# CryoPTOSPORIDIOSIS

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<th>Animal Group(s) Affected</th>
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<td>Mammals</td>
<td>Direct: fecal to oral. Waterborne transmission, possible paratenic host transmission, possible aerosol transmission in birds.</td>
<td>Gastrointestinal: Diarrhea, vomiting. Respiratory disease documented in birds.</td>
<td>Depending on the affected species and organ system, severity can vary from a mild, transient, self-limiting disease to a severe and fatal disease. Severe disease is typical of immune suppressed patients, and reptiles.</td>
<td>Nitazoxanide (Alinia) is licensed and approved for use in humans. Oral bovine hyper-immune serum is reported to be effective in reptiles. Paromomycin (Humatin) is effective against some stages of the disease, but will not eliminate infection.</td>
<td>Strict quarantine, testing of new specimens, biosecurity, personal and environmental hygiene.</td>
<td>Yes. C. parvum is known to affect both animals and humans. Other species (C. felis, C. canis, C. melea-gridis, C. fayeri, etc.) are occasionally isolated from immune compromised.</td>
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<td>Herptiles</td>
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<td>Fish</td>
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<td>Humans</td>
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**Fact Sheet compiled by:** Christopher J. Bonar  
**Sheet completed on:** 3 August 2011; updated 9 April 2013  
**Fact Sheet Reviewed by:** David Lindsay, Christie Hicks  
**Susceptible animal groups:** Mammals, avian, herptiles, fishes  
**Causative organism:** Cryptosporidium sp. of which at least 20 different species exist. Cryptosporidium parvum in mammals and humans, C. ubiquitum in man and many species, C. saurophilium in lizards, and C. serpentis in snakes are the most commonly encountered species in zoological medicine, but there are many others. C. meleagridis, C. baileyi and C. galli are reported in birds. Some species are being debated (eg. C. parvum = C. pestis), but clearly there are many and molecular techniques may define still more.  
**Zoonotic potential:** Yes, at least for mammalian forms.  
**Distribution:** Common in domestic dairy calves, and often transmitted to humans. Virtually, all dairy calves become infected if sampled repeatedly during life. C. andersoni and C. bovis are found in weaned cattle. Cryptosporidium spp. are present in free-ranging wildlife. C. serpentis apparently affects both free-ranging and captive squamates. The reptile form is common in zoological parks and serpentariums. Avian forms are found in both exotic and domestic species.  
**Incubation period:** This period is not well defined in zoological specimens. Reptiles can show gradual, progressive illness. Inapparent carriers are suspected. Humans often become acutely infected, and incubation time is approximately 2 to 10 days, although often the exact time between exposure and onset of disease is often unknown.  
**Clinical signs:**
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**Humans:** Diarrhea, intestinal cramping, low grade fever, nausea, vomiting, malabsorption, dehydration. Occasionally respiratory, ocular, pancreatitis, choecystitis, cholangitis.

**Animals:** Vomiting, anorexia, and mid-body (gastric) swelling in snakes. Diarrhea in lizards, chelonians, exotic and domestic mammals, and birds. Respiratory disease is also reported in birds.

**Post mortem, gross, or histologic findings:**
This coccidian parasite can cause a variety of pathology in different taxonomic groups. In mammals, enteritis is the most common. In reptiles, proliferative gastritis is the most common manifestation in snakes, often yielding a firm, mid abdominal swelling. In lizards, enteritis with hyperplasia and mononuclear cell infiltrate in the small intestine is more common. In both gastritis and enteritis, the organism can often be seen attached to the luminal surface or within a parasitivorous vacuole within the host cells. Aural and pharyngeal cell polyps are reported in iguanas. Birds are often diagnosed with either enteric or respiratory tract infections. In humans, infections of the bile ducts, respiratory tract, and conjunctiva are found in immunosuppressed patients.

**Diagnosis:** Diagnosis is by histopathology, ELISA test on feces, Meriflour IHC of gastric washings or gastric biopsies. Acid-fast stain of gastric wash, fecal smear, or cytologic preparations. Low sensitivity and specificity of acid fast stains on gastric washes, fecal smears, and cytologic preparations makes confirmation by more sophisticated tests (of both positives and negatives) important. FLOTAC has been shown to detect Cryptosporidium in reptiles.

**Material required for laboratory analysis:** Fecal sample, gastric wash, gastric or intestinal biopsy.

**Relevant diagnostic laboratories:** Many laboratories can perform these tests, although some are more experienced or have more capabilities than others. Much of the pioneering work on this disease in exotic animals has been performed at the University of Florida and Johns Hopkins University.

**Treatment:** Nitazoxanide (Alinia) is licensed and approved in the U.S. for treatment of immune-suppressed humans with clinical disease from cryptosporidiosis. It is not documented to shorten the course of disease in immunologically normal humans. Its effectiveness in exotic animals is not published. Oral bovine hyper-immune serum has been demonstrated to be effective in reptiles. Paromomycin (Humatin) has been used to suppress the organism, but it is not effective against all stages of the organism and is unable to eliminate the infection. Other drugs similar to Nitazoxanide are in pre-clinical testing for use in humans and may show promise for exotic animals as well. Drugs such as tizoxanide, tizoxanide-glucuronide, D-eritadenine, and (S)-DHPA all have shown promise in in-vitro testing.

**Prevention and control:** Strict quarantine and testing of reptiles for Cryptosporidium has long been considered an important part of biosecurity for serpentariums. Good hygiene and disinfection is essential to prevent zoonotic transmission of mammalian Cryptosporidium to human caregivers. Testing of symptomatic birds, reptiles, and mammals should be performed and appropriate biosecurity and hygienic practices implemented to prevent spread to other animals and caregivers when positive cases are detected.

**Suggested disinfectant for housing facilities:** Cryptosporidium is notoriously resistant to most common disinfectants, especially chlorine based disinfectants. Heat sterilization of implements is most reliably effective, as well as having separate implements and tools to prevent spread from one enclosure or exhibit to another.

**Notification:** Public health officials may need to be notified if zoonotic transmission occurs. In humans, it is a reportable disease.

**Measures required under the Animal Disease Surveillance Plan:** Currently none.

**Measures required for introducing animals to infected animal:** An infected animal should not be introduced to others of the same taxonomic group. However, mammalian Cryptosporidium parvum has been shown to be non-infective to some reptiles. Cryptosporidium has been shown to be transmissible between squamates and chelonians, and wild mammals have been shown to carry C. parvum.
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**Conditions for restoring disease-free status after an outbreak:** Heat disinfection is the only method known to destroy oocysts and can be used to disinfect utensils, cleaning equipment and surfaces.

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**References:**


