

# Zoonotic Diseases

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The World Health Organization (WHO) defines zoonoses as diseases and infections that are transmitted between animals and humans (WHO, “Zoonoses and the Human-Animal-Ecosystems Interface,” accessed 2014). A zoonotic agent may be a bacterium, a virus, a fungus, or other communicable disease agent. According to the Centers for Disease Control and Prevention (CDC), at least 61 percent of all human pathogens are zoonotic, and have represented 75 percent of all emerging pathogens during the past decade (CDC, “Emerging and Zoonotic Diseases — At a Glance,” accessed 2014).

Newly emerging zoonotic diseases include Severe Acute Respiratory Syndrome (SARS), which sparked an epidemic in 2002 and came from animals sold in Chinese markets (WHO, “Severe Acute Respiratory Syndrome (SARS),” accessed 2014), and the avian influenza H5N1 virus, which came from Asia and can be contracted through handling infected poultry (U.S. Dept. of Health and Human Services, accessed 2014).

Although many anti-cat campaigns use the fear of zoonotic diseases to push for the eradication of feral cats, history

has shown us the important role cats have played in preventing the spread of disease. For instance, during the 14<sup>th</sup> century, the bubonic plague, or the Black Death, took the lives of 25 million people living throughout Europe. For hundreds of years prior to the plague, cats were hunted and killed because they were thought to be associated with witches. While cat populations were virtually eliminated, rat and mice populations exploded, which allowed for the spread of the disease. It wasn’t until the Age of Exploration that cats became popular again and were welcome passengers aboard ships as rodent control specialists (Seymour, accessed 2014).

While it is true that cats can transmit a few diseases to humans, the Cornell Feline Health Center reports you are much more likely to contract infectious diseases from other humans than you are from your cat (Cornell, “Zoonotic Disease: What Can I Catch from My Cat?,” 2014). For this very slight risk, simple precautions, common sense, and good hygiene, including careful handling of litter boxes and treating cats aggressively for fleas and other parasites, can further reduce any possible risk of zoonotic dis-

ease transmission from cats (Cornell, "Zoonotic Disease: What Can I Catch from My Cat?," 2014). Individuals with immature or weakened immune systems, such as infants, individuals with acquired immunodeficiency syndrome (AIDS), the elderly, and people undergoing cancer therapy should take extra precautions.

Below are a few zoonotic diseases that can be transmitted from cats to humans and the precautions that can be taken to prevent transmission.

## Rabies

Of all zoonotic diseases, rabies is the most feared and most misunderstood. Rabies is an acute and deadly disease caused by a viral infection of the central nervous system. The rabies virus is most often spread by a bite and saliva from an infected mammal. Although there is an extremely low incidence of contracting rabies in the U.S., the virus still causes great panic.

The primary carriers of rabies are wild animals, although any unvaccinated mammal can be a vector for rabies. The CDC reports that wild animals accounted for 92 percent of reported cases of rabies in the U.S. in 2013 (Dyer et al., 2014). Raccoons accounted for 32.4 percent of the cases, followed by bats (27.2 percent), skunks (24.7 percent), foxes (5.9 percent), and other wild animals (Dyer et al., 2014).



Nancy North

*Zoonotic diseases are a consideration for colony caretakers, but simple precautions can serve to mitigate the risk of transmission for them and the millions of people living with outdoor cats across the world. This colony is in the Buenos Aires Botanical Garden in Argentina.*

In the last 100 years, the number of human deaths from rabies in the U.S. has fallen from 100 or more per year to an average of one or two (CDC, "Rabies in the U.S.," accessed 2014). In most fatal cases, death occurs largely because the victim failed to recognize the health risks associated with bite wounds and did not seek medical advice or treatment.

