



Zoonotic Diseases of Sheep and Goats

Zoonotic Disease	R	Transmission	Clinical Signs in Sheep and Goats	Clinical Signs in People
Etiologic Agent			Prevention for Sheep and Goats	Prevention for People
Anthrax <i>Bacillus anthracis</i> Woolsorters' disease in humans	AH	Ingestion: (animals)spores when grazing; contaminated feed, bone meal; (people) undercooked meat Inhalation: spores in soil, hides or wool Direct contact: spores in soil, blood	Incubation period: 1-10 days Sudden death, lack of rigor mortis; highly infectious blood from mouth, nose, anus fails to clot; respiratory difficulty, edema in neck, throat, shoulders (cattle, sheep, goats, equines); swine usually asymptomatic Clean and disinfect; dispose of carcasses – burn if possible; don't contaminate soil with infectious blood; vaccinate	Incubation period: 1-10 days, can be variable Cutaneous: pustules; dark black scab (eschar) Gastrointestinal: severe vomiting; bloody stools Respiratory: flu-like signs; respiratory distress All forms: sepsis, shock, death Wash hands; wear personal protective equipment (PPE) (gloves, mask, eye protection, coveralls); cover wounds; ventilate animal areas; disinfect hides; avoid suspect animals and don't eat their meat
Brucellosis <i>Brucella melitensis</i> Undulant fever in humans	AH	Direct contact: reproductive tissues/fluids Ingestion: reproductive tissues/fluids; contaminated feed, water Fomites	Incubation period: varies Reproductive: abortion, stillbirths; retained placenta; placentitis; orchitis; epididymitis Musculoskeletal: arthritis; lameness; spondylitis Clean and disinfect; vaccination; prevent exposure to wild or feral swine; obtain animals from <i>Brucella</i> -free sources; screening; isolate infected animals; establish separate area for birthing; remove, destroy aborted fetuses, placentas	Incubation period: 2-4 weeks, up to 6 months Flu-like: headache; fever; fatigue; chills; aches Chronic: waxing, waning fever; bone, joint infections Reproductive: epididymo-orchitis; seminal vesiculitis and prostatitis; abortion or premature birth Wash hands; wear PPE (gloves, mask, eye protection, coveralls); cover wounds; do not touch your face; be cautious when vaccinating; wear gloves when handling animal tissues
Campylobacteriosis <i>Campylobacter jejuni, C. coli, C. fetus</i>	H	Ingestion: feces; reproductive tissues; contaminated soil, water Direct contact: infected animals Fomites	Incubation period: 3-25 days Asymptomatic in most species Gastrointestinal: mucoid, blood-flecked diarrhea Reproductive: abortion Clean and disinfect (including AI equipment); remove manure; prevent overcrowding; vaccinate (animals may still be carriers); isolate aborting animals; remove, destroy aborted fetuses, placentas; control rodents	Incubation period: 1-10 days Gastrointestinal: mild to severe GI distress; fulminant or relapsing colitis; fever; headache; muscle pain; children and immunosuppressed at most risk for diarrhea Reproductive: (<i>C. fetus</i>) miscarriage; premature birth; infant meningitis followed by death Wash hands; wear gloves; keep children/vulnerable people away from animals, feces; don't consume undercooked meat, raw dairy, untreated water; wash fruits, vegetables; disinfect kitchen surfaces; don't cross-contaminate
Caseous lymphadenitis <i>Corynebacterium spp.</i>		Direct contact: abscesses Inhalation: aerosols Fomites	Incubation period: 1-3 months Abscesses: peripheral lymph nodes and lungs Clean and disinfect; fly control; remove manure; quarantine new animals; isolate infected animals; treat promptly; disinfect equipment after use; prevent skin injuries	Incubation period: 1-2 weeks suspected Abscesses: suppurative granulomatous lymphadenitis; rectal and chest abscesses Wash hands; wear gloves and mask; cover wounds; don't touch fluid draining from lesions; don't consume raw dairy

