Bulls, Bears, and Birds: Preparing the Financial Industry for a Pandemic

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Tara O'Toole, MD, MPH

Opening Remarks

The Center for Biosecurity of UPMC, Deutsche Bank, and the Contingency Planning Exchange are especially grateful to the Alfred P. Sloan Foundation, represented today by Paula Olsiewski, for their support of this event, and for their ongoing support of programs that educate and encourage businesses to take a role in preparedness for all kinds of disasters, particularly bioterrorism.

I am going to introduce our first two speakers, but first I want to say a few words about the nature of the problems that we are going to address today. Almost every day we hear news reports and updates of human cases of avian influenza in Asia, or expanding zones of infection among wild birds, or warnings from researchers and public health officials of the potential peril of an influenza pandemic in the next year or two or three.
It's important to understand that the H5N1 strain of influenza is unlike any strain of influenza seen previously. No one has immunity to it. This strain is highly lethal to chickens, but it is also capable of infecting other bird species, as well as pigs, felines, and humans. Over 100 million domestic poultry in Southeast Asia have been culled, but the virus is now understood to be endemic in wild migratory birds, which means that it cannot be eradicated from the planet. It possesses uniquely virulent properties.

More than 100 human cases have been documented, with a death rate ranging from 40% to 70%. The number of human infections so far in 2005 is twice the number observed in 2004. It is possible, indeed it is probable, that some milder cases are not being identified, but the numbers of these unidentified cases are unlikely to be large. Thus far, most human cases have occurred among people who have had close contact with infected chickens. However, the virus is steadily changing genetically, as influenza viruses customarily do. A genetic change in the virus that favors transmission among humans and maintains the virulent properties of this virus could trigger a global pandemic.

Estimates of the numbers of people who would die, were such an event to occur, vary from millions to tens or even hundreds of millions. The 1918 influenza pandemic was, by far, the most furious epidemic to afflict the world in the past two centuries, and it is estimated to have killed somewhere between 20 to 100 million people. In the United States, 675,000 people died in a matter of months during the 1918 influenza pandemic, and this in a population one-third the size of the country now. For our present population, that would represent 1.7 million deaths, again in a matter of months. These numbers pertain to the 1918 strain of the virus that had a mortality rate of 1.0% to 2.0%, not the 40% to 70% mortality rate we are [currently] observing with H5N1.

Now many might suppose that modern medicine would result in more favorable outcomes for patients than was the case in 1918. That expectation, as I stand here, is not likely to be realized.

The world has only a small supply of the one antiviral medicine that is known to be somewhat effective against H5N1, if -- if -- given quickly enough after infection. Countries are rushing to obtain stockpiles of antiviral medicines, and manufacturers are struggling to fill requests. Most of the developing world will be unable to afford these drugs, and the logistical challenges of distributing medicines in time to stop the spread of disease are formidable. An experimental vaccine is now being tested at the National Institutes of Health (NIH), but there is no possibility of manufacturing an adequate supply of vaccine for the 2005-2006 flu season, and unless heroic efforts are undertaken immediately, there is little chance that there will be enough vaccine to cope with a pandemic a year or two years from now. Few hospitals in this country have yet developed any plans for handling the surge of patients who would seek medical care during an epidemic. Indeed most U.S. hospitals are operating at or near maximum capacity on a routine basis, and in recent years have been stressed by the demands of ordinary, mild flu seasons. [Given all of this], there are ample reasons why the financial industry should be concerned about avian influenza.
We are very fortunate, and indeed honored, that many of the planet’s leading authorities on influenza are in this room today. They have all graciously agreed to participate in this program, in part because of the importance of this audience.

You are about to hear from the scientists and public health officials and government leaders who are key players in the effort to alert or, if necessary, to respond to a global pandemic. You will also hear from people who have studied past disease outbreaks and their consequences, and who have important lessons to impart. Their willingness to be here today, interrupting horrendously busy schedules -- Dr. Venkayya was up all night dealing with Hurricane Rita, for example -- that people have flown from all over the country as well as from Europe and Asia to be here, is testimony both to the magnitude of the threat, and again, to the importance of this audience and to what you can do.

The organizers of this conference hope to achieve three aims. First, we want to convey the nature and the dimension of the problem of pandemic influenza and the range of activities underway to deal with it. Secondly, the program is intended to give you in the financial community some practical suggestions on how you might prepare to mitigate the effects of a pandemic on your employees, your operations, and the communities in which you work. And thirdly, although this conference is an educational event, we also hope it will serve as a call to engagement and a catalyst for leadership.

If the calamity of the pandemic comes to pass, the world will depend heavily on the talent and the operational capabilities and vision of the private sector, as Seth mentioned.

Epidemics are an ancient scourge of humankind. For almost two generations now the developed world has, for the most part, enjoyed a respite from the large, lethal, fast-moving outbreaks of infectious disease that have visited history, but this period is ending. Population pressures and commercialization are bringing humans into contact with once remote ecosystems and with new viruses and pathogens. Modern travel and globalization mean that a single patient infected with SARS staying in the Metropol Hotel in Hong Kong infected others who moved the virus across four continents in a matter of hours.

Resistance to available antibiotics and antiviral drugs is increasing, and drug companies are increasingly reluctant to create new anti-infective therapy, given other pressing medical needs which offer greater opportunities for profit at less risk. And finally, revolutionary advances in bioscience, which will be a great boon, coupled with the phenomenon of the Internet and catastrophic terrorism, mean that deliberate attacks on civilians using biological weapons are a real and imminent possibility.

But the good news -- and there is good news -- is that advanced planning and preparation for epidemics, whether they be deliberate or naturally occurring, matters. Preparation matters a great deal and can make a big difference. As we witnessed in 9/11, and as we saw after the attacks in Madrid, in London, and in the wake of Hurricane Katrina, the private sector has an extraordinary capacity for situational awareness, for
planning and innovation, for rapid, agile response and communications. I think this program today will persuade you that the world now has great need of these abilities in the context of avian influenza.

Please feel free to ask critical questions and to think aloud about how your company and others might protect its people and their interests, and how the talents and capacities of the private sector might work to lessen the deaths, the suffering, and the economic and social disruption that might follow in the wake of a pandemic flu.

Rajeev Venkayya, MD

Pandemic Influenza Preparedness: The View from the White House

I am honored and feel privileged to be here among such a distinguished group of speakers, and I’m not sure that I can trump what they're going to say. But I thought that it would be helpful to give you a sense of the U.S. government's perspective on the pandemic threat—a scene-setter—if you will, to set the stage for the scientific, public health, and financial contingency discussions that are to follow.

I really want to applaud the organizers of this conference and those who are participating today. I think we've seen without a doubt, since the tsunami through Katrina, and last night, hours ago, in Rita, the private sector has stepped up to the plate. And we've seen phenomenal outpouring of support, both financially and in the response of relief efforts of the U.S. government here on our own soil. And I want to thank you for that.

I should note that many of the things that we're talking about today do not just relate to an influenza pandemic. The kinds of things we're talking about are the kinds of things that we need to do to prepare for unorthodox threats. Those being threats other than terrorism, other than hurricanes, other than things that would degrade your infrastructure explicitly, but would in fact leave your infrastructure intact and force you to deal with severe absenteeism, severe infrastructure degradation. The infrastructure necessary to support your organization isn't working because those people haven't shown up.

It's a very different kind of threat. Ultimately, perhaps, it's the same outcome. You can't do what you need to do to take care of your business, to take care of your employees, and to help your company. And we'll hear a lot more about that today.

Now, on to the threat, the H5N1 or bird flu threat, the pandemic threat that you've heard so much about, that you've seen on the cover of magazines, that you've seen talked about
on PBS on Tuesday of this week, on ABC last week, is very real. This is something that we take very seriously.

There have been three pandemics in the past century alone, and by my recollection -- not that I was alive, but in reading books -- about every century for the past four or five has had about three pandemics. It just happens. This is the way the influenza biology works, and this is the way the immune systems of our species respond.

So it is not a matter of if, but it is a matter of when, as Director General Lee said a couple of weeks ago at the WHO. The president said that if left unchallenged, uninterrupted, this virus could lead to the first pandemic of the 21st Century, and I couldn't agree more. If it doesn't, that's okay, because something else will, and so everything we do today is relevant to the threat that we face tomorrow, a year from now, or 20 years from now.

I'm not going to go into all the details of what the U.S. government is doing, but I do want to give you a sense and some confidence that we take this seriously. Every department and agency within the U.S. government is fully engaged in pandemic influenza preparedness, as of this moment.

I can say that with confidence because we run these meetings -- and people much more senior than me run these meetings -- with leaders of the respective departments and agencies sitting around the table talking about the pandemic threat. You should walk away knowing that your government is fully engaged on this issue.

We began our preparations internationally. The threat lies in Asia and it is endemic, as Dr. O'Toole pointed out, in many bird species, an accelerating number of bird species. It was poultry at one time. It's now an incalculable number of species of birds, and it's not just birds. It's mammals. It's mixing in birds and pigs, leading to the genetic mutation that could be the one that leads to human-to-human sustained transmissibility.

In order to address this, we cannot just look inward. We have to look overseas. We have to do what we can to ensure that the mechanisms are in place in Asia and in European nations that may see this very soon, and even in our own nation, to know as soon as possible that something has gone awry. If we don't do that, if we don't put those mechanisms in place, we will risk being behind the eight ball by weeks or months. And as we found in SARS, that can have devastating consequences.

So what does it take to do that? Well, transparency is number one. We know from the SARS experience that there is a disincentive to sharing information about a communicable disease that lies within your borders, no big surprise. I think any world leader will tell you that if he or she were to announce something to the world that could impact trade commerce travel, the economy of his or her nation, that would not bode well to their future administration. It would not bode well for their economy.
And so it’s no big surprise that countries that I don’t need to name are reluctant to share information. Not all of them--there are a number of countries that have been fantastic about sharing information. But we must encourage all nations to share information.

So how do you do that? Well, you can't do it by focusing on the health sector. This is not accomplished by individuals who lead the agriculture sector, the health sector in these countries talking with each other and being encouraged by multilateral organizations to do the right thing.

Those efforts are critical, but they're not enough. It is critically important that heads of state, ministers of state are engaged on this issue -- presidents, prime minister, their deputies must be talking about this. I'm also happy to report to you that's happening. We've seen a dramatic shift in the volume of discussions and the altitude of discussions that have been happening on this issue.

As you know, the president is fully engaged. He announced the international partnership with the United Nations, just several blocks away from here, a week ago. He also mentioned in his public remarks with Putin as well as the Thai Prime Minister. He is very engaged on this issue, as are others that are running your government.

We need to put money behind that. We need to put resources behind that, as do other nations, and we've done that. We've begun to do that -- $25 million in the avian influenza supplemental has gone to helping Asian nations to enhance transparency, enhance surveillance capabilities, enhance diagnostic capabilities to protect animal workers. To educate the public, to work on risk communication, to do the whole host of things in addition to preparedness and response planning necessary to get on this quickly.

All of this is at the heart of the containment strategy. What does containment mean?

Containment means that if you have a threat that resides in Asia, that's naturally occurring, that is communicable, that is going to be very, very difficult to stop or slow if it gets out of control, you put everything in place that you can to give you additional time.

To prepare domestically, to put your vaccine in place, to put antivirals in place. So that when the pandemic comes -- and I think many of us think it's unlikely we'll be able to contain this overseas -- our containment will actually be slowing the outbreak, that we will be better prepared than we were when we first recognized sustained human-to-human transmission.

The final thing that I'll say in addition to resources is that we need to have a group of nations that work together. The WHO is remarkable in this regard. The WHO does an amazing amount with limited resources and I think we can all be very proud of the work that it does and you'll hear more from Dr. Stohr later. But it's important for nations to stand behind WHO.
So the initial partnership in avian influenza, avian and pandemic influenza, the president announced last week at the UN, is designed to support WHO efforts, FAL OIE efforts on the animal health side, so that donor efforts are coordinated.

If we're putting money into this, they should be coordinated. We should have a common set of goals and objectives that all donor nations are working toward in Asia, and I think we'll accomplish that with the partnership.

There are 10 core principles that if you want to be in the club you have to sign up to, and those are principles that encourage transparency, cooperation, sample sharing with the WHO, and so on. That's critical on the international front, and I'm happy to tell you that is going quite well. We've seen a phenomenal outpouring of interest and support from nations and a long list of nations that have signed up explicitly.

Let me touch on domestic issues, and then I'm going to want to talk about the business considerations here.

Domestically it's important to have planning in place, as Dr. O'Toole has pointed out. The Department of Health and Human Services (DHHS) and state and local entities have worked on pandemic planning. They're continuing to work on pandemic planning. You will hear much more on U.S. government pandemic planning in the coming weeks, I can assure you.

There's been a lot of discussion around countermeasures, as they like to call these in the biodefense arena. Things that you can do to prevent or mitigate disease, usually delivery of disease, in this case naturally occurring [disease].

Vaccine and antivirals are what we talk a lot about. There are a couple of antivirals that we know, in the laboratory, have shown activity. In humans, in clinical influenza, they have some effectiveness and in the setting of not having a lot, I think we're hoping that if we do face a virus that can be transmitted between humans that there will be some effectiveness of this drug, of those drugs, against this virus. But we don't know that. But it's all we've got, and so we're stockpiling it, and we've laid out a goal of 20 million courses of antivirals to be available to the American population.

Now the strategy on how to use antivirals is complicated. I mean, we've worked out an approach that we think is very sound.

