Infectious Diseases in Large-scale Cat Hoarding Investigations

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[Beginning of Audio]

Facilitator: For those of you who are attending the Florida Veterinarians Continuing Education session tonight it does provide the three hours of required CE that we're required to take every three years. And so if you signed up for that you should have a meal voucher in your nametag. If you haven't received this meal voucher then go ahead to the registration desk and you can pick that up. And you can pick up your meal at Café Largo and then bring it into the session. So please help me welcome Dr. Polak.

[Applause]

Katherine Polak: All right, well, thank you everybody for attending and as Dr. Levy already mentioned the title of the talk today is going to be the infectious diseases found in large-scale cat hoarding investigations. And before we start I would like to just get a show of hands, quickly, in how many of you in the audience have either been asked to assist with a hoarding case in your own community or perhaps have taken cats in from a hoarding case that was present? Wow. So quite a lot of you so really, I'd say at least 70-80 percent of you have been touched in some way personally by the effects of hoarding.

So I'd like to just first start by showing you a scene from an area where cat hoarding has occurred. And I think sometimes it can be difficult to understand how conditions can deteriorate to something like this. Very often hoarding can start with good intentions. An individual believes that he or she is rescuing animals and begins taking in more and more. Sometimes it doesn't always start with good intentions that's variable, but oftentimes individuals in the community and even other organizations might monopolize on this opportunity for feline live release and actually

bring this person or individuals more and more animals. And over time conditions deteriorate. So here's a garbage can that's filled with maggots and cages go uncleaned because the capacity for care of these animals is very easily overwhelmed when their numbers grow.

So one by one cats that enter the facility healthy then become sick. And as you see these faces appear on the screen these are really the victims of animal hoarding. And so now imagine, and probably you don't have to imagine, because many of you have assisted with such cases, but that you're the veterinarian and you're being ask by local animal control or maybe the local police department to help assist with the sheltering and adoption of these cats. And so you can just imagine that the degree and the severity of illness coupled with the fact that you know we're not really sure what pathogens are causing these diseases, what pathogens are common in cats or hoarding cases. It really complicates the sheltering, adoption and placement opportunities for these cats. Very difficult to ask an organization to, to find good homes for cats that look like this, right?

So just to break down the outline of today's talk I'll be providing some background on hoarding. What it looks like, how it's challenging organizations across the country, and then we're going to shift into talking about a study that we conducted at the University of Florida that actually examined the records of about two, a little over 2,000 cats that were rescued from these large-scale seizures. And then we'll discuss what those cases look like, so four large-scale cases of hoarding. We'll talk about the cases themselves and then transition to the actual results of diagnostic testing. And then hopefully be able to issue some, some solid take home points or some recommendations that you can take home to your shelter next time you're faced with the sheltering and treatment of cats rescued from hoarding cases.

So just to start with a little bit of background, I'm sure most of here are familiar with hoarding, but I thought it would be worth mentioning that the accumulation and neglect of animals has become an increasingly reported phenomenon since the 1980's and it's seen both domestically as well as internationally. It's unclear, however, whether or not this actual increase, in the number of cases is due to an actual increase in the overall prevalence of hoarding or whether or not we're just becoming more attuned to it and our capacity to respond to these cases is increasing. So that's under debate.

As we all probably know the conditions of these cases are pretty horrendous, characterized by an accumulation of animal waste, dead bodies often will be scattered around the property or often in the refrigerator or freezer. Garbage as well as the associated elevated

ammonia levels that goes together with the increased fecal matter and urine, unclean litter boxes as well.

Cases will frequently come to the attention of local law enforcement when individuals amass more animals than they can properly care for. And oftentimes it's a neighbor, a friend of the family or maybe a family member that recognizes that the situation has gotten so out of hand that they're going to take matters into their own hands and actually take steps to report this person.

There are an estimated 700 to 2,000 new cases of hoarding reported in the U.S. every year. This is probably a gross underestimate of the actual prevalence. It's actually estimated that up to a quarter million animals are victims of hoarding in this country every year.

These are just new snapshots of a few of the recent cases from the last few years. And just take a look at the number of animals that are featured in these headlines. There's 697 cats, 700 cats, 400 cats so these certainly are pretty massive, massive seizures. And certainly we see these becoming more and more frequent. So whereas a few years ago the seizure of 700 cats, wow, that was, you know, a really historically event but now it's oh, you know another, another 600 seizure.

And important to note also that animal hoarding can occur in a variety of facilities. So it's not necessarily, you know, in someone's back yard. These can really hide under the façades of legitimate animal rescue and sanctuary operations. Hoarding is certainly a very complex behavior that results from a variety of psychological and behavioral deficits that really limits a, a person's ability to both care for themselves as well as care for the animals. And eventually it appears that the needs of the hoarder become or well, the needs of the animals, become lost to the hoarders need for possession of these animals.

And approximately 25 percent of all new hoarding cases that are reported involve rescuers or rescue type organizations. And I'm certainly not by any means trying to give a, a bad name or a bad reputation to rescuers because they're really the ones on the front lines that are doing a lot of good. But it's just interesting to note that many of these organizations or these cases that we'll be talking about had very fancy and well-designed websites. I mean you really wouldn't know what was going on unless you went on site and took a look at the horrendous conditions and cruelty that took place.

The pathological accumulation of animals was first described in the early 1980's and animal hoarding was formally defined in the public health literature in 1999. And it was then using the following criteria. One,

hoarders typically have more than the typical number of animals. And so that will depend, right, on the person and, and geographical area. Failing to provide even minimal standards of nutrition, sanitation shelter and veterinary care. And I think that's a big one. Denial of the ability of the inability to provide minimum care. You know many times these hoarders think, again, that they are doing good and that they are, serving these animals well. And the persistence despite this failure in accumulating and controlling animals, so even though there are dead bodies in the refrigerator and there's fecal matter accumulating in the bedrooms, you know they're still, they are still doing these animals justice and it's okay to take in more and more. And that's very typical.

So within the last decade, again, the phenomenon of animal hoarding has been receiving increasing attention, increasing intervention, by local authorities, as well as media attention. I mean, there's even a show on A&E titled hoarding, which features animal cases. I mean that's how mainstream this has become. But when we try to step back from it and ask the question you know just how big of a problem is hoarding and try to assess the actual magnitude of the situation becomes very difficult. And for one, hoarders are typically socially isolation and as a result many of these cases go unreported and unnoticed.

Similarly, there are often dismissive responses of both potential reporters as well as those that have these cases reported to them. Oftentimes people will see this situation and clearly understand that you know, this isn't right, but *[chuckle]* they don't think it's their place to intervene or you know, this is a friend of the family and so they're to going to get involved. And so they turn a blind eye. And oftentimes you know we hear the, the opposite of that. That people do try to report but it seems to fall on deaf ears, in terms of the, the authorities that it's being reported to.

