

Risk of Importing Zoonotic Diseases through Wildlife Trade, United States

Technical Appendix

Technical Appendix Table. Risk zoonoses capable of infecting mammals imported into the United States, 2000–2005

Total potential Risk Zoonoses (i.e., Risk Zoonosis found within family)			15	15
Total Risk Zoonoses in genus			3	15
Viruses	Lymphocytic choriomeningitis virus ^{2,29,30,80,222,226}			
	Cercopithecine herpesvirus-1 (herpes B) ^{2,75,80,192,193}			
	Nipah virus ^{2,77,80,230}		o	
	Rabies viruses * ^{2,32-74,80,135,195,227-229,233}	X		
	Venezuelan equine encephalitis virus ^{1,2,21,23,80}			
	Tick-borne encephalitis virus complex * ^{2,18,19,76,80,186,191,198}			
	Crimean-Congo hemorrhagic fever virus ^{2-26,80}			
	Ebola viruses * ^{1,2,24-28,80,189,223}			
	Lassa fever virus ^{2,49,80}			
	Marburg virus ^{2,28,29,80,212,225}			
	Rift Valley fever virus ^{1,2,7-15,80,190}		X	
	South American hemorrhagic fever arenaviruses * ^{2,3,16,17,80}			
	Hantaviruses associated with HFRS * ^{2,78-80,190,191,216,231}			
	Hantaviruses associated with HCPS * ^{2,78-80,231}			
	Highly pathogenic avian influenza (H5N1) virus ^{2,4,9,80,83,215}			
	SARS virus (or SARS-like CoV) ^{2,3,1,80,194,225,226}			
	Yellow fever virus ^{2,20,80,202}			
	Monkeypox virus ^{2,80-82,198,199,206}			
	Brucella spp. ^{2,49,80,94-100,208,211,221}			
	Coxiella burnetii ^{2,80,106-115,187,204,205,207,220}			
	Leptospira spp. ^{2,80,136-148,187,202,205,209,210,218,219,232}			
	Bacillus anthracis ^{2,49,80,84-93}			
	Burkholderia mallei ^{2,80,149}			
Francisella tularensis ^{2,80,150-162,188,201}				
Mycobacterium tuberculosis complex * ^{2,49,80,116-135,196,200,202,217}				
Yersinia pestis ^{2,32,80,101-105}				
Echinococcus spp. ^{2,80,163-184,186,196,203}				
Helminths				
Family				
Common name or type				
Genus				
Acinonyx	Cheetah	<i>Felidae</i>		
Aepyceros	Impala	<i>Bovidae</i>	X	
Ailuropoda	Giant panda	<i>Ursidae</i>		
Alcelaphus	Hartebeest	<i>Bovidae</i>		
Alopex	Fox	<i>Canidae</i>		
Amblonyx	Otter	<i>Mustelidae</i>		

