax vegetative cells, induction of future amount of several components and it's projectory (inaudible), pecoric acids, deported chloric acids, liquid proteins, liquid proteins, which are and we know this perfectly well which are very powerful inducers of prifometry [sp] factors which are powerful inducers of shock mediators. And you notice it's--according to our study, shock, sepsis, septic shock and death results not from lethal toxins effect, it results from contraction of these shock mediators.

Lethal toxin is playing its role, but it's playing its role in the beginning. But, you know, again, I'm not going to, for example, discuss this scientific medical discovery or development, but, you know, again in my opinion, there was some knowledge in 50's and 60's and we lost that knowledge. We started studying microbiology of anthrax infection. You know, I'm not saying we need to stop it, but it's probably time now just to combine the knowledge we acquired in 50's and 60's, understanding, let me say, organ system pathogens with these infections and to combine this with our knowledge in medical biologies as infections because actual picture, actual pathogenesis is different from what, let me say, we currently think. Unfortunately, it's true and probably it would be true with many infectious disease including small pox.

And, you know, this--last issue, what we need to do in the general public. You know, it's a matter of competition. You know, just what we know on this--I'm not going to, I'm not going to say anything about people who speak on TV because from time to time I speak there myself.

But, you know, I hate to appear as a talking fed. And, you know, when you're invited, for example, to one or the other of the TV station, of course, and you are asked three or four questions. Of course and you realize, of course, you have no time, but, you know, they ask some questions. They've got their own agenda and it's their agenda just to attract as many as possible people just to make this topic, let me say, more attractive to a general audience.

And, you know, when we have this approach and we have no, I would say, significant, really thorough, very careful study, what's going on in this infection. When we are not able to deliver our messages to general public, of course, we are going to lose this war. And what's important for us for a medical community, for a church community, just to start bringing real knowledge, not--as I said before, if you educate general public, you're going to win this war.

And at least when general public is informed by, let me say, by knowledgeable people, people who understand this problem, don't try to hide this information because it's not going to help. Because when

you hide this information, lack of knowledge feeds fear, anxiety, overreaction and disruption of defense efforts. In my opinion, we need to completely reconsider, let me say, our relationship with the media and the relationship with general public. You are able to do this, of course, it will be half a victory. But, you know, and when we start developing real protection and we are able to develop protection against biological weapons, it will be a full victory.

Thank you.

MR. COHEN: Thank you, Dr. Alibek.

While Dr. O'Toole is setting up the--her presentation, let me introduce her. It's good to welcome somebody from another part of Johns Hopkins University. Dr. O'Toole is the Deputy Director of the Johns Hopkins University Center for Civilian Bio-defense studies. She's a faculty member at the School of Hygiene and Public Health. She's also a distinguished public servant, having served as assistant Secretary of Energy for Environmental Safety and Health in the Clinton Administration. And it's our pleasure to welcome her to SAIS.

DR. TARA O'TOOLE: Thank you.

MR. COHEN: And we hope that your slides work.

DR. O'TOOLE: Yes, I know. Okay.

MR. COHEN: See if we can make Einstein disappear.

DR. O'TOOLE: It's hard to see up here. Well, it's always a pleasure to follow Dr. Alibek. I'm glad he didn't give his scary talk. That's actually not a joke, that was not his scary talk. That's great.

I am from the Center from Bio-defense studies, which is a--is supported by both the School of Medicine and the School of Public Health at Hopkins. We do collaborate with people in the other schools and would be happy to have more connection with SAIS should any of you be interested.

That's great. Thank you very much.

This is our Website which you might find interesting. I am going to zip through these slides and hopefully we can get to the questions quickly. What I'm going to talk about is a number of things related to biological weapons but these are the three main points I'm going to try and persuade you of.

Biological weapons are a strategic security threat. This is not a passing danger. This is not something that we can simply relegate to some small section at DoD or HHS. It is very important, however, to understand that there is much that we can do to mitigate the consequences of a biological weapon attack should it occur and also to prevent the development and use of biological weapons, although the latter is much more difficult.

This is quote from the so-called Hart Rubin Report [sp], the United States Commission on National Security in the 21st Century. This is on the first page of the first volume. It was written almost two years ago and was somewhat prescient. It is interesting that a bunch of politicians came up with this analysis. This is a great report. If you've not read it, you should take a look at it. I will come back to it at the end.

There's five reasons to really be worried about biological weapons and not think of them as simply another small tactical weapon that we have to deal with in the usual way of doing business in defending the United States. Ken talked about how fear inducing they are. That's true; they're also extremely destructive. They are cheap. You can get a hold of them. They have a lot of appeal because of their so-called disruptive technologies. They're going to get more powerful and more diverse as bioscience progresses and because of a lot of reasons having nothing to do with weapons, we're very invulnerable to infectious diseases in this century anyway and hence, we should pay great attention to the threat of infectious diseases and infectious disease epidemics.

The first reason to worry about biological weapons is that their lethality comes close to nothing other than nuclear weapons. Bioweapons and nukes are in a class unto themselves. Chemical weapons don't even come close. You cannot deploy enough chemical weapons, even a powerful nerve gas to kill tens of thousands of people. It is just very impractical. They are not weapons of mass lethality or mass destruction - bioweapons are.

