



Coccidia in a Shelter Setting **Video Transcript**

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[Beginning of Audio]

Dr. Danielle Boes: So as I was saying, my name is Dr. Boes, and it's really great to be able to speak here today at Maddie's and the ASPCA Conference here at Cornell. We're going to be talking about Coccidia today and how to deal with it in a shelter setting. There are some similarities to *Giardia*, which Dr. Hoshizaki just went over, but there are some differences. Probably the first one you'll notice is that it doesn't have a smile face, unfortunately. *[Laughter]* But, there are quite a few similarities, as well. I'm going to need your help to go over the five "W's:" the who, what, where, when, and why of Coccidia to start.

We will start with the "who." What is the typical population that's affected at a shelter? With Coccidia? I heard it.

Audience member: Kittens.

Dr. Danielle Boes: Kittens and?

Audience member: Young animals.

Dr. Danielle Boes: Young animals. Perfect. Kittens and puppies are your typical population that you're going to see affected with Coccidia.

Now the "what." What is Coccidia? This one's a little bit trickier.

Audience member: Protozoa.

Dr. Danielle Boes: Perfect. You guys are so smart. So, it's a single-celled organism. They're really small – it is a protozoan. Now, the "where." Where does Coccidia typically affect an animal?

Audience member: Intestines.

Dr. Danielle Boes: Intestines, yeah. It causes diarrhea.

When? So, when would an animal be affected with Coccidia and show signs of Coccidia? How do they get Coccidia?

Audience member: Two to four weeks old, from the mother.

Dr. Danielle Boes: Yeah. Young animals. I heard from the environment. You can get it from anywhere in the environment, anything that's been contaminated with fecal material. And, why are we talking about Coccidia today? Why is it important?

Audience member: A lot of kittens fail, and they end up dying.

Dr. Danielle Boes: Yeah. It can be a pretty serious illness, and it also can be challenging to manage, especially in a shelter population where you have a lot of animals that can be affected.

Risk factors. We talked about a couple already. I'll give you the first one. Young age. Your puppies and kittens are going to be the most commonly affected animals in your shelter. Do you guys know of any other populations that might be affected or any other risk factors? I think I heard one up here.

Audience member: Stress.

Dr. Danielle Boes: Stress. Yeah. Do you think animals in shelters are sometimes stressed out? A little bit, yeah. We might see Coccidia, at higher prevalence in shelter settings, because they're stressed out. It's a new environment; they're not used to it. We have young age and we have stress. What other factors? What if they have *Giardia*? Do you think that's a problem?

Yeah. If they are infected with another parasite, it can just decrease their immune system and the ability for it to deal with these infections. Also, nursing mothers can be prone to having it.

Immunocompromised or sick animals. If you have a sick, older animal that has diarrhea, you might want to rule out Coccidia. It is not common for older animals to have it, but, if they are sick and immunocompromised, then they might be able to have it as well. And, co-infection with other parasites.

The prevalence is anywhere from 3 to 38 percent. The reason why it is kind of a wide range depends on a variety of factors. It depends on location – owned versus strayed animals. The paper that I got this information from looked both at owned and stray animals, and there is a difference in prevalence.

Also husbandry practices – the shelter you are working at, the cages you have to work with, the population you have at your shelter.

Species of Coccidia. There are a couple common ones that you might have heard of. Does anybody know of some of the names? Any common ones you might have heard of? They're all fancy names. The main one

that you might have heard of is *Isospora*, and that is the most common one you are going to deal with in a shelter setting. Some other ones are *Sarcocystis*, *Toxoplasma*, which is what Dr. Berliner talked about before, and *Neospora caninum*. [Those] are some of the common ones you might encounter.

The way Coccidia are named, even scientists are pretty confused about this. There have been a lot of changes and updates recently, and they're trying their best to classify each species so we know exactly what we are dealing with. It's based on the number of sporozoites, which are the motile infective cell. So, they're the cell that is going to break out in the gastrointestinal system and cause infection. They are this oval cell right here, and they are the ones that reproduce.

The sporocysts, they are the resting cells that contain the sporozoites. They are these oval cells right here. You can have a variety of them inside the egg, which is this thick-walled resistant structure – which means that in the environment, they can survive pretty well on their own.

The life cycle. How do animals get this parasite? First of all, active eggs – they have to be active, and I'll talk a little bit more about that after – are ingested by the host, mostly via (infected) feces.

There is one form of Coccidia that they can get by eating infected meat, so by eating a mouse or some other animal that has this parasite. Do you guys know what it is? You guys might be experts from it this morning. Dr. Berliner taught you nothing? *[Laughter]* Toxo(plasmosis). Perfect, yeah. So toxo's the one that can be transmitted by infected meat, but the other ones are typically by feces.

