FTS-CDC-PHPPO
November 17, 2004
12:00 p.m. CST

Moderator … listen-only mode until the question and answer session of today's conference. The call is being recorded. If you have any objections you may disconnect.

I'd like to introduce your first speaker, Ms. Shawn O'Connell.

S. O'Connell Good day and welcome to the 2004 Public Health Teleconference Series on Infectious Disease. This is Shawn O'Connell, State Training Coordinator at the Tennessee Department of Health Laboratory Services. Today's teleconference is being hosted by Laboratory Services and is sponsored by the National Laboratory Training Network in cooperation with state public health laboratories. Welcome to our teleconference, Veterinary Diagnostic Laboratories.

After the program each participant needs to register and complete an evaluation form. Documenting your participation helps us to continue

high-quality training programs in a variety of formats. To do this go to http://www.phppo.cdc.gov/phtnonline . The password is VETERINARIAN. When you've completed the registration and evaluation form you'll be able to print your CEU certificate. You will have until December 17th to complete this process. These instructions are in your original confirmation letter and the general handout and they were also e-mailed to each site representative this morning. If time permits the end of the program will be opened up for questions.

Again, welcome and thank you for joining us. We have over 60 sites from across the United States listening to this teleconference. Today's speaker is Dr. Patricia Blanchard. Dr. Blanchard is a Veterinary Pathologist by formal training, but through experience and job responsibilities, is a broad-based diagnostician dealing with diseases of livestock, primarily cattle. She serves as the Chief of the Tulare Branch of the Five Laboratory California Animal Health and Food Safety Laboratory System, the CAHFS. CAHFS is an accredited veterinary laboratory with the American Association of Veterinary Laboratory Diagnosticians, the AAVLD. From 2000 to 2003 she was an officer of the AAVLD, serving as President in 2002. Also, since 2002 she has served as the association's representative on the National Animal Health Emergency Management Steering Committee

Steering Committee and as the Official Liaison of the AAVLD with the Association of Public Health Laboratories.

It is my pleasure to welcome our speaker, Dr. Blanchard.

Dr. Blanchard Thank you, Shawn. Good day, all.

Today I'd like to explain and help you understand the role of veterinary diagnostic labs, their capabilities and how they work with emerging diseases and foreign animal diseases. In addition, I'd like to address some of the past, current, and future common concerns and interactions that we share with the public health laboratory community.

Slide two, "Structure in Veterinary Diagnostic Laboratories." Most veterinary diagnostic labs are associated with the universities, primarily veterinary schools in the 25 states that have those and land grant universities, which are the original agricultural schools. In land grant universities without veterinary schools they're associated with veterinary science or animal science departments. Some veterinary laboratories are linked to the state Department of Agriculture with no university or college affiliation. Some are private, for-profit, which may serve a unique niche

or be a national chain, such as Idexx or Antech. These laboratories specialize in companion animal testing, such as biopsies, bacteriology, serology, and rapid viral assays for cats and dogs and other companion animals. They also provide a broad clinical pathology service for all different species of animals.

In addition, there are some resources that are for specific functions. Large zoos and wild animal parks may have their own diagnostic laboratories. A number of the commercial poultry companies have their own in-house diagnostic labs and as we know, most of the pharmaceutical industry has its own research and development laboratories. Most of the small poultry producers tend to use the veterinary diagnostic laboratories that already exist in their state or university.

In addition, the State Departments of Fish and Game will often have a smaller veterinary laboratory that provides services specifically to wildlife in that state, but will use the broader base of the testing provided in the state or university laboratories for additional testing.

Slide three: The primary funding of the diagnostic lab, since we all know that function follows money and just as we see with their structure, veterinary

labs are often funded from a university or veterinary school budget and the expectation is they provide teaching and research outlets for those entities in which they're funded. In addition, state departments of agriculture will subsidize funding for livestock and poultry disease testing and for some food product testing. The reason for subsidizing the cost is to increase the opportunities for owners with limited resources to

submit to laboratories and to provide surveillance for emerging and foreign animal diseases. As we know, 11% to 16% of the gross national product is agricultural products. In addition, 20% of the workforce is in Ag or related industries and 22% of U.S. agriculture production is exported.

Laboratories that provide a lot of companion animal work also get a lot of their income from client based fee for service, which is a profit margin for them. This would include the clinical pathology done on various species, biopsy work, microbiology, but rarely is necropsy actually a fully funded as fee for service. It usually costs more than we actually collect for it.

