



# Top 10 Reportable Diseases Part 1

## 5 Of Zuku's Top 10 Reportable Diseases To Know For NAVLE® Success:

### 1. Foot-and-mouth disease

- **Classic case:** Cattle, sheep, and pigs (NOT horses)
  - Drooling: Viscous, sticky saliva; lip smacking; bruxism
  - High fever
  - Lameness: Foot stomping, shifting feet
  - Painful vesicles or erosions on tongue, muzzle, gums, teats, between claws, coronary bands
  - Poor milk production, agalactia
  - Abortions, neonatal disease/death
  - Spreads quickly!
- **Dx:** Situation determines which test to use (i.e., surveillance, carriers, outbreak)
  - Etiology: an *Aphthovirus* of the Picornaviridae family, 7 serotypes
  - ELISA, PCR, virus isolation, electron microscopy (EM), complement fixation (CF):
    - Samples: Vesicular fluid, epithelium, exudates, pharyngeal/esophageal fluid, milk, semen, blood
    - Approved labs perform initial testing; special reference labs do confirmatory testing
- **Rx:** Preventative measures
  - Euthanize all positive and in-contact animals; burn or bury carcasses
  - Maintain strict movement/entry requirements
  - Quarantine +/- vaccination (killed vaccine provides 4-6 mo immunity)
  - Thorough disinfection of premises, equipment, etc.
  - Use disinfectant with pH less than 6 or greater than 9
- **Pearls:**
  - One of the MOST contagious animal diseases known
  - Reportable worldwide
  - SEVERE economic impact and production losses
  - Export/travel bans on animals and products within and between nations
  - Prognosis:
    - Good for infected individuals
    - Poor for overall herd health and economic outcome
    - Guarded in neonates and nursing animals



*Eroded FMD ulcers on bovine tongue*

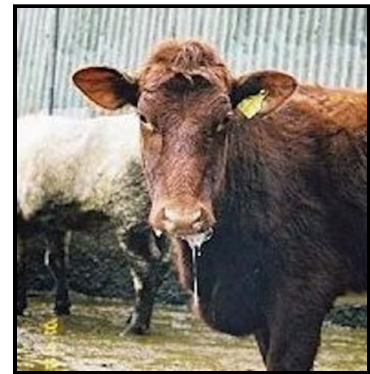


*Detachment of horny tissue of a pig's trotter following rupture of FMD vesicles*

### • 1½. Vesicular stomatitis (VS, "evil twin" to FMD)

- **Classic case:** CATTLE and HORSES, occasionally swine, camelids, rare in sheep/goats
  - Warm humid areas in western hemisphere (Mexico, Central America, parts of South America, Southwest USA)
  - Adult animals greater than 1 yr

- Fever
- Salivation, difficulty eating
- Lameness
- Secondary infection (mastitis)
- Vesicles, erosions, ulcers on mouth, lips, teats, udder, coronary bands, sheath, belly
- Hyperemic (skin) or raised blanched areas (oral)
- Morbidity variable, mortality very low



*Hypersalivating cow secondary to VS*

○ **Dx:**

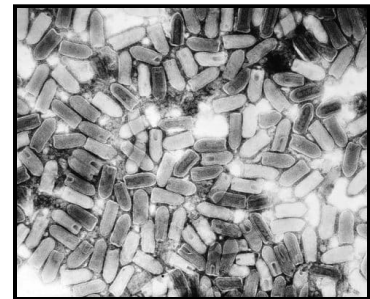
- Etiology: Family Rhabdoviridae, genus *Vesiculovirus*
  - Two serotypes: New Jersey (NJ) and Indiana (IND)
  - Transmission by insects (sand/black flies, mosquitos) or direct contact with saliva, epithelium, exudates, or fomites
- Identify viral antigen or antibody (ELISA most commonly used)

○ **Rx:**

- Symptomatic care: Soft feed, bedding, +/- analgesics
- Antibiotics
- Prevention:
  - QUARANTINE farm
  - Isolate affected animals
  - Sanitation/disinfection
  - Insect control/exposure
  - Vaccines available

○ **Pearls:**

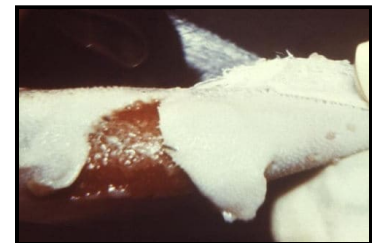
- Zoonotic
- Cannot be distinguished from FMD, swine vesicular disease (SVD), or vesicular exanthema of swine (VE) by clinical signs alone
- Although mortality rare, there is significant economic loss



