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College of Veterinary Medicine
Iowa State University

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Technical Disease Cards
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Swine

- African Swine Fever
- Anthrax
- Bovine Tuberculosis
- Brucellosis
- Classical Swine Fever
- Foot and Mouth Disease
- Porcine Epidemic Diarrhea Virus
- Rinderpest
- Swine Vesicular Disease
- Vesicular Stomatitis
LEVEL GREEN

- Avoid driving your vehicle into or through animal production sites
- If you drive through production area, assure tires and wheel wells are free of organic debris and disinfected prior to leaving premises
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Clothes and footwear should be free of organic debris and disinfected prior to leaving premises
- If possible, avoid livestock areas, pens, barns, etc.
- Assure hands are clean before entering and leaving premises
- Remove as many insect vectors from vehicle as possible

LEVEL YELLOW

Apply procedures from level green plus the following:
- Contact State of Federal Animal Health Officials
- Wear clean rubber boots or new disposable boot covers upon exiting vehicle. Disposable should be worn only in activities where damaging the plastic and compromising biosecurity is possible
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Clean and disinfect any reusable equipment such as rubber boots with a brush and USDA approved disinfectant
- If wearing disposable boots, remove and dispose in a nearby trash receptacle on farm, or in garbage bag in your vehicle to dispose later
- Contact local veterinarian or the Virginia Department of Agriculture

LEVEL ORANGE

Apply procedures from level yellow plus the following:
- Contact State or Federal Animal Health Officials
- Wear clean clothing free of organic debris or freshly laundered clothing (coveralls are preferred)
- Removed soiled clothing before entering vehicle and place in a plastic bag
- Designate separate “clean” and “dirty” areas in your vehicle to dispose of / store clothing and equipment
• At end of day, dispose of “dirty” items in a manner that prevents exposure to livestock, launder all clothing, and shower while making sure to shampoo hair and clean under fingernails

**LEVEL RED**

Apply procedures from level orange plus the following:

• Set up a disinfection point just outside the premises before entering
• Approved personal protective clothing and equipment must be worn
• Vehicles must be parked on a public road right-of-way and personnel must walk to premises
• Appropriate disinfectants for disease situation must be used
• Disposable (Tyvex) suit must be worn with rubber or disposable boots, disposable gloves, disposable head covering, and surgical mask using duct tape to seal gloves to Tyvex sleeves and boots to Tyvex pant leg
• A waterproof suit (pants and long sleeve jacket) may also be necessary
• Eye and respiratory protection should be used in cases of airborne pathogens
• Minimize the amount of equipment taken on premises and leave any items taken on site until disinfected or disposed there
• Maintain necessary devices (watches, phones, etc.) that cannot be disinfected in sealed waterproof bags
• **STAY ON THE SITE** until directed to leave by a State Agricultural Response Team member
STATE VETERINARIAN CONTACT NUMBERS

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OFFICE OF LABORATORY SERVICES
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PRELIMINARY INVESTIGATION HISTORY FORM

Owner information:
Name: __________________________________________________
Address: ________________________________________________
City: ___________________ State: _____ Zip: _______
Phone: ______________________
Location of the Animal(s): ________________________________
long: __________ lat: __________

Circle which livestock species are on the premise:
Beef    Dairy    Swine    Sheep    Goats    Poultry    Other: __________

Circle how many rats and / or mice are on the premise:
None    Few    Moderate    Abundant

Describe potential insect or arachnid vector burden:
None    Few    Moderate    Abundant
List insect or arachnid vector(s) of concern: ____________________________

Total number of animals on premises: ____________________________

For the following questions, circle the appropriate response:

Have any domestic livestock (ruminants or swine) on the premises been sick in the last month?  Y  N
Have any domestic livestock (ruminants or swine) moved onto the premises in the last 90 days?  Y  N
Have any domestic livestock (ruminants or swine) moved off of the premises in the last 90 days?  Y  N
Do farm employees live on other farms or have contact with other livestock?  Y  N
Are any family members or employees employed off the farm?  Y  N
Have any family members or employees visited a foreign country in the last 90 days?  Y  N
If yes, which country? ____________________________________________
INVESTIGATION HISTORY FORM CONTINUED

Have any family members or employees received food from a foreign country in the last 90 days?

Y    N

If yes, which country and what food? ________________________________

Have any foreign residents visited the family, farm employees, or neighbors in the last 90 days?

If yes, which countries? ________________________________

Are wildlife, especially feral swine, deer, elk or birds (domestic or wild), on the premises?

Y    N

Are the premises located near a zoo or fair?

Y    N

Are there any pets on the premises?

Y    N

Is household refuse or garbage fed to domestic livestock (ruminants or swine)?

Y    N

If yes, how is it processed? ________________________________

Are there any garbage or refuse dumps near the premises?

Y    N

Has manure been applied to fields on the premises in the last 180 days?

Y    N

Is there any active vector (i.e. fly) control on the premises?

Y    N

Have any other animal conditions or diseases been treated on the premises in the last 90 days?

Y    N

Your name and phone: ________________________________
AFRICAN HORSE SICKNESS

AGENT: AHFV - family Reoviridae, genus Orbivirus,

SPECIES AFFECTED: Horse, mule, donkey, zebra, occasionally other animals

TRANSMISSION:
- Not directly contagious
- Vector: Culicoides spp., occasionally mosquitoes

CLINICAL APPEARANCE:
- Clinical Signs:
  - Pulmonary Form - Acute to peracute form of the disease
    - Fever up to 106° F, depression, injection of the conjunctivae, dyspnea, paroxysmal coughing, copious frothy nasal discharge
    - Disease progression may last hours to several days after onset
  - Cardiac Form - Subacute form of the disease
    - Fever up to 41° C depression, supraorbital non-pitting edema, swelling, petechiation and eversion of the conjunctivae, edema of the head (eyelids, lips, cheeks and tongue), neck, thorax, pectorals and shoulders
  - Mixed Form - Combination of pulmonary and cardiac forms of the disease
  - African Horse Sickness Fever
    - Mildest (subclinical) form of disease, seldom diagnosed clinically
    - Moderate malaise, remittent fever of 40-40.5° C occasionally mild edema of the supraorbital fossa and dyspnea
- Lesions
  - Respiratory form – pulmonary edema, pericardial and pleural effusion, edema of thoracic lymph nodes, petechial hemorrhages of pericardium
  - Cardiac form – subcutaneous and intramuscular gelatinous edema, epicardial and endocardial ecchymoses, myocarditis, gastritis

INCUBATION PERIOD: 3 – 14 days

DIFFERENTIAL DIAGNOSIS: Heart failure, acute pleuropneumonia, equine viral arteritis, equine infectious anemia, purpura hemorrhagica, anthrax, plant toxicosis, chemical poisoning, heat stress, piroplasmosis, equine encephalosis, Getah or Hendra virus infection and trypanosomiasis.

