The following table represents a list of 51 canine pathogens that are (1) zoonotic/sapronotic/anthroponotic, (2) involve the dog in transmission to humans either directly, through maintenance of the pathogen in the environment, or through detection of the pathogen as a sentinel for human exposure, and (3) have been reported in the canine population in Canada. Please use this chart as a guideline for additional information regarding each pathogen when prioritizing your pathogen list.

Pathogen	Additional Information
Acanthocheilonema reconditum	- Non-pathogenic subcutaneous filarial nematode of dogs; *C. felis* serves as intermediate host - Only one human case report of subconjunctival infection; source of infection presumed to be a flea - Historically reported in dogs in Canada through veterinary surveys - Largely controlled through heartworm medication[1–4]
Alaria spp. (alata, americana, canis, marcianae)	- Generally non-pathogenic trematode of dogs, rare in humans - Dogs act as definitive host and shed eggs in environment - Human infection occurs following ingestion of undercooked intermediate hosts (ex. wild boar) - Fatal human case has been reported in Canada after ingestion of infected frog legs; larva can penetrate stomach wall an migrate through various tissues[1,5]
Anaplasma phagocytophilum	- Transmitted to humans via Ixodes ticks (including *Ixodes scapularis*) - Dogs act as sentinels for human risk, not direct transmission - Non-specific clinical signs in dogs, low pathogenicity - Often self-limiting in humans[6]
Apophallus donicus	- Intestinal fluke; non-pathogenic in dogs; uncommon - Dogs act as a reservoir host - Human infection occurs from ingestion of raw or undercooked fish[1,5,7]
Bartonella spp. (henselae, vinsonii subsp. berkhoffii)	- Vector, bite or scratch transmission possible; handling of blood can also lead to human infection - Main reservoir host in *B. henselae* (cat scratch fever) is the cat; dog acts as incidental host; - Main reservoir host in *B. vinosonii berkhoffii* is the dog - Fever and lymphadenopathy in humans is most common, but other manifestations possible[2,6]
Baylisascaris procyonis	- Roundworm; causes visceral larva migrans and ocular larva migrans in humans, especially children - Racoons are the most common definitive host; dogs can act as both a definitive and intermediate host - Transmission to humans is from ingestion of parasitic eggs; dogs can shed eggs in environment or carry eggs on their coat - Disease is severe (eosinophilic meningoencephalitis, chorioretinitis, optic neuritis and atrophy, and blindness) and can be fatal[1,2,8]
Blastomyces dermatitidis	- Commonly known as blastomycosis; fungal infection - Shared environmental exposure; rare dog bite pathogen - Humans acquire infection from inhalation or from the soil; endemic areas where canine infection is also occurring - dogs act primarily as sentinels - Cutaneous and systemic infection in humans is possible[2,6,9]
Bordetella bronchiseptica	- Human infection in immunocompromised individuals has been reported - Commonly known as kennel cough; can be directly transmitted to humans from dogs - Diseases in humans range from upper and lower respiratory tract infections including sinusitis, bronchitis and pneumonia[2,6]
Borrelia burgdorferi senso stricto	- Causative agent of Lyme Disease; transmitted by Ixodes ticks (*Ixodes scapularis, Ixodes pacificus*) - Dogs and humans are incidental hosts; dogs serve as sentinels for human exposure - Positive dogs have experimentally re-infected ticks and could serve as a reservoir host - Dogs can introduce ticks into the household[6]
Brucella canis	- Human acquired infections most common through direct contact with aborting bitches - Reproductive tissue, fluids, urine - Poses greatest risk to the immunocompromised - Severe disease in immunocompetent humans is uncommon[2,6]

Campylobacter spp. (coli, jejuni, upsaliensis)	- Causes enteric disease in humans - Oral-fecal direct transmission from dogs; food and water-borne sources also common - Has been identified as a dog bite isolate[1,2]