Slide four: Secondary funding sources include federal and state cooperative agreements. These are most often programs that are currently under efforts to eradicate, such as brucellosis and pseudorabies. Federal contracting

began in 2001 for scrapie eradication efforts where they contracted with select laboratories to test sheep brain and lymph node that were collected at slaughter. These programs have since expanded to five diseases, including BSE, which most of you have probably heard of as Mad Cow Disease, Chronic Wasting Disease, Avian Influenza, and Exotic Newcastle Disease.

Other sources of funds include the universities, state, federal, and private research grants and/or projects. Projects might include contracts with power companies that are monitoring dead wildlife for toxins, environmental monitoring being done by state environment protection agencies or fish and game. Fish and game are also common contractors for specific testing with vet labs and fee for service testing for public health labs. In some states rabies testing on animals is a fee for service done in vet diagnostic labs paid for through public health funding.

Slide five: Now that we understand better the structure and the funding, it's probably pretty clear what veterinary labs do. The primary functions are animal disease diagnosis. They perform necropsies, which is the equivalent of an autopsy, only it's done on an animal. Autopsies are self

exams, so they refer only to humans. The array of animals that are necropsied in diagnostic labs ranges from fish to elephants, most commonly domestic animals; farm animals, poultry, pet birds, dogs, cats, and pocket pets, which include hamsters, guinea pigs, and all of those little rodent types of species.

Veterinary laboratories provide full-service microbiology, including a variety of tests in bacteriology, parasitology, virology, toxicology. They also use

antigen detection and nucleic acid detection methods for both bacterial and viral testing, much as the public health labs do. In fact, a number of the kits that we use in vet diagnostic labs are actually marketed for human testing, such as rotavirus, respiratory syncytial virus and coxiella because the same agents exist in animals or have antigens close enough that we can use the same kits.

Veterinary laboratories also are used as surveillance tools for detection of emerging and foreign animal diseases. Of the 50 states 46 of them have foreign animal disease trained diagnosticians working in their laboratories. This training is provided by Plum Island Foreign Animal Disease Diagnostic Lab where veterinarians receive hands-on experience in the necropsy and clinical signs and lesions of a variety of foreign animal diseases.

Emerging diseases, as we all know, include zoonotic diseases, but they also include diseases that transmit from one species to another. Most recently we found toxoplasma in sea otters that have shown neurologic signs off of the California coast. This is a disease, as we know, of cats that also can affect women and cause abortions.

Other functions include monitoring, surveillance, and export testing. Most countries in which we export live animals or even just embryos require a certain number of serological tests to guarantee the animals are free of specific diseases. That testing is done both, by the National Laboratory in Ames, Iowa and veterinary diagnostic labs that are state based. Surveillance testing usually includes things like tuberculosis, looking for bovine tuberculosis on slaughter samples, pseudorabies and brucellosis, which are also done on slaughter serologic samples. These are all diseases we're in the process of eradicating.

Monitoring might include things like individual ranch owners that feed whole milk to their calves use pasteurizers on their farm and they might want to monitor that milk to check to make sure it's free of any pathogens, or looking at disease trends, emergence of pathogens, even monitoring of

medication levels, like cyclosporine in dogs and cats. Food product testing for quality and pathogens is done by a limited number of laboratories and would include meat, milk, milk products, or water.

Teaching, I also want to include extension here since most veterinary diagnostic labs provide extension outreach and presentations to private practicing veterinarians, as well as producers or the farmers, which we serve. The purpose of this is to inform them about trends and new diseases, emerging diseases, new problems of old diseases,

problems that we may see with antibiotics not working and those types of things. That's a big portion of what we do in addition to teaching at the university and even secondary school level.

Then research: As most public health labs know, there's always a need for improved diagnosis and detection methods and diagnostic labs are pretty heavily engaged in that.

Slide six: The type of daily work that's being done in vet diagnostic labs would include serologic disease monitoring, for instance, animals undergoing abortion there are panels of serologic tests that we can run; disease diagnosis and disease eradication efforts, as I've already

mentioned, as well as export and sales testing. Some of our monitoring also includes in beef herds they test the bulls every year to make sure they're not carrying trichomoniasis since this causes infertility and abortion when infected bulls breed cows.