There's also a lack of legal investigative authority and this might be one reason why agencies aren't very, aren't very interested in going after these cases. According the animal legal defense fund many states have no legal definition for animal hoarding and courts already assign relatively low priority to animal abuse and neglect cases in general. And many people also are unfamiliar with this severity of abuse in hoarding situations. The high cost of caring for these animals rescued from hoarders, who often are, are cared for at the rescuers expense. It's also a huge disincentive for prosecuting hoarding cases. These factors certainly contribute to a very lengthy and difficult legal process in securing a positive verdict in these cases.

So as we move forward from here I just want to be very clear that these cases and, and the, the results and data that I'm going to be sharing with you are from large-scale cases. So these aren't just your, your back yard

or your, you know, elderly lady who has 10 cats in a, in her home or in a trailer. I mean these are cases that involved hundreds and hundreds of cats. And these cases certainly required very extensive planning and it was a very high cost associated with these cases. In the largest cases from the time of seizure, so from the time that the cats were seized to their disposition, so whether or not that was adoption or euthanasia or transfer, these cases cost one to two million dollars. There's certainly no, no small, expense here. And so easy to imagine why, you know, your local animal control or your local humane society, this really is outside their capacity, to shelter and care for these animals. And so this picture truly exemplifies what I consider as large scale. Again, we're talking typically cages stacked on cages of animals.

Because these cases can be so cumbersome and very costly they typically require multiple agencies. And so, if a local humane society is called about responding to a case or to shelter you know 100 or 200 cats and, and that's outside their capacity whether it be financially or staffing wise, they'll typically solicit the assistance of other regional groups. Or perhaps even national animal welfare organizations such as the ASPCA, Humane Society of the US or American Humane. And regional and we're very fortunate here in Florida to have really amazing disaster response groups and, and they will often deploy to help with these situations as well. Not only with the seizure of these cats but also with the sheltering and, and continued care.

Very important to keep in mind also that these cats are not – do not necessarily get turned over in their ownership to the agency that's pursuing this seizure. So if you're a local humane society and you issue a warrant, that thing goes through the court process and you might have possession of those cats but you do not have legal disposition of those cats until they're actually officially signed over by the hoarder or the court awards legal custody. So you as a humane society or whatever organization you might be working with may be stuck with these cats for six months, eight months, a year, a year and a half. So these *[chuckle]* can be very, long term operations so just important to keep in mind.

And then veterinarian are often solicited in these types of operations to help assist, with not only the preplanning phase but also medical triage, doing intake exams of these cats as they arrive at whatever temporary facility they'll be held at, or also in just administering daily care.

And I just wanted to go through this briefly because this kind of describes what the whole process looks like from start to finish. Again, a lot of planning goes into play and this isn't all done just by the animal welfare organization, you know; this might be done by law enforcement. And so they will typically try to document the scene, document the cruelty, get

enough evidence to actually pursue the case and obtain a warrant in court. Once that's been secured, then, then the planning really kicks into, kicks into gear because the humane society needs to start ordering, you know medical supplies. What will the, the long term sheltering, housing look like? Who will staff this operation? So a lot of planning.

And so then once that warrant is obtained, then the actual day onsite occurs. And typically law enforcement will go in first and potentially escort the suspected hoarder off site and then a thorough crime scene documentation takes place. For any of you that perhaps are enrolled in our online master's program at UF you know a lot about documenting the crime scene and taking adequate photographs and making sure that you have enough evidence in court when that time comes to prosecute this person.

After that's done then medical triage will come on site and get those cats that really need immediate attention off site and sometimes will even treat them on site as well it just depends. Important also just to mention that if you are planning on sending, you know, 100 sick cats to a local veterinary hospital you might want to give them a heads up beforehand, but certainly without disclosing the information about the case.

So then after the cats have been properly identified then they're typically transferred to a temporary shelter and that could be an hour, two hours away, it really just depends. And then once they arrive at that temporary shelter, then they're like any other shelter animal arriving to a shelter where they typically will receive a through intake processing procedure.

And this is what an intake procedure would look like and they're typically done by teams of three, a veterinarian, an assistant, and a scribe to record all of the physical exam findings. And remember you know this, these are all a very important legal documents and legal findings that can be used in court. And so a lot of care and attention are taken, in these intake examinations. But just think also about the time and workload that it takes to do intake examinations on 700 cats many of which are fractious. It takes a lot of time, a lot of effort; these typically will take days to perform.

Locating a temporary shelter and securing a lease is certainly best done well before hand. A lease that is potentially long term is very important, because, again, organizations are forced to shelter these animals for month and months awaiting legal disposition. These are examples of what temporary shelters might look like. They can, they can involve warehouses, shelters, as well as fairgrounds.

And this is one from a case that involved almost 700 cats and there was a multiple warehouses used in this operation.

So these cases, again, involve both forensic and animal rescue components. And you know best case scenario is that on site the day of the seizure the suspected hoarder signs over custody of the animals. Because then you can do as an organization you can do what you want with them. If you want to adopt them, you can treat them, you can transfer them to interested rescue partners. But if they don't and you have to pursue that legal process, then that's kind of worst case scenario.

Historically, when we think about large scale cat seizures, they typically result in mass euthanasia, unfortunately. These cats are very ill. They've been living in overcrowded conditions with very unsanitary conditions. Many of them are poorly socialized, because they rarely get human contact. Many of them are more on the feral spectrum of behavior. And there's also a lack of space in our local shelters, our regional shelters and certainly I'm preaching to the choir here. But there's really not a niche market in many of these locations for barn cats; it's difficult to find placement for them.

And certainly you know we're talking about the medical conditions if any of you have taken in, you know cats in these situations you probably know that they're pretty sick. And they serve as a risk to other animals both in your facility, in your shelter as well as in the community. And a lot of these cats in these large scale operations get transferred to organizations across the country that can take a few. Maybe a group in Seattle can take a few and maybe Boston Animal Rescue they can take a few, just as an example. And so these cats are being decimated nationally and with that they also take whatever infectious diseases they might be carrying. And certainly their medical conditions dictate the ordering of supplies, the preparation of shelter protocols as well as the eventual placement of the cats themselves.

So that was some background just on hoarding in general. And now I wanted to transition into sharing with you all, the results of a study that we conducted at University of Florida. Over the past view years our team at UF has assisted with multiple large scale seizures of cats. And as a result we decided to go ahead and examine the records form all of these cats to determine the prevalence of infectious diseases to help assist with the characterization of these disease, in cats with respiratory signs, with signs of gastrointestinal illness and also their prevalence of retroviral infections. And the reason we did this really was for multiple reasons. For one, we really wanted to help assist with response planning of these cases. Ordering of supplies, development of medical protocols, whether or not memorandums of understanding with local veterinary clinics would be necessary. And also how the infectious disease burden might affect sheltering considerations. So if you were to take in 500 cats tomorrow,

you know would you need isolation facilities, what would the medical care necessary look like and what are the adoption options for cats, with varying clinical illness and clinical disease?