*Transmission electron microscopic (TEM) image of numerous VS virus virions*

• **The big 8 rule outs of vesicular diseases:**

- Bluetongue
- Bovine papular stomatitis (BPS)
- Bovine viral diarrhea (BVD)
- Bovine papular stomatitis (BPS)
- FMD
- Infectious bovine rhinotracheitis (IBR)
- Malignant catarrhal fever (MCF)
- Rinderpest
- VS



*Epithelial detachment of the tongue of an unknown farm animal with VS*

2. **Classical swine fever (CSF, hog cholera)**

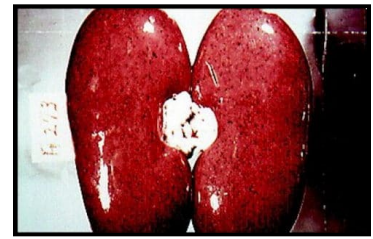
○ **Classic case:** PIGS only

- Severity varies with:
  - Age: Young animals most severe with high mortality
  - Immune status of herd
  - Strain
- Acute form (~100% morbidity/mortality):
  - High fever >105°F (>41°C)
  - Anorexia
  - Constipation followed by watery diarrhea
  - Cyanosis, erythema, skin hemorrhages
  - Staggering, incoordination, posterior paresis, seizures

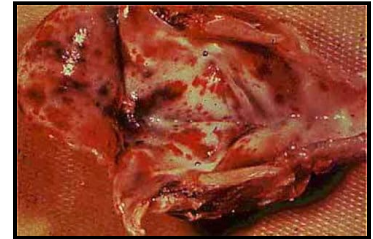


*Hypermetria or "goose-stepping" in a pig with CSF*

- Death within 1-3 wks
- Some cases ASYMPTOMATIC, inapparent carriers
- **Dx:**
  - Etiology: RNA *Pestivirus* of family *Flaviviridae*
  - Suspect if:
    - Septicemia, high fever, incoordination, diarrhea, deaths
    - History of feeding garbage, new/returning animals to herd
    - NO response to treatment
    - Cases on nearby farm
  - Necropsy:
    - Widespread hemorrhages
    - "Turkey-egg" kidneys with pinpoint hemorrhages
    - Necrotic foci on intestinal mucosa, larynx, epiglottis
  - RT-PCR: Commonly used in CSF surveillance
- **Rx:** REPORTABLE, DO NOT TREAT CSF positive pigs
  - Notify Federal and State veterinarians
  - Quarantine farm until definitive diagnosis determined
  - Isolate CSF-suspect animals
  - Prevention:
    - NEVER feed pigs undercooked garbage (swill) or pork products
    - Quarantine newly purchased, returning animals for a minimum of 30 d
- **Pearls:**
  - Main sources of infection: Carrier pigs, feeding garbage
  - Clinically indistinguishable from African swine fever



*Pinpoint hemorrhages on kidneys are characteristic of CSF*



*Hemorrhages on larynx of pig with CSF*

*Image courtesy of [The Pig Site](#)*

• 2½. **African swine fever (ASF, "evil twin" to CSF)**

- **Classic case:** Acute form (most common)
  - Ear tip hyperemia
  - Scleral hemorrhage
  - Skin cyanosis
  - Hemorrhagic intestines
  - High fever >105°F (>41°C)
  - ~ 100% mortality
  - Wart hogs have NO clinical signs (natural host)
  - Close contact between domestic pigs and wart hogs (due to infected ticks)



*Ear tip hyperemia is a common sign of ASF*

- **Dx:**
  - Etiology: DNA virus, genus *Asfivirus*. The only member of the family *Asfarviridae* (African swine fever-like viruses)
  - Field diagnosis:
    - History and clinical signs
    - If suspected, REPORT IMMEDIATELY
    - Samples sent ONLY to authorized state diagnostic lab via secure shipping
    - Samples: Tonsil (best), kidney, spleen, lymph nodes, whole EDTA blood
  - Necropsy: THINK HEMORRHAGIC
  - PCR: Tonsil scraping can detect before onset of clinical signs
- **Rx:** NO treatment
  - Quarantine farm
  - Slaughter all, burn or bury carcasses
  - Prevention:



*Cut pericardial sac reveals hemorrhages on the myocardium and excess fluid in a case of ASF*

- Strict biosecurity and sanitation protocols
- Importation restrictions on pigs and pork products
- NEVER feed pigs undercooked garbage (swill) or pork products



An important vector of ASF, soft, eyeless ticks (*Ornithodoros moubata*, tampan) inhabit wart hog burrows