R=Reportable Disease; A=for animals, H=for humans

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Chlamydiosis <i>Chlamydia abortus</i>		Inhalation: aerosols Direct contact: reproductive tissues/fluids Ingestion: contaminated feed, water	Incubation period: varies Reproductive: (sheep, goats) late term abortion, stillbirth, low birth weight or premature offspring; (cattle) abortion, retained placentas, mastitis	Incubation period: 2-4 weeks, up to 6 months Reproductive: stillbirth; abortion; pre-term labor Flu-like: fever; headache; dry cough; vomiting Systemic: septicemia; renal dysfunction; pneumonia
			Clean and disinfect; remove manure; maintain closed herd; isolate aborting animals; establish separate area for birthing; remove, destroy aborted fetuses, placentas	Wash hands; wear PPE (gloves, mask, coveralls); don't touch your face; clean, disinfect boots
Colibacillosis <i>Escherichia coli</i> STEC-Shiga-toxin producing <i>E. coli</i> VTEC-Verotoxin-producing <i>E. coli</i> EHEC-Enterohemorrhagic <i>E. coli</i>	H	Ingestion: contaminated soil, food, water Direct contact: feces Fomites	Incubation period: varies Gastrointestinal: (lambs) diarrhea	Incubation period: 1-16 days with most signs in 3-4 days Gastrointestinal: watery diarrhea; hemorrhagic colitis; nausea; vomiting; abdominal pain; cramping Systemic: hemolytic uremic syndrome (HUS); fever
			Clean and disinfect; remove manure; vaccinate pregnant animals to reduce shedding; provide colostrum; minimize stress at weaning/diet changes; prevent crowding	Wash hands; wear gloves; keep boots outside the home; launder dirty clothing separately; prevent manure from leaching into groundwater; do not consume raw dairy; cook meat thoroughly, especially ground beef; don't cross-contaminate; isolate infected people
Contagious ecthyma <i>Parapoxvirus</i> (Sore mouth) Orf in humans *reportable in some states	A*	Direct contact: scabs; lesions Fomites	Incubation period: 2-3 days Asymptomatic in adults Cutaneous: (young sheep/lambs) pustules, vesicles, scabs on mouth, muzzle, eyelids, nostrils, teats, udder	Incubation period: 3-7 days Cutaneous: small, firm red-blue papule (usually on hands/fingers), progresses to hemorrhagic bulla or pustule, +/- central crust; becomes weeping nodule covered by thin crust, usually self-limiting
			Clean and disinfect; vaccinate, keep recently vaccinated animals away from others; quarantine new animals; isolate infected animals; prevent flies; remove sharp vegetation from pastures or feed to prevent oral, skin trauma	Wash hands; wear gloves; cover wounds
Cryptosporidiosis <i>Cryptosporidium</i> spp	H	Ingestion: oocyst-contaminated food, water, soil Fomites	Incubation period: 3-5 days Asymptomatic Gastrointestinal: (neonatal calves, lambs, kids, piglets) watery diarrhea; tenesmus; anorexia; weight loss	Incubation period: 2-3 days to 2 weeks Gastrointestinal: mild to severe profuse, watery diarrhea; abdominal cramps; anorexia; nausea; gas; malaise
			Clean and disinfect (organism is resistant); remove manure; prevent overcrowding; provide colostrum; isolate sick animals; prevent/treat other infections	Wash hands; wear PPE (gloves, coveralls); don't drink untreated water; wash fruits, vegetables; don't cross-contaminate; avoid young, sick animals if vulnerable



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Cysticercosis/ Taeniasis <i>Taenia</i> spp.		Ingestion: gravid proglottids in pastures; contaminated food, water or soil	Incubation period: months to years Asymptomatic Gastrointestinal: unthrifty; poor appetite; diarrhea Neurologic: (sheep, lambs, swine) neurological signs	Incubation period: variable; 8 weeks to years Gastrointestinal: proglottids in stools; nausea; gas; diarrhea; constipation; abdominal pain; poor appetite Neurologic: (neurocysticercosis) seizures; increased intracranial pressure; headaches; blindness