We're also very heavily involved in population diagnostic medicine and we work with companion animals where there are usually houses with only one or two animals, but when we work with livestock there could be anywhere from three animals in somebody's backyard to as many as 200,000 or even a million animals in a poultry house. In our laboratory here we work with a lot of calf ranches we see 30,000 calves under three months of age all housed at one location. We're really dealing with what's the disease that's going on in that population of animals and what can they do to prevent those diseases from spreading. So animals are brought in that die to look for diseases.

For disease diagnostics the most common reasons that they submit for livestock, poultry, and equine are for diarrhea, respiratory problems, and abortions. Obviously, poultry don't have abortions, but they do have decreased egg production, so that would be equivalent.

With small animals, pet birds, and pocket pets more common submissions would be biopsies of lumps and bumps, tumor removals, skin problems, clinical pathology, looking for infectious diseases by rapid viral or bacterial testing, and aging diseases. We see a lot of cancers in our small animal population because of the age of the animals.

On live animals we commonly would do bacterial cultures, PCR, electron microscopy, a variety of antigen detection tests, such as fluorescent antibody, antigen ELISA's, immunohistochemistry and latex agglutination, as I mentioned. Remember, some of these tests are the commercially available ones actually designed and marketed for human pathogens, like rotavirus and respiratory syncytial virus, but work perfectly well on animal pathogens in the same classes.

Slide seven: Most veterinary diagnostic labs at a university or state based will also have some degree of toxicology service. I've listed the most common toxins we see in our livestock species, small animals, and wildlife. Most of our wildlife submissions tend to be wild birds that are found dead and they're exposed to a lot of the insecticides or other rodenticides. That's why we see the cholinesterase inhibitors. There's still a problem with lead shot being eaten by wild birds, the rodenticides and strychnine. In livestock nitrates is one of our most common problems.

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That's usually associated with different types of grass hays that are harvested at an inappropriate time so they have high levels of nitrates. Small animals, anticoagulant and rodenticides and over-the-counter medications. They get into what people bought or they're treated with an inappropriate over-the-counter medication, such as acetaminophen in cats, which is not recommended and can kill cats. I've listed some other ones there, but I won't go into those.

Slide eight: I want to discuss here some examples of the type of work that comes into laboratories and some of the spin off that occurs from that work. The first case is Salmonella enteritidesphage type four, which at one time was considered a foreign animal disease in the U.S. On routine weekly monitoring of a poultry flock where the owner would bring in dead birds once a week just to find out if he's got any new diseases popping up they found a number of birds that had infections of their oviducts. They cultured those and found Salmonella enteritides phage type four.

What this then led to is the FDA became involved because of concerns for human food-borne disease from the eggs even though there were no eggs linked to human disease. No people had become sick from eggs that trace back to this premise. This began a multi-month round of testing with over 4,500 egg

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pools tested with 20 eggs per pool, so over 90,000 eggs were submitted and tested by 4 of the 5 laboratories in our system.

The difficulty was they never put a deadline as to how many eggs had to be tested and how many had to be negative before they discontinued testing, which is the reason it went on for so long. In addition, over 700 necropsies were performed on chickens from his multiple houses.

Since poultry, especially layer hens, are placed in a house when they're very young and they stay there their whole life they weren't out running the countryside. So where did they pick this up from? It certainly wasn't by their movement, so it had to be movement of some other species that they were in contact with, which first led to concerns about wild animal carriers. They did some trapping of wild animals

and they did in fact confirm the presence in a number of wild animals on the premise. The premise was very close to a stream, so they thought maybe the wild animals were getting it from the stream and sure enough, they found it in the stream water. They traced the stream upstream and found it upstream where it eventually led to a sewage waste water treatment plant. They found it in the effluent coming off of the plant, which should have been clean, and they were doing coliform count monitoring, which the coliform counts were

acceptable, but nobody was looking for Salmonella. Then they also found it in the raw sewage coming into the plant. So, in all likelihood, this was a human organism that went through the sewage treatment plant and was dumped into the stream, transmitted to the poultry houses by wild animals carrying it back and forth.

In doing all of this testing they had to develop methods to sample stream water as well as the litter in the houses to determine at what point the house is free of this organism. They developed drag swab methods where they took cheesecloth and tied it onto ropes and dumped it in the stream and left it for two days and came back and weighed out the cheesecloth and did a 1:9 dilution in salmonella enrichment broth to culture it out.

Some of those are the types of things that end up being developed. It's not just a disease investigation that yes, it's got salmonella, but where did it come from and how do we prevent it in the future?