Clostridium spp. (difficile, perfringens)	- Commensal GI bacteria in dogs that can cause enteric disease in humans; direct transmission - *C. difficile* is an important nocosomial and antimicrobial-associated cause of diarrhea in humans; reverse zoonosis (human to dog) also possible - *C. perfringens* has been isolated from dog bites; can be transmitted to humans through wound contamination in addition to ingestion[2,6,10]
Coxiella burnetii	- Agent of Q-fever; dogs are a less common source for human infection than other animals but still reported - Animals are usually non-clinical; severity of disease in humans is related to degree of exposure and results in flu-like illness; pneumonia and hepatitis is common - Arthropod (tick) and direct transmission through ingestion or inhalation possible; can be shed in feces, urine, milk, placenta and reproductive fluids[2,6]
Cryptococcus gattii	- Sapronotic fungus; environmental exposure leads to human infection - Inhalation most common source of infection, but transmission from ingestion and wound contamination are also reported - Dogs act as sentinels; common-source infection - Clinical illness most common in immunocompromised individuals and includes meningitis and systemic infections; granulomatous intracranial lesions and pulmonary nodules called cryptoccomas[2,6]
Cryptocotyle lingua	- Rare intestinal fluke; only one confirmed human case – diarrhea was a possible clinical sign (coinfection common in study participants); infection in humans can occur from ingesting undercooked or raw fish - Non-pathogenic in dogs; dogs act as a definitive host[1,5,11,12]
Cryptosporidium canis	- Fecal-oral transmission most common; contaminated food/water and inhalation also possible - Infection is often subclinical in dogs and immunocompotent individuals - More serious infections in immunocompromised individuals possible; enteric disease[1,2]
Dermatophytes (*Microsporum canis, Trichophyton spp.*)	- Causative agents of ringworm (fungal infection) - Dermal lesions in humans, often pruritic, result from direct contact with clinically affected or asymptomatic animals as well as contaminated environments[1,6]
Diphyllobothrium spp.	- Intestinal tapeworm; dogs act as definitive host and shed eggs into environment - Humans are infected from eating undercooked or raw fish - Human infection is usually asymptomatic; rare clinical signs include obstruction, diarrhea, abdominal pain and anemia[1,5]
Dipylidium caninum	- Common intestinal tapeworm; dogs are the definitive host and fleas are the intermediate host - Human infection is most common in children and occurs following ingestion of fleas - Adult tapeworms are generally non-pathogenic in dogs and humans but may cause peri-anal pruritis[1,5]
Dirofilaria immitis	- Agent of heartworm disease in dogs - Rare cause of human illness; granulomatous pulmonary nodules possible - Transmitted to humans from mosquito bites; humans act as a dead end host[1,2,6]
Dog bite pathogens [*Actinomyces viscosus, Capnocytophaga canimorsus, Fusobacterium spp., Moraxella spp., Neisseria weaveri, Pasteurella spp. (canis, multocida), Staphylococcus spp. (aureus, pseudintermedius), Streptococcus spp.*]	- Direct transmission; part of normal canine oral flora or skin and other mucosal surfaces - *C. canimorsus* can cause fatal septicemia in humans; bites, licking ulcers; veterinarians have also been infected during dental procedures - *P. canis* is one of the most common species isolated from dog bites; *S. aureus* is the most common Staphylococcal species isolated from dog bites[2,6,13,14,15,16,17,18,19,20]

Echinococcus spp. (granulosus, multilocularis)	- Dogs act as definitive host of this tapeworm; transmission to humans is through fecal-oral ingestion of parasitic eggs - *E. granulosus* causes space occupying cysts in the lungs and liver of humans (hydatid cyst disease) - *E. multilocularis* causes masses most commonly in the liver of humans (alveolar cyst disease)[1,2]
Ehrlichia canis	- Transmitted to humans through tick bites (*Rhipicephalus sanguineus*) - Dogs act as reservoir hosts - A subspecies of *E. canis* is suspected as the cause of Venezuelan human ehrlichiosis; flu-like symptoms[2,6,21]