The sporozoites are released into the GI (gastrointestinal) system here, and that's where they mature and reproduce. That is where they cause the clinical illness that we see, the diarrhea. Once they reproduce, it causes the cells to die. As some of the cells of the GI system die off, that's what causes the diarrhea.

After that, the eggs are passed into the feces and into the environment, so into grass, into cages, wherever the animal is in contact.. However, in order for them to be infective, they must sporulate in the environment. That takes the right conditions, the right temperatures and the right amount of time.

They are not infective the minute they land on the ground. It takes a couple hours, and we will talk about the timing for them to be actually infective. Then the cycle repeats. A new host will come around, get infected with that fecal material, and it all starts over again.

What are some common sources of infection that you might encounter at a shelter? *[Laughs]*. So the first one I'll give you. Fur and hair coat, which Dr. Hoshizaki talked about a little bit. What are some potential other sources of infection? What's the kitten playing on? Scratching post. So it's carpet. The eggs stick really well to carpet surfaces, so that's something you need to be aware of.

What's this puppy playing in? Grass. Yeah, exactly. The feces can land in the grass, and it's really hard to get rid of, out of dirt. There are a lot of surfaces and areas that can be a source of infection. Other cats and dogs in your shelter that you don't know about. The animal itself. With *Giardia*, Dr. Hoshizaki talked about reinfection and how the animal needs to be washed. That can be a potential source of infection. The housing they're in. The list goes on. There's a ton of things that can cause infection in your shelter. It's just about being aware of them.

Transmission. Like I said, it is transmitted by infected fecal material, coming in contact with that. The eggs must be active, or sporulated, to be infective. That means the temperatures must be between 68 and 104 degrees Fahrenheit. If they are cooler than that or warmer than that, the eggs won't survive in the environment.

The optimal temperature range that they sporulate the fastest in is 85 to 100 degrees Fahrenheit. They can sporulate in less than 16 hours in those conditions. Sometimes it'll take longer if they're outside those temperature ranges. They're very hardy in the environment. Like I said before, the eggs are really resistant to disinfectants and cleaning, so you have to be aware of that.

It's extremely host-specific. But what exactly does that mean? Can a cat pass Coccidia to a dog? Not really. The dog can get the cat form of Coccidia, but it is known as a pseudoparasite. It won't cause infection. It won't cause clinical signs.

Same with humans. They do not typically transmit cat or dog Coccidia to humans. What's the exception? What's always the exception? Toxo, yeah. Exactly. So that's the other one that you need to worry about some zoonotic potential.

Clinical signs. They depend on a variety of factors. Parasite burden. Does this animal have one egg? Does it have 20 eggs? They can cause different clinical signs. Immune status, we talked about this before. Is this a healthy puppy or kitten? Is this a sick puppy or kitten? Are they stressed out? Those are all factors you need to consider. Stress levels.

And, like *Giardia*, they can also be asymptomatic. So they can still be shedding, but not showing clinical signs. In the really serious cases, it can be life-threatening and it does require prompt attention and treatment to deal with those cases effectively.

The actual clinical signs that we might see are, diarrhea – and a lot of people are like, “Oh, if it’s bloody diarrhea, it’s Coccidia.” Sometimes it doesn’t necessarily have blood in it. In the more serious cases that have been going on for a little bit, you can definitely see blood, but it doesn’t always have to be there.

Weight loss, which comes along with not feeling great, not wanting to eat, which are a couple of the other signs. Dehydration, anorexia, so they’re not hungry; they don’t really want to eat anything. Depression and lethargy.

How do we diagnose this? Does anybody know?

Audience member: Fecal. Perfect. So we need to make sure that we do a fecal float, plus clinical signs. If we have an animal who has other clinical signs and we do a fecal float on it and find Coccidia, it might not be their cause of disease. You need to make sure you take into account the whole clinical picture.

It can be relatively easy to find. Unlike *Giardia*, it is not as tricky to find. Once you know what you're looking for, you can usually find it. It is still pretty small, but a little bit bigger than *Giardia* on a slide. And you can have different species on your fecal. You want to check for different varieties at the spore sites and the sporozoites that will lead you to have different species. This is just an example of them more close up. You can see the spore sites, right here are the different numbers of them.

Challenges to diagnosing it via fecal. You need an experienced person to look at this. You need to be able to catch it when you know what you are looking at as well. You need fresh samples ideally. The animal might not be shedding at the time that you take the fecal sample, as well. They can have a low burden – maybe the slide you were looking at, you don't have very many eggs and you miss them. And, it might not be seen on the sample.

This is the same picture that was shown with the *Giardia* talk, but we replaced it with the appropriate sized *Isospora* egg. You can see that it is quite smaller than some of the other common eggs you might see, but on the previous slide you saw that there was usually quite a few on the slides. That's actually my little foster puppy. She found a new home last year, but she's there helping me study.