So records were reviewed retrospectively from four large scale seizures of cats performed by national animal rescue agencies in which we were also a part of, from November 2009 through March 2012. In each case veterinarians performed intake examinations and screened for infectious diseases as needed to help guide their treatment decisions and to isolate ill cats in the temporary shelter. So a total of 2,023 cats were enrolled in this study. And that was based on them having available intake data, and as well as available diagnostic testing results for us to look at. All four of these cases involved facilities that classified themselves as, as feline sanctuaries and they house a combination of stray, surrendered and feral cats.

Intake examinations were performed on all of these cats on site actually at the sanctuary in case one or upon arrival at the temporary shelter, which was the case in cases two, three and four. And as you can imagine again, you know performing intake examinations of 600 cats is no small task and these exams certainly did take a prolonged period of time. Intake protocols did vary between the cases because they were run by different national animal welfare organizations. There were differences among the intake examinations in these four cases but all of them included a thorough physical examination that documented each cat's age, sex, weight and body condition score. Details of illness and/or injury were also recorded primarily for forensic purposes but also to guide medical decisions. Cats were photographed, vaccinated, treated for internal and external parasites and blood was collected for retroviral testing.

What I want to point out though is that testing for respiratory pathogens and gastrointestinal pathogens were primarily completed on cats that exhibited severe signs of these diseases. So not all cats received a respiratory PCR rather it was done to guide treatment decisions of those cats that were ill. So if a cat came in on intake and it had severe blepharospasm and mucopurulent nasal discharge it probably was sampled for its respiratory disease would be noted and then it would be sampled for PCR. And similarly with cats with, with diarrhea if they had obvious, I'm trying to think, rectal prolapse or fecal matting those would be sampled at intake for a gastrointestinal pathogen PCR. But if severe diarrhea with noted within those first couple days after intake then samples would be collected. So just important to keep in mind as we're going through that when I'm talking about the characterization of these disease I'm talking about the cats that were tested. The cats that had signs of disease not necessarily all of the cats.

In terms of serologic testing, cats were tested for feline leukemia viral antigen and FIV, FIV antibody with a commercially available point of care [*inaudible*] using whole blood. Testing for heartworm antigen was performed in the majority of the cats seven months or older in two of the four hoarding cases.

Diagnostic specimens from cats with signs of respiratory disease were collected using sterile swabs and those were submitted for PCR detection of pathogens. Two samples were typically collected from each cat, one from the conjunctival sac and one from the oropharynx. The respiratory PCR panel included the following pathogens that you see here: that included feline herpes virus, feline calici, chlamydophila, bordetella, mycoplasma, as well as strep equi subspecies zooepidemicus also known as strep zoo, we'll certainly be talking about that a little bit later. And that was typically requested as an add-on and we'll talk about why that was added on later and also the importance of that.

Fecal specimens, again, were collected either from rectal swabs or from litter boxes or cage floors from cats with obvious signs of diarrhea. Typically a fecal specimen was sent out for both PCR and fecal flotation but sometimes, again, depending on the responders present and veterinary, veterinary decisions, maybe one sample only went to PCR and another went to fecal flotation. But nonetheless, we analyzed the data that was available and so on the IDEXX GIPCR pathogen panel we can see that those samples were tested for Tritrichomonas foetus, which we'll discuss is fairly common in cats from situations such as this. Let's see, the cryptosporidium, giardia, toxoplasma, feline parvo, feline coronavirus, clostridium perfringens, campylobacter jejuni, and campylobacter coli all potentially pathogenic bacteria. And then we have fecal flotation – your run of the mill fecal parasite infections that you're detecting for – ascarids, hook worms, whip worms and coccidia.

So to preface the four hoarding cases as we move forward, all four seizures had a lot in common, many similarities in terms of their inability to provide adequate care for the cats, as well as the frank unsanitary conditions. I hope you can see the cat that's actually in the carrier living in there. We can refer to these sanctuaries as failed sanctuaries, as all of them were eventually reported to authorities, shut down and the animals were seized.

So this is case one, we'll go through these cases briefly. In November 2009, 594 cat were relinquished from a cat sanctuary in Florida following an onsite assessment that revealed very high rates of disease and mortality. The majority of cats have been group housed in indoor/outdoor wire mesh pens. Cats under treatment had been housed in a barn in plastic airline carriers and that's where they lived. Following relinquishment cats were

examined and sheltered onsite for several weeks pending disposition. A 185 of these had to be euthanized because they were critically ill or because their behavior didn't warrant them as adoption candidates while the rest the remainder found new homes.

In June 2010, 387 cat were relinquish from a Pennsylvania cat sanctuary after an inspection revealed that cats had been housed in overcrowded and unsanitary conditions on the first floor of a two-story commercial building. The majority of cats were group housed and that took place indoors. Following relinquishment in this case cats were transported to a temporary shelter established at a nearby fairground for intake examination. And they were housed there at the temporary shelter in sack wire crates for several weeks pending disposition. And you can see the example of the temporary shelter there on the top left.

In June 2011, 697 cats were seized from a cat sanctuary in Florida. This response was a joint effort between local animal services, HSUS, ASPCA, as well as the United Animal Nation. Cats had been group housed in both outdoor community pens, barn pens, as well as travel trailers or in indoor wire crates as you see here. Cats were transported after seizure to several air conditioned warehouses where intake examinations were performed. Cats were housed there in stacked wire cages in the temporary shelter for approximately three months until legal disposition. Approximately 60 of these cats were euthanized.

In February 2012, 696 cat were seized from a Florida, another Florida cat sanctuary. The majority of cats had been allowed to roam freely outdoors with a few dozen housed in pens or in trailers that were designated for sick animals. However, even though the suspected individual in this matter attempted to segregate ill animals they were certainly found throughout the property. Movement of animals was unrestricted in and out of these very sick trailers. Cats healthy, cats were actually triaged in the field and those in critical condition were taken to nearby veterinary hospitals for immediate treatment and stabilization. Cats that were healthy enough for transport were relocated to a vacant animal shelter where they received their intake examinations.

Really interesting about this case also was the disparity between, you know – you might be looking at that picture in the bottom right and say you know I'm looking at a heaven for cats, a little cat community. But, it was in very stark contrast to the level of disease and suffering that was found throughout the cats there at that property.

At the temporary shelter, so about two hours away these cats were taken, where a lot of preplanning had taken place to establish this shelter. And cats were group housed there two to four to, uh, indoor/outdoor dog run,

the guillotine door. Or they were placed in individual cages if their medical condition warranted so until disposition approximately six months post seizure. So, now again, take into consideration here, you know, 600 cats, almost 700 cats, sheltering, sheltered for six months and many of them looked like that.

This is a picture of the national animal agency going on scene to do some of the scene documentation before the seizure occurred. And this is a picture of one of the vans that was a transporting the cats from onsite, so from the site where hoarding occurred to the temporary shelter.

Now just to recap, available records were reviewed from every cat from these seizures. So we're talking about PCR results, fecal flotations, and intake data for over 2,000 cats. So it was quite the spreadsheet as you might imagine. And so now let's delve into the results. So not surprisingly clinically affected cats from all four large scale seizures were found to carry a variety of infectious diseases. It's not unexpected given the large number of cats confined in crowded conditions as well as the failure to isolate diseased cats from clinically normal cats.