MORBIDITY & MORTALITY: Equid mortality can reach 70-95%

BIOSECURITY LEVEL: Yellow
AFRICAN HORSE SICKNESS

Terminal froth

Supraorbital edema

Pulmonary edema

Hydropericardium

Edema between cervical muscles

Pulmonary fluid in trachea
AFRICAN SWINE FEVER

AGENT: African swine fever virus, family Asfarviridae

SPECIES AFFECTED: Domestic and wild pigs

TRANSMISSION:
- Direct: contact with infected animals
- Indirect: feeding on garbage containing infected meat
  o ASFV can remain infectious 3–6 months in uncooked pork products
- Fomites: premises, vehicles, implements, clothes
- Vector: Ornithodoros spp. ticks
  o transstadial, transovarial, and sexual transmission occur

CLINICAL APPEARANCE:
- Clinical signs: Can be acute, peracute, subacute or chronic
  o Sudden death
  o High fever (105-107°F) and anorexia
  o Skin reddening in white pigs
  o Cyanotic blotching on ears, tail, lower legs, or hams
  o Painless swelling of joints, especially carpal and tarsal joints
  o Bloody diarrhea, vomiting, dyspnea, and abortion sometimes seen
- Lesions
  o Very large, friable, dark red to black spleen
  o Swollen, hemorrhagic gastrohepatic lymph nodes
  o Hemorrhages, petechiae, and ecchymoses of other organs
  o Dark red or purple area on the skin of the ears, feet, and tail

INCUBATION PERIOD: 2 – 15 Days

DIFFERENTIAL DIAGNOSIS: Classical swine fever, PRRS, porcine dermatitis and nephropathy syndrome, eperythrozoonosis, salmonellosis, erysipelas, actinobacillosis, Glasser’s disease, Aujeszky’s disease, thrombocytopenic purpura, warfarin poisoning, and heavy metal toxicity

MORBIDITY & MORTALITY: Mortality can reach 60 – 100%

BIOSECURITY LEVEL: Orange
AFRICAN SWINE FEVER

Pig with reddening of skin

Pigs with bloody diarrhea

Enlarged, black, friable spleen

Hemorrhagic gastric lymph nodes

Hemorrhagic renal lymph nodes

Ornithodoros spp. tick
ANTHRAX

AGENT: Bacillus anthracis (spore forming, Gram positive aerobic rod)

SPECIES AFFECTED: All livestock and humans; chickens resistant

TRANSMISSION:
- Ingestion of spores in soil or on plants in pastures
  - Associated with heavy rainfall, flooding or drought
- Inhalation
- Contact with infected tissues (human) – do not necropsy!
- Biting flies

CLINICAL APPEARANCE:
- Clinical Signs
  - Sudden death (may be only sign)
  - Staggering, trembling, and dyspnea
  - Rapid collapse with terminal convulsions
  - Bloody discharge from nose, mouth, and anus – infectious material
- Lesions
  - Swelling of neck, sternum, lower abdomen, and lymph nodes
  - Dark red blood that does not clot
  - “Blackberry jam” spleen
  - Absent or incomplete rigor mortis
  - DO NOT NECROPSY!

INCUBATION PERIOD: 1-20 days

DIFFERENTIAL DIAGNOSIS: Electrocution, heart water, lead poisoning, peracute blackleg, acute leptospirosis, acute bloat, hypomagnesemia

Morbidity and Mortality: Very high in ruminants; relatively low in carnivores

BIOSECURITY LEVEL: Orange
ANTHRAX

Zebra with anthrax

Cow that died of anthrax

Gazelle with anthrax

Transmission via contact with hides

Cutaneous anthrax

Cutaneous anthrax
BLUETONGUE & EPIZOOTIC HEMORRHAGIC DISEASE

AGENT: BTV, EHDV *Orbivirus*, family *Reoviridae*

SPECIES AFFECTED: BTV – Most ruminants (sheep noted)
EHDV – Most ruminants (deer noted)

TRANSMISSION: Biological vectors – *Culicoides* species
Once a midge is infected it stays infective for life

CLINICAL APPEARANCE:
- **BTV** – Sheep
  - Elevated temperature 106 – 107°F
  - Excessive salivation and frothing at the mouth
  - Hyperemia and swelling of buccal and nasal mucosa
  - Erosions and ulcerations can be observed in the mouth
  - Tongue may be cyanotic and protrude from the mouth
- **BTV** – Cattle
  - Typically causes no clinical signs
  - Mild hyperemia in buccal cavity & around coronary band
  - Lameness and reproductive failure
- **BTV** – Goats
  - Typically causes no clinical signs
- **EHD** – Sheep
  - Does not appear to cause significant clinical disease
- **EHD** – Cattle
  - Rarely causes disease
  - Fever, erosive and ulcerative lesions of the mouth, throat
  - Stiffness, lameness

DIFFERENTIAL DIAGNOSIS: Vesicular stomatitis, foot and mouth disease, bovine viral diarrhea, malignant catarrhal fever, infectious bovine rhinotracheitis

INCUBATION PERIOD: 7 – 10 days

MORBIDITY & MORTALITY:
Sheep (BT) – morbidity can reach 100%, mortality 0 – 50%
Cattle/Goats (BT, EHD) – usually subclinical. Morbidity can reach 5%