<i>Antidorcas</i>	Springbok	<i>Bovidae</i>	o	o	X	o	o	X	o	o	o								o		o	X	o	o	X				4	15	
<i>Aonyx</i>	Clawless otter	<i>Mustelidae</i>		o	o	o		o	o	o	o		o	o	o									o					-	11	
<i>Aotus</i>	Monkey	<i>Aotidae</i>			X	o		o	o	o		o	o		o				o		o			o		o			1	12	
<i>Atelerix</i>	Hedgehog	<i>Erinaceidae</i>			o	X			o			X											X			X			4	6	
<i>Bison</i>	Bison	<i>Bovidae</i>	X	o	X	o	o	X	o	o	X								o		o	o	o	o	X				5	15	
<i>Cacajao</i>	Uakari	<i>Cebidae</i>			o	o						o	o											o		o			-	6	
<i>Callithrix</i>	Monkey	<i>Cebidae</i>			X	X						o	X												X		X		5	6	
<i>Callosciurus</i>	Squirrel	<i>Sciuridae</i>	o	o		o			o	o	o							o				o	o	o					-	10	
<i>Canis</i>	Canine	<i>Canidae</i>	X	X	X	X	X	o	X	X	X			o	X				X				X		X	X	X			14	16
<i>Capromys</i>	Rodent	<i>Capromyidae</i>																											-	-	
<i>Caracal</i>	Caracal	<i>Felidae</i>	o	o	o	o	o	X	o	o	o		o	o				o				o		X	o				2	15	
<i>Castor</i>	Beaver	<i>Castoridae</i>	X			X																		X					3	3	
<i>Cavia</i>	Guinea pig	<i>Caviidae</i>		X				X																X					3	3	
<i>Cebus</i>	Monkey	<i>Cebidae</i>			X	o						o	X											o		X	o		3	7	
<i>Cephalophus</i>	Duiker antelope	<i>Bovidae</i>	o	o	o	o	o	o	o	o	o							o				X	o	o	o	o				1	15
<i>Cephalorhynchus</i>	Dolphin	<i>Delphinidae</i>		o	o	o			o		X	o	o											o	o					1	9
<i>Ceratotherium</i>	White rhinoceros	<i>Rhinocerotidae</i>			X			X	o									X				X								4	5
<i>Cercopithecus</i>	Guenon	<i>Cercopithecidae</i>			X	X		X	X	o		X	X		o				X		o			o		o				7	12
<i>Cerdocyon</i>	Fox	<i>Canidae</i>	X	o	o	o	o	o	o	o	o			o	o				o				o		o	X	o			2	16
<i>Cervus</i>	Deer	<i>Cervidae</i>	X	o	X	o		X	X	X	X														X					7	9
<i>Chaeropus</i>	Bandicoot	<i>Peramelidae</i>																												-	-
<i>Chaetophractus</i>	Armadillo	<i>Dasypodidae</i>																							o					-	1
<i>Cheirogaleus</i>	Dwarf lemur	<i>Cheirogaleidae</i>																												-	-
<i>Chinchilla</i>	Chinchilla	<i>Chinchillidae</i>											X												X					2	2

<i>Chlorocebus</i>	Monkey	<i>Cercopithecidae</i>			o	o		o	o	o		o	o					X	o			o	X	2	12	
<i>Choloepus</i>	Sloth	<i>Megalonychidae</i>										X												1	1	
<i>Civettictis</i>	African civet	<i>Viverridae</i>			o			X	o				o	o						o		X		2	7	
<i>Coendou</i>	Porcupine	<i>Erethizontidae</i>										X												1	1	
<i>Colobus</i>	Monkey	<i>Cercopithecidae</i>			o	o		X	o	o		o	X	o				o	o			X	X	4	12	
<i>Connochaetes</i>	Wildebeest	<i>Bovidae</i>	X	o	X	o	o	X	o	o	X							X		o	o	o	o	o	5	15
<i>Cricetomys</i>	Pouched rat	<i>Nesomyidae</i>										X												1	1	
<i>Cricetus</i>	Hamster	<i>Cricetidae</i>	o	X	o	X		o	o	o	o	o	o	o	o	o	o	o	o	o	o	X	o	3	20	
<i>Crocuta</i>	Hyena	<i>Hyaenidae</i>	X		X			X	X		X											X		6	6	
<i>Crossarchus</i>	Mongoose	<i>Herpestidae</i>			o																	X		1	2	
<i>Cryptomys</i>	Mole rat	<i>Bathyergidae</i>																						-	-	
<i>Cryptoprocta</i>	Fosa	<i>Viverridae</i>			o			X	o				o	o						o		o		1	7	
<i>Cryptotis</i>	Shrew	<i>Soricidae</i>				o								o					o	o	o	o		-	5	
<i>Cynictis</i>	Mongoose	<i>Herpestidae</i>			o																	X		1	2	
<i>Cynomys</i>	Prairie dog	<i>Sciuridae</i>	o	X		X		o	o		X						o			o	o	o	X	4	11	
<i>Dactylopsila</i>	Striped possum	<i>Petauridae</i>						o																-	1	
<i>Damaliscus</i>	Antelope	<i>Bovidae</i>	X	o	X	o	o	X	o	o	X						o		o	X	o	o	X	6	15	
<i>Dasyprocta</i>	Agouti	<i>Dasyproctidae</i>	X									X												2	2	
<i>Dasypus</i>	Armadillo	<i>Dasypodidae</i>																				X		1	1	
<i>Dendrohyrax</i>	Hyrax	<i>Hyracoidea</i>		o				o														X		1	3	
<i>Dendrolagus</i>	Kangaroo	<i>Macropodidae</i>	o					o	o															-	3	
<i>Desmodus</i>	Vampire bat	<i>Phyllostomidae</i>																			X	X		2	2	
<i>Dolichotis</i>	Mara	<i>Caviidae</i>		o				o														o		-	3	
<i>Eira</i>	Tayra	<i>Mustelidae</i>		o	o	o		o	o	o	o	X	o	o								o		1	11	