But the reality is that, if you want to use antivirals to protect the American population, to slow the spread or contain an outbreak, you need a lot of antivirals. You need to be able to give a pair a day to every individual who is at risk for as long as the pandemic threat is there, the influenza threat is there. Which could be weeks, and most people may never get influenza or be exposed to it.
And the result of that calculation is a tremendous amount of antiviral that far exceeds the capacity of the manufacturing sector. This is a real challenge that we're all facing. Nevertheless, we have set a goal, and we will meet it.

We've also set a goal on the vaccine front. We have seen success in the laboratory and in clinical trials with the human vaccine against H5N1. We have a vaccine that shows an immune response that we anticipate will show protectiveness in humans and that is in the process of undergoing additional testing, dose-sparing or dose-stretching evaluation to see if we can squeeze more out of it.

Somebody called it the "Hamburger Helper" approach. You've got a certain amount of vaccine, but it goes three times as far because you could administer it with something else.

We're also investing in surveillance to provide real-time visibility and awareness of what's happening in hospitals around this country. If you think a pandemic is underway or if you hear that there's an outbreak, if you hear a plane has arrived that might have somebody on it, you need to know instantaneously what's happening in the emergency departments and intensive care units around that town. And we think real-time surveillance capability is a critical element of that.

The final thing I'll say is that we're investing in diagnostics. When you have a limited, constrained resource such as antivirals, it is very important that those go to the people who actually need them. Which means that every sniffle, until we have unlimited antivirals, every sniffle can't get that drug. It's not a prudent use of your constrained resource. And so diagnostics can help you to understand whether somebody truly requires that treatment and we're investing there.

Let me lastly turn to business considerations. I'm not the expert on this. I can tell you, though, in watching the response to the two naturally occurring events that are ongoing, that a couple of lessons jump out to me.

I've talked about infrastructure degradation, and I just want to highlight for you that this is not like Katrina, in that it doesn't come and go in a matter of days, then allow you to pick up the pieces over weeks. This occurs over weeks. It's a slow roll. This is something that would begin overseas. We'll watch it in slow or relatively fast motion arrive on our shores, and you won't have to deal with this threat for quite some time to come.

Even if a single employee of yours is not infected, there's a pretty good chance, if it's a real pandemic, that somebody they know will be and that they may have to care for that person. There is a good chance that the infrastructure necessary to support your people coming back and forth from work, supporting your IT infrastructure, that those folks may have the same considerations and not be able to deliver. So, realize that the threat may be a couple of degrees removed, but the ultimate outcome is no different.
I think it's critically important that companies have clear communication strategies for their employees. Your employees will not only turn to their local public health officials in this event and the federal government, they'll turn to you to give them guidance, and you will need to know who the information sources are immediately. And I would say that you need to know what those information sources are yesterday.

If you have an outbreak of infectious disease domestically, my recommendation is that you go to the CDC website to get instantaneous information that's updated on a very regular basis on what to do with your employees or what guidance to give them. If it's an international outbreak, go to the CDC. Also go to the Department of State and you'll see, again, rapidly updated information.

You should run to put your contingency planning through its paces to know exactly where you're going to get that information, because you're going to be turned to. And you need your BlackBerrys, if your BlackBerrys are working in this environment, to put out information, push out information within hours, not days.

The last thing I'll say is that I think it's important for the private sector to not only think about protecting its interest, for every company to not only think about preserving its continuity, but also to think about protecting its employees. And finally, to think about protecting its community. I think that every company of any size in a community ought to be part of that community's plan.

True preparedness is not just about, as we've learned, the national government being prepared. It's not just about state governments being prepared or local governments being prepared. Guess what? It's about every individual, rich or poor, being prepared. You don't have to be rich to be prepared in your household.

But, it's also critical for companies to be prepared, and I think as we've seen with Katrina, we're going to turn to the private sector to help in any way they can. And so to the extent that you can integrate yourself so that we're not guessing and that you're not in there with a surprised look on some government official's face when you show up on their doorstep, I think integrating yourself into their preparedness planning early is critically important.

So, with that, I just want to close by saying that this is a very complicated issue for the private sector, and I've only touched on a couple of issues, assuming that my distinguished colleagues will speak longer on these issues.

I think there needs to be an effort to model the impact on the private sector. There are many entities that have taken a stab at this. I think there needs to be a concerted effort, and I would propose that individuals in the private sector look at doing this on your behalf, and look at the unique considerations that you're going to face with an infectious disease of this type.
We know that UPMC has done this kind of thing. We already know where this is going. But I think you need to nail, for yourselves, the explicit, specific things that impact your entities. That would be my recommendation and admonition.

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James Pavitt

Pandemic Flu as a Major Security Threat

For 30-plus years, I served as an intelligence officer, so I often was known as the "skunk" at the party. I am here today to try to help focus this issue. I am not a scientist. I am not an expert. I am somebody who has a keen understanding of how information can be used or not used, listened to or not listened to.

Four years have passed since the tragedy (9/11) that took place in this town not far from where we are today, when an organization called al Qaeda directed attacks here in New York City and in Washington, DC. Let me posit some questions as I speak to you today.

Are we safer today than we were four years ago, three years ago, two years ago, a year ago? For all that we have done as a nation, for all the changes that we have made, for all the efforts that you have made from a contingency perspective to deal with business disruption, let me posit a question. Are you comfortable with where you are in those contingency plans? Are we better prepared to deal with the next attack? And there will be another attack. Are we better prepared than we were in 2001? I think the answer is yes, a bit, but not sufficiently better prepared.

Let me give you some facts, some facts as I see them. The staggeringly slow response to Hurricane Katrina was nothing this nation is proud of. The president has said it was not good enough. State and local officials have said the response was not good enough. We found ourselves, despite all the preparations we made for a catastrophic attack, woefully unprepared to deal with a natural attack. Nothing went right. We did not communicate properly. We did not talk properly, up and down, or laterally. We did not coordinate properly. We could not move school buses from point A to point B or water from point A to point B. We could not get helicopters on the ground fast enough. We frankly did it all wrong.

Now, as a former intelligence officer, I spent a great deal of my career trying to assemble facts, to collect information, to get what some have -- I think, improperly -- characterized as perfect intelligence, perfect warning. We need to know exactly what is going to happen. Well, we had damn near perfect intelligence four weeks ago on Hurricane Katrina. We had as close as we will ever have--near perfect warning. [There were mix ups] for a variety of reasons, none of which I believe were mean spirited. We did not do it very well, and I think we have learned from that. As we sit here today, a hurricane is moving toward Texas with category 4 force, and we meet here 4 weeks
[after Hurricane Katrina] better prepared. That is good news. But we didn't come here to talk about hurricanes, did we?

An H5N1 pandemic would be devastating to the world and to our nation. I think it is important that we learn from what has happened in the past. If we do that, perhaps we can find a way to better deal with what might come and, as you say, whether it comes next year or the year after, it certainly will come. Are we ready for a pandemic? I suggest we are not. Is there a tougher mass alert response in place? I think we are working on that. Do we have a strategy? Clearly we're developing a strategy. But are we driving this issue with sufficient intensity and focus, that we will not find ourselves when it comes -- not if it comes, when it comes -- saying we did not do it right?

We did not have school buses in the right place. We did not have medical records in the hospital system that were able to be shared electronically from one hospital to another. We have 50 public health services, 50 in 50 states, each of which does their work differently. Could we do something about that now? I suspect we could.

In the global society in which we live today, I think it is important that we understand that there is no easy way short of sealing our borders to prevent infected, particularly non-symptomatic, individuals from entering our country.

There was a lot of warning -- a lot of warning -- in advance of the attack that took place on the 11th of September 2001, of the risk to a city other than Washington. In 1993, al Qaeda and Osama bin Laden tried to blow up a building in this city. What building was that? They drove a truck packed with explosives into the garage of the World Trade Center, parked it, walked away, and set it off. And some people died. We all remember that image, 1993.

If that was not strategic warning, I don't know what strategic warning is. What should we have done? What would we have done then, or in 1995, that you have all just read in the press? Now, some declassified information in the 9/11 Commission Report said the Federal Aviation Administration started receiving intelligence warnings in 1995, that terrorists would use aircraft as weapons to attack monuments or high-profile buildings in our nation. Could we or should we have shut down all air traffic in the United States? Could we have done that?

Well, in a pandemic context, sealing our borders, would that help? No one gets in? Probably. Will we do that? Of course not, we cannot.

The United States government has got to demonstrate that it has a sophisticated, highly motivated plan in place to deal with this issue. I do not think we have demonstrated that to date. Again, not because of mean-spiritedness, and not because we are not concerned about it, and not because we do not recognize that it is a problem, but because it is very hard. Solving issues like this is hard.
In the event of a global pandemic, some countries are likely to seal their borders, and that's going to have an inevitable impact on what many of you know about—International trade [and] international business. We, the United States, are dependent upon critical capabilities and materials that come from abroad. A tanker has to come into a port in the United States that originated in Asia [carrying] minerals, precious metals, semiconductors -- I can go on and on.

All of that is going to be impacted in the pandemic context. How is that populous going to respond? What are we going to do? There are people who are not sophisticated scientists, not people such as myself or those of us who are in "the business," but what is the average American or, for that matter, the average person in the room going to do in the context of a pandemic? How will they respond? Will workers report to work? Will we worry about family members?

As a former senior official of the United States government, I was at one time told that in the event of a certain disaster I was to go to Place A where a helicopter would pick me up and sweep me off to survive a terrible disaster of some kind. And I was going to leave my family in Great Falls, Virginia? I don't think so. That's a real issue. How will human beings respond, and do we have the time to deal with that?

Many of you here are engaged in contingency planning in the event of a natural or terrorist disaster of some kind that would impact your ability to function in a commercial context. All of you have contingency plans -- or I hope all of you have contingency plans. But how often do you exercise those plans? How often are you out there actually doing something to make sure you know what will happen and know how people will respond in a true crisis?

There is probably no one in this room who was alive in 1918 when a pandemic swept through this nation and killed hundreds of thousands of people. Tara O'Toole rightly describes what would happen if we had a similar pandemic today.

On the 11th of September, 2001, tragically, we lost somewhere in the neighborhood of 3,000 innocent people. We have lost hundreds of people in the wake of Hurricane Katrina. How would we deal, as a nation, with losing hundreds of thousands of people? Are we ready to deal with that? Have we thought about that? Is that motivating us sufficiently?

H5N1 avian flu pandemic -- to me those are numbers, letters, as they probably are to most of you. These could be, literally, the most important two numbers and two letters you've heard in your lives. The United States government has, in May of this year, invested $25 million to try and deal with avian flu from Asia, and I commend that. But I also note that I think it is woefully inadequate to the issue out there. If there were cynics in this room among us, some might say now is the time to simply go ahead and create the presidential or the congressional commission, naming the commissioners who will do the investigation of what went wrong and why our nation suffered a loss of hundreds of thousands of people because a pandemic struck [and we were unprepared].
In the three decades I spent as an intelligence officer, bad news was my business, as I said at the outset. I collected information, always incomplete. I collected tidbits, nuggets of information. I witnessed the way that collection took place. In the business I used to be in, I recruited spies to steal secrets. In the dead of night somewhere, a spy would deliver a secret to an intelligence officer, a nugget, a piece, never the whole picture, and we tried to cobble that together.

We do not need spies to tell us about the pandemic that is coming. We do not have to recruit a single spy. We do not need a single intelligence officer to intercept a signal anywhere in the world to tell us a pandemic is coming, and we do not need to take a picture from the sky that says a pandemic is coming. We have the intelligence. The director general of the WHO and others have all said it is coming. We have to prepare for a pandemic. We have strategic work [to do]. I posit we will not get tactical warning. If we are sitting around waiting, in the pandemic context, for the tactical warning to tell us that it is coming, that we need to be prepared, that we need to do something, I do not think that will happen.

We do live in troubled times. We are talking about a pandemic in the context of this conference and I think it is altogether appropriate that we are doing that, and I hope this conference generates another, and I hope those conferences and this kind of activity generate greater focus on what is coming.

We learned a lot about terrorism. We have spent an immense amount of money in preparing for the next terrorist attack, and I think that was right. We do not want to be unprepared. But there is nothing we can do that will stop every attack that is directed at us. Pandemic and biology -- how about the fact that we have been attacked? We have been attacked biologically with anthrax here in this city, and there was an anthrax attack in Washington, D.C. Thank God it was in a very focused, limited context. There was terrible loss of life, but it was controlled. We do not know who did that. But imagine people [dying] because a pandemic is here.

Can't we lash up that which we do in the fight against terrorism with preparing for this kind of a disaster? I could go on, but I must not. Let me talk briefly about what I think is the responsibility of the United States in this context. We bear, I believe, a very special responsibility in the context of this global threat because of who we are and what we represent as a nation. Our unique science, and that is going to be shared with all of you today, our extraordinary economic power represented by many in this room today -- all of those things make our nation uniquely capable, and indeed responsible for dealing with this issue.

To look the other way and not do something would be really irresponsible! It cannot be solved easily. It is going to require incredible focus. It is going to require incredible determination to do something. It is going to require us to shake things up a bit.

But remember four years ago when this nation was shaken up because a bunch of thugs came in and killed a bunch of innocent people. We had strategic warning it was coming -
- 1993, Nairobi, Dar Assalam, the USS Cole. We had strategic warning, and I can tell you, we are never going to have that kind of hard tactical warning for a pandemic. But those [terror attacks] happened, and now we should be better prepared to deal with not only when that happens again -- and I think we are -- but for other things, including natural disasters, or something as devastating as a pandemic.