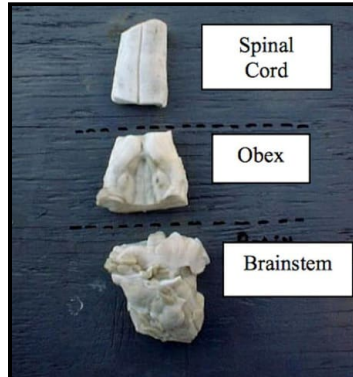
o **Pearls:**

- Vector: Soft ticks that inhabit wart hog burrows
- Devastating economic consequences

### 3. **Bovine spongiform encephalopathy (BSE)**

o **Classic case:**

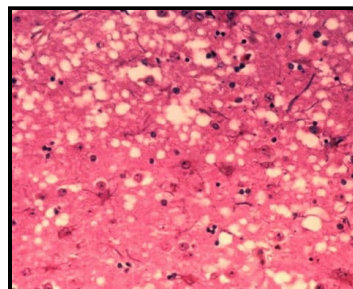
- Adult animal (> 2 yr)
- Insidious onset abnormal behavior:
  - Aggression
  - Apprehension
  - Ataxia
  - Tremors
  - Low head carriage
  - Weight loss
  - Reduced milk yield



Dorsal view of sections showing the rostral brainstem, obex (best tissue sample for BSE diagnosis), and spinal cord from a cow

o **Dx:**

- Etiology: BSE is a transmissible spongiform encephalopathy (TSE) caused by a misfolded version of normal cell prion proteins (PrP)
- Screening: ELISA
- If ELISA inconclusive, send to a National Veterinary Services Laboratories (NVSL)-approved lab for confirmation:



Vacuolar or "spongy" appearance of gray matter in a case of BSE

- Immunohistochemistry (IHC) of obex (in brainstem) +/- electron microscopy
- Western blot used for autolyzed or degraded samples
- List of labs approved by National Animal Health Laboratory Network (NAHLN).

o **Rx:** None: Euthanasia

- Prevention:
  - Do NOT feed animal tissues/products to cattle
  - Incineration of carcass is best method to destroy prions
  - Test all "downer" cows for BSE
  - Take GREAT care in handling tissues

o **Pearls:**

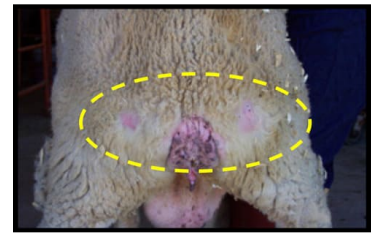
- Prognosis: Always fatal
- UNLIKE scrapie (below), pruritus is not a feature of BSE
- Misfolded prion proteins accumulate in cells and cause dysfunction
- BSE is spread by ingestion; no genetic susceptibility required for infection
- BSE is ZONOTIC: Linked to variant form of Creutzfeldt-Jakob disease (vCJD) in humans

### 4. **Scrapie**

o **Classic case:**

- Adult sheep (> 2 yr):

- Black-faced breeds in US (96% of cases)
- Many breeds elsewhere
- Seen in goats rarely
- Pruritus is classic; seen in 70% of cases:
  - Sheep rub skin constantly
  - Wool is scraped off
  - Hypersensitivity
- Progressive neurologic signs:
  - Head tremors
  - Ataxia, bunny-hopping, prancing
  - Nibbling at legs and air, lip-smacking
  - Behavior changes: Separate from flock, hyperexcitable
- Weight loss with normal appetite
- Death within weeks to months once clinical signs present