Several programs have been responsible for the decline in rabies cases. First, vaccination programs for dogs and cats began in the 1940s, virtually eliminating the chance of contracting the disease from our beloved companion animals. Secondly, an oral rabies vaccination program for wildlife was introduced in the 2000s (Wildlife Services, 2011). Thirdly, effective pre-exposure and post-exposure rabies vaccines have not only reduced the risk of infection for those who receive the pre-exposure vaccine,

but they also reduce the effects of the illness and prevent death in those who receive post-exposure treatment.

Some countries in Asia, Africa, and Latin America have a high incidence of rabies infection. These countries have large populations of domestic and feral dogs who live in cities and come in close contact with humans. These countries do not have the resources to provide spay/neuter and TNR programs; therefore, dogs remain the major vector species for rabies in these countries. While there are far fewer cases of rabies infection in the U.S. than in many other countries, the virus is still widespread among wildlife here and it remains a serious public health concern.

The first symptoms of rabies in humans are similar to a flu-like illness, which includes fever, headache, and general discomfort. However, within days, the infected person will experience symptoms such as anxiety, confusion, agitation, abnormal behavior, delirium, and hallucinations. Once the latter symptoms appear, the disease is almost always fatal. Therefore, any person who has been bitten or scratched by a potentially rabid animal should see a physician immediately for post-exposure treatment.

Any unvaccinated cat who bites a human should be quarantined for at least 14 days, examined by a veterinarian, and then vaccinated prior to release. If a cat appears ill at the time of the bite or becomes ill during the quarantine period, a veterinarian should evaluate the cat for signs of rabies and continue to monitor the cat's health closely. Once infected

with the rabies virus, a cat will only survive for about three or four days. Obvious signs of rabies infection in cats include, foaming at the mouth, trouble walking, lethargy, and erratic and extremely aggressive behavior. Unfortunately, if such symptoms are present, the only option is to euthanize the cat to prevent suffering and transmission of the virus.

To prevent the transmission of rabies, never approach or attempt to handle an unfamiliar cat (or wildlife). Always use a humane trap and wear thick gloves when handling or transporting a cat whose vaccination history is unknown. It is highly recommended that anyone handling feral or stray cats (or other animals, especially wildlife) should receive the pre-exposure rabies vaccine.

It is also important to make sure all domestic cats (and dogs) receive the rabies vaccine, and TNR programs are implemented for community cats. In TNR programs, feral cats receive a three-year rabies vaccine, which studies have shown to be effective for longer than three years. Vaccinated cats provide a buffer zone between wildlife and humans, and vaccinating community cats will reduce the risk of an individual coming in contact with an unvaccinated cat.

If a cat bites you, immediately wash the wound with hot soapy water for several minutes and clean with peroxide. Apply an antibiotic cream and cover the wound with gauze and tape. Monitor for infection (redness, swelling, pus) and seek medical attention if the wound doesn't seem to be healing.

If a cat (or other animal) is showing signs of rabies infection, the animal should not be approached and the appropriate authorities should be alerted immediately. For more information on rabies and preventing the transmission of the disease, please refer to Addendum 4 in the back of the handbook.

## Bacterial Diseases

Bites are the most common animal-human health concern. Bacteria in the mouths of cats can cause serious infection if a bite wound is left untreated, including swelling, inflammation, and pain. If you are bitten by a cat, immediately wash the wound with hot soapy water for several minutes and clean with peroxide. Apply an antibiotic cream and cover the wound with gauze and tape. Monitor for infection (redness, swelling, pus) and seek medical attention if the wound does not seem to be healing.

Always use caution (wearing thick gloves and using a trap if possible) when handling an unfamiliar cat. This will help prevent being scratched or bitten.

## Cat Scratch Disease

Cat scratch disease, or cat scratch fever, most commonly occurs in children following a cat scratch or bite. Typical symptoms include enlarged lymph nodes, fever, fatigue, sore throat, and headaches. Although most patients do not become seriously ill and recover with or without treatment, all cat scratches

and bites should be thoroughly cleaned and properly bandaged.