The experts will speak to the specifics, and the specifics, I think, are bad news. I do not think there is a lot of good news in what we are going to hear about today. But, there can be better preparation, and we can be better able to deal with what I used to do as an intelligence officer -- deal with that "skunk" when he or she walks into the party.

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Robert Webster, MD

Avian Influenza: Current Status and Potential Impact

Thank you. I would like to bring some good news. I've been hearing some terrible news this morning, but my message to you is that since H5N1 came on the world scene in 1997, the scientists of this country and the world have put into place [new] medicines that can cope with it, and we [also] developed strategies for making new vaccines for these viruses rapidly.

I can tell you that when H5N1 appeared in 2003 and Klaus Stöhr called a pandemic alert, within 15 days we had a new vaccine strain prepared and ready for use in the population. Has that vaccine been prepared in sufficient quantity? No.

The problems are not with the scientists but with the public. And, I'm afraid that, as a scientist, I've been talking to the choir too long, and it's a privilege to talk to you people, because you are the people that have to push to get these scientific achievements that are in place through the Congress, through the governments, so that they're put in place in time, so that [we're] not faced with a Katrina, which is a total disaster. We have the tools to build the levees higher. They are not doing it; they're piddling around here. But, let me go to my script now for a little bit. I just want to introduce influenza on the left.

I will give you a little background on influenza. We all think, or most people in this room think that influenza is a problem of humans. It really isn't. There are 16 families of influenza. They all live in the wild aquatic birds of the world, and they live in total harmony, no disease, no problems at all.

So far, of these 16 families, 3 have appeared in humans over the past century and caused problems. The threats we see at the moment are H5, H7, and H9. These are all possible pandemic threats that we have to deal with. Just to look back at the last century, [at] the last pandemics and how they appeared: The pandemic of 1918 was catastrophic, [killing] somewhere between 20 and 50 million people. That virus emerged from the aquatic
birds of the world by direct transmission. It didn't reassort somewhere. It came, as Jeffrey Taubenberger tells us, from the wild birds of the world, by accumulating like mutations, and it became [such a] dreadful killer [that] many cities of the world couldn't bury the dead. In my own native New Zealand, whole villages just disappeared, and this was a catastrophic event.

The other we know much more about -- the Asian pandemic. It killed about a million people in the world. That virus reassorted probably in the pig. It got its coat proteins from a duck in Asia, three gene segments, and its transmissibility from the human strain, so it shuffled its genes. It had viral sex, if you like, in the pig, shuffled its genes, and it got transmissibility from the previous human strain, and it killed about a million people and continued to evolve.

And, then in 1968 a similar kind of thing occurred. So we've got two strategies, two major strategies for influenza viruses to acquire transmissibility, either by mutation, accumulations of point mutations, or what we call "viral sex" probably in the pig.

So let's turn to H5N1. We've heard that this virus has spread across Asia, and all the countries in Eastern Asia have been affected. Hundreds of millions of chickens and domestic poultry have been culled to try and stop its spread. The bottom line is that there have been more than 100 cases and more than 50% of those have died. Those are not good odds.

If we look at the various countries, the activity is still going on in Vietnam, a lot of activity in Indonesia. The great worry at the moment is Indonesia. The number of cases is uncertain, but probably increasing. Thailand, I want to look at for a moment; because, in Thailand, there are no new cases in 2005 in humans.

The Thais have been doing something correctly, which sends a message--there are things still to be done out there to stop this virus spreading, and the Thais are doing that, and so we could come back to that in the question time.

The genesis, I want to walk through how these viruses appear. These viruses, we first met them in Southern China, in Guangdong in 1996, where a few geese started dying. A virus in the wild birds of the world spread into geese, mutated, and started killing a few geese. That virus got into the live poultry markets in Hong Kong, and the goose viruses mated with a quail virus and a duck virus, and reshuffled their gene segments to give us a virus that infected humans.

The Hong Kong authorities wisely culled all of the poultry, got rid of that virus. We've never seen it again, but the virus kept reappearing out of Southern China, out of the goose population, and that virus reassorted with multiple other viruses to give us the current lot of viruses. And, up till 2002, it didn't kill ducks, but after that, it learned that trait.
There have been three waves of this virus through Asia and we can ask, "How pathogenic is it, how bad a virus is this one?" The prototype of these viruses is called Vietnam H5N1. If we inoculate this virus into chickens this afternoon, they're all dead tomorrow morning. It's a real killer. It kills ducks in one to two days, high risk of death in humans, with diarrhea, respiratory signs, and neurological symptoms. Diarrhea and neurological symptoms are not standard flu.

If we put these viruses into ferrets, the animal that we classically use for working with influenza, [in which] influenza usually causes a mild infection, respiratory [signs], and a high fever. This [virus causes] respiratory signs, diarrhea, hind leg paralysis, and they die. This is the first one of these influenza viruses that kills the ferrets--spreads throughout the body to the brain, and they die with paralysis.

These are extraordinarily bad viruses. I've worked with influenza all my life, and these are the worst influenza viruses I've ever seen.

What about pigs? We mentioned earlier on that the pig probably plays an important role in getting these viruses across from the avian reservoir to humans, and I should point out, at this time, the only characteristic this virus doesn't have is its ability to transmit human-to-human. It transmits from the chicken population to humans and kills a high percentage.

What this virus hasn't learned to do yet is to transmit from you to me, me to you. If it learns that trait, then we're in terrible trouble, and we ask this question: Would these viruses replicate and transmit in the pig? Because that would an indicator of what's happening.

We put a human, a chicken, a duck, a goose virus into pigs in our isolated facilities. We put two pigs in a cage, and the virus infected every one of the pigs, but it didn't transmit. The virus hasn't got the characteristics of transmissibility, and there is a tendency, at the moment, to think what's been done since 1997. It hasn't learned to transmit yet. Well, we can forget about it--it's not going to do it.

Don't believe it. This virus is going to learn to do it. Historically we can go back to Helen of Troy. We've seen influenza all centuries, and we've had the privilege, if you like, of watching this one evolve very slowly from 1997-acquired new characteristics, and it's probably going to do it . . .

[sick chickens were fed to tigers and leopards in Thailand, they all died . . . [a] group in the Netherlands fed the infected chickens to domestic cats, they died. [They] not only died, they transmitted . . . cat-to-cat. Many people in this room have cats as pets. If this virus gets away, that's going to be another animal for transmitting.

The duck, we now recognize, is one of the big problems with this virus, because early on in 2002, the virus started killing ducks. The assumption was if the virus was in the community, the ducks would die. But the virus and duck have been together for millions
of years, and the virus is evolving rapidly and many of the ducks, at the moment, are not dying. And so in the duck, the virus retains its high-pathogenic characteristics for chickens and presumably humans. It keeps drifting along and changing its characteristics, and the virus is currently quite stable in the environment.

A big question is whether the wild, migrating birds of the world, which mainly migrate north to south in the hemispheres, have been involved in transmitting. We're not sure if that was the case early on. We now know that these highly pathogenic viruses are in the wild birds of the world.

From when the deaths that occurred in Western China (on April 30) there were a few dead geese on Qinghai Lake. By May the 4th there were daily mortalities of over 100 geese and by June, five thousand geese had died, and this is in an area where there's no domestic poultry.

Since that time, the virus that occurred in May . . . has been spreading westward into Southern Russia, in the Novosibirsk region and now to Kazakhstan, and right up to the border of Europe, with migrating birds transmitting.

The Europeans in Holland and France have put their commercial birds inside. A lot of arguments, the Dutch have just taken them out again, but the worry is that this virus will spread westward and extend its range. By extending its range, it extends the number of times it multiplies, the number of times to make mistakes and to learn this trick of human-to-human transmission.

So what's the good news? What do we have, as scientists? What do we have to offer the world? In 1997, when we first found it, [the] drug amantadine was effective. However, with this drug, an ion channel blocker, you get resistance rapidly. The recent human strains are totally resistant, so that drug is not available to us.

However, the good news is that the neuraminidase inhibitor, also known as oseltamivir, is efficacious. This is the study in a mouse model to show that if we use 10 mg/kg per day, the drug is effective. So this is our ace in the hole. That's been developed in the last five years based on basic science and structural biology.

What about vaccines? There are no vaccine strains available, but scientists in the last three years can make any influenza virus that we think about by a process called "reverse genetics." We can make these viruses and make vaccine strains extremely rapidly.

The studies on these vaccine strains in ferrets show complete protection of homologous challenge, cross protection between one strain and the next, and with no virus shedding, no weight loss, no virus in the brain. And so we can manipulate this virus to make a perfect vaccine strain very rapidly.
The problems are with liability. These are the problems, not enough vaccine factories, certainly not in the United States, and so the scientists, I argue, have done their work. Time has probably got it right. There is a bird flu epidemic hatching in Asia.

So the question that people here are likely to ask is, "What is the economic impact?" We can look back at SARS. With 8,000 cases, about 70 to 74 people died, and the GNP dropped by 0.2 to 1.8%. With pandemic influenza, up to 35% of the global population, millions, probably billions would die in the first wave, and the effects would be catastrophic. The comments raised at the back, you're absolutely right, our culture as we know it today would be drastically affected. SARS hammered the Canadian economy and H5N1 would [do so] much, much more.

I'll just finish by showing you the Vietnam chicken. It's the Year of the Chicken, and my colleagues in Vietnam pointed out [that] during the last Year of the Chicken 12 years ago, millions of people died due to the war and starvation. They're concerned the same thing could happen this Year of the Chicken.

And so I'll just summarize what I've said. This H5N1 is lethal for wild waterfowl, so it's going to continue spreading in the world, [it's] lethal for humans, lethal for ferrets, lethal and transmissible in the cat families, and the infection and transmission in pigs in Indonesia -- it is a great worry. This virus is evidently in the pigs in Indonesia and is now causing death, and that is a big worry.

This summarizes what the United States is doing about the bird flu epidemic. I think that we have to accept that fact that we're sleeping on top of a time bomb. I repeat: the scientists have done their jobs. Now it's up to you people to push, to use that science to put our levees in place.

I'd like to conclude by acknowledging that the work was supported by NIH, that many people in the world working on flu, especially from Hong Kong, Indonesia, Vietnam and Thailand, contributed the viruses and work. I'll stop there.

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**Robert Shapiro**

**The Economic Consequences of Epidemics**

Let me begin by saying that economists are certainly as sensitive as scientists or bankers, but economics can be a bloodless discipline. So, while the human toll from an avian flu pandemic could well be horrible, it's likely that a large advanced economy like America's will accommodate the shock without changing its basic course. Smaller, less-developed countries will probably not be so fortunate.
Now, let’s start by clarifying the economic nature of a pandemic. Pandemics are not economic phenomena in themselves, [rather, they are] genuine exogenous, natural events. The fact that pandemics do not arise from within the economy means that we can’t start with standard economic logic. Instead, we should look at other exogenous shocks and, to my mind, the closest analogous event to a pandemic is a terrorist attack, especially a bioterrorist one.

The analogy is not only close but particularly useful, because terrorists have inflicted enough damage in enough places, over a long enough period of time, for economists to evaluate how this particular kind of shock actually affects economies.

Without going into more detail than we need today, all the research has shown that when terrorism is occasional and localized, its economic impact is very modest. To have real economic effects on growth or development, terrorism has to be both pervasive across a society and protracted in time.

In a large country and diverse economy like ours, that's difficult to achieve. Even a huge, single terrorist strike is just a blip. It's clear, for example, that the 9/11 attacks did not move the overall U.S. economy. Actually, both consumer spending and investment accelerated in the quarter immediately following the attack -- October, November, and December of 2001 -- producing the strongest quarter for growth for nearly two years in either direction.

Other exogenous shocks also can provide some perspective. For example, bouts of bad weather and natural disasters have produced much greater losses, especially in human terms, than any terrorist attack seen thus far, without derailing large, modern economies. An example might be the 1988 U.S. heat wave, which took the lives of more than 5,000 Americans, or the 1999 earthquake in Izmit, Turkey that killed 17,000 people. Nor will Hurricane Katrina change the basic course of the current economy.

In a few places, terrorism has been both genuinely pervasive and protracted -- principally in Columbia, Northern Ireland, the Basque region of Spain, and Israel. Those are the cases in which economists have found significant economic effects, especially regarding investment. Studies have shown, for example, that investment in the Basque region was about 10% lower than it would have been, had there not been terrorism sustained by Basque separatists.

Foreign direct investment is particularly sensitive to long struggles with terrorists. So, protracted terrorism is thought to have reduced FDI in the 1980’s by more than 13% in Spain and by 12% in Greece, where the November 17th terrorist movement was active at the time.

Evidence shows that pervasive and protracted terrorism -- that is, pervasive and protracted exogenous shocks -- also stunted the development of Northern Ireland, distorted the path of development in Columbia, and shifted the course of development in Israel.
All of these examples are small countries in which no place seemed safe from attack, and small economies depended on foreign capital.

By contrast, the economic effects of terrorist acts in much larger economies, without exception, have been highly localized and distributional -- shifting investment from industries in places thought to be particularly vulnerable to safer sectors in safer places, with little net effect on overall economic activity. The 9-11 World Trade Center attacks dealt a blow to the economy of Lower Manhattan, but not to Boston and Chicago -- and even in Manhattan the impact was concentrated downtown.