BIOSECURITY LEVEL: Green
BLUETONGUE and EPIZOOTIC HEMORRHAGIC DISEASE

Bilateral nasal exudate  Multiple erosions

Ulcerations of teats  Hyperemic crusting of muzzle
BOVINE SPONGIFORM ENCEPHALOPATHY (MAD COW)

AGENT: Prion protein

SPECIES AFFECTED: Cattle, goats

TRANSMISSION:
- Ingestion of infected nervous tissue (i.e. feeding offal, meat and bone meal)
- Atypical form occurs spontaneously

CLINICAL APPEARANCE:
- Clinical signs
  o Hyperesthesia, apprehension, nervousness, sometimes pruritis
  o Hind leg ataxia, pelvic swaying, hypermetria, tremors, and falling
  o Difficulty rising, abnormal posture
  o Weight loss, decreased rumination, decreased milk production
  o Recumbency, coma, and death
- Lesions
  o Emaciation and wasting
  o No other gross lesions

DIFFERENTIAL DIAGNOSIS: Nervous ketosis, hypomagnesemia, rabies, listeriosis, polioencephalomalacia, brain tumors, spinal cord trauma, lead poisoning

BIOSECURITY LEVEL: Yellow
BOVINE SPONGIFORM ENCEPHALOPATHY (MAD COW)

Cows with signs of BSE

Downer cow with BSE

Brain showing sampling location

Brain section with BSE lesions
BOVINE TUBERCULOSIS

AGENT: *Mycobacterium bovis* (Gram positive, acid-fast bacteria)

SPECIES AFFECTED: All animals, especially cattle, **humans**

TRANSMISSION:
- Inhalation of aerosol particles
- Ingestion of organism

CLINICAL APPEARANCE:
- Clinical signs
  - Early infection is asymptomatic
  - Progressive emaciation, fever, weakness, inappetance
  - Moist cough that is worse in morning, when cold, or with exercise
  - Enlarged retropharyngeal lymph nodes
- Lesions
  - Tuberculosis granulomas where bacteria have localized
  - Granulomas most often in mediastinal, retropharyngeal, and portal lymph nodes
  - Granulomas may be in lung, spleen, liver, and abdominal wall
  - Granulomas are yellowish and caseous or calcified and are often encapsulated

DIFFERENTIAL DIAGNOSIS: Contagious bovine pleuropneumonia, pasteurella pneumonia, inhalation pneumonia, traumatic reticulitis, chronic aberrant liver fluke infestation

BIOSECURITY LEVEL: **Yellow**
BOVINE TUBERCULOSIS

Bovine lung

Elk lung and lymph node

Pig lymph node

Bovine uterus
BRUCELLOSIS

AGENT: *Brucella* spp. (Gram negative, facultative intracellular rod)  
*Brucella abortus* has been eradicated from domesticated cattle in the US, but it persists in wildlife hosts in the Greater Yellowstone Area.  
*Brucella suis* is present in the feral hog population in the US.

SPECIES AFFECTED: All farm animals, **humans**

TRANSMISSION:
- Contact with contaminated fetal materials and fluids
- Ingestion of organism
- Contact with fomites

CLINICAL APPEARANCE:
- Clinical signs
  - Systemic signs not commonly seen
  - Abortion in the second half of gestation
  - Retained placenta in females, epididymitis / orchitis in males
  - Inflammation of supraspinous bursa (fistulous withers) in horse
- Lesions
  - Chronic placentitis with thickening of intercotyledonary region
  - Granulomatous inflammatory lesions of reproductive tract, mammary gland, supramammary lymph nodes, and joints

DIFFERENTIAL DIAGNOSIS: Trichomoniasis, vibriosis, leptospirosis, IBR, listeriosis, epizootic viral abortion, chlamydiosis

BIOSECURITY LEVEL: **Yellow**
BRUCELLOSIS

Ram testicle

Swine testicle

Abortion in cattle

Abortion in sheep
CLASSICAL SWINE FEVER (HOG CHOLERA)

AGENT: Classical swine fever virus, family *Flaviviridae*, genus *Pestivirus*
A common and important disease in the US until eradicated in 1973.

SPECIES AFFECTED: Domestic and wild pigs

TRANSMISSION:
- Pig is the only natural reservoir of the virus
- Ingestion of organism (i.e. uncooked garbage) – most common way to enter free countries
- Oral and oronasal routes via direct or indirect contact
- Direct contact between animals (secretions, excretions, semen and blood)
- Indirect contact through fomites
- Transplacental infection – may create unapparent carrier piglets

CLINICAL APPEARANCE:
- Clinical signs vary by acute or chronic virulence of the virus
  - High fever (105 – 108°F) dullness, weakness, drowsiness, huddling, swollen lymph nodes, dyspnea, coughing
  - Anorexia, unsteady gait, conjunctivitis
  - Constipation followed by diarrhea, vomiting
  - Purplish ears and inner thighs several days after first signs
  - Abortions, stillbirths, fetal mummification
  - Stunted growth, alopecia, concurrent infections in chronic cases
- Lesions
  - Severe tonsillitis, splenic infarcts
  - Hemorrhagic lymph nodes (periphery) and renal cortex
  - Button ulcers of cecum and colon

INCUBATION PERIOD: 2 – 14 days, usually 3 – 4 days

DIFFERENTIAL DIAGNOSIS: African swine fever, porcine dermatitis and nephropathy syndrome, erysipelas, erythrozoosonosis, salmonellosis, actinobacillosis, Glasser’s disease, thrombocytopenia purpura, warfarin poisoning

MORBIDITY & MORTALITY: High in acute cases

BIOSECURITY LEVEL: Yellow
CLASSICAL SWINE FEVER

Pigs huddling with CSF

Multiple necrotic foci in tonsils

Hemorrhages in lymph nodes

Spleen with infarcts from CSF

Petechial hemorrhages of kidney

Hemorrhagic colitis of spiral colon
CONTAGIOUS BOVINE PLEUROPNEUMONIA

AGENT: *Mycoplasma mycoides mycoides* (small colony type)

SPECIES AFFECTED: Cattle, especially European breeds, bison, yak

TRANSMISSION:
- Inhalation of aerosol particles
- Direct contact with infected secretions
- Transplacental infection

