

Investigating Respiratory Disease Outbreaks: An integrated approach to investigations, specimen collection, and pathogen identification

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Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen-only mode until the question and answer session of today's conference. At that time, you may press star 1 on your touchtone phone to ask a question.

I would also like to remind parties that this call is being recorded. If you have any objections, please disconnect at this time. I would now like to turn the call over to Ms. Alycia Downs. Thank you, you may begin.

Alycia Downs: Good afternoon and welcome to today's COCA conference call entitled Investigating Respiratory Disease Outbreaks; An Integrated Approach to Investigations, Specimen Collections and Pathogen Identification. We are very excited to have Dr. Lauri Hicks present on this call.

Dr. Hicks is a medical epidemiologist in the respiratory disease branches - respiratory disease branch within the National Center for Immunization and Respiratory Diseases here at the Centers for Disease Control and Prevention in Atlanta, Georgia.

We're using a PowerPoint presentation for this call that you should be able to access from our Web site. If you have not already downloaded the presentation, please go to www.emergency.cdc.gov/COCA. Click on

Conference Call Information Summary and Slide Sets. The PowerPoint can be found under the call in number and pass code.

The objectives for today's call; after this activity, the participants will be able to describe the clinical and public health challenges associated with investigating respiratory disease outbreaks, discuss CDC's approach to supporting respiratory outbreak investigations, introduce the unexplained respiratory disease outbreak Web site and describe new diagnostics that will be useful for investigating outbreaks.

In compliance of continuing education requirements, all presenters must disclose any financial or other relationships with the manufacturers of commercial products, suppliers of commercial services or commercial supporters as well as any use of unlabeled products or products under investigational use.

CDC, our planners and the presenters for the seminar do not have financial or other relationships with the manufacturers of commercial products, suppliers of commercial services for commercial supporters. This presentation does not involve the unlabeled use of a product of a product under investigational use. And there's no commercial support.

In the PowerPoint, you can advance through the Title slide and the creating statements, the objectives and continuing education information for call. And we'll start on Slide 6, Respiratory Outbreak Challenges.

Dr. Hicks, I'll now turn the call over to you.

Lauri Hicks: Well, thank you, Alycia, thank you for that great introduction. I'm really pleased to have this opportunity to present to you on behalf of the respiratory

outbreak working group at CDC. I currently lead the respiratory outbreak working group and today I'm going to share some information with you about how we can help you with respiratory outbreak investigation.

And I'm going to describe some of the resources that we have recently put up on our Web site. So let's start on Slide 6. This is - the slide is entitled, respiratory outbreaks, challenges. And it's probably no surprise to many of you on the phone that respiratory outbreaks are associated with a number of challenges, although it isn't always immediately apparent, differentiating an outbreak from sporadic disease can be quite difficult.

Unfortunately, baseline disease rates in the community or nationwide are often unknown. In many situations, endemic respiratory infections like influenza and pneumococcal disease exhibit seasonality so there are cyclical increases that are expected each year. And that can certainly be confusing.

Both endemic disease and outbreaks are often due to a wide range of pathogens that can cause similar clinical syndromes and certainly we know that many viral pathogens and viral infections can mimic bacterial or fungal infections. Even non-infectious respiratory syndromes can sometimes mimic an infectious disease.

And then outbreaks may involve multiple ideologies so there may be more than one pathogen involved. And then there's always the potential for new pathogens. And then we'll go to our next slide.

So in some cases, these new pathogens are really known pathogens with new characteristics such as adenovirus 14 and multi-drug resistant tuberculosis. Recently there are a number of newly described potential pathogens. One of these is the human (bocavirus) and then I'm sure all of you are familiar with

the human coronavirus that I've listed here which is the cause for the SARS outbreak which occurred in 2003.

Next slide. Now other challenges include the fact that adequate commercially available diagnostics are often lacking. In many cases, there's limited state capacity for diagnostics. And quite frankly, for some pathogens, useful diagnostic tests are simply not available, even at reference laboratories or CDC.

So a carefully integrated epidemiologic and laboratory response is really, really critical to outbreak investigations. But it can be quite challenging.

Next slide. So let's begin with an example of a particularly challenging situation. This slide is entitled Pertussis Puzzle. Now some of you may have heard of this already as the details of this situation were published in the MMWR last year.

But I think it's a good example for how to describe why these outbreaks are so challenging. In March 2006, a laboratory worker in a 396-bed hospital presented to the Occupational Health Clinic with a three-week history of paroxysmal cough and post-(tussis) vomiting. These are symptoms that many of you may know as classic for pertussis.

A respiratory specimen was collected which was positive for pertussis by the hospital single target PCR assay. And the worker was subsequently treated with azithromycin and furloughed for five days under the assumption that she had pertussis. Now because of the potential risk to vulnerable patients, active screening was implemented. Case investigation identified many additional healthcare personnel with respiratory illness and this lead hospital investigators to suspect an outbreak.