Similarly, 9/11 set back a handful of industries, principally airlines, hotels, and insurance. But investment and demand shifted to other industries, especially interest-sensitive sectors following the Fed’s easing to calm the first 9/11 markets, and that’s why we saw an acceleration in consumer spending and investment in the quarter following the attacks.

These general patterns are what economists should expect in the event of a pandemic. Large advanced economies shrug off exogenous shocks, provided they don't have pervasive and protracted effects. This is because such economies are big and because their markets reallocate capital and jobs to where they can be used relatively more safely and therefore productively.

What can derail an economy like ours are shocks that strike all our markets and don't go away -- as when OPEC tripled energy prices. By contrast, small countries in the forefront of a new pandemic, especially those dependent on foreign capital, will prove very vulnerable economically.

Let's apply this perspective to what we know about an avian flu pandemic. We should begin by acknowledging that we don't know enough to be truly certain about almost anything in this area, even as we accept the judgment of almost all scientists that the current avian virus will almost certainly mutate to a form that’s communicable among humans.

No one can say yet just how communicable that mutation will be, so we don't know precisely how fast it will spread, or how much of the population might get it. Moreover, no one can say how lethal the mutation will be. The current virus, as we've heard, is very lethal but it's also non-communicable from human-to-human, so we don't know what a strain that is highly communicable will look like. The evidence, however, certainly suggests that it may be very lethal. These uncertainties are the principal reasons why recent estimates of the death toll from a global avian flu pandemic range from one million to 50 million.

We can get some additional perspective on those estimates by looking at how deadly other infectious diseases are already. For example, 39 million people worldwide are infected with HIV, and nearly 3 million die of them every year. Another 8.8 million are infected with TB, which kills 2 million people a year. Five million more have malaria,
killing about 1 million a year. Perhaps most to the point, influenza infects tens of millions of people every year and kills some 1 to 1.5 million annually.

In all of these cases, we see significant economic effects from these illnesses and deaths only in small, poor countries, especially in sub-Saharan Africa.

One frightening scenario for an avian flu epidemic assumes that it will be as infectious and lethal -- more lethal actually -- than the Spanish influenza epidemic of 1918-1919, despite advances in public health, medicine, and nutrition in the intervening 90 years. The 1918-1919 pandemic infected about one in four Americans and killed about 2.5% of those infected. The result was 675,000 American deaths in a population of 105 million.

If the same numbers occurred in an avian flu pandemic today, it would kill nearly 2 million Americans. Most estimates of American deaths from such a pandemic, however, range from 50,000 to 500,000. At the lower end, that would raise the current U.S. death rate from 8.25 per 1,000 to 8.42 per 1,000; at the upper end, it would rise from 8.25 to 9.92. The point here is that only in a replay of the 1918-1919 pandemic, with 2 million dead, does the avian flu substantially change the U.S. death rate. In the event of a less serious pandemic, the change is modest from an economic perspective.

What these data suggest is that, in all but the worst case scenario, avian flu would not by itself cause pervasive and protracted effects on the U.S. macro-economy. Businesses will not stop investing, and most people won't stop spending, although the composition of both would likely change. That is, in most scenarios for avian flu, we are likely to see what we have already seen in cases of terrorism -- distributional rather than macroeconomic effects, reflecting both the size of our economy and its advanced markets.

Countries that don’t have those advantages will be more seriously affected. Looking around the world, the economic impact of a serious pandemic would depend on the economy's size (the bigger the better); its market structure (the less regulation of capital and labor markets, the better); and finally, the extent of the disease's spread.

Most experts predict that a communicable strain of avian flu will begin in Asia, because that's where pigs and poultry are raised in both great quantity and close proximity, as we heard from Dr. Webster.

The first significant economic effect could well be a serious blow to Asian poultry and pig sectors that would set back the economies in Viet Nam and Thailand, and possibly Korea and Taiwan. Back home, that would be bad news for American banks and funds invested in those markets. The United States, Brazil, and the EU are the world's largest poultry exporters, and the spread of an avain flu strain from chickens to humans would put significant dents in their businesses, too, if only by driving down prices.
But even if everyone shuns chicken and pork, everyone still has to eat. So such a pandemic could also boost the fishing and beef industries, a clear example of the kind of distributional effects you typically see arising from large, exogenous shocks.

We can also imagine some of the secondary effects. If a serious epidemic flu breaks out in smaller Asian countries and stalls out their economies, it could certainly affect commodity prices. Any significant impact on global commodity prices, however, would probably require a pandemic crisis in China as well -- and one much more widespread than SARS, since China still grew 9.1% in the four quarters immediately following that outbreak.

In themselves, falling commodity prices would probably be a plus for the American economy, although the slowdown in Asia required to produce them would also depress U.S. exports. Here again, the overall economic impact is largely distributional, with gains going to sectors that use the depressed commodities, against the hit to the export industries.

A significant slowdown in China's growth rate also could reduce their capacity to continue buying U.S. treasuries, putting some upward pressure on U.S. interest rates -- but a flight to quality in global capital markets and the inevitable Fed action would likely offset this effect by reducing U.S. interest rates. In fact, that's just what happened during the Asian financial crisis.

The greatest adverse effects in the United States could well arise from the political responses to a new flu pandemic. We got a glimpse of this in a recent war game exercise, called Atlantic Storm, that posited the simultaneous release of smallpox in multiple places in both America and Europe.

The United States and most other major countries have actually stockpiled smallpox vaccine, so the greatest economic damage in that scenario arose not from the smallpox itself, but from political authorities at state, local, and national levels responding by closing their borders and grounding aircraft.

Here, too, shutting down the transport of people and goods in affected areas and everywhere else could produce a more systematic effect -- as if the flu were pervasive, whether or not it actually was yet. If this response were short-lived, the macroeconomic effects would be manageable, probably shifting consumption and investment a few months down the line. But if the shutdown persisted -- for example, if the pandemic came in waves, as it did with the 1918-1919 flu, and with no effective treatments -- then you could have the combination of effects that produces large, economic consequences. The exogenous shock would become both pervasive and protracted.

There's another cost that could be quite considerable, even though it's very hard to measure or estimate. Research has shown that when it comes to assessing the risks associated with terrorism, people tend to predict worst-case scenarios while neglecting their low probability. The same may hold true for a pandemic. Certainly any serious
outbreak of a communicable form of avian flu would produce enormous public anxiety, which could induce a lot of people to flee the affected areas or stay inside their homes.

At a minimum, avian flu outbreaks will convince many people to avoid public places where people congregate -- a blow for movie theaters, restaurants, hotels, and tourism generally, with airlines taking their inevitable hit. Past evidence suggests strongly, however, that most people will still go to work -- unless and until a deadly strain rages through the area. Should that happen, it could certainly freeze the labor force.

By definition, a pandemic is in some sense pervasive. Precisely how pervasive, in the sense we've been using it here, will depend on the mutated strain's communicability and lethality. And whether or not an avian flu pandemic follows most exogenous shocks and has relatively modest overall effects on the American and global economies will also depend on how protracted it is.

We cannot control the emergence of a killer strain of avian flu. We may well be able to affect how protracted the resulting pandemic is. The National Institutes of Health have modeled virus responses to an avian flu outbreak and believe that 3 million doses of an antiviral such as Tamiflu could stop a global pandemic under three specific conditions: if the outbreak is caught very quickly; if treatments are quickly targeted to everyone initially infected or in their vicinity; and if schools and workplaces are closed in the areas where the flu first emerges.

The WHO will have 1 million doses by this December and 3 million by early summer of next year. It has also asked its members for $250 million to expand its monitoring and rapid response capacities. Here in the United States, the administration has announced plans to buy 20 million doses of antivirals, although following its recent spectacular failures, that plan doesn't inspire much confidence. I think those failures have to be taken seriously.

I was distressed to hear today, for example, that the U.S. government's plans for a quarantine and other rapid responses to avian flu will be released in a few weeks. Where has the administration been for the past 3 years? Why don't those plans already exist? Why aren't they in place? The administration would be well advised to quickly fund the WHO proposal.

These are opportunities that are not available in the case of bioterrorism. In bioterrorism, advanced planning can only be generic. In this case, the advanced planning can be very specific and very targeted -- especially for the worst case scenarios. Such scenarios may be unlikely to come about; but they do sometimes happen when a number of special conditions come together.

In this case, the likelihood of a worst-case scenario is certainly real. The steps required to move that likelihood out another decimal point would involve planning very modest public investments for a country like the United States and other advanced nations. We should insist upon those investments.
Much of what I've said today about how exogenous shocks affect the economy assumes that we behave rationally. Here, it assumes that we take that steps which are available to us, which the scientists have determined are prudent, and for which we have a large public infrastructure to carry them out. If we don't and the United States suffers a pervasive and protracted shock, it could shift the course of our economy.

So, if a highly lethal and highly communicable avian flu pandemic comes, and if it's not caught quickly, and it's not treated quickly, the lessons of other exogenous shocks will apply. First, the smaller the economy, the more it depends on foreign investment, and the more regulated its markets are, the greater its economic impact.

And second, in large, advanced economies like ours -- and especially ours -- the economic effects should be largely distributional. But if we do not take the steps which we know we can and know we should, the effects, in time, will also be macroeconomic.

Thank you.

Isaac Weisfuse, MD, MPH

New York City's Avian Influenza Response Plan

What I wanted to do was talk about some [of our] planning assumptions in New York City, what our preparedness plans are like, and what we feel that businesses, at least in New York City, can do. Some of the information on businesses may not be necessarily translatable to other cities, so if you are from another city, it may be something that you need to look into with your local or state or provincial health department.

In looking at the potential impact on the City of New York, we have used some software that's been provided, called FluSurge, and we can debate the attack rates for a long time, but we tend to look at it in intervals, if you will. So we're looking at attack rates of between 15% and 35%, which would mean somewhere between 1.2 and 2.8 million folks in the City of New York infected, with the corresponding intervals or spread of outpatient visits, 60,000 to 280,000 hospitalizations and 12,000 to 141,000 deaths.

Again, we could really debate a lot of these assumptions, but I think this gives you a sense of the kind of assumptions that we are going on. So we're talking about a true public health emergency by any stretch of the imagination in the city.

We've also had some other planning assumptions, and I want to go down to the last bullet. There is just no way that we can think of to keep a pandemic from coming to and being spread in New York.
We don't think that is realistic, at this stage in our knowledge and at this stage in the
amount of pharmaceuticals or countermeasures there are to keep it from coming from
New York. Again, at this stage -- and it may be different a year from now -- we don't
think the vaccine will be likely for six months or more, and when a vaccine is available
we'll probably need two doses [for each vaccinee].

As you've heard before, there's a limited supply of antivirals in the United States, both in
the strategic national stockpile and in the private sector, and that these scarce resources,
as was alluded to before, will likely dictate that the product will be available only for
treatment and not for prophylaxis.

And that is an issue that local and state health departments wrestle with a lot and then
finally, and again this is what's been alluded do, is that it will be very important.
Everything that public health can do is dependent on the maintenance of potential
services.

So, public safety, the medical system, and the socioeconomic system have to be up and
running for us to have really any kind of major impact on the course of such a pandemic.
So it is a public health emergency, but it really is a societal emergency, and we need
these other factors that keep our city safe and distribute goods to be operating as well.

Now, in preparing for this talk, I realized that a lot of the work that we've been doing
here in the City of New York on public health emergency preparedness in the last couple
years actually really does apply to avian flu. So let me give you a couple of examples.

I'll go through some of them in a little bit more detail. But we have worked very hard on
creating a cutting edge surveillance system in the city to alert us at the earliest possible
moment when there is a spread of a disease, whether it's a naturally occurring disease or
whether it's an attack from a bioterrorism agent. And I'll give you some examples of
that.

We've worked very hard at increasing, since our anthrax attacks in 2001, our laboratory
capacity and we recently opened a 20,000 square foot biosafety level III laboratory that
we didn't have before. It greatly augments our capabilities in that respect.

Last year, with the flu vaccine scarcity, we operated flu PODs. PODs are points of
distribution sites, and we did that on purpose. Well, first of all, we had flu vaccine
scarcity, so that we didn't do on purpose, so let me correct that. But we decided to put
together these POD sites because if we ever had to do the real thing in a pandemic flu
situation, we wanted to learn from that experience.

And we really did a lot along those lines. We gave out in excess of 30,000 flu vaccines.
Many were to elderly people. We had people in wheelchairs, people on stretchers
coming to our sites and that was invaluable [in terms of testing the capabilities of the
PODs]. In addition to giving out a good service, that was a valuable experience in
dealing with many vulnerable populations.
I'll talk a little bit about provider outreach and community outreach. We have a lot of backups. I've sort of termed this "backup planning," and I guess I was influenced by Hurricane Katrina. But we have a lot of backup plans in case facilities or equipment go down, so that we can continue on in our work.

And then we've worked very [closely] in the last couple years with the 70 or so acute care hospitals in New York City to make sure that we have good communication systems with them, and that we are furthering their work in getting ready for a pandemic or a bioterrorism event or some sort of other terrorist event.

Along those lines, the New York State Department of Health has created a software program called HERDS, which allows us a way to assess what's going on in the hospitals, minute by minute or day by day, in terms of numbers of beds vacant, number occupied, staff that are there, medical equipment, etc. We've practiced that and drilled it a number of times with our New York City hospitals.

Let me give you a sense more of the surveillance. This is a slide that I think gives you a feel for what we call syndromic surveillance. This is something that we have throughout the city, and we're looking to come up with the earliest indication of a problem in the city and each day we get downloads from hospitals to help us look at that.