Again, always use caution (wearing thick gloves and using a trap when possible) when handling an unfamiliar cat. This will help prevent being scratched or bitten.

## Lyme Disease

Lyme disease is caused by bacteria and is transmitted by ticks. In 70-80 percent of cases, a rash will appear at the site of the bite, often in a bull's eye pattern. Early symptoms can include headache, fever, and fatigue. In most cases, the infection and its symptoms are eliminated by antibiotics, especially if the illness is treated early. Delayed or inadequate treatment can lead to more serious symptoms that affect joints, the heart, and the nervous system (WHO, "Lyme Borreliosis," accessed 2014).

Lyme disease can also affect cats (and dogs). It is highly recommended that domestic cats who spend some part of their day outdoors, and all community cats (when possible), should be treated with a monthly topical (flea and) tick medication. Shelters and bedding should also be treated, using flea and tick powders or sprays. Providing cats with tick preventative treatments, not only protects the cats but it also protects the caretaker and others from contracting Lyme disease.

If you do find a tick biting you or a cat, carefully remove it using a pair of tweezers.

Make sure to completely remove the head and the mouth parts, which can be difficult to remove if the tick has become engorged. Clean the area, apply antibiotic ointment, and monitor for infection (redness, swelling, bull's eye rash). If you see signs of infection, seek medical attention immediately. Dispose of the tick by flushing it down the toilet.

## Campylobacter

Campylobacteriosis is usually transmitted through raw or undercooked meat, but humans can also catch the infection from other humans or animals. The main source of contamination in both humans and cats is ingesting undercooked poultry. Although campylobacter is not common in cats, it can sometimes be found in kittens, who usually get it from kennels (PetMD, accessed 2014). The bacteria causes cramping, diarrhea, fever, and abdominal pain (NIH, "Campylobacter Infection," accessed 2014). Symptoms usually last about one week and can be treated with increased hydration or antibiotics, if necessary.

Wearing gloves when handling cat feces can prevent possible contamination. Making sure the living space of cats is clean will also prevent them from becoming infected.

## Salmonella

A foodborne pathogen with symptoms similar to campylobacter, salmonella

causes diarrhea, fever, and stomach pains within hours or a few days of infection. Again, the main source of contamination is raw or undercooked food, largely poultry or eggs. Infected humans often recover without treatment, though hospitalization is sometimes necessary in severe cases.

Cats and other animals can pass salmonella in their stool. The bacteria is common in cats who are fed raw meat or cats who eat birds and rodents. If a cat has diarrhea, wear gloves when cleaning her litter box and wash your hands thoroughly afterward to avoid contamination (CDC, "Salmonella," accessed 2014).

## Fungal Infections

Fungal infections can be common occurrences in cats, with skin lesions typically appearing on the tips of the ears, nose, tail, and also on the feet and hocks; however, the rash can spread to all parts of the body. The skin around these lesions is often flaky and bald; not always red in color; and the rash is usually itchy. In humans, the infection is called Ringworm because the outside of the spots usually appears more red than the inside, resulting in the characteristic ring shape (NIH, "Ringworm," accessed 2014).

Fungal infections are highly contagious and can spread to other animals, as well as to people, through simply touching an infected animal or person. It can also be transmitted through unwashed clothing and showers. It is important to keep

the infected cat quarantined and to wear gloves when applying ointment.

Treatment for humans (and cats) depends on severity, but may include antifungal ointments and oral medications. Topical treatment sterilizes the outside of the body, while oral medications kill the infection internally. For small outbreaks, over-the-counter antifungal creams (i.e. athlete's foot cream) can be used to treat cats, dogs, and humans.

## Parasites

There are a few diseases common to cats and humans caused by parasites. They include cryptosporidiosis, giardiasis, and toxoplasmosis. Cryptosporidiosis and giardiasis can cause diarrhea in both cats and people, usually through drinking contaminated water. To prevent the spread of infection, everyone should have a veterinarian perform an annual fecal examination on their cats. If a cat should have one of these parasites, use extra caution while cleaning litter boxes by wearing gloves and washing your hands.

