Sampling and Testing Guide for Common Viral Diseases of Animals in Louisiana

The Louisiana Animal Disease Diagnostic Laboratory

A service unit of the LSU School of Veterinary Medicine

Adapted from Murphy, F.A., et al, Veterinary Virology, 3rd ed. Academic Press, 1999. Compiled by Rob Poston

Please click on the species of interest:

Cattle

Deer and Small Ruminants

Swine

Horses

Dogs

Cats

Multi-species: Rabiesvirus

Cattle

Please click on the principle system involvement

Generalized viral diseases

Respiratory viral diseases

Enteric viral diseases

Reproductive/neonatal viral diseases

Viral infections affecting the skin

Back to the Beginning

Deer and Small Ruminants

Please click on the principle system involvement

Generalized viral disease

Respiratory viral disease

Enteric viral diseases

Reproductive/neonatal viral diseases

Viral infections affecting the skin

Back to the Beginning

Swine

Please click on the principle system involvement

Generalized viral diseases

Respiratory viral diseases

Enteric viral diseases

Reproductive/neonatal viral diseases

Viral infections affecting the skin

Back to the Beginning

Horses

Please click on the principle system involvement

Generalized viral diseases

Neurological viral diseases

Respiratory viral diseases

Enteric viral diseases

Abortifacient/neonatal viral diseases

Viral infections affecting the skin

Back to the Beginning

Dogs

Please click on the principle system involvement

Generalized viral diseases

Respiratory viral diseases

Enteric viral diseases

Reproductive/neonatal viral diseases

Back to the Beginning

Cats

Please click on the principle system involvement

Generalized viral diseases

Respiratory viral diseases

Enteric viral diseases

Reproductive/neonatal viral diseases

Back to the Beginning

Generalized Viral Diseases of Cattle

Please click on the virus of interest:

Bovine Viral Diarrhea (BVD) Virus

Bovine Herpesvirus Type 1 (BHV-1, IBR, IPV)

Bovine Leukemia Virus (BLV)

Bovine Immunodeficiency Virus (BIV)

Foot and Mouth Disease (FMD) virus

Back to the Beginning

Respiratory Viral Diseases of Cattle

Please click on the virus of interest:

Bovine Viral Diarrhea (BVD) Virus

Bovine Herpesvirus Type 1 (BHV-1, IBR, IPV)

Bovine Respiratory Syncytial Virus (BRSV)

Parainfluenza Type 3 (PI-3) Virus

Bovine Respiratory Coronavirus (BRCV)

Bovine Rhinovirus

Bovine Adenovirus

Back to the Beginning

Enteric Viral Diseases of Cattle

Please click on the virus of interest:

Mucosal Disease

Bovine Rotavirus (BRotV)

Bovine Enteric Coronavirus (BECV)

Astrovirus, Calicivirus, Torovirus

Back to the Beginning

Reproductive/neonatal Viral Diseases of Cattle

Please click on the virus of interest:

Bovine Viral Diarrhea (BVD) Virus

Bovine Herpesvirus Type 1 (BHV-1 or IBR)

Bluetongue Virus (BTV)

Back to the Beginning

Viral Infections Affecting the Skin of Cattle

Please click on the virus of interest:

Mucosal Disease (MD)

Bovine Viral Diarrhea (BVD) Virus

Bovine Mammillitis Virus (BHV-2)

Bovine Papilloma Virus

Vesicular Stomatitis Virus (VSV)

Pseudocowpox Virus

Foot and Mouth Disease (FMD) Virus

Back to the Beginning

Generalized Viral Diseases of Small Ruminants

Please click on the virus of interest:

Bluetongue Virus (BTV)

Epizootic Hemorrhagic Disease (EHD) Virus

Caprine Arthritis-encephalitis (CAE) Virus

Ovine Progressive Pneumonia (OPP) Virus
Maedi / Visna virus

Malignant Catarrhal Fever (MCF) Viruses

Back to the Beginning

Respiratory Viral Disease of Small Ruminants

Please click on the virus of interest:

Parainfluenza 3 (PI-3) Virus

Ovine Adenovirus

Respiratory Syncytial Virus (RSV)

Ovine Pulmonary Adenomatosis Virus

Back to the Beginning

Enteric Viral Disease of Small Ruminants

Please click on the virus of interest:

Rotavirus

Coronavirus

Adenovirus

Astrovirus

Back to the Beginning

Reproductive Viral Diseases in Small Ruminants

Please click on the virus of interest:

Bluetongue Virus (BTV)

Back to the Beginning

Viral Skin Diseases of Small Ruminants

Please click on the virus of interest:

Orf (Contagious Pustular Dermatitis)

Vesicular Stomatitis Virus

Foot and Mouth Disease (FMD) Virus

Back to the Beginning

Generalized Viral Diseases of Swine

Please click on the virus of interest:

Pseudorabies Virus (PRV)

Porcine Reproductive and Respiratory Syndrome (PRRS) Virus

Porcine Hemagglutinating Encephalitis Virus (HEV)

Porcine Circovirus Type 2 (PCV-2), Postweaning Multisystemic Wasting Syndrome (PMWS)

Porcine Lymphosarcoma Virus

Encephalomyelocarditis Virus (EMCV)

Vesicular Stomatitis Virus (VSV)

Hog Cholera (HC)

Back to the Beginning

Respiratory Viral Disease of Swine

Please click on the virus of interest:

Pseudorabies Virus (PRV)

Porcine Reproductive and Respiratory Syndrome (PRRS) Virus

Swine Influenza Virus (SIV)

Swine Cytomegalovirus

Back to the Beginning

Enteric Viral Disease of Swine

Please click on the virus of interest:

Porcine Rotavirus (PRotV)

Transmissible Gastroenteritis (TGE) Virus

Back to the Beginning

Reproductive/neonatal Viral Diseases of Swine

Please click on the virus of interest:

Pseudorabies Virus (PRV)

Porcine Reproductive and Respiratory Syndrome (PRRS) Virus

Porcine Parvovirus (PPV)

Porcine Enteroviruses 2-11 (SMEDI group)

Back to the Beginning

Viral Infections Affecting the Skin of Swine

Please click on the virus of interest:

Vesicular Stomatitis Virus (VSV)

Swinepox Virus

Foot and Mouth Disease (FMD) Virus

Swine Vesicular Disease

Vesicular Exanthema of Swine

Back to the Beginning

Generalized Viral Diseases of Horses

Please click on the virus of interest:

Equine Infectious Anemia (EIA) Virus

Equine Viral Arteritis (EVA) Virus

Back to the Beginning

Neurological Viral Diseases of Horses

Please click on the virus of interest:

Eastern Equine Encephalitis (EEE)

Venezuelan Equine Encephalitis (VEE)

Western Equine Encephalitis (WEE)

West Nile Viral (WNV) Encephalitis

Rabiesvirus

Back to the Beginning

Respiratory Viral Disease of Horses

Please click on the virus of interest:

Equine Herpesvirus Type-1 (EHV-1)

Equine Herpesvirus Type-4 (EHV-4)

Equine Rhinopneumonitis Virus (ERV)

