



# Coccidia

**Coccidia for Cat Last updated:**

Oct 1, 2016

## Species

### Feline

*Cystoisospora felis*

*Cystoisospora rivolta*\*

Feline *Cystoisospora* spp. are sometimes referred to as *Isospora*.

## Overview of Life Cycle

Nonsporulated (noninfective) oocysts in feces

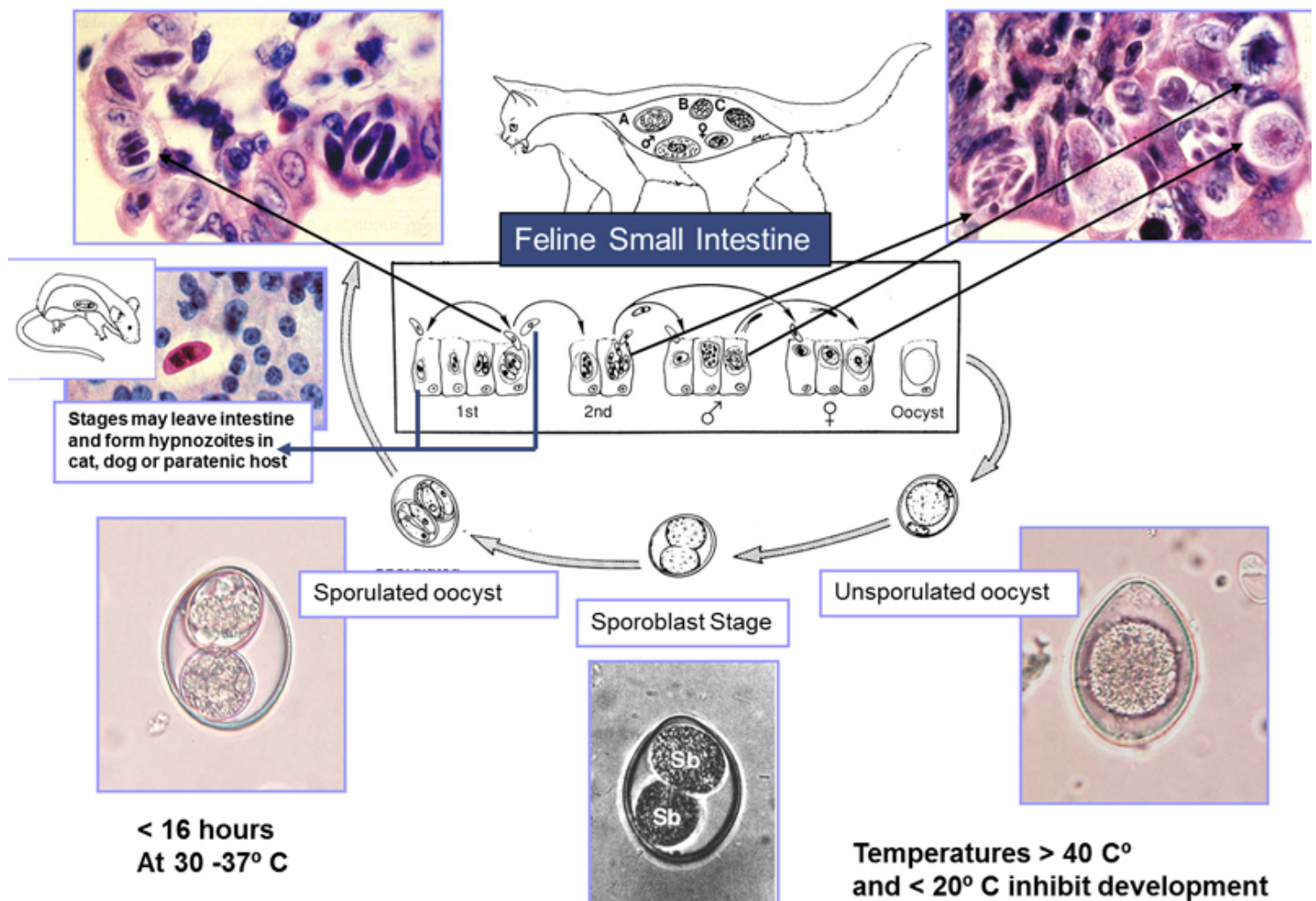
Sporulated (infective) oocysts in the environment

Schizonts (asexual stages) in the small and/or large intestine

Gametes (sexual stages) in the small and/or large intestine

Zoites, which may be sporozoites or merozoites, are found in extraintestinal tissues (i.e., mesenteric lymph nodes, liver, or spleen) of definitive host as well as in paratenic (transport hosts) such as mice, rats, hamsters, and other vertebrates.