We say most frequently severe feline upper respiratory infection, which I'll show you a few pictures of in a minute. Severe gastrointestinal disease. Diarrhea was frequently common in these situations and it, you know, accumulates everywhere. Dramatic mitosis was quite common as well as emaciation, poor nutrition; these cats a lot of them were in poor body condition.

The vast majority of these cats were adults and in fact less than two percent of all the cats that were taken in were kittens. And this may attest to the high kitten mortality rate, potential cannibalism or infertility due to stress and illness. And there's about a 50-50 mix of males to females. And most of these cats were intact. Signs of upper respiratory infection were observed at intake examination in about 27 percent of cats for which records of physical exam findings were available. The proportion though in each case with signs of upper respiratory infection ranged from 16 to almost 40 percent of cats from a specific case had moderate to, to severe signs of respiratory infection. The majority of cats were infected with on average three pathogens on PCR panels so there were usually some, some co-pathogens or multiple pathogens at play in these cats.

So just to, to paint you a picture of what these cats might look like; note the severe mucopurulent nasal discharge. Often there's ocular involvement. Interesting to note also the ocular ramification of the upper respiratory infections and a lot of missing eyes.

So here are the results of the respiratory PCR pathogen panel. And we can see that the most common pathogens identified were feline calicivirus and mycoplasma felis. Those were surprisingly high and that was followed by feline herpes virus, which was identified in you know less than 40 percent of cats. Chlamydophila was then next in terms of prevalence and then bordetella was identified the least frequently.

So feline calicivirus was the most common viral pathogen detected in almost 80 percent of cats. So passing the prevalence rate of feline herpes virus, which was identified in only about 33 percent of these cats. In feline herpes virus, of course this is latent infection in cats and can recur during times of stress. Now as a consequence of stress and cross contamination we very commonly thing of feline herpes virus as the main player in acute upper respiratory infection in our traditional shelters. And I think we've been taught that and, it's common knowledge to most of us. But in stark contrast to that it appears that cats that are living in these overcrowded sanctuary like conditions are more likely to be infected with feline calicivirus rather than feline herpes virus.

The high prevalence of calicivirus among cats with URI is concerning for several reasons. For one there's considerable strain variability in terms of its pathogenicity, transmissibility and environmental stability, not an easy bug to kill. And it's also associated with a wide array of clinical features such as fever, conjunctivitis, oral ulceration, limping, gingivostomatitis and the reason for this shift from high prevalence of feline herpes virus in cats in short term shelters to high prevalence of feline calicivirus in cats in long term group housing situations is unknown. But it's certainly warrants further investigation.
So just to drive this point home, you know in, in traditional shelters we think of feline herpes virus and we think of cats typically with mild to moderate signs of upper respiratory infection, maybe some serious to, to light tinged greenish nasal discharge. But then we look at cats in upper respiratory. We'll see aural polyps and photodermatitis, and a lot of gingivostomatitis. And could it be that feline calicivirus is the source of the high rate of these chronic inflammatory conditions seen in hoarding cases? I'm not sure that we can say that with certainty but it certainly begs to ask that question.

In terms of mycoplasma, the role in upper respiratory infection is, is currently not completely yet defined and most infected cats also carry co infections such as feline herpes virus. And, and that was certainly the case in our study as well. When we're talking about treating cats that have clinical illness that can be somewhat attributed to this pathogen; there was a paper published in 2012 that looked at, you know the efficacy of using a 14-day course of doxycycline versus a 7-day course. And researchers found that the 14-day course did result in, in improvement versus the 7-

day treatment course although clearance of this organism wasn't demonstrated. And so it can be certainly tricky when trying to manage this but typically occurs as a pathogen.

Just to keep this image fresh in your mind again of the severity of clinical illness in upper respiratory disease in these cats. A very unexpected finding that we found when examine the results: respiratory panels was that was the prevalence of strep zoo in these cats. Fifty-five percent of cats tested with upper respiratory infection were positive for strep zoo. And about 80 percent of those were co-infected with either calicivirus or mycoplasma. So strep zoo is known to be an issue in dogs but rarely in cats. Certainly if some of you have been coming to this conference you know for several years now you might remember that our responsibility expert, Dr. Crawford, actually gave a talk on this and its importance in, in its role in sheltered dogs. But so now we're talking about looking at this pathogen in cats. And so strep zoo historically has been known to serve as an opportunistic infection in horses but is also considered to be an emerging pathogen in animal shelters. And has been reported as the causative agent in several outbreaks of fatal hemorrhagic pneumonia disease in dogs and cats more rarely. But in cats strep zoo has been associated with purulent nasal discharge, rhinitis, meningoencephalitis and death. But the overall prevalence of strep zoo in shelter cats has yet to be determined.

The common finding of strep zoo in large scale cat, in, in these, in cats from large scale seizures may explain in part why this URI is so clinically severe. And you know it's often deadly. Like cats from these hoarding cases can die of upper respiratory infection but when have you seen a cat in your shelter, well I hope you haven't seen many cats that actually, you know, are so severe to the point where they die in a traditional shelter.

So it could be that strep zoo is an under recognized cause of severe disease in cats since screening is not currently included for this pathogen in routine laboratory diagnostic panels. And the clinical presentation is much different in cats than the dramatic hemorrhagic disease that we attribute it to in dogs.

A thought can be given to perhaps using prophylactic antibiotic treatment in these cats. So while antibiotic therapy certainly should always be used judiciously to avoid the development of drug resistance, consideration should be given to the inclusion of antibiotics in the initial intake protocol at seizure due to the high prevalence as well as morbidity associated with this pathogen strep zoo. Convenia we know has been pretty effective in the control of fatal strep zoo outbreaks in shelter dogs because a single dose provides broad spectrum coverage, long lasting activity and

particularly in cats it reduces the stress of handling cross contamination between animals and labor costs associated with dosing cats daily.

It's also an ideal imperial treatment from cats, for cats from hoarding cases, for commonly encountered conditions from cats such as wounds, pyoderma and otitis. But unfortunately important to note that Convenia just using it alone is ineffective against common bacterial pathogens that are associated with URI such as mycoplasma bordatella and chlamydia. So that means if you're treatment cats with URI this alone probably is not going to be effective and you'd want to couple it with a drug such as doxycycline.

A total of 68, fecal samples were tested for [*inaudible*] PCR and a total of 95 specimens were tested using zinc sulfate centrifugation. And what we found here in terms of the diarrhea samples were that most specimens harbored multiple enteropathogens. It wasn't typical that a cat was a suffering from just one infectious cause of diarrhea.

Just also wanted to paint you a picture of a fecal situation for lack of a better phrase of it. But what these conditions look like and just imagine the potential for infection, also for reinfection of these pathogens. There's another picture here.