Equine Influenza Virus (EIV)

Equine Herpesvirus Type 2

Equine Rhinovirus

Equine Adenovirus

Back to the Beginning

Enteric Viral Disease of Horses

Please click on the virus of interest:

Rotavirus (RotV)

Corona virus

Back to the Beginning

Abortifacient/neonatal Equine Viral Diseases

Please click on the virus of interest:

Equine Herpesvirus Type-1 (EHV-1)
Equine Abortion Virus

Equine Viral Arteritis (EVA)

Back to the Beginning

Viral Infections Affecting the Skin of Horses

Please click on the virus of interest:

Vesicular Stomatitis Virus (VSV)

Equine Papilloma Virus

Equine Sarcoid

Back to the Beginning

Generalized Viral Disease of Dogs

Please click on the virus of interest:

Canine Distemper Virus (CDV)

Canine Parvovirus Virus Type 2 (CPV)

Canine Adenovirus Type 1 (CAdV-1)

Infectious Canine Hepatitis (ICH) virus

Back to the Beginning

Respiratory Viral Disease of Dogs

Please click on the virus of interest:

Canine Distemper Virus (CDV)

Canine Adenovirus Type 2 (CAdV-2)
Canine Tracheobronchitis Virus

Canine Parainfluenza Virus (CPIV)
Parainfluenza Virus Type 2 (PI-2)

Canine Herpesvirus (CHV)

Back to the Beginning

Enteric Viral Disease of Dogs

Please click on the virus of interest:

Canine Coronavirus (CCV)

Canine Parvovirus Virus Type 2 (CPV-2)

Rotavirus (RotV)

Back to the Beginning

Reproductive/neonatal Viral Diseases of Dogs

Please click on the virus of interest:

Canine Herpesvirus (CHV)

Back to the Beginning

Generalized Viral Diseases of Cats

Please click on the virus of interest:

Feline Infectious Peritonitis (FIP) Virus

Feline Leukemia/sarcoma Virus (FeLV)

Feline Immunodeficiency Virus (FIV)

Feline Parvovirus (FPV)
Feline Panleukopenia Virus (FPL)

Back to the Beginning

Respiratory Viral Diseases of Cats

Please click on the virus of interest:

Feline Herpesvirus (FHV)

Feline Viral Rhinotracheitis (FVR)

Feline Calicivirus (FCV)

Back to the Beginning

Enteric Viral Disease of Cats

Please click on the virus of interest:

Feline Parvovirus (FPV)
Feline Panleukopenia Virus (FPL)

Feline Coronavirus (FECV)

Rotavirus (RotV)

Back to the Beginning

Reproductive/neonatal Diseases of Cats

Please click on the virus of interest:

Feline Parvovirus (FPV)
Feline Panleukopenia Virus (FPL)

Back to the Beginning

Guide Key

Virus name, synonyms (*Family name, subfamily or genus in italics*)

- Systemic or local infection / with or without viral persistence / “major”, “moderate”, “minor”, or “slight” disease significance (minor or slight—testing probably not cost effective until other common differentials considered, relative to the target species population in Louisiana)
- Antemortem or postmortem specimens:
  - Preferred samples; swabs, fluids, tissues or organs (popular technology in parentheses)
  - Viral detection technique abbreviations:

    EM—Electron microscopy
    ELISAg—Enzyme-liked antibody assay for viral antigen
    FA—Fluorescent antibody
    IHC—Immunohistochemistry
    ISH—In-situ hybridization
    PCR—Polymerase chain reaction or similar genetic probe technique
    HA—Hemagglutination
    VI—Virus isolation by culture.
  - Serological technique abbreviations:

    AGID—Agar gel immunodiffusion
    ELISAb—Enzyme-liked antibody assay for viral antibody
    HI—Hemagglutination inhibition
    IFA—indirect fluorescent antibody
    LA—Latex agglutination
    PRNT—Plaque reduction neutralization
    SN—Serum neutralization
  - Some indicated technologies are not currently available at LaVMDL
  - If testing is “not routine”, viral detection technology is not used in diagnosis generally, or may not be readily available; specimens may be sent elsewhere for testing, if necessary.
- Clinicopathology—system involvement, signs, lesions, and possible known consequences of viral infection (relative to species), pathogenesis, natural host range, disease prevalence
- Other relevant diagnostic and epidemiological information, such as serotypes and sub-types, cross-species infections, zoonotic potential

Back to the Beginning

Back to previous screen

Bovine Viral Diarrhea (BVD) Virus (*Flaviviridae, pestivirus*)

- Systemic infection / persistence / major significance
- Antemortem
  - Nasopharyngeal swab or fluid, stool, whole blood; carrier calf's serum (VI, PCR)
  - Nasopharyngeal swab or fluid, serum (ELISAg kit)
  - Paired serum (Serology—SN, ELISAb, IFA) (Carrier's serum is virus positive, antibody negative)
- Postmortem
  - Turbinate, trachea, lung, tonsil, ileocecal Peyer's patches, mandibular and mesenteric lymph nodes, cerebellum; fetal lung, liver, kidney, spleen, adrenal, brain (generally unrewarding samples include spleen, thymus, and mucosa of esophagus, rumen, and oral cavity) (FA, VI, PCR)
- Clinicopathology—respiratory, enteric, dermal, mucosal disease, reproductive (early embryonic death, abortion), runting, cerebellar hypoplasia, and persistently infected carrier calves
- BVDV also causes Mucosal Disease

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Herpesvirus Type 1 (BHV-1)
Infectious Bovine Rhinotracheitis (IBR)
Infectious Pustular Vulvovaginitis (IPV)
(Herpeviridae, alphaherpevirinae)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Conjunctival, vaginal, preputial scraping smear (FA)
  - Vesicle fluid, scraping, or swab (EM)
  - Nasopharyngeal, ocular, vaginal, preputial swab or fluid, semen (VI, PCR)
  - Paired serum (Serology—SN, ELISAb, IFA)
- Postmortem specimens
  - Lung, turbinate, trachea, salivary; fetal lung, liver, spleen, kidney, adrenal, cotyledon (FA, VI, PCR)
- Clinicopathology—respiratory, conjunctivitis, reproductive (dermal and abortifacient)
- BHV-1 causes two distinct clinical syndromes, a systemic respiratory infection (IBR), and dermal eruptions (pustules) of the genital mucosa (IPV), which also similarly affects bulls as Infectious Pustular Balanoposthitis.
- Abortion can result from IBR, typically not IPV infection.

