Dogs and Cats

The following document describes common types of zoonotic illnesses encountered when working with the indicated species. **This is not an exhaustive list and the possibility of zoonotic disease should be considered every time work is conducted with animals.** Specific-pathogen-free status in laboratory animals tests only for the presence of particular pathogens and is NOT an assurance that the animal is pathogen-free or that it cannot transmit zoonotic diseases. PPE and experimental practices appropriate to the specific task should be followed when working with any animal species. EHS recommendations are made during review of your IACUC protocol –additional questions about the potential for zoonotic disease exposure should be directed to your EHS representative.

If you have had an exposure and/or are showing symptoms of illness, and need medical attention refer to the information in the University of Michigan's Bite Scratch Protocol

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Bacterial

Disease:	**BRUCELLOSIS**
Description of Disease:	In dogs, this disease is also known as contagious abortion. In humans, it is referred to as Mediterranean fever, Malta fever, or undulant fever. The most common causative agent of Brucellosis in dogs is *Brucella canis.*
Clinical Signs in Animals:	It is unlikely that dogs raised for use in research will harbor the disease. Most infected dogs will not display any signs of illness, but clinical signs in include abortion during the last trimester of pregnancy, infertility, and testicular abnormalities in males. Other possible clinical signs are diskospondylitis, and inflammation of eyes and brain. Infected dogs used for breeding may be found to have poor semen quality.
Transmission and Symptoms in Humans:	Humans are thought to be relatively resistant to infection with *B.* canis. Transmission to humans in a laboratory setting is by the direct contact of broken skin or the mucous membranes (such as eyes or mouth) with infected animal birth products (aborted fetuses, fetal

	fluid and membranes, and secretions), blood, or urine. The bacteria can also be transmitted through inhalation of aerosols. Symptoms usually develop in humans within one-two months of infection. Flu-like symptoms such as fever, headache, chills, sweating, weakness, malaise, muscle aches, and nausea can last two to four weeks. In some cases, infection with *B. canis* has caused bacteremia or painful generalized lymphadenopathy and splenomegaly.
Prevention:	Transmission of *Brucella* can be prevented through utilization of good personal hygiene and strict sanitization methods, and by wearing personal protective equipment especially when working with pregnant host dogs or their birth products. Birth products should be disposed of promptly and carefully. Contaminated surfaces should be appropriately disinfected. Dogs should be tested before breeding and euthanized, neutered, or not bred if found to be infected.
Additional Information:	https://www.cdc.gov/brucellosis/index.html

Disease:	**CAMPYLOBACTERIOSIS**
Description of Disease:	*Campylobacter* spp, especially *C. jejuni* and *C. coli* have been recognized as leading causes of diarrhea in humans over the past decade. *C. jejuni, C. coli, C. upsaliensis,* and *C. helveticus* have been isolated from laboratory animals, where they can be commensal or can cause diarrheal disease.
Clinical Signs in Animals:	Dogs and cats may be carriers without clinical signs or may have diarrhea that can contain blood. Younger animals more easily acquire the infection.
Transmission and Symptoms in	Humans can acquire the infection through handling of feces or contaminated food, bedding, or enrichment.

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Humans:	Fecal-oral transmission is most common, though the bacteria can also enter through breaks in the skin. Diarrhea (often bloody), abdominal pain, and fever are the most common signs in humans. Complications of infection with *C. jejuni* can include reactive arthritis, Guillian-Barre syndrome, and myocarditis.
Prevention:	Transmission of the disease is decreased by wearing personal protective equipment including gloves when handling dogs or cats to prevent fecal contamination and inadvertent oral ingestion.
Additional Information:	https://www.cdc.gov/campylobacter/index.html