The OTA did a study corroborative by a separate analysis by the World Health Organization some years ago showing that if you deployed 100 kilograms of Anthrax upwind of DC in perfect meteorological conditions, you would kill approximately the same number people as would a one megaton hydrogen bomb dropping on Washington, DC.

The Anthrax and the Daschle letter contained approximately 10 billion spores per gram. That two grams of white powder contained in that letter had, again, potentially with perfect distribution, two million lethal doses of Anthrax. I think one of the problems right now is it's very difficult, as Ken contended, to wrap our minds around the lethality of biological weapons and what they mean.

The second reason to worry about biological weapons is that they are assessable. The materials and know-how you need to build them are out there. This is a picture of a fermenter in a plant outside Baghdad where we suspected they made Anthrax. Iraq admits to making around 8,000 liters of Anthrax. UNSCOM [sp] thinks the amount was approximately 10 times that much. They also made a whole bunch of botulinic toxin. They had the complete germ plasm of the wheat crops of the United States and Canada and they were working on a bunch of other biological pathogens which I won't go into.

These fermenters are perfectly available on the open market. Virtually everything you need to build a biological weapon has a legitimate use. It's the perfect, as one says, dual-use technology. And it doesn't cost nearly as much as it costs to get a hydrogen bomb in place. Also you wash this out and it's

a perfectly legitimate piece of equipment. It's very easy to hide a piece of equipment like this - put it on the truck, drive it away.

A lot harder to hide this. This is a uranium enrichment plant in Tennessee. These sorts of infrastructures leave signatures that you can see in satellites. We can track the materials needed to build nuclear weapons a lot more easily than we can track those required for biological weapons.

Third reason to be worried about biological weapons is that they represent so-called asymmetric threats. The material and knowledge you need to build these things is quite available on the open market. They are relatively cheap, the so-called poor man's atomic bomb.

We know that Aum Shinri Kyo among others sought to develop biological weapons. Luckily, they didn't succeed. The lesson learned from Aum Shinri Kyo's experience should not be that it's too hard to build a biological weapon. I was flabbergasted, as were my colleagues, by all of the chatter and the press to the effect that it couldn't possibly be the case that near terrorists could build a sophisticated anthrax weapon because it was too hard to mill, it was too hard to get it in a form that was easily dispersible. That's nonsense. The technologies that you need to build aerosolizable weapons are out there. And again, they're being used for perfect legitimate purposes such as pharmaceutical applications.

A critical factor in biological weapons is that these things can be built and deployed by individuals or small groups of individuals. Again, you don't need the know-how of a nation state to do this. And, of course, they don't come with a return address as ballistic missiles do.

The next reason to be afraid and concerned about the biological weapons threat has to do with where the life sciences are going in our century. This is going to be the century of big biology. We are moving forward at a prodigious pace in understanding living things. We're only at the beginning but we are building on the advances, particularly the computational advances that were achieved in the 20th century - the age of physics and engineering. And consequently we are amassing large, huge, databases that can be shared widely all over the world thanks to the magic of computers.

We also have a global workforce - the life sciences powered by international corporations that are well-capitalized. They have a multinational workforce. This is widely disseminated around the planet. And they are going forward very quickly.

Every time we learn a new fact about why a bacteria is especially virulent or what causes antibiotic resistance, we are going to get a new tool that will be of great benefit to medicine and agriculture, no doubt about it. But, this knowledge is dual use. That same information can be used to build a more virulent biological pathogen or to create antibiotic resistance.

There was an article in the Times the other day talking about how one of the global germ banks, the World Federation for Culture Collections, was trying to put a tighter lid on the transfer of dangerous

pathogens among its 400-some odd members. The less encouraging news was that that big collection was only one-third of the nation's germ--of the world's germ banks.

The other piece of news is that scientists typically exchange pathogens amongst themselves; probably with more alacrity and more often than they seek microorganisms for germ banks. There's a lot of pathogens floating around there. It's easy to get your hands on them. Anthrax lives in the world naturally. The notion that some of these organisms are too hard to get a hold of, I think, is wishful thinking.

As I said, a lot of the science needed to build a biological weapon has been developed for routine and perfectly beneficent uses. There are any number of articles in the literature now, in the open literature complete with methods sections. This one, for example, gives you a pretty good idea of what you need to think about if you're building a biological weapon.

And, lastly, we need to be concerned about bioweapons as part of the larger picture of thinking through the importance of infectious disease in this era. There are at least 15 mega cities with more than 10 million people in them, most of these are in the developing world. They basically represent perfect breeding grounds for dangerous pathogens, naturally occurring pathogens, such as the influenza virus.

In addition, commercialization and population pressures are causing humans to intrude into once remote ecosystems where we're coming in contact with bugs such as the HIV virus and Ebola that we never had much to do with heretofore.

Finally, now we can move around the planet in less than 24 hours. So someone who gets sick in Africa can be in LA overnight. In the age of trolley cars and steam ships, it took about six weeks for the pandemic flu of 1918 to circle the globe. Again, we can do it in a day.

