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Update on SARS

Dr. Steve Ostroff
Deputy Director for the National Center for Infectious Disease

***Please note: Data and analysis discussed in these presentations were current when presented. Data collection and analysis are ongoing in many cases, therefore updates may be forthcoming elsewhere on this website, through publications such as [CDC's Morbidity and Mortality Weekly Report](#) or other venues. Presentations themselves will not be updated. Please bear this in mind when citing data from these presentations*

- The numbers of reported SARS cases internationally as of yesterday was 2,781 cases worldwide from 16 different countries. This included 111 deaths.
- We are aware that at least in some of the countries in which we have international teams that are assisting the national and local health authorities, there are indeed additional cases. These will be reported today from several of these locations, particularly Hong Kong, which continues to see significant instances of transmission. Their numbers today are expected to increase by 61 cases, which would put them over 1,000 cases with 11 of these being continued problems related to healthcare workers as well as 11 of these additional cases associated with the apartment complex that many of you have heard so much about, the Amoy* Gardens.
- In the United States there are 167 suspected cases from 31 different states.
- Over the past couple of weeks we have responded to thousands of press calls, over 13,000 calls from the public, and many calls from clinician. We also did a satellite training for clinicians, which reached about 41,000 individuals.
- We have been trying to reach out to the Asian community, particularly the Asian community here in the United States. We are doing this in a variety of different ways, but in particular trying to decrease the potential for there to be stigmatization within the community. We have been working with a variety of Asian language media outlets throughout the country and will be setting up additional translation services on our web page to be able to address these individuals.
- In addition to the Health Alert Cards, which we have been passing out at airports to arrivals on direct or indirect flights from affected areas, we will be developing a video to show on these flights to inform people about SARS issues and to provide information about its signs and symptoms. The video also will explain how to seek healthcare and how notification can take place with local and state health departments and the CDC if a person does become ill shortly after arrival in the United States.
- The vast majority of domestic cases—all but about 12 of the 166 cases reported to date—continue to be in individuals with travel history to one of the SARS-affected areas in Asia. Nine cases involve close contacts of individuals that fulfill the SARS case

definition. Eight of these nine were household contacts and one occurred in a workplace setting. In addition to these cases, there have been three suspected cases in health care workers.

- We are developing guidance for all settings in which SARS may be an issue, including schools, occupational settings, health care, households, the airline industry, adoptive parents, first responders, and others.
- We continue to recommend postponement of nonessential or elective travel to SARS-affected areas of concern, which include all of mainland China, Hong Kong, Hanoi, and Singapore.
- Laboratory work is underway to refine some of the assays that are under development, including PCR-based assays and serologic assays.
- There is little information on immune response to the corona virus and how long it takes for the immune response to develop. We do not know if a negative assay for the virus indicates that an individual has not been infected or that there has not been enough time for an immune response to develop. Therefore we have been using a 21-day convalescent specimen as a cutoff to determine negativity in a specimen. In many individuals suspected of SARS infection that have been identified, 21 days have not yet elapsed, so we are unable to better characterize their illness.
- Preliminary results of antiviral screening by CDC's partner, USMARIID (?), indicate no activity against Ribavirin. Considering that the majority of reported cases of SARS in this country have been fairly mild and given the side effects associated with Ribavirin, we suggest a cautious approach to its use, particularly as our information indicates a relative nonsusceptibility of the corona virus to Ribavirin.
- CDC is working with the FDA and the blood-banking community to develop blood donation deferral policies for individuals returning from SARS-infected areas. Canada is developing similar policies. There has been some PCR positivity in blood specimens from infected individuals early in the course of the illness. However, at this point, we have to be careful in interpreting a positive PCR assay as these assays have not been stringently evaluated.
- There is some evidence of at least very limited transmission of SARS here in the United States, and we need to continue to be very vigilant for the potential for transmission, both within and outside healthcare settings.

Dr. Matt Cunert (sp?), team co-leader for clinician and infection control activities on SARS

- Infection control for SARS is critical, particularly because we have neither diagnostic tests nor an effective treatment for the disease. We are updating our triage document to emphasize that the first line of defense is disease detection, which requires suspecting SARS (in the presence of fever and respiratory symptoms?) and having infection control precautions in place.
- CDC has issued specific guidelines for SARS infection control and exposure management in inpatient and outpatient health care settings, households, and laboratories. Guidelines are being developed for transportation settings including ground and air transport for emergency medical personnel. Guidelines for school settings have been

issued within the past 24 hours, and we will issue ones for workplace settings in the near future.

