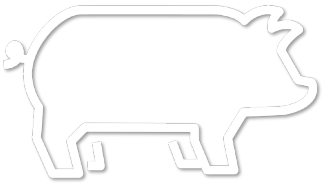
Ante-Mortem and Post-Mortem Inspection and Disposition

PHV Refresher Course

Swine



Learning Objectives

- Describe the general procedures for ante-mortem and post-mortem inspection of swine.
- Name the diseases or conditions listed in the PHIS Animal Disposition Reporting (ADR) module which may be used to characterize PHV dispositions.
- Cite the FSIS regulations which support the various ante-mortem and post-mortem dispositions.

Resources

The following FSIS documents will serve as your primary resources for performing and documenting dispositions:

Regulations:

- 9 CFR 309
- 9 CFR 310
- 9 CFR 311
- 9 CFR 311.16
- 9 CFR 311.17

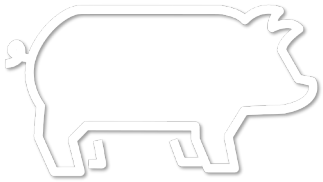
Directives:

- 6000.1
- 6100.1
- 6100.2
- 6100.6
- 6100.8
- 6410.4
- 6600.1
- 6600.2

Other:

- FSIS PHIS Page
- PHIS Help Button
- PHV IPP Help

Ante-Mortem Inspection and Disposition



Ante-Mortem Inspection

In this section, we will review:

- Ante-Mortem Inspection Procedures
- Voluntary Segregation Procedures
- Common Ante-Mortem Conditions of Swine
- Ante-Mortem Condemnations of Swine
- Foreign Animal Disease/Reportable Animal Disease Considerations on Ante-Mortem
- New Swine Slaughter Inspection System (NSIS)

Ante-Mortem Inspection Procedures

FSIS Directive 6100.1 describes Ante-Mortem Livestock Inspection.

- As with all livestock species, swine should be observed **at rest** and **in motion**.
- Use discretion to determine if animals presented for slaughter should be observed from one side or both sides based on the age, sub-class, and history of disease conditions observed at the establishment.

Ante-Mortem Inspection Procedures (cont.)

As you observe swine in pens or while being moved, look for the following:

- Lame or non-ambulatory animals
- Animals isolated from the herd/group
- Pronounced coughing, sneezing, dyspnea, or nasal discharge
- Visible external swellings or fistulous tracts
- Clinical signs indicating foreign/reportable diseases (e.g. vesicles, hyperemia, hemorrhage)
- Poor body condition
- CNS signs

Ante-Mortem Inspection Procedures (cont.)

- Outcomes of ante-mortem inspection:
  - Passed for slaughter
  - U.S. Suspect
  - U.S. Condemned

Remember that swine are condemned for pyrexia when their temperature is **106°F or above**.

Voluntary Segregation Procedures

- Establishments that slaughter primarily market classes of swine (usually market hogs) may implement voluntary segregation procedures during ante-mortem.
- They must maintain and follow a written program (as part of the HACCP system or prerequisite program) for separating normal appearing animals from those exhibiting abnormalities.
- IPP observe **all** normal animals **at rest**, and **5 to 10 percent** of all presented animals **in motion**, and the PHV will perform ante-mortem examination on the abnormal animals (refer to **FSIS Directive 6100.1** for detailed voluntary segregation procedures).

Common Ante-Mortem Conditions in Swine

- **Arthritis**
- **Abscess**
- **Hernia/Prolapse**
- **Non-Ambulatory Conditions:**
  - **Fatigued**
  - **Injured**
  - **Moribund**
  - **Acute Swine Erysipelas**

Arthritis

Signs:

- Enlargement of one or more joints
- Abnormal locomotion
- Variable temperature
- Painful or abnormal stance and movement
- Reluctance to move or stand
- Depression
- Poor wasting condition
- Infected navel in young animals
- Sequela to diseases such as swine erysipelas, etc.

