

Zoonotic Diseases

Zoonoses are diseases and infections that are transmitted between animals and humans. A zoonotic agent may be a bacterium, a virus, a fungus, or other communicable disease agent. Around 60 percent of all human pathogens are zoonotic, and up to 75 percent of all emerging pathogens are zoonotic in origin (Salyer et al., 2017).

Recently emerged zoonotic diseases include Severe Acute Respiratory Syndrome (SARS), which sparked an epidemic in 2002 and came from animals sold in Chinese markets (World Health Organization: WHO, 2019); the avian influenza H5N1 virus, which can be contracted through direct contact with infected birds or contaminated environments, but is not highly transmissible between humans (World Health Organization: WHO, 2020; Nuñez and Ross, 2019); and the family of Coronaviruses, including COVID-19, which are transmitted by a variety of species, most prominently wild bats (Tiwari et al., 2020).

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 (“Zoonotic Disease: What Can I Catch from My Cat?,” 2014). 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 disease transmission from cats. 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.

Following 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 humans 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 91.8 percent of reported rabies cases in the U.S. in



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.

2019 (Ma et al., 2021). Bats remain the primary source of human infection, at around 70 percent (Nigam, 2019; Saplakogu, 2022; Gross, 2022). Raccoons accounted for another 32.3 percent of the cases, as well as skunks for 19.5 percent, and foxes for 7.7 percent (Ma et al., 2021).

Among domesticated animals, dogs are the source of most transmissions to humans worldwide (“Animals and Rabies,” accessed 2023); however, in the United States, cats are the most commonly-reported rabid domesticated animal (Aiello, Moses, & Allen, 2016). Therefore, it is extremely important for owners to ensure that their cats’ vaccinations are kept up-to-date.

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 (Nigam, 2019). In most fatal cases, death occurred 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 in the U.S. Vaccination programs for dogs and cats began in the 1940s, virtually eliminating the chance of contracting the disease from our beloved companion animals. 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. Further protection against rabies came in the 2000s when the USDA introduced an oral rabies vaccination program for wildlife. Then in 2022, the oral vaccination program began distributing fish-flavored edible pellets over large areas of the eastern U.S. by aircraft (Kanowsky, 2022).

Some countries in Asia, Africa, and Latin America have a relatively high incidence of rabies infection. These countries have large

populations of tame 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.

Obvious signs of rabies infection in a cat include, foaming at the mouth, trouble walking, lethargy, and erratic and extremely aggressive behavior. A cat with rabies will usually die within four to six days. Unfortunately, the only option is to euthanize a rabid cat to prevent suffering and transmission of the virus.

Any unvaccinated cat who bites a human should be quarantined for 10 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.

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 that 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 (Dodds et al., 2020). Vaccinated cats provide a buffer zone between wildlife and humans, and vaccinating community cats will reduce the risk of a person coming in contact with an unvaccinated cat.

If a cat bites you, immediately wash the

wound with hot, soapy water for several minutes and then clean it with peroxide. Apply an antibiotic cream. 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.

Cat Scratch Disease

Cat scratch disease, or cat scratch fever, is caused by a bacterium spread to cats by flea bites and droppings. When the cats get flea droppings on their nails and between their teeth from scratching, the bacterium can be transmitted to humans if the cat breaks the skin with her teeth or claws ("Cat Scratch Disease," accessed 2022). It can also occur if an infected cat licks a person's open wound.

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 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 help prevent them from becoming infected.

Salmonella

A foodborne pathogen, salmonella causes diarrhea, fever, and stomach pains within hours or a few days of infection. Like campylobacter, 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 (“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 a characteristic ring shape (“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 from unwashed clothing and showers. It is important to keep an infected cat quarantined and to wear gloves when applying ointment.

Treatment for humans as well as 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 both cats and humans that are caused by parasites. These include cryptosporidiosis, giardiasis, and toxoplasmosis. Cryptosporidiosis and giardiasis can cause diarrhea in cats and people, and is usually contracted by 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 carry these parasites, but contaminated water is a greater threat. No one should drink water directly from lakes, rivers, streams, or springs (“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 when travelling 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 health concern for pregnant women. Raw meat, especially pork, is actually 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,” 2018).

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 the parasite on to their unborn child. For this reason, people in these groups were historically advised to avoid cats prior to modern research proving avoidance to be unnecessary (“Toxoplasmosis in Cats,” 2019). It is important to note that there is less risk of acquiring toxoplasmosis from cats than eating unwashed vegetables and undercooked meat (Vittecoq et al., 2012). Additionally, owning an indoor cat does not significantly increase the risk of contracting toxoplasmosis (Hai-Xia et al., 2016; Lepczyk et al., 2019). Both latitude and access to the outdoors play significant factors in transmissions of *T. gondii* and related strains, with cats that were both living in the northern hemisphere and given access to the outdoors being nearly three times as likely to carry the parasite (Lepczyk et al., 2019). Pregnant cat owners in the United States may therefore wish to consider restricting their cats to the house for the duration of their pregnancy.

Further precautions can also be taken when in contact with cats to ensure a pregnant person’s safety. If pregnant, one should avoid cleaning litter boxes if possible, as infected cats can 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 gar-

dening, as it is possible for the parasite to live in soil (“Toxoplasmosis,” accessed 2014).

All cats newly adopted by families with pregnant members in the home should be tested for the disease. Pregnant women can also be screened for toxoplasmosis. The greatest risk occurs when the parasite infects a woman during pregnancy — if she was exposed to toxoplasmosis before the pregnancy, there is less risk to her child since she will have developed antibodies to fight the parasite. Nevertheless, it is recommended to wait at least three to six months after an infection before trying to become pregnant (Center for Food Safety and Applied Nutrition, 2018; “CDC - Toxoplasmosis,” 2018). If a woman does contract toxoplasmosis while pregnant, medication is available.

According to *WebMD*:

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.

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 cause disease in humans and 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 ("Visceral larva migrans," 2020).

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 to detect parasites. In colonies, outdoor litter boxes should be 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, where the primary carriers are opossums, rats, and cats (Civen, 2008; Blanton et al., 2016; Mullins et al., 2018). *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.

Spray or dust the cats' sleeping areas with a flea preventative, especially during 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. Cat owners in these areas may also want to seriously consider restricting their cats' outdoor access to supervised periods or secure enclosures, as free-roaming pet cats are just as susceptible to flea borne diseases as unowned cats (Luria et. al., 2004; Ayllón et al., 2012).

Plague

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

Precaution should be taken in situations where exposure to rodent fleas is possible, such as when working outdoors or camping ("Prevention of Plague | CDC," 2018). 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.

Conclusion

Although there are potential hazards of 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 (“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. Taking 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



Feeding feral cats in Rome, Italy

Louise Holton

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.