CLINICAL APPEARANCE:
- Clinical signs
  - Lethargy, anorexia, and fever initially
  - Progresses to cough, thoracic pain, dyspnea, and elbow abduction
  - Labored respirations
  - Infected calves commonly have polyarthritis + / - pneumonia
  - Chronically infected animals will cough with exercise
- Lesions
  - Thickening of lung tissues with extensive fibrin deposits
  - Large amounts of straw-colored fluid in thoracic cavity
  - Characteristic marbled appearance of affected lung lobe
  - May involve only one lung
  - Severe fibrinous pleuritis

INCUBATION PERIOD: 1-4 Months

DIFFERENTIAL DIAGNOSIS: Acute bovine pasteurellosis, traumatic pericarditis, bronchopneumonia from mixed infection, tuberculosis, actinobacillosis, hydatid cysts, East Coast fever

MORBIDITY & MORTALITY: 10 – 70% Mortality rate

BIOSECURITY LEVEL: Yellow
CONTAGIOUS BOVINE PLEUROPNEUMONIA

Extended head and neck  Cow with clinical CBPP

Thoracic wall with fibrin deposits  Severe fibrinous pleuritis

Classic interlobular “marbling”  CBPP with only one lung involved
CONTAGIOUS EQUINE METRITIS (CEM)

AGENT: *Taylorella equigenitalis*

SPECIES AFFECTED: Horses, donkeys and mules

TRANSMISSION:
- Highly contagious
- Venereally transmitted
- Fomites – instruments, equipment, personnel

CLINICAL APPEARANCE:
- Mares
  - Copious mucopurulent vaginal discharge 10-14 days post breeding to an infected stallion that lasts several days
  - Short cycling of mares with return to estrus
  - Abortion or birth of carrier foal
  - Most infected mares do not conceive
- Stallions
  - Asymptomatic carrier

INCUBATION PERIOD: Inflammatory reaction begins within 24 hours of colonization; becomes clinical apparent 10-14 days after breeding

MORBIDITY AND MORTALITY: High morbidity, fatal infections not seen

DIFFERENTIAL DIAGNOSIS: Uterine infection, vaginitis

BIOSECURITY LEVEL: Orange
CONTAGIOUS EQUINE METRITIS (CEM)

Mucopurulent vaginal discharge

Vaginal discharge on inside thighs

Mucopurulent discharge within uterine lumen during acute infection
EQUINE PIROPLASMOSIS

AGENT: Protozoa: Babesia caballi or Theileria equi

SPECIES AFFECTED: Horses, mules, donkeys, and zebras

TRANSMISSION:
- Vector borne by Dermacentor, Hyalomma, and Rhipicephalus ticks
- Contaminated needles and syringes
- Intrauterine infection of foals is fairly common
- Infected animals may remain carriers for long periods and can act as sources of infection for tick vectors

CLINICAL APPEARANCE:
- Clinical signs
  - Signs are variable and often non-specific
  - Fever, inappetance, malaise, labored breathing, congested mucus membranes
  - Anemia, jaundice, hemoglobinuria, sweating, petechial hemorrhages on the conjunctiva, a swollen abdomen, and posterior weakness may be seen
  - In chronic cases, may have exercise intolerance, weight loss, and a palpably enlarged spleen
- Lesions
  - Animal is usually emaciated, jaundiced, and anemic
  - Enlarged, dark orange-brown liver
  - Enlarged spleen and pale, flabby kidneys
  - Petechial hemorrhages of kidneys and heart

INCUBATION PERIOD: B. caballi 10-30 days, T. equi 12-19 days

DIFFERENTIAL DIAGNOSIS: Immune-mediated hemolytic anemia, Surra, equine infectious anemia, dourine, African horse sickness, purpura hemorrhagica, various plant and chemical toxicities

MORBIDITY & MORTALITY: death rate can reach 10-50%

BIOSECURITY LEVEL: Yellow
EQUINE PIROPLASMOSIS

Kidney – congestion, icterus

Equine – icterus

Equine – congestion, icterus
EQUINE VIRAL ARTERITIS

AGENT: EVA virus, family Arteriviridae, genus Arterivirus

SPECIES AFFECTED: Horses, ponies, and zebra

TRANSMISSION:
- Inhalation of aerosol particles from acutely infected horses
- Venereal transmission from carrier stallions and infected semen
- Stallions appear to be the only carrier of the virus
- Indirect contact with fomites

CLINICAL APPEARANCE:
- Clinical signs
  - Many infected horses are asymptomatic
  - Generally more severe in young, old, or debilitated animals
  - Fever, depression, anorexia, nasal discharge, respiratory distress
  - Edema of limbs (especially hind limb), prepuce, and scrotum
  - Lacrimation, conjunctivitis, photophobia, supraorbital edema
  - Urticaria localized to head or neck may be seen
  - Abortions
- Lesions
  - Edema, congestion, and hemorrhages of SQ tissues
  - Fluid accumulation in peritoneum, pleura, and pericardium
  - Edema and hemorrhages of lymph nodes and intestines
  - In foals, may see pulmonary edema, interstitial pneumonia, emphysema, splenic infarcts, and enteritis

INCUBATION PERIOD: 2 – 13 days

DIFFERENTIAL DIAGNOSIS: Equine influenza, equine herpes, equine infectious anemia, African horse sickness, purpura hemorrhagica

MORBIDITY & MORTALITY: Death is rare. MLV vaccine available

BIOSECURITY LEVEL: Yellow
EQUINE VIRAL ARTERITIS

Equine scrotal edema
EXOTIC NEWCASTLE DISEASE

AGENT: END virus, family Paramyxoviridae, genus Rubulavirus

SPECIES AFFECTED: All species of birds

TRANSMISSION:
- Direct contact with feces or respiratory discharges
- Indirect contact with fomites

CLINICAL APPEARANCE:
- Clinical signs
  - Sneezing, gasping, nasal discharge, coughing
  - Greenish, watery diarrhea;
  - Depression, tremors, droopy wings, circling, and complete paralysis
  - Partial to complete drop in egg production and thin-shelled eggs
  - Swelling of tissues around the eyes and in the neck;
  - Sudden death
  - Increased flock mortality
- Lesions
  - Hemorrhagic conjunctivits, tracheitis, and lining of rectum
  - Hemorrhagic proventriculus and necrohemorrhagic enteritis
  - Additional lesions may include edema, hemorrhages, necrosis, or ulcerations of lymphoid tissue