			Clean and disinfect; remove manure; deworm farm dogs and cats; remove and destroy dead stock; do not use river water for animals; keep animals away from human feces	Wash hands; do not defecate in fields, pastures or waterways; treat infected people; do not eat raw or undercooked meat; cook meat to proper internal temperature
Dermatophilosis <i>Dermatophilus congolensis</i> (Lumpy wool - sheep, Streptothricosis - goats)		Direct contact: skin lesions Fomites: soil, thorns Mechanical vectors: biting insects	Incubation period: 1-30 days Cutaneous: (cattle, sheep, goats, horses) serous exudates at base of hair shaft ("paintbrush lesions"), crusts, alopecia; found in young animals/wet environments	Incubation period: 1-10 days Cutaneous: multiple pustules on hands, forearms; rupture, leaving reddish crater-like cavity
			Clean and disinfect (especially equipment like tack, grooming tools); isolate infected animals; control mechanical vectors; keep skin dry; prevent zinc deficiency	Wash hands; wear gloves; cover wounds
Echinococcosis <i>Echinococcus granulosus sensu lato</i> complex (cystic echinococcosis), <i>E. multilocularis</i> (alveolar echinococcosis) Hydatid disease		Ingestion: gravid proglottids on fur; from plants, contaminated water, soil	Incubation period: not known Respiratory: bronchopneumonia; respiratory difficulty Systemic: abdominal distension; ascites; icterus; heart failure; lameness; sudden death	Incubation period: variable, months to years Various organs: cysts in liver and lungs (most common), may grow faster in immunocompromised
			Clean and disinfect; deworm cats and dogs; don't let dogs and cats roam in pastures; don't feed viscera to dogs and cats	Wash hands; wear PPE (gloves, coveralls) if handling feces; deworm dogs, cats; don't drink untreated water; wash fruits, vegetables; cook meat properly
Erysipelas <i>Erysipelothrix Rhusiopathiae</i> Erysipeloid in people		Direct contact: animals, fluids Ingestion: contaminated soil, feed, water; cannibalism (poultry) Mechanical vectors: biting insects	Incubation period: 1-7 days Musculoskeletal: (lambs) polyarthritis	Incubation period: 1-7 days Cutaneous: acute localized cellulitis; painful red/purple firm swelling, usually on hands and fingers; generalized disease possible
			Clean and disinfect; remove manure; control rodents	Wash hands; wear gloves; cover wounds
Giardiasis <i>Giardia duodenalis</i> or <i>G. intestinalis</i>	H	Ingestion: cysts in contaminated food, water, soil Direct contact: infected animals; grooming (self or others)	Incubation period: 3-10 days Asymptomatic, young more affected Gastrointestinal: (cattle, sheep, goats, swine) pasty to fluid, mucoid diarrhea; weight loss or failure to gain	Incubation period: 1-45 days; signs usually within 1-2 weeks Gastrointestinal: mild-severe, acute-chronic diarrhea Systemic: anemia; anorexia; weight loss
			Clean and disinfect; remove manure; change bedding frequently; do not overcrowd; provide colostrum; house calves separately; keep animals away from fresh water/don't use fresh water as your water source	Wash hands; wear gloves; don't drink untreated water (treat or filter fresh water prior to drinking); treat infected animals; prevent contact with feces;



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<p>Leptospirosis <i>Leptospira</i> spp.</p> <ul style="list-style-type: none"> - Sheep can serve as maintenance hosts of Hardjo serovar <p>Weil's disease in humans</p>	H	<p>Direct contact: infected urine; contaminated water; aborted tissues</p> <p>Ingestion: contaminated feed, water</p> <p>Inhalation: aerosolized urine, water</p>	<p>Incubation period: 7-12 days</p> <p>Reproductive: abortion; decreased fertility; stillbirth; weak offspring</p> <p>Systemic: (lambs, kids) fever; icterus; anemia; death</p>	<p>Incubation period: 7-12 days</p> <p>Acute/septicemic phase: fever, chills, conjunctival suffusion, headache; myalgia; nausea; vomiting</p> <p>Immune phase: anicteric (common) or icteric forms; aseptic meningitis; stiff neck; headache; kidney failure; pulmonary hemorrhage; edema; dyspnea; death</p>