Disease:	**CAPNOCYTOPHAGA INFECTION**
Description of Disease:	*Capnocytophaga canimorsus* and *C. cynodegmi* can rarely cause local and systemic infections in humans.
Clinical Signs in Animals:	The bacteria *Capnocytophaga canimorsus* and *C. cynodegmi* can frequently be isolated from the mouths of dogs and cats, where it causes no disease.
Transmission and Symptoms in Humans:	In humans, a severe infection can occur if the organism is introduced into tissues such as during an animal bite or scratch, or when the animal's saliva contacts a pre-existing open wound. Blisters can appear around the wound within hours of inoculation. Additional clinical signs usually develop within approximately 5 days and initially consist of tissue redness, swelling, pain, drainage from the site, and inflamed lymph nodes. Without treatment, these signs may progress to fever, vomiting, diarrhea, abdominal pain, malaise, difficulty breathing, mental impairment and headache. The disease can be fatal. Individuals with impaired immune systems, those who have had a splenectomy, and those who abuse alcohol are at increased risk of developing a severe or fatal disease.

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Prevention:	Transmission of the disease is decreased by wearing personal protective equipment including gloves when handling dogs or cats. In addition, all dog or cat bite wounds should be evaluated by medical personnel.
Additional Information:	https://www.cdc.gov/capnocytophaga/index.html

Disease:	**CAT-SCRATCH FEVER**
Description of Disease:	The bacterium *Bartonnella henselae* has been directly associated with cat-scratch fever, which typically causes mild systemic symptoms and lymphadenopathy in humans.
Clinical Signs in Animals:	This organism has been demonstrated to produce chronic, asymptomatic infection, especially in younger cats, for at least 2 months, and possibly for as many as 17 months. Some cats experience a mild systemic illness that can include a fever lasting 2-3 days. *Bartonella* infection is less likely in dogs, but is more likely to cause more serious illness, which can include vomiting, red eyes, swollen lymph nodes, lethargy, and inappetence.
Transmission and Symptoms in Humans:	Of patients with the disease, 75% report having been bitten or scratched by a cat, and over 90% report a history of exposure to a cat. The organism has been isolated from fleas that fed on infected cats, and fleas have been shown to be capable of transmitting the organism between cats. This finding suggests that fleas could serve as a vehicle in zoonotic transmission. The disease begins with introduction of the organism into the skin (bite or scratch) of an extremity, usually a hand or forearm. A small bump appears at the site of inoculation several days later, and is followed by blister and scab formation. The lesion resolves within a few days to a

	week. Several weeks later, regional lymph node swelling occurs, and can persist for months. Pus formation and rupture of the lymph node sometimes occurs. Cat-scratch fever can progress to a severe systemic or recurrent infection that is life-threatening in immunocompromised people.
Prevention:	Elimination of fleas should largely eliminate *Bartonella* in the research setting. The use of proper cat-handling techniques, protective clothing, and thorough cleansing of wounds should minimize the likelihood of personnel exposure to the organism of cat-scratch fever.
Additional Information:	https://www.cdc.gov/healthypets/diseases/cat-scratch.html

Disease:	**LEPTOSPIROSIS**
Description of Disease:	Leptospirosis in dogs and, to a lesser extent, cats, also referred to by its shorthand “Lepto,”, is caused by spirochete bacteria of the genus *Leptospira*, with dogs being the maintenance host of *Leptospira interrogans* serovar Canicola. The most common serovars have shifted rapidly over time, with serovars Icterohaemorrhagiae, Canicola, Autumnalis, Pomona, Bratislava, Sejroe, and Ballum all capable of causing infection in dogs. The severe, acute form of this disease in humans is known as Weil’s disease. Infection is highly unlikely in animals specifically bred and raised for use in research.
Clinical Signs in Animals:	Infected dogs may show no signs or may show signs such as fever, tiredness, vomiting, diarrhea, anorexia, conjunctivitis, jaundice, or changes in urination (polyuria, oliguria, anuria), which are indicative of kidney and liver disease. Clinical signs in cats in cats are rare, but there

	may be a link between *Leptospira* infection and chronic kidney disease.
Transmission and Symptoms in Humans:	Transmission to humans may occur if the individual's abraded skin or mucous membranes come in contact with the urine or tissues of infected animals or equipment contaminated with these substances. It is also possible for humans to contract the disease through inhalation of fine particles of contaminated fluids that may be generated during high-power washing of contaminated equipment. Symptoms in humans may include fever, chills, weakness, pain, malaise, and headache. The severe form of the disease, which may be accompanied by conjunctival suffusion and a rash, results in impaired kidney and liver function, hemorrhage, and possible death.
Prevention:	The best methods of control are good sanitation with appropriate animal waste control and appropriate use of personal protective equipment when handling animals. Dogs can also be vaccinated against some strains of *Leptospira*.
Additional Information:	https://www.cdc.gov/leptospirosis/index.html

