



Giardia- aaaaaaarrrrggggghhhh and other faecal nasties

Presenter: Ian Wright, chair of ESCCAP



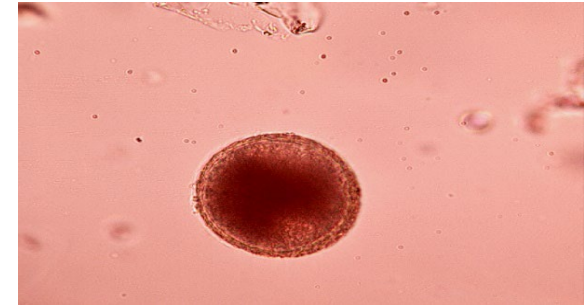
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- +

What intestinal parasites are we likely to find in the faeces of cats and dogs?

- + Intestinal nematodes

- + *Toxocara* spp
- + *Trichuris vulpis*
- + Hookworms



- + *Tritrichomonas* in cats



- + Tapeworm?



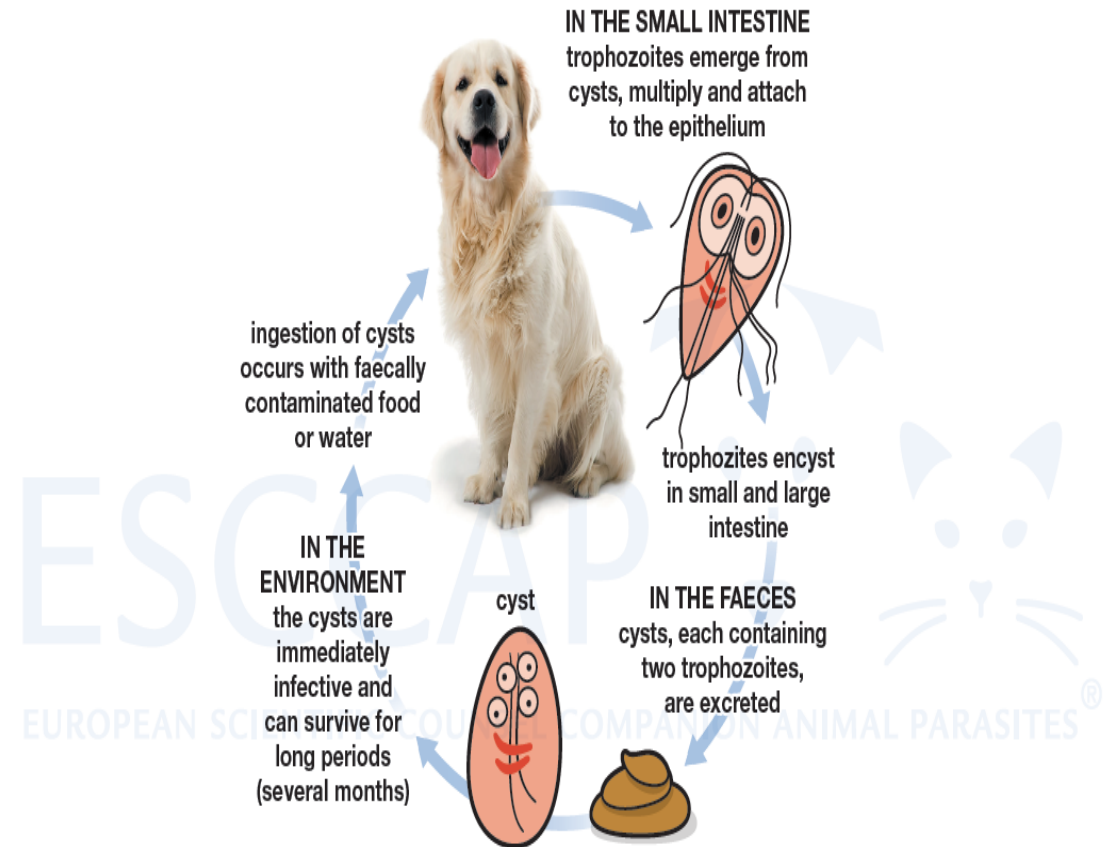
- + *Giardia*



- + All infections may be subclinical

Giardia intestinalis/duodenalis

- + Small intestinal flagellate protozoan
- + Ubiquitous in geographic distribution
- + Wide variety of mammalian hosts including dogs, cats and humans
- + Direct transmission via Ingestion of cysts