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Leukemia Virus (BLV) (*Retroviridae, deltaretrovirus*)

- Systemic infection / persistence / moderate significance (particularly Southern US)
- Antemortem specimens
  - Serum (Serology—AGID, ELISAb, federally approved for export testing)
  - Citrated blood (VI, PCR; difficult to culture)
- Postmortem specimens
  - Clotted blood, spleen (Serology)
  - Blood, lung, spleen, bone marrow (PCR, VI; difficult to culture)
- Clinicopathology—B-lymphocytosis & sarcoma
- Most infections are asymptomatic; about 30% of seropositive animals develop lymphocytosis with no other signs; only a few percent develop multisystemic tumors
- Sheep and goats are susceptible, but natural infection is rare
- Spread by contact with cellular transfer; possible iatrogenic transmission

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Immunodeficiency Virus (BIV) (*Retroviridae, lentivirus*)

- Systemic infection / persistence / unknown significance (possibly moderate-major in Southern US)
- Antemortem specimens
  - Serum (Serology—ELISAb)
  - Whole blood (VI, PCR; viral detection not routine)
- Postmortem specimens
  - Clotted blood, spleen (Serology— ELISAb; not routine)
  - Blood, spleen, bone marrow, lymph node (effector lymphoid tissue), brain (VI, PCR, IHC, ISH; viral detection not routine)
- Clinicopathology (proposed) — acceleration and exacerbation of chronic problems from bacterial infections, neoplasia, and aging; lameness and neurological disease
- Seroprevalence in southern US cattle is far greater than northern cattle

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Respiratory Syncytial Virus (BRSV) (*Paramyxoviridae, pneumovirus*)

- Local infection / no persistence / moderate-major significance
- Antemortem specimens
  - Nasopharyngeal, tracheal swab or fluid (FA, VI, PCR; culture not routine, difficult to culture)
  - Serum, paired (Serology—IFA, SN)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, VI, PCR; culture not routine)
- Clinicopathology—in adults, inapparent infection; in young calves, pneumonia, pulmonary edema, and emphysema, with secondary infections; "shipping fever" agent
- Protection from natural infection short-lived, re-infections common; current vaccine protocol minimally effective

Back to the Beginning

Go to the Guide Key

Back to previous screen

Parainfluenza Type 3 (PI-3) Virus (*Paramyxoviridae, respirovirus*)

- Local infection / no persistence / moderate significance
- Antemortem specimens
  - Nasopharyngeal or tracheal swab or fluid (FA, VI, PCR)
  - Paired serum (Serology—IFA, HI, SN)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, VI, PCR)
- Clinicopathology—upper and lower respiratory disease with secondary infections; "shipping fever"
- Infectious for horses, dogs, primates, humans, and other ruminants

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Respiratory Coronavirus (BRCV) (*Coronaviridae, coronavirus*)

- Local infection / unknown persistence / possible moderate significance
- Antemortem specimens
  - Nasopharyngeal or tracheal swab or fluid (FA, PCR, VI; culture not routine, requires specific cell line)
  - Serology: Paired serum (IFA, SN)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, PCR, VI; culture not routine)
- Clinicopathology—upper and lower respiratory disease, possible "shipping fever"

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Respiratory Viruses of Cattle

Bovine Rhinovirus, three serotypes *(Picornaviridae, rhinovirus)*
Bovine Adenovirus, ten serotypes (*Adenoviridae, mastadenovirus*)

- Cause mild upper respiratory disease in cattle, and are of slight significance
- Sampling protocol is similar to PI-3 and BRSV in cattle

Back to the Beginning

Go to the Guide Key

Back to previous screen

Mucosal Disease (MD)
Bovine Viral Diarrhea (BVD) Virus
(*Flaviviridae, pestivirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Nasopharyngeal swab or fluid, serum (ELISAg kit)
  - Nasopharyngeal swab or fluid, stool, citrated blood, serum (VI, PCR)
  - Paired serum (Serology—SN, ELISAb, IFA) (Carriers' serum is virus positive, antibody negative)
- Postmortem specimens
  - Turbinate, trachea, lung, tonsil, ileocecal Peyer's patches, mandibular and mesenteric lymph nodes, cerebellum (generally unrewarding samples include spleen, thymus, and mucosa of esophagus, rumen, and oral cavity) (FA, VI, PCR)
- Clinicopathology—mucosal disease, watery diarrhea, lameness, erosive stomatitis, pneumonia affecting only a few in a herd
- BVD (acute infection) and MD (chronic infection) are two distinct syndromes caused by the same virus. MD involves in-utero infection by non-cytopathic BVD, persistent infection in the calf, then mutation or super-infection by cytopathic BVD.
- Signs of MD are similar to BVD but more severe and of higher morbidity and mortality than acute BVD infection

Back to the Beginning

Go to the Guide Key

Back to previous screen

Rotavirus (RotV) (*Reoviridae, rotavirus*)

- Local infection / no persistence / minor to major significance, especially in group habitats
- Antemortem specimens
  - Stool (serial, pooled) (EM, ELISAg group specific kit)
- Postmortem specimens
  - Small intestine and contents, various levels (FA, EM)
- Clinicopathology—diarrhea, severe in neonates; mild to inapparent in older animals
- Found in most mammalian species; cross infections suspected
- Colostrum from vaccinated gravid dam confers immunity to suckling neonates in those species capable of passive transfer

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Enteric Coronavirus (BECV) (*Coronaviridae, coronavirus*)

- Local infection / no persistence / minor significance
- Antemortem specimens
  - Stool (serial, pooled) (EM, VI ELISAg kit)
- Postmortem specimens
  - Intestine and contents (various levels) (FA, EM, VI)
- Clinicopathology—neonatal diarrhea, inapparent to subclinical in older animals

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Viral Diarrhea (BVD) Virus (*Flaviviridae, pestivirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Dam's nasopharyngeal swab or fluid, citrated blood; carrier calf's serum (VI, PCR, ELISAg, commercial test kit)
  - Dam's paired serum (Serology—SN, ELISAb, IFA)
- Postmortem specimens
  - Fetal lung, liver, kidney, spleen, adrenal, brain (FA, VI, PCR)
- Clinicopathology—respiratory, enteric, dermal, mucosal disease, reproductive (early embryonic death, abortion, and persistently infected calves), cerebellar hypoplasia

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Herpesvirus Type 1 (BHV-1), Infectious Bovine Rhinotracheitis (IBR) (*Herpeviridae, alphaherpevirinae*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Dam's conjunctival, vaginal scraping or smear (FA)
  - Dam's vesicle fluid, scraping, or swab (EM)
  - Dam's nasopharyngeal, ocular, vaginal swab or fluid (VI, PCR)
  - Dam's paired serum (Serology—SN, ELISAb, IFA)
- Postmortem specimens
  - Fetal lung, liver, spleen, kidney, salivary, adrenal, cotyledon (FA, VI, PCR)
- Clinicopathology—respiratory, conjunctivitis, reproductive (dermal and abortifacient)
- BHV-1 causes two distinct clinical syndromes, a systemic respiratory infection (IBR), and dermal eruptions (pustules) of the genital mucosa (IPV), which also similarly affects bulls in Infectious Pustular Balanoposthitis.
- Abortion can result from IBR, typically not IPV infection.