Disease:	**Methicillin-Resistant *Staphylococcus aureus* (MRSA)**
Description of Disease:	MRSA, an opportunistic, antibiotic-resistant form of a common skin bacterium which has been reported in dogs and cats, among other species, can cause skin infections and pneumonia in humans.
Clinical Signs in Animals:	Most dogs and cats will not show signs of MRSA infection, but the bacteria can infect catheter implant sites or surgical sites and cause abscesses, dermatitis, pneumonia, or urinary tract infections. Dogs and cats are usually colonized from MRSA strains found in humans.

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Transmission and Symptoms in Humans:	Recently MRSA has become more prevalent in both animals and humans in both the clinical and surgical setting. MRSA is a type of *Staphylococcus* bacteria that is resistant to beta lactam antibiotics, which include methicillin, penicillin, and amoxicillin. *Staph* organisms are found naturally on the skin of most people. There is growing concern that MRSA can be transmitted back and forth between animals and people. There have been reports of people developing MRSA who have worked in close contact with dogs and cats that are harboring the bacteria. MRSA colonization does not necessarily lead to infection, but it can predispose people to other opportunistic pathogens. Clinical signs in humans typically present as skin infections. Infected areas appear as pustules or boils that may be mistaken for spider bites. The bumps are red, swollen painful and pus may also be seen draining from the site. Signs of a more severe MRSA infection vary from blood steam infections to pneumonia and can lead to potentially life threatening situations. Historically these severe infections are seen in people that have undergone surgery in the hospital, and they are not common in the regular laboratory setting. The biggest risk factor in contracting MRSA is accidental exposure of an open cut or wound when handling infected animals.
Prevention:	It is important to practice good hygiene, such as frequent hand washing, when working closely with laboratory animals. Gloves should be worn at all times, and any breaks in the skin should be covered whenever handling laboratory animals. Appropriate disinfection protocols should be followed if an animal is suspected of having MRSA.
Additional Information:	https://www.cdc.gov/mrsa/

Disease:	**PASTEURELLOSIS**

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Description of Disease:	Pasteurellosis is caused by infection with the gram-negative bacteria of the genus, *Pasteurella*, with *Pasteurella multocida* being commonly cultured from the oropharynx of cats and dogs. Pasteurellosis can cause chronic local and systemic infections.
Clinical Signs in Animals:	*Pasteurella* spp commonly colonize the upper respiratory tracts and oral mucosa of cats and dogs without signs of infection, Clinically-apparent infections can occur in the ears, nose/sinuses, eye, joints, meninges, and spinal cord. *Pasteurella* can also cause a fatal pneumonia in cats and dogs.
Transmission and Symptoms in Humans:	This disease is transmitted to humans through bite wounds, scratches, or rarely through the air (aerosol transmission). Symptoms in humans include swelling at the site of the bite, cellulitis, erythema, local lymphadenopathy, fever, and pain. Wounds can have serosanguineous or purulent discharge. Infection can also progress to septicemia, meningoencephalitis, osteomyelitis, and purulent tenosynovitis. These signs initially appear anywhere from 8-72 hours after the bite.
Prevention:	Transmission of the disease is decreased by wearing personal protective equipment including gloves when handling dogs or cats. In addition, all dog or cat bite wounds should be evaluated by medical personnel.
Additional Information:	https://www.lonestar.edu/16739.htm

Fungal

Disease:	**RINGWORM (DERMATOPHYTOSIS)**
Description of Disease:	Ringworm, most commonly caused by *Microsporum canis* and *M. gypseum* fungi in dogs and cats, can cause skin, hair, and nail lesions in affected animals and people.