Life cycle courtesy of ESCCAP with permission, used here for educational purposes

Life Cycle of *Giardia duodenalis* (syn. *G. intestinalis*, *G. lamblia*)

Giardia duodenalis

Trophozoites

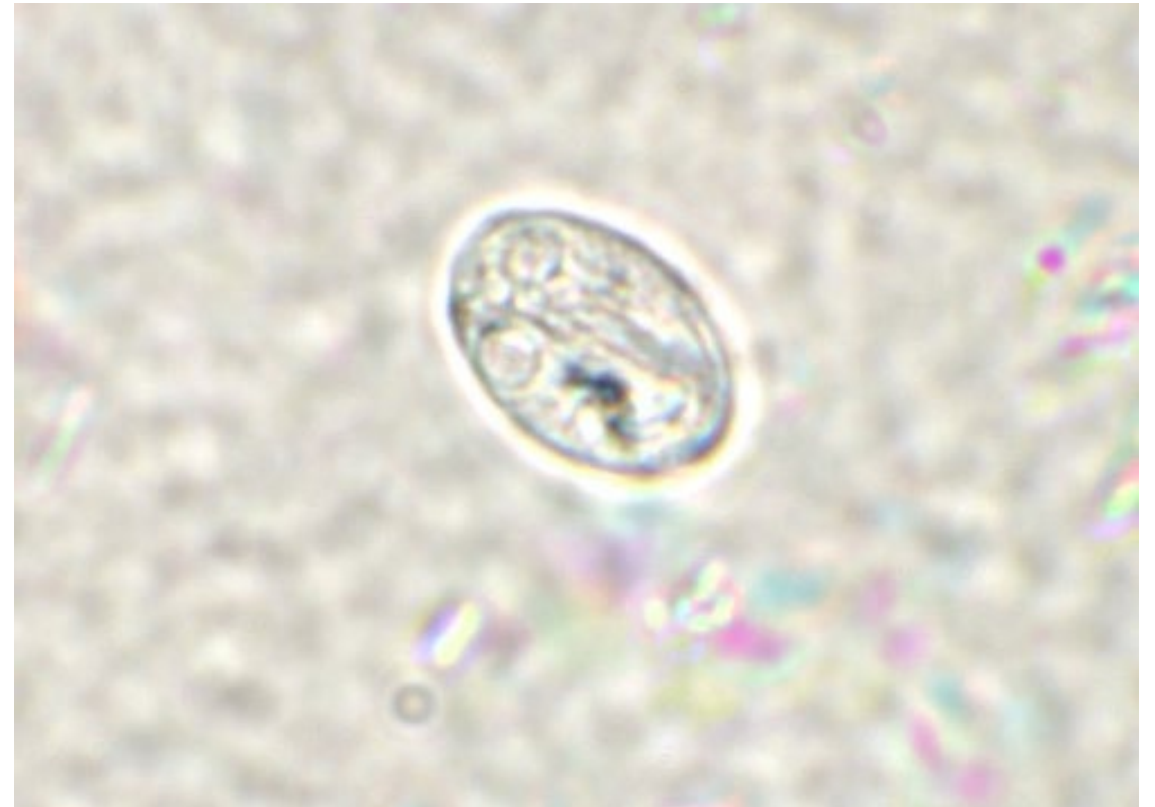
- + Motile, flagellated organisms that are teardrop shaped (12 – 17µm x 7-10µm)
- + Move in a “Falling leaf motion”
- + Attach to brush border of the small intestine
- + Can be detected in a saline direct faecal smear but difficult
 - + Needs a warm microscope stage
 - + Sample must be fresh and kept warm
- + Need to be distinguished from *Tritrichomonas* in cats



Giardia duodenalis


Cysts

- + Environmentally resistant stage responsible for transmission (12 – 17 μ m x 7-10 μ m)
- + Prefers wet, cold conditions
- + *Giardia* cysts detected by centrifugal flotation in 33% Zinc Sulfate
- + Direct smear less sensitive method of detection