INCUBATION PERIOD: Varies from 2-15 days depending on virulence and susceptibility; 4-6 days in chickens with the velogenic form

DIFFERENTIAL DIAGNOSIS: Fowl cholera, highly pathogenic avian influenza, laryngotracheitis, coryza, fowl pox, psittacosis, infectious bronchitis, mycoplasmosis, Pacheco’s disease

MORBIDITY & MORTALITY: up to 100% depending on viral strain

BIOSECURITY LEVEL: Orange
EXOTIC NEWCASTLE DISEASE

Edema, hemorrhage in eyelid       Petechiae on proventriculus

Lymphoid necrosis in intestine    Hemorrhage of cloaca and rectum

Conjunctivitis from END           Necrohemorrhagic enteritis
FOOT AND MOUTH DISEASE

AGENT: FMD virus, family Picornaviridae, genus Aphthovirus

SPECIES AFFECTED: Cloven-hoofed domestic and wild animals

TRANSMISSION:
- Highly contagious and infectious
- Ingestion of infected animal products (i.e. garbage (food) feeding)
- Inhalation of aerosol particles
- Direct contact with infected animal
- Indirect contact with fomites
- Artificial insemination with contaminated semen
- Contaminated biologics, contaminated hormone preparations

CLINICAL APPEARANCE:
- Clinical signs
  - Fever, vesicles, excessive salivation
  - Lameness can be severe, reluctant to move or rise
  - Vesicles effect mouth, nares, muzzle, feet, and teats
  - Oral lesions of tongue, dental pad, gums, soft palate
  - Hoof lesions of the coronary band and interdigital space
  - Signs or lesions are not pathognomonic for FMD alone
- Lesions
  - Lesions from small white area to fluid filled blister
  - Ruptured vesicles leave red eroded area covered with gray, fibrinous coating
  - Sloughing of tongue and / or hooves

INCUBATION PERIOD: 1-5 days

DIFFERENTIAL DIAGNOSIS: Vesicular stomatitis, swine vesicular disease, vesicular exanthema of swine, foot rot, chemical / thermal burns, rinderpest, IBR, BVD, malignant catarrhal fever, bluetongue, contagious ecthyma (Orf)

MORBIDITY & MORTALITY: Morbidity typically 100%, Mortality < 1% in adults, Mortality 10-20% in young animals

BIOSECURITY LEVEL: Red. Stay on site and contact state or federal animal health officials.
FOOT AND MOUTH DISEASE

Cow tongue with FMD lesion

Pig with FMD vesicle on snout

Oral lesions in pig

Area of myocardial necrosis

Lesions of coronary band in pig
GLANDERS

AGENT: *Burkholderia mallei* (Gram negative, aerobic rod)

SPECIES AFFECTED: Horses, mules, donkeys, humans

TRANSMISSION:
- Ingestion of infected material
- Direct contact with skin exudates or respiratory secretions
- Indirect contact with fomites
- Subclinically infected equids can shed and be a source of infection

CLINICAL APPEARANCE:
- Clinical signs
  - Three forms; nasal, cutaneous and pulmonary
  - High fever, cough, inspiratory dyspnea, thick nasal discharge
  - Deep, rapidly spreading ulcers that become star-shaped scars
  - Swollen, painful submaxillary lymph nodes and lymphatic vessels
  - In chronic cases, malaise, unthriftiness, weight loss, chronic purulent nasal discharge from one nostril, skin nodules
- Lesions
  - Ulcers, nodules, and stellate scars in nasal cavity, trachea, pharynx, larynx, skin, and SQ tissues
  - Catarrhal bronchopneumonia with enlarged bronchial lymph nodes
  - Miliary gray nodules of lung, liver, spleen, and kidneys
  - Swollen lymph nodes with focal abscesses and fibrosis

INCUBATION PERIOD: Weeks to months

DIFFERENTIAL DIAGNOSIS: Strangles, epizootic lymphangitis, ulcerative lymphangitis, melioidosis, dermatophilosis, sporotrichosis,

MORBIDITY & MORTALITY: Morbidity can be high; mortality varies among acute and chronic forms

BIOSECURITY LEVEL: Orange
GLANDERS

Lesion on donkey’s lip

Granulomatous pneumonia of donkey lung
HEARTWATER

AGENT: Rickettsia; *Ehrlichia ruminantium* (formerly *Cowdria ruminantium*)

SPECIES AFFECTED: Cattle, sheep, goats, and buffalo

TRANSMISSION:
- Acute noncontagious infectious disease of ruminants
- Vector borne by *Amblyomma spp.* ticks
- Tick carried by birds (cattle egret)
- May be transmitted from cow to calf in colostrum

CLINICAL APPEARANCE:
- Clinical signs
  - Peracute form: fever, respiratory distress, hyperesthesia, lacrimation, severe diarrhea, terminal convulsions, sudden death
  - Acute form: sudden fever (up to 107°F), anorexia, listlessness, tachypnea initially, then nervous signs – chewing movements, protrusion of tongue, twitching of eyelids, circling, and hypermetria
  - Terminal stage shows opisthotonos, hyperesthesia, nystagmus, frothing of mouth, and galloping movements
- Lesions
  - Hydropericardium with straw-colored to reddish fluid
  - Ascites, mediastinal edema, hydrothorax, pulmonary edema
  - Petechial hemorrhages of thoracic organs
  - Splenomegaly, edematous lymph nodes, nephrosis, and hemorrhagic abomasitis may be seen

INCUBATION PERIOD: 14 – 28 days

DIFFERENTIAL DIAGNOSIS: Anthrax, rabies, tetanus, chlamydiosis, anaplasmosis, bacterial meningitis, piroplasmosis, cerebral trypanosomiasis, theileriosis, poisoning (lead, strychnine, organophosphates, arsenic)