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bluetongue Virus (BTV) (*Reoviridae, orbivirus*)

- Systemic infection / prolonged viremia > 100 days / moderate significance in cattle as possible abortion agent
- Antemortem specimens
  - Dam's serum (Serology—AGID, ELISAb, federally approved testing for export)
  - Dam's citrated blood (VI, PCR)
- Postmortem specimens
  - Fetal lung, spleen, bone marrow (FA, VI, PCR) (BTV typically is not recovered from fetal tissues)
- Clinicopathology—asymptomatic or subclinical in non-gravid cattle; post-infection abortion in gravid cattle
- Replicates in hematopoietic and endothelial cells of blood vessels
- Mosquito vector (principally *Culicoides spp*. or "no-see-ems")
- Five serotypes (2, 10, 11, 13, 17) in North America

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Mammillitis Virus (BHV-2) (*Herpesviridae, alphaherpevirinae*)

- Systemic infection / persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, including periphery) (EM, VI, PCR)
  - Serum (to discern carriers) (Serology—SN, IFA, ELISAb)
- Clinicopathology—ulcerating vesicles of teats and udder of first-calf heifers
- Differentiate from warts, cowpox, pseudocowpox, vesicular stomatitis, and foot and mouth disease

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bovine Papillomavirus (*Polyomaviridae, papillomavirus*)

- Systemic infection / persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, including periphery of lesions) (EM, PCR)
- Clinicopathology—cutaneous warts, fibropapillomas, squamous carcinoma
- Six types of Bovine papillomaviruses, distinguishable by the lesions they produce
  - Type 1—“teat frond” warts
  - Type 2—common cutaneous warts
  - Types 3 & 6—flat, broad lesions without fibroblast proliferation
  - Type 4—as 3 & 6, but with a tendency for alimentary and urinary squamous carcinoma
  - Type 5—“rice grain” fibropapillomas
- Horses contract infection by bovine types 1 & 2 from contaminated environment, and develop warts and sarcoids

Back to the Beginning

Go to the Guide Key

Back to previous screen

Vesicular Stomatitis Virus (VSV) (*Rhabdoviridae, vesiculovirus*)

- Local infection / no persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, include periphery) (EM, VI, PCR)
- Clinicopathology—fever, vesicular lesions on tongue, oral mucosa, teats, coronary bands; epithelial denudation, secondary infections; resolves in 7 days
- Cross-species infection: horse, cow, pig, and deer
- Indiana and New Jersey strains are the two principal strains in North America; no cross protection
- VSV in cattle is reportable, requires federal program testing to distinguish from FMDV

Back to the Beginning

Go to the Guide Key

Back to previous screen

Pseudocowpox Virus (*Poxviridae, parapoxvirus*)

- Local infection / no persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, include periphery) (EM, VI, PCR)
- Clinicopathology—papules on teats; scabs desquamate leaving characteristic ring or horseshoe lesions
- Zoonotic; “milker’s nodule”

Back to the Beginning

Go to the Guide Key

Back to previous screen

Foot and Mouth Disease (FMD) Virus (*Picornaviridae, aphthovirus*)

- Systemic infection / persistence, prolonged shedding / not significant where eradicated; moderate-major where endemic
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, include periphery, buffered transport), probang collection of pharyngeal epithelium (VI, ELISAg, EM, PCR)
  - Serum (Serology—AGID, SN, ELISAb, CF)
- Clinicopathology—fever, vesicles on tongue, interdigital skin, oral mucosa, teats, coronary bands; ulcers, epithelial denudation, lameness, secondary infections
- Cross-species infection: cow, goat, pig, sheep, wild ruminants (not horse)
- Seven types (O, A, C, SAT-1, -2, -3, Asia-1) and numerous sub-types of varying antigenic composition preclude a universally efficacious vaccination program
- Eradicated in North and Central America, Australia, Japan, and most of Europe; controlled in South America; common in Asia, Africa, and elsewhere
- Reportable, subject of eradication program; **when suspected, contact state or federal animal health authorities**

Back to the Beginning

Go to the Guide Key

Back to previous screen

Bluetongue Virus (BTV) (*Reovirus, orbivirus*)

- Systemic infection / prolonged viremia >100 days / major significance in sheep
- Antemortem specimens
  - Serum (Serology—AGID, ELISAb, federally approved testing for export)
  - Whole blood (VI, PCR)
- Postmortem specimens
  - Lung, spleen, bone marrow (FA, VI, PCR)
- Clinicopathology—in sheep, highly morbid systemic, hematogenous or hemorrhagic, dermal, lameness, abortion; in deer and antelope, hemorrhagic disease of high mortality; in cattle and goats, subclinical with abortion
- Replicates in hematopoietic and endothelial cells of blood vessels
- Mosquito vector (principally *Culicoides spp*. or "no-see-ems")
- Five serotypes (2, 10, 11, 13, 17) in North America

Back to the Beginning

Go to the Guide Key

Back to previous screen

Epizootic Hemorrhagic Disease (EHD) Virus (*Reoviridae, orbivirus*)

- Systemic infection / prolonged viremia >100 days / moderate significance in deer
- Antemortem specimens
  - Serum (Serology—AGID)
  - Whole blood (VI, PCR)
- Postmortem specimens
  - Lung, spleen, bone marrow (FA, VI, PCR)
- Clinicopathology—hemorrhagic disease of high morbidity in deer; asymptomatic infection in non-gravid cattle, suspected post-infection abortion in gravid cattle
- Southern deer seem more resistant to disease, perhaps from a higher rate of immunity possibly due to the endemic state of EHD in the south
- Two serotypes in North America

Back to the Beginning

Go to the Guide Key

Back to previous screen

Caprine Arthritis-encephalitis (CAE) Virus (*Retroviridae, lentivirus*)

- Systemic infection / persistence / major significance in goats
- Antemortem & postmortem specimens
  - Serum (Serology—AGID, ELISAb)
  - Synovial fluid or membrane (PCR, VI; culture not routine, requires specific cell line)
- Clinicopathology—arthritis in goats >12 months of age; encephalitis in kids 2-4 months of age; interstitial pneumonia; target organ is the mammary gland, with shedding; asymptomatic infections are believed to be common
- About 80% of all goats have antibody to CAEV
- Lab techniques not helpful in CAE diagnosis, which remains clinical and histological
- Serology testing is used in “test-and-slaughter” control programs

Back to the Beginning

Go to the Guide Key

Back to previous screen

Ovine Progressive Pneumonia (OPP) Virus Maedi / Visna Virus (*Retroviridae, lentivirus*)

- Systemic infection / persistence / moderate significance in sheep
- Antemortem & postmortem specimens
  - Serum (Serology—AGID)
  - Viral detection not routinely performed
- Clinicopathology—insidious onset of pneumonia following protracted incubation (>2 years); often complicated by secondary infections
- Maedi is a synonym for respiratory disease caused by OPPV

Back to the Beginning

Go to the Guide Key

Back to previous screen

Malignant Catarrhal Fever (MCF) Viruses *(Herpesviridae, gammaherpesvirus)*

- Systemic infection / persistence (latency) / slight (unknown) significance
- Antemortem specimens
  - Whole blood (peripheral leukocytes) (PCR)
  - Serum (ELISAb)
- Postmortem specimens
  - Lymph node, brain, gut, spleen (PCR)
- Clinicopathology—fever, depression, leukopenia, nasal & ocular discharge, opthalmia, lymphadenopathy, diarrhea from intestinal mucosal erosions
- MCF virus group includes Alcelaphine Herpesvirus 1 (AHV-1, which causes classic MCF in African wildebeests), Ovine Herpesvirus type-2 (OHV-2, which crosses species to cause MCF in co-grazing domestic cattle or deer), and a putative goat gammaherpes (not yet associated with disease)
- MCF viruses can infect wild, native, or zoo ruminants, particularly cervids, which also have their own unique MCF viruses
- Except for AHV-1, the MCF viruses are uncultivable, and only are detected genetically
- Domestic MCF increasingly is recognized as a wildlife and zoo problem