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Clinical Signs in Animals:	Infected animals may not exhibit any signs of infection or may develop areas of scaly or crusty alopecia and erythema with broken hairs. Lesions may or may not be itchy. The most commonly affected areas are the ear tips, face, tail, and feet. The rate of infection is typically low in dogs and cats raised for use in research.
Transmission and Symptoms in Humans:	Ringworm can be transmitted to humans by direct contact with infected areas of skin or through contact with a contaminated object. Lesions in humans may appear as flat, spreading, ring-shaped lesions in the skin and often appear within 10-14 days of the exposure. As the lesions increase in diameter, the center often returns to a normal appearance. Dermatophytes only grow in dead, keratinized tissue, so growth of the infection is limited by live tissue and the inflammatory response. Skin lesions may develop different appearances and can only be definitively diagnosed through culture or laboratory examination of the skin.
Prevention:	Transmission of an infection can be prevented through use of appropriate personal protective equipment including gloves and protective clothing and through appropriate environmental sanitation. Newly-acquired animals should be screened for suggestive lesions, and isolated and treated when lesions are found.
Additional information:	https://www.cdc.gov/healthypets/diseases/ringworm.html

Parasites/Protozoa

Disease:	**CRYPTOSPORIDIOSIS**
Description of Disease:	*Cryptosporidium*, a protozoan intracellular parasite, causes profuse, watery diarrhea in humans.

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	Cryptosporidium parvum and *C. hominis* are considered the pathogenic species in humans.
Clinical Signs in Animals:	Cryptosporidiosis is rare in cats and dogs, and typically does not result in any clinical signs. Affected dogs will have diarrhea.
Transmission and Symptoms in Humans:	*Cryptosporidium* is spread through fecal-oral transmission. Humans can come into contact with it through contaminated water or surfaces. Humans can be asymptomatic, but when symptoms occur, they will begin 2-10 days after infection. Symptoms most commonly include watery diarrhea, but can also include abdominal discomfort, dehydration, nausea, vomiting, fever, and weight loss. Illness can last 1-2 weeks, but those with compromised immune systems can develop more serious and chronic illnesses.
Prevention:	Transmission of the disease is decreased by wearing personal protective equipment including gloves when handling dogs or cats. Alcohol-based hand sanitizers are not effective against *Cryptosporidium*, so washing with soap and water is necessary after handling cats and dogs.
Additional Information:	https://www.cdc.gov/parasites/crypto/

Disease:	**TOXOPLASMOSIS**
Description of Disease:	*Toxoplasma gondii* is an intracellular coccidian protozoa that may cause birth defects in newly-infected pregnant women Nearly all warm- blooded animals may become infected with the agent although cats, as the definitive hosts, are the only animals that can shed infective materials.
Clinical Signs in	Adult cats are generally asymptomatic, but young or

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Animals:	immunocompromised cats may have vomiting, diarrhea, difficulty breathing, a loss of appetite, eye lesions, and abdominal pain.
Transmission and Symptoms in Humans:	A large percentage (~33%) of the human population has been exposed to the agent. Transmission to humans in the animal research setting is by ingestion of infective materials from sources contaminated with cat feces (i.e. litter boxes). Infected cats can shed the parasite in feces for up to 3 weeks after infection. Diagnosis in people is made through a series of blood tests. In most healthy humans, the infection results either in no signs of illness or in a mild flu-like illness. More severe signs may include fever, swollen lymph nodes, pneumonia, and rashes. Immunosuppressed persons may develop a more severe, life-threatening form of the disease requiring aggressive treatment. Infections of pregnant women may lead to birth defects including blindness, severe neurologic disease, and mental retardation of the infant.
Prevention:	Cat litter and feces should be disposed of promptly, and individuals, especially pregnant women or those that are immunocompromised, should avoid contact with or wear gloves when handling cat feces or litter.
Additional information:	https://www.cdc.gov/toxoplasmosis/

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