- We have made three major guidance (guidelines?) changes:
 - Persons with fever or respiratory symptoms or persons who have been exposed to SARS but exhibit no symptoms should limit interaction with others and take infection control precautions. The previous recommendation addressed only persons with fever or respiratory symptoms. This change had been made because we have seen cases in which persons exposed to SARS who had not yet exhibited symptoms transmitted the disease to others.
 - Persons infected with SARS should exercise infection control precautions for ten days following resolution of fever provided that respiratory symptoms are absent or improving. This accommodates those who had respiratory symptoms at baseline. This is a change from previous guidance, which was that persons with SARS should exercise infection control precautions for ten days following resolution of fever and respiratory symptoms.
 - There are new guidelines for persons with SARS who do not have a home who are discharged from a hospital or who do not require hospitalization. Such persons include the truly homeless, persons who have homes but do not have access to them (for instance, those in transit), and persons in whose homes infection control precautions are not feasible or optimal. For any such homeless persons infected with SARS, state or local health departments have the option of designating an appropriate residential care facility.
- In summary, CDC is developing guidance for infection control and exposure management in schools and other community settings. This guidance will be updated continuously as additional information on SARS and how to control it becomes available. Consult our website frequently for updates: www.cdc.gov.

Questions and Answers:

Bill Borwegen SEIU:

Canada has a policy in place which seems to be much stricter, even though cases still continue to spread. Basically, the policy is that if you have been exposed to someone who has SARS you are supposed to stay home for 10 days.

Dr. Steve Ostroff:

Indeed, throughout the world in different locations different measures are being promulgated in an attempt to limit the spread of SARS. And you are correct that in Canada health authorities in Ontario as well as in the city of Toronto have put requirements put in place asking individuals who are direct contacts of patients with probable or suspected SARS to voluntarily remain at a home for a period of ten days and to monitor themselves for any signs or symptoms of illness. And in some instances where individuals have not voluntarily complied with those requests mandatory quarantines have been imposed, at least based on the information that we had yesterday in five instances in the Province of Ontario. Based on the patterns of illness that we have seen here in the United States, we have decided that it is very important to be very prudent in terms of the individuals here, particularly since many of these individuals are not being cared

for in a healthcare setting but are being cared for at home. However, in our recommendations, based on what we have seen up to this point, we tried to strike a balance between what is prudent and appropriate and what does not **accessibly (?) (maybe should be “excessively”?)** restrict the activities of close contacts, such as household contacts. In this country we do not currently recommend that individuals who are contacts of suspected cases differ their activities. However, we are currently working very aggressively with our state and local health departments to enhance the monitoring of these individuals for a period of ten days after their contact with a suspected SARS case. We have not yet defined exactly how that active monitoring would occur, but we are working with our partners at the state and local level to determine that. However, at this point there are no restrictions on well individuals who may be household or other contacts of a patient with suspected SARS, unless and until the contact develops signs and symptoms of illness.

Bill Borwegen SEIU:

My second question regards the N95 respirators. We are still doing some investigations up there, but apparently there are two people at North Shore Hospital in Toronto who were actually wearing N95 respirators, two healthcare workers, and they now have SARS.

Eric Esswein:

I cannot speculate on whether or not that was an inhalation exposure, if the person did in fact, if this is a confirmed case of SARS. But the issue with N95s, the important part, is that wearing a respirator does not say anything about assuring the fit of a respirator.

Bill Borwegen SEIU:

I would just urge you to reemphasize that N95 respirators do need to be fit tested. I believe that that is not occurring to the degree that it needs to occur. So whatever materials you put out on N95s, it is imperative that you mention that these facilities need to be doing proper fit testing.

Dr. Matt Kuenert:

We are very concerned about the reports of healthcare worker transmission in Canada and in other parts of the world. It seems that whenever we hear one of these reports where someone had taken full precautions, had full protective equipment in place, the assumption is that the mask does not work. We need to also be cognizant of the other aspects of personal protective equipment, which include contact precautions as well, because from the hypothesis that the etiologic agent is corona virus, there is the potential for transmission certainly through contact, with the predominant spread being by droplet transmission. I think it is important for healthcare personnel to be aware of that and be aware of potential contamination through contact, emphasizing proper hand hygiene and also proper use of gloves and also disposable respiratory masks as well.