Cats and dogs can have these parasites, but a much larger concern is contaminated water. No one should drink water directly from lakes, rivers, streams, or springs (CDC, "Parasites - Cryptosporidium (also known as "Crypto")," accessed 2014). Those who want to take extra precautions may wish to boil water to eliminate parasites such as *Cryptosporidium* or *Giardia*. These precautions are especially important for travel outside the U.S. because water standards elsewhere may be different.

## Toxoplasmosis

*Toxoplasma gondii* is an intestinal parasite that is most often associated with cats. The parasite causes the disease toxoplasmosis, which is a human health concern for pregnant women. Raw meat, especially pork, is the primary mode of transmission of the parasite to humans. Consuming raw or undercooked meat is a danger, as is failing to wash your hands properly after handling meat or utensils used with contaminated meat. *Toxoplasma* cannot pass through the skin, but oocytes left on the skin can unintentionally be ingested if hands are not washed properly, resulting in infection (CDC, "Toxoplasmosis," accessed 2014).

This parasite is estimated to infect as much as one third of the world's human population, but very rarely do those infected get sick (Montoya and Liesenfeld, 2004). Most healthy people have immune systems that can fight off the parasite and will never become sick. However, the parasite can be dangerous in rare cases. Individuals with weakened immune systems, such as AIDS patients, can sometimes become seriously ill as a result of infection, and pregnant women can pass on the parasite to their unborn child. For this reason, doctors are quick to tell pregnant women to get rid of their cats. However, it is important to note that there is less risk of acquiring toxoplasmosis from cats than eating raw vegetables and undercooked meat (Vittecoq et al., 2012). Additionally, owning a cat does not increase the risk of contracting toxoplasmosis (Vittecoq et al., 2012).

Still, pregnant women can take certain precautions when in contact with cats to be safe. If pregnant, one should avoid cleaning litter boxes if possible. Infected cats could pass the oocyst of *Toxoplasma* in feces. If a pregnant woman has no alternative but to clean the litter box herself, she should wear disposable gloves and wash her hands thoroughly afterwards. The same goes for if she is gardening, as it is possible for the parasite to live in soil (CDC, "Toxoplasmosis," accessed 2014).

Pregnant women should also keep their cat indoors, where the cat is not exposed to other animals who may be infected, and all newly adopted cats should be tested for the disease. Pregnant women can also be screened for toxoplasmosis. The only risk occurs when the parasite infects a woman during pregnancy — if she was exposed to toxoplasmosis before pregnancy, there is no risk to her child since she will have developed antibodies to fight the parasite. However, some experts recommend waiting six months after an infection before trying to become pregnant (CDC, "Toxoplasmosis," accessed 2014). If a woman is pregnant when she contracts toxoplasmosis, medication is available.

#### *Web MD* reports:

It is important to understand the mode of transmission from cats to understand how minimal the risk is. Even a cat with an active toxoplasmosis infection is only capable of passing it on for seven to ten days of

her entire life, when there's an acute infection. It takes anywhere from one to three days for oocysts shed in the feces to become infectious — which means the litter box would have to sit unscooped for one to three days before the infection could be passed on [emphasis added]. Then, to become infected from cat feces, a person would have to touch the feces and then touch an opening in their body. (WebMD, accessed 2014)

ACR does not want to make light of the fact that if a pregnant woman does contract toxoplasmosis it can be dangerous for her unborn baby. However, those who do not like cats exaggerate this particular hazard. Many doctors are uninformed that the risk of toxoplasmosis for pregnant women is low, and exposure from cat feces is far less likely than from raw and undercooked meat.