Wool loss over hindquarters from rubbing due to pruritus from scrapie

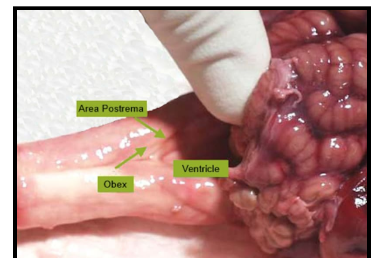


Scrapie in Rambouillet-Cheviot ewe

- **Dx:** Must detect prion proteins in tissue
  - Etiology: Mis-folded versions of normal cellular prion proteins (PrP<sup>SC</sup>)
  - Histopathology: Vacuoles, plaques
  - IHC is gold standard:
    - Brain tissue, most often the obex
    - Cerebellum for 'atypical' scrapie
  - Western blot when tissues are autolyzed
  - ELISA for screening: Brain, lymphatic tissues
  - Biopsy lymphoid tissue inside 3<sup>rd</sup> eyelid for IHC
  - Biopsy of tonsils - used in Europe - for IHC or ELISA
- **Rx:**
  - None: Euthanasia
  - Prevention: Take GREAT care in handling and transporting tissues:
    - Breed only genetically resistant sheep
    - Do not feed ruminant proteins to ruminants
    - Maintain closed herds
    - Euthanize positive sheep
    - Follow Eradicate Scrapie guidelines and US Mandatory Scrapie Eradication Program
    - Carcasses: Incineration or alkaline digestion
- **Pearls:**
  - Incubation is 2-5 yr
  - Prions are normal cellular proteins: No immune response
  - Check out these videos on scrapie:
    - Scrapie with a creepy soundtrack
    - Itchy sheep and goats
    - Nibbling goat

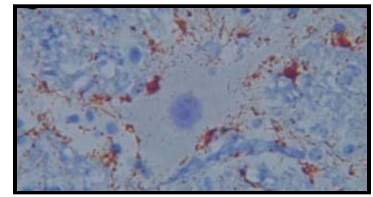
- 4½. **Chronic wasting disease (CWD)**

- **Classic case:** White-tailed deer, mule deer, elk
  - Aspiration pneumonia due to esophageal dysfunction
  - Weight loss
  - Neurologic signs
  - Behavior changes
  - Adults older than 16 mos
- **Dx:** Detect prion protein
  - Etiology: Mis-folded versions of normal cellular prion proteins (PrP<sup>CWD</sup>)
  - ELISA for screening
  - Confirm with IHC or western blot:



Dorsal view of the obex of the brainstem is seen by lifting cerebellum. The obex is the CNS area most often positive on histopathology testing for CWD

- White-tailed deer and mule deer:
  - Brainstem (obex) and lymphoid tissues
  - Always submit retropharyngeal lymph node
- Elk: Brainstem (obex) and lymphoid tissues
- **Rx:** None
  - Prevention:
    - Quarantine
    - Test and cull
    - Disposal: Incineration, approved disinfectants
- **Pearls:**
  - Recently found in Canadian moose
  - Prions seen in lymph tissue before CNS in most deer
  - Prions *very resistant* to destruction
  - Hunters beware: Cooking DOES NOT destroy PrP
  - Horizontal transmission: Direct contact between animals or environment



*Perineuronal and extracellular deposits of abnormal PrP in CWD*

## 5. **Equine infectious anemia (EIA)**

- **Classic case:** Three types
  - Inapparent: NO signs (most common form)
  - Acute:
    - Fever
    - Lethargy
    - Thrombocytopenia
  - Chronic:
    - Recurrent episodes of fever
    - Anemia
    - Weight loss
    - Ventral edema
    - Petechiation
- **Dx:**
  - Etiology: Lentivirus (Retroviridae family)
  - Coggins test: Agar gel immunodiffusion (AGID)
  - ELISA
  - Testing must be performed at USDA-approved lab and submitted by licensed AND federally accredited veterinarian
- **Rx:**
  - No treatment
  - Prevention:
    - Seropositive horses must be in lifelong quarantine at least 200 yards from other horses, or euthanized
    - All horses moved interstate or sold within a state must have been tested negative for EIA within the last 12 months
- **Pearls:**
  - Lentivirus is related to HIV
  - Persistent lifelong infection
  - Transmission by biting insects or blood transfer
  - Not a common disease in US: < 0.01% of tested horses tested positive in 2005
  - Historically more common in gulf states (swampy)
  - Prognosis: Grave for normal use



*Weight loss and edema (ventral and distal limb) in a horse with EIA*



*Pale conjunctiva in a horse with EIA*



*Petechial hemorrhages in a horse with EIA*

Images courtesy of [Craig Packer/USDA](#) (thermography of FMD cow - top image), USDA ([ASF ear hyperemia](#), obex under cerebellum), [Izvora](#) (FMD tongue), [Joelmills](#) (CSF kidneys), [FAO](#) (ASF tick), [CDC Public Health Image Library \(PHIL\)](#) (FMD pig, pig vesicular stomatitis images, ASF heart, goose-stepping pig), USDA APHIS ([obex](#), [BSE histopath](#), scrapie in ewe), [Official Nebraska Government Website](#) (cow with VS), [Joel C. Watts](#) (CWD histopath), Darreenvt ([EIA horse with edema](#), [EIA horse with pale conjunctiva](#)), Dr. Erwin Pearson (petechiae), [The Photographer](#) (Charolais - bottom image), and [Rachel Keegan](#) (FMD sign).

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