## Life Cycle of *Isospora felis*



## Disease

Coccidiosis causes diarrhea with weight loss, dehydration, and (rarely) hemorrhage

Severely affected animals may present with anorexia, vomiting, and depression. Death is a potential outcome.

Cats may shed oocysts in feces but remain asymptomatic.

Intercurrent disease(s), infectious or iatrogenic immunosuppression, or the stresses of environmental changes (i.e., shipment to pet stores or relocation to pet owners) may exacerbate coccidiosis.

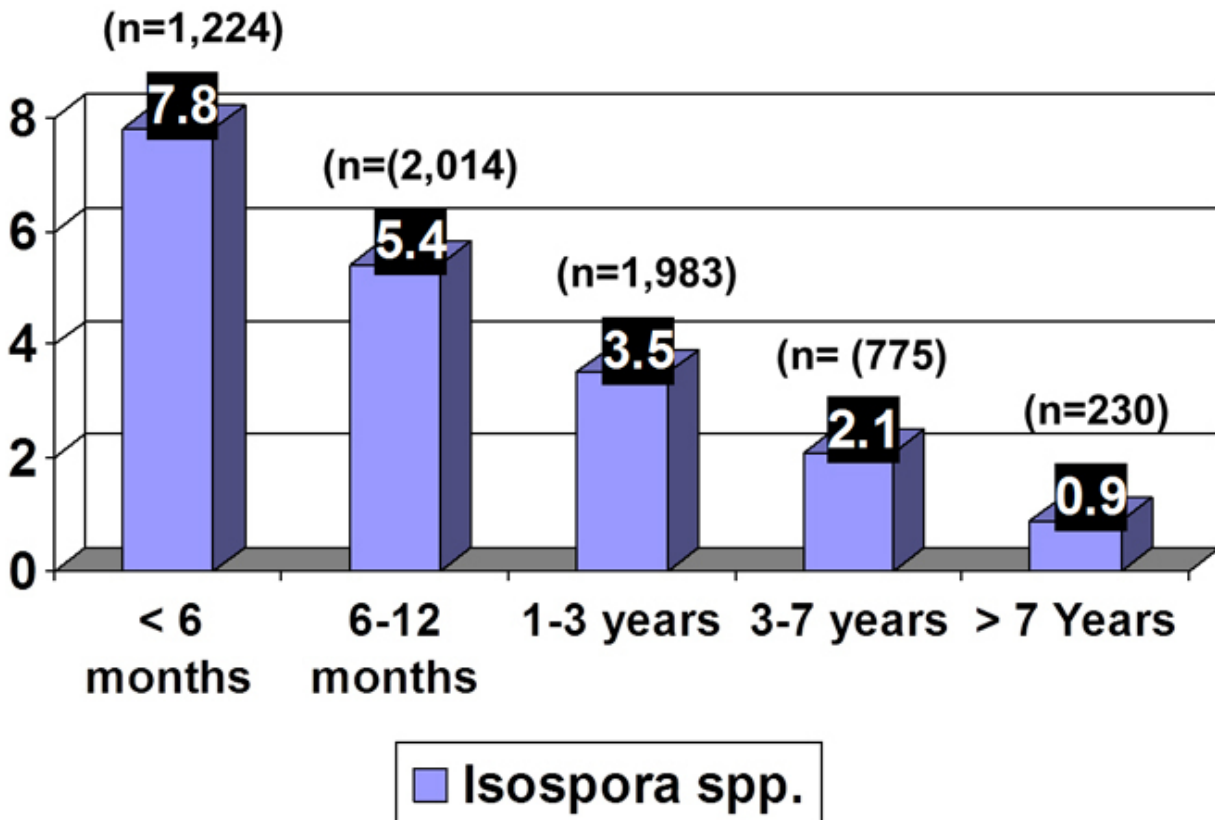
## Prevalence

Coccidial infections are common in cats.

Published surveys indicate that coccidia are present in 3% to 36% of cats in North America. See Prevalence Data below.

Young animals are more likely than older animals to become infected with coccidia.