Approximately 1,000 of 6,289 healthcare workers were tested - so just a huge number of folks were tested, treated and furloughed for suspected pertussis. Approximately 2,300 azithromycin packs were distributed and over 4,500 persons were vaccinated with adult acellular pertussis vaccine. So just an incredible investment of resources.

Next slide. And this slide says the pertussis epidemic that wasn't pertussis. So now I'm leading you down the path that this may not have been pertussis. By June, 134 suspected pertussis cases had been identified, 98 by positive or equivocal PCR results and 36 by clinical symptoms alone.

However, more than 190 cultures that had been performed, there were no positives for pertussis. So this certainly raised some concerns. Confirmatory testing was sought at CDC and included retesting of the initial DNA abstracts - extracts using a two-target PCR assay so as opposed to the one-target PCR assay.

The testing at CDC showed no evidence of a pertussis outbreak and it was determined that this was an outbreak of mild respiratory disease but with no single etiology. So as highlighted in the New York Times article in January of 2007, (safe) and a quick test leads to an epidemic that wasn't.

Next slide. Okay, so this slide is entitled Whooping Challenges. And certainly the challenges that were encountered with this respiratory outbreak are not unique to pertussis. The differential diagnosis for respiratory outbreak for prolonged cough illness is large. And clinical syndromes are non-specific. In addition, diagnostic tests used to confirm or define respiratory outbreaks can be unreliable.

And outbreaks of pertussis and other respiratory diseases can quickly overwhelm local public health resources. Now these barriers to effective investigation and response can result in a delay in identifying the ideology, unfortunately negative media attention and further promotion of an anti-vaccine mentality.

Next slide. Now this slide I'm presenting here is a slide which describes which outbreaks should be investigated. And I want to process this by saying that this was a list that was compiled with input from state and local health department partners. And it is a work in progress so certainly if there's some additions or changes to this list that folks believe we should make, I really appreciate hearing from you about that.

So which outbreaks should be investigated? The feedback from state partners revealed that it would be useful to describe which outbreaks should be investigated. So this is a list here; the first one we begin with is those outbreaks that have unusual outbreak characteristics.

So for example, all outbreaks of truly unknown ideology or where clarification or causative agent is needed, certainly outbreaks of severe disease that maybe manifested by hospitalizations, a lot of deaths are large and rapidly progressing outbreak. And this is - the next one is a suggestion by some of our colleagues in the state health departments and local health departments that certainly must consider the possibility for a potential bio-terrorism event.

And then certainly if you're dealing with a specifically or particularly vulnerable population, then you would want to make sure that you investigate it as well.

And certainly if there is an opportunity for intervention, if there's an opportunity to stop the outbreak, you want to investigate in order to do that. So what are the options for interventions? There are many but listed here we have vaccines, environmental intervention such as cleaning the environment or, for example, disinfecting hospital's potable water system for (alleginella). And then of course institution infection control measures.

Then next we have advanced knowledge. In certain situations, it's really useful to investigate an outbreak to describe the disease characteristics or to describe transmission of disease. And so it really can help us with the epidemiology of a disease.

In addition, it may be an opportunity to evaluate a new laboratory test. And we've been actually able to do that in a number of outbreak situations recently. And then finally, there certainly are infection control issues that may be evaluated in this situation. And it's useful to know whether a vaccine or an intervention - other infection control intervention is effective.

And then lastly, this may not be as critical to most of us but certainly I think there is a role for investigating an outbreak when there is a lot of excessive public anxiety.

Next slide. So there are a number of challenges at CDC. And certainly, this is not unique to CDC but I think it's important for you to understand where we're coming from. And that can really inform you as to why we've taken this approach.

So CDC lacked a unified approach to handled unexplained respiratory disease outbreaks. CDC's respiratory disease experts are organized in silos in many

divisions and centers. And this makes communication among CDC's respiratory disease experts really challenging.

And in addition to that, coordination of specimen collection and laboratory testing during outbreak response has often been lacking. And the end result is this may hinder timely recognition of the primary ideology for the outbreak and delay effective control measures.

In addition, while for other types of disease outbreaks - food borne, for example - there are resources available. Guidance and resources were really limited for investigating respiratory disease outbreak. So we'll move on to the next slide.

We're on Slide 14, Moving Towards a Solution. In an effort to move toward the solution, a CDC respiratory outbreak working group was formed in 2004. And the whole idea obviously is to prove response to respiratory outbreaks. The group currently exists of 43 members with respiratory disease expertise, a multi-disciplinary group (unintelligible) by reaching across divisional and center boundaries to assist public health partners responding to respiratory outbreaks. And ultimately the overall goal is to optimize public health preparedness and response to respiratory disease outbreak.

Next slide. So in keeping with the overall goal, I was going to show you here what our organizational structure looks like. And if you look at the slide, it's very busy and I apologize for that. But you can see that there are just a number of different groups here that work on respiratory diseases. So this is what we have to do, we needed to get everyone at the same table.

And you can see that represented on this slide are three coordinating centers, four centers, 12 divisions and 17 branches. And we have representatives from each of those groups.

