COCA Conference Call
Recent Mumps Outbreak and Update
Dr. Susan Reef
July 24, 2006

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Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen only mode.

After the presentation, we will conduct a question and answer session. To ask a question, please press star-1 on your telephone keypad.

Today's conference call is being recorded, so if you have any objections, you may disconnect at this time.

I will now turn the meeting over to your host, Mr. James Schwendinger.

Sir, you may begin.

James Schwendinger: Thank you Mark. Hi everyone and thank you for calling in. This is a very important conference call.

We have the privilege of having Dr. Susan Reef, here from the Centers for Disease Control to talk about the recent mumps outbreak in the Midwest primarily. We're very lucky to have Dr. Reef.

She's that Technical Lead for the Rubella and Congenital Rubella Syndrome Epidemiology Section, in the Measles Mumps, and Rubella team, as part of the National Center for Immunization and Respiratory Diseases.

She's been the Technical Lead for Rubella and CRS in the United States since 1996, so she has a lot of experience and lot of knowledge on these topics.

She's published numerous articles in rubella and CRS and has worked extensively with the Pan American Health Organization or PAHO in promoting rubella and CRS elimination in the Western hemisphere.

In addition, Dr. Reef has worked extensively with the WHO Eastern Mediterranean Regional Office in promoting rubella and CRS control throughout the world.

So we're very privileged and very happy that she could take this time to talk to us about mumps in general and the recent mumps outbreak here in the United States.

And with no further ado, I would ask Dr. Reef come on in. Thank you for being with us and presenting.

Susan Reef: Thank you very much for asking me to speak. In addition to my work in rubella, I've also dealt a lot with mumps since'96 and worked extensively till about last year with mumps too. And then I was – I went out to Iowa as part of the mumps outbreak this year.

Today, I'd like to talk to you about the epidemiology of mumps and the multi-state mumps outbreak in the United States in this year.

Next slide please.

As part of what I'm going to present today, I'm going to talk a little bit about the clinical characteristics, but I'm sure many of you have seen a lot more mumps than I am.

I'm a pediatrician trained in infectious disease, so I've seen mumps but probably not to the extent that many of you have.

Then we're going to talk about the epidemiology of mumps. We're going to talk about the multi-state outbreak this year and then look at vaccine recommendations and how they changed in light of the outbreak this year, and some of the challenges that we faced as part of this outbreak.

As many of you know, mumps is acute viral infection and it was probably first seen as parotitis and orchitis described by Hippocrates in the fifth century B. C. It's an old, old disease.

And that it was basically in 1934 Johnson and Goodpasture identified it as the ideological agent of mumps as a virus. And then as what's seen World War I it was a frequent cause of outbreaks among the military personnel in the pre-vaccine era.

And the last one that we know of was onboard a ship in the Western Pacific in 1992, so it had - continued to be of cause of outbreak (upon) military personnel.

Mumps is a paramyxovirus virus and is related to paraflu, measles, and RSV. It is a single stranded RNA virus which has only one serotype or antigenic type and it's rapidly inactivated by chemical agents, heat and ultraviolet light.

Next slide, please.

Some of the clinical features is that the average incubation period is 14-18 days, however, the incubation period can range from 12 days to 26, so it has a very lengthy incubation period.

And many times we see non- specific prodrome of low grade fever, headache, malaise and myalgias.

Parotitis is also seen in 30%-40% of the cases and up to 20% of the infections are asymptomatic, which makes it very hard, very typical to rubella and not like measles.

And in children, it may present as lower respiratory tract infections, particularly in the school age children.

Next slide, please.

And this probably a photo that many of you have seen as mumps in a child. It's very interesting that back in the mid-1990s, we had a pseudo-outbreak of mumps because of someone misdiagnosed one of the lymph nodes as being - as mumps or parotitis and we have false positive IgM, so they had – we had a pseudo outbreak in a nursing home.

So it's very important to look at what mumps looks like clinically.

Some of the complications that we see with mumps is CNS involvement and that can be up into 15% of the clinical cases. And it usually results without any sequelae in by three to ten days. This includes the meningitis and the encephalitis.

And adults are at higher risk for this than children and males are at a higher risk than females. Orchitis which - particular information can occur in 20$ to up to 50% of post pubertal males. And about half of these - of the males are left with some degree of testicular atrophy but the sterility is very rare, and as a concern of many when a male have some mumps.

Pancreatitis occurs only in 2%-5% of patients.