Abscess, Hernia, Prolapse

Signs of abscess:

Swellings may be evident in various parts of the animal

Abscesses of any size may be seen near the jowl, ham, hock, shoulder

Hernia/Prolapse may present with:

- Depression or lethargy
- Variable temperature—from very high to subnormal
- External wounds including scirrhous cord (funiculitis)
- Umbilical abscess, tail-bite lesions, or infected open wounds
- Swollen joints
- Poor wasting condition

Non-Ambulatory Conditions

Fatigued - stress related

Fatigued Pig Syndrome Signs of Acute Stress:

- Open mouth breathing
- Skin discoloration
- Abnormal vocalizations
- Muscle tremors

Injured - structure/injury related

- Lameness
- Non-ambulatory

Moribund - Dying Condition

Signs include:

- Depression
- Reluctance to move
- Cold dark ears, legs, belly
- Reduced or elevated body temperature
- Non-ambulatory, inability to rise
- Paddling
- Unaware of surroundings
- Moribund
- Dehydration

Swine Erysipelas

Ante-mortem findings include:

- Fever in acute stages; some variation
- Reluctant to move, squeal in pain
- Non-ambulatory
- Swollen joints
- Diffuse areas of purple skin (acute) to raised, red, edematous, rhomboid wheals (acute stages) to sloughing of affected dead areas of skin (chronic)
- Sudden death

Diamond shaped skin lesions

Swine Erysipelas

Ante-mortem disposition:

- **Condemn:** if fever and signs of acute erysipelas are present, indicating carcass would be condemned on post-mortem. **9 CFR 309.9**
- **Suspect:** if lesions and clinical signs indicate erysipelas, but insufficient for condemnation. **9 CFR 309.2(h)**

Ante-Mortem Condemnations

Swine may be condemned at ante-mortem and recorded in the PHIS Animal Disposition Reporting (ADR) module for any of the following (list not all inclusive, but includes common ante-mortem condemnation dispositions in swine):

- Central Nervous System Disorder*
- Dead
- Moribund
- Non-ambulatory (only in conjunction with other abnormal signs)
- Other Reportable Diseases*
- Pneumonia (if severely affected and cachexic)
- Pyrexia
- Rabies*
- Swine Erysipelas (acute)
- Tetanus
- Vesicular Diseases*

Non-Ambulatory Disabled

- **Non-ambulatory disabled** (NAD) is not a required condemnation in swine, as in cattle.
  - Swine that are NAD will be assessed by the PHV to make a final disposition.
  - NAD livestock other than cattle, including swine, shall be designated as U.S. Suspects.
  - Under the New Swine Inspection System (NSIS) - PHVs make dispositions on swine that have been sorted as subjects by the establishment **9 CFR 309.2(b).**

Foreign Animal Disease Consideration on Ante-Mortem Inspection

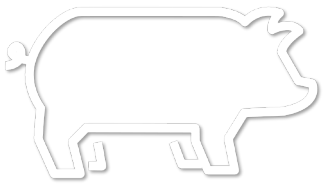
Follow **FSIS Directive 6000.1** for Foreign Animal Disease (FAD) and Reportable Conditions:

- Animals exhibiting signs or symptoms observed at ante-mortem inspection consistent with possible FAD differential diagnosis.
- +/- Clinical history of animals if available.
- PHV identify animal(s) as U.S. Suspects or U.S. Condemned per regulatory requirements and inform the District Office via supervisory channels.
- APHIS will be informed via supervisory channels.
- FAD and Reportable Animal Diseases (RAD) will be covered later in this module.

New Swine Slaughter Inspection System (NSIS)

- NSIS is an optional new inspection system for market hog slaughter establishments.
- Establishment personnel sort and remove animals before ante-mortem inspection by FSIS and sort, identify and trim defects before post-mortem inspection by FSIS.
- **FSIS Directive 6600.1** describes NSIS ante-mortem and post-mortem inspection procedures.
- **NSIS Student Training Materials** available on **IPP Help**.