So next slide. Okay, so in keeping with our goals, the respiratory outbreak working groups first objective is to streamline and coordinate CDC's epidemiologic and laboratory response to requests for assistance.

And next slide. And the title of this slide is Working Group Consultations Since March of 2007. And this is - March of 2007 was when we really began tracking how many consultations we were doing. And over the past several months, we've had more. So that's why you see these Xs on this slide. When I originally developed this slide, it was a few weeks ago, we'd only provided 18 consultations. But in the past couple of weeks, we've added four to those.

So we provided 22 consultations for unexplained outbreaks. And when I say consultation, we've had 20 working group conference calls, we've supported several of these outbreaks with laboratory support, 18 of them. And we've also assisted with the investigation (unintelligible). We've sent an FEA team out to the field to collect specimens and also to perform an epidemiologic investigation.

Now the location for our requests are not only domestic. There were 15 - there have been 15 domestic outbreaks. But there have also been several international outbreaks of interest, seven here. And the outbreak etiologies so far that we've identified include micro plasma pneumonia, bordetella pertussis, adenovirus, respiratory syncytial virus, microbacterial tuberculosis, parainfluenza virus 3 and influenza. So you can see that there's been a number of different organisms identified with these unexplained outbreaks.

Next slide. So this slide, Objective 1, streamline and coordinate CDC's response. So CDC's response has been developed over a series of meetings and we have met several times to determine what the best approach would be. So when the initial team member is contacted and receives their request for assistance, it is their responsibility to engage the rest of the members of the respiratory outbreak team.

And this is usually accomplished by sending an email to all members of the respiratory outbreak team. Then the available members participate in conference calls and discussions about the outbreak. And in certain situations, the health department has adequate resources and the conference call alone will meet their needs.

But in many situations, additional support is requested. And in these situations, epidemiologists and laboratorians work together to obtain the necessary information and supplements to optimize outbreak response.

Next slide. Okay, so I'm going to provide you an - a couple of examples of outbreak investigations that we've been involved with recently. And this first one is an unexplained outbreak that occurred in St. Croix, the US Virgin Islands in December of 2007.

And the group actually was notified of an unexplained outbreak of cough illness among school children in St. Croix. And it just happened it was right before the Christmas holiday as is always the case with these situations. The conference call was organized to provide emerging advice to health officials.

And because it was determined that there was a need for an urgent investigation, an FEA aid field team actually traveled to the field to assist with the investigation.

Next slide. Okay, we're on Slide 20, unexplained outbreak, St. Croix, US Virgin Islands December 2007. And specimens were collected by the team in the field and transported to CDC. And this triggered a rapid coordinated laboratory response and there was simultaneous testing of specimens for multiple viral and bacterial pathogens in several laboratories.

And fortunately, this led to a timely recognition that pertussis was the primary ideology. And this allowed for appropriate treatment of ill persons, a coordinated effort to distribute prophylactic antibiotic contacts and a vaccination campaign which effectively ended the outbreak.

Next slide. Okay, so here is another example of how I explained outbreaks. This is Prince of Whales Island in Alaska in September 2008. And you can see the photo of our outbreak investigation team there on the slide.

And it was actually - this actually happened this past September. And it was September 30 that folks from Alaska or Alaska colleagues notified us that they had had ten cases of respiratory disease and three of them were hospitalized. And there have been one death. This is in a very small community.

On October 1, the CDC's working group was notified and a conference call was organized with Alaska or Alaska colleagues. And on October 3, CDC received specimens for testing. And testing was performed that day in our laboratory and it was confirmed that four specimens were positive for adenovirus 14.

And because of the concern and the severity of this illness that we were seeing, we decided that we would send out a team to investigate and our

Alaska colleagues invited us. So on October 12, five-member combined team of epidemiologists arrived to assist with the investigation.

And I just want to make the point that, you know, certainly while we are available to help with field investigations, even if it doesn't warrant a field investigation or field assistance by CDC, we are more than willing to help with just providing advice over the phone or providing materials for your outbreak investigation.

Next slide. So we're on Slide 22, CDC's Respiratory Working Group. We're on Objective 2. And the next step was to develop a Web site to provide background guidance and tools for investigation of outbreaks. And the purpose of the unexplained respiratory disease outbreak Web site is to build capacity to respond to and investigate respiratory disease outbreaks and provide tools that will lead to the timely identification of the ideology of an outbreak because of the facilitate disease control efforts.

Now who is this Web site for? Well the primary audience is certainly state and local health departments. But we've learned that a lot of other folks are interested in this information, certainly international partners and public health, hospital epidemiologists and emergency responders.

Next slide. So here's a screen shot of our Home Page. This is our newest and latest and greatest home page. The main categories that are included here are based upon feedback we received from state and local health departments as well as hospital infection control personnel. And there are resources for investigating an outbreak, generating a differential diagnosis, specimen collection, diagnostic testing, prevention, there's some other resources and we've linked to other Web sites that are helpful.