## Prevalence of Canine Coccidiosis by Age (Blagburn et al., 1996)



## Prevalence\* of Coccidia in Dogs and Cats

■ Host	Location	No.	% Infected
■ <b>Dog</b>	Iowa (S)	224	8.0%
	Louisiana (C)	4,058	2.6%
	Minnesota (C)	332	4.2%
	Missouri (C)	1,468	4.5%
	New Jersey (S)	660	21.8%
	Ohio (S)	500	7.2%
	Pennsylvania (C)	2,294	2.7%
	Pennsylvania (C)	8,077	3.1%
	Quebec (C)	239	38.1%
	US (M)	6,458	4.8%
■ <b>Cat</b>	Kansas/MO (C)	516	17.2%
	New Jersey (S)	757	36.0%
	Ohio (S)	1,000	10.6%
	Pennsylvania (C)	452	2.9%

\*North America, Alaska, and Hawaii; C=Cared for, S=Stray, M=Mix

## Host Associations and Transmission Between Hosts

Feline coccidia are acquired by ingestion of sporulated oocysts from contaminated environments.

Coccidiosis is also transmitted to dogs and cats by ingestion of transport hosts (predation) containing extraintestinal stages.

Cystoisospora spp. are rigidly host-specific. Canine coccidia will not infect felines leading to passage of oocysts in feces. The same is true for feline coccidia.

Feline Cystoisospora spp. are not known to be of zoonotic significance.

## Prepatent Period and Environmental Factors

Development of oocysts to infective sporulated oocysts (sporulation) does not occur above 40° C or below 20° C.

Sporulation occurs rapidly (<16 hours) at temperatures between 30° C and 37° C.

Sporulated oocysts are resistant to adverse environmental conditions and can survive as long as one year in moist, protected environments if they are not exposed to freezing or extremely high temperatures.

## Life Cycle Information for Canine and Feline *Isospora* Spp.

Species	Location/Site	Prepatent/Patent Period	
<b>Canine</b>			
<i>Isospora canis</i>	PSI/LP	9 days/ND	<i>I. canis</i>
<i>Isospora ohioensis</i>	SI+LI/E	5 days/ND	<i>I. ohioensis-like</i>
<i>Isospora neorivolta</i>	PSI/LP	6 to 13 days/23 days	
<i>Isospora burrowsi</i>	PSI/LP+E	6 days/9 to 15 days	
<b>Feline</b>			
<i>Isospora felis</i>	SI/E	7 to 11 days/10 to 11 days	<i>I. felis</i>
<i>Isospora rivolta</i>	SI+C/E	4 to 7 days/ > 14 days	<i>I. rivolta</i>

SI=small intestine, LI=large intestine  
 C=cecum, E=enterocyte, LP=lamina propria  
 PSI=posterior SI

## Site of Infection and Pathogenesis

Developmental stages reside in either cells lining the intestinal villus (enterocytes) or cells within the lamina propria of the villus.

Maturation and emergence of asexual and sexual stages from infected cells causes cell lysis. This damage can be especially severe when caused by species that develop within cells in the lamina propria.

Zoites also are found in extraintestinal tissues (i.e., mesenteric lymph nodes, liver, or spleen) of definitive or paratenic hosts. These resting or latent stages are not thought to cause clinical disease.

## Diagnosis

Diagnosis of Feline coccidiosis is based on signalment, history, and clinical signs, and the structure of oocysts present in feces.

Fecal examination should be performed using centrifugal flotation and an adequate amount of feces. (Click here to see [Fecal Examination Procedures](#).)

Several genera of coccidia-like organisms may be present in canine and feline feces. It is important to differentiate them on the basis of size, state of sporulation, and presence/absence of oocysts or sporocysts.

The presence of oocysts in feces is not, in itself, adequate proof that coccidiosis is the cause of accompanying clinical signs.

Oocysts of *Eimeria* spp. are sometimes observed in feline fecal samples. Cats are not hosts to *Eimeria* spp.; therefore these oocysts are referred to as pseudoparasites. These oocysts never reach the two-celled stage typical of *Cystoisospora* spp. A few two-celled



Cystoisospora oocysts are often observed, even in fresh fecal samples. Additionally, oocysts of many Eimeria spp. often have oocyst wall ornamentations called micropyles or micropyle caps.