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Respiratory Viruses of Sheep

Ovine Adenovirus (*Adenoviridae, mastadenovirus*)
Respiratory Syncytial Virus (*Paramyxoviridae, pneumovirus*)

- Have been associated with respiratory disease in sheep and goats, but are of slight clinical significance; sampling protocol is similar to BRSV in cattle

Ovine Pulmonary Adenomatosis Virus (*Retroviridae, betaretrovirus*)

- Causes a respiratory disease of moderate significance, worldwide distribution; diagnosis is cytological and histological

Back to the Beginning
Go to the Guide Key
Back to previous screen

Coronavirus (*Coronaviridae, coronavirus*)

- Local infection / unknown persistence / moderate significance
- Antemortem specimens
  - Stool (serial, pooled) (EM)
- Postmortem specimens
  - Intestines and contents (EM)
- Clinicopathology—diarrhea, possibly severe in neonates; possibly subclinical-asymptomatic in older animals, with shedding

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Enteric Viruses

Astrovirus *(Astroviridae, astrovirus)*
Adenovirus *(Adenoviridae, mastadenovirus)*

- Local infection / no known persistence / slight significance
- Antemortem specimens
  - Stool (serial, pooled) (EM)
- Postmortem specimens
  - Intestines and contents (EM)
- Clinicopathology—diarrhea, possibly severe in neonates; possibly subclinical-asymptomatic in older animals, with shedding

Back to the Beginning
Go to the Guide Key
Back to previous screen

Orf, Contagious Pustular Dermatitis (*Poxviridae, parapoxvirus*)

- Local infection / no persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, include periphery) (EM)
- Clinicopathology—cutaneous nodules that occasionally evolve into ulcers in areas where wool/hair is shortest, as head, neck, ears, axillae, under tail

Back to the Beginning

Go to the Guide Key

Back to previous screen

Pseudorabies Virus (PRV) (*Herpesviridae, alphaherpesvirinae*)

- Systemic infection / persistence / moderate-major significance among ferals, eradicated from domestic stock in Louisiana
- Antemortem specimens
  - Single serum (Serology—SN, ELISAb, LA; federally approved testing, depends on state's vaccination program parameters)
  - Saliva, nasopharyngeal or tracheal swab/wash (VI, PCR)
- Postmortem specimens
  - Lung, trachea, tonsil, salivary, brain; fetal lung, spleen, liver, kidney, adrenal (FA, VI, PCR)
- Clinicopathology—respiratory, neurological, abortion
- Cross-species infection, neurological in secondary hosts: "mad-itch" or "pseudo-rabies" in cattle, feral pig hunting dogs

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Reproductive and Respiratory Syndrome (PRRS) Virus, Lelystad Virus (*Arteriviridae, arterivirus*)

- Systemic infection / persistence / moderate-major significance
- Antemortem specimens
  - Paired serum (Serology—IFA, ELISAb)
  - Lung lavage (FA, IHC)
  - Nasopharyngeal, tracheal swab, wash, semen; blood or serum (VI, PCR; culture requires specific cell line)
- Postmortem specimens
  - Lung, lung lavage, spleen (FA, IHC, VI, PCR; culture requires PAM or MA-104 cell lines)
- Clinicopathology—abortion, respiratory in surviving neonates; subclinical in shedding breeders
- PRRSV best recovered from carrier sows; not detected in all individuals within affected litters

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Hemagglutinating Encephalitis Virus (HEV) (*Coronaviridae, coronavirus*)

- Systemic infection / persistence / minor significance
- Antemortem specimens
  - Serum, herd profile (Serology—IFA, HI, SN)
  - Nasopharyngeal, tracheal swab or wash (PCR, VI; culture not routine)
- Postmortem specimens
  - Turbinate, trachea, lung, brain (FA, PCR, VI; culture not routine, requires primary pig cell culture)
- Clinicopathology—In pigs 2 weeks of age or younger, neurologically induced vomiting and wasting, rapidly progresses to general neurological signs; probably subclinical or asymptomatic in older pigs

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Circovirus Type 2 (PCV-2) Postweaning Multisystemic Wasting Syndrome (PMWS) (*Circoviridae, circovirus*)

- Systemic infection / unknown persistence / unknown significance ("emerging disease")
- Antemortem specimens
  - Serum, herd profile (Serology—IFA, ELISAb; not routinely available)
  - Nasopharyngeal, tracheal swab or wash (PCR, VI; culture not routine)
- Postmortem specimens
  - Lung, inguinal lymph node, tonsil, or other lymphoid tissue, gut (rapid-growing tissues) (FA, PCR, VI; culture not routine)
- Clinicopathology—vomiting and wasting of piglets, interstitial pneumonia and enlarged lymph nodes, other pig viral diseases exacerbated by PCV-2 infection

Back to the Beginning

Go to the Guide Key

Back to previous screen

Encephalomyelocarditis Virus (EMC) *(Picornaviridae, cardiovirus)*

- Systemic infection / no persistence / minor significance
- Antemortem specimens
  - Serum (Serology—SN, IFA, ELISAb; not routine)
  - Stool, blood (VI, PCR; not routine)
- Postmortem specimens
  - Heart, liver, spleen, kidney, pancreas, brain (VI, PCR; not routine)
- Clinicopathology—sudden death from myocarditis; few signs or gross lesions in pigs
- Rats are the primary host and reservoir of EMCV, which has a broad host range, including calves, horses, squirrels, swine, monkeys, elephants, and humans

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Enterovirus Virus Type 1 Porcine Polioencephalomyelitis (*Picornaviridae, enterovirus*)

- Systemic infection / no persistence / minor significance
- Antemortem specimens
  - Nasopharyngeal swab or wash, stool, (VI, PCR; not routine)
- Postmortem specimens
  - Brain, spinal cord (VI, PCR; not routine)
- Clinicopathology—reversible ataxia to 75% mortality; neurological signs include tremors, seizures, and paralysis, particularly in young pigs
- Synonyms—Teschen, talfan, endemic posterior paresis of pigs

Back to the Beginning

Go to the Guide Key

Back to previous screen

Hog Cholera (HC) (*Flaviviridae, pestivirus*)

- Systemic infection / persistence / eradicated in North and Central America, but of major significance throughout underdeveloped areas of the world
- Antemortem specimens
  - Whole blood (buffy coat) (VI, PCR; isolates typically non-cytopathic)
  - Serum, herd profile (Serology—IFA, SN)
- Postmortem specimens
  - Lymph node (mandibular), tonsil, spleen, intestine (FA, VI, PCR)
- Clinicopathology—febrile, catarrhal, hemorrhagic disease of pigs affecting most tissue and organ systems
- HCV is antigenically and biologically similar to BVDV