And so let's move on. I see - I just want to point out to you that the Web site address is on the bottom of your screen.

So what defines an outbreak? So this is a question that keeps coming up. And we had a lot of folks at various meetings ask us, you know, what really defines an outbreak? Well, right - for the purposes of this Web site, an outbreak or cluster of respiratory disease is illness in excess of what would be expected for a given time and location.

And I did mention earlier that we don't always know what is expected so we do recognize that this is imperfect. So here is your next slide - we're on Slide 26, Develop a Case Definition.

And this - these are examples of tools and materials that are on the Web site. There are some very basic materials such as how to develop a case definition as you can see here.

We got to Slide 27 - next slide - you'll see that there are templates to generate line with, there's some basic information there that can be collected including demographic information, case characteristics and specimens collected.

Next slide. And here's some data collection forms that we developed. And I know for a fact that these have been used in a number of respiratory outbreak investigations recently. And these data collection forms are samples that can be printed out and can be used for your outbreak investigation or they can be used as examples to develop your own data collection instrument or questionnaire. Certainly they made need to be tailored to suit your needs.

Next slide. Okay, so this slide is entitled, Differential Diagnosis Clues - Slide 29. And when you're investigating an outbreak, certainly there are many

differential diagnostics clues that can really help to narrow down the list of potential pathogens.

The clinical information, such as the principal respiratory syndrome and associated syndromes is really important to characterize the outbreak.

Demographic information such as the age groups effected and the population's characteristics can further provide useful information.

And then certainly the disease and the location for the outbreak can provide a lot of guidance of what the most likely pathogens are. And finally, it's helpful to know what the high risks are for certain conditions or what exposures could lead to certain conditions.

So next slide. This is just a sample of one of the tools that is on our Web site. And you can see here that the table - and this table can help you generate a differential diagnosis. We have tables - and this is one example of them - we have tables that include information about the illness itself, the characteristics of the illness, the clinical presentation in the syndrome, attack rates and incubation periods.

We also have information about demographic features. And then of course populations at increased risk. And on this slide, for example, if you were investigating an outbreak in a long term care facility and it was an elderly population, they developed pneumonia, you may be thinking of Group A streptococcus but certainly there are other diseases you would be considering.

Next slide. So we're now on Slide 31, guidance for specimen collection. And one of the most frequent challenges we face with respiratory outbreak investigations is specimen collection. The questions that arise are, what

specimens should we collect, how should we collect them and how should they be stored.

And this is really different than identifying which specimen should be collected for making a diagnostic decision in an individual or identifying the ideology in an individual. This I about collecting the specimens that would be most useful for identifying the ideology in an outbreak setting.

Next slide. So here's - this is an appendix of actually in - on the Web site as well, in a set of guidance materials for specimen collection. And if the ideology is truly unknown, you should pursue testing that will enable you to test for as many pathogens as possible. And certainly the approach taken for testing will involve a review of the available diagnostics at your laboratory before the decision is made what to collect.

In a situation where PCR diagnostics are available of CDC is involved, there is specific guidance here for what types of specimens to collect and how to handle and store them.

Now again, I just want to reiterate that the best test to help identify the ideology of an outbreak may not be the best test to make a diagnosis in an individual patient. I'm going to have to just answer the door, someone's banging on my door. So just hang on a second.

Sorry, I'm giving a Webinar to 500 people so...

Man:

Sorry.

Lauri Hicks: I'm sorry about that. So we'll move on to the next slide. Okay, so one of our last priorities was to identify gaps in laboratory capacity and increase laboratory capacity to test for multiple pathogens.

And this Slide - Slide 34 - kind of gives you our thought process in terms of what we wanted to achieve by identifying respiratory pathogens. Well, it's important to develop new diagnostic assays to improve our ability to identify the ideology.

Once we develop those assays, then need to be validated. And the hope is that we can validate them here at CDC but in some situations we do need outside assistance with this validation. Once we've been able to validate these assays, the goal is to transfer this technology to our partners. And that means state health departments if local health departments are doing diagnostic testing, local health departments and academic partners.

So we want to transfer this technology, we want to train individuals to become proficient in using the test. And then ultimately the goal is to detect the disease and be able to rapidly identify the pathogen causing disease.

Next slide. Okay, so were on the slide that says Real Time PCR Assays and Development. And there are several real time PCR assays in development currently available at CDC. But many of the protocols will be available in the near future.

And I have listed some of these new assays here; there are others. One example is an assay detect in genotype (unintelligible). There is an assay to do bacterial and viral subtypings for micro plasma pneumonia. And there's also one for (unintelligible), human coronaviruses, rhinoviruses and (bocaviruses).

And then there's an emerging issue with macrolide resistance among micro plasma pneumonia isolates. And we recently developed a new assay to detect macrolide existence.

And then of course there are other specimens that you may be considering for diagnostic testing. And we are using some of these new specimens to identify pathogens. For example, we're using PCR on serum, CSF and CSF for streptococcus pneumonia.