<i>Procyon</i>	Raccoon	<i>Procyonidae</i>	X	X	X		X	X	X	X	o													X						8	9	
<i>Psammomys</i>	Rodent	<i>Muridae</i>	o	o	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o				o			-	21
<i>Pseudalopex</i>	Fox	<i>Canidae</i>	X	o	o	o	o	o	o	o	o			o	o					o			o	o	X	o				2	16	
<i>Pseudocheirus</i>	Ringtailed possum	<i>Pseudocheiridae</i>																												-	-	
<i>Pteronotus</i>	Bat	<i>Mormoopidae</i>																							X					1	1	
<i>Pteronura</i>	Otter	<i>Mustelidae</i>		o	o	o		o	o	o	o			o	o	o								o						-	11	
<i>Pteropus</i>	Bat	<i>Pteropodidae</i>												o					o	o		o			X	X			2	7		
<i>Puma</i>	Feline	<i>Felidae</i>	X	o	o	o	o	X	o	o	o			o	o				o				o		X	o			3	15		
<i>Pygathrix</i>	Langur	<i>Cercopithecidae</i>			o	o		o	o	o		o	o		o				o	o				o		o			-	12		
<i>Raphicerus</i>	Antelope	<i>Bovidae</i>	o	o	o	o	o	X	o	o	X							o			o	o	o	o	X				3	15		
<i>Rattus</i>	Rat	<i>Muridae</i>	X	X	X	X		X	X	X	o	o		X	o	o	X	o	X		o	o	o	X	X			X	13	21		
<i>Ratufa</i>	Squirrel	<i>Sciuridae</i>	X	o		o		o	o		o							o					o	o	o				1	10		
<i>Redunca</i>	Reedbuck	<i>Bovidae</i>	o	o	X	o	o	X	o	o	o							o			o	X	o	o	X				4	15		
<i>Rhinolophus</i>	Bat	<i>Rhinolophidae</i>												X			X	X	X				X	X	X				7	7		
<i>Rhipidomys</i>	Rodent	<i>Muridae</i>	o	o	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o			o		-	21	
<i>Rupicapra</i>	Chamois	<i>Bovidae</i>	o	o	o	o	o	o	o	X	X							o				o	o	o	o	X			3	15		
<i>Saguinus</i>	Tamarin	<i>Cebidae</i>			o	X						o	X										o			X			3	6		
<i>Saimiri</i>	Squirrel monkey	<i>Cebidae</i>			X	X		X				X	X											o		o			5	7		
<i>Scapanus</i>	Mole	<i>Talpidae</i>		X	o																			o					1	3		
<i>Sciurus</i>	Squirrel	<i>Sciuridae</i>	o	X		X		X	X		o						X					o	o	X		X			7	11		
<i>Speothos</i>	Canine	<i>Canidae</i>	o	o	o	o	o	o	o	o	o			o	o				o			o		o	o	o			-	16		
<i>Spermophilus</i>	Ground squirrel	<i>Sciuridae</i>	o	X		X		o	X		o						o					o	o	X					4	10		
<i>Suricata</i>	Suricate	<i>Herpestidae</i>			X																			X					2	2		
<i>Sylvicapra</i>	Bush duiker	<i>Bovidae</i>	o	o	o	o	o	X	o	o	X						o			o	X	o	o	X					4	15		