Host specificity of *Giardia duodenalis*

- + Molecular studies show that *G. duodenalis* has multiple assemblages (A-H) that are mostly species specific
- + Dogs – Assemblages C + D
- + Cats – Assemblage F
- + Humans – Assemblages A + B (also cats and dogs via human infection)



***Giardia* infection in cats and dogs is unlikely to pose a zoonotic risk unless it originated from human infection.**

Giardiasis

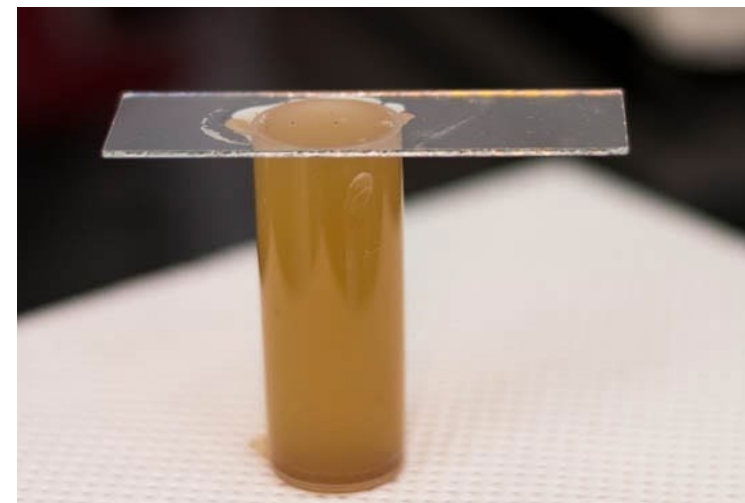
- + Pre-patent period
 - + Dogs: 4–12 days
 - + Cats: 5–16 days
- + Many cases subclinical with 3-8% prevalence in UK cats and dogs*
- + Clinical signs more likely in
 - + immune suppressed,
 - + Young animals
 - + Coinfections or GI pathology present.
- + May contribute to clinical signs without being the sole cause
- + Clinical signs of Giardiasis include:
 - + Acute/chronic diarrhoea and steatorrhea
 - + Weight loss



**Batchelor DJ, Tzannes S, Graham PA, Wastling JM, Pinchbeck GL, German AJ (2008) Detection of endoparasites with zoonotic potential in dogs with gastrointestinal disease in the UK. Transbound Emerg Dis 55:99–104*

Diagnosis

- + Saline Direct Smear
- + Centrifugal Flotation
- + Giardia Antigen Testing
- + PCR Testing
- + Flotation and antigen useful to use in combination for suspected clinical cases



Is it worth screening healthy pets for *Giardia*?

- + It is not recommended to treat healthy carriers unless.
 - + Trying to eliminate from multi cat or dog premises
 - + There is concern about severely immune compromised people in a household
- + Useful for local prevalence data
- + Indicates which pets are susceptible carriers
- + Does not mean that future GI signs due to *Giardia* but may be contributing
- + Further testing still required if clinical signs develop



Treatment

Metronidazole (25 mg/kg PO BID for 5 days)

- Most commonly used to treat *Giardia* infection in small animals
- Efficacies of 50-70% are reported
- Reversible neurological side effects at high doses

Fenbendazole (50 mg/kg PO SID for 5 days)

- Approved for use in Europe
- Experimental evidence suggests more effective than metronidazole alone
- Wider safety margin than metronidazole, particularly in puppies and kittens

Fenbendazole (50 mg/kg PO SID) + Metronidazole (25 mg/kg PO BID) for 5 days

- Combination may result in better resolution of clinical disease

Patient and environmental hygiene to minimise re-infection risk

Drug dosages courtesy of Companion Animal Parasite Council capcvet.org/guidelines/giardia

Follow up testing after treatment

Follow up testing after treatment



Recommended to be conducted ideally 24-48 hours after completion of therapy and no longer than 5 days



Perform centrifugal flotation with 33% Zinc Sulfate or antigen testing



If test negative and patient is no longer showing clinical signs, no further testing or treatment is needed



If centrifugal flotation test is negative but patient still showing clinical signs, further diagnostic work up is warranted



Antigen tests highly sensitive but may give false positive shortly after treatment.