So, in this slide, rather than waiting for somebody who's really sick with that severe illness, that red graph, we hope to identify people at the very onset of their symptoms so that we can identify problems in the city as quickly as possible. And we have syndromic surveillance systems for emergency department visits, for ambulance runs. We have an agreement with large pharmaceutical companies to look at their sales, and we look at employee absenteeism in several places as well.

This is a little bit of an old slide, but it gives you a sense of our coverage. Right now, probably 80% of all ED visits in the city are monitored on a daily basis, so we get an electronic download every day and can look at that. We do that seven days a week to try to see what's going on in the city and the hope is that this will help us identify pandemic flu.

Now, it works in the sense that every year New York City, like every place else in the United States, has an influenza epidemic and usually syndromic surveillance efforts from the emergency departments are the first to pick up any indication that flu is in the city. So we have several years' worth of experience in looking at flu ED visits in the city, and our hope is to find out, as early as possible, if there is any kind of problem with pandemic flu in the city.

We also rely very heavily on traditional surveillance. With traditional surveillance, we say that our physicians are our eyes and ears, and just to point that out, in 2001 all the anthrax cases that were reported in New York City came through traditional surveillance. So that's an important point that we're working on as well.
A couple of other generic foundations. One is that we have tried very hard to integrate mental health approaches into all of our work. We know from Hurricane Katrina, from PTSD following the World Trade Center disaster, that mental health is clearly a critical part of what a public health response should be.

We work very hard with some of the mental health providers, for example, in the city, so that they can feel prepared to take care of their vulnerable populations at the time of a crisis, so the most vulnerable in our society are not left adrift in terms of having people who can take care of them, as an example of one of our mental health approaches.

We've done a lot of work on communications. We have done a lot of media and risk communication training.

We have something called the "Health Alert Network" for providers that is an electronic messaging system that is open to all New York State licensed professionals who register with us and any company who has an employee health program. It should be a requirement that if you have any of those folks, licensed professionals, that they be on our HAN. That should be something that you today. I'll give you some instructions about how to do that.

We've also deepened our ties with the ethnic media. You know that New York City is a city of immigrants. There are many languages spoken, and we worked very hard to extend our roots into many different communities to get messages out. So it's not just the mainstream media that we try to work on.

We've also done a very good job at trying to develop a contact mailing list, which is growing every day, where we try to get messages out to people on a variety of health issues and that would be of use in case there was an emergency.

I'm not going to go through all the specific avian flu surveillance mechanisms we have, but just getting a little bit more specific on avian flu, we have a couple things going, listed here. Some of it, that nontraditional surveillance that I talked about, that's located on the bottom, to help us pinpoint if avian flu is in the city. You know, a pandemic doesn't necessarily mean that it'll be avian flu, but any increase in flu activity in the city, so we have some specific issues around avian flu.

We've also worked, as I said, very hard with our hospital systems to look at surge capacity, and we have plans and ideas. We recently had a tabletop on September 9 with all the hospitals in the city, talking about avian flu and talked about the "creation of beds" to be able to deal with that surge in hospitalizations.

I won't go on in great detail on it, but obviously one of the issues will be communication with the public: When to go to the hospital, when not to go to the hospital, so we don't overburden the hospital system. We have a superb medical care system in the City of New York, but we need to protect them and make sure they're dealing with appropriate patients.
We also worked with our Office of Chief Medical Examiner. There have been allusions to
great, large mortality rates, and I’ve talked to them about their service plans for dealing
with remains of people who die from pandemic flu, and that plan is in place.

Under discussion are issues such as Tamiflu policies, community controls, and city
respirator capacities. We’re going to be looking at what our capacity is for respirators
and ventilators in the city and whether we should augment that capacity. Because, if you
look at the clinical literature, from people who died in Southeast Asia, many of these
folks died of an overwhelming immunologic reaction and would need to be supported
throughout their hospitalization. And one way to do that would be important, would be
respirators, but if you run out of respirators you lose your ability to do that.

Let talk a little bit about businesses: You know clearly I said that one issue is the
essential services that businesses provide, and we’re talking kind of basic here, but food,
water, electricity, fuel are all critical for us getting our job done, for the hospitals getting
their job done.

I'm not a businessman, and maybe this is something all businesses at this point do, but
this issue of the just-in-time inventory control and some of the essentials are something
that businesses really need to look at to keep our city running.

What should you tell your employees? Well, from my perspective, if your employees are
residents or work in the City of New York, the better your employees are doing, the
better I'm doing. So one suggestion is dealing with telecommuting, sort of decreasing
the burden on the transportation infrastructure, make sure that you have the IT
infrastructure for telecommuting.

In SARS, we read that some businesses split essential employees into home and work
teams, so if one team had a problem, the other team could come in. And obviously
online transactions are something that we think is very important for some
of these essential services.

I get my pharmaceuticals delivered to me by mail after I register online. Hey, I'd like to
be able to offer that to the entire City of New York for anybody with pharmaceutical
needs. I mean, we're not stuck in 1918 is my mantra. 1918 was bad, but there's been
significant progress on a number of fronts, and we ought to figure out what that
progress is and use it to our advantage.

In terms of public health and your business, obviously keeping your employees well
informed, and reinforcing during a time of a pandemic those really boring messages of
public health, about covering your mouth and nose when you sneeze or cough. I talked
about the HAN, the Health Alert Network that your employee health director should be
required to sign up with our HAN, and there are HAN equivalents in every state.
We also have a Medical Reserve Corp. That is something that we'd like people to look into as well, and you can access both at the website shown, and I believe this will be put up as well.

Finally, we have a number of public/private initiatives through our New York City Office of Emergency Management. A number of them are here. One is something on the bottom called "Ready New York" that should be in the hands of every one of your employees. It has to do with emergency preparedness for people and for families.

We have programs to allow people to get credentialing so they can go into places where they need to go and also, information about current events in the city through corp.net.

Just a reminder: We get flu every year. We have an influenza outbreak every year. That's the normal state of events. If there's enough vaccine -- and the vaccine supply is a little bit iffy today -- but it's a good time, if you're having flu vaccination sessions, to also educate your folks about avian flu.

I realize I went through very fast. I hope I kept to the time limit, and I will be around to answer questions. If something comes up, that we run out of time, I'd be happy to answer questions by e-mail. Thank you.

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**David Fedson, MD**

**International and National Vaccine Planning Efforts**

Klaus [Stöhr, of the World Health Organization], how many people do you have on your staff in the WHO influenza program in Geneva? You've got how many?

Twelve. You're going to have to take off your shoes to get above 20, I guess. So you've got a staff of 12 people in Geneva working on global pandemic preparedness, and that's another number that I think all of you ought to pay attention to, and you are not allowed to say that. But I can drag that information out of you.

I would like to spend a few minutes talking in a much more focused way on one of the many, many issues that concern all of you who have come to this meeting today, and that's developing vaccines and perhaps other agents for an imminent pandemic.

Now, since you all represent -- or most of you at least -- economic institutions, I thought that you would appreciate a quote from Herb Stein, who back in the 1970s said, "Things that can't go on forever won't," and of course he was talking about the economic cycle. But I think you could say the same thing about influenza and inter-pandemic annual...
influenza epidemics. Will they go on forever? Absolutely not. They won't go on. They can't go on forever.

Rob Webster, writing in a wonderful paper, which all of you should read, on the threat of the next pandemic, wrote a couple of years ago, "Influenza experts agree that another influenza pandemic is inevitable, and may be imminent, and the world will be in deep trouble if the impending pandemic strikes this week, this month, or even this year." I think this is a given, and I think we all understand this.

Now, what will we have [on hand] to confront an imminent pandemic? Here I'm really talking about essentially what weapons we [will] have to fight this war. I think that's one way and a useful way to think about it. What's specific weapons will we have to fight this war?

Well, we've had a lot of information on antiviral agents, anti-neurominadase inhibitors, and I will not dwell on those. We have the current inactivated vaccines, and we must focus on those, because for an imminent pandemic we don't have anything else.

We don't have live, attenuated vaccines, [and] we don't have cell culture-produced vaccines. We don't have cross-protective vaccines, and if the pandemic is coming in the next week, the next month or the next year, we have got, as a Texas politician would say, "You've got to dance with the one that brung ya." You've got to use the resources that you've got at hand.

And I would like to say something at the very close of my remarks about the potential for other existing agents, which we already have in our pharmacies.

Now, let's look at an example of developing a pandemic vaccine by going back to the United States and the situation in 1976, when within four to five months of the isolation of a swine influenza virus from one fatal case, publicly-funded vaccine trials were completed. These trials involved over 6,200 children, younger and older adults.

They involved testing for different vaccines. Each one tested at three dose levels. One to two doses were studied. The serologic, the antibody tests were all completed in one laboratory, and at the end of four to five months, the information was obtained [from] immunologically naïve subjects. In other words, people who had never seen this virus before.

Very large doses of hemoglutinin antigen, the key antigen, the key substance which gives you your immunity when you give the vaccine, very large hemoglutinin doses of a whole virus -- not a split or a subunit manipulated vaccine -- will be required for a successful immunization, and two doses were better than one. This we knew, and we knew it in four to five months when we faced an imminent pandemic threat.

Now, if we translate that into what we are faced with today, and we look at it in the United States, I think we start by calculating what is the arithmetic of pandemic vaccine
supply. How many doses of vaccine will we need? And the arithmetic is unforgiving. It is unforgiving. This is not molecular biology. This is arithmetic.

We have to say, for the United States, that everyone will require two doses if it’s something like an H5 pandemic. The domestic need for pandemic vaccine, therefore, will be 600 million doses. Arithmetic: 300 million X 2.

The domestic vaccine production capacity that we have in the United States in the sole facility is 60 million doses of the trivalent inactivated vaccine we make every year. At the same strength of the hemoglutinin antigen, that translates into 180 million doses of that sort of vaccine.

Now a supply of vaccine formulated in that way would be enough to vaccinate, over a sort of six-month routing production cycle, 90 million Americans. Now, a strategy that leaves millions of Americans unvaccinated will be socially and politically unsustainable.

Now, developing then a vaccine for a pandemic, what do we need to do? The underlying principle of all of the development must follow these rules. We have to use existing facilities to produce the maximum number of doses of a monovalent vaccine that is acceptably immunogenic for a population, and not optimally immunogenic for an individual.

Our public health needs demand this. Now we can use different approaches. We can increase the antigen content above the 15 micrograms (mcg) of hemoglutinin per dose, which has been tried already. But you can see, obviously, if we do that, we then reduce the number of doses that would be available subsequently, and [would], of course, reduce the number of people who could be vaccinated.

Or we can take an antigen-sparing strategy, try to reduce the amount of antigen that we can produce in our one production facility, either by giving an intradermal inoculation or we can add something called an adjuvant.

Now all you need to know about an adjuvant is that it's a substance, in most instances alum, which we use in our childhood vaccines to augment the antibody response and to prime the immune system so that we can actually be guaranteed that we will have an adequate immune response in the vaccine recipients.

Now, these are the approaches that we can take. I would like to contrast what's been going on in other countries with what's going on in the United States, and I think we really need to take a look at the European approach to clinical trials of what are called pandemic-like H5N1 vaccines.

Now the European companies in five European countries -- the UK, France, Germany, the Netherlands, and Italy -- and the governments in those countries are following an antigen-sparing approach, and they've been committed to this for many years. This is a low dose hemoglutanin, alum adjuvant vaccine.
Furthermore and very importantly, European regulators will not require Phase III clinical efficacy trials for these vaccines. For the vaccine companies to develop vaccines in which they can show that their vaccines, which are alum adjuvanted, are safe and that they induce an acceptably immunogenic antibody response, that’s all that will be required to obtain a license for these test vaccines.

And once the pandemic comes and the true pandemic virus is isolated, they simply slot that new virus into their process, which has already been approved by regulatory authorities. They will have a license for the pandemic vaccine literally in 3 to 4 days.

Now the vaccine companies in Europe need public funding for these trials, and European governments have been amazingly slow in providing that public funding. So that the trials that need to be undertaken, specifically the trials that are large enough to give people the assurance and feel comfortable that these are the vaccines they will want to use, have simply not been undertaken.

Now, if we contrast that with the U.S. approach to clinical trials of pandemic vaccine, we can see the happy talk that comes out of NIAID saying that they’re testing H5N1 vaccines, produced by Sanofi, Pasteur, and Chiron. The vaccines that have been tested and will continue to be tested now have been formulated at 7.5, 15, and 45 mcg and 90 mcg of hemoglutinin per dose. But they do not contain an adjuvant.

Now we heard recently, in early August, that two doses of this vaccine were immunogenic only at 90 mcg of hemoglutinin, which [means that] giving two doses to recipients would be enough to vaccinate, with our current production capacity, only 5.0% of all Americans. Are you happy with that kind of development?

A new alum adjuvanted H5N1 vaccine is being formulated, and I have learned this recently, at 45, 15, and 7.5 mcg of hemoglutinin, but this would be enough to vaccinate only 10%, 30%, or 60% of all Americans. Is that kind of vaccine development strategy something that is sustainable for the American population?

But there’s another hooker here and that’s the FDA. The FDA is on record as saying, "Simple changes in the antigen content of a non-adjuvanted vaccine -- current vaccines contain 15 mcg of hemoglutinin per strain or 45 mcg in total for the three strains -- licensing a pandemic vaccine like this will be very simple and will require only some antibody data and safety data in order to get a license."

But an adjuvanted vaccine will be considered a brand new vaccine, and clinical evidence of efficacy during the inter-pandemic years will be required.