Next slide. Slide 36; I'm going to talk a little bit about something I think is really exciting in the world of diagnostics. And these are the multiple pathogen assays or MPAs. Or MPAs are based on lyophilization. And lyophilization is basically drying of real time PCR reagents.

And it's in a format that allows convenient testing for several agents in a short period of time. In addition, what is wonderful about these MPAs is that they can be stored for immediate use in emergencies. And we're really at this point in time considering two approaches. The one is the (attack man) low density array card or (tilda) card. And the second is called the eight well strip tube. And I'll describe both of these for you.

Let's move to Slide 37. So this is a depiction of the (tilda) card that I just mentioned. It's available at CDC. This is a very expensive tool but we're hoping to use this in several outbreak investigations. We have used it in a few so far.

And this markedly improves the speed and efficiency testing, as it allows a researcher to perform nearly 400 simultaneous real time PCR reactions. And you can see here, as listed on the left hand side, there are many viral and

bacterial pathogens listed there. So particular card that we're using can test for all of those pathogens.

Now CDC was able to view this through partnering with the Department of Defense. And as you can imagine, this could really transform how outbreaks are investigated.

Okay, so next slide. Slide 38; now you know, one of the reasons why we're considering this technology, this strip tube technology is because there are some disadvantages with the (tilda) cards. The (tilda) cards are in a fixed format and they're very expensive. Like I mentioned, they're currently about \$400 per card.

And unfortunately, there's no current mechanism to achieve FDA approval for this diagnostic approach in the US. So even though a validation of the (tilda) cards is eminent, we're using this as an opportunity to provide us a better understanding of the sensitivity and specificity of multiple pathogen assays.

So here's a more practical option. Strip tubes will probably replace the (tilda) cards in the very near future. The eight well strip tubes also contain lyophilized real time (unintelligible) reagents. But they're configured in a way that increases flexibility and decreases costs.

These strips are eight interconnected PCR reaction tubes. And we're working with Applied Biosystems, Incorporated to prepare some prototype tubes for a limited number of viral and bacterial pathogens. The nice thing is these tubes can be prepared using good manufacturing practices which may allow pursuit of FDA approval during validation.

Okay, next slide. So recent advances in diagnostics certainly offer the potential for multiple pathogens from a single specimen. Multiple pathogen assays could be extremely valuable for surveillance of recent outbreaks of unknown etiology and early response to pandemic influenza.

So CDC would like to work with states and local health departments on validations on new lab tests and the setting of respiratory outbreaks. And we've already been able to do that in a number of situations.

So I just want to give you some examples of what our current efforts are. And I've already just described one. We've been working to develop these from multi-pathogen diagnostics. We're also working on building a virtual world training model. And this virtual world training module will be situated on our current respiratory outbreak Web site.

And what we would like it to do is simulate a real world situation. And you would be able to go in there and walk through an actual outbreak investigation. And it would allow folks to actually become more familiar with the tools that are available on our Web site.

And the other thing that we're trying to do certainly is to increase awareness of the availability of the Web site and the respiratory outbreak working group. And certainly this call is one opportunity to do that.

Included there on this slide is a button we've created. And we've partnered with a number of organizations to get this button on their Web sites. And what it does is it allows folks to just click on this button and then it will bring them directly to our Web site.

So just in summary, unexplained respiratory disease outbreak investigations are acquired and integrated and the epidemiologic and laboratory approach. And I just want to be clear that CDC's respiratory outbreak working group is available to assist with respiratory outbreaks.

And we hope that the unexplained respiratory disease outbreak Web site is a useful resource for investigating respiratory outbreaks.

Okay, so moving on to this last slide here, Number 42. It says resources. And when you're faced with a cluster of respiratory disease, I want you to think about whether or not you know what is causing the cluster. And if you think that you could use some help, certainly contact your state or local health department. I know there's some local state and health department folks on the call.

So if you're at a state or local health department, you certainly consider consulting us directly and call the respiratory outbreak working group. and there are a couple of different ways you can get in touch with us. I would say probably the best way to get in touch with us is probably by calling CDC's emergency operations center at that number listed there.

We do have the Web site that certainly you can contact us through the Web site. But if you're looking for emergent help, the better approach is to contact us through the emergency operation center.

And I'm always available for questions if folks have questions they want to answer.

Alycia Downs: Yeah, thank you so much, Dr. Hicks. And Diane, if we can go ahead and open up the lines for the question and answer session.

Coordinator: Thank you. We will now begin the question and answer session. If you would like to ask a question, please press star 1. Please unmute your phone and record your name clearly when prompted. Your name is required to introduce your question.

To withdraw your request, press star 2. One moment please while we wait for the first question.

Your line is now open.

Question: Hi, I'm at the University of Utah. Lauri, that was a great presentation and I loved the concept that you've put together. Are you planning on developing a document similar to the guidelines for investigating diarrheal disease that's been around for a number of years or is that too 1990s? That's Question 1.

And Question 2 is, you know, I think with people who are in diarrheal disease, it's fairly easy to get providers to suspect a meaningful outbreak and to report it. Have you thought about ways to improve the sensitivity for outbreak detection, now that you have all these resources to bring to bear?