Specific prevention for puppies and kittens. Typically we would advise doing a preventative dose at intake. Usually that's a one-time dose, and you do that typically with other GI parasites as well.

You want to have separate housing areas. You don't want to be housing your puppies with your general population. You want to have them in a separate area. Same with your kittens. You want to limit interactions between different litters of puppies. While you have all the puppies in a separate area, you don't want to necessarily put all the puppies you have into one big room. Because one litter could be infected, but another litter may not be.

Play groups and play areas. You do want to let the dogs outside. They do need to have social interaction, but you need to weigh the risk – was there another animal in that play area that was infected with Coccidia? If there was, then you probably do not want to put puppies that are negative in that area.

Try and get the puppies and kittens out to foster homes as much as you can. It decreases the stress that they have in the shelter. It also protects them if there are other positive puppies in the shelter. Or kittens. You want easy-to-clean cages. So not wooden. Usually metal works well, or cement floors, that type of thing. Not carpet, basically.

Disposable litter boxes. You may think that you're scooping out all the feces, but you might miss a tiny (spot) that's on the side of the litter box, and that can be a potential source of reinfection, even if you're treating. So just getting rid of the whole litter box, especially for puppies and kittens, can be really effective for that.

You want to handle the puppies and kittens with clean clothes and gloves if you can, especially if they're going between different sets of animals as well. Limit exposure. You don't necessarily want all of your volunteers to be going between the puppies and then kittens, and then your general population. If you can, have a specific volunteer or staff that's designated for the puppies for that day, or the kittens. Whatever your shelter can work out with that.

Removal of feces within hours. Remember the eggs aren't infective until about 16 hours at the earliest, but we do not want to risk possible infection. If we remove the feces within hours, then we should be clear of that. Unlike *Giardia*, there's not really a disinfectant or cleaner that's really great for getting rid of Coccidia. We typically rely on steam or boiling water to get rid of it, which is not that effective. You can see where some of the challenges arise. Pressure washing can sometimes loosen the eggs off of surfaces, so that can be another aid. And make sure

that the surfaces are dry after cleaning. Similar to *Giardia*, you do not want to be putting an animal in there if the cages are still wet.

Painted floors and walls. If they're painted, it's a really clean surface, and the eggs tend to not stick on there as much as say carpet, or some other material.

Spot versus deep cleaning. The trend right now is to recommend spot cleaning. It reduces stress of the animals. They don't have to be necessarily removed from their cage, and have everything removed all at once. We also need to think about risks of reinfection. Say you leave the litter box in there, and don't necessarily scrub it out, or have a disposable litter box that could be a potential source of reinfection. But also, if you're doing a deep clean all the time at various times of the day, you might be causing extra stress to that animal, which is an increased risk factor.

Treatment. There are two types of medications that we normally use to treat this. The first one is a Coccidiostat. That means that this medication stops the reproduction of the parasites, but they don't kill the parasites that are already present in the GI system. It takes a while for the body's immune system to kick in and get rid of those parasites on its own.

One of the most commonly used ones is Albon. You guys might have heard of that. It's the only on-label drug that is currently available. Another common one is TMS. It's a sulfa type of drug that we can use. However, more recently there has been some interesting coccidiocidals.

These drugs stop reproduction, but they also kill the parasites that are present. So people typically have found that animals respond faster to these drugs. It doesn't take the immune system to kick in to get rid of the burden. The most commonly used one is ponazuril. It's marketed as Marquis. And people have seen a faster response with this, because it does stop the reproduction and also kills the parasites themselves.

It is a large animal drug, so it does have to be diluted down to small animal doses. So just be careful when you're dosing your animals. And it is expensive when you buy the initial, a syringe of it. But you can split it with other shelters, or have it compounded, and it's pretty reasonable on a per-animal basis. It's just when you buy the initial dose, it can be quite costly up front.

The treatment length varies based on the medication you choose. And especially since a lot of the drugs are off-label, there have been kind of some, people have played with the different regimens that are available.

Most drugs stop the replication, and the immune system must do the rest. However, ponazuril is the new drug that kind of goes against that rule.

In the meantime, it's really important to provide supportive treatment, especially for your critically sick animals. So things like IV fluids of subQ fluids, depending on how severe the animal is. Also appetite stimulants, close monitoring, those things will be really important. And then you want to bathe and wash the animals to prevent any possible sources of reinfection.

Let's look at this housing area. It looks like this is probably a puppy kennel that's set up. There's no dog inside of it right now, but I would imagine being in there. So what's good about this set up right here? What do you like about this set up, in regards to Coccidia? Sorry? Dry.

Audience Member: Dry.

Dr. Elizaebth Boes: Yeah, that's good. It's dry. Pardon?

Audience Member: No carpets.

Dr. Elizaebth Boes: Yeah, so there are no carpets, but we're going to talk about the wood in a minute, whether you guys think that that's a good surface to have. What about this? What's that?