Enterococcus spp. (faecium; VRE)	- Endogenous, normal flora of GI tract in dogs; becomes opportunistic infection - Highly resistant; important cause of nosocomial infections in humans - Dogs can shed in urine and feces as source of human infection; has also been recovered from dog food - Also reported in dog bites[2,6,22]
Escherichia coli	- Opportunistic pathogen; shed in canine feces - Source of human infection by direct transmission; food, water-borne and dog bite transmission also possible - Multi-drug resistant strains[1,6]
Fleas *(Ctenocephalides canis, C. felis, Pulex irritans)*	- Direct contact with dogs; can serve as vectors for transmission of several other zoonotic pathogens - Clinical signs in humans results from flea bites and include erythema, pruritis and dermatitis[5,23]
Francisella tularensis	- Agent of Tularemia in humans; highly infectious - Transmission to humans through ticks; licking, scratches and dog bites also possible transmission routes - Clinical signs in humans range from fever, anorexia, skin lesions, lymphadenopathy, conjunctivitis and pneumonia[2,6]
Giardia duodenalis (assemblage A1, assemblage B)	- Surface water contamination is the most common source for human infection - Transmission from dogs to humans (uncommon) is likely to be indirect through environmental contamination - Dogs shed cysts in their feces which can survive in the environment for prolonged periods - Asymptomatic and self-limiting in most individuals but can cause enteric disease[2,5,6]
Helicobacter heilmannii	- Oral to oral transmission from dogs to humans; gastric Helicobacter species - Only rarely transmitted from pets; causes gastritis in humans[6]
Histoplasma capsulatum	- Sapronotic; environmental exposure leads to human infection via inhalation of soil-borne fungus - Dogs act as sentinels; common-source infection - Clinical illness in humans most common in immunocompromised individuals; pulmonary and systemic[2,6]
Klebsiella spp.	- Opportunistic pathogen; nasopharynx, GI, genitourinary and systemic infections possible - Cause of nosocomial infections in humans; has also been isolated as a dog bite pathogen - Canine multi-drug resistant urinary isolate[6,14,24]
Leishmania infantum	- Dogs act as main reservoir host for human infection; increased prevalence in canine populations correlates with increases in human infection (poor socioeconomics is an important risk factor) - Vector-transmission through sandfly bites; fox hound prevalence study in Ontario could not find source of infection suggesting other transmission routes likely possible - Potentially fatal in both dogs and humans[1,2,6,25]
*Leptospira interrogans (*serovars autumnalis, bratislava, canicola, grippotyphosa, hardjo, icterohaemorrhagiae, pomona*)*	- Transmission through both direct and indirect contact; infected canine urine most common - Contaminated water, soil and food; dogs can excrete the pathogen for up to several months following infection (serovar *canicola* can be shed life-long in some cases but is a less common serovar) - Humans are incidental hosts; dogs may act as incidental or reservoir hosts - Disease in humans can range from mild signs to fatal[2,6]

Malassezia pachydermatis	- Commensal yeast of skin and mucous membranes in dogs; transmitted to humans through direct contact - Clinical signs most common in the immunocompromised or young children; skin lesions, dermatitis[6]
Mesocestoides spp.	- Tapeworm; dogs can serve as secondary intermediate host and definitive host - Human infection occurs from ingestion of uncooked blood/organ tonics of snakes and turtles; rare in Canada - Clinical signs in humans include diarrhea, abdominal pain and hunger[1,5]
Methicillin-resistant *Staphylococcus aureus*	- Opportunistic pathogen; transmission occurs through direct contact - Zoonotic transmission from dogs and reverse zoonotic transmission also suspected - Antimicrobial resistant pathogen; hospital acquired infections important in human medicine[2,6]
Methicillin-resistant *Staphylococcus pseudintermedius*	- Commensal bacteria that leads to opportunistic infections in dogs - Uncommon cause of clinical disease in humans but still possible - Transmission from dogs most likely associated with bites[2,6]