Now vaccine companies have no commercial incentive to pay for the development of adjuvanted inter-pandemic vaccines full stop. They have no incentive as businesses to do this, and they won’t do that. Now, if the FDA does not change its position, the U.S. will not be able to develop an adjuvanted pandemic vaccine.
That is the only conclusion that you can adopt if you take a look at what is the FDA's stated position. You have got to be aware of this fact, and therefore, we won't have an adjuvanted vaccine for the American people.

So what is our current situation? The Europeans and the Australians and the Canadians and the Japanese know what to do -- an alum-adjuvanted low-dose vaccine -- but they have been very slow to figure out how to do it, namely to provide the public funds. The European community at large is completely out of the picture because they can't get their act together to do anything at the kind of speed required.

The United States is the odd man out, internationally, among the nine vaccine-producing countries. It knows how to do it. It provides public funds. But it has been very slow to figure out what to do -- namely a low-dose alum-adjuvanted vaccine -- and the FDA has simply been not connected to this whole process.

There is no international institution today or a process that is capable of coordinating, and more importantly managing, global pandemic vaccine development, and even going beyond that, once you develop that global vaccine production and far, far more important than anything else, the equitable distribution globally of a pandemic vaccine.

Now, why is this global perspective important? So if you take a look at this slide right here that goes from 1994 to 2003, you will see the amount of vaccine used in Western Europe, Canada and the United States and then the rest of the world. Take a look at the top of the slide, because that's where the action is occurring today.

The global use of influenza vaccine more than doubled in the decade from 1994 to 2003, but most of that growth occurred in the rapidly developing countries outside of North America and Western Europe. In 2003, those countries outside of Western Europe and North America used 38% of the world’s vaccine last year. It was up over 40% within a few years. I would say half of the influenza vaccine will be used in countries that do not produce it.

Think about the political implications of that when the pandemic arrives. The countries that had been using the vaccines inter-pandemically will expect to receive supplies of pandemic vaccine. What will they do when the vaccine-producing countries nationalize their supplies -- as will happen -- and refuse to allow vaccines to be exported to other countries until their populations are vaccinated?

It means that people in the Bordeaux, France will survive while people in Barcelona, Spain will die. That's the only way you can look at it.

So, what are the underlying realities of this global supply? There's no surge capacity beyond the 300 million doses of annual trivalent vaccine production. The nine vaccine-producing countries will prohibit their exports. The have-not countries will receive little or no vaccine, and this will produce a global diplomatic and security as well as public health crisis. I think this conclusion is unmistakably clear.
So I think if we're considering questions about pandemic vaccination, [there are] three questions for Wall Street, and I think everyone else, if the pandemic is imminent:

1. Will the U.S. be able to obtain and adequate supply of pandemic for its own population? The answer today is clearly not.

2. Will the U.S. be able to provide pandemic vaccines to Mexico -- a word that does not appear in the earlier draft pandemic plan -- other have-not countries? I think not.

3. What will be the social, economic, political, and national security consequences if have-not countries cannot obtain adequate supplies of pandemic vaccine? Unimaginable.

I believe we could do something if we got our international act together for pandemic vaccines . . . if we found a way to formulate and produce a low-dose alum-adjuvanted pandemic vaccine. There are studies with pandemic-like vaccines that show you can go down to 1.875 mcg.; that's an eight-fold reduction from our current antigen content of 15 mcg. You combine 1.875 mcg antigen together with an alum-adjuvant, and you could produce in six months perhaps 7.2 billion doses, enough to vaccinate 3.6 billion people, more than half the world's population and certainly probably more vaccine than could be accommodated by the healthcare systems throughout the world.

Is that pie in the sky? Of course is it. Is it an achievable target if we were socially and politically and economically organized to do just that? I believe, absolutely, yes it is.

Now, let me just spend one slide on one aspect of a response with a weapon to fight the war that has not been considered, but which I think if nothing else, represents another direction in which our thoughts ought to be going. And that is, could a currently available drug be useful for treatment and prophylaxis of pandemic influenza?

To summarize a large body of information very succinctly, I hope, let me just say that influenza viruses induce inflammatory changes in the human host and statins. The cholesterol-lowering drug that so many high living financial people have to take if they want to survive long enough to see what the markets are doing next Monday, statins, act as antiinflammatory agents.

Now in a recent study of patients with pneumonia, patients taking statins had a 64% reduction in mortality from pneumonia. I have been advocating for over a year that what we really ought to look for is an epidemiological signal in populations that people taking statins have a reduction in the influenza-related morbidity and mortality that we experienced during inter-pandemic years, namely hospitalization and death from influenza-related conditions. And I persuaded two groups of epidemiologists to actually look in to their large administrative databases for such a signal.
All the results from these two studies suggest clearly and consistently that statins are protective against influenza-related diseases. [We apologize; the last few sentences were lost to technical difficulties]

. . . The Americans can always be counted to do the right thing, after they had exhausted all other possibilities. Thank you.

Gene Matthews, JD

The Economic Impact of SARS in Toronto

Let me talk just for a few minutes about how this public health law issue applies to where you are and where you're going. There is a renaissance taking place now in the field of public health law, and it appears to be [happening] just in time.

The reason behind this [is that] public health law was a very quiet subspecialty in the law for the last 50 years of the 20th Century. And beginning in the 1990s, we became aware, because of the bioterrorist and an emerging infection threat, of the need to start a public health law initiative. That was moved forward rather dramatically by the anthrax attacks following September 11, 2001, and then the international components got in gear after the SARS epidemic of 2003.

Just as an example of the renaissance, there are all sorts of practitioner-related courses out there that are particularly directed toward, [for instance], forensic epidemiology, a new course for law enforcement, public health emergency law for emergency management, public health law 101 for practitioners. Courses are being developed for the judiciary, who would have quite a role in a quarantine situation. So there's a lot going on.

I think it's important to think about that and clearly. Peter will talk more about the communication aspects of it. But I use the Guns of August analogy of Barbara Tuchman, Guns of August and March of Folly, where she talks about how great tragedies occur when technology leaps ahead of strategy and doctrine. And we are at one of those moments--just like in August of 1914, except it is our communications technology, our transportation technology that has simply leapt ahead, certainly in my world of public health strategy and doctrine. And we need to really adapt to that.

The two thought leaders that I look to on this are David Fidler, who is a law professor at Indiana University and his book, SARS, Governance and Globalization of Disease. And Thomas Friedman, whose most recent book, The World is Flat, I think, is compelling reading for anybody in this room.
Fidler talks about how, after SARS, because of the communications technology, the Central Beijing government could not control the flow of information that came out through cell phones and web chat rooms and all of that. And there were two important vertical governance entities that reacted. One was the WHO -- Gro Brundtland and David Heyman stepped up. The other one was CNN, the Cable News Network, the 30-minute news cycle. We're going to talk about it.

And so we're getting into an area of vertical governance as opposed to horizontal government, which has been in place internationally since the Treaty of Westphalia in the 1600s. Friedman talks about, in *The World is Flat*, how we're all so interconnected and clearly, in a pandemic flu situation that lays directly on us.

This is the saddest slide in my accounts, as far as I'm concerned, because I've been using this slide for two years now. Why should I care? In an outbreak situation, the private sector cannot afford for the government to fail. Think of New Orleans. Governments are facing multilevel budget deficits at the federal, state, and local levels. So, as Winston Churchill or David Fedson would say, would conclude, we're going to need all the help from the private sector leadership and experience that we can to get through these situations.

It's important for the business community, I think, to reflect on the rediscovery of public health. Forty years ago, your professional parents and grandparents came to the conclusion that they were in the business of healthcare provision as well, to employees. A whole set of cottage industries developed, many of which many of you are institutionalized in this room, of providing, having to deal with the healthcare needs of employees.

So, now you are facing the fact that you are also in the business of public health. Your supply chains are impacted by international public health events, the interruptions of global markets, and employee travel that we've already talked about, and the new business opportunities and risks. The risks are clear. The opportunities -- look at Wal-Mart and Home Depot over the last two weeks -- in the corporate benefit that they incurred by being independent, being resilient, and being prepared.

So it is a very interesting time. But you are clearly in the business of public health.

Because of time limits, I'm not going to go deeply into this "I" chart, but any lawyer can fly over this at 40,000 feet and immediately extract the legal and policy issues embedded in an economic recovery from a public health event like avian flu.

You've got to deal with sick leave policies, wage replacements, grace periods for people paying bills -- again, we're applying this right now in New Orleans -- viability of insurance coverage, temporary support of populations, liability protection, both individuals and entities. If you want my hospital to be on the list of collaborating institutions in an emergency, what is my liability exposure in volunteering to do that? The laws have got to address this. Compensation for personal injury and for the
property that's taken or redirected in these emergencies, the recovery strategies at the national, international, and community levels, and how we're going to rebuild New Orleans or Houston. Regulatory waivers are a hot issue right now, leading into the environmental issues of remediation and cleanup, exposure assessments, monitoring, healthcare tracking. All of that sort of stuff is critically important.

And then, on the international level, the revisions of the international health regulations, which are currently underway. I might drop a footnote that the ABA and the Public Health Law Association will sponsor, I believe on November 17th, a teleconference on what you in business need to know about WHO's new international health regulations, and I can get you more information on that if you're interested. So, things are moving along quite smartly.

Well, a tale of two cities I'd like to talk about. How am I on time? Are you tracking me? Okay. Oh, no, it's okay. We're going to make it, don't worry.

I have a presentation, which I've been using, some of you may have heard, regarding what we learned at Toronto in the Sloan workshop that we did. But I think we're sort of left this morning with why did Toronto go the direction of Toronto and why did New Orleans go the direction of New Orleans, on the scale of divisiveness and panic versus social cohesion?

Let me say a moment about Toronto, because I found it fascinating. I was watching this and interacting with this in my old job as Chief Council at CDC. Toronto quarantined 30,000 people, voluntary quarantine. Now, if you ask Barbara Yaffe what does she mean by a voluntary quarantine, she said, "It's a voluntary quarantine so long as you voluntarily went along with it."

Okay, intriguing, but it's important that only 27 people in Toronto actually needed to be served with a formal quarantine order and [there was] only one appeal, which was withdrawn after he was told what his exposure event was. So on the scale of divisiveness and panic versus cohesion, Toronto coalesced. They experienced a temporary shift of cohesion.

From [the perspective of] a lawyer, that's very relevant, because how many law enforcement people are you going to have out there enforcing your quarantine? You've got to have voluntary cooperation for this thing to work. The compliance with the directives was substantial. It's an example of how a culture temporarily changes in one of these emergency situations.

From a business point of view the story is that on the day that the large medical conventions -- American Psychiatric Association canceled its conference for Toronto, and it was in April, they said, We ain't coming in June in 2003 -- the center of leadership shifted. SARS was no longer a health problem for government leaders to solve. It was an economic problem for business leaders to solve. They got it, and they went about it.
They created a roadmap of recovery while the epidemic was raging of beginning to think, now, once the all-clear sounded, we’re going to need a grassroots engagement to get people in Toronto feeling good about themselves again. Phase two, we’re going to have to have a rally and a festival and a big bang event.

They got Mick [Jagger] and Keith [Richards and] the Rolling Stones to come, okay, and planned events around that and then gradually shifted on over into the traditional marketplace outreach.

The importance is they came together, and they started thinking while the epidemic was going on: What are we going to do on the first green day that occurs after the all-clear is sounded? And they put together marketing tools and branding elements and so forth.

I’ll give you one example . . . Peter Wilson’s fascinating story from Air Canada. All of them had put together a logo, "Canada Loves Toronto," you know, the heart, the maple leaf, the Toronto Needle, good stuff. They thought this out and focus-grouped it upstream. But it’s real interesting. This is from Air Canada’s website at the time, and the point of this slide is they had the usual promotions -- flight deals, hotels, car rentals, entertainment discounts, go dollar night at the Blue Jays game, etc. But over here, there are two important things: Bus deals and rail deals. This is Air Canada. Who is the mortal enemy of the airline industry? Steel wheels and rubber tires, okay? But during the emergency, the VIA Rail person said to Peter Wilson, "Are you saying to me you’re going to let me put a passenger train discount hot link on your Air Canada website?" And he said, "Yes."

Okay? The world changed up on him. It’s an important idea to stay in touch with. So the lessons from Toronto are understandable and transferable. The biggest lesson is that the balance of governance is significantly, if only temporarily, altered during an emergency, and business and public health need to be building bridges with each other.

In light of time, I’m not going to go into further details. But if you’d like the report there's a 12-page report that we did for Sloan, which you can pull off the CDC Foundation website at www.cdcfoundation.org. Okay, we’re there. So take a look at it if you’re interested.

So let’s talk for a minute, then, going back to why did Toronto go its direction and New Orleans go its direction, why the city’s different. Remember Maslow’s Pyramid and the hierarchy of needs beginning with physiological needs -- food, water, shelter, safety needs. And then it moves on up -- belonging, esteem, understanding, aesthetics, self-actualization, and then I transcend into the universe.

Well, there’s something to focus on regarding the bottom of the pyramid. When we move away from having shelter and safety and food and water, we behave differently, and that was identified in New Orleans, and it didn't occur the same way in Toronto. I leave the question at the bottom for Peter. How does communication fit in?
I believe that as we have evolved in this electronic era of the 21st Century, when we're cut off from communication that's almost like being cut off from food and water and safety. We are different in that regard, when our cell phones don't work and we can't go on the web, and our access to communications is cut away. We can't see what's going by on the crawl on CNN. We are different because of this, I am convinced.