MORBIDITY & MORTALITY: Mortality in cattle can reach 60%

BIOSECURITY LEVEL: Yellow
HEARTWATER

*Amblyomma variegatum* tick

Cow with CNS form of heartwater

Hydropericardium with Heartwater

Excessive thoracic fluid

Cattle egret

Deer with CNS form of Heartwater
HIGHLY PATHOGENIC AVIAN INFLUENZA

AGENT: Type A influenza virus, hemagglutinin subtype H5 or H7

SPECIES AFFECTED: Birds, humans

TRANSMISSION:
- Highly contagious in poultry
- Ingestion of feces from migratory waterfowl (low path strain)
- Low path strain can mutate to high path strain
- Fecal-oral in poultry
- Inhalation of aerosol particles
- Indirect contact via fomites

CLINICAL APPEARANCE:
- Clinical signs
  - Marked depression with ruffled feathers, inappetance, excessive thirst, watery diarrhea (green changing to white)
  - Swollen combs, skin on head and wattles that may be cyanotic or bruised
  - Coughing, sneezing and sinustis
  - Sudden death is frequently noted
  - Ecchymosis on shanks and feet
  - Congestion, swelling, or hemorrhages may occur on conjunctiva
  - Decreased egg production with misshapen eggs
- Lesions
  - Excessive fluid from nares and oral cavity
  - Subcutaneous edema of head neck, severely congested conjunctiva, small petechiae of abdominal fat and serosal surfaces
  - Hemorrhage of mucosa of trachea, proventriculus, gizzard, and intestine
  - Kidneys are severely congested and plugged with white urate

INCUBATION PERIOD: usually 3 – 7 days

DIFFERENTIAL DIAGNOSIS: Exotic Newcastle disease, infectious laryngotracheitis, acute bacterial diseases (fowl cholera, E. coli)

MORBIDITY & MORTALITY: Can be 100%

BIOSECURITY LEVEL: Red. Stay on site and contact state or federal animal health officials.
HIGHLY PATHOGENIC AVIAN INFLUENZA

Congestion of wattles

Cyanosis of comb (left), normal (right)

Congestion of hock and shanks

Opened edematous wattle

Visceral hemorrhages

Hemorrhages of trachea
LUMPY SKIN DISEASE

AGENT: LSD virus, family Poxviridae, genus Capripoxvirus

SPECIES AFFECTED: Cattle and water buffalo

TRANSMISSION:
- Vector borne by biting insects (mosquitoes and flies)
- Direct contact is a minor source of infection

CLINICAL APPEARANCE:
- Clinical signs
  - Signs range from inapparent to severe
  - Skin nodules (1-5 cm) develop after an initial fever
  - Nodules become painful and necrotic before becoming scabs
  - Nodules may develop in GI tract, trachea, and lungs
  - Depression, anorexia, excessive salivation & emaciation noted
  - Lymph nodes may become 4-10 X normal size near lesions
  - Rhinitis, conjunctivitis, agalactia, lameness and edema of the brisket and legs may be noticed
- Lesions
  - Post mortem lesions can be extensive including nodules that penetrate SQ tissue and muscles with hemorrhage, edema, necrosis
  - Lesions may be found in oral and nasal cavities, pharynx, epiglottis, trachea, GI tract, lungs, testicles, and bladder
  - Pleuritis, edema, and focal lobular atelectasis in the lungs may occur with enlarged mediastinal lymph nodes

INCUBATION PERIOD: 4-28 days

DIFFERENTIAL DIAGNOSIS: Herpes-virus skin disease, pseudocowpox, bovine herpes mamillitis, dermatophilosis, ringworm, insect or tick bites, rinderpest, demodicosis, hypoderma bovis infection, photosensitization, urticaria, cutaneous tuberculosis, onchocercosis

MORBIDITY & MORTALITY: Morbidity 10-20%, Mortality often low (1 – 3%) but may reach 20-80%

BIOSECURITY LEVEL: Yellow
LUMPY SKIN DISEASE

Calf with LSD nodules

Second calf with LSD

LSD (pox) lesion in trachea

Atelectasis and lobular edema
PESTE DES PETITS RUMINANTS

AGENT: Small ruminant morbillivirus (SRM), family Paramyxoviridae, genus Morbilivirus – still commonly known as PPRV

SPECIES AFFECTED: Goats, sheep

TRANSMISSION:
- Close contact with ocular, nasal, or oral secretions, or feces
- Inhalation of aerosol particles
- Indirect contact with fomites
- No known carrier state

CLINICAL APPEARANCE:
- Clinical signs
  - Sudden fever (104-106°F), restlessness, inappetance
  - Serous nasal discharge that becomes mucopurulent
  - Hyperemic gums with erosive lesions that form scabs
  - Profuse, non-hemorrhagic diarrhea leading to severe dehydration
  - Bronchopneumonia with coughing is common late in the disease
- Lesions
  - Necrotic lesions in oral cavity and GI tract
  - Emaciation, conjunctivitis, and erosive stomatitis
  - Extensive necrosis of Peyer’s patches, “Zebra stripe” congestion of posterior colon, erosive lesions of vulva and vaginal wall
  - Bronchopneumonia with consolidation and atelectasis

INCUBATION PERIOD: Typically 4 – 6 days but may be up to 10 days

DIFFERENTIAL DIAGNOSIS: Rinderpest, bluetongue, pasteurellosis, heartwater, contagious caprine pleuropneumonia, contagious ecthyma, FMD, coccidiosis, mineral poisoning

MORBIDITY & MORTALITY: Morbidity 90-100%, Mortality 50 – 100%

BIOSECURITY LEVEL: Yellow
PESTES DES PETITS RUMINANTS

Goat with clinical signs

Oral lesions of infection with PPRV

Bronchopneumonia with PPRV

“Zebra striping” of colon with PPRV

Dry exudates on muzzle

Necrosis (white areas) in mouth
PORCINE EPIDEMIC DIARRHEA VIRUS (PED)

AGENT: PED virus, family Coronaviridae, genus Alphacoronavirus

SPECIES AFFECTED: Swine

TRANSMISSION:
- Direct – Fecal/Oral route
- Indirect - Fomite

CLINICAL APPEARANCE:
- Clinical signs
  - Acute outbreak of severe diarrhea and vomiting
  - Dehydration
  - Anorexia
- Lesions
  - Small intestinal villous blunting
  - Thinning of the intestines, mostly limited to the small intestines
  - Presence of undigested milk in the stomach
  - Watery intestinal contents