The waste water treatment people were really interested in these findings and this led to a multi-county cooperation where they tested waste water coming off a variety of plants, changed some of their processes, change

some of their monitoring to reduce the chance of any Salmonella getting out of the plant.

On slide nine there's a picture of the sewage treatment plant and the effluent flowing into the stream in the lower right hand side. That effluent today, because this plant was restructured considerably, is crystal clear water. It was somewhat sudsy and cloudy at the time of the problem in this picture.

Then in the lower left is the fingerprint that shows SE phage type 4 isolates that came from mice, skunk, chickens, upstream water and raw sewage coming into the plant showing they had identical plasmid profiles and these were indeed the same organism.

On slide ten I'm going to move on to some animal disease. As I mentioned, necropsy is the primary way in which we detect foreign animal and emerging diseases. In human medicine, if a disease like West Nile comes into the country we don't eradicate it in humans, but in animals we do eradicate it. That usually means eradicating the animals that

have the disease. In addition to diagnosing it you have to deal with all of the follow-up recovery of eradicating and releasing quarantines.

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Exotic Newcastle Disease was diagnosed in September of 2002. They had one site diagnosed and two days later another site 30 miles away was diagnosed. So it was pretty clear it had spread widely. Neither of these sites had anything in common. That suggested to us we probably had a very widespread problem by the time the first case came in. The delays were because that segment of the industry, which were game bird backyard owners, did not use veterinarians and they did not use diagnostic labs. Once we started investigating we found out hundreds of game birds had died in probably a one-month period on a number of premises throughout the urban area.

On slide ten, the receiving laboratory at our Davis lab, where they did the PCR testing is shown on the left-hand side. The actual samples came in to our southern California laboratory.

The right-hand side is our egg incubators. We had to inoculate three eggs per sample and we did 15,000 virus isolations in a 12-month period during this outbreak. So it became pretty clear early on that we weren't going to be able to keep up with the demand using virus isolation alone. The turnaround time would be three to five days by the time you confirmed it as being the exotic strain of Newcastle Disease, since we do have non-

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exotic strains, vaccine strains, and pigeon strains in California and the U.S.

Slide 11: From the very beginning it was clear we were going to need a rapid assay, such as a real-time PCR and the federal government was in the process of developing one with the Agricultural Research Service in collaboration with the National Veterinary Services Lab. This assay was a single tube, PCR assay and would allow four technicians to complete approximately 200 samples in a 10-hour working day. However, we anticipated we would need a lot higher volume than that and we weren't going to have enough lab space to quadruple the number of technicians, nor could we find that many trained people.

So we started developing in parallel with the federal assay a high throughput, rapid, real-time PCR, which allowed a 96-well format, so three to four technicians could do 1,600 samples a day and they've actually completed up to 2,000 on some days. This was a great collaboration with federal, state, and private industry who brought to us technologies they hadn't even put on the market yet. They were really instrumental in getting this assay up and running.

Unfortunately, since it was being developed at the time of the outbreak it put a lot more strain on the laboratory system because then we had to validate it as we were trying to run it and it wasn't accepted as valid until April, which worked fine for the recovery stage, but it still required a lot of virus isolations to be done in parallel and prior to using the assay as the sole test. It was bench validated very quickly, even before December when they started doing the initial field validation. Then it was tested in parallel with clinical signs and necropsy, as well as virus isolation results. I have the sensitivity and specificity listed there.

Slide 12: This just kind of recaps for you some of the volume of work that was done during that 12-month period. The PCR assay, as we said, wasn't validated until April and the real demand for it came when they were trying to release quarantines. They had 18,000 premises that were quarantined and those all had to be tested. They used the PCR test to determine they were free of the disease. In a peak month they did 24,000 tests by PCR and, as I mentioned, actually 2,000 tests was their peak on a single day. In addition, the federal lab in Ames, Iowa ran 6,300 PCRs.

We did 15,000 virus isolation samples and most of these were done prior to April, so they were between September when it first occurred and April,

when the PCR became the sole test used with a peak of 2,600 virus isolation in a month. Those of you that do egg virus isolations realize how much work that is. Then after that you have to do the HA and the HAI test and then the PCR before you can actually say that's what it is.

19,000 birds were necropsied of all different species because many of these backyard owners had five or six different bird species on their premise, with over 100 birds necropsied on a single day.