And there is no data to support no cover relationship between mumps and diabetes, that's been conclusively demonstrated. And deafness is caused by mumps as seen in 1 and 20,000, but when I talk to physicians that - for mumps in the pre- vaccine era they think this is very low, because mumps was one of the top primary causes of non- traumatic deafness in post acquired disease or deafness and it’s usually unilateral and it’s usually permanent.

And that is also very rare and seen in 1 to 3 per 10,000 cases of mumps.

Next slide, please.

Humans are the only known reservoir for mumps which is very important when you want to eliminate or eradicate a disease. It could not have another host or reservoir.

The virus is transmitted via direct contact, either through saliva or infected droplets on surfaces or by respiratory droplets. And it enters through the nose and mouth and this is much different than what we see with measles, which is much more respiratory transmitted and you can pick up the measles virus 2 hours after someone has been there.

Also to note is that clinical infections may transmit disease also. As we see usually mumps peak in the late Winter and early Spring. And communicability is 3 days before to 4 days after the onset of active disease.

Next slide, please.

This slide is an epicurve. Mumps became a nationality reportable disease in 1968, 1 year after the live attenuated mumps vaccine was licensed in 1967. And as you can see, this are - the access shows you cases by - in thousands.

So in 1967, we had over 114 - or 140, 000 cases and basically gone down to less than a 1,000 cases in the mid-1990s.

Next slide, please.

And as you will see this epicurve is from 1980 to 2005. In 1998 because of the measles outbreaks and the vaccine failures, a two dose schedule is recommended for measles which meant because mumps was given as an MMR vaccine, that mumps automatically because a two dose schedule apart of the two dose schedule. And you can see there the rapid decline after the implementation of the two dose schedule.

Next slide.

You will see in 1993, we had 1,600 cases reported of mumps. In 1996 we had 751 which was a significant decline, almost a 1000 less.

Nineteen – 2002 270, 2004 258, 2005 265 and in 2006 we have over 5,000 cases. As part of the 2010 Healthy People Objective, was to eliminate indigenous mumps by 2010. I think we have some work to do.

What happened in 2005 is that we were alerted to an outbreak that occurred among campers and staff members at a summer camp. There were 31 cases of mumps. This was published as an MMWR in February 2006.

And the index case was a camp counselor who traveled from the UK to - and see had not been vaccinated from mumps.

And what we learned out of this outbreak is that they did a vaccine affecting this study and one dose was found to be 80% effective, the second dose was 90%.

Just so you know that in the UK, from 2004-2005, there were over 73,000 reported cases of mumps and was particularly seen in adolescents and young adults because of their vaccination strategy.

Next slide, please.

Going on to this year, and the mumps outbreak basically was centered around Iowa and you'll see more information where there's a little over 2,000 cases now of mumps disease.

Next was Nebraska with almost 800 cases, Wisconsin 600, and in Illinois 500, but you'll see the surrounding states basically were affected by the mumps outbreak and you'll see a few states like New Mexico, Mississippi, and New York had some outbreak associated cases.

This is data up to the - almost the end of June, where we had 4600 cases.

Looking at the week of onset for mumps cases, for - looking at the eight outbreak states and this is provincial data, you will see in yellow is Iowa. And you can see that Iowa basically led the outbreaks in that it peaked right before about a month, before we see the peaking of the other seven states.

Basically the outbreak is particularly almost over. There are a few states that are still having cases, but it's very limited. And you'll see that it peaked in the mid April or first part of April and then first part of May.

This case, this slide is very busy, but it looks at the incidence of mumps by week of onsets. And you will see there are different scales. Iowa goes up to almost 10 per 100,000 cases when it peaks.

Iowa is up on the left hand upper corner. You'll see in Nebraska it almost went up to 2.5 to 3 per 100,000 cases and the rest of them are less than one or less than two.

You'll see Wisconsin peaked almost up to two, but much less incidence. And when you look at the overall incidence will show that Iowa had the highest incidence.

When we look at the demographics of the reported mumps cases, Iowa had about 50% of the cases, which were almost close to 2,000, where the other seven outbreak states together had less - about 50% of the cases.

Females represented 65% of the cases. Median age was 22, with a range of less than 1 to 96 years of age.

Next slide.

When we looked at the incidents, Iowa had 65 per 100,000 population, or Kansas had less than half that incidence with 28, South Dakota 24, Nebraska 17 and Wisconsin 4.9.

So you can see that the center of the outbreak was sitting in Iowa, with the states around it having much less incidence of mumps.

Next slide.

When we look at the overall incidence by age group, you will see that persons 18-24 years of age had the highest incidence, whereas people 5 to 19 had the second to the highest incidence, but not that much different from people 25 to 39.