INCUBATION PERIOD: 1-4 days

DIFFERENTIAL DIAGNOSIS: Transmissible Gastroenteritis (TGE)

MORBIDITY & MORTALITY: Morbidity: up to 100%
  - Mortality varying according to age:
    - Suckling piglets: up to 100%
    - Piglets older than 10 days: less than 10%
    - Adult and fattening pigs: less than 5%

BIOSECURITY LEVEL: Yellow
RABBIT HEMORRHAGIC DISEASE

AGENT: VHD virus, family *Caliciviridae*, genus *Lagovirus*

SPECIES AFFECTED: Wild and domesticated rabbits

TRANSMISSION:
- Direct contact with infected animals
- Fomites
- Mechanical transmission: Insects can transmit viral particles to conjunctiva

CLINICAL APPEARANCE:
- Clinical Signs
  - Rabbits < 8 weeks tend to be resistant
  - Peracute – fever & death within 12 – 36 hours of onset,
  - Acute – neurologic signs (opisthotonos, excitement, paddling, turn & flip quickly in cage), dyspnea, cyanosis, blood stained frothy nasal discharge
  - Chronic – thought to be asymptomatic
- Lesions
  - Hepatic necrosis & splenomegaly
  - Pale liver with reticular pattern of necrosis
  - DIC is common in terminal stage
  - Infarcts may be seen in most organs

INCUBATION PERIOD: 1 – 5 days

DIFFERENTIAL DIAGNOSIS: Pulmonary pasteurellosis, severe bacteremia or septicemia with secondary DIC, enterotoxemia due to E. Coli or Clostridium perfringens type E, heat exhaustion

MORBIDITY & MORTALITY: Depends on strain: Morbidity 30 – 100%, Mortality 40 – 100%

BIOSECURITY LEVEL: Red. Stay on site and contact state or federal animal health officials.
RABBIT HEMORRHAGIC DISEASE

Severe Epistaxis

Hepatic necrosis (reticular pattern)

Swollen liver

Trachea containing foam
RIFT VALLEY FEVER

AGENT: RVF virus, family *Bunyaviridae*, genus *Phlebovirus*

SPECIES AFFECTED: Cattle, sheep, goats, buffalo and **humans**

TRANSMISSION:
- Vector borne by *Aedes* spp. Mosquitoes
- Wild ruminants serve as reservoir host in endemic areas

CLINICAL APPEARANCE:
- Clinical signs
  - Vary with age, species, and breed; most severe in young
  - In lambs: biphasic fever (104 – 107°F), anorexia, abdominal pain, dyspnea
    - weakness, death in 24-36 hours
  - In sheep and goats: fever, mucopurulent nasal discharge, dyspnea, fetid hemorrhagic diarrhea, vomiting, jaundice, abortion, sudden death
  - In cattle: fever (104 – 106°F), anorexia, weakness, excessive salivation, fetid diarrhea, abortion, decreased milk production
- Lesions
  - Most consistent lesion is massive hepatic necrosis
  - In aborted fetuses, liver is very large, brown to red, soft and friable, with multiple gray to white necrotic foci usually present
  - Jaundice, widespread cutaneous hemorrhage, body cavity fluid
  - Wall of gallbladder is often edematous with hemorrhages
  - Widespread petechiation and ecchymosis

INCUBATION PERIOD: 12 Hours to 6 days

DIFFERENTIAL DIAGNOSIS: Bluetongue, enterotoxemia, brucellosis, vibriosis, trichomonosis, heartwater, ovine enzootic abortion, pestes des petits ruminants, rinderpest, toxic plants, bacterial septicemia

MORBIDITY & MORTALITY: Mortality in adult sheep 20-70%, adult cattle< 10%, mortality up to 70-100% in young lambs, calves and kids

BIOSECURITY LEVEL: **Yellow**
RIFT VALLEY FEVER

*Aedes* spp. Mosquito

Aborted fetuses

Massive hepatic necrosis in lamb

Liver with hepatic necrosis
RINDERPEST

AGENT: Rinderpest virus, family *Paramyxoviridae*, genus *Morbillivirus*
- Eradicated from the world in 2011 - Virus held in laboratories

SPECIES AFFECTED: Cloven-hooved animals

TRANSMISSION:
- Direct contact with infected animals (nasal-ocular discharge, feces)
- Indirect contact with fomites

CLINICAL APPEARANCE:
- Clinical signs
  - Different forms depending on virus strain and host resistance
  - Peracute form: high fever (104 – 107°F), congested mucous membranes, death
  - Classic form: fever (104 – 106°F), depression, anorexia, tachypnea, leukopenia, congested mucous membranes, ocular & nasal discharge, oral erosions with salivation
  - After 2-3 days, develop profuse, watery or hemorrhagic diarrhea, tenesmus, dehydration, abdominal pain, weakness, recumbency
- Lesions
  - Small necrotic foci on gums, lips, palate, cheeks, base of tongue
  - Foci will slough leaving red erosions, can extend to GI and upper respiratory tract
  - “Zebra” striping in large intestines, enlarged GI lymph nodes with necrotic Peyer’s patches

INCUBATION PERIOD: 3 – 15 days, usually 4 – 5 days

DIFFERENTIAL DIAGNOSIS: BVD (mucosal disease), IBR, foot & mouth disease, vesicular stomatitis, malignant catarrhal fever, salmonellosis, necrobacillosis, paratuberculosis, arsenic poisoning, peste des petits ruminants