<i>Syncerus</i>	Cape buffalo	<i>Bovidae</i>	X	o	X	o	o	X	o	o	X										X			o	X	o	o	o										6	15													
<i>Tamandua</i>	Anteater	<i>Myrmecophagidae</i>																																					1	2												
<i>Tamiasciurus</i>	Squirrel	<i>Sciuridae</i>	o	X		X																																		2	10											
<i>Taurotragus</i>	Eland	<i>Bovidae</i>	o	o	X	o	o	X	o	o	X																														5	15										
<i>Tolypeutes</i>	Armadillo	<i>Dasypodidae</i>																																									-	1								
<i>Trachypithecus</i>	Monkey	<i>Cercopitheciidae</i>			o	o		o	o	o																																			-	12						
<i>Tragelaphus</i>	Antelope	<i>Bovidae</i>	X	o	X	o	o	X	X	o	X																																			7	15					
<i>Tragulus</i>	Mouse deer	<i>Tragulidae</i>																																												-	-					
<i>Trichosurus</i>	Brush-tail possum	<i>Phalangeridae</i>			X					X	X																																				3	3				
<i>Tupaia</i>	Tree shrew	<i>Tupaiaidae</i>																																													-	-				
<i>Tursiops</i>	Dolphin	<i>Delphinidae</i>		o	o	o			o		X	o	o																																				1	9		
<i>Ursus</i>	Bear	<i>Ursidae</i>		X		X		X	X	X	X																																					7	7			
<i>Viverra</i>	Civet	<i>Viverridae</i>			o			X	o																																								2	7		
<i>Vulpes</i>	Fox	<i>Canidae</i>	X	X	X	o	o	o	X	X	X																																							9	16	
<i>Wallabia</i>	Wallaby	<i>Macropodidae</i>	X					o		o																																							1	3		
<i>Xerus</i>	Squirrel	<i>Sciuridae</i>	o	X		o			o	o																																									3	10
Total affected genera†			41	24	48	31	5	57	35	20	32	13	16	8	4	1	2	-	13	4	1	5	27	6	4	78	5	6	12	7																						
Total potentially affected genera‡			89	101	124	115	46	113	131	108	95	62	37	56	62	17	23	17	76	14	17	55	91	59	46	155	23	12	25																							

Legend: X = Risk Zoonosis identified in genus; o = Risk Zoonosis identified in different genus within same family.

*Rabies viruses includes the zoonotic lyssaviruses Australian bat lyssavirus, Duvenhage, European bat lyssavirus 1 and 2, Mokoko, and rabies (234); tick-borne encephalitis complex includes Kyasanur Forest disease, Omsk hemorrhagic fever, and tickborne encephalitis (234); Ebolaviruses include Bundibugyo, Côte d'Ivoire, Reston, Sudan and Zaire (234); epidemiologically relevant South American hemorrhagic fever arenaviruses include Guanarito, Junin, Machupo, and Sabia (234); hantaviruses associated with HFRS include Dobrava, Hantaan, Puumala, Saaremaa, and Seoul (234); hantaviruses associated with HCPS include Andes, Bayou, Black Creek Canal, Laguna Negra, New York, and Sin Nombre (234); *Mycobacterium tuberculosis* complex species are *M. africanum*, *M. bovis*, *M. bovis* BCG, *M. caprae*, *M. microti*, *M. pinnipedii*, and *M. tuberculosis hominis* (235).

†Risk zoonosis identified in genus.

‡Risk zoonosis identified in different genus within same family.

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