And, finally our food supply is becoming increasingly globalized. We are eating stuff that comes out of gigantic webs of transport and processing that makes it very difficult to track contamination or control it. One hamburger contains pieces from about 100 cows. And those cows came from feed lots that contained about 100,000 animals. Figuring out exactly where the E.coli came from in your hamburger would be a tremendous and, in fact, pretty much a undoable task right now.

So, we need to think about more modern ways of controlling even natural outbreaks of infectious disease as the tragic foot and mouth disease outbreak in Britain last year taught us.

Now, I think it's pretty apparent to people by now, following the anthrax attacks that medicine and public health is at the heart of a response to bioweapons threats. But, that's news to a lot of people in the defense community and we haven't thought through what we need to get in place in order to deal with this threat thoroughly enough yet.

There's a lot of vulnerabilities, as Ken suggested. I want to go through them quickly in a little bit more detail. First of all, the medical system, docs haven't seen anthrax. They haven't seen small pox. They

don't know what to look for. They don't know how to diagnose it. Big problem as we saw with the two patients, one in DC and one in Maryland who went to their doctors' offices, went to the emergency room and were sent home with anthrax and later died tragically.

There is no surge capacity in the medical system. We have treated healthcare as a business and there is no one to pay for disaster preparedness. In addition, in a search for financial efficiency we have eliminated all excess capacity. Everything is now ordered or used in just time supply models. We figure out how many nurses we're going to call into Hopkins tomorrow based upon today's patient census.

Drugs, equipment, everything is just in time. The pharmaceutical companies are no more able than the hospitals are to turn around and suddenly ramp up to meet a sudden surge of in patient demand. We would very quickly exceed our capacity to deal with large numbers of patients coming through the emergency room doors. No hospital or no geographically contiguous set of hospitals in the United States today could deal with 1,000 patients suddenly needing advanced medical care. This is almost two years old now. We have known about this lack of surge capacity for some time. It is very well documented. Basically, we've done nothing.

The public health system is even in worse shape. And D.A. Henderson said previously, maybe he said it today, it is hard to overestimate how badly off the public health system is right now. We have not invested sufficiently in this system. People are not flooding in to public health. The students at Hopkins, for the most part, are more interested in academic careers, for example, than they are in working for state or city or federal governments. It is not connected. The local health departments are bereft of resources. Half of them do not have Internet connections.

As we have seen in the anthrax outbreaks, it is very difficult for one to communicate with another. There was a great deal of confusion, for example, when CDC, having discovered the patients who were made ill at the Brentwood facility sent out word to all local health departments, "go find all the federal mailrooms, all of the mailrooms receiving mail from Brentwood in your locale. Put everybody on Cipro and do environmental surveys in those mailrooms."

There was no list of the mailrooms. No one knew quite how to define them. The local folks didn't know what to tell the patients they were putting on these powerful antibiotics and they didn't know how to do environmental surveys. And there were no profiles. Big problem. Not CDC's fault, easy to blame the victim. It would be a mistake.

The labs are basically overrun and flat out already around the country, not just in this area where we've had actual anthrax cases as a result of trying to analyze the rash of white powders that have been called in by people who are fearful that they might be something deadly.

During the West Nile virus, we maxed out the viral diagnostic capacity of the United States. We had the Fort Collins lab - the CDC lab in Fort Collins, Colorado completely out flat. There were 62 cases in that outbreak.

As you have seen, no doubt, we've done a terrible job, there is no other word for it, terrible job keeping the public informed of what was going on in this outbreak and what happened. The government has had a hard time connecting among itself, partly because it's such a spaghetti of different agencies involved and partly because we don't have a plan.

Again, it's easy to criticize public health, but these are people working for half what they could get in other jobs, seven days a week, some of them 20-hours a day, sleeping on the floor of their labs, easy to blame the victim. Big mistake.

There was an exercise carried out at Andrews Air Force base last June that has become infamous in the press called Dark Winter. This was not a military exercise. I repeat for all reporters in the audience, not a military exercise. We did it at Fort Andrews because--at Andrews Air Force Base because it was a very good space in which to hold such a meeting. But, it was conducted by my colleague, Tom Inglesby [sp] and I at Johns Hopkins, along with Randy Larson and Mike Denier [sp] from the Ansora [sp] think tank, John Hamry of CSIS, former Deputy Secretary of Defense had the idea and MIPT paid for it.

The notion of Dark Winter was to present a mock National Security Council played by the people you see before you - folks who had been or close to national Security Council settings to present them with a fictional smallpox attack and let them react.

What we were trying to do was not predict what would happen, although we used our best scientific judgment in making estimates of what would befall them. What we were trying to do was acquaint them with how different a bioweapons attack would be from any other form of catastrophic terrorism. These are real pictures of modest smallpox cases. These are not particularly severe cases. And I think we succeeded in our efforts.

The two points I would like to emphasize is how unfamiliar these very experienced national security experts were with the parameters of the decisions they were confronted with in a bioweapons attack.

As one participant who'd been a Deputy Secretary of Defense said, he was so unfamiliar with the issues, he had a hard time during the three-quarters of the exercise wrapping his mind around the questions. And, hence, he was very tentative in his decision-making.