So when we look at the PCR results we can see that feline coronavirus was most commonly identified. We'll talk about the significance of that in a minute. Then followed by giardia in about 55ish percent of cats. Followed by several, potentially pathogenic bacteria camp, clostridium jejuni and clostridium perfringens. Tritrichomonas foetus was identified in almost 40 percent of cats tested. Cryptosporidium was also detected but in much lower frequency. We also had another pathogenic bacteria there, [*inaudible*] E. coli and feline pan leukopenia virus was not detected in any of these samples.

Looking at the fecal floatation results, ascarids and hookworms were identified in 15 percent in nine percent of cats tested. And this is much lower than prevalence rates that have typically been reported for outdoor feral cats in Florida. But this could be because in some of these cases the collection of specimens occurred after the intake protocol was performed and that included a deworming procedure that could have artificially decreased our results of these parasites.

Switching over to Tritrichomonas foetus. This was detected with very high frequency in cats from all four cases with prevalence ranging from 29 to 50 percent of cats tested. Tritrichomonas foetus is a highly contagious causative agent of intermittent large bowel diarrhea in cats but particularly so when cats are confined in these large group situations. The diagnosis,

management and adoption of these cats is very tricky and difficult in a shelter setting. It's often misdiagnosed as giardia. In this study about 50 percent of cats were [*inaudible*] found to co harbor both giardia and Tritrichomonas foetus. And currently there's no real approved drug for the treatment of Tritrichomonas and the responsive therapy is variable. But in case four, when we found a large percentage of cats to be positive for this and it also was correlated, directly correlated with our clinical signs, these cats were isolated and administered a recommended dose of ronidazole at 30 mgs per kg daily for 14 days.

And so any cats that have this pathogen identified in a hoarding shelter or a shelter that's caring for these cats long term should be immediately isolated. These cats serve as potential sources of infection for other cats in the shelter. And after you're done treating these cats a repeat PCR test should be performed to assure treatment success. But unfortunately, regardless of the testing results these cats really should be kept isolated until after adoption to minimize disease transmission because relapse of infection with this organism can occur as long as 20 weeks post treatment.

Giardia as I mentioned before was identified in 56 percent for so of fecal specimens tested. And this rate exceeds prevalence's previously reported in shelter cats both with and without diarrhea. Cryptosporidium was also identified at a higher rate than what is typically thought of as being a normal level in cats with diarrhea. Coccidia, however, was very low and that can probably be attributed to the fact that there weren't many kittens at all. And so very low rates of that organism.

But when we're talking particularly about giardia and cryptosporidium really creates a management dilemmas in your temporary shelter. They're fairly environmental durable. There's a lot of potential for misdiagnosis of these pathogens and there's a lack of practical curative treatment. We will be talking about tomorrow, though an innovative solution, perhaps a one-time treatment for giardia so stay tuned for that tomorrow at 3:00.

In terms of pathogenic bacteria that was identified several, strains of clostridium were identified in the majority of cats. It's pretty ubiquitous. The clinical significance of this, however, is fairly unclear because for instance clostridium perfringens can be found in cats both with and without diarrhea. So it's been suggested that actually the quantity of the clostridium perfringen's toxin A or CPA actually detected in feces might better correlate with diarrhea rather than the mere presence of pathogen itself.

I mentioned earlier too that feline corona virus was found in many of the cats that were tested and one of the, the most prevalent pathogens identified. And that's very consistent with previous reports that document

higher prevalence's in cats that are confined in situations such as this that share a common litter box.

Viral mutations of this organism are concerning. And can potentially lead to fatal feline infectious peritonitis or FIP. This is anecdotally reported to be more common in hoarding cats not something that we commonly identified. We did see a few cats particularly in case four that were had a presumptive diagnosis of FIP but didn't seem to be more common but just something to keep on your radar.

Now let's switch from respiratory and gastrointestinal pathogens to ringworm. And we've probably all can agree that ringworms an important consideration when sheltering animals from really any source. Because it's highly contagious, has zoonotic potential and it certainly can be difficult to diagnose. Its management is particularly challenging when sheltering very large numbers of cats from hoarding cases because of its' widespread prevalence in these populations.

So data was collected from these cases, some better than others and in cases one through three there were well documented challenges I should say with the management of ringworm. There was documented transmission both to volunteers, to shelter staff, as well as to other cats. Very difficult particularly when we're talking again about hundreds and hundreds of cats. So in case four, a very well concerted effort was mad to try to identify infections proactively, so identify potential infections at intake, take steps to mitigate the risk of transmission and really halt in shelter transmission at that point.

So all cats as part of the intake protocol were screened for ringworm at intake, both in room light, so just in the natural light and then in a bathroom in a trailer where these exams were taking place with the woods lamp. And I just also wanted to pause here to say that there is recent evidence to suggest that we no longer have to allow a woods lamp to warm up. I think historically we're taught, you know, 10 minutes minimum, go turn on the woods lamp but now we understand that we can actually just turn it on and it's ready to go.

So cats that were, that exhibited signs suspicious of ringworm were immediately segregated on intake and put in separate housing. Their skin lesions were cultured, and they also received a lime sulfur dip. And not just the cats that, clinical signs we're actually talking about all cats. So all 697 cats went through this station. So as you can imagine nobody wanted this job. Like nobody wanted to man the dunk tank. And so keep in mind that you know 20 percent of these cats are fairly fractious and so this required some sedation. So while the actual effect that this practice has difficult to quantify it certainly believed that this preventative measure

dramatically lessoned the transmission, of ringworm throughout the shelter.

And so the reason we did this was two-fold. One, we wanted to just go ahead and decrease the spore burden so let's dip all these cats. There's' also some thought given that lie sulfur might actually have a protective effect and I'm not sure that this has been well quantified but, perhaps this also will infect, hopefully not infect, will also, prevent these cats from, becoming infected while they're at the shelter. So in case four, 11 percent of cats had ringworm like lesions on intake. And those were cultured and about 11 percent of those were positive for microsporum canis. And then throughout the next couple weeks, a few additional, a few as in 45 cats also were noticed to develop skin lesions and so whether or not these were missed at intake or what happened is unclear, but those were cultured about 35 percent of those. So some of those might have just had a reaction to the topical antiparasiticides, but about 30 percent of those cultured positive as well.

So all of those cats were placed in an isolation ward and were begun on a treatment regimen including twice weekly lime sulfur dips as well as oral terbinafine at 30 mgs per kg once daily. And then there were also repeat weekly cultures to help guide in their treatment decisions and to assess the success of treatments. This protocol is actually pretty effective in eliminating infections in the majority of treated cats. And this certainly was also coupled with the use of appropriate personal protective equipment as illustrated – there in that picture of gowns, gloves and booties.

Certainly, no treatment can truly be effective without consideration given to environmental cleaning as well. You know one key factor to remember is these spores don't multiply in the environment, they don't invade buildings and so the daily removal of debris and organic material will minimize environmental contamination. And so we use, whizzy wash at the temporary shelter in case four and that's a, a bleach like derivative product that can be attached to an end hose sprayer and so it's pretty effective when we're talking about dog runs or hallways. But certainly, the historical 1 to 10 bleach dilution can be used assuring adequate 10-minute contact time. There's some thought given to the use of accelerated hydrogen peroxide yet but I think that the jury is still out. And again, assuring that contact time is important.