Bill Borwegen:

Is the CDC involved in any investigation in Canada?

Dr. Ostroff:

We have been in virtual continuous contact with our colleagues in Canada. Obviously the situation in Toronto is quite different from what we have experienced here in the United States. They have had rather explosive transmission in several healthcare settings as well as in direct contact outside of the healthcare setting, in the home. And they have felt that it was prudent in order to try to limit ongoing transmission, particularly transmission in the wider community setting, to take some of these steps. We have been in constant communication with them. There is a liaison from Health Canada who is working here at CDC, and we have a liaison from CDC who is working with Health Canada as well. Canada has not asked us to directly provide assistance onsite in the hospitals in Toronto, and we would be unable to do that without a direct request from them.

Bill Borwegen SEIU:

I know up there they are doing obviously very rigorous screening as people walk into hospitals. They are doing questionnaires of people before they even really get into the emergency rooms. And I was wondering if you were thinking of doing that. I think one problem in the current approach is that CDC is not releasing the locations where these cases are occurring. It seems like if you released locations at least of the cities where these cases were occurring that it would increase healthcare worker vigilance and hospital vigilance so that perhaps they could do more aggressive screening as people do walk into these facilities.

Dr. Ostroff:

Thanks for that comment, first of all. And let me just say that we would not be able to do that. That would have to come from the individual states and localities. I would turn it around and say that we have suspected cases in so many different locations around the United States, and we do not know at this point which ones are going to definitely turn out to be SARS and which ones will not. But it is really important for healthcare workers to be on top of this and be aware and take the appropriate precautions everywhere in the country and not just in specific locations or where we might have some evidence that there is a confirmed case.

Bill Borwegen SEIU:

Could the CDC for instance be recommending to hospitals that they begin questioning people as they walk into the emergency room? I do not know if that is part of your protocol already. I have not seen that, and I know that is the protocol in Canada. It seems like that would be a way, especially when you realize that people frequently wait in the emergency room for many hours, that would prevent transmission from occurring in those instances.

Dr. Ostroff:

I think that is a very good point, and our updated triage guidance is going to emphasize facilitation of identification of patients who may have SARS through targeted screening questions, although we are not currently planning to have a specific questionnaire for dissemination. We outlined specific content for such questions that should be posed and also recommended that there be a system put in place so that patients can be triaged as early as possible and have infection control precautions applied after those triage questions are asked. So

I think that is a very good point. I think triage is very, very important, and it is important that it be done as quickly and efficiently as possible.

Dr. Bob Hendler Tenet Health Systems:

In followup to the last question, do you know if the healthcare workers in Canada wore eye protection?

Dr. Kuenert: I do not know.

Dr. Bob Hendler, Tenet Health Systems:

I think it just would be an interesting question, because, as you brought out the issue of contact and have had it in all your documents, I think people just do not routinely do that in hospitals in many cases, and I think it is a good idea. The major question that I would like to ask follows a comment. We have put out recommendations to our hospitals in a fair number of states, including the two largest population areas of southern California and southern Florida, and we have strongly recommended a method of triage upon entrance of the hospital based on our previous experience with the Anthrax epidemic, trying to sort of figure out who might have been exposed, such as postal workers. And we have seen a number of different approaches to this. One California county actually has a large poster that has the CDC definition and the countries of origin that is literally a 2-by-4 poster sitting there for everyone who walks in the door to see and the availability of at least surgical masks in the entranceway. We have not done that. In your recent web cast, which was superb, your infection control person talked about, in one of her slides, put out basically a slide that could be printed in color and put on the ER door saying, "If you have respiratory symptoms get a mask before you come in the door." So I think there is a missing piece before triage, knowing how ERs are. And we also did this in our hospitals for anthrax or for dusting of people, where we would sure like to know who they are before they walk in and get it in the air system, not so much for corona virus but for the anthrax issue. So my question to you is, or my suggestion to you is, if we are really serious about this, in that specific application should we not be mandating a standard information system in entering the hospital? And in areas of high risk should we not be putting masks on people with fever or respiratory symptoms with a travel history, and perhaps eventually without, to simply be on the safe side and limit spread?