This maybe due to the fact that the second dose strategy that came into effect in 1989 was not immediately implemented in many of the states and that many of the students only had one dose.

We have tried to implement or we are working with the College Association to implement two dose strategy including mumps strategies for the college age students. But you will see the effect of the one dose in the 18- 24 year olds.

When we look at Iowa compared to the seven other states, which is the next slide, you'll see that they almost mirror each other in the incidence by age group.

Next slide, please.

When we look at the summary of the multi-states mumps outbreak, we noticed that college students were particularly affected especially in Iowa and that there were cases in healthcare workers.

What - to note is there were a few outbreaks reported in schools and that's primary and secondary schools, or childcare centers and that the transmission remained fairly focal, with little or no spread to the vaccine refuser population and very few cases in infants.

From the data we have so far, the vaccination status, reported through NDS to date our – which is our National Notifiable Disease Surveillance System. But looking at the data from Iowa, 7% were unvaccinated, 14% had one dose, 50% had two doses, and 30% had unknown vaccination status, that basically was the adult population.

Next slide please. When we looked at the mumps genotype, which was from 20 plus specimens, from nine different states, it was mumps genotype which is similar to what we've seen in the UK, but the index case has not been identified yet.

Next is the clinical summary of reported mumps cases that we have. I just want to tell you that what's important is that when we look at this, we have to realize that our case definition plays a very important role.

Our clinical case definition for reporting cases is an illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary glands, lasting two days or more and - without other apparent cause.

And that's important because we see that parotitis makes up 80% of the cases, and that has to do with basically what we are reporting as a clinical case of

mumps, and that is different from what we've - I presented earlier, the clinical features.

You'll see that we had 10 cases reported of meningitis which is 0.4%, which is much lower than what has previously been informed – reported. And encephalitis, which we had five cases of 0.2% and orchitis which is - we had 59%, which is 4.4, and deafness which is 6 or 0.2 which is much lower.

However we have to remember that we are now in a post-vaccine era and that the data I presented earlier was in the pre-vaccine era. And we had 43 hospitalizations and we've had zero deaths.

Next slide please.

When we looked at hospitalizations, we had two different data sources for this. And we had the surveillance system which reported 43 hospitalizations and we had biweekly reporting, to which the states reported to the CDC directly and we have 66 hospitalizations.

And looking at just the biweekly reporting, here below is of – and of 55 the - why people were hospitalized, ten for meningitis, three for encephalitis, four for orchitis, one each for iritis and mastitis which have been seen in mumps, pancreatitis, pregnancy which is important that you get basically no defects, it's not a teratogen, however some people have reported spontaneous abortions with - resulting from mumps infection, but that's of question and then people were hospitalized (severe) dehydration, pain, headache, and swelling.

Going on to our next - as part of looking at the mumps outbreak, we decided to look at the attack rates in two highly affected college campuses in Iowa.

And when we looked at one college campus which had a high percentage of their college students with two doses of vaccine, the attack rate was 2%.

However in the second college, as only 77% of their students with two doses, the attack rate was 3.8 -- almost double.

When you looked at the vaccine failure rate, it was – for two dose recipients, it was about 8%, which is not that high.

I want to shift gears to talk a little bit about the mumps vaccine. This next slide is that - the composition of the vaccine is a live attenuated vaccine, is the Jeryl Lynn strain that is as you know, Maurice Hilleman's daughter – Jeryl Lynn, is where he got the mumps strain from.

From the clinical trials, efficacy was about 95%, with a range of 90%-97%. It was assumed that the duration of immunity was lifelong from the mumps vaccine.

And the schedule it's says here is two doses as with MMR. As we talked earlier that in the late 80s, that - with the issues around the mumps – the measles outbreak, they went to a two dose schedule and that it should be administered with measles and rubella as MMR, and that's been recommended since the late 1970s.

The next slide.

When we look at information on the mumps vaccine – efficacy, from the original clinical trials before it was licensed, we found that the vaccine efficacy ranged about 95%-96% with confidence intervals in the high 80s versus 98%, and this is both on Jeryl Lynn.

When we looked at outbreaks studies in the next slide, there were several outbreaks that they looked at the vaccine effectiveness, it ranged from 75% all the way to 91%.

So the vaccine was not quite as effective in the outbreak study, as what it had been in the clinical trials and this is with one dose. And this is what we saw with the outbreak that we've just seen over the last couple of years.

The next slide, please.

And - so the next several slides that I'm going to show you is up until June - May and June of this year, is what has been our recommendations for mumps. Mumps vaccine is indicated for all infants 12 months or greater of age, and that has not changed at all.