There were 152 different people that took part in helping in the laboratory during this 12-month period. Fifty-eight of them came from existing CAHFS employees. Ninety-four came from other sources, including a fair number from the National Vet Services Lab in Ames, Iowa, temporary services, and at least … (Recording cuts out.)

Coordinator You're back on-line. You may go ahead.

Dr. Blanchard Good day, again. Sorry for the technical difficulties.

I believe we left off on slide 12, so I'll continue at that point. As I mentioned, there were 152 personnel involved and we had technical

support come from 11 laboratories in the U.S. and Canada to assist in our laboratory operations.

Slide 13: Once they eradicated END that wasn't the end of it because now our trading partners wanted us to assure them that it hadn't spread to other states in the U.S. and at the same time, Avian Influenza was gaining increased prevalence in Asia. The year before END occurred the USDA had validated an Avian Influenza test, so they actually deployed both of these PCR test simultaneously since the target population was poultry for both and set up a contract fee-for-service system for national surveillance. They trained individuals from 30 labs in 29 states and where necessary provided equipment to those laboratories. Now the state diagnostic laboratories are also involved in early detection for END, H5 or H7 Avian Influenza, as well as proving freedom of disease for our export markets.

We'll move to slide 14: Kind of changing gears a little bit here, some of the other things that we deal with are outbreaks, such as botulism, which occurs yearly in many states in water fowl, less commonly in poultry, and occasionally in cattle and horses. You'll see in the lower right-hand corner the headlines from the Modesto Bee when actually 430 of 440 cows that ate the same feed died in a four-day period due to botulism. This is a case

when a single cat could kill a whole herd. It was actually a dead cat that was on the top of a silage pile and the botulism contaminated fluids from the cat had leaked into the silage and it was very well mixed before fed to the cattle, so every animal got an equal amount and it killed a fairly high portion of the man's herd.

That generated some concerns about its presence in milk. We did all of the assays on the market and using the mouse assay we were unable to find it in milk. We also conducted research to look at the median lethal dose in cattle and at that dose whether it could be found in milk or even at lower doses. Again, it wasn't found in milk with the available assays, but we did find cattle are much more sensitive than mice are on a per pound basis, which is probably the reason why it's difficult to confirm botulism in cattle or horses using the mouse assay.

Slide 15: Other toxicoses also evoke concerns for milk and meat, so it isn't just the diagnostic lab's role to diagnose it, but also to help determine whether meat or milk is safe from animals that may have undergone a subclinical poisoning with one or more other toxins. The slide on the left is actually the inside of the reticulum, which is the first of the four stomachs in a cow and the little bits of metal in it are piece of lead battery. We do

still see lead poisoning in beef cattle on pasture and those are sometimes used for meat, so we had to show that meat was safe for human consumption.

In addition, we see it in dairy animals. Often they're younger animals, one to two years of age and the concern is that lead deposits in bone and when a cow freshens she mobilizes her bone in order to get calcium to produce milk. When she mobilizes that bone she mobilizes the lead and would this result in milk having lead present in it or in the animal suffering a relapse of lead poisoning? Studies have been done to look at blood levels and milk levels of lead in animals that have been previously exposed and recovered. Again, we found that milk was safe and so was meat and animals did not show a relapse even though they had a slight increase in lead levels in their blood.

For oleander toxicosis we do find oleander in milk. Fortunately, it's very uncommon to see toxicosis in dairy cattle, but it's actually one of the most common toxicoses that we see in horses, llamas, and alpacas, at least in the state of California.

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In addition in humans there have been accidental, suicidal, and homicidal exposures to oleander. It has been used by some individuals to kill their spouses. It's been used by people to kill themselves, and there has been, unfortunately, poisoning in young children eating leaves from the plant. Since the coroner's office and the public health labs didn't in the past have an assay for oleander our laboratory and in certain situations other labs in the U.S. do special request testing on human samples submitted to them from public health labs for tests that they are uniquely qualified to run.

Slide 16 is another example of that cooperative relationship where the veterinary laboratory confirmed the poisoning by methomyl in people at a restaurant. (recording cuts out)

Slide 21 ... NAHLN concept paper, which we had got out to Congress via a number of our allied groups. Over the next year the two seemed to merge. So despite the lack of funding for all of the aspects of the concept paper the 12 pilot labs suddenly became the same thing as the concept paper. That's created some difficulty in that we haven't really got the funding to do what we proposed in the concept paper because the assumption by Congress was this little bit of money provided in 2002 would do it.