			<p>Clean and disinfect, especially breeding/birthing areas; vaccinate; control rodents; prevent contact with reservoirs; provide safe, clean water for drinking; avoid contaminated water sources/ flood waters; quarantine and test new animals; prevent contact with wild or feral swine</p>	<p>Wash hands; wear PPE (gloves, mask, eye protection, coveralls); cover wounds; control rodents; avoid wildlife; avoid contaminated water (like floodwaters); drain standing water if possible</p>
<p>Listeriosis <i>Listeria monocytogenes</i></p>	H	<p>Ingestion: improperly fermented silage; spoiled/decaying feed, plant matter; soil</p> <p>Direct contact: reproductive tissues/fluids</p> <p>Reproductive: vertical</p>	<p>Incubation period: 1 day to 7 weeks</p> <p>Reproductive: (sheep) abortion; stillbirth</p> <p>Neurologic: ataxia; circling; nystagmus; torticollis; cranial nerve deficits</p> <p>Ocular: "silage eye," keratoconjunctivitis</p>	<p>Incubation period: within 2 weeks for nonpregnant individuals; 2 weeks to 2 months for pregnant women</p> <p>Reproductive: abortion; stillbirth; premature birth</p> <p>Neurologic: meningitis; meningoencephalitis</p> <p>Systemic: septicemia; fever; chills; headache; dizziness</p>
			<p>Clean and disinfect, especially silage handling equipment; remove manure; keep manure away from feed; feed high quality silage, remove first few layers before feeding—may be moldy/spoiled; dispose of leftover silage after feeding; don't feed rotting vegetation; isolate sick animals; remove and destroy placenta, fetuses</p>	<p>Wash hands; wear gloves; keep foods refrigerated; wash fruits, vegetables; avoid high risk foods - deli meats, meat spreads, raw dairy (soft cheeses), smoked seafood; heat deli meat and leftovers to steaming hot</p>
<p>Mange/Acariasis <i>Sarcoptes scabiei</i> var <i>ovis</i> (sheep) <i>Sarcoptes scabiei</i> var <i>caprae</i> (goats)</p> <p>Scabies</p>		<p>Direct contact: infested animals</p> <p>Fomites: contaminated bedding</p>	<p>Incubation period: 10-60 days</p> <p>Cutaneous: pruritus; dermatitis; alopecia; crusted skin (sheep) non-woolly areas of head; (goats) head, neck;</p>	<p>Incubation period: <24 hours to 4 days</p> <p>Cutaneous: severe pruritus on arms, chest, abdomen, thighs</p>
			<p>Clean and disinfect; power spray mite hiding places; quarantine and treat new or affected animals; nest/litter management; prevent exposure to rodents, wild birds; monitor for signs of pruritus and agitation</p>	<p>Wash hands; wear gloves; treat infested animals; remove wild bird nests from buildings; keep bird housing areas clean</p>
<p>Q Fever <i>Coxiella burnetii</i></p>	AH	<p>Inhalation: aerosols</p> <p>Direct contact: reproductive tissues</p> <p>Ingestion: contaminated feed, water</p> <p>Fomites</p> <p>Vectors: ticks</p>	<p>Incubation period: 1-3 weeks; varies</p> <p>Reproductive: abortion; stillbirth; weak offspring; (goats) purulent cotyledons</p>	<p>Incubation period: 2 days to 6 weeks, average of 2-3 weeks</p> <p>Flu-like: fever; chills; malaise; joint pain; sweating</p> <p>Respiratory: mild productive cough</p> <p>Gastrointestinal: (children) nausea; vomiting; diarrhea</p> <p>Cutaneous: (children) rash</p>
			<p>Clean and disinfect (especially birthing areas, bacteria are resistant); remove manure; establish separate area for birthing; remove aborted fetuses or placentas after birth, then burn or bury; don't spread manure on windy days; tick control</p>	<p>Wash hands; wear PPE (gloves, mask or respirator; eye protection), especially if around births; don't spread manure on windy days; don't share dirty laundry; don't consume raw milk or dairy products</p>