Secondly, Sam Nunn and others kept calling throughout the exercise for more intelligence information as they called it, more data, more data, more data. Everything they wanted to know was public health data. And they got a lot more in this exercise than they would ever get in real-time in a real life situation where you have the poor beleaguered public health departments trying to figure out what's going on and report it in.

So, what do we do? Again, there is much that can be done and that will make a big difference. And let me review quickly what that might be. First of all, as Ken was intimating, we need a significant bio-Apollo sized investment in research and development and production in order to get ahead of the

attackers. We have to throw the advantage to the defense. This should include DoD and HHS. This is not something that either DARPA or DoD or NIH can do alone and we have to get the talent that lives in the universities and in the private sectors engaged.

In the near-term, I think we should invest in vaccines and in antiviral treatments and in drugs that would be effective against the most likely and most well known bioweapons, pathogens. In the longer-term, we should go in the direction that Ken is suggesting, maybe with some variations, but we should take on the immune system so that we can get ahead of our current one bug, one drug dilemma and be able to diagnose something coming over the transom and then quickly create the recipe and then deploy it widely.

If we did that, if we invested the kind of monies now that we did when Sputnik went up in the Apollo project, I think we would not only remove biological weapons as weapons of mass destruction threats, but I think we would also give the world great aid in dealing with malaria and TB and AIDS, the infectious diseases that account for half of the premature mortality in the developing world.

And I think that burden of disease is no doubt, as the CIA recently said in its national Intelligence Council report, a big speed bump in the transition to democracy. They didn't quite use those words, but that's what they meant.

We need to increase the capacity of the medical system to respond. Some of this is obvious. Clinicians have to know what anthrax looks like. They have to know who to call if they suspect a case and there has to be somebody there in the public health department on the other end. We need to have rapid diagnostic tests widely available and we have to figure out what we would do with a large number of casualties in our hospital system. This will necessarily involve getting communities together. Hospitals are now competitors, they need to become collaborators in investing in a community-wide response capability.

There's a lot to do in public health. Most of it is not rocket science. We don't have to invent a whole lot of new technologies. We just have to make some prudent investments in such things as bringing enough people in to carry the load. I wasn't kidding when I said there were people sleeping on the floors. And, again, this is only with 18 cases.

In Maryland, they are pulling people from all over the other parts of the Department of Health and Mental Hygiene to help man hotlines and to the epidemiological analysis for what's coming in from emergency rooms around the state and so forth. Public health has no surge capacity. There's a lot of other work to be done in public health we can talk about in the questions if you wish.

Finally, particularly for this audience, we need to really rethink how we're going to avoid a biological arms race. There's no doubt much that we can learn from our experience with nuclear weapons but there is much that we are going to have to invent from scratch.

The scientific community is going to have to get engaged in this because of the nature of the threat. Everything is dual use. It is the knowledge itself, not simply its application that is dangerous. And we need to find ways of thwarting the development of biological weapons while not hindering the development of biomedicine and agricultural advances and so forth.

I think that is going to take the active engagement of many, in fact, everybody to some degree in the scientific community and I hope it starts soon, because otherwise what we're going to do is we're going to burden ourselves with all kinds of traditional reporting requirements and other regulatory apparatus that are likely to get us very far down the road.

I'm happy to see that the administration is, I think, beginning to pursue international methods of biological arms control. I think you can understand from this presentation, why although important, nation-to-nation agreements are not going to be sufficient in this area.

And, finally, we need to take the bioweaponers, Ken's former colleagues, and we need to make sure that they have ways of earning a living that don't force them into the arms of people who would use their talents against us. And secondly, I think as you understood from Ken, we need to learn what they know.

Right now if we spend less than 2 billion this year on local, state, city health departments then our leaders don't know what's going on and don't get it.

Some of that money is going to waste. There's no help for that. We have got to get money to the local level very quickly in order to just get some raw capacity in there. We have to make sure that the national pharmaceutical stockpile, which I think is one of the successes of the Clinton Administration, thank heavens Peggy Hamburg got that going with the help of many others in the government, but we need to make sure it's got the right stuff in it, it's got enough stuff, it's available and we can replenish it if we need to.

I have no reason to believe that that is not the case, but I think to make people feel at ease and prevent this flocking to pharmacies to buy Cipro and whatnot, we should have an independent assessment of the efficacy of the stockpile that people could have some confidence in.

I talked about community consortia for mass casualty and the need for training. Connectivity is a real problem. We've got a big government. We've got a federalized form of government. It is very difficult to get everybody on the same page, particularly in a crisis. I think the best mechanism for doing that is exercise and drills. And I think we have evidence that that is the case.

I would hope that we would create at least a strategy for R&D investments in the very near future. I think we need to think through not only what we want to invest money in, but what is the governmental structure for making sure those investments go somewhere. I don't see a ready home for this kind of bioweapons R&D project in any of the extent government agencies. I think we need to think anew there.

In the near term, I think it would be very prudent to have a second generation anthrax vaccine. I think we can do that very quickly and we should. We also need to think through how we are going to get more human capital into the government at all levels who are expert in these matters. There are not a lot of people with bioscience or medicine or public health backgrounds now in government. That has to change.