Post-Mortem Inspection and Disposition



Post-Mortem Inspection

In this section, we will review:

- Post-Mortem Inspection Procedures for Swine
- Common Post-Mortem Conditions of Swine including Post-Mortem Findings, Differential Diagnoses, and Dispositions

Post-Mortem Inspection Procedures

FSIS Directive 6100.2 provides instructions on how to perform post-mortem inspection in swine:

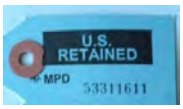
1. **Head inspection:** observe head and incise mandibular lymph nodes.
2. **Viscera inspection:** observe and palpate viscera, spleen, mesenteric lymph nodes, portal lymph nodes, observe and palpate the lungs, mediastinal lymph nodes, bronchial lymph nodes, heart, and liver.
3. **Carcass inspection:** observe front, back, and inside of carcass, grasp and turn both kidneys.

FSIS Directive 6600.1 describes NSIS post-mortem inspection procedures.

Post-Mortem Inspection Procedures

Outcomes of post-mortem inspection:

- U.S. Inspected and Passed
- U.S. Retained for PHV disposition
- U.S. Condemned
- Restricted Product*



Post-Mortem Diseases and Conditions

The post-mortem conditions discussed fall into one of two categories:

1. **Diseases and Conditions of Public Health Significance**
   - These conditions are usually acute and generalized, wherein a pathogen has overwhelmed the animal's immune system and entered the bloodstream, such as septicemia, toxemia, or pyemia. Gross contamination would also fall into this category.
2. **Diseases and Conditions NOT of Public Health Significance**
   - These conditions are usually chronic and/or localized and pose no human health risk because either affected tissue can be easily trimmed, or there is no evidence of ongoing infection.

Septicemia

Description:

Septicemia occurs when a pathogen overwhelms the animal's immune system and enters the bloodstream.

At ante-mortem, the animal may appear sick and may be febrile; however, this is not always the case. Therefore, it is unlikely you would condemn an animal for septicemia at ante-mortem.

Septicemia Post-Mortem Findings

- Diffuse inflammation with reactive, hyperemic, or edematous lymph nodes (acute lymphadenopathy)
- Abnormal coagulation (petechiae, ecchymosis, bruising, hyperemic tissues)
- Degenerative changes to organs
- Fluid effusions +/- dehydrated tissues

Septicemia Differential Diagnoses

- Toxemia
- Pyemia
- Other identifiable underlying condition
- Other dropsical condition (edema, ascites)

Septicemia Post-Mortem Disposition

9 CFR 311.16 and 311.16(a)(2)

- When a specific underlying condition cannot be identified for the signs described, condemn for **Septicemia.**
- Pass carcasses not meeting the criteria for condemnation (e.g., signs appear localized +/- chronic), after removal of abnormal tissues.

Toxemia

Description:

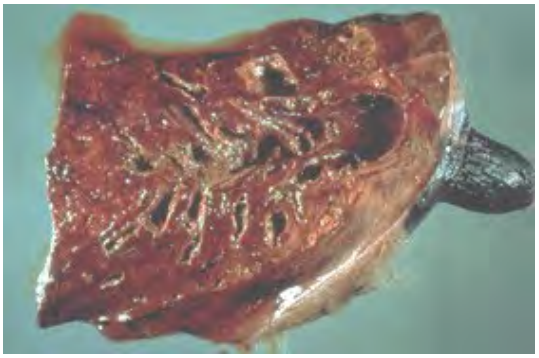
Toxemia occurs when the endotoxin or exotoxin produced by a pathogen enters the circulation and causes diffuse toxic changes to tissues or body systems.

At ante-mortem, the animal may appear sick and may be febrile; however, this is not always the case. Therefore, it is unlikely you would condemn an animal for toxemia at ante-mortem.