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Rabies <i>Lyssavirus</i>	AH	Direct contact: infected animal saliva (bite, droplet on mucous membrane, aerosol, broken skin)	Incubation period: 10 days to 6 months Paralytic: progressive paralysis; dysphagia; hypersalivation; ataxia; ascending paralysis; death in 2-6 days Furious: tremors; restlessness; aggression; ascending paralysis; death in 4-8 days; (sheep) wool pulling; (goats) bleating	Incubation period: a few days to several years, most commonly 1-3 mos. Neurologic: headache; fever; pain at inoculation site Encephalitic form: anxiety; confusion; agitation, inability to swallow; hydrophobia; death Paralytic form: generalized paralysis; death
			Clean and disinfect; vaccinate (including dogs and cats); quarantine exposed animals (can re-vaccinate exposed animals and confine under strict observation for 45 days); isolate, euthanize, test symptomatic animals; prevent access to wildlife	Wash hands; wear PPE around exposed animals (gloves, eye protection, coveralls); avoid saliva; get rabies vaccine if high-risk; cover wounds; stay away from places where bats live (wear PPE if you can't)
Ringworm/ Club Lamb Fungus Dermatophytosis <i>Microsporum</i> spp., <i>Trichophyton</i> spp.		Direct contact: infected animals; skin lesions Fomites	Incubation period: 2-4 weeks Cutaneous: alopecia, scaling, crusts, erythema; (sheep) face, head, chest, non-wooled parts of legs	Incubation period: 1-2 weeks Cutaneous: pink to red, scaly, slightly elevated skin lesions; follicular papules, pustules, or vesicles at the borders
			Clean and disinfect, specially shared equipment; quarantine and test new animals; isolate and treat affected animals; prevent exposure to rodents; do not overcrowd	Wash hands; wear PPE (gloves, coveralls); clean, disinfect equipment; treat infected animals; treat infected people
Salmonellosis <i>Salmonella</i> spp. ser. Typhimurium ser. Enteritidis (humans)	H	Ingestion: contaminated feed, water Direct contact: infected animal, feces Fomites Reproductive: vertical (poultry) Mechanical vectors: flies	Incubation period: varies; less than 1-2 days if severe Gastrointestinal: severe enteritis +/- blood; young most affected Reproductive: abortion; decreased milk (cattle) Systemic: (lambs, kids) septicemia; CNS signs; pneumonia	Incubation period: 6-72 hours Gastrointestinal: acute diarrhea (+/- blood); abdominal pain; nausea; vomiting; dehydration Flu-like: fever; muscle pain; headache; malaise; chills Systemic: immunocompromised most at risk; bacteremia
			Clean and disinfect, especially equipment, buildings; remove manure; practice good biosecurity; control vectors; reduce stress; prevent overcrowding; provide colostrum; purchase from <i>Salmonella</i> -free sources; quarantine new animals; isolate and treat, or cull, carriers	Wash hands; wear gloves; wash and/or peel fruits, vegetables; don't consume raw dairy; cook meat, poultry, eggs to proper internal temperature; reheat foods thoroughly; refrigerate leftovers; don't cross-contaminate; don't drink untreated water
Staphylococcosis including methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)		Direct contact: skin wounds; feces Fomites Inhalation: aerosols (dust)	Incubation period: variable Cutaneous: wound infections, abscesses Reproductive: mastitis; metritis	Incubation period: variable; 4-10 days Cutaneous: skin, soft tissue infection; necrotizing fasciitis; staphylococcal scalded skin syndrome Gastrointestinal: acute gastroenteritis; nausea; vomiting; diarrhea; abdominal pain; +/- fever; headache; blood or mucous in vomit or stool
			Clean and disinfect; remove manure; don't overcrowd; isolate infected animals; good hand hygiene when milking; separate grooming equipment/tack for each horse; wear face mask, gloves when handling animals	Wash hands; wear PPE (gloves, mask); cover wounds; avoid touching animal wounds, secretions; do not share personal items (e.g., towels); refrigerate leftovers; don't cross-contaminate foods; refrigerate raw milk immediately to prevent enterotoxin formation