Okay, just quick comparisons of Toronto and New Orleans that immediately come to mind. The New Orleans communication system was knocked down. Not only did it impact the mid-level managers not being able to communicate, but I think it impacted the population--not being able to know what was going on increased the panic and divisiveness. The experience of shortages of food, water, shelter, transportation, etc., was clearly different in New Orleans.

Toronto, don't forget, had not only a public health system, they had a unified healthcare system. So when we try to do something like this in this country, with our privatized multi-point healthcare system, it could be different. Both countries had serious problems with leadership linkages, when the communication went down between city, provincial, state, and national. Those are comparative.

The hurricane displaced all of New Orleans but the persons who didn't have resources were the ones that couldn't evacuate. In Toronto, SARS initially impacted a higher socioeconomic layer -- international travelers and healthcare workers -- maybe the communication was changed because of that. I'm not sure. But comparable in both is that the business communities reacted quickly.

You have the parable of Air Canada. You know the lesson of Wal-Mart and Home Depot. In normal days, government, individuals, and business like to keep their distance from each other. When SARS comes to town, you find them pull in on your Ven diagram so that individuals listen to their government about quarantine. Employees are connected to their businesses about what's going on, where is everybody, should I come in to work today, and businesses take over a quasi-governmental role in plotting out the recovery.

The PowerPoints, by the way, will be made available through your conference support people, so this is all public domain, and you don't need to scribble furiously.

Well, if you step back on it, on a normal day, whether we are businesses, whether we're people, whether we're government, we're sort of spread out. When the emergency occurs, there's a collapsing down. People draw closer together. Now, after New Orleans, I might add a third point out there. If it gets so bad, we may explode. We go far away again. It becomes anarchy and chaos. So it's an interesting situation.

The cycle of change in one of these situations is very important to you, okay. Normally we're on a green zone day. You know, we're just watching TV and whatever is happening. The emergency occurs, your culture temporarily changes. You've got to go do it. Get it done, okay. Then, when it's over, you have this immediate aftermath of changing your laws and policy.
Okay, you can pass the Homeland Security Bill and airline recovery, okay. All these things occur. The president stands in Jackson Square and announces a major recovery after the hurricane. Then the blame game cranks up, okay, who is going to pay for all this? Toronto went through this in great, exquisite detail, excruciating detail.

But who paid? And then, we're an ADD culture, you know, selective amnesia sets in, and we go back to the green zone again. You got to remember, when you're planning your business strategy, where are you on that cycle? You can't do legislative change if this is a green day. Nobody cares, okay, and if you are in the red zone up here, if you are Wal-Mart and you're sending your trucks with ice and water into New Orleans and somebody at FEMA is setting down here saying, well, you can't go in unless you've got a tracking number, a FEMA tracking number, you can't go into the city, somebody's not playing on the wrong face of the script here.

So, it is important, the flat world message to all this is coming out of Thomas Friedman. He talks about wholesale reform and retail reform. It's in the interest of governments to provide the best legal and institutional framework with which to innovate, start companies, and become attractive partners for global collaboration.

The final message for you, out of this, is what can business and legal communities do?

One, we've touched on this earlier, verify that your governments are ready and prepared. Are your legal and institutional frameworks there? If you have a footprint in China, you need to be testing.

Do they really have epidemiology, laboratory, intervention, communications, command and control, okay? That's part of your due diligence to find out. Wherever you are, are they really ready?

Second, you need to build your own external preparedness networks, geographically, wherever you are, be it Chicago or Guangdong, and industry-wide, within your own supply chain structures. And then finally, prepare for the moments of change. Your leadership arrangements are going to shift. The laws and policies are going to change. You've got to prepare for that upstream and as Bob Shapiro pointed out . . .

If I were saying what we need to do, the great challenge here is to build some new bridges. I really want to thank the sponsors of this, for Roseann and Deutsche Bank, for Paul H. Sloan and for Tara at UPMC.

The law can assist in building some of these new bridges, but I'm very gratified to be here and see that you're well on your way. Thank you very much.

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**Peter Sandman**
Risk Communication Before and During Epidemics

Let me tell you the basics of risk communication, and then I want to apply them, a little bit, to bird flu. The fundamental principle of risk communication can be summarized in a number, [which] is the correlation between how much harm a risk does and how upset people get about it. If you look at a long list of risks, and you rank them in order of how upset people get [about them], then you rank them again in order of how much harm they do, then you correlate the two, you get a glorious 0.2.

Those of you who remember your statistics know you can square a correlation coefficient to get the percentage of variance accounted for: If you square 0.2, you get 0.04, or 4% of the variance.

That is, the risks that kill people and the risks that upset people are completely different. If you know that a risk kills people, you have no idea whether it upsets them or not. If you know it upsets them, you have no idea whether it kills them or not.

If you replace mortality with morbidity in the calculation -- you're not killing people, you're just making them sick -- our correlation remains 0.2. If you use ecosystem damage, the correlation is once again 0.2, and if, as this group likes to do, you correlate economic damage with public concern, the correlation is 0.2.

It doesn't seem to matter what your measure of harm is. Whatever your measure of harm, across a wide range of risks, the correlation between how much harm [a risk is] going to do and how upset people are going to get is this absurdly low 0.2 correlation.

In the mid-80's, I took these two concepts -- how dangerous [a risk is] and how upset people get [about it] -- and I called the first one "hazard" and the second one "outrage." The word "outrage" applies more readily to the environmental controversies that I was working on at the time than it does to the kind of public health issues we're focused on today, but the terminology stuck, so what we've got is this glorious 0.2 correlation between hazard and outrage.

It's worth noticing, by the way, that the correlation between hazard and perceived hazard is also very low, but the correlation between outrage and perceived hazard is very high. Now, as soon as you have a high correlation, of course, what you want to know is: What's the direction of the causality. That is the question we're asking when we look at the high correlation between whether people get upset and whether they think [a risk is] dangerous. Are they upset because they think it's dangerous, or do they think it's dangerous because they're upset?

That's an important question, because if you want to manage the system, you have to know which one is the cause and which one is the effect. You don't want to be in the awkward position of trying to manage a cause by manipulating the effect. That's not likely to work. So you need to know the direction of the causality. This is much studied, and as usual in social science, it turns out to be a cycle, but one of the arrows is very
robust and the other arrow is very weak. The strong arrow is from outrage to hazard perception. That is, for the most part, it is not true that people are upset because they think [a risk is] dangerous; it's much more true that people think [a risk is] dangerous because they're upset.

The same is true in the negative: It's not true that people are calm because they think [a risk is] safe; it's much more true that people think [a risk is] safe because they're calm. It follows, [therefore], that if you want people to think [a risk is] dangerous, then you'd better get them upset, and if you want them not to think [a risk is] dangerous--if you want them to think it's safe--then you need to calm them down.

The outrage is the engine in this relationship, and the hazard perception is very much a result of what's happening to the outrage.

Given this reality, imagine a 2 x 2 table of hazard against outrage. In one corner, we have the high hazard/low outrage risk, where people are very endangered but not very upset. The task [in this setting] is precaution advocacy: You try to persuade them to take the risk more seriously so they'll take precautions. In the opposite corner, you have high outrage/low hazard, [where people are] very upset but not very endangered. The risk communication task [in this setting] is outrage management--to try to reduce the outrage so they'll stop wasting their time on this trivial hazard. Those are the two mismatches.

In the third corner, high hazard/high outrage, you have crisis communication. People are upset, and they're right to be upset because they're endangered. Crisis communication is entirely unlike the other two [settings]. In precaution advocacy, you want the outrage [to be greater]. In outrage management, you want the outrage lower. In crisis communication, the outrage is just fine.

But there's still a lot of communication to be done. If you were communicating in the Superdome a few weeks ago, or if you were communicating in Lower Manhattan a few years ago, there was a great deal of communication to be done, but it wasn't telling people to calm down, and it wasn't telling people to get excited. It was helping people bear their outrage and take wise rather than unwise precautions in the face of their outrage.

And finally, just to complete this 2 x 2 matrix, in the low hazard/low outrage corner, I have not found a way to earn a living. I do the other 3 for a living, and I think it's worth noticing that they are 3 different skill sets. You can have all of them, just as you can be a good carpenter and a good electrician at the same time, but you'd better bring the right tool kit to the task. If you think it's a carpentry task when it's really an electrical task, you're going to screw it up.

Figuring out where you are on this map of hazard against outrage is the beginning of risk communication.
So where is bird flu on this map? Where does avian influenza live? And of course all that means is, how serious do you think the risk is and how concerned do you think your public is? Those are the two questions.

Clearly, when it happens, when we are in the middle of a pandemic, it's going to be crisis communication. Everybody sees why that's true: People are going to be endangered, and they are going to feel endangered, and we are going to be talking to them about what they can do. What can they do to protect themselves? What can they do with their feelings? How can they get through this incredibly tough time?

One of the more obvious risk communication issues here is that we all need -- you folks need, the government needs, everybody needs -- a standby pandemic crisis communication plan. I will tell you that the crisis communication plans for avian flu I have seen so far are universally horrible. I've only seen a few, and they're all awful, and that includes the one that HHS produced a year or so ago.

I was delighted to hear this morning that HHS has a revised pandemic management plan. Hopefully it will include a revised pandemic communication plan. We'll see. But I have hope, a slight hope, that maybe they have good standby pandemic crisis communication plans, and they're secret. I would rather have a government that failed in transparency than a government that was flat-out completely unprepared to talk to people in a pandemic influenza crisis.

I think it's clear to everybody in this room that one of the things that went very badly awry in New Orleans a few weeks ago was precisely that we were unprepared to talk to people in a crisis. So that's a task, [and] it's an important task. I think we're not in good shape on that dimension at all.

But communication in the middle of a pandemic isn't what I want to talk about now.

The question I want to focus on is, where are we now with respect to pandemic flu? Where are we on this map? And of course [the answer] depends on whether you think the risk is serious [or not]. If you think the risk is serious, then we're in the precaution advocacy corner, where we are trying to persuade people to take it seriously.

But what if you think the risk isn't serious? What if you're worried that people are coming to take it too seriously: "My God, PBS and ABC talked about avian flu in the same week!" That's a trend!" If you're worried about that, you might say, as Marc Siegel, the much-feted author of False Alarm has said, [that] the problem is that people are excessively worried about avian flu, and we need to do some outrage management and get them focusing on something serious.

It's always amusing to see that happen, because as many of you know, flu is usually the example given by people who don't want the public to be worried about something, as the thing they should have been worried about instead.
So, when people are worried about SARS, there's always going to be some commentator to say, "My God! Look how many people flu killed, and we're not worried about flu, so why should we worry about SARS?" Same thing with West Nile Virus. Now, at last, people are worried about flu, and it turns out the same commentators don't want them worried about that either.

There are people out there who genuinely believe that avian flu isn't a serious problem, and for them, [the task is] outrage management. Presumably, most of the people in this room would agree that the task is precaution advocacy.

However, and this is important, there's another group of people who think that precaution advocacy isn't the task. [There are] people who do think avian flu is serious but don't think the public should take it seriously. That's a position held by a number of people in the government and a number of people in a number of governments who argue that, yes, we the government are going to prepare, but for God's sake don't tell the public, because . . . they might get excessively frightened, and that might be bad for their psychology and bad for the economy. God forbid people should be afraid just because they're going to be dead. As the economists earlier on pointed out, it doesn't hurt the economy all that much for a lot of people to die, but if a lot of people get frightened, that's bad for business! So, there's a sense that we dare not frighten people. The other base in this argument says, "It's serious but let's not say so," [because] there's nothing for people to do anyhow.

So those are the two arguments, it seems to me, that are given for not talking to the public now about avian flu -- the arguments for having lots of plans about where we're going to put all the dead bodies, for example, but [deciding not to tell the people who are going to be the dead bodies. We don't want to scare them, and there's nothing for them to do anyhow. What I want to do with the rest of my time is rebut those two arguments. [Or] I'll rebut one of those two arguments, and I'll assign the other one for homework.

So the question is, why do I think it's all right to scare people about avian flu? And let me describe for you, very quickly, some of the errors that underlie the view that we dare not frighten people -- errors that underlie official fear of fear.

First is the false expectation that fear will inevitably escalate into panic.

I wish I had ample time to demonstrate to you that panic is rare. Even in New Orleans, where the circumstances were as conducive to panic as any I've seen in a long time, there isn't that much evidence of panic. There's lots of evidence of panicky feelings. There's lots of evidence of misery. There's lots of evidence of lots of things going wrong. But if you ask yourself which was a bigger problem in New Orleans, people so frightened they couldn't think straight, or people insufficiently frightened who didn't get out of town, I think you can make a very strong argument that the latter was a bigger problem than the former.
Now, you do always have, in a crisis, lots of people feeling panicky, but people behaving in panicky ways is relatively rare. New Yorkers know this better than anybody because we have the lesson of 9/11. In the stairwells of the World Trade Center, people were more courteous than New Yorkers usually are, and more organized than New Yorkers usually are, and there were very few signs of panic among those who evacuated the Twin Towers. . . . When you interview the survivors, the vast majority tell you they panicked, but they didn't. They're wrong. They felt like panicking, and they did just fine.

Panic, in short, is rare. But official "panic panic" is common. That is, officials often imagine that the public is panicking or about to panic. And in order to allay panic, officials sometimes do exactly the wrong thing from a crisis communication perspective: They withhold information, they over-reassure, they express contempt for public fears, etc.