Dr. Ostroff:

I think those are insightful comments. I think you mentioned mandating at one point, and I think what we can do here is certainly guide, recommend, and suggest. I think that it is probably up to the individual facilities as far as what sort of informational materials they want to use to do efficient triage. I agree about having persons triaged as quickly as possible after presentation, including before they even get to the waiting room. I mean, I think that for instance for cardiac disease there are symptoms in place for that to quickly identify people so that they can be treated in the appropriate manner as quickly as possible, and so those are very good ideas and certainly approaches could be designed for that. As far as signs or posters to be put up and also for rapid availability of surgical masks, I think those are all very good suggestions.

Dr. Bob Hendler Tenet Health Systems:

What you could do to promulgate that, and I certainly understand your position as not being a regulator of this, would be for the CDC to put out a PDF that could be blown up. And actually your infection control person actually did that in her slides in your web cast.

Lynn Steele:

Yes, I think we really can develop some materials that people can adapt. We have done it for other issues. We have a smallpox poster, as you know, that can be adapted with local information. So I think that is a good idea, and we will take that forward. Thank you.

Dr. Bob Hendler Tenet Health Systems: Why is Canada not listed on your list of countries?

Dr. Ostroff

We have tried to distinguish between those areas in which there is clear evidence of transmission outside of direct contact through healthcare or direct household contact, i.e., that there is actually community transmission going on in those areas in which transmission has been contained, and specifically healthcare or household contact settings. And the other circumstance that we have at least in some parts of Asia is a relative lack of information about exactly what is going on. And so what we have tried to do is to distinguish between those locations in which there seems to be clear activity of greater community transmission and/or those areas in which there is a relative lack of information that would lead us to be concerned about the potential for community transmission, and those locations in which the evidence to date continues to indicate that there is only limited person-to-person spread via a healthcare setting and direct household contact. Canada currently fits into the latter category, and because of that in our recommendations regarding deferral of nonessential travel we have not included Canada in the same way that we have some of the locations in Asia.

Dr. Bob Hendler Tenet Health Systems:

The WHO epidemic data, at least me looking at it, looks like the number of cases reported daily is falling. Are the reported cases, daily cases, for WHO on the downswing or upswing?

Dr. Ostroff:

What I can say is that virtually all of the locations in Asia with the exception probably of Vietnam, which has maintained a relatively stable number of cases with the exception what seems to be a very small chain of transmission related to the one institution in Vietnam, most of these other locations – Singapore, Taiwan, Hong Kong and mainland China -- continue to report increasing numbers of cases. And it is not exactly clear what the overall trend is at this point.

Dr. Peggy O'Neill:

I think I would underscore the need to standardize the basic way to more preemptively identify a case, the ill individual, whether you call it a triage document or a little poster. I suspect that whether or not you do so right now in a forceful way, based on present data, many of us at the local level – I am here in Rhode Island, for example – need to step out on our own. We have had instances in which individuals requiring high levels of care have been transferred to us from Canada, and we are getting into a more preemptive mode. I literally just left a meeting discussing

whether we ought to have it, that we are not accepting patients in transfer from Canadian hospitals unless their fever has been ascertained with documentation of the measurement and the patient's transfer history. So I think that there is a level of concern and without getting draconian and trying to walk the tightrope between being perceived as Chicken Little versus waiting till it is too late, more of us are trying to get into a preemptive mode to the extent that you are able to provide cogent and always well done materials to help with that. I think it would be greatly appreciated. I have a couple of sort of more hard core scientific questions. I realize that a lot is in progress so...

Dr. Peggy O Neill: I think I would also underscore the issue about looking at standardizing the type of whether you are calling it a triage document or little poster that gets at this basic way to more preemptively identify a case, the ill individual. Because I suspect whether or not you do so right now on present data in a forceful way many of us at a local level, I am here in Rhode Island for example, are needing to just sort of step out on our own. We have a couple of circumstances in which for high levels of care individuals are transferred from Canada and we are now getting into a more preemptive mode. And literally I just left a meeting that is discussing whether we ought to have it that we are not accepting patients in transfer from Canadian hospitals until there has been ascertained their fever with the documentation of the measurement and the patients transfer history. So I think that there is a level of concern and without getting draconian and trying to walk the tightrope between being perceived as Chicken Little versus waiting till it is too late, more of us are trying to get into a preemptive mode to the extent that you are able to provide a cogent and always well done materials to help with that I think it would be greatly appreciated. I have a couple of sort of more hard core scientific questions. I realize that a lot is in progress so...