And - for susceptible adolescence and adults without documented evidence, the immunity, and that's not changed either.

And what the MMR vaccine – next slide – 12 months is the recommended age and the minimum age. And MMR should not be given for 12 months of age and it should not be counted as a valid dose.

If it's given because of issues around a measles exposure and stuff in a younger child, that vaccine even though it's given is not counted, period. And the child should be revaccinated at 12 months of age or older.

Next slide.

What we would consider with mumps immunity is birth before 1957. Documentation of physician diagnosed mumps, serological evidence of mumps immunity or documentation of adequate vaccination which has changed – that last one has changed significantly since the outbreak.

On the second dose recommendations which was on the next slide, is that the first dose of MMR should be given at 12 to 15 months of age. The second dose we've recommended of MMR, should be given at four to six years of age.

However, the second does maybe given anytime after four weeks after the first dose. So you don't have to wait to four to six years of age, if there are issues around exposure to measles, mumps, or rubella.

Next slide, please.

And the second dose of MMR was initially intended to produce immunity in persons who fail to respond to the primary dose. So primary vaccine failures. And it may boost antibody titers in some of the persons.

Next slide, please.

However, that has changed at this point in time. The updated ACIP recommendations that were changed in light of this outbreak, was that basically changes in evidence of immunity through vaccination, one dose for children one to four years of age and for low risk adults, two doses for school age children and students in post high school educational facilities, international travelers, and workers, and healthcare facilities.

For healthcare workers without other evidence of immunity that we talked about, two doses should be given routinely. And birth before 1957 consider one dose in non-outbreak settings and strongly consider giving two doses during outbreak settings.

During outbreak situations, you may consider to give a second dose for children one to four years of age and low risk adults which are – which is everybody else that we didn't talk about, if they're affected by the outbreak.

And the second dose for children one to four years of age, if they – if there's issues around exposure or if they're at high risk for getting mumps.

The next slide, please.

I think the issues are why mumps, why the Midwest and why now. The question was raised, is it unrecognized importation from a student, visitors from the UK or elsewhere.

As we talked about or I briefly mentioned earlier, that there was over 70,000 cases of mumps going on in the UK, their vaccination program is totally different than ours.

UK did not start their vaccination program until 1988, and that's when they started routine MMR given to childhood and prior to that, they had an adolescent program for rubella.

It was not until 1996 that they had a two dose recommendation. And in the meantime, they did an MMR, measles, rubella campaign for children up to the age of 15. So there is a major gap for - in the UK on young adults – in adolescents and young adults who have not been given the mumps vaccine.

The other issue is the delayed recognition for the outbreak. You know, many physicians have never seen mumps disease. Was it modified? And I think what was very important is some early cases were ruled out with a negative IgM.

We – the issue of, can this really be mumps with people that have had two doses and it really was mumps. So it's very hard, you know, the initial cases were negative for IgM.

And for the college settings where a lot of the transmission occurred in Iowa, is that there is high transmission potential. They live in dorms. I think there's an intense interaction for social events.

And in some schools there were lower two doses vaccine coverage than other schools, and the question of poor adherence to isolation guidelines.

I think even though many of the students may have been told to stay in their rooms or not to socialize, but because they may have had mild disease, that did not stop them from getting out and socializing or going to parties.

Next slide, please.

I think we've shown that two doses from previous studies was about 90% vaccine effectiveness. And you know, that may have resulted in accumulation of susceptible persons that were (suspicious) to sustain transmission, and that's why we have a sizeable outbreak.

We don't know about contribution of (waning) immunity or the transmission of - from mumps infections in the mild illness presentations which we saw in possibly many of the students.

Next slide.

However, I want to say that we have had – we had MMR vaccine coverage levels and even though the vaccine effectiveness probably prevented thousands of additional mumps cases, because 9 out of 10 exposures probably - that may have resulted infections were prevented.

When you look at it, the incidence was relatively low compared to the pre-vaccine era and that the disease because of persons who vaccinated with mumps vaccine, the complications may have been and hospitalizations may have been decreased significantly.

That's the end of it. Thank you very much.

James Schwendinger: Great. Thank you Dr Reef. That was excellent.

I just had one question before we open it up to the other folks.

Back on Slide – I believe it was 28…

Susan Reef: Okay.

James Schwendinger: …the first slide looking at the clinical trials data for…

Susan Reef: Uh-huh.

James Schwendinger: …the vaccine. Are those numbers from one dose or two?

Susan Reef: It would be one dose.