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Lymphosarcoma Virus *(Retroviridae, gammaretrovirus)*

- Systemic infection / persistent / minor significance in pigs
- Diagnosis by cytology and histopathology
- Clinicopathology—lymphocytosis

Back to the Beginning

Go to the Guide Key

Back to previous screen

Swine Influenza Virus (SIV) *(Orthomyxoviridae, influnzavirus A)*

- Local infection / no persistence / moderate significance
- Antemortem specimens
  - Nasopharyngeal swab or wash (VI, ELISAg kit, PCR)
  - Serum, herd profile (Serology—ELISAb, HI)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, VI, PCR)
- Clinicopathology—upper and lower respiratory, with fever, high morbidity, low mortality; H1N1 also pathogenic for humans and turkeys
- Prevalent strains, H3N2, H1N1; strains H1N2 and H4N6 also reportedly associated with pig respiratory disease

Back to the Beginning

Go to the Guide Key

Back to previous screen

Swine Cytomegalovirus *(Retroviridae, betaherpesvirus)*

- Local infection / unknown persistence / minor significance in pig respiratory disease
- Sampling protocol is similar to BRSV in cattle

Back to the Beginning

Go to the Guide Key

Back to previous screen

Transmissible Gastroenteritis (TGE) virus (*Coronaviridae, coronavirus*)

- Local infection / no persistence / minor-moderate significance
- Antemortem specimens
  - Stool (serial, pooled) (EM)
- Postmortem specimens
  - Small intestine and contents (FA, EM)
- Clinicopathology—neonatal diarrhea

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Parvovirus (PPV) (*Parvoviridae, parvovirus*)

- Systemic infection / persistence / moderate significance
- Antemortem specimens
  - Dam's paired serum, herd profile (Serology—HI, SN)
- Postmortem specimens
  - Fetal lung, kidney (FA, PCR, VI; culture not routine)
  - Fetal body fluid, tissue pool (HAg vs. guinea pig RBCs)
- Clinicopathology—stillbirth, mummification, embryonic death, infertility (SMEDI)
- Difficult to recover from retained or mummified fetal material

Back to the Beginning

Go to the Guide Key

Back to previous screen

Porcine Enteroviruses 2-11 (SMEDI group) (*Picornaviradae, enterovirus*)

- Systemic infection / unknown persistence / minor disease significance
- Antemortem specimens
  - Dam's serum (Serology—not routine, many serotypes)
  - Dam's stool (PCR, VI; culture not routine)
- Postmortem specimens
  - Fluids from fetus > 70 days gestation (Serology—SN)
  - Lung, brain, tonsil, kidney, spleen, intestinal contents (PCR, VI; culture not routine)
- Clinicopathology—stillbirth, mummification, embryonic death, infertility (SMEDI)
- Virus typically recoverable from stillborn tissues, but not mummified tissues

Back to the Beginning

Go to the Guide Key

Back to previous screen

Swinepox Virus (*Poxviridae, suipoxvirus*)

- Local infection / no persistence / minor significance
- Antemortem & postmortem specimens
  - Vesicular fluid, active lesions (multiple samples, include periphery) (EM, VI, PCR)
- Clinicopathology—cutaneous nodules that occasionally evolve into ulcers

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Exanthematous Viruses of Swine

Swine Vesicular Disease *(Enteroviridae, enterovirus)*

- Systemic infection / no persistence / minor significance in Asia and Europe only

Vesicular Exanthema of Swine *(Caliciviridae, vesivirus)*

- Systemic infection / no persistence / no significance. Last seen in the US in 1959; believed to be eradicated from swine, but may still exist among certain marine mammals (i.e., sea lions); clinically indistinguishable from foot and mouth disease

Back to the Beginning

Go to the Guide Key

Back to previous screen

Equine Infectious Anemia (EIA) Virus (*Retroviridae, lentivirus*)

- Systemic infection / persistence / moderate significance in the Southern US delta and coastal regions; slight-minor elsewhere
- Antemortem specimens
  - Serum (Serology—AGID, ELISAb, federally approved testing)
  - Whole blood (VI, PCR; viral detection not routine)
- Postmortem specimens
  - Serum (Serology—AGID, ELISAb)
  - Clotted blood, spleen (VI, PCR, AGID; viral detection not routine)
- Clinicopathology—"swamp fever" of equids; typically subclinical; primary infection febrile respiratory; chronic infection and shedding; eventual glomerulonephritis
- Mandatory testing and eradication programs, depending on federal and state regulations

Back to the Beginning

Go to the Guide Key

Back to previous screen

Equine Viral Arteritis (EVA) Virus (*Arteriviridae, arterivirus*)

- Systemic infection / persistence / minor significance
- Antemortem specimens
  - Paired serum (Serology—modified SN, IFA, export testing requirements may apply)
  - Nasopharyngeal, conjunctival swab or wash, citrated blood, semen (PCR, VI; viral detection not routine)
- Postmortem specimens
  - Lung, turbinate, trachea, spleen, colon, cecum & associated lymph nodes, adrenal cortex; include small and medium-sized arteries (FA, PCR, VI; viral detection not routine)
- Clinicopathology—subclinical febrile illness with leukopenia, depression, edema, panvasculitis, edema; “abortion storms” on breeding farms
- Virus culturable only for first 2 weeks post-infection

Back to the Beginning

Go to the Guide Key

Back to previous screen

Eastern Equine Encephalitis (EEE) Virus (*Togaviridae, alphavirus*)

- Systemic infection / no persistence / major significance in gulf delta and east coast US (swampy, wooded habitat), moderate-minor elsewhere
- Antemortem specimens
  - Serum, CSF (Serology—ELISAb for IgM, HI, SN)
  - Whole blood, brain biopsy (VI, PCR; low, variable viremia in horses, viral detection not routine)
- Postmortem specimens
  - Brain, spleen (FA, VI, PCR)
- Clinicopathology—EEE "sleeping sickness" of horses, rapid onset and progression of neurological signs, high mortality
- The horse, as most other mammalian species, is considered a dead-end host
- In EEE infections involving non-native birds as ratites, high viral titers are found in hematogenous organs, as the spleen
- Zoonotic, public health concern, reportable

Back to the Beginning

Go to the Guide Key

Back to previous screen

West Nile Virus (WNV)
(Flaviviridae, flavivirus)

- Systemic infection / no persistence / moderate-major significance
- Antemortem specimens
  - Serum, CSF (Serology—ELISAb for IgM; PRNT, HI, IFA, SN)
  - Whole blood, brain biopsy (VI, PCR; low, variable viremia in horses)
- Postmortem specimens
  - Brain (especially brain stem), spleen, kidney (VI, PCR, IHC)
- Clinicopathology—ataxia, limb weakness, recumbency, muscle fasciculation, fever, lip paralysis, and blindness; most neurological manifestations are associated with viral lesions in the brain stem; high mortality in clinically affected animals, but asymptomatic or subclinical infections are possible
- WNV ecology is supported by the bird-mosquito cycle, as EEE
- The horse, as most other mammalian species, is considered a dead-end host
- WNV surveillance efforts utilize kidney, heart, spleen, and brain tissue from sentinel avian species (crows, blue jays, and raptors)
- Zoonotic, public health concern, reportable