Zoonotic risk from *Giardia* infection

- + Very limited zoonotic potential
- + Most likely in the immune suppressed or in the event of human infection cycling through pets
- + Zoonotic exposure not grounds for eliminating individual infections
- + Good hand hygiene
- + Limiting environmental contamination
- + Clinically affected people should avoid working with animals until infection has resolved



Tritrichomonas foetus/blagburni

- + Intestinal flagellate protozoa of cats with worldwide distribution
 - + Purebred cats may be more commonly infected
 - + No evidence of bovine reservoirs
 - + Both infection and disease most common in catteries, breeding establishments of colonies.
- + Direct transmission with Ingestion of trophozoites from contaminated environment and fur
- + Pre-patent period 7-14 days with many infections being subclinical
- + The most common clinical sign is chronic large bowel diarrhoea, which can last weeks, months or years.
 - + Relapses common weeks or months later.
 - + Proctitis and rectal prolapse can also occur
- + Most cats have spontaneous resolution of clinical signs and infection but can take up to 2 years



Diagnosis

+ Saline Direct Smear

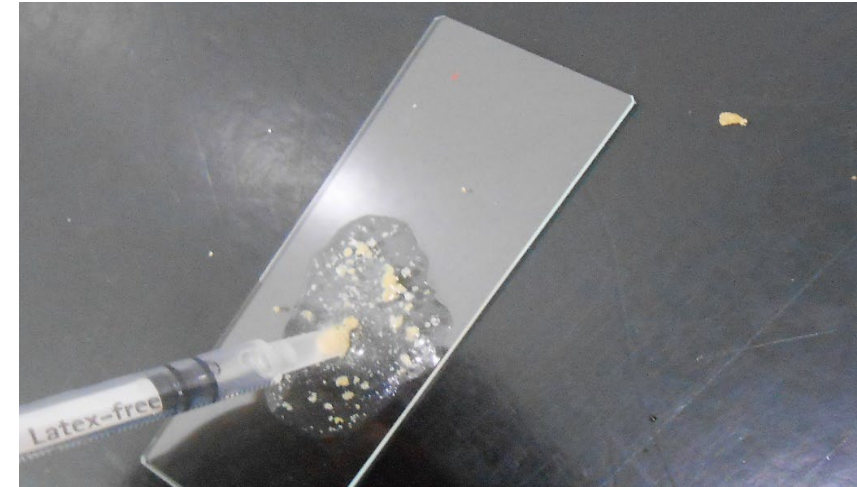
- + Trophozoites are motile and teardrop shaped (12 – 17 μ m x 7-10 μ m)
- + Move in a “rapid jerky movement”
- + Undulating membrane
- + Warm stage and warm fresh sample required

+ Culture (InPouchTF-Feline™, BioMedDiagnostics)

+ PCR Testing


+ Multiple faecal tests performed over several days may be necessary to rule out clinical infection

+ PCR carried out on pooled samples highest sensitivity for identifying chronic infections



Treatment

- + No approved treatment and treatment failures are common
- + Ronidazole (30mg/kg, SID, for 14 days)
 - + currently considered the treatment of choice
 - + upper limit safely tolerated by cats.
 - + Reversible neurotoxicity reported
 - + If adverse signs develop (e.g., lethargy, inappetence, neurologic signs), treatment should be discontinued and not re-instituted
- + Shorter courses of treatment may eliminate infection in some cats
- + Metronidazole (30-50 mg/kg, BID, for 3-14 days) has some short-term efficacy but clearance of infection is uncommon
- + Patient And environmental hygiene to minimise the risk of re-infection



The need for treatment should be balanced against potential adverse reactions to treatment and likelihood of success

Giardia and Tritrichomonas elimination from premises

- + Elimination is often desirable in kennels and breeding establishments
- + Washing infected and in contact pets
 - + with shampoo, particularly around the perineum to remove faecal contamination and cysts from the coat
- + Move pets to clean holding areas
 - + To allow previously inhabited areas to be disinfected
- + To reduce environmental contamination with cysts, these areas should be cleaned, dried and disinfected with
 - + Hot pressure washing
 - + Consider quaternary ammonium compounds.
 - + The areas should then be allowed to dry for 48 hours before reintroducing pets.
 - + Bedding should be washed at 60°C or above.
- + Screen animals – To identify those shedding cysts
- + Treat clinical cases – To reduce shedding