James Schwendinger: Okay. That's what I thought, thank you.

At this time, (Mark), we could open it up to questions from the listeners and just ask that if there's any media folks on the call, not that we don't want you on the call, but this, you know, these call are primarily for clinicians, so we would just ask that you not ask a question over the phone and at the very, very end, I'll give the media relations mailbox address that the media could inquire through. And we'd like to just leave room for the clinicians to ask clinical questions.

And with that, I ask (Mark) to open it up for questions.

Coordinator: Sure. We'll know begin the question and answer session.

If you would like to ask a question, please press star-1 on your telephone keypad. If you wish to cancel your request, press star-2, and if you're on a speakerphone, you may need to lift your telephone receiver before making your selection.

One moment please for the first question to queue up.

Go ahead, please.

Question: Hello. I have kind of pair questions.

The first is, in the context that was sometimes think of pandemic influenza, one of the issues appears to be that we could expect an infectious disease to spread very rapidly across the country.

And yet here, we see this kind of narrow spread in just the middle of the Midwest with only the tails going outside of the sort of a circle in the middle of the country.

And I was little surprised, (at least) perhaps but a little surprised, is there an explanation for that?

Susan Reef: We're not completely for sure why this happened. I think that's an important observation. What it has to do with – was looking at this further, but whether what the two dose coverage is particularly in college students, the way of - the travel patterns and some stuff, it may have, you know, made a big difference on how it was spread, you know, where they travel to versus what the two dose coverage is.

You raised a great question. We're not for sure why.

Q (con't): Well, I hope that it's good news. Quickly ask, you said that you had various sources of information. I was wondering if this was one of the things that the BioSense program that CDC is running contributed to.

Susan Reef: Not that I know of.

Q (con't): Okay. Thank you very much.

Susan Reef: We rely basically on our surveillance system that has been in place for years – decades. So - and then we supplemented it with talking to our contacts in the States.

Coordinator: Next question.

Go ahead, please.

Question: Yes. We have just recently been (inviting) all of our employees that work in like pediatrics and nursery and things like that, if they have low (siders), we've been giving them their MMR vaccines.

We have recently had an employee that a month ago we gave her an MMR...

…and she has a reaction to her arm. She came in this morning. It's been four weeks, with a hard knot in the area where she had her vaccination. Is that something that's normal with MMR?

Susan Reef: It is not. I would look to see how long is the hard knot been in there, is it inflamed, is it tender, warm?

No, it's not at all what we have seen.

Q (con't): Right. It really is and, you know, we just – we had never seen that before with an MMR vaccine.

Susan Reef: No, is it secondarily infected or – but no, we've not seen that either.

Q (con't): Okay. What she said she had had a little spot there ever since we gave her the vaccination and then just over weekend, got low grade (temp) and her arm is inflamed.

Susan Reef: I wonder if there's – it was, you know, somehow secondarily infected at the time or shortly thereafter.

Q (cont'): Okay. Thank you.

Coordinator: Next question.

Question: Hi. I have a couple of questions.

Susan Reef: Okay.

Q (cont'): I see here in your slide, parotitis incidence is about 30 to 40 persons even though, you know, most cases are almost 80%?

Susan Reef: Right.

Q (con't): But do we still look for parotitis as the main feature, in other words, like if they don't have parotitis, is it still, you know, can they still have mumps?

Susan Reef: They can still have mumps, definitely.

As I was saying that, the reason we probably saw predominance of parotitis, have to do with our case definition and what people are looking for. However, I can tell you that - and – like the ones that have like meningitis or - particularly meningitis, around 50% of them do not have parotitis.

So parotitis may not be present at the time. So if you think someone may have mumps and they don't have parotitis, I would still work them up – definitely.

Q (con't): I work in an office - in an office setting, (unintelligible) other infections that is symptomatic, so - I mean who do you screen and who do you not screen…

Susan Reef: I think that's a tough call, but I would probably – I would look at the symptomatic ones that you could really look at because it's almost impossible to look at the ones that have such a non-specific.

Q (con't): Right.

Susan Reef: So I think you have to go where it must clear and in diagnoses and stuff.

Q (con't): My second question is how sensitive and specific is the serology for confirmation of the diagnosis?

Susan Reef: That – to be honest with you, that was one of the challenges during our mumps outbreak. And we found that because people had one and two doses of mumps vaccine, many of them did not have an IgM or they had an IgG present.

Many times we had to look at the IgM, the IgG and then get a very good specimen for virus. So what we did is that we would get all those three tests and if we could not confirm it, you know, and it looked like parotitis, then we would put it as a probable case knowing that our – that the laboratory is not that sensitive.