And this is the last slide. This is a great book. If you don't know of it and I think this quote speaks for itself: "You're doing exactly what you ought to be doing right now." We need to learn. We need to question. We need to take nothing for granted. It's a new world.

Thank you.

MR. COHEN: I had sort of hoped you were going to cheer us up but I guess--I think I was mistaken. Let me, if I could, abuse the prerogative of the chair and ask you both two related questions.

The first is, just as a layman, let's assume that the government does some things you would like it to do. To what extent is offense always going to be ahead of defense in this kind of game? If the technology is one that's going to be out there if it's relatively inexpensive, if knowledge is advancing in the way that you say it is, doesn't that mean that, not necessarily that we're doomed, but that it's going to be impossible to ever really to move to a significantly different level of safety?

And the second question I'd like to ask you is just what your impression is of what you see in our government right now in terms of understanding of the problem and a sense of urgency and willingness to dedicate the resources. I'd like to throw those questions out to the two of you if I might.

DR. ALIBEK: Like I said before—it works? You hear me? For the last four or five years, we've had dozens if not hundreds discussions in the field, what is the real biological weapons threat and whether or not we were prepared and what kind of defense we need to develop against biological weapons.

And in one of the major statements I was always trying to deliver that there's a significant gap between our understanding of biological weapons threat and our understanding and our biological weapons defense.

And you know, we may be it's going to sound striking, but you know this gap is very, very deep and very, very wide. You know, just according to my literacy preliminary, I would say not very, maybe, precise calculation, this gap is about 20 25 years.

And the problem is this: I'd like to repeat it again, 20 to 25 years. Now we develop this, if you analyze all the achievements, all developments in the field of biological weapons and what kinds of biological weapons are out there, what kind of weapons have been developed, what kind of genetically engineered research has been done. And, you know, at the same time, you try to understand what is

our knowledge of a biological weapons defense? Our knowledge of biological weapons defense is still in 70's. It's still in 70's. But now it's 2001. This is the biggest problem.

If we continue same approach, chasing newly emergent threats and you know we're not going to catch up. Now for example, it's anthrax, a very small event. And you know you can see what kind of problems we've had.

If we don't understand one important--just only important thing that now it's time, not to take one announced problem and try to resolve this problem. Now is the time for us to understand the real nature of biological weapons threats, to define our understanding of the threat, to develop a new concept to protect against biological weapons and to implement this concept.

As soon--the faster we understand this, the faster we'll start to developing the right protection. One more observation, you know when--the problem is this, especially with this last case of anthrax, when some countries were developing biological weapons, you know, a usual time frame to develop a weapon, a prototype of the weapon or to develop, let me say, industrial process, you know, it's usually taken between one and a half to three years and doing this in industrial process, up to three years.

How long will it take just to develop the vaccine - 8 years, 10, 15. You know, we know this. And then just to mention, of course, unless we decide to develop a wall, for example in New York City. Lets imagine to sell them 50 and they're going to have walls, by then it will all be different. That's the problem. We would not understand this important issue. Of course, we are going to be behind. And you might just keep it in mind, you know, I don't want to be a bad messenger, but it's clear, it's obvious. The 21st century is the century of terrorism, the century of war. War turns to conflicts. And unfortunately, when we talk about terrorism, biological weapons are perfectly suited to commit terrorist attacks.

And, you know, even if we don't develop a completely new program government, private sector, foundations to protect our society from biological weapons, we will be always behind. And we will be always suffering. That's in my opinion, the major message.

Whether or not we're able to just--to change our mind, whether or not we're able to just to start thinking using not our tunnel vision and aerial vision of biological weapon threat, you know, it would depend on us, on physicians, on scientists working in this field.

In my opinion, now it's time when we start developing a completely new science. I would call it medical biodefense science. It would involve many, many different disciplines of its appropriate time. If we don't do this, we're going to lose.

MR. COHEN: Thank you. Dr. O'Toole?

DR. O'TOOLE: Well, I'm slightly less pessimistic. I do agree that the real peril is a failure of imagination. And a--we will not succeed if a certain critical mass of scientists and people who understand the science do not engaged very quickly in biodefense and begin to understand the threat.

Ken is saying we're 20 or 25 years behind where the offense had traveled. That's very likely truly. But I think we can make up that ground very quickly. For example, it might be worth considering whether we should bring the Russian scientist over here and learn exactly what they know very quickly. We did that after World War II with the German rocket scientists. It worked rather well. Perhaps we could reconsider what we're doing in Russia and be a little bit more forceful about it.

I certainly think we need an R&D strategy, as I said, a pretty robust one. But I think we can move very rapidly. We have phenomenal capability in bioscience in the west, phenomenal. Whether we can mobilize it, whether can direct it, whether we can apply it fast enough in time to prevent a big attack, that's a fair question. Could we switch the advantage to the defense? Absolutely. But, it's a matter of will and imagination.

MR. COHEN: Okay. Thank you. Yes? I'm sorry, the gentleman right over here.

MR. WAYNE CANEVA: Just a couple comments and then one--.

MR. COHEN: Could you wait for the microphone? And if you could today, introduce yourself as well.