Lauri Hicks: Okay, really great questions and questions that we have discussed before. Certainly I think it would be useful to have a document like the one that is available for diarrheal diseases. And our goal was to improve the response to respiratory outbreaks similar to what has already been done for food borne and diarrheal diseases.

So I think ultimately what we would like to do is publish some guidelines or actually publish some guidance once we have received more feedback from our state and academic partner.

So yes, I would say that we would hope to have a document that would be useful for folks investigating outbreaks.

And then the answer to your second question is absolutely, sensitivity of this situation or sensitivity in terms of identifying outbreaks is really an issue with respiratory disease. And we've had a number of conversations with folks at the state level to determine if there would be interest in conducting surveillance for respiratory outbreaks.

And there certainly have been a few states that have expressed some interest in at least reporting respiratory outbreaks to us so we can get a better sense of the magnitude of this problem and also how often it's occurring.

But we don't have a commitment yet to do that. So we're working on it, we're trying to figure out what would be the best way to really detect outbreaks in terms of do we need to have surveillance for respiratory outbreaks similar to food borne diseases. But it's really unclear yet as to where that is going to head.

Question cont'd: I mean, I wonder if you can't use the existing syndrome surveillance (unintelligible) line network. And then look for large clusters of influence and negative ILI as one approach. The other would be to focus where the greatest danger exists in healthcare facilities, particularly in transplant and oncology units or military and civilian clothed populations.

Lauri Hicks: Yeah. And a lot of those facilities are already performing their own surveillance. And so you're right, it would just be a matter of trying to develop a system to track it. And so that's where we are. We're just trying to determine what the best approach would be to develop some sort of tracking.

And it may not be a nation wide effort. It may be something that's more focal. We've had some discussions with our emerging infection site. But I think again that it would be very useful at some point to get a better sense of, you know, what really constitutes an outbreak, what are the baseline disease rates. And also just understand - better understand what the different pathogens are that are causing outbreaks.

Coordinator: Our next question. Your line is now open.

Question: Yes, I'm working at an animal - Bio Level 3 animal disease research center developing an occupational health screening for employees. And wondering if I should have diagnostic abilities here in case I see a cluster or anything like that?

Lauri Hicks: Well I guess my question to you would be, do you have the capacity also to do the epidemiologic investigation?

Question cont'd: Well, it's really a small area. So it would - it's a small group of people.

Lauri Hicks: Okay.

Question cont'd: Basically, you know, we're doing base line TB tests when they first arrive and we're trying to develop a protocol. And I've noticed on your PowerPoint that there's a few other things that I should be looking at when they're working with animals.

Lauri Hicks: Yeah. Well one thing I would say is that whenever an approaching an outbreak investigation and we're thinking about the diagnostics that should be

used, we definitely engage all the epidemiologists to make sure that we're headed down the right pathway.

Of course, in your situation, you may already know to some extent what some of the pathogens that you're working with are. So that may make it easier, you know, to determine what you should be testing for.

Question cont'd: Okay.

Lauri Hicks: But I think that, I mean, it's a great idea. If you do have a better idea of what the pathogens are that folks are coming into contact with, then it may be beneficial to have some sort of rapid diagnostic testing available on site.

I don't know how to - I wouldn't know how to implement something like that.

Question cont'd: Okay.

Lauri Hicks: But certainly we could start out, if there was ever a situation, you could contact your state. And then if you needed our input, we could help with the multiple pathogen diagnostics to begin with. Moving forward, you could see where and how you would implement a multi-pathogen diagnostic approach.

Question cont'd: It's unknown so I'm concerned about, I mean, we do test the animals before they come for a lot. I'll have to check for the other two that I still have on the chart. But it's the unknown, you know, that maybe they were missed before they come.

Lauri Hicks: Right. So I think in that setting the best option would be definitely with an epidemiologist and then have them work with the laboratory and to provide some information about what would be the best approach for diagnostic

testing. And that was the whole idea behind our respiratory outbreak working group.

We found sometimes that certain labs and epidemiologists, epi groups, worked well together. But in many cases we found that they working fairly independently. And so it was - there wasn't - it would just depend upon where the request came to first. So if the request came to epi first, an epidemiologist would decide which diagnostics they would move forward with. And if the request came to the lab, the lab would decide.

And often times they would arrive at different conclusions.

Question cont'd: That's what we're dealing with. We're trying to decide a policy for TB baseline. And should we do it every year, every five years, should we do X-rays on just the healthy, non-infected employees.

Lauri Hicks: Right. So I think the best thing to do would be to try to get some clinical epi input as well as laboratory input. And we've learned from the past that that works the best.

Question cont'd: Okay, thanks.

Lauri Hicks: You're welcome.

Coordinator: Our next question. Your line is now open.