Back to the Beginning

Go to the Guide Key

Back to previous screen

Other Viral Encephalitides of Horses

Western equine encephalitis (WEE) *(Togaviridae, alphavirus)*

- Systemic infection / no persistence / slight significance in Louisiana and points east; moderate-major significance in Texas and points west
- Sampling and testing protocol is similar to EEE

Venezuelan equine encephalitis (VEE) *(Togaviridae, alphavirus)*

- Systemic infection / no persistence / no disease significance in North America; major significance in South & Central America
- Sampling and testing protocol is similar to EEE

Back to the Beginning

Go to the Guide Key

Back to previous screen

Equine Herpesvirus Type 1 (EHV-1) *(Herpesviridae, alphaherpesvirinae)*

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Paired serum (Serology—SN, IFA)
  - Nasopharyngeal swab or wash, citrated blood, CSF (VI, PCR)
- Postmortem specimens
  - Lung, trachea, turbinate (FA, VI, PCR)
- Clinicopathology—primary infection often respiratory; abortion usually in the last 4 months of gestation; occasionally neurological in surviving foals

Back to the Beginning

Go to the Guide Key

Back to previous screen

Equine Herpesvirus Type-4 (EHV-4) Equine Rhinopneumonitis Virus (ERV) (*Herpesviridae, alphaherpesvirinae*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Paired serum (Serology—SN, IFA)
  - Conjunctival smear (FA)
  - Nasopharyngeal, tracheal, or bronchoalveolar swab or wash, citrated blood (FA, PCR, VI; culture difficult, not routine)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, PCR, VI; culture not routine)
- Clinicopathology—subclinical febrile respiratory illness in foals >2 months old
- EHV-4 closely related, yet genetically distinct from EHV-1

Back to the Beginning

Go to the Guide Key

Back to previous screen

Equine Influenza Virus (EIV) (*Orthomyxoviridae, influenzavirus A*)

- Local infection / no persistence / major significance
- Antemortem specimens
  - Nasopharyngeal swab or wash (VI, ELISAg kit, PCR)
  - Paired serum, herd profile (Serology—ELISAb, HI)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, VI, PCR)
- Clinicopathology—febrile respiratory illness, resolves in 2 weeks; seasonal and stress related
- Two main serovars: EIV-1=H7N7; EIV-2=H3N8

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Respiratory Viruses of Horses

Equine Herpesvirus Type 2 ***(Herpesviridae, gammaherpesvirinae)***
Equine Rhinovirus Type 2 ***(Picornaviridae, genus unassigned)***
Equine Adenovirus ***(Adenoviridae, mastadenovirus)***

- Have been associated with mild respiratory illness of horses and are of slight-minor significance
- Sampling protocol is similar to EHV-1

Back to the Beginning
Go to the Guide Key
Back to previous screen

Equine Herpesvirus Type-1 (EHV-1) Equine Abortion Virus (*Herpesviridae, alphaherpesvirinae*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Dam's paired serum (Serology—SN, IFA)
  - Dam's nasopharyngeal swab or wash, citrated blood, CSF (VI, PCR)
  - Dam's vaginal scraping or swab (FA, VI, PCR)
- Postmortem specimens
  - Fetal lung, spleen, liver, kidney, adrenal, brain, spinal cord; Dam's pharynx, CSF (FA, VI, PCR)
- Clinicopathology—abortion usually in the last 4 months of gestation; occasionally neurological in foals
- EHV-1 easier to culture than EHV-4

Back to the Beginning

Go to the Guide Key

Back to previous screen

Miscellaneous Exanthematous Viruses of Horses

Equine Papilloma Virus *(Papovavirdae, papillomavirus)*
Equine Sarcoid *(Papovaviridae, papillomavirus)*

- Local infection / persistence / minor significance
- Antemortem & postmortem specimens
  - Lesions (warts or sarcoids) active, multiple samples (EM, PCR)
- Clinicopathology—warts and sarcoids, respectively
- Genetic evidence links sarcoids to bovine papillomavirus types 1 & 2, which are non-productive in lesions and unculturable from equine tissue

Back to the Beginning
Go to the Guide Key
Back to previous screen

Canine Distemper Virus (CDV) (*Paramyxoviridae, morbillivirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Conjunctival smear, citrated blood smear, buffy coat smear, CSF (FA)
  - Paired serum, CSF (Serology—ELISAb kit, IFA, SN)
  - Nasopharyngeal swab or wash, citrated blood, CSF (PCR, VI; culture difficult, not routine,)
- Postmortem specimens
  - Lung, spleen, brain (cerebellum), bladder, tonsil, lymph node, thymus (FA, PCR, VI; culture not routine)
- Clinicopathology—multisystemic, respiratory, alimentary, hyperkeratotic, immunosuppressive, both acute and chronic neurological manifestations; secondary infections common
- Natural host range includes ferret, raccoon, mink, skunk, fox

Back to the Beginning

Go to the Guide Key

Back to previous screen

Canine Parvovirus Virus (CPV) Type 2 (*Parvoviridae, parvovirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Stool (serial, pooled) (ELISAg kit, EM, HA, PCR, VI; culture difficult, not routine)
  - Paired serum (Serology—IFA, HI, SN)
- Postmortem specimens
  - Intestine (with contents) thymus, spleen, lung (FA, EM, PCR, VI; culture not routine)
- Clinicopathology—immunosuppressive, multisystemic, enteric; secondary infections common
- CPV–2 occurs in two subtypes
- Canine parvovirus type 1 (CPV-1) causes mild enteric and hemorrhagic disease with cardiac involvement in neonates, and is of slight significance

Back to the Beginning

Go to the Guide Key

Back to previous screen

Canine Adenovirus Type 1 (CAdV-1) Infectious Canine Hepatitis (ICH) Virus (*Adenoviridae, mastadenovirus*)

- Systemic infection / persistence / moderate significance
- Antemortem specimens
  - Paired serum (Serology—IFA, HI)
  - Nasopharyngeal or ocular swab or wash, citrated blood, urine (PCR, VI; culture not routine)
- Postmortem specimens
  - Liver, kidney, lung, bladder, spleen, lymph nodes, lung, brain (FA, PCR, VI; culture not routine)
- Clinicopathology—respiratory, alimentary, hepatitis; acute in pups; subclinical & chronic in older dogs; corneal opacity; encephalitis in foxes

Back to the Beginning

Go to the Guide Key

Back to previous screen

Canine Adenovirus Type 2 (CAdV-2) Canine Tracheobronchitis (*Adenoviridae, mastadenovirus*)

- Local infection / persistence / moderate significance
- Antemortem specimens
  - Paired serum (Serology—IFA, HI)
  - Nasopharyngeal or tracheal swab, wash or lavage (FA, PCR, VI; culture not routine)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, PCR, VI; culture not routine)
- Clinicopathology—"kennel-cough" respiratory complex; secondary infections