But currently there are several studies going – ongoing right now to really look at the sensitivity and specifity of the laboratory testing and whether or

not we need to improve that - prove the testing that is available, but is a really good question and something that we're trying to address.

Q (con't): Is there a positive for IgM and maybe (unintelligible) IgG (unintelligible) have probably better effectiveness, you know, confirmed together of mumps?

Susan Reef: I, you know, I would probably say if we had an IgM peripheral (rides) one of them or a viral isolate, I would take it because probably most of the cases you see have at least one or two doses of vaccine on.

So I think one of the tests being positive I would call it mumps.

Coordinator: Next question.

Question: Slide 33, the updated ACIP recommendations…I was a little confused by the first bullet.

Susan Reef: Okay.

Q (con't): …what you are talking about when you say changes in evidence of immunity to vaccination?

From the previous slides, it sounds like you want them to get it at 12 months and then maybe the second dose somewhere between four to six years old, but then the slide is confusing me.

Susan Reef: Okay, okay.

Probably – what we are saying now is the same at one dose at 12 to 15 months.

Q (con't): Okay.

Susan Reef: And then the second dose to give it still at the four to six years.

Q (con't): Okay.

Susan Reef: And - so it's the same situation as we are - have now. But in an outbreak setting, that you can go ahead and give a second dose to the younger kids, if needed.

Q (con't): Are you going to be looking for evidence of immunity in a blood titer type or first or you're just going to be giving it if they've had a clear exposure?

Susan Reef: I would just give it. I would not do titers of immunity.

We found out that the vaccine only one dose is only 80% effective, so you need a second dose.

Coordinator: Next question.

Go ahead.

Question: Yes, my question kind of mirrors the one that was just asked regarding the immunity. Because it states that a serologic evidence of mumps immunity for healthcare workers, is it recommended to get that titer first before we go ahead and routinely vaccinate them if they were born before 1957?

Susan Reef: What we have found that – and we're looking at this is, is that we're not for sure what is protective immunity by serology. And some people would say just go ahead and give them the second dose if they're exposed.

And one dose - if they're born before 1957, one dose is good enough. And I think if you look at the hospital workers, they'll talk about one dose.

Q (con't): Okay. So the one dose rather than – consider the two doses.

Susan Reef: Right. It's – the two dose is only for, if a person's born 1957 or after or if someone's born before 1957 if there's an outbreak going on in the community then consider giving them a second dose.

Q (con't): Okay. So not necessarily recommended, the titer, because we don't have a range to know what is protective.

Susan Reef: Right.

Q (con't): Okay. Thank you.

Coordinator: Next question.

Question: Yes, we are as well a healthcare doing titers.

Have any recommendations – number of employees for the MMR potentially to previous reactions or other medical history?

Susan Reef: I think what you would have to do is that, on the hospital – the CDC site, it talks about exclusion, if there is an exposure, then you may have to exclude them depending on whether they've had only one dose of vaccine.

But there's a whole entire exclusion policy on our CDC Web site and they would probably be excluded.

Does that make sense?

Q (con't): Excluded from the vaccine or…

Susan Reef: It - no, there's exposure issues with mumps.

Q (con't): Okay. I'll just take a look at that.

Susan Reef: But, yeah - no, you know, you would just keep documented who has one dose, who has two doses. And if you've done serology on the, look at their level of immunity, but you'll look at the Hospital Infection Web site, they don't, you know, they consider serology as, you know, not one of the definitive measures for immunity.

And they would probably exclude those folks if there's a risk of exposure to - risk of exposure or if they've been exposed to mumps.

Q (con't): Thank you.

Coordinator: All right then.

Our next question.

Go ahead please.

Question: Yeah. Thank you.

I work for a local health department and we are involved in doing surveillance for mump cases. And we - well, for all reportable diseases. And we try to follow very closely the clinical case definition which includes, you know, positive IgM as being a case. And I'm wondering if you can comment on false positives, as well as it appears that Iowa interpreted it possibly a little different.

They counted a positive IgM as a probable that could potentially be ruled out with clinical information.

Susan Reef: I think you - they were looking at that because of people that didn't meet the clinical case definition.

Q (con't): Right.

And we had, you know, if somebody came back positive even a 1 to 10, we counted that as a case irregardless of clinical considering that maybe it was an asymptomatic person that was infected, just given the situation with mumps.

And I'm not, you know, I just want some clarification because I was a little uncomfortable with that myself.

Susan Reef: Right.

I think when you look at a clinical case definition, it talks about parotitis.