Question: Hi. I'm in a local health department and I'm calling because we've had a couple of pertussis cases arising which we honestly couldn't say they were outbreaks or not. And just wondering if there's any advances being made in the diagnostics, especially with pertussis, the problem with cultures, the

sensitivity being low and later in the disease. And also with PCR seeming to have a lot of false positives.

Lauri Hicks: Right, that's a great point. And that's why I used that example in my talk about pertussis because it's certainly one of those diseases where you do see a lot of false positives or presumed outbreaks where you may not actually have an outbreak.

The issue with diagnostics is there are a number of PCR tests out there that are circulating, some that are commercially available, certainly some that are not commercially available. And unfortunately, there's a lot - there's just a huge variability of the quality of those tests. And for example, the one test that was used was a single target PCR assay, which means it was only looking for one section on the - one area, one little bit of DNA.

Whereas the target - or the targets that we're looking at, they're two different targets here that we look at at CDC. So I think that is a much better PCR test and it tends to not result in false positives. In a situation where you do have a PCR positive, you definitely want to try to confirm with culture.

Question cont'd: Yeah, we've been trying to but we have had PCR positives and culture negative. And I guess what you're saying is the best thing might be to call the lab and see exactly what type of PCR test they're using and I would want to ask if they're using a two-target test versus a one-target test?

Lauri Hicks: Yeah, I think it would be really helpful to just - they might be able to just provide you the name of the PCR test that they're using.

Question con't: Okay.

Lauri Hicks: And in many cases, some of these commercial tests - and some of them are very good. But some of them may not have as much specificity and/or - and there are also issues on both sides of the coin. So it's certainly sensitivity as well.

But in your - in this situation, you may get a false positive due to issues of there not being enough targets. So what I would do is recommend that you communicate with your laboratory - and I can certainly put you in contact with the folks here that do pertussis work.

Question cont'd: Yeah.

Lauri Hicks: And they can give you some advice about whether or not what you're seeing is truly a false positive or probably just a negative culture.

Question cont'd: Oh, okay. Do you - yeah, I'm just curious. Do you have a name I should call or a number or anything like that?

Lauri Hicks: Yeah, not off the top - I know who the folks are but what I can do is, if you want to just send me an email after the conference call I will connect you with them. How does that sound?

Question cont'd: Okay.

Alycia Downs: And if you could, send that email to COCA@cdc.gov and we'll connect with Dr. Hicks and get that answer out to you. Again, send your email to COCA@cdc.gov - COCA@cdc.gov.

Question cont'd: Okay. Thank you.

Lauri Hicks: You're welcome.

Coordinator: Our next question.. Your line is now open.

Question: Hello, I was wondering if you could comment on your thoughts on some of the newly commercial available (TIM) PCR or multi-plexing tests that are out there? I know there is a respiratory panel that's been marketed, etcetera.

Lauri Hicks: Yeah. And as an epidemiologist, I'm probably not the best person to comment on those. I can say that I am not clear, again, on the sensitivity and specificity of those multi-packaging diagnostics. So I could probably check with your laboratory up here and get back to you on that question.

My understanding is that they do have some concerned with what's available commercially.

Coordinator: Our next question. Your line is now open.

Question: Yes, thank you for the great presentation. I'm a member of a national disaster medical system, disaster medical assistance response team. And with reference to what you're saying on some of the challenges earlier with specific reference to outbreaks very quickly overwhelming local resources and the potential for bioterrorism events. What if anything is your working group doing to interface with the response community? That's my first question.

And the second one is on Slide 28, the data collection forms and again on Number 30 with the differential diagnosis, can you tell me if these forms are available online on PDF format?

Lauri Hicks: Okay, sure. In terms of connecting directly with national and medical - with response teams, we are working - our Web site is actually on the emergency communications system at CDC. And so we're hoping that we'll be able to reach out to disaster response folks that way. Certainly we - our initial attempt to share this information has mostly been with health care providers, state and local health departments and within CDC just to make sure that communication within CDC is efficient.

But we would love to take an extra step and a couple of extra steps to spend some more time sharing this information with folks that are doing disaster response. If you have any ideas on how we should do that or how best to get the word out with those kinds of groups, then certainly that would be really helpful to us.

Question cont'd: Next month in Dallas, Texas, the Department of Health and Human Services is hosting the 2009 Integrated Training Summit. And situations like that would be an excellent way of getting the word out to over 7,000 volunteers that are part of the National Disaster Medical System response teams. And it's not just DMAT teams, it's veterinarian response teams as well.

And I'm certain that there's many things here presented in your - in the call here that would be beneficial not just myself as a respiratory care practitioner but the physicians on my response teams to be aware of. And since disasters can happen anywhere at any time and they can include events such as respiratory disease outbreaks, it would be beneficial for - there would just be some linkage between what you're discussing here and the response teams.

Lauri Hicks: Yeah. And do you see - are there - is there information that I didn't present that you think would be useful for these kinds of folks?

Question cont'd: Well CDC's Web, in fact, the very part of the Web site that some of this is on, the bioterrorism part - emergency.cdc.gov presents a lot of information on organisms and training for anyone to get and how to treat illness caused by various pathogens. So I think that's a good start.