## Worms

Roundworms, hookworms, whipworms, and tapeworms can also cause disease in humans and cause malnutrition in cats if left untreated. Visceral larva migrans, a disease that often goes away on its own but can be serious in rare cases, can result from accidental consumption of roundworm eggs. Children who play in soil can be at risk, or the eggs could travel on vegetables that were in contact with infected soil (NIH, "Visceral Larva Migrans," accessed 2014).

Cutaneous larva migrans, on the other hand, is caused by any kind of contact

with hookworm-contaminated soil. It is most common among travelers returning from tropical regions (Caumes, 2000).

To prevent possible worm infections, children and adults should wash their hands after playing/working outside and coming in contact with soil. Fruits and vegetables should be washed thoroughly before consumption. Travelers should wear sandals on unfamiliar beaches, and no one should go barefoot in areas that might be contaminated by dog or cat feces. Worms go away on their own or with anti-parasitic drugs (NIH, "Visceral larva migrans," accessed 2014).

Cats can be treated with a monthly topical dewormer, such as Profender, or deworming pills can be crushed into wet food to prevent infection. Fecal exams can be performed, if possible, to detect parasites. In colonies, outdoor litter boxes should be built and regularly scooped. And remember to ALWAYS wash your hands after handling cat feces.

## Murine Typhus

Murine typhus (*Rickettsia typhi*) is caused by fleas that are often carried by rats, but can also be found on opossums, cats, dogs, and other wild animals. Typhus occurs around the world, but in the United States, murine typhus is limited to the southern states, particularly Texas and California (NIH, "Typhus," accessed 2014). *R. typhi* does not produce disease in cats and dogs, as it does in people. Epidemic typhus, spread by lice, is generally a more severe disease.

In order to placate neighborhoods that fear this disease, some health agencies may rush in and trap and kill feral cats in the area. This is not wise, as the fleas will still exist, and may then be more prone to jump on people. In any case, the rodent population will thrive without predators to keep them in check, and rats are the primary carriers of fleas in the first place.

TNR and flea control are a far more effective solution than killing cats. Spray or dust the cats' sleeping areas with a flea preventative, especially in warm, dry seasons. Capstar pills can be crushed into canned cat food, and a monthly topical flea treatment should be applied. Clean up neighborhoods and backyards, because junk left lying around attracts rodents.

## Plague

Plague is also usually carried by fleas, which in turn are transported on rodents and other mammals. Plague infects humans and animals (WHO, "Plague," accessed 2014).

People usually contract plague when bitten by a rodent flea carrying the plague bacterium, or when handling an infected animal. Millions of people in Europe died from plague in the Middle Ages, when human homes and workplaces were infested by plague-ridden, flea-infested rats. Cats were almost wiped out during this time, as they were scapegoated for being "witches' familiars." With fewer

cats, there were more rats and more carriers of the plague, increasing the spread of this deadly disease (Zeugner, 2008).

Precaution should be taken in situations where exposure to rodent fleas is possible, such as when you are working outdoors or camping (CDC, "Prevention - Plague," accessed 2014). Use a repellent to keep fleas off yourself and wear gloves when handling an animal with fleas. You should also treat cats and other companion animals for fleas. To prevent flea infestations, all cat blankets should be washed regularly and sleeping places can be dusted with flea powder. Capstar pills can be crushed into canned cat food, and it is also highly recommended that cats be treated with a monthly topical flea treatment such as Advantage Multi.

## Tuberculosis

Among humans, tuberculosis, or TB, is more common in regions of overcrowding and poverty. TB is a bacterial disease that is contagious and able to spread from animals to humans (CDC, "Tuberculosis (TB)," accessed 2014).

Cats are resistant to the primary strain of TB that affects humans, *Mycobacterium tuberculosis*, but can catch a strain that is more common in cows, *Mycobacterium bovis*. Dogs and humans are susceptible to both strains, but bovine TB is very rare and makes up only one percent of TB cases in the United States (McNeil, 2014).