Q (con't): Uh-huh.

Susan Reef: And I think what's going to happen with - in light of this outbreak, we're going to modify the case definition to include orchitis, meningitis, encephalitis.

But the issue of the asymptomatic or the mildly symptomatic folks, what Iowa did is make them into probable or suspects because they, you know, they're not for sure what - whether or not these folks were just mildly infected, or what.

You can, you know…

Q (con't): And we would consider then a more probable but ultimately that counts as our numbers for a confirm, the probable and the confirmed get lumped together as cases…

Susan Reef: Right.

Q (con't): …our state and the numbers that includes both.

Susan Reef: What state is this?

Q (con't): Illinois.

Susan Reef: Illinois, okay.

I can tell – we - what we did is, is that we kind of took out the asymptomatic IgM positives and didn't currently count them. So…

Q (con't): And another challenge for us has been, you know, just the parotitis. We might get information about swelling but we're not, you know, and oftentimes, you

know, it isn't challenging to know if it's actually parotid gland or lymph gland.

And you know, if someone may have just gone because they heard about mumps happening during the time period and request a blood test. So there were all kinds of challenges with the surveillance information.

Susan Reef: Yes, yes.

I know what you're saying. I think you know, you have to get the best clinical information you can. But then at the end of the day, as I said - back in the - I think it was the mid-90s, we were involved with a pseudo-outbreak because people got the lymph nodes mixed up with the parotid and other salivary glands.

And we had IgM positives. It was not until we went out and realized what had happened.

I think one thing mumps is the only thing that causes epidemic parotitis. I think if you have a person that's been exposed in this part of an outbreak setting, I think it's much more realistic.

But if there are sporadic cases, then, I think that would raise a lot of red flags and - for further information to be obtained.

Does that make sense to you?

Coordinator: Okay. She has left the line.

Susan Reef: Oh, no. Okay.

Coordinator: We'll go on.

Once again, if anybody would like to ask a question, if anybody has any further questions, please press star-1 on your telephone keypad.

Next question..

Go ahead.

Question: Yeah, I had a question, you mentioned that there was little or no spread to the vaccine refuser population. With this population, is there any chance they were serving as a reservoir of asymptomatic patients or what not?

Susan Reef: Not that we know of. People look to see - if they were vaccine refusers, they would probably have full-blown disease and not the asymptomatic.

We'd probably seen much more asymptomatic or mild disease in the vaccine population, so probably not.

Coordinator: Our next question.

Go ahead.

Question: Hi.

I have a question. At your study, why it is that we only have the mump case outbreak in US? I was reviewing the cases in Mexico and Canada, and since that student college case went to Mexico for a spring break, they only have 22 cases reported as of July 15 over there.

And I've been reviewing how the vaccines are being stored and handled and that's my biggest concern.

Do you have any studies regarding that topic?

Susan Reef: I don't know how many. It depends on - I don't know about Canada and stuff, it depends on their vaccine practices and stuff and their level of immunity.

I don't know the quality of what surveillance is like in Mexico. So it may depend on the reporting of cases, it could vary from a whole list of issues and stuff.

But the UK, I can tell you we had 74,000, there is mumps in other countries. So, mumps is seen in many places throughout the world.

Q (con't): Well, actually, surveillance in Mexico has to be – is much intense under reporting is larger than here. And - so I'm confident about the type of surveillance.

My question is, have you done any study to see how they store and handling those vaccine, may have an impact on this type of outbreak because based on my personal observation despite all the efforts that the state does, there are still many issues surrounding that.

Susan Reef: I think that's an important question but because that there was many healthcare providers, many different persons, many places that people got vaccinated, storage and handling can't make - cannot explain what happened in the mid-West.

So, if we found (local) outbreaks, that's one thing. But this was a quite a diffused outbreak.

So - but that's important, you know? And in some places, it can't be ruled out.

Q (con't): Thanks.

Coordinator: Next question.

Question: Yes, hi. Thank you for taking my call.

I work a lot with education of international travelers and I was wondering what your recommendation would be for our clients who are traveling internationally, who maybe in their childhood immunizations only received one dose of MMR.

Would you at this point recommend for those frequent travelers who say third world countries in Asia, China, pretty much all over the world, would you recommend that they just go ahead and get a second dose?

Susan Reef: I would because mumps is still endemic in many parts of the world.

Q (con't): Okay.

Susan Reef: So, what we recommend is a second dose for international travelers.

Q (con't): Thank you.

Coordinator: Next question..

Go ahead.

Question: Thank you.

I'm the Director of a college health center in Virginia and so my question is sort of two parts.