Back to the Beginning

Go to the Guide Key

Back to previous screen

Canine Parainfluenza Virus (CPIV)
Parainfluenza Virus Type 2 (PI-2)
(*Paramyxoviridae, rubulavirus*)

- Local infection / no persistence / minor significance
- Antemortem specimens
  - Paired serum (Serology—IFA, HI)
  - Nasopharyngeal or tracheal swab, wash or lavage (FA, PCR, VI; culture not routine)
- Postmortem specimens
  - Turbinate, trachea, lung (FA, PCR, VI; culture not routine)
- Clinicopathology—"kennel-cough" respiratory complex, secondary infections common

Back to the Beginning

Go to the Guide Key

Back to previous screen

Canine Herpesvirus (CHV) (*Herpesviridae, alphaherpesvirinae*)

- Local and systemic infection / persistence / slight significance as a respiratory pathogen, moderate significance in neonatal disease
- Antemortem specimens
  - Paired serum (pup, dam or adult) (Serology—IFA, SN, ELISAb)
  - Conjunctival, preputial, nasopharyngeal, or vaginal smear, swab, or wash (pup, dam, or adult) (FA, VI, PCR)
- Postmortem specimens
  - lung, kidney (neonate); lung, trachea, turbinate (juvenile or adult) (FA, VI, PCR)
- Clinicopathology—systemic infection of gravid dam results in hemorrhagic disease of neonates; local primary infection of juveniles and adults causes subclinical respiratory/reproductive tract disease

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Infectious Peritonitis (FIP) Virus (*Coronaviridae, coronavirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Serum, thoracic or abdominal fluid (Serology—ELISAb kit, IFA, serum or fluid protein electrophoresis)
  - Conjunctival scraping, smear, or swab, peritoneal lavage, needle biopsy, cavity fluid (FA, PCR; difficult to culture)
- Postmortem specimens
  - Kidney, liver, lung, parotid gland, thymus, lymph node (mesenteric), cecum, thoracic or abdominal fluid (FA, PCR; difficult to culture)
- Clinicopathology—wet or effusive (high protein fluid in body cavities); dry or noneffusive (pyogranulomatous lesions); ocular, neurological
- Finding of virus in intestine, but not in liver or kidney, suggests feline enteric coronavirus; conventional lab techniques do not readily distinguish FIP from other asymptomatic-subclinical coronavirus infections in cats

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Leukemia/sarcoma Virus (FeLV) (*Retroviridae, gammaretrovirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Serum, buccal swabs, saliva, citrated blood (ELISAg kit, PCR, VI; culture not routine)
  - Citrated blood smear, bone marrow biopsy smear (FA, indirect)
- Postmortem specimens
  - Bone marrow (ELISAg, FA indirect, PCR, VI; culture not routine)
- Clinicopathology—multisystemic, myeloproliferative, lymphosarcoma, fibrosarcoma, anemia

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Immunodeficiency Virus (FIV) (*Retroviridae, lentivirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Serum (Serology—ELISAb kit, IFA)
  - Whole blood, buccal swab, saliva (PCR, VI; viral detection not routine)
- Postmortem specimens
  - Serum from heart clot (Serology—ELISAb, IFA)
  - Effector lymphoid tissue (PCR, VI; viral detection not routine)
- Clinicopathology—enteric, dermal, neurological, general reticuloendothelial in older, mostly male cats; insidious onset of FUO, leukopenia, lymphadenopathy, anemia, secondary infections, unkempt and wasting; resembles various stages of human AIDS

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Parvovirus (FPV)
Feline Panleukopenia Virus (FPL)
(*Parvoviridae, parvovirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Serum (Serology—ELISAb, IFA)
  - Stool (serial, pooled) (ELISAg, EM)
  - Urine, saliva (PCR, VI; difficult to culture)
- Postmortem specimens
  - Intestine, lung, lymph node, spleen, thymus (FA, EM, PCR, VI; difficult to culture)
- Clinicopathology—multisystemic, enteric, neonatal infection and disease; cerebellar hypoplasia and wasting disease in kittens

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Herpesvirus (FHV)
Feline Viral Rhinotracheitis (FVR)
(*Herpesviridae, alphaherpesvirinae*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Conjunctival smear (FA)
  - Nasopharyngeal or conjunctival swab or wash (VI, PCR)
  - Paired serum (Serology—SN, IFA, ELISAb)
- Postmortem specimens
  - Lung, trachea, turbinate, spleen, tonsil (FA, VI, PCR)
- Clinicopathology—respiratory disease, acute in kittens; inapparent or subclinical in adults, conjunctivitis, post-infection abortion

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Calicivirus (FCV) (*Caliciviridae, vesivirus*)

- Systemic infection / persistence / major significance
- Antemortem specimens
  - Nasopharyngeal, conjunctival, sinus, oral, buccal swab or wash (VI, PCR)
  - Paired serum (Serology—SN, IFA, ELISAb)
- Postmortem specimens
  - Lung, trachea, turbinate, oral lesions (FA, VI, PCR)
- Clinicopathology—oral vesicles, upper respiratory disease
- Common secondary infection in FIV-infected cats

Back to the Beginning

Go to the Guide Key

Back to previous screen

Feline Enteric Coronavirus (FECV) *(Coronaviridae, coronavirus)*

- Local infection / unknown persistence / minor significance
- Antemortem specimens
  - Stool (serial, pooled) (EM)
- Postmortem specimens
  - Intestine and contents (FA, EM, PCR, VI; culture not routine)
- Clinicopathology—mild to severe diarrhea in neonates; subclinical-asymptomatic with shedding in adults
- Conventional technology does not distinguish FECV from FIP
- Certain strains of FECV penetrate the intestines and migrate to the regional lymph nodes, where they theoretically mutate into FIP strains

Back to the Beginning

Go to the Guide Key

Back to previous screen

Rabiesvirus (*Rhabdoviridae, lyssavirus*)

- Systemic infection / persistence / minor significance as an animal disease, major public health significance
- Antemortem specimens (antemortem diagnostic testing not routine)
  - Serum (Serology—IFA, ELISAb; immune status check, int'l travel)
  - Buccal or saliva swab, mussel or tactile hair, muscle skin biopsy (IHC, PCR, VI; antemortem viral detection not routine)
- Postmortem specimens
  - Brain (bilateral sample, including hippocampus, cerebellum, brain stem) (FA, VI, PCR)
- Clinicopathology—chronic neurological with shedding in reservoir hosts; progressive neurological in incidental hosts
- In Louisiana, bat and skunk are reservoir hosts; dog, cat, fox, raccoon, cattle, and horse are incidental hosts; all mammals are potential hosts
- Zoonotic, reportable

Back to the Beginning

Go to the Guide Key

Back to previous screen

- Virus has slight or no real clinical significance, or currently is not recognized to exist in North America.

- Sampling protocol is similar to that of other viruses with the same systemic involvement in this animal species

Back to the Beginning

Go to the Guide Key

Back to previous screen