Moving on to slide 22, some of the things that impact the NAHLN development were things like the anthrax letters, which you in the public health lab are very familiar with, but I was surprised to learn that 15

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veterinary laboratories also provided environmental testing on samples during the anthrax scare in 2001 and 2002. None of those laboratories were LRN laboratories, but 12 of them had been requested by law

enforcement in their state or the FBI and nine by the state public health director to provide that testing. The assumption is they were probably low risk samples and usually they were being asked because of location and past capability with detecting anthrax in animals. Location in that the state public health lab may be on one end of the state and the vet labs were on the opposite end, so it made it convenient to have sites at both locations.

In addition, there was a lot of press in 2002 about Chronic Wasting Disease and its spread in wild deer. The federal government and USDA had launched a scrapie eradication program, which is a disease that occurs in sheep that is similar to Chronic Wasting Disease in deer, in 2001 and they had started contracting with states to provide this testing. They just expanded that program, added more labs, and since the testing for scrapie was the same test you run for CWD that provided the surge capacity to do a national surveillance for Chronic Wasting Disease in 2002. There was also a lot of concern by hunters that they wanted their animals tested before they ate it and even though we continue to say that the test is not a food safety test, if the animal is positive the hunter is notified and they get

rid of the animal. If it's negative it doesn't guarantee they didn't have it. It just means that that sample was negative at that time.

In addition, there were increasing concerns about some foreign animal diseases that affect swine. As I mentioned, END, Exotic Newcastle Disease, had occurred in the U.S. and now we had surveillance needs for that. Avian Influenza was a concern. All of those impacted the NAHLN network and increased the number of tests that the federal government needed state labs to run and they needed those labs to report results back to them on.

During the Exotic Newcastle Disease outbreak we did a lot of validation. We also found that it's really better to validate tests before an outbreak rather than during an outbreak, so that was another impact. We really wanted to expand the NAHLN concept to do validation using negative field samples before outbreaks occur, not after the fact.

Slide 23: Obviously, we all now about the increased concerns about bioterrorism agents. Monkey Pox occurred in 2003. Prairie dogs were linked to the source for humans. In humans you developed assays that said in this person with this lesion we can test the lesion and determine it's

monkey pox. Some of the challenges were what if the dogs and cats carry it, but don't show clinical signs. What sample do we test? Does the test we currently have work on that animal? What sample from that animal would be best? Some of those questions still haven't been

answered today, but they're questions that come up every time we deal with a zoonotic disease, especially if there may be low level carriers of that disease.

The other thing that we really needed is we needed these foreign animal disease tests to be integrated with our endemic disease testing, so diseases they looked like could be tested simultaneously in a multiplex environment. We needed to be doing ongoing surveillance so that we weren't just there to respond if the disease occurred, but we actually were there to detect it early.

On slide 24: In August of this year they redefined the National Animal Health Lab network and said any laboratory performing contract, fee-for-service work would now be part of the NAHLN, so that now expanded from 12 laboratories to 43 laboratories in 37 states. However, as I mentioned, there was no additional infrastructure funding. All they got paid for was

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running that test that they were contracted to run on the samples that they received.

In addition, a steering committee was developed for the National Animal Health Lab network and they developed a laboratory qualification checklist, which very much mimics the Lab Response Network qualification checklist. There are some additional signatures on ours that were important to veterinary medicine.

In 2001 my understanding was there were approximately six state public health departments that had requested that vet labs in their state be added to the LRN to give them a broader geographic distribution within their state and to capitalize on capabilities that existed in vet labs. At that time there were no criteria for vet labs to enter the LRN and with the development of NAHLN and cooperation between CDC, APHL, and AAVLD, those qualification checklists were developed and currently there's approximately seven vet labs in the Laboratory Response Network and I think eight or nine that are pending that have submitted applications, but not completed them yet.

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The next slide, number 25: This just shows you a map of the current 43 labs in 37 states and what testing they run. As I mentioned, the NAHLN was redefined from 12 pilot labs to laboratories that ran any of the five current contract fee-for-service tests, but no additional infrastructure was provided to those laboratories.

Slide 26: In 2003 an informal survey of laboratory directors 35 labs responded and 23 of them stated that they had BL3 space from 200 to 2,000 square feet. A year earlier the same survey had only found eight laboratories, so there had been a big jump in the number of laboratories that had developed or enhanced existing space for BL3 capabilities. But

even today there's only one laboratory in the U.S. that has BL3 large animal necropsy facilities. In addition, vet lab surveys have indicated 11 labs routinely perform food product testing on meat, milk, or water, for either microbiologic or chemical agents.