Lauri Hicks: Okay.

Question cont'd: But I can certainly send you the program information for the conference if you'd be interested in getting that.

Lauri Hicks: Yeah, I think this would be a group that we would definitely be interested in reaching out to. And I agree with you that this is an important group of folks to make sure that we are connecting with. Because certainly they could be - disaster response teams could be the first responders in respiratory outbreak situation.

Question cont'd: Absolutely.

Lauri Hicks: And with respect to your second question, you were asking about the availability of some of these materials online. I would say yes. The next thing is that these materials, that all the materials that I presented are available online on our Web site.

And certainly can be printed off, reproduced. There's really nothing - there are no limits here in terms of what you can do. You can certainly take them and adjust them for your own needs if necessary.

Question cont'd: Great, thanks again.

Lauri Hicks: You're welcome.

Alycia Downs: And Diane, if we can take one more question.

Coordinator: Our next question comes from Montreal. Your line is now open.

Question: Yes, hello, thank you. We were just curious in Montreal, how does the (Pacman) work?

Lauri Hicks: Okay, so the (Pacman) is fairly - it's not a complicated system. It works like any other PCR. It just has a number of different wells. If you go - if you're able to go back to that slide that I showed with the photo of - or the picture of the (Pacman) low density array cards, you basically put the samples - a very small amount of sample of each one at the top. There's one well and it filters down through all the wells. And you see in this particular depiction, there are 24 wells.

And it actually just - it's the same type of PCR reaction that you would run if you were running an individual PCR. It's just done simultaneously on this card.

I don't know if - I'm probably not explaining it as well as a laboratorian could but all you need is a single sample. You can run actually a number of different samples at the same time from different patients. So you could put a sample in one well and then a sample from a different patient or a different case in the next well and you can be running them all simultaneously.

Question cont'd: Okay, thank you very much.

Alycia Downs: And Diane, how about we take just one more question.

Coordinator: All right, one moment. Our next question. Your line is now open.

Question: Hello, Dr. Hicks. Your presentation was excellent, so thank you.

Lauri Hicks: You're welcome.

Question cont'd: I just have a question from a practical standpoint. I work for the military and I just wanted to know what your recommendations are for the investigatory teams when they go out for the initial investigation of a respiratory illness of unknown ideology in terms of respiratory precautions. Do you usually recommend a surgical mask or (unintelligible) respirator mask, you know, especially in international settings? So if you could please touch on that issue because I know it was a big deal with the SARS outbreak, etcetera.

Lauri Hicks: That's a great question. And we are working with our infection control colleagues in the Division of Healthcare and Quality Promotion to further revise our recommendations for investigating respiratory outbreaks.

And we actually don't have a specific protocol right now but what I would say is in general, the guidance that we're providing is if you are in a situation where you know there is severe disease and the ideology is unknown, it is recommended that you start with a N95 mask.

In situations where you know where it's most likely influenza or you know, a milder respiratory illness where there's less risk for the persons that are investigating the outbreak, then we say that it's fine to use a surgical mask instead. If say, it's just an upper respiratory infection or a mild respiratory infection as opposed to a severe lower respiratory infection or ARDF.

I know that's not - it doesn't - I know that doesn't sound very helpful because I'm not giving you anything specific but my hope is in the future that we'll have more specific guidance about exactly when and how to use different types of personal protective equipment.

Question cont'd: That's wonderful, thank you. I think that internationally though, probably you guys would be more likely to don an N95 mask because you don't know necessarily what you're going to be exposed to versus for your domestic investigations. Is that probably true?

Lauri Hicks: I think it - for most of these situations that we're talking about, they are unexplained. So I would say that in any situation where it is unexplained and there's some evidence of person-to-person transmissions, we do recommend an N95 mask until you really have cleared - have just determined what the cause of the outbreak is.

And that doesn't really vary depending upon the location. But I would agree with you that in situations internationally, there are probably many more unknown. So in those situations, I think that we're faced with these unknowns and severe respiratory illness, we are consistently recommending that folks use N95 or, you know, N95 masks for personal protective equipment.

Question cont'd: Okay, thank you so much.

Lauri Hicks: You're welcome.

Alycia Downs: Dr. Hicks, thank you again for providing our listeners with this information. I think this was a great and meaningful presentation. I'd like to thank our participants for joining us today. And I know some of you weren't able to answer your questions, so if you could please send an email to

COCA@cdc.gov – c-o-c-a@cdc.gov, we will work with Dr. Hicks to get you a timely response.

The recording of this call and the transcript will be posted to the COCA Web site, www.emergency.cdc.gov/COCA within the next week. You have a year to obtain continuing education credits for this call. All continuing education credits for COCA conference calls are issued online through the CDC training and continuing education online system, ww2a.cdc.gov/tveonline.

Thanks again for participating and I hope everyone has a wonderful day.

Lauri Hicks: Thank you, Alycia.

Coordinator: And that concludes today's conference. Thank you for participating. You may disconnect at this time.

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