So now we'll transition a little bit into retroviral testing. The sanctuary managers from all of these four cases assured us that all the cats were tested for retroviruses and were appropriately segregated based on their serological results. However, retroviral infections were identified in each

of the facilities in all areas. So certainly these cats were not appropriately segregated and they were often group housed with uninfected cats.

The retroviral prevalence's of these cases surpasses infection rates previously reported for both pet and feral cats. So, we found that when we looked at all of the data, and took the, took the mean of that on average the feline leukemia viral prevalence was about eight percent as well as the FIV prevalence as well eight percent also. And the reason that this is higher could be several reasons. For one, these cats could have been dropped off already positive. So perhaps, a local shelter had some FeLV cats that didn't have any placement options for and they heard about this great sanctuary that would take them. And so it could be that these cats were relinquished with these infections.

But it also can be attributed to the shear physical contact, stress and agonistic interactions between these cats living in these densely populated confinement areas. But also might lend some evidence to in sanctuary transmission as well. So all cats should be retroviral tested at the times seizure from hoarding cases as the retroviral status of these cats will influence housing decisions. So whether or not you co-house them or individually house them. Their medical care as well as their adoption options as well. Cats should also be retested two months, so if you have these cats for more than a month, two months after they initial test you should go ahead and repeat another test to identify early infections that may have escaped detection at the time of intake.

So we have all this data, we've characterized you know the respiratory and gastrointestinal pathogens, we've looked at their retroviral statuses and the ringworm burden but, but what does it all mean and, and you know, how does it change what we do?

And I can't really emphasize enough the need for well-developed pre, thought of protocols. The planning of seizures of hoarding cats doesn't' involve just calculating costs. Protocols must be written to determine the intake protocols for these animals so again, taking into consideration that these cats are pieces of evidence and so documenting them forensically is important. But also documenting their medical conditions and that lends evidence for how you're going to treat these cats. You know again, easy to treat 10 cats with URI but not easy to treat 400. And so when we're talking about you know those intake protocols they really need to be comprehensive because it's very hard to go back after the fact. It's very hard to say you know shoot, cat number 459 really needed its ear cleaned and now I'm going to try to find it in the shelter and do that four days later, like that doesn't happen.

And so if you're planning on let's say implementing a convenient injection at intake like that needs to be done at intake because very difficult then to go back and try to find all those cats. And that's what happened in case four. We started testing cats for respiratory pathogens and seeing all these, all these cases of strep zoo. So we called IDEXX to confirm it and said can you make sure these are right and can you all the other PCR's we sent you, can you please go back retrospectively and look at those and see if they're positive for strep zoo. And all these cats started, you know – we started getting all these positive results and so then we had to go back after the fact and try to administer Convenia injections to 700 cats. And it's really no small task. So making sure your intake protocol is very robust and very comprehensive.

Then sheltering considerations, also feeding, cleaning and you always need to anticipate staff shortages. Like you will never have enough people even just to clean and feed. And so certainly you know when we're talking about having a staff for medical considerations like it sometimes can be hard to just clean the cages.

When we're talking about, you know, what does a robust intake protocol look like, it includes some of these things. So it includes a comprehensive deworming protocol with pyrantel, ponazuril, praziquantel, there's also a topical profender you could use and secnidazole, which again is coming tomorrow at 3:00 pm. I don't want to give too much away but this could be an interesting addition to an intake protocol.

For cats that are four weeks of age or older should receive a modified live vaccine with feline panleukopenia virus, feline calicivirus as well as feline herpes virus. Cats also should receive a rabies vaccine that are 12 weeks of age or older. Vaccination against FVLV, should be initiated at intake particularly if cats are to be cohoused to help reduce the risk of continued transmission from cat whose infections might have not been detected immediately on intake.

Appropriate administration of an ectoparasiticide is important as well but the lime sulfur also takes care of a lot of those bugs that might be on the skin as well so handy for that as well. Microchipping these cats, again, at intake, can really help decrease the staff time needed to microchip them at adoption or at the end of the case. And then again, considering an empirical treatment such as Convenia, for many, for addressing many of the commonly encountered conditions in cats found from these types of hoarding cases.

Treatment protocols for individual diseases are also important and something that you might want to give consideration to because in these large scale cases there's not always going to be necessarily the same

veterinarian on site. And so to help assure treatment consistency no matter who the veterinarian is or who the staff is like you have an actual protocol that says you know if a cat has, you know, diarrhea or a cat has a alopecia lesion, this is the protocol that you follow. And making these readily available to staff when they rotate in and out. Dosing charts can also be a help as well in these cases.

This is a typical organizational chart for staffing considerations for these cases and very similar to the incident command structure ICS that many of you might be familiar with. And these cases run the same. There are multiple branches, an operations branch, so that's the day to day on the ground activities. We have logistical considerations. Admin finance so how we're going to fund all these activities that we're doing in the shelter. And then planning. And so what can be a culture shock to some veterinarians is that they fall pretty low down on the ICS structure under operation. They are not incident commander. They are not in that orange box. And so again, you know it's veterinarians like we like to be in charge of things but that's not the case. Veterinarians in these cases typically have a very defined albeit very important, very important role, but it's certainly it's limited in scope and, and defined.

Typically after the end of these cases, so once legal disposition is granted to the organization that's caring for these cats they'll put out a call for either a large mega adoption event, such as was the case in Jacksonville for 700 cats or they'll try to solicit rescue partners from across the country to see if they're interested in maybe taking a few of these cats. So not uncommon that many of these cats are literally distributed nationally. And whether cats are discharged from temporary shelters directly into new adoptive homes or to another shelter for eventual placement complete records of their examination findings, diagnostic results, and treatments administered should be transmitted with that cat.

And also very helpful is a summary of findings for the population as a whole. So you know providing that veterinarian that's 2,000 miles away with – we had a lot of Tritrichomonas foetus and, you know, 80 percent of the cats are positive for ringworm like I just want to give you a heads up. Maybe tell them that after they've agreed to take the cat. But, so just making sure that they're aware, and that you know they're aware that if you're sending them a cat that was treated successfully with Tritrichomonas foetus it's negative now but it's going to need you know retesting and it will probably need to be isolated at that shelter that it goes to. Like making sure that you're in frequent communication with those, with those veterinarians at those facilities. Because the high carriage rates for persistent infections in these cats such [*Tritrichomonas foetus*]. Those are difficult to diagnose and eliminate and they certainly make them a risk for introducing new pathogens into their facility.

There's certainly available funding for emergency relief efforts if you're ever confronted with the potential for responding to one of these cases. This is just an example from PetSmart Charities, which will actually pull up a large sized tractor trailer onto the property with about $70,000.00 worth of supplies, crates, bowls, and etcetera. Petco also has a similar emergency relief grant that's available.

