

# Zoonotic Infections From Common Household Pets

Jean O'Neil, DNP, FNP-BC

## ABSTRACT

Animal to human zoonosis is when an animal transmits infections, such as viruses, bacteria, parasites, and fungi, to humans via direct or indirect contact. Common household pets can be a source of these infections. Most of these zoonotic infections go unrecognized by the primary care provider and, therefore, may go unreported or untreated. Although most people contract mild cases of these diseases, zoonotic infections can become quite devastating for those who are very young, pregnant, elderly, or immunocompromised.

**Keywords:** animal, human, infection, pets, zoonosis, zoonotic

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Pets offer us a source of comfort and companionship. Many households consider their pets as part of their family. Research shows that pets can lower our blood pressure, decrease depression, and even lower our cholesterol.<sup>1</sup> However, even with these benefits, it must be remembered that pets can also present risks of infection through animal to human transmission.<sup>2</sup> Infections contracted from animals are called zoonotic. These infections can be especially worrisome, and possibly even fatal, in very young children, pregnant women, the elderly, and those who are immunocompromised.<sup>3</sup> In September 2017, 39 people, 9 of whom were hospitalized for severe diarrhea and dehydration, were infected by the bacteria *Campylobacter* through the handling of infected puppies purchased from a popular pet store chain.<sup>4</sup> In fact, 3 of 5 new human infections are caused by some form of zoonosis.<sup>5</sup> These types of infections are often missed or there is a delay in diagnosis because of the provider's lack of knowledge regarding zoonotic infections.<sup>6</sup>

## TRANSMISSION OF PET-RELATED INFECTIONS

Animal to human zoonosis occurs when an animal transmits organisms such as viruses, bacteria, parasites, and fungi to humans through various mechanisms, which cause illness. These illnesses can be transmitted from direct or indirect contact. Direct contact

requires the human to be licked or bitten by an infected animal. Infections from indirect animal contact occur by touching surfaces that were contacted by an infected animal, being bitten by an infected vector such as a mosquito, inhaling infected particles, or eating or drinking contaminated foods and liquids.<sup>7</sup>

## HOW ZOOBOTIC INFECTIONS ARE TRACKED

The Centers for Disease Control and Prevention and the World Health Organization work to track, study, and disseminate information regarding major health risks from animals. However, zoonotic infections transmitted from common household pets to humans are not as well reported.<sup>8</sup> It was recognized early on that there was a need for the collaboration of medical professionals, human and veterinary, as well as other related disciplines, to come together as one group to improve the health of people, animals, and the environment. The concept of One Health was officially recognized in the United States by the formation of the One Health Commission. Representatives from the American Veterinary Medical Association formed the One Health Initiative in 2007.<sup>9</sup> The American Medical Association joined later that same year. This group also works with other global health professionals to perform research, training, and education in order to prevent diseases in humans and animals. They share

information related to disease detection, develop new therapies and treatments, and monitor environmental changes that could cause potential new or reemerging diseases.<sup>9</sup>

The US has excellent and readily available veterinary care, as well as government restrictions regarding the ownership of certain animals. Because of proper hygienic practices, zoonotic illnesses are less common in the US than in other countries. However, with our improved technology and increased travel to remote and exotic areas, animals are now transported out of their natural habitats or country of origin across the globe to new homes, carrying with them potential zoonotic illnesses.<sup>6</sup> There is an increase in the number of certain pathogenic zoonotic diseases in countries where these problems had not previously existed.<sup>6</sup>

Traditional household pets not only include dogs and cats but also rodents, rabbits, ferrets, birds, amphibians, reptiles, and fish.<sup>2</sup> Pet ownership is not exclusive to any one country, culture, or socioeconomic group. It is estimated that, in the US alone, approximately 63% to 75% of American homes own 1 or more pets.<sup>3,10</sup> Although there are many types of zoonotic illnesses, this article focuses on the more common and well-known zoonotic animal to human infections that are caused by direct contact with infected household pets through petting, licking, or physical injury, as well as indirect contact through handling infected animal waste products. A summary of these diseases, their diagnosis, and recommended treatments can be found in the [Table](#).

## COMMON ZOOONOTIC INFECTIONS FROM HOUSEHOLD PETS

### Parasitic Infections

Toxoplasmosis is perhaps the most common parasitic zoonotic infection seen in primary care.<sup>3,11</sup> One third of the world's population has been infected with this parasite, but it often remains unrecognized because most patients are asymptomatic. However, it can pose a threat to pregnant women and their fetuses, as well as to those who are immunocompromised.<sup>11</sup> It is caused by the protozoan *Toxoplasma gondii*.

Although the majority of toxoplasmosis occurs through eating undercooked contaminated meat, indirect transmission can occur between common household animals to humans when the parasite is transmitted through infected cat feces that contain oocysts formed from parasitic sexual reproduction.<sup>12</sup> In most cases, these oocysts do not cause a severe infection. However, in a small percentage of people, these oocysts can proliferate and migrate to different organs of the body. Humans contract this disease when hygiene measures have not been observed, such as when cleaning the litter box or gardening without gloves in soil containing feces from infected animals.<sup>12</sup> Although cats are the primary reservoir for this infection, dogs have also been known to transmit this disease because of their propensity to roll in dirt that may contain infected feces.<sup>11</sup>

Symptomatic patients may present with cervical lymphadenopathy and a mononucleosis-like illness that includes fever, headaches, muscle pain, lymphadenopathy, and pharyngitis.<sup>11</sup> These symptoms are usually self-limiting. However, an acute infection in a pregnant woman, especially during the first trimester, can lead to fetal transmission, which causes congenital toxoplasmosis. Signs and symptoms of an infant infected by toxoplasmosis can include hydrocephalus, convulsions, blindness, intracranial calcifications, strabismus, thrombocytopenia, and anemia.<sup>11</sup> There are an estimated 3,000 of these congenital infections in the US yearly.<sup>3</sup> Chorioretinitis, an inflammation of the choroid and retina of the eye, as well as neurologic deficits can occur in childhood or adulthood years after fetal exposure, especially if the affected person becomes immunocompromised.<sup>11</sup>

Diagnosis of this disease is usually made from a thorough patient history, physical examination, and a serologic test called the immunoglobulin G avidity assay, which measures the strength of immunoglobulin G binding to *Toxoplasma gondii*.<sup>11</sup> In pregnant women, when there is a suspicion of fetal infection, additional tests, including an ultrasound and amniocentesis, are performed.<sup>11</sup> These tests are expensive and are not always conclusive. In the US, the infection rate of pregnant women is relatively low, and, therefore, routine serologic screening is not recommended. However, in areas with a high

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