Yeah, a puppy pad. That's perfect. It's a good way to get rid of any mess, hopefully, as long as the puppy is using it, as soon as possible. I also like that this area is separate, or appears to be separate from the other animals. Away from other litters, away from your general population.

The bad things about it. We mentioned the wood. Do you guys think that that's a good thing?

Audience member: No.

Dr. Danielle Boes: Yeah, so it's probably a little bit better than carpet, but the cysts still are going to stick to the wood. Ideal would be a painted floor of some sort, possibly concrete. Something that we can spray or pressure wash the cysts off of. Also these beds and the toys are cloth, which you can't always avoid. So as long as they're not super-attached to them, and we can throw them out, or wash them in boiling water after, to prevent any sources of reinfection.

Changes we might do. We might change the flooring; we might look at the bedding. But, if we're not super-attached to the bedding, we can probably just dispose of that.

Audience member: Towel [inaudible] very hard [inaudible].

Dr. Danielle Boes: Towel, yeah. It's really hard to find comfortable bedding for a puppy or kitten that they're going to like to sleep on that isn't going to keep cysts in there. So, as long as you're replacing them frequently, or washing them in boiling water... [Interruption]

Audience member: [Inaudible] kennel itself? The wire [inaudible].

Dr. Danielle Boes: Oh, the wire. Yes. You're saying it was easy to clean?

Audience member: No, it would hard to clean because of the way it's set up. It would be hard to scrub every--

Dr. Danielle Boes: Every individual wire. Yeah, that's exactly right. So what they were saying is, the wires might be difficult to clean individually. There might be a cyst stuck on one surface that you haven't cleaned. So just be really conscientious of that.

Next steps. We're going to recheck a fecal in two weeks after treatment.

And what if we find no clinical signs, and the fecal flotation is clear?

What do you guys think? Yay. [Laughter].

But what if they still have clinical signs, or there are eggs present on the fecal? We're not quite as happy. *[Laughter]*

We want to look for other causes of diarrhea. Maybe it's another parasite that's causing this, that we haven't addressed yet. Maybe we need to look at sources of reinfection. Have we washed that animal? Have we disposed of any bedding? Have we made sure the environment's clean? Maybe we need to try a different treatment regimen, or look at our prevention protocols and techniques. So maybe we need to look at our husbandry a little bit.

Adoptions. The ultimate goal of any animal in a shelter is to leave and to be adopted. So can we put a pet that's still on treatment up for adoption? Or on the adoptions floor? I think you have to look at it in your shelter. There are definitely some risks.

To other animals. What do you think the risk of a cat passing to a dog, Coccidia? Is there a risk? Not as much. Remember, it's very host-specific. They can get pseudoparasites, but they don't typically cause clinical signs. So low risk to other animals that are different species. But if it's a cat to a cat, there's definitely a risk there.

Staff, volunteers, and adopters. Is this a zoonotic parasite? No, except for *Toxoplasma*. Just be aware if you are dealing with *Toxoplasma*.

Some possible pre-adoption steps that you can take to safeguard the adoption process. You could have info signs on your kennels and cages saying, “I have Coccidia, but don’t worry. I’m on treatment.” Info sheets for the adopters, so telling them what Coccidia is, how you’re dealing with it, possible things to keep an eye out for. A waiver. As long as the adopter knows what they are adopting, and that their pet will have Coccidia initially, but, that they are on treatment. Main thing is that they’re aware of it.

You want to check back in after adoption. Maybe you can call those owners and say, “Hey, how is Fluffy doing? Does he still have diarrhea?” And if so, you might have to pursue further treatments at that point.

The take home messages. It can be a serious illness. It typically affects puppies and kittens in your shelter. It’s transmitted by the fecal/oral route, so infected fecal material. It’s very host-specific, so you don’t typically have to worry about a cat giving it to a dog, or a dog or a cat giving it to a human, with the exception of *Toxoplasma*.

You want to remove feces every couple hours to make sure that the eggs are not active at that point. And we might now always treat this disease in

a private practice setting. If the animal's not clinical, or very symptomatic, [if] they're a healthy, happy puppy, you might not always treat. But, we have a very large population, typically in shelter settings, of at-risk animals, so we typically tend to err on the side of caution and treat those animals.

Just a couple resources if you want to read up on this at home. Maybe some more light reading. *Worms and Germs* blog. It's actually by a Canadian professor, Dr. Scott Weese, and he usually does a "hot topic" on what's new in the parasite world. *Pets and Parasites* is just a general info sheet on Coccidia. Veterinary Partner. The first link is a general info sheet, and then the second link is a link specifically to ponazuril. So if you're interested in learning a little bit more about that drug. And then this is a cleaning article, just for different cleaning protocols that you might want to institute at your shelter.

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