Panic is quite rare. What's quite common is denial; denial is why panic is rare. We are organized such that, when we're about to panic, we trip a circuit breaker instead and go into denial. There are good reasons for being worried about bird flu denial. There's very little reason, in my judgment, for being worried about bird flu panic -- with the possible exception of in the middle of the crisis, where that's going to be an issue. But it's not an issue now. So, I think that's the first misperception.

I obviously don't have as much time for the others, but let me list some of them for you quickly:

- The mistaken belief that people cannot tolerate their fear. There are some people who can't; the vast majority of people can.
- The underestimation of the frequency with which fearful people rise to resilient, pro-social, and even heroic behavior. We had ample evidence of that in 9/11, and I won't belabor the point.
- The failure to recognize the positive value of fear in encouraging preparedness, vigilance, tolerance of inconvenience and expense, and so forth.

The relationship between fear and precaution-taking is a U-curve, an inverted U-curve, obviously. If people are insufficiently afraid, they don't take precautions. If people are excessively afraid, they don't take precautions. They don't panic either. They go into denial and sit around saying, "It'll happen to somebody else." But I think that between apathy and excessive fear leading to denial is a period in which [people are] getting more concerned and are, therefore, doing more about [the risk]. So it's completely inconsistent to say we want the public to prepare, [but] we don't want the public to be frightened. The main incentive for people to prepare is becoming frightened.

There's also the failure to understand that the initial burst of fear on first encountering a new piece of alarming information is temporary. Psychiatrists call this an "adjustment reaction." The normal reaction when you first discover that something bad is going to happen is to overreact temporarily. You become more vigilant. You stop doing things that look like they may be dangerous. If it's 9/11, you stop flying in airplanes. If it's
SARS, you stop going to Chinese restaurants. Then there's a hepatitis outbreak in a Mexican restaurant, and you say, "All right, I'll go back to Chinese restaurants." [In the] short-term, [though] you got through an adjustment reaction.

The adjustment reaction is a rehearsal. It's a logistical rehearsal, and it's an emotional rehearsal, and the evidence is that people who have an adjustment reaction have two big advantages over people who don't. The first advantage is they are likelier to do the right thing in the crisis because they have rehearsed, and the second [advantage] is that they are more likely to notice if the crisis doesn't happen because they have rehearsed. They gear up better, and they stand down better. Ideally we want as many people as possible to have this adjustment reaction beforehand, so they'll be used to the idea if and when the crisis comes, and they'll be ready to take appropriate action.

A final error that underlies official fear of fear is the notion that when you make people more afraid of bird flu, you are making them more fearful people. That is flat-out not true. You are as fearful as you are. You get slowly more fearful as you get older. Remember your teenage years if you doubt this. But your fearfulness changes over the decades, not over the days and weeks and months. For the most part, we are who we are. In a crisis we become very temporarily more fearful -- that's the adjustment reaction -- but we quickly settle into the New Normal.

But even though our fearfulness can't be increased for long, it can be reallocated. It is fungible, to use a word you folks like to use. Greenpeace wants us afraid of genetically modified food, and the Christian Right wants us afraid of gay marriage, and I want us afraid of H5N1. You should not think of any of those three as trying to make people more afraid. What we are doing is competing with each other for our slice of the fearfulness pie.

So when you try to frighten people about bird flu, you're not changing who they are. You're trying to get more of their fearfulness for your issue. As evidence of that, after 9/11, telephone calls to pollution hotlines plummeted. People who were worried about terrorism didn't have the emotional energy left to worry about pollution. Little by little, as we settled into the New Normal, pollution hotline calls rose again, but not back to their pre-9/11 levels, because terrorism now has a smaller chunk of our concern than in the months immediately after 9/11, but a larger chunk of our concern than before 9/11.

That's what we're trying to get for bird flu. Let's do it now, because we're going to need it later. Thank you.

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Kenny Seow

Financial Sector Lessons Learned from SARS
It's certainly a privilege to be among so many distinguished experts on this subject.

What I'd like to share with you today is our experience with the 2003 SARS outbreak in Asia, as well as to share with you some of the lessons learned from this and see how we can apply the lessons learned to the pandemic situation that we are facing today.

When I first started looking into planning for avian flu about 10 months ago in the industry, people thought I was crazy. I mean, they said, "What? Why are you concerned with avian flu?" Certainly we have forgotten the lessons that we learned from 2003, and I think people have short memories of the issues that we faced.

I think the summit we have today is timely. In fact last week, we had a similar event in Singapore that was attended by over 350 people, where we had the people from the Minister of Health in Singapore present to the industry on the risks of avian flu, as well as a panel discussion amongst banks to share ideas as to what we could be do to prepare for a pandemic.

My presentation is going to focus on Asia, specifically on the financial sector. In terms of background for SARS, I think that requires no introductions.

The problem started in Guangdong back in November in 2002, and within a short period of 8 or 9 months it had spread to 29 countries. There were more than 8,000 people infected, with more than 900 deaths. And the economic loss to Asia was estimated to be around $30 billion.

On the impact to the financial industry -- I don't think there was any direct financial impact as such. However, the banking sector did feel the fallout from lost opportunities, to slow economic growth, and so on.

One of the services that was greatly impacted were those that required physical contacts with clients and customers, for example, people in the private banking, private wealth management segment as well as people who had to present to customers to make sales opportunities, product launches and so on. This was primarily due to travel restrictions that were put in place in some locations, as well as fear of clients and suppliers from meeting up with people from infected locations.

Deutsche Bank, for example, being a global bank, our relationship managers are on the road all the time and when countries put up travel restrictions or quarantine measures, that impacted the way that business was conducted.

There were also a lot of other operational difficulties faced by organizations. For example, in some locations or some organizations, they would implement a quarantine period for anyone coming from Asia. You had to quarantine yourself for between 5 to 15 days before you were allowed to come into the office. And that created a lot of disruption to the work.
Some employees in a bank in Hong Kong came down with SARS, and a number of their co-workers had to be quarantined was well. As a precautionary measure, the bank also sent the entire team of their Bond traders home to be quarantined for 10 days before they were allowed back to work again. From an operational point of view, the reduced workforce would have certainly adversely affected some of the work in the office.

Higher rates of absenteeism -- before SARS, it used to be the case where if you were not feeling well or you had the sniffles you came to work anyway. But during the SARS period, anyone with the sniffles would get "the look" or "the stare" from their colleagues because they wanted to know what you were you doing in the office! "Why don't you go back home?" And that resulted in higher rates of people reporting in sick and productivity was impacted.

Staff morale -- some of the organizations went into "split operations" mode, whereby they would divide the team into two separate locations, with the assumption that should one of your offices by quarantined, then at least you have a backup team working off site. What we found from our experience in Deutsche Bank was that such arrangements affected staff morale. When teams were split up, they were given instructions not to socialize with other teams, such as not to have lunch together.

The risk to bank employees -- the risk of SARS to staff was not just at the place of work but from the time that they left their homes to get on the public transportation systems. By the time they got to the office they would have been exposed as well.

And there was also the threat of forced closures of business premises. In the early days of SARS, around about the February-March timeframe, depending on which country you were in, you were getting conflicting information from the authorities as to what they would or would not do should an employee came down with SARS in the office.

We had cases where the authorities would say, "Yes, we would quarantine the entire building."

In other cases they said, "No, we would not quarantine the building but we would quarantine the office in which the infected employee worked."

There was lots of conflicting information, and certainly there was a threat of office closure. Banks were very concerned with that. Hence some of them went to into split operations.

The challenges that the banks and most organizations faced were that when you look at the typical business continuity plans, in particular after September 11, we were basically planning on the basis of building and infrastructure failures. We were basically planning on the basis of terrorist attacks, where it would take out your building’s infrastructure. It would take out public transportation and so on. And that was really the basis of the planning.
And what we found with SARS was that these plans did not work at all. Very few organizations actually took into consideration infectious diseases that would directly impact their employees as well as the community in which they lived. Therefore, very quickly, certainly with the banking industry, we had to scramble and we had to deal with the situation as it occurred.

The second challenge was dealing with the unknowns. For example, how would the health authorities react in different countries? There were different policies and different legal requirements which were implemented by different countries.

How would the employees react? For example, we’ve heard of cases where expatriate staff would evacuate themselves and their families, and this became a problem. Some of the banks, particularly the global banks, had a lot of employees from overseas working in Asia. Some essentially packed up and left. So, again, that created business continuity issues.

How would landlords react? Some of the banks were in multi-tenanted buildings. Some landlords were more cooperative than others in terms of providing information as to whether anyone in the building had been infected or not and so on.

Travel restrictions -- in some cases, some organizations in some countries implemented controls which were beyond those that had been recommended by WHO. Because of the inconsistency, there were a lot of uncertainties as to what needed to be done.

And of course the disease itself. In the early days, there were a lot of unknowns as to how virulent was the disease, whether that was a risk to the general public or was this confined within healthcare providers.

And the next point is communications. In the early days of SARS, I think there was a lack of transparency in certain locations. It was very difficult to get the true picture as to what needed to be done, what was actually happening. Eventually, at least in the banking sector in some locations, we began to share information amongst the banks, and that provided some relief.

And then there were fears and concerns of employees and customers. I think the psychological aspect probably created more business interruption and business impact than SARS itself. For example, staff would refuse to come to work for whatever reason. As an organization, we needed to provide information to them and essentially ensure that their fears were addressed. Or rather, their unfounded fears were addressed.

And the last point was preventing the spread of rumors. We had a case in Singapore where one bank threatened to sue another bank because a bank employee sent an SMS to say that there was a SARS outbreak in that particular bank. And that circulated through the SMS system, circulated through the company e-mail, and that created a big public relations problem for the bank that was impacted. From an organization’s perspective, there was a need to control the spread of rumors.
And lastly, the challenge in terms of responding to SARS -- for example, the limitations imposed by split operations. What we found was that there were a lot of issues with workflow. Teams that used to sit together but now had been split. Communications became a problem. Documentation handling became a problem. Workflow became a problem and also, in some instances, cross border business continuity became a problem as well.

Pre-SARS days, some of the banks would have cross border plans, where, say something happens in Hong Kong, I would fly a whole bunch of traders to Singapore, and I’d continue trading from Singapore. And what happened in SARS was that did not work at all, obviously, because both Singapore and Hong Kong were affected at the same time.

And there was also a shortage of health and safety consumables, things like masks, gloves, disinfectant and so on. It is questionable if wearing a mask was effective, but for the psychological comfort of the employees, I suppose, a lot of organizations went ahead and provided masks to employees anyway. And that itself created a problem on the supply side.

So how can we apply some of the lessons learned from SARS to pandemic planning, the issues that we face today? I feel one of the most important things is to build a knowledge base, to find out what's happening, to consult the experts to understand exactly what the disease is all about, how it spreads, as well as the issues from a legal and regulatory perspective.

In particular for the multi-national banks, we need to understand what are the implications, for example, issues of quarantine, issues with building closures, and so on. What are the legal implications? How would the local regulators react when something happens? And that goes beyond your regular channels.

Apart from getting information from people like WHO and CDC, is that we have to engage the regulators. We have to engage the governments in dialogs so that we are able to build a knowledge base for the basis of our planning.

The second item is that we need to define the trigger points. There are a lot of things that need to be done, both in terms of preventive measures, in terms of protecting the staff, in terms of protecting the businesses. But we need to be clear as to when do we need to activate, when do we need to execute these plans.

We need to be clear about that and one of the things that we have done in Deutsche Bank is to align our trigger points with those that have been published by WHO. And we essentially say that the moment that there is human-to-human infection we would execute a set of measures that have been predetermined.

The next point which is very important for global organizations is to plan globally and execute locally.
A bit of a cliché here, but I think it is extremely important for us to assimilate whatever plans we have with the local governments' health and legal guidelines.

There is no point in us making a plan on a global basis without understanding in every single location that we operate, in particular in Asia, what the limitations are, what the assumptions are that we need to make in each of those locations. You need to be aware of some of these legal regulations, what can and can't be done in each of these locations.

The fourth point is to maintain open communication. One of the most important things is that we need to educate senior management on the risks, on the threats, and what needs to be done, because without the sponsorship of senior management, I think nothing is going to move.

So, we need to educate them. On top of that, the plans and policies, as well as the rationale behind them need to be communicated to employees as well. For example, with quarantine measures, is it 5 days, 10 days, or 15 days? These have to be communicated, and the rationale behind that has to be communicated.

During SARS, we had some organizations where the official company policy was a 10-day quarantine, but in some other locations they said, "Well, no, it's not 10-days, I want you locked away for 15 days," for example. So there was a huge inconsistency in the application of this policy, within the same organization across different locations around the world. So, I think it's important that these things are communicated to the staff.

Last but not least, as we learned from SARS and as we learned from all the BCP's and all the contingency plans that we have developed, is that we need to maintain flexibility. We've learned that for SARS the regular BCP's did not work. We had to adapt them very quickly and I think, certainly, for pandemics, the planning needs to be done. We need to make the assumptions. We need to really understand what the assumptions are and what the limitations are.

We need to plan for it. However, at the same time, we need to maintain flexibility in the way that we execute the plans. For example, if you are looking to, say, a work from home strategy, I think which one of the speakers had mentioned, we also need to consider the "what ifs?" Could we do cross-border BCP's, do split operations, and so on and so forth? It is really to have that flexibility so that you are able to adapt to the situation as it changes.

So, I think with that, that's the end of my presentation, and I'll be happy to take any questions now. Thank you.