Intestinal roundworms and clinical disease

- + *Toxocara* spp

- + Diarrhoea
- + Loss of condition
- + Obstruction
- + Respiratory signs
- + Mostly in puppies and kittens

- + *Trichuris vulpis*

- + Large intestinal diarrhoea
- + Rectal prolapse

- + Hookworms

- + *Ancylostoma* more pathogenic than *Uncinaria* in dogs
- + Uncommon and relatively non pathogenic in UK cats
- + Diarrhoea and anaemia



Diagnosis

Saline Direct Smear

- Very poor sensitivity for ova detection

Centrifugal Flotation

- Sensitivity and specificity dependent on technique and experience
- AI now available to improve sensitivity and specificity
- Coprophagia can cause false positive results

Antigen Testing

- Highly sensitive and specific
- Unaffected by coprophagia

PCR Testing

- Becoming more widely available
- Also highly sensitive and specific

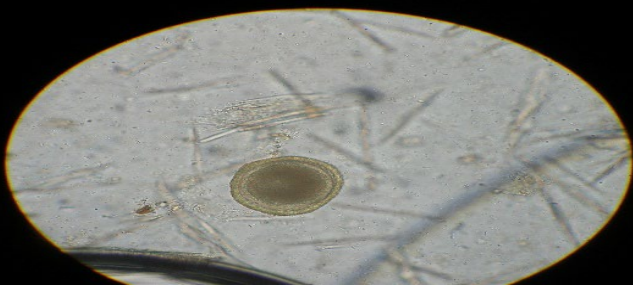
Routine testing for intestinal roundworms

Instead of
routine
treatment

Alongside
routine
treatment

Testing as a replacement for routine treatment

- + Viable option but needs to be done frequently with high sensitivity
- + Cats and dogs are not ruminants or horses
- + Expense and owner compliance can be a barrier
- + Shedding can occur between tests
- + Very little routine testing currently performed in UK
- + Testing option in practice health plans



Testing alongside treatment

- + Confirming compliance
- + Demonstrates value
- + Local and national surveillance
- + Early detection of resistance



Early detection of resistance

- + Resistance slow to develop
- + Wildlife reservoirs and spectrum of products
- + Not limited by not treating negative pets
- + Likely to emerge in small foci and spread
- + Testing crucial for early detection to limit spread

Research | [Open Access](#) | Published: 09 December 2019

Multiple drug resistance in the canine hookworm *Ancylostoma caninum*: an emerging threat?

[Pablo D. Jimenez Castro](#) , [Sue B. Howell](#), [John J. Schaefer](#), [Russell W. Avramenko](#), [John S. Gilleard](#) & [Ray M. Kaplan](#)

[Parasites & Vectors](#) **12**, Article number: 576 (2019) | [Cite this article](#)

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Abstract

Background

The canine hookworm, *Ancylostoma caninum* is the most prevalent and important intestinal nematode parasite of dogs in the USA. Hookworms are typically well controlled by treatment with all commonly used anthelmintics that are approved for this use in dogs. However, in the past few years, cases of recurrent/persistent canine hookworm infections appear to have dramatically increased, suggesting that anthelmintic resistance (AR) may have evolved in this parasite. These cases are highly overrepresented by greyhounds, but multiple other breeds are also represented. The aim of this study was to characterize several of these suspected resistant isolates using *in vitro*, genetic and clinical testing to determine if these cases represent true anthelmintic resistance in *A. caninum*.