I just wanted to step back to – we certainly have a lot of – we shared a lot of interesting information. But it's there's certainly some limitations to this study that, that warrant discussion as well. You know this was certainly retrospective in nature and so there were limited records available. And the quality of record certainly were variable among cases and even among medical staff and veterinarians that might have been at each case even on a day to day basis.

And so there are also in terms of sampling, you know, a lack of very systematic testing, every agency, every veterinarian had their own indications for perhaps performing that PCR panel or that fecal flotation and so it's difficult to comment on the actual prevalence of disease in all cats rescued from hoarding situations. And furthermore, cats were only sampled at one point in time so just a snapshot. And differences in disease latency and duration of shedding dramatically affected detection of disease. So we really had to exercise caution in extrapolation the findings of this study to all cats that we rescue from hoarding cases.

This paper, so hopefully this will be coming to the veterinarian or a copy of the Veterinarian Journal near you in a, in a special feline infectious disease issue, which hopefully will be – I'm looking at you Dr. Lister, but hopefully becoming available sometime this summer. So this will have all these results kind of well characterized and recommendations well summarized for your use. Also, for your viewing pleasure if you're interested there's a poster, right next door that also summarizes the results of the study.

There are a lot of resources out there. If you're interested in learning more about hoarding, certainly there's a lot of grant money available and also I encourage you to visit the Tuft's University Animal Research Consortium. That's just an amazing wealth of resources available on hoarding.

Animalsheltering.org has some interesting cost templates so if you needed to perhaps present to your board or your director, some cost analysis you can actually plug in how many cats and it will give you. You know, how many bowls and crates and things like that that you might need.

And also, I'm sure probably the majority of you are familiar with this but University of Florida has partnered with the ASPCA to offer a very rigorous and intensive veterinarian forensic sciences program. So, it's very exciting. I completed my master's in forensic science at the University of Florida but at the time there wasn't a veterinary forensics degree, so mine is more human-related. And so very exciting that you know this is such a, a new field and, and one that I would highly encourage you to take a look at if you are interested in these types of things really interest you.

So we're coming to the end and I wanted to discuss now so what are the practical takeaways? Like what are the major points here that we've, that we've learned through looking at all of these sick cats?

First of all, a well-planned and resourced intake protocol is more likely to result in comprehensive and consistent care than a less thought out protocol that relies on routine treatments we've provided at a later time. Very important for that intake protocol to really cover the majority of things that these cats need. It's just very hard to go back. It might take days for you to get an accurate inventory of even where these cats are. You know, again, if you wanted to find black cat number 694 it's really difficult and that takes days and days to establish. And so, hard to go back after the fact and so really devoting some time to sitting down and writing protocols ahead of time.

Similarly, think about treatment protocol for all conditions that you might see in these cats. So if you see, you know, ear disease, if you see otitis, if you see ear mites, there should be a common protocol because again, you might have vets from across the country coming to help and they all have different clinical judgment. Some, you know, better than others. And so you really don't want to come back to the shelter after being back, after being gone a few days and you're wondering why this cat has been changed to, you know, an antibiotic that you don't' really necessarily think it's the best treatment for that disease.

Give consideration to lime sulfur dipping all cats in lime sulfur on intake. Really made to help to decrease the overall dermatophyte spore burden in the shelter and also helped to reduce in shelter transmission.

Four, is that strep zoo is likely an under recognized cause of severe disease in cats. And so consideration should be given to the inclusion of antibiotics in the intake protocol due to the high prevalence and morbidity of strep zoo in cats in large scale hoarding cases.

In contract to traditional shelters cats from sanctuaries are more commonly infected with calicivirus rather than herpes virus and then certainly may

lend evidence to the increased prevalence of these chronic inflammatory conditions like polyps and photodermatitis.

Once your organization obtains legal custody of these cats they're often decimated nationally and so really give thought to sending complete records and give special consideration for their management.

Similar references and I'd also like to thank Ogena Solutions who generously sponsored this session. I see that we're done a little bit early and so I'd be happy to take any questions at this, at this time. *[Applause]* Yes?

Question: *[Inaudible]*

Katherine Polak: So certainly. So the question was what about using the utilization of minocycline rather than doxycycline and you know these cases occurred before that shortage occurred and so getting doxy was not a problem but certainly minocycline also has similar efficacy. Probably not for the strep zoo, a lot of those strains are actually resistant to tetracycline's but using that for upper respiratory would be a great idea. Yes.

Question: *[Inaudible]* Yeah, I just wondered if you could give us a little bit more information about the new treatment for giardia for those of us who won't be here tomorrow.

Katherine Polak: Sure. Sure. And I might hand this question off to Dr. Crawford if she feels more comfortable answering this because the, the question was about new treatment for giardia is actually a newer drug called Secnidazole. It's been used in, in human medicine. It's a one-time treatment for giardia. And so if you're interested in looking more up about it, there was a paper recently published on it, limited in its scope but it is currently available for review. And I'd be happy to send that paper to you if you want to get my e-mail.

Question: I was going to comment on the lime dipping every cat and how brilliant that is, but after you've done that did you fine that it was a lot easier or harder than you had first expected with these fractious cats? And, if they also had comorbid illnesses – did you, you mentioned sedation – what drugs did you use and like what determination?

Katherine Polak: Sure. Sure. So, the lime sulfur dipping of cats we anticipated to be hard and it was hard. So I don't think there were any surprises in terms of that. It was hot this operation, took place in July-ish, late summer in Florida. And it was very hot particularly in those Tyvek® suits and it was in a rather closed off room. So in retrospect having, you know, and I would go and say open windows certainly but a screen where you can get some

fresh air would be important, an important consideration having done it. Having a staff rotation of people that are doing that is important also to not stick the same three or four people in there day after day.

Some other considerations with it; I don't think it really got any easier as the case progressed. Like I think the cats never really acclimate to lime sulfur dips and a drug, a combination cocktail I believe of TKX was used. But certainly you know TTD could be also used, but a lot of close anesthetic monitoring went into play and I think one the most challenging parts of doing that was to carefully balance, you know we don't want these cats to be too anesthetized but too sedated, but then we also want to ensure the safety of the staff. And so that was, was very tricky particularly in the beginning. Yes?

Question: Good morning. I'm a veterinarian from Miami I'm just curious, didn't mention anything what incidence of FIP coronavirus have you seen even though they're adult cats where you're not going to get the effusive wet form, did you trip over any FIP in your studies there? Because, not a lot of kittens we're going to get the wet effusive form so in dry is very difficult to diagnose anyway. So I'm curious if you tripped over it?

Katherine Polak: Sure. Yeah. So regarding FIP you know we did find a very high coronavirus prevalence in almost 90 percent of the cats that were tested. But again the clinical significance of this is, is somewhat unknown or unclear. In case four I can tell you that we did have, at least three cases that were tentatively diagnosed as suspected FIP cases. And anecdotally we hear a lot about the potential for FIP development. But you know, I can say that looking in the records that wasn't very well documented and so if cats developed FIP certainly I don't, I would think that it would be noted but we didn't, we really didn't run into that a whole lot except a few cases in adults, but unknown really you know kind of the, the exactly cause or reason for that. But those cats were isolated and then some of them became very clinically severe and then were euthanized. *[Laugher]* Oh boy. *[Laughter]*

Facilitator: Your final presentation as a resident.