Dr. Ostroff:

We have gone to great lengths to acknowledge the fact that there maybe actions and activities going on at the state and local level that may not be entirely consistent with the guidance and recommendations that we are putting out there. We recognize the fact that in individual circumstances and situations people who are a little bit closer to the real life situation than we are here in Atlanta may find reasons to do things a little bit differently. And our feeling is that it is inappropriate for us to second guess activities that might be taken at the state and local level.

Peggy Neal: Correct. And because the risk is not equivalently distributed, well understood. The questions that I have are likely all relating to work in progress. I am wondering if you can give us even any qualitative information. Bullets are basically... Do you have any information yet about the detectability of corona virus in individuals who might represent a control group, albeit however the control group might be defined. The second question is whether there is anything that you can talk about on the sequencing data for the corona virus isolates as far as the question of relationship to the other known corona viruses. And then the third is the rather notable difference in the severity of the disease we are describing here in the United States and experiencing versus that which has so often cogently been described in Hong Kong and the other

locations. Is there any sense that the severity appears to decrease with generations of transmission?

Dr. Ostroff:

All great questions, of course. Let me see if I can try to address several of them. In terms of control groups, most of our efforts up to this point in the United States have been to try to collect specimens from ill individuals as an attempt to try to best characterize their illness. We had at the beginning when we first developed the IFA and the ILIZA* FAs, we did pull out from our serum bank here at CDC approximately 300 specimens that would be from individuals in which there was no suspected corona virus-like illness. And using the assays specifically directed against this corona virus, all of those specimens were negative. And so we think that, at least here in the United States, the level of background activity that we might be expected to see against this particular corona virus looks to be essentially zero, and there seems to be little cross reactivity, at least this has been found in the assays that we have developed and with the other corona virus types. As far as the genetic sequences are concerned, there continues to be a great deal of work on looking at the overall genome of this particular virus. We cannot say with certainty when we will have complete sequencing completed. We have taken a look at several of the significant genes such as the *palmaris**, so some of this has been reported in the articles that have come out in the last day or two. We continue to find that all of the sequences that we have looked at seem to be sequences fairly unique to this particular virus and so far have not really given us any good clues as to how it may be related to the other corona viruses as far as a potential source of concern. But we still need to do some additional work in this area. As far as the severity is concerned, I do not think that it has nearly as (Inaudible) with the potential that this may decrease by generations as much as it is that we have been casting such a much wider net here in the United States, because our principal aim here is to try to recognize all potential cases so that we can take the appropriate steps for infection control and monitoring of contacts in order to minimize the potential to have a situation like what has occurred in other parts of the world. And so we think that by and large a significant portion of these individuals, once we get the diagnostic assays up and running and think that they are performing in the way that we think that they ought to perform, that probably a significant number of these folks are going to turn out not to have this particular disease. And that is the reason that our numbers happen to look so much better in terms of severity of illness and in terms of mortality than what is being seen in other places.

Peggy Neal: Anything more on the *human metapneumovirus coinfection* angle?

Dr. Ostroff:

The whole issue of coinfections continues to be studied quite actively in virtually all of the locations around the world that are part of the laboratory network. The major concern is that some of these other agents, whether they are bacterial or whether they are viral, may help to enhance the overall severity of disease rather than playing a primary role in SARS itself. I think that the evidence that is being accumulated continues to be so overwhelming concerning the etiologic role of SARS. I think the question now is more an issue of whether or not there may be some cofactors that explain severity of illness rather than these other agents playing some sort of an etiologic role. That still remains to be seen. Suffice it to say we found very little evidence

here in specimens that we have looked at, whether they be respiratory specimens or serologically of Medanuma* virus involvement.

Dr. Bob Hendler, Tenet Health Systems:

Do we have a confirmed case in the United States?

Dr. Ostroff:

Well we will not be able to say with certainty that we have a confirmed case in the United States until we have been able to definitively establish corona virus as being the etiologic agent and have been able to determine that the assays that we are using have sufficient stringency to use them diagnostically. When we get to that point, we definitely re-characterize individuals as being confirmed or not confirmed. At this point all we can do is continue to use the case definitions that have been promulgated by the World Health Organization and talk about cases as being both probable and suspected until such time as we change the case definitions to include a confirmed category.

Dr. Bob Hendler Tenet Health Systems:

You have referred only to suspected cases. Do you have probable cases?

Dr. Ostroff:

Let me just try to answer that by saying that we indeed do we have cases in this country that would fulfill the current definition that WHO is using as a probable case.