Methods

Fecal samples containing hookworm eggs from three cases of persistent hookworm infections; one from a greyhound, one from a miniature schnauzer and one from a hound-mix, were

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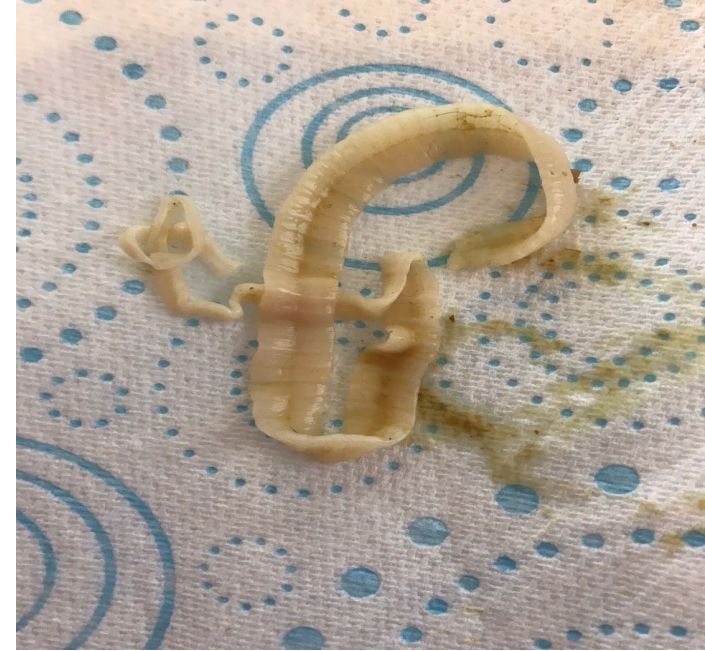
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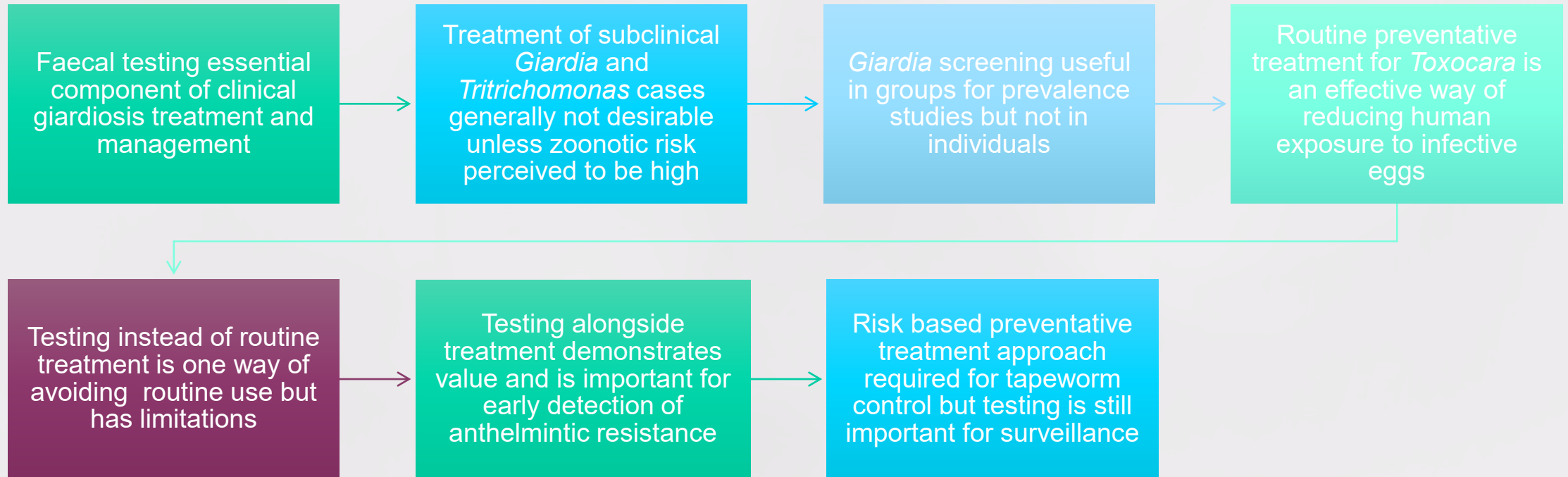
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Tapeworm diagnosis

- + Rarely clinical signs in cats and dogs
- + *Echinococcus* has direct zoonotic potential via eggs in faeces
- + Testing demonstrates exposure and geographic distribution
- + Currently no test with high enough *Taenia* or *Echinococcus* sensitivity to replace a risk-based, routine preventative treatment approach
- + Faecal flotation/sedimentation
- + Coproantigen
- + PCR



Summary





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