MORBIDITY & MORTALITY: Can approach 100%

BIOSECURITY LEVEL: Yellow
RINDERPEST

Ocular discharge with Rinderpest

Oral erosions with clinical Rinderpest

Necrotic lesion over Peyer’s patch

“Zebra striping” of colon

Hemorrhage of gall bladder

Conjunctivitis of early Rinderpest
SCRAPIE

AGENT: Prion protein

SPECIES AFFECTED: Sheep and goats

TRANSMISSION:
- Ingestion of contaminated material

CLINICAL APPEARANCE:
- Clinical signs
  - Behavioral changes including isolation from flock, hyperexcitability, gait abnormalities, fixed stare, erect head, apprehension
  - Other signs include ataxia, incoordination, trembling, convulsions
  - Scratching and rubbing apparently to relieve pruritis (itching) beginning at tail head and progressing cranially
  - Weight loss with retention of appetite
  - Gait abnormalities including swaying of back end, hopping and high stepping of forelegs
- Lesions
  - No gross lesions except emaciation or wasting of carcass

DIFFERENTIAL DIAGNOSIS: Listeriosis, louping ill, ovine progressive pneumonia, caprine arthritis encephalitis, polioencephalomalacia, pruritic dermatitis from bacteria, fungi or ectoparasites, Aujeszky’s disease, rabies

BIOSECURITY LEVEL: Yellow
SCRAPIE

Alopecia secondary to rubbing
SHEEP & GOAT POX

AGENT: Sheep pox virus, goat pox virus, family Poxviridae, genus Capripoxvirus

SPECIES AFFECTED: Sheep, goats

TRANSMISSION:
- Inhalation of aerosol particles
- May enter body through abraded skin
- Spread by insects is possible

CLINICAL APPEARANCE:
- Clinical signs
  - Fever, followed 2-5 days later by erythematous macules
  - Macules become 0.5-1.5 cm papules with gray center surrounded by hyperemia, then dark, hard, sharply demarcated scabs
  - Skin lesions in axilla, perineum, and groin
  - Systemic signs may include conjunctivitis, rhinitis, depression, blepharitis, lymphadenopathy, anorexia, dyspnea, nasal discharge
- Lesions
  - Skin usually contains macules and papules with areas of edema, hemorrhage, congestion, necrosis, and vasculitis
  - Lymph nodes can be enlarged up to 8X normal size
  - Lungs often contain discrete lesions or hard white nodules
  - Papules or ulcerated papules commonly in abomasal mucosa, rumen, large intestine, trachea, esophagus, tongue, and palate

INCUBATION PERIOD: 4 – 13 days

DIFFERENTIAL DIAGNOSIS: Contagious ecthyma (orf), bluetongue, mycotic dermatitis, sheep scab, mange, photosensitization, peste des petits ruminants, parasitic pneumonia, caseous lymphadenitis

MORBIDITY & MORTALITY: Morbidity - up to 90%, Mortality – up to 100% in naïve animals

BIOSECURITY LEVEL: Yellow
SHEEP & GOAT POX

Macule (M) & papule (P) of SGP
Necrotic lesions in skin of goat

Dried necrotic sheep pox lesions
Atelectatic area of lung with SGP

Skin lesions of sheep with SGP
Kid with SGP lesions of head
SWINE VESICULAR DISEASE

AGENT: SVD virus, family *Picornaviridae*, genus *Enterovirus*

SPECIES AFFECTED: Pigs

TRANSMISSION:
- Ingestion of contaminated meat scraps (i.e. food garbage)
- Direct contact with infected animals, feces or secretions
- Environmental contamination by infected animals

CLINICAL APPEARANCE:
- Clinical signs
  - Fever, salivation, lameness
  - Vesicles and erosions of snout, mammary glands, coronary band, interdigital area, tongue and teats
  - On rare occasions, CNS signs may occur including shivering, unsteady gait, (chorea) rhythmic jerking
  - Recovery in 2-3 weeks typical
- Lesions
  - The only lesions are the vesicles that can be seen on live pigs

INCUBATION PERIOD: 2 – 7 days

DIFFERENTIAL DIAGNOSIS: Foot and mouth disease, vesicular stomatitis, vesicular exanthema of swine, chemical or thermal burns

MORBIDITY & MORTALITY: Morbidity can reach 100% Mortality very low

BIOSECURITY LEVEL: Red. Stay on site and contact state or federal animal health officials
SWINE VESICULAR DISEASE

Ruptured vesicles on pig’s foot  Vesicle on pig’s snout

Ruptured vesicles on pig’s heels  Erosions on pig’s tongue

Pig sitting from sore feet  Erosions of coronary band
VESICULAR STOMATITIS

AGENT: VSV virus, family Rhabdoviridae, genus Vesiculovirus

SPECIES AFFECTED: Horses, donkeys, mules, cattle, swine, very rarely sheep, goats, camelids, and humans

TRANSMISSION:
- Vector borne by sand fly (Lutzomyia), black fly (Simulidae) and mosquito (Aedes spp.)
- Direct contact
- Indirect contact with fomites
- Inhalation of aerosol particles (humans)
- Not completely understood

CLINICAL APPEARANCE:
- Clinical signs
  - Fever, vesicles of oral cavity and coronary band
  - Vesicles lead to drooling, chomping, mouth rubbing, lameness
  - Cattle and pigs have vesicles of oral cavity, mammary gland, coronary band, and interdigital spaces
  - Compared to other vesicular diseases, vesicles tend to be isolated to one area of body
- Lesions
  - Vesicles of oral cavity and coronary band
  - Absence of heart and lung lesions seen with FMD

INCUBATION PERIOD: 1-8 days

DIFFERENTIAL DIAGNOSIS: Foot and mouth disease, foot rot, chemical or thermal burns, rinderpest, IBR, BVD, malignant catarrhal fever, bluetongue, swine vesicular disease, vesicular exanthema of swine

MORBIDITY & MORTALITY: Morbity 5-70%, Mortality rare

BIOSECURITY LEVEL: Red. Stay on site and contact state or federal animal health officials
VESICULAR STOMATITIS

Sand fly

Black fly

Oral lesions of VSV in horse

VS lesion on cow tongue

VS lesions on cow’s teats

VS vesicle on pig’s snout
FOR ADDITIONAL INFORMATION

Iowa State University – Center for Food Security and Public Health
http://www.cfsph.iastate.edu/

United States Animal Health Association – Foreign Animal Diseases
https://www.usaha.org/disease-information

United States Department of Agriculture

OIE (World Organization of Animal Health)
https://www.oie.int/animal-health-in-the-world/technical-disease-cards/