Toxemia Post-Mortem Findings

- Diffuse inflammation with reactive, hyperemic, or edematous lymph nodes (acute lymphadenopathy)
- Gangrenous or necrotic tissue
- Abnormal coagulation (petechiae, ecchymosis, bruising, hyperemic tissues)
- Degenerative changes to organs
- Fluid effusions +/- dehydrated tissues

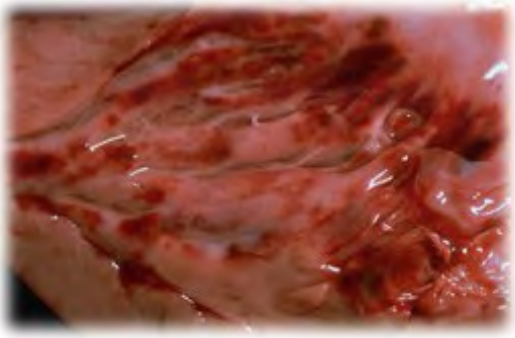
Toxemia Differential Diagnoses



- Septicemia
- Pyemia
- Other identifiable underlying condition
- Other dropsical condition (edema, ascites)

Toxemia Post-Mortem Disposition

9 CFR 311.16



- When a specific underlying condition cannot be identified for the signs described, condemn for **Toxemia.**
- Pass carcasses not meeting the criteria for condemnation (e.g., signs appear localized +/- chronic), after removal of affected tissues.

Pyemia

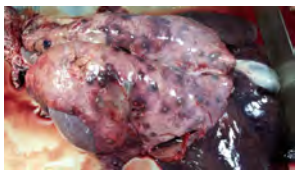
Description:

Pyemia is an acute condition which occurs when a pyogenic organism enters the circulation and causes formation of diffuse abscesses throughout the body.

At ante-mortem, the animal may appear sick and may be febrile; however, this is not always the case. External abscesses may or may not be present. Therefore, it is unlikely you would condemn an animal for pyemia at ante-mortem.

Pyemia should **not** be diagnosed when multiple, localized, well-encapsulated (chronic) abscesses are found.

Pyemia Post-Mortem Findings



- Diffuse inflammation with reactive, hyperemic, **suppurative**, or edematous lymph nodes (acute lymphadenopathy)
- Diffuse, poorly encapsulated abscesses +/- hemorrhage or hyperemia
- Possible abnormal coagulation
- Degenerative changes to organs
- Fluid effusions +/- dehydrated tissues (less common)

Pyemia Differential Diagnoses

- Septicemia
- Toxemia
- Coccidioidal granuloma
- Tuberculosis
- Neoplasm with necrotic center

Pyemia Post-Mortem Disposition

9 CFR 311.16(a)(2) and 311.17

- When a specific underlying condition cannot be identified for the diffuse, active/acute abscessation, condemn for **Abscess/Pyemia.**
- Pass carcasses not meeting the criteria for condemnation (e.g., signs appear localized +/- chronic), after removal of abnormal tissues.

Differentiating Septicemia, Toxemia and Pyemia

Note that all 3 are of Public Health Significance--consumption of meat from these animals could result in an adverse health event for a consumer!

- Septicemia is the most general of these conditions and is used as the disposition when (a) the underlying condition cannot be identified and (b) the signs do not make toxemia or pyemia ideal diagnoses.
- Toxemia is defensible when there is evidence that a toxin-producing organism may be involved (typically associated with such conditions as mastitis, metritis, or gangrenous wounds).
- Pyemia is diagnosed when the abscessation is in the acute, diffuse phase and the underlying cause of pyogenesis cannot be identified.

Contamination

Description:

FSIS takes a "zero tolerance" approach to contamination of carcasses and head, cheek, and weasand meat by feces, milk, and ingesta, as these can all be sources of pathogens. Bile, urine, dirt, rust, and other foreign material can also adulterate product and render it unwholesome.

In most cases, contamination may be trimmed. However, when gross contamination occurs, making trimming impossible or impracticable, this may be a public health concern, and the entire carcass and viscera may need to be condemned.

Contamination Post-Mortem Findings

Diffuse gross contamination by feces, milk, or ingesta that cannot be readily trimmed **(public health concern).**

Diffuse contamination by bile, urine, or foreign material that cannot be readily trimmed **(non-food safety concern).**

Be prepared to **differentiate** contaminants of public health concern (feces, milk, ingesta) from those which are non-food safety concerns (e.g., rust, bile, grease).

Contamination

Refer to **FSIS Directive 6410.4** on how to verify that swine slaughter establishments effectively prevent contamination of carcasses and parts by enteric pathogens, feces, ingesta, and milk throughout the entire slaughter and dressing operation.