# Coccidia of Dogs/Cats in NA

## Dog

## Cat

**Unsporulated large** oocysts

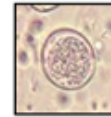
*I. canis*



*I. felis*

**Unsporulated medium** oocysts

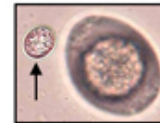
*I. ohioensis*-like



*I. rivolta*

**Unsporulated small** oocysts

*H. heydorni*  
*N. caninum*



*H. hammondi*  
*B. darlingi*  
*T. gondii*

**Sporulated small** oocysts  
or sporocysts

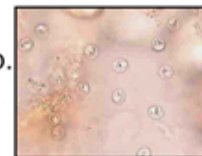
*Sarcocystis* spp.



*Sarcocystis* spp.

**Sporulated very small**  
oocysts without sporocysts

*Cryptosporidium* spp.



*Cryptosporidium* spp.

## Treatment

Sulfadimethoxine is the only drug that is label approved for treatment of enteritis associated with coccidiosis.

Numerous additional drugs and drug combinations have been used with some success. (See below)

Among the newer drugs, ponazuril appears to be effective, according to published research and user testimonials.

### Treatment of Coccidiosis of Dogs and Cats

#### Sulfadimethoxine

50-60 mg/kg daily for 5-20 days (D,C)

#### Sulfaguanidine

150 or 200 mg/kg daily for 6 days (D,C); 100-200 mg/kg every 8 hours for 5 days (D,C)

#### Furazolidone

8-20 mg/kg once or twice daily for 5 days (D,C)

#### Trimethoprim/Sulfonamide

Dose/length depends on sulfa; 30-60 mg/kg trimethoprim daily for 6 days in animals  $\geq$  4 kg; or 15-30 mg/kg trimethoprim for 6 days in animals  $\leq$  4 kg

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**Sulfadimethoxine/Ormetoprim**

55 mg/kg of sulfadimethoxine and 11 mg/kg of ormetoprim for 7-23 days (D)

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**Quinacrine**

10 mg/kg daily for 5 days (C)

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**Amprolium**

300 to 400 mg (total) for 5 days (D); 110-200 mg (total) daily for 7-12 days (D); 60-100 mg/kg (total) daily for 7 days (C); 1.5 tbsp (23 cc)/gal (sole water source) not to exceed 10 days (D)

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**Amprolium/Sulfadimethoxine**

150 mg/kg of amprolium and 25 mg/kg of sulfadimethoxine for 14 days (D)

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**Toltrazuril**

10-30 mg/kg daily for 1-3 days (D)

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**Diclazuril**

25 mg/kg daily for 1 day (C)

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**Ponazuril**

20 mg/kg daily for 1-3 days (D,C)

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## Control and Prevention

In addition to treatment, appropriate sanitation is helpful in preventing spread of coccidiosis in kennels and catteries.

Oocysts sporulate quickly once in the environment; daily removal of feces can aid in the prevention of coccidiosis.

After they are infective, oocysts are resistant to most commonly used disinfectants. Infective oocysts can survive for many months in the environment.

Disinfectants containing high concentrations of ammonia can destroy oocysts, but harmful odors and the necessity of removing animals from runs or cages during treatment limit their use.

Steam and pressure washing may help to dislodge feces from kennel and cage surfaces.

Painting or sealing kennel floors will help prevent adherence of feces to these surfaces and will aid in cleaning.

Treatment of all in-contact animals, including queens, may also be beneficial in controlling coccidiosis in catteries.

Prevention of predation should be emphasized to prevent infection via paratenic hosts.

## Public Health Considerations

Because humans are not susceptible to *Cystoisospora* infections in cats, canine or feline coccidia are not considered zoonotic agents.

Oocysts of *Toxoplasma gondii*, which is zoonotic, are passed in feline feces, but are much smaller than those of *Cystoisospora* spp.

## Selected References

Dubey JP, Lindsay DS, Lappin MR. 2009. Toxoplasmosis and other intestinal coccidial infections in cats and dogs. *Vet Clin Small Anim.* 39:1009-1034.

Gates MC, Nolan TJ. 2009. Endoparasite prevalence and recurrence across different age groups of dogs and cats. *Veterinary Parasitology.* 166: 153-158.

Lappin MR. 2005. Enteric protozoal diseases. *Vet Clin Small Anim.* 35: 81-88.