Katherine Polak: Oh dear.

Facilitator: No. I thought the audience might appreciate the challenges we faced with the oral ulcerations and the extreme pain a significant proportion of these cats were experiencing with their mouths. And I thought you might want to make some comments about how we tried to make them comfortable and to get them eating.

Katherine Polak: Sure. Sure. Yeah, that's a good point is that these cats not only were you know clinically severe in terms of the discharge that we saw, nasally and ocular as well but also in the ulcerative nature, in their oral cavities. And many of these cats had stopped eating. And it, it can be very difficult to detect, again, if you don't have the robust intake protocol that actually calls for you know an oral exam you probably, you know very well going to miss it when you're trying to go through very quickly and photograph and deworm and do all this stuff to all these cats. So, noting it on intake is very important and pain management also becomes really important going forward. And so we were actually using some, some Buprenex in those cats to try to encourage them, you know we'd put a little bit transmucosally to encourage them to eat some soft food and that seemed fairly effective, but again, it's very difficult to manage these cats with chronic stomatitis and these oral ulcerations. Some of them did go – so when I talk about, you know, these cases costing one to two million dollars well a lot of that went towards you know these cats that needed full mouth dental extractions and so that did happen in some of these cases. And it was fortunate that these organizations had the financial resources to do so. But certainly pain management is important in those guys to try to keep them eating and flourishing in the shelter situation.

And I guess just one other thing that I wanted to mention that I kind of forgot as we were going through was the finding of Tritrichomonas foetus and are any of you guys testing for that in your shelters? One person. Well it looks like one person is testing. But one, one point that I wanted to make and it was on the slide but I don't think I made it verbally is that you know when you see Tritrichomonas foetus, when you test for it and you diagnose it like that should really be a red flag. That should be a red flag that you should go and conduct an onsite visit of where this cat came from because it just seems too coincidental that we see Tritrichomonas foetus associated with overcrowded conditions. And so if you see either a cat come into your shelter or your practice with that, with a clinical history of, you know, severe straining and mucoid diarrhea, and you find that agent go and do an onsite visit if possible of where that cat came from. Is there anything else?

Question: Of the 2,000 animals that were seized do you have numbers or percentages that were adopted out?

Katherine Polak: Sure. So again, historically we think of these large scale cases resulting in mass euthanasia. But nowadays you know we're trying to reach higher and higher levels of live release and so that is the same for both sheltered animals and for animals rescued from hoarding like these are actually great opportunities to really monopolize on public interest. Like people really you know are fascinated by hoarding it's an interesting subject and so why not monopolize that and get big adoption, you know adoption

campaigns going for you know save a life, save a, you know a cat that came from a really awful situation.

And so luckily in most of these cases, pretty successful adoption events were held. In some of them many of them actually were sent to other agencies. So hopeful, we hope that they were eventually adopted. I certainly don't have that data, but I would say you know, in one of the cases about 60 cats were euthanized out of you know 5 or 600. In the last couple cases, at least 80 percent of them had good outcomes so very favorable. It's always difficult at the end when you have the not unlike any shelter, but when you have the, the feral type cat trying to find that niche market for feral cats can be tough.

Facilitator: Hi. Just for clarification, I believe it was close to 90 percent of the cats that were adopted through various partners with the ASPCA.

Katherine Polak: Great. Thank you very much. So that's great.

Question: Did you, did you test at all for bartonella and do you think that that would be significant?

Katherine Polak: So that wasn't included in routine diagnostic panels. Certainly it could be very possible cause of you know anemia and other clinical signs that we very commonly saw. So if that were to be included in a diagnostic panel that was at a reasonable cost to a shelter I think, you know, there could be value in pursuing that testing but it wasn't done by these in these cases.

Question: So did it seem like there was an increase prevalence of dental disease in any of these cases because I know it seemed like with case number three a little bit higher than what you normally see in general practice, but I'm not sure on the rest of the cases if you saw worst dental disease than normal.

Katherine Polak: Sure. Sure. So we're talking about dental disease; it was horrendous. It was very awful. Awful again not only in you know the accumulation of plaque and calculus on the teeth but also in the degree of periodontal and gingival disease. And so again, a large number of these cats actually went off site for dentals, because it was so severe. And it was really affecting their quality of life an ability to eat as well in the temporary shelter.

Question: My question is sort of two part; of the animals that were euthanized on intake were you performing the necropsies on these animal and were they included in the PCR testing and also from a forensic standpoint, I know a lot of the bodies that are found are you know decaying and things like that but do you put resources into performing necropsies on the dead animals that are found and trying to determine a cause of death?

Katherine Polak: Sure. Okay, so the first question was about sampling of pathogens, kind of doing necropsies. And so the point of this study was to try to characterize infectious diseases in these cats from hoarding. You know when on day one, so when they entered the shelter because we didn't want to capture any cats that became sick in the shelter and certainly that could have happened particularly when they're group housed. And it was very important for us to only include those cats that came into our doors alive. So we did not personally perform diagnostic testing to be included in this study for cats that might have passed away. But certainly, those, you know dead bodies that are on site very important, as you said, to go ahead and collect those and submit them to a diagnostic laboratory for forensic necropsy because it is important to understand for legal purposes particularly like did this animal die of starvation and neglect and that lends evidence to your case. So it is very important and that's' why usually the veterinarian team doesn't go on site first like they stay back until people that are appropriately trained in processing a crime scene and collecting pieces of evidence like bodies, do their job and then they go for extensive, yes, forensic necropsies at whatever sate diagnostic lab they go to.

Question: There was a comment made about the bartonella and it does cause oral lesion also. And the comment on using azithromycin because it's much easier to administer, less frequency and I've used a lot of it in the shelter and in private practice. And just wondered if you'd comment on the use of that.

Katherine Polak: Sure. So certainly nothing that we personally used but I definitely appreciate that, that thought and I think that could have potential use. You know these oral, these cats with oral lesions are very difficult to manage. And so I think you know it could be something that we could try certainly. Again, it's just difficult to administer these drugs to the vast number of animals I think is the problem, and so certainly using that are you using that once a day for five days?

Question: I usually use it once a day for three days and then every other day for three weeks.

Katherine Polak: Sure. And so again, that attests to the importance of having these types of protocol, in that you know what your protocol is for a cat with severe oral lesions; and at what point do you invest the resources in getting this cat additional diagnostics and treatments? I'm certain a consideration could be given to that.

Question: Yeah, I've used it with some of the upper respiratory and which may be related to bartonella.

Katherine Polak: Yeah. Mm-hmmm. Sure.

Question: Very successfully and it's a lot easier and less time, less volume.

Katherine Polak: Sure. Absolutely. Thank you for that comment. Well, thank you all very much and check out the poster. *[Applause]*

[End of audio]