- **9 CFR 310.18(c)**

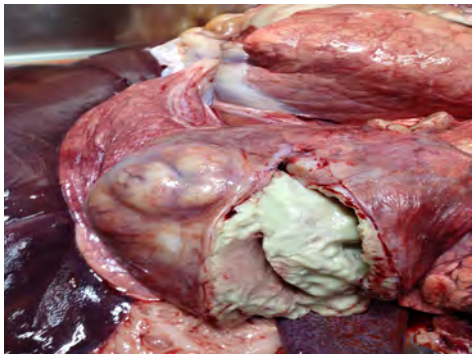
Abscesses

Description:

Abscesses are walled-off accumulations of purulent material of many different etiologies. They may or may not be visible externally during ante-mortem inspection, but when they are visible, the PHV will determine if affected animals should be sent to slaughter as U.S. Suspects.

The PHV should characterize abscesses by extent and distribution, viscosity of the purulent material, and the nature of the walls or capsules around them.

Abscesses Post-Mortem Findings



- Single or multiple accumulations of purulent material (+/- clustered).
- May be small and widely distributed or may be localized.
- Purulent material may be liquid or may be caseous.
- Capsule may be thick and well-defined (chronic) or may be limited and possibly hyperemic (acute).

Abscesses Differential Diagnoses

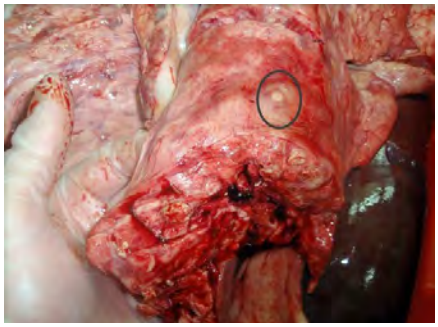
- Pyemia
- Actinobacillosis/actinomycosis
- Coccidioidal granuloma (or other granuloma)
- Tuberculosis
- Neoplasm with necrotic center
- Cysticercosis or other parasitic cyst

Abscesses Post-Mortem Disposition

9 CFR 311.14 and **311.16**

- Diffuse abscesses in the acute phase or widespread chronic abscesses without obvious underlying condition should be condemned for **Abscess/ Pyemia.**
- Wherever abscesses are well-encapsulated and can be effectively trimmed, not involved in systemic disease, the remaining carcass and viscera may be passed.
- Any contamination from ruptured abscesses must be trimmed.

Granulomatous Conditions



Description:

Granulomas should be approached in a similar manner to abscesses, and many of your differentials will be the same. However, keep in mind they may have different etiologies and appearances.

Granulomas can be roughly described as clustered accumulations of purulent or caseous material separated by septa (which may or may not be easy to discern).

As with abscesses, granulomas may or may not be visible externally at ante-mortem.

Granulomatous Conditions Post-Mortem Findings

- Single or multiple accumulations of purulent or caseous material with a distinctive granulomatous appearance.
- May be small and widely distributed or may be localized.
- Capsule may be thick and well-defined (chronic) or may be limited and possibly hyperemic (acute).

Granulomatous Conditions Differential Diagnoses

- Abscess/pyemia
- Actinobacillosis/actinomycosis
- Coccidioidal granuloma*
- Tuberculosis
- Mesothelioma
- Other neoplasm with liquefactive necrosis at center
- Cysticercosis or another parasitic cyst

Granulomatous Conditions Post-Mortem Disposition

- ALWAYS consider tuberculosis as a differential--collect samples and submit to FSIS Pathology Laboratory if TB is suspected!
- Diffuse granulomas in the acute phase or widespread chronic granulomas without obvious underlying condition should be condemned for **Abscess/Pyemia.**
- Wherever granulomas are well-encapsulated and can be effectively trimmed, the remaining carcass and viscera may be passed.
- Any contamination from ruptured granulomas must be trimmed.