MR. WAYNE CANEVA: Wayne Caneva [sp] with the Chem. Bio Center Response Force. Just a couple of comments and then a rhetorical question. The NPSP, the National Pharmaceutical Stockpile Program is a great half solution. Getting the 50 tons to the airfield within 12 to 24 hours is great but you've got to get that stuff distributed out and that obviously is a huge logistical problem that still needs to be solved.

Also GAO obviously, is looking at that process and has at least two reports and ongoing investigations of who that program is doing. So, there is somebody--some entities looking at that program. Also, anthrax, obviously the second generation--.

MR. COHEN: Could I ask you to be--we don't have that much time, so if you have a question, I'd like to ask you to get to the question.

MR. CANEVA: Okay. My rhetorical question is everything that I've seen presented here would seem to support this, should we limit our strategic and tactical arsenal to conventional weapons and nuclear weapons as the strategic response? Everything seems to support that and as you know, bureaucracies do what bureaucracies do, if you want money spent on biological weapons defense, there'd be a lot of money spent on offensive side than on the defensive side.

MR. COHEN: Okay, thank you.

Responses?

DR. O'TOOLE: We need to spend a lot more money on biodefense. It's got to come from somewhere and it can't come from public health.

MR. COHEN: Okay. Dr. Alibek, did you want to respond to that?

DR. ALIBEK: Yes. I think it's a good idea but, you know, I don't want to be very pessimistic, as Tara said.

MR. COHEN: Could have fooled me.

DR. ALIBEK: The problem with this, of course, as I said I was very optimistic and I'm still very optimistic. My idea is this, you know, of course, there is threat and threat of biological weapons. And now, we for the several last months, we discussed a necessity to develop anti-missile protection and defense system. No, I don't, let me say, this system just to compare what is more important, what is less important. But when we talk about these different types of defense, we need to keep in mind all ballistic missiles, they've got a return address and we know who is doing something like this.

But when we talk about biological terrorism and, of course, impossible damage to the country, radiological, just take a look. We've got a biological weapon event and we've got no idea, we have no idea who did it. In this case, to understand what is more important for now, of course, it's up to the government. But, you know, in my opinion, it's very important to start thinking a little differently out of the box just to see what is more important for the country. Because it's, let me say, elusive, maybe important in the future. Let me say, missile threat or existent real biological weapons threat and bioterrorism threat.

MR. COHEN: Okay. Thank you. I'm going to ask questioners to be very brief. Back there?

MS. LORI MILLROY: Hi. I'm Lori Millroy [sp] a publisher of Iraq News and also known of a strong critic of the Clinton Administration.

MR. COHEN: Okay. Lori, if you could just ask the question real quickly.

MS. MILLROY: Okay. What is more likely - that terrorism including the anthrax letters to Senator Daschle that is so highly lethal was produced by an individual or was it more likely produced by a state?

DR. O'TOOLE: No idea.

MR. COHEN: Okay.

DR. O'TOOLE: No idea. Both are plausible.

DR. ALIBEK: And, you know, it is--I would support what Tara said. You know, the problem is this, of course, because it's--you need much more information. The problem is we know the government has some information. Unfortunately, this information is not available. But you know just--you've got several parameters and I tried to mention this. You need to have more information to understand who could do this. But in order to understand this, of course, you need to have many, let me say, to start in different parameters of this powder.

MR. COHEN: OK. Over there?

UNIDENTIFIED MAN: (inaudible) what's the latest on Mayo's—the test of what now as far as their rapid diagnostic test for anthrax versus having the flu?

DR. O'TOOLE: What's the latest on--?

UNIDENTIFIED MAN: Mayo--talking about a rapid diagnostic test--.

DR. O'TOOLE: Yes.

UNIDENTIFIED MAN: For Anthrax. If 20 percent of the people getting the flu this year, how many millions is that, how many millions are going to think they have Anthrax versus having the flu, and I'm curious, Mayo's talking about now a one-hour diagnostic test.

DR. O'TOOLE: Yeah. There's a great need for rapid diagnostic tests. There's a number of possibilities that might come to fruition. The technology is out there should we invest sufficient amounts of funds to deploy it. That would obviously make a big difference, even in the last few cases of anthrax if you could tell within an hour if somebody was infected or not.

I think the flu season will be problematic. I think we're going to have to get through it with a much more robust information campaign than we have mounted thus far hitting both the clinicians and the public. And I think much will depend upon what happens from now on if that was the last anthrax case, I think, the mood in the country will be very different than if they continue.

MR. COHEN: Yes?

MS. ALISHA GLADBORSH: How much of the Russian experience can the United States use? I'm sorry. Alisha Gladborsh of America. How much of the Russian experience could the United States use?

DR. ALIBEK: You know, it's a very interesting question because there is a problem supported by the government. Just to develop, let me say, to support some projects by--, let me say, done by some scientist previously involved in biological weapons defense. But, unfortunately, what I'd like to say, you know, this program was supported by many countries including the United States. But, you know, it's--from year to year, we've had some increase in funding, some decrease in funding. But, you know what

my--this is just an observation. You know, when I talk to people who are supported by the government or one of the entities. And you know what it is shocking to me, you know, just each time when you're in like this, about 10 percent of scientists who are supportive without your knowledge in biological weapons research and development for. And the rest is so-called scientists who have no idea what biological weapons are.