The first one is, do you expect to see an increase in mumps cases? Again, when the kids come back to college, you know, in late August, early September. I know in Virginia, we were having maybe anywhere from 2 to 10 cases of mumps annually. And this - so far this year, we have over 42 cases reported in the state.

And of course, my concern is, is mumps going to come to my campus? My campus is very well-immunized. My students – I've got 3,500 students and virtually, all of them, it's less than 1% that probably doesn't have immunity that we can document or has, you know, hasn't gotten the shots. We're working on that.

But I'm more concerned about the faculty and staff. And I know that the CDC and the American College Health Association, when they made their joint recommendation, their last comment was that schools and post high school educational institutions experience an outbreak of mumps should consider implementing a policy to ensure that faculty and staff has two doses of MMR.

Or I was wondering, if you expect there's going to be a resurgence of mumps when college starts back up this fall, is it – is there any merit to advising your faculty and staff sort of preemptively that they might want to know what their status is, in the event, you would have an outbreak on your campus or is that just, you know, causing too much commotion?

Susan Reef: I think you raised a wonderful question.

We can't tell you what's going to happen. We're hoping that by working with to give a two-dose vaccine policy that we will prevent it from coming or taking out the risk of it.

And I was in Iowa and yes, some faculty and staff did get mumps. And so, definitely, if, you know - they are at risk because they are close to the students and work with the students.

So, I think, you know, if there's not too much problems, I think giving vaccine to them would be important.

Also, you said, your 3,500 have - are vaccinated. Is that one or two doses?

Q (con't): Two doses.

Susan Reef: Great.

Q (con't): Virtually all of them. Maybe a handful of law students haven't gotten around to it yet.

Susan Reef: Okay.

Q (con't): But we don't have an employee (housed) here…

Susan Reef: Okay.

Q (con't): …at the university. So, while I know what's going on with my students, I don't know what's going with faculty and staff. I don't know than anyone does.

Susan Reef: Uh-huh.

Q (con't): And there's a - quite an age range. I mean there are folks that is, you know, born before '57 and those after '57. And people have come from all over the place to work here and they may or may not have had one or two doses of vaccine.

And frankly, I'm more concerned about an asymptomatic student bringing a case to campus and giving it to one of the employee, more so than to the other residential students.

But…

Susan Reef: I think it would be something worth investigating.

Q (con't): Uh-huh.

Susan Reef: Because, you know, in the outbreak there were staff in place that definitely developed mumps.

Q (con't): I was trying to look at this as a proactive more than a reactive stance just in case.

Susan Reef: I think it makes perfect sense…

Q (con't): Thanks.

Susan Reef: …and makes perfect sense because we - that's why the statement was put out by both – a joint statement to prevent mumps from coming back to the campuses, this next school year.

Q (con't): Thank you.

Coordinator: All right then, we show no further questions on the phone line.

We'll turn it back over to you for further comments.

James Schwendinger: Great.

Thank you.

And Dr. Reef, thank you very much. Those are some great questions. Thank you to the participants for asking them.

Dr. Reef, if you have anything to close, please feel free.

Susan Reef: I think the most important thing is that we've realized from this mumps outbreak that we needed to change our vaccination policy and that two doses are needed for immunity to mumps.

And I agree with the last caller that instead of being reactive, proactive, it's very important.

James Schwendinger: Great. Very wise words.

Thank you so much again, and thanks for the great presentation.

For the participants, please, you know, hang on till (Mark) gets back on. He's going to give the replay number and information.

And I'd also like to just ask you to keep in mind that our next COCA conference call will be Tuesday, August 8 at 1:00 pm Eastern time. And Dr. (Nicole Smith) from CDC is going to talk about pandemic flu preparedness.

And the call-in number and her bio and slides hopefully, will be on the Web site. And I apologize as well for the technical difficulties we ran into and not having our slides ready till this morning.

But that information about that call and other upcoming COCA conference calls will be on our Web site at www.bt.cdc.gov/coca -- C-O-C-A.

And if you didn't get a chance to ask a question, please feel free to email us at COCA, that's coca@cdc.gov. So, C-O-C-A at cdc.gov and we will answer them.

And with that, I turn it back over to (Mark).

Coordinator: All right. Thank you.

Instant replay will be available in about an hour.

For those of you who wish listen to the call, you can do so by dialing 866-443-8037. That replay of this - today's conference call will be available in an hour and if you wish to listen to it or have somebody else listen with you, you can dial 866-443-8037.

This concludes today's conference call. We thank you for your participation.

You may disconnect at this time.