Metorchis conjunctus	- Non-pathogenic liver fluke in dogs; dogs are definitive hosts - Human infection is rare; transmission occurs from ingestion of raw fish - Can cause fever, abdominal pain and eosinophilia in humans[1,5]
Mites (*Cheyletiella yasguri, Sarcoptes scabiei var canis)*	- Transmission to humans from dogs is through direct contact or contaminated fomites - Causes pruritic skin lesions in humans - Humans rarely require any treatment once effected animals are treated[1,5]
Nanophyetus salmincola	- Intestinal fluke responsible for transmission of rickettsial "salmon poisoning" agent that infects dogs - Dogs shed eggs in feces in environment; humans are infected from ingestion of undercooked or raw fish - Causes mild gastritis in humans[1]
Paragonimus kellicotti	- Lung fluke of dogs; humans affected only rarely - Humans infected from ingestion of undercooked crayfish or crab - Clinical illness in humans usually includes pulmonary signs[1,5]
Pseudomonas aeruginosa	- Opportunistic pathogen; has been isolated from dog bites - Nosocomial infections in human hospitals - Multi-drug resistant canine urinary isolate that can be shed into shared environments with humans[6,26,27]
Rickettsia rickettsii	- Agent of Rocky Mountain Spotted Fever; transmitted to humans through tick bites (*Dermacentor variabilus, D. andersoni* most common; *Amblyomma americanum* and *R. sanguineus* also possible) - Dogs and humans act as incidental hosts; dogs can serve as sentinels and also expose humans to ticks - Clinical signs in humans include upper respiratory, skin lesions, cardiac, and neurological signs; can be fatal[2]
Salmonella enterica (enteritidis, typhimurium)	- Foodborne infections common; fecal-oral transmission from dogs to humans - Handling of raw food diets and shedding in canine feces - Multi-drug resistant strains emerging[2,28]
Sporothrix schenckii	- Fungus; widely distributed in the soil; dogs become infected from penetrating wounds - Direct transmission to humans through bites and scratches or by direct contact with contaminated wounds - Human illness manifests as cutaneous lesions and systemic spread[2,6,29]
Streptococcus canis	- Direct transmission through dog bites or contact with open wounds on human skin - Has been reported to cause septicemia in humans; was also reported as the cause of endocarditis in a human (close contact with an infected dog, no bite history)[2,6]

Taenia spp. (serialis)	- Tapeworm; dogs are definitive hosts; infection rare in domestic dogs, more common in feral and shelter dogs - Fecal-oral transmission; human ingestion of eggs by contaminated water, soil and vegetation - Can lead to cystic disease in humans (subcutaneous tissue, muscle, eyes, and CNS)[1,2]
Toxocara canis	- Common canine roundworm; dogs shed eggs in feces; fecal-oral transmission - Visceral and ocular larva migrans possible in humans; most common in children[1,2]
Trypanosoma cruzi	- Causative agent of Chagas disease; "kissing bug" vector transmits pathogen to humans through contaminated bites; dogs act as a reservoir for the vector as well as the pathogen - Can act as sentinels for disease risk in humans; risk factor in developing countries is dogs in the home - Varying degrees of severity in humans; curable if treated early in infection, otherwise symptomatic treatment only and potentially life-long effects[6,30]
Unicaria stenocephala	- Canine hookworm; dogs shed eggs in feces; transmission to humans through L3 larva penetrating the skin - Can cause cutaneous larva migrans in humans; most common in children[1,2]
Yersinia spp. (enterocolitica, pestis)	- Dogs are a rare source of *Y. enterocolitica* infection; dogs can excrete in feces after ingestion of contaminated pork; causes gastroenteritis in humans - *Y. pestis* is the agent of Plague; transmitted to humans from flea bites, inhalation, bites/scratches or direct contact with open wounds; dogs are source of flea exposure to humans, but dogs can also become infected from ingestion of wildlife and harbor bacteria in the oropharynx and transmit directly - Flu-like syndrome in humans, lymphadenitis, pneumonia and sepsis; fatal if left untreated[1,2]

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