And I'm not going to criticize the government because when you have such a big problem--program, of course, it's really difficult just to do this. My idea and just recently discussed this issue, we tried to involved Senator Simone, we tried to involved, let me say, non-government entities. In my opinion, we need to reconsider completely our efforts. And you know, it's the best way and cheapest way for us as a country would be just to invite the scientists from the former Soviet Union and keep the scientists here, real scientists involved in biological weapons defense and fund these projects here in the United States. It will be much cheaper, much more effective and we will get, let me say, much more real information in this field.

MR. COHEN: Okay. Yes?

MR. JOSH SEAGAL: Josh Seagal [sp] from the Naval Academy and also DOENM on leave right now. For years and years, we prepared for our first response. We finally did a first response on several occasions. What would be your critique or grading of how we responded? And additionally, what if this had been something other than anthrax since that's the only thing we're testing for?

DR. O'TOOLE: That's a serious question that is not amenable to a short answer. I would give us, as a government a D on communication, both within the government and between the government and the public. I think there was a heroic effort on the part of the health departments. I think there were a lot of mistakes, a lot of missed connections, a lot of misjudgments. I think what we see reflected is the total disengagement of the medical community from any bio-preparedness planning or exercises to date. And I think that we need to get much more serious about training everybody who would be involved on a very rigorous basis. You know, the military, as you do know, they fight like they train. If we're really talking about biodefense in a serious way with the emphasis on the defense, then we need to fight like we train in public health and most people are totally untrained in these matters. They did the best they could off the seat of their pants with the resources at hand. That's not good enough.

MR. COHEN: We're going to wrap up in 10 minutes. So, again, I'm going to ask people to be very brief. Yes?

UNIDENTIFIED WOMAN: I have a question about whether or not the government can be caught flatfooted or what? Okay. Being caught flatfooted in terms of what you have sometimes--.

MR. COHEN: Could you speak up a little bit?

UNIDENTIFIED WOMAN: Sorry. I was just wondering is there any strategy for beefing up intelligence gathering instead of being just so defensive and kind of anticipating instead of being caught flatfooted?

DR. O'TOOLE: Yes, the intelligence agencies are trying to develop more capacity in these areas. My understanding is that the CIA, for example, has gotten a lot of applicants from people with biological degrees.

Again, the human capital issue is very serious. A lot of you have got to think about going into the government. A lot of people probably do think about going into the government. This is not a medicine and public health audience for the most part, I suppose.

But we aren't going to be able to solve this human capital problem overnight. And as Ken said, we're going to lose this through a failure of imagination. We need engagement on a big scale from a lot of people who don't usually think about government.

MR. COHEN: Sir?

RICHARD GILPEN: Richard Gilpen [sp] from Baltimore and bio safety. Today, there were some hearings in Congress on the potential of tracking or inventorying all microorganisms that are possible pathogens in the United States. I'd like your thoughts on whether or not that is going to be useful.

And the second thing I'd like an answer on, if you could, would be, since we know that there are stockpiled bioweapons in at least two other locations overseas, are we going to try to get a hold of those?

DR. O'TOOLE: Well, there are bioweapons presumably in at least 13 locations overseas. And you know, trying to get a hold of them, I think as we proved with UNSPOT [sp] is quite difficult. And this notion that we can kind of go in and grab them, I think, is naive and we need to get over that because, you know, we can get those but somebody else can create the anthrax over here that ends up in our post offices.

I think the effort by people on the Hill to think through the elements of preventing or at least making it more difficult to develop biological weapons is important and serious. I hope though that we don't do something quickly that ends up accomplishing little more than imposing a reporting burden on scientists.

We need scientists engaged. I think eventually we need to track biological organisms better than we do now. It's not clear to me that the first thoughts on how we would do that, that is circulating in Hill and would get us very far down the road. But it's the beginning of what I hope will be a very serious investigation and completely new forms of regulations because we're going to need new models and new paradigms.

DR. ALIBEK: You know, I'm afraid—this one--the problem is this. Of course, you can impose new rules. You can develop a new system of controlling all biological agents. But, you know, in this case, of course, the problem is this, it's very difficult. You need to first to establish a system once you can see the pathogens. You know, and in this case genome [sp] is a pathogen or not? We know that you can use it--can--disease just elderly people. But, in this case, it will be a very difficult system.

But, you know, if you impose such rules, of course, you need to make the next step, just to develop a system how to control, as you say, and register all animal cemeteries, all rodents infected with plague, all rodents infected with splaramia [sp] and so on and so forth. You know, just, of course, we need to find a logically way because we need to start developing something like this is. Of course, it must be a system reached which is logical up to a certain level. I'm not saying we don't have to do this. It needs to be done, obviously. But we need to develop a logical system in which, for example, what I was observing, for example, in Russia. There was a very powerful system to control all labs. But, you know, it didn't protect the system from stealing actual pathogens from these labs. There's a problem with biological agents. There're not--you cannot count them. You know, it's not--they are not nuclear devices or nuclear materials of course.

You can see it instead of 200 tubes because it—to fund it, let me say if one, that we see in your pocket. We need to think very carefully before we develop something like this because it could, let me say, it could slow down our scientists, our science, because so far what I saw just recently.