In 2014, the first cases of humans catching TB from cats were documented in England. Four people caught bovine TB from a rare group of infected cats (McNeil, 2014). Though the other strain of TB is serious, bovine TB can be treated with antibiotics (Gray, 2014). Officials also noted that there is very minimal risk of exposure from cats and this was an unusual circumstance (McNeil, 2014).

It is not entirely known how these individuals were exposed to the disease, but it usually requires close physical contact, and most likely came from direct contact with an open wound (Gray, 2014). Cats seem to catch this disease from cows or from other animals, such as rodents or badgers, who can become infected. When dealing with free-roaming cats, you should cover any and all of your injuries and wear gloves when handling an animal who appears sick or injured.

## Health Benefits of Community Cats

Despite the attention given to zoonotic diseases and claims of animals being a public health risk, there are actually more health benefits resulting from the association with cats than there is harm. Cats and dogs have been shown to lower blood pressure, relieve stress, decrease depression and anxiety, extend life expectancies, and promote overall happiness. Studies have shown that individuals who care for animals have improved immune systems and children raised around animals develop less autoimmune diseases.

A study at the University of Minnesota showed a 30 to 40 percent less risk of cardiovascular disease, including stroke, in those who lived with a cat (Qureshi et al., 2009), while a national Australian survey analyzed by Bruce Headey showed that individuals living with companion animals visited the doctor less often and were less likely to take medication for heart conditions and sleep disorders (Headey, 1999). Another study revealed that individuals who had companion animals were less likely to die after suffering from a heart attack compared to those who did not have companion animals (Friedmann et al., 2010).

Similarly, two independent studies supported the correlation between living with companion animals and a decreased risk of heart disease, particularly a decrease in blood pressure and cholesterol (Arhant-Sudhir et al., 2011; Anderson et al., 1992). Another study showed that companion animals provide for the improved health and psychological well-being of individuals (Serpell, 1991). Cat companionship has also been found to help reduce stress and anxiety while improving overall health (Jennings, 1997).

Researchers at the Columbia Center for Children's Environmental Health (CCCEH) at Columbia University's Mailman School of Public Health released findings that cat companionship has a protective effect against the development

of asthma symptoms in young children at age five. The study, published by the *Journal of Allergy and Clinical Immunology*, also found that children with cats in the home were more likely to have produced allergy-related antibodies to cats (Columbia University, 2008).



Louise Holton

Feeding feral cats in Rome, Italy.

## Conclusion

Although there are potential hazards for acquiring some diseases from stray and outdoor cats, the incidence is rare, and in most cases cat companionship provides improved health benefits. If common sense and good hygiene are exercised when working with colonies, transmission of infectious diseases from cats to humans can be minimized. Contact with other humans is more likely to be a source of contracting infectious diseases than contact with animals (Cornell, "Zoonotic Disease: What Can I Catch from My Cat?," 2014).

However, it is critical to be vigilant about cleanliness, especially when feeding feral cats and cleaning up cat feces. All of these precautions will help not only with potential health hazards, but will stop neighbors from complaining about dirty places due to outdoor cats.

There are millions of feral cats living in every corner of the world, and they help with the control of rodents in cities and

towns. After all, this was one of the reasons they became friends with humans in the first place. One rarely hears of humans becoming ill because of the cats living among us in our alleyways and on our streets. It is a friendship appreciated on both sides, by cats and by humans. The transmission of disease from cats to humans, as a result of this closeness, can certainly be managed.

### Summary

To protect yourself from cat-related diseases:

- Wear gloves and wash your hands thoroughly with soap and water after handling cat feces.
- If a cat does scratch or bite you, wash the area immediately with soap and hot running water.
- Vaccinate domestic and feral cats against rabies.
- Treat domestic and feral cats for internal (worms) and external (fleas, ticks) parasites.
- Build outdoor litter boxes and scoop frequently.
- Do not put too much food out; only supply the amount of food sufficient to feed the cats in a single day. Bring food bowls in at night to avoid attracting wildlife.