The next slide, number 27: This is a list of overlap agents that both CDC and the USDA feel are important bioterrorism agents. Yersinia pestis, is the only one that's not actually an overlap agent for USDA but occurs in animals and and is on the CDC list, but since it doesn't occur in livestock or poultry the USDA doesn't

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recognize it as an overlap agent. Rabbits are also considered livestock and poultry because they're raised for meat purposes.

Of the bioterrorism bacteria, most if not all of these occur some place in the U.S. every single year. That means veterinary laboratories see them in animals every year. In our area the most common ones are Coccidiodies immitis, which we see every day in our laboratory, and Coxiella burnetti, which is one of the more common causes of abortion in goats, but can also be carried in sheep in the placenta and in the uterine discharges, though it doesn't cause abortion as often as it does in goats.

On slide 28, this was a survey done in 2001. You can see anywhere from 25% to 75% of the laboratories had identified these four agents in the five years previous to 2001 in routine submissions to their laboratories. Three of the agents, 90% to 100% of them said they were capable of identifying it. The one they weren't was botulism and, as we mentioned, the mouse assay is always a challenge because of the difficulty and the lack of sensitivity that that assay has.

Slide 29: Vet diagnostic labs and the LRN and FERN, the Food Emergency Response Network: With monkey pox it really increased the

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visibility of veterinary diagnostic labs and the value that they could provide public health labs. Even before that there were a lot of activities going on, so many more public health departments within states are recognizing the vet diagnostic labs' capabilities. I think West Nile Virus is probably the one agent that's promoted that more than anything because of the high numbers of horses effected, the fact it occurs in wild birds, and that it's such an important pathogen in humans. That's promoted a lot of understanding and increased interactions between state veterinarians and state public health directors, as well as between state public health and veterinary diagnostic laboratories in collaborative efforts.

Food testing is actively done in a number of laboratories and with the advent of the Homeland Security Presidential Directive Number Nine, which specifically stated there would be surveillance and monitoring of

animals, food and water, that led to the LRN expanding its partnerships since many public health labs already do food and water testing, but many other labs that are not public health labs or vet labs do food and water testing. So now they had to look for an even wider arena of laboratories that included vet diagnostic labs to get a better understanding of who had what capabilities and a more cohesive plan for an emergency.

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The Food Emergency Response Network was formed and currently four vet labs are a part of that. They have their own steering committee, so there are all of these different networks and they all overlap to a degree.

Slide 30 shows three of the major networks. I don't list all of the partners there; the National Animal Health Lab Network is the state labs with the USDA APHIS and CSREES, which is Cooperative state research and Extension service.

The Food Emergency Response Network, the main players are the FDA and FSIS, but there are a number of representatives on the committee, including CDC, APHL, AAVLD.

Then the Lab Response Network; again, this is not all of the partners even in that. That's expanded considerably. I think the whole idea of the Lab Response Network being primarily for clinical disease in humans has vastly expanded with the advent of all of these different activities and the need for environmental testing, which many of the public health labs ended up doing during the anthrax letter outbreaks.

Slide 31: Some of the past mutual laboratory issues that APHL and AAVLD have worked on together, many of them were generated by the

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bioterrorism law that was enacted in June 2002 and posted in the Federal Register earlier that year. We worked together to get exemptions on a number of different things, including vaccine strains that could be used for QC. We use a lot of anthrax vaccine in the U.S. It's endemic in so many of our soils that without vaccination we would lose animals all of the time.

Concerns about proficiency testing, endemic disease reporting: As I mentioned, Coccidioides we see every day in our laboratories, so we don't want to report every single case every day, so we're allowed to report every two weeks the total number of cases that we've seen.

Packaging and shipping requirements: These aren't part of the Bioterrorism Act, but the Department of Transportation. We share so many common issues between pathogens versus diagnostic samples with the public health laboratories. Criteria for select agent identification, the biosafety manual that comes out from not CDC, but one of those human health agencies every year and the concerns that vet labs had in some of the biosafety postings on the CDC Web page that

really weren't realistic when you're an equine veterinarian out in the field. You can't do a horse necropsy in a biosafety hood like you could a rodent when you're dealing with West Nile Virus.

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So we had to look at some of the practicalities and ensure the safety was there, but it was practical.