Zoonotic Diseases of Sheep and Goats, continued

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Toxoplasmosis <i>Toxoplasma gondii</i>	H	Ingestion: soil, plants, water, or feed contaminated with cat feces Reproductive: vertical	Incubation period: not known Reproductive: congenital infection; abortion; stillbirth; mummification Neurologic: (lambs, kids) weakness; ataxia; anorexia; inability to nurse; death	Incubation period: 5-23 days Flu-like: fever; malaise; myalgia; lymphadenopathy Ocular: chorioretinitis; vitreous inflammation Reproductive: abortion; stillbirth (1 st trimester) Congenital: chorioretinitis; hydrocephaly; encephalitis; visual and learning disabilities later in life
			Clean and disinfect; keep cats out of animal areas, barns, pastures; do not let cats prey on rodents or birds; do not feed cats raw/undercooked meat; keep cats out of animal areas; control insects; remove and destroy aborted fetuses, placenta	Wash hands; wear gloves if gardening, touching sand; cook meat properly; freeze meat for >3 days at 5°F to kill parasites; wash, peel fruits, vegetables; avoid cross-contamination in the kitchen; do not drink untreated water
Tuberculosis, bovine <i>Mycobacterium bovis</i>	AH	Direct contact: body tissues/fluids Inhalation: aerosols Ingestion: unpasteurized dairy; contaminated water	Incubation period: varies; months to years Asymptomatic Systemic: weight loss; weakness; emaciation; fever Respiratory: chronic cough, bronchopneumonia; tachypnea; dyspnea Gastrointestinal: intermittent diarrhea; constipation Reproductive: abortion; infertility; mastitis; metritis	Incubation period: variable; several months to years Respiratory: fever; cough; chronic weight loss Systemic: fever; weight loss; malaise; other signs vary Neurologic: meningitis; meningoencephalitis (rapidly fatal for all ages); chronic meningitis
			Clean and disinfect (organism may be resistant); remove manure; avoid high pressure hoses when cleaning; provide good ventilation; do not overcrowd barns; control rodents; minimize exposure to reservoirs (deer fencing, barriers, protect feed from rodents); tuberculin testing; quarantine reactors until negative then cull	Wash hands, wear PPE (gloves, mask or respirator); clean, cover wounds; do not consume raw dairy; cook meat to proper internal temperature; wear a mask if you are infected
Tularemia <i>Francisella tularensis</i>	AH	Ingestion: contaminated food, water Direct contact: animal tissues, bites Inhalation: aerosols Vectors: ticks, biting insects	Incubation period: 1-10 days Asymptomatic Systemic: (sheep, goats) fever; depression; regional lymphadenopathy; death in young lambs and kids Reproductive: (sheep) abortion	Incubation period: 3-5 days, can range from 2-20 days Ulceroglandular: flu-like, papule at inoculation site, ulceration, regional lymph node swelling Glandular: same as ulceroglandular, but no papule Oculoglandular: painful, purulent conjunctivitis with regional lymphadenopathy, often unilateral Oropharyngeal: local lymphadenopathy; exudative stomatitis, pharyngitis; nausea; vomiting; GI bleeding Pneumonic: cough; dyspnea; pneumonia; death Typhoidal: (rare) severe systemic disease
			Clean and disinfect; remove manure; control vectors (ticks, flies); keep animals indoors; keep away from wildlife; protect feed from rodents/wild animals; prevent exposure to potentially contaminated water	Wash hands; wear PPE (gloves, mask, face protection) especially if handling or skinning animals; cover wounds; clean and disinfect equipment; avoid bites or scratches; don't cross-contaminate; wear insect repellent; remove attached ticks; do not drink untreated water; keep rodents out of feed