You know, we do some work with known pathogen, bacillus anthracis, strong. But, you cannot even imagine how many obstacles we need to, let me say, overcome to get the permission to work with the strong strain. Strong strain, which is used, let me say, to vaccinate livestock. And it's a huge of number of obstacles. You know, if you're going to something ever more severe than we have now, of course, in my opinion, we need to forget some labs are going away.

You know it's a very, very, very sensitive issue and we need to think--many times before we make decisions.

MR. COHEN: Dr. O'Toole, you wanted to--?

DR. O'TOOLE: I would just agree with that completely. I think it's going to be a very complicated regulatory challenge. I think we should go very slowly and I think the goal ought to be transparency and increasing awareness, not just tracking. Tracking, you know, you change a tiny little bit of the gene, you've got something that isn't on the list of what needs to be tracked. I mean, it needs a lot of thought.

DR. COHEN: We'll take one last question and then turn the podium back over to our host, Professor Barrett. Sir?

UNIDENTIFIED MAN: Yes. (inaudible), sorry. In public health, I became a (inaudible).

DR. COHEN: I think you just have to click.

UNIDENTIFIED MAN: Got it. MPH 89, but because of the distance in public health, I couldn't hang around Wall Street and now I'm a solo internist in Baltimore, Maryland. And I just want--the question is, I'm going to pose the question as three incidents that happened in my office in the last two weeks.

One was a woman who came in with a bag, which contained a sack of beans that she bought in the store and she opened it and she found a white powder in that and she was panic stricken. She wanted me to test it for anthrax.

The second was a mail sorter who worked in BWI post office who was panic stricken and came into the office because she said everybody went around my mail distribution center and handed Cipro to every other worker in all the other facilities, can you please give me Cipro?

The third was a person who worked for the federal government again in a totally unconnected office who said his supervisor came to him and gave him, you know, a sack of Cipro pills and told him to start taking it from then on. He was in my office also wanted to know should I take this or not?

So, I have no information about what the official policy was on how I should respond to this. And the only information I got was a leaflet, which I found in my third grader's school bag where the school principal had instructed parents on how to deal with the situation where you find a white powder or something like that.

This, I feel is total unpreparedness and I don't know what Hopkins is doing for this?

DR. O'TOOLE: Well, the information that is available is on our Website. Part of the problem is that some of the answers to your questions came out on Websites run by CDC and MWR has some information. The New York City Department of Health did a fabulous job putting info out quickly that would have been of tremendous use to clinicians. The problem is that most docs don't read that stuff. They're not on those circuits. They don't get NMWR. They don't go to the Web. They don't have enough time.

We need to figure out how to get information to the clinical community very quickly. CDC hasn't done that yet. We need to, no doubt about it. Your situation's been echoed times millions of times around the country. Try our Web and it will get you to the others.

MR. COHEN: And that Website again, is--?

DR. O'TOOLE: [www.hopkinsbiodefense](http://www.hopkinsbiodefense.org)—[hopkinsbiodefense](http://www.hopkinsbiodefense.org).--I knew there was a missing word in there. www.hopkinsbiodefense.org.

DR. COHEN: OK, great. Well, I can't say that either of you have been terribly reassuring but you were asked to be enlightening and that you certainly were. So let me thank you very much, ask for a round of applause.

And a final word from Professor Barrett.

PROFESSOR BARRETT: Let me just wrap the conference up with a few more thank you's and then one very rapid summary.

I want to thank the speakers, of course, and the chairs and the audience, in particular, by the way, my students for the course I'm teaching now and also my students who graduated last year. I also want to thank Novartis again for generously funding this conference. We're very grateful for the contribution that you have made here. I want to thank the people at SAIS for organizing this, and especially Daniel Mesko again, who's done a brilliant job and I'm very, very grateful.

I want to thank the Kaiser Family Foundation for broadcasting the conference. I look forward to seeing it again when I can actually pay more attention to it at home in the privacy of my own computer. Finally, I want to thank you son, Jackson, an 11-year old who sat through the entire conference with great patience, if not always with full attention. So, thank you, Jackson.

I actually find summarizing this conference very easy. Jeff Sachs, when he got up to speak just said how depressing the conference had been up to that point. And I think he was right. Now, we've heard from the speakers who really, in many ways, been the most depressing, and yet, Dr. Alibek has said, I am optimistic. And at one point I think I heard Dr. O'Toole say, I'm more optimistic, at least about one issue, than Dr. Alibek.

And this is how I see things. What we've basically been given here, I think, is--first, people who don't know every much about the subject are scared. For people who know about the subject, I hope you learned something. But like a lot of things in life, I think--basically what I think we've heard here is that this is our challenge. The challenge, both about controlling bioterrorism, the challenge also about the ordinary, garden variety, everyday problems of international public health, particularly in the controlled infectious diseases. And one of the reassuring thing about the conferences is that these things are linked, doing something for one should help in doing something for the other.

And, basically what I've learned is that there's a lot to be done. And I think we should start by getting on with this. By going out to the reception and talking to each other and deciding how we can move forward.

Thank you all very much.

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