Then an ongoing challenge for both organizations has been the interstate movement of veterinary pathogens. Veterinary pathogens are not defined, but it's a permit that's required by USDA. It says anything that's contagious or infectious to animals, but many things that are contagious and infectious to livestock and poultry are in the soil. They're carried in the nasal passages or on the skin, but all of those are suddenly qualifying to require permits, so Staph aureus or Salmonella requires a permit if you cross state lines because it could be infectious to an animal. We're trying to meet those challenges too.

Slide 32: Some of the additional things that we have in common with you you've already heard many of them throughout my talk, but they include issues of funding for improved facilities, training, equipment, enhancing our quality assurance programs, funding for surveillance testing. It's not cheap to do surveillance testing and the USDA has provided funding where it's been targeted for AI, Avian Influenza, and Exotic Newcastle Disease. But there's also been the question of do labs have the legal authority to test samples that come in for a different purpose for

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surveillance testing or is that sample owned by the submitter and only they can agree to let us test it? Every state varies with that.

Proficiency testing; as new diseases come along there's need for expansion of that, for reagents. The public health labs, just like the vet labs, need multi-agent rapid assays so when you're looking for an organism like anthrax that may cause a pulmonary disease you can also be looking for hantavirus and SARS and other things that can cause pulmonary disease rather than do it test-by-test. You can do them simultaneously. We need the same thing for panels for foreign animal diseases that look like many of the diseases that occur naturally in animals in the U.S.

Secure communications: We need to be able to push the data on those specific tests to the central warehouse. For the veterinary community the federal government uses an emergency response computer system and they want us to link into that data during an emergency. So we have different partners wanting different things from that data and then engaging all partners at the state level.

Slide 33: I think that it's particularly important that labs are involved when we do tabletop exercises at the state level, because public health is the responsibility of

the state when food borne outbreaks are being exercised or zoonotic diseases, but the vet labs should be at the table because if it is a zoonotic disease they're going to be involved with it because it's going to be occurring, probably, in animals at the same time. So we need to do exercises that look at the strengths and weaknesses, the responsibilities of each partner. How can that work to our advantage? Who will take the lead in which areas? How will we report during an emergency that's a zoonosis in animals and humans, such as a hot Avian Influenza? If we're testing poultry how is the reporting going to work so that the public health people know where it's moving in the state, that type of thing?

We need to determine what's an actionable event and what the response will be and what's really important to vet labs is that we need to keep client confidentiality in mind at all times because we can destroy a client's economic well-being, wipe out his income source just by inappropriately announced information.

In addition, when clients feel that they can't count on us to keep information confidential that gets out throughout the industry and they stop submitting. When they don't submit to us we have no surveillance

activities. We can't look for foreign animal diseases and we can't look for emerging diseases. We have to have their trust to get them to submit.

Slide 34: This is just a quote from the Senate Committee Report. You'll note it says, "The Committee commends the CDC's efforts to merge surveillance systems with state diagnostic labs, veterinary labs, wildlife health agencies, and …." We need to continue those efforts. We need to work together at the state and local level, at the grass roots level. There is activity at the federal level, but a zoonotic disease outbreak is actually the responsibility of each individual state. The health of their people is their state's responsibility, so that's where we need to be looking at merging and collaborating between the different laboratories.

That's all that I have for today. Shawn?

S. O'Connell Thank you, Dr. Blanchard. We'll now take a few questions.

We don't appear to have any questions at the moment or we may be having problems with the system again. I'm sorry for that. It took up a great deal of our time and would have allowed a little more time to answer

questions. If you have questions that are not answered, please e-mail them to neoffice@nltn.org . Dr. Blanchard will answer any questions by e-mail.

Again, I'd like to remind all of the participants listening to our program to register and complete an evaluation form by December 17th. The directions for this are on your confirmation letter and general handout. They were also e-mailed to each site's representative this morning. Documenting your participation will help us to continue to bring you high quality training programs in a variety of formats. When you've completed the registration and evaluation form you will be able to print your CEU certificate.

That concludes our program. Our next teleconference will be on December 15th. The topic is WHO Activities to Strengthen Global Public Health Diagnosis and Biosafety.

The co-sponsors of today's program would like to thank our speaker, Dr. Patricia Blanchard, from the Tennessee Department of Health in Nashville, Tennessee.

This is Shawn O'Connell. Good day.

Coordinator That concludes today's conference. You may disconnect at this time.