Granulomatous Conditions: "Acti"

9 CFR 311.9

A quick word about "Acti":

- Fairly uncommon in swine, but they may be affected by *Actinobacillus lignieresii* or other *Actinobacillus* spp.
- Always consider TB as a differential.
- Animals are rarely condemned for Acti unless severely and extensively affected.
- More commonly would condemn for **Abscess/Pyemia**, **Misc. Infectious Diseases**, or **Gen. Miscellaneous** (with remarks).

Tuberculosis (TB)

9 CFR 311.2

Swine TB *Mycobacterium avium*

- Mycobacterial infections in swine primarily affect the digestive system.
- Due to *Mycobacterium avium*, though *M. bovis* or *M. tuberculosis* may occur.
- FSIS slaughter data has shown the prevalence of *M. avium* in market hogs has steadily decreased.

Tuberculosis Post-Mortem Findings

- Lesions are most frequently found in cervical lymph nodes, mesenteric lymph nodes, liver, and spleen; pulmonary involvement may occur.
- TB granulomas typically appear in incised lymph nodes as small grains of sand or small abscesses 0.5-2 mm in diameter. When found in the mesenteric lymph nodes, they may appear as small abscesses just below the surface of the mesentery along the mesenteric lymph node chain.
- Submit samples collected from swine suspected of having TB lesions that **do not exhibit generalized thoracic granulomas** to the FSIS Eastern Laboratory.
- Only submit samples from swine with **generalized thoracic granulomas** to the National Veterinary Services Laboratories (NVSL) in Ames, IA (even if results are negative, submitting samples helps APHIS with surveillance).

TB Sample Submission Manual pdf

Tuberculosis Disposition

9 CFR 311.2

Condemn carcass and parts for TB according to **9 CFR 311.2(a)**

Passed without restriction **9 CFR 311.2(e)**

Passed for cooking **9 CFR 311.2(f)**

Inflammatory Conditions

Description:

This section refers to numerous conditions ending in "itis." There are some general rules and considerations for disposition of these conditions:

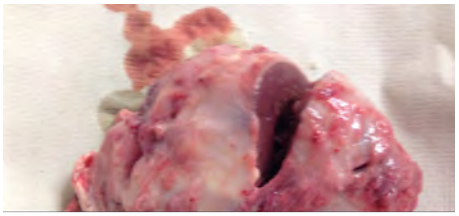
- Acute, generalized inflammatory conditions may progress to septicemia, toxemia, or pyemia (systemic changes) and be of Public Health Significance.
- Acute inflammatory conditions warrant residue testing by the PHV.
- Chronic inflammatory conditions may be resolving and no longer be of Public Health Significance.
- Most will not result in ante-mortem condemnation unless the animal is pyrexic or severely debilitated.

Inflammatory Conditions Post-Mortem Findings

Acute conditions:

- Inflammatory changes to the affected organ or body system (hypertrophy, hyperemia, etc.)
- Acute lymphadenopathy (either local or systemic)
- Abnormal coagulation
- Transudates or exudates

Inflammatory Conditions Post-Mortem Findings



Chronic pericarditis

Chronic conditions:

- Affected tissue may be of normal size or remain hypertrophic
- Lymphoid hypertrophy without signs of active inflammation
- Fibrous adhesions or scar tissue
- Well-encapsulated abscesses
- Mild transudates or ascites (or not visible effusions)

Inflammatory Conditions Post-Mortem Disposition

Acute conditions:

When the inflammatory condition **can** be identified and the signs are generalized, condemn for the appropriate condition:

- Pneumonia and/or Pleuritis
- Peritonitis
- Pericarditis (including Traumatic Pericarditis)
- Gastroenteritis
- Arthritis
- Mastitis
- Metritis
- Nephritis/Pyelitis (or may condemn for Uremia, if pronounced)

Inflammatory Conditions Post-Mortem Disposition

Acute conditions:

When the underlying acute inflammatory condition **cannot** be identified and the signs are generalized, condemn for the most appropriate condition:

- Septicemia
- Toxemia
- Pyemia
- Misc. Inflammatory Diseases

Inflammatory Conditions Post-Mortem Disposition

Chronic conditions:

- Generally, when inflammatory conditions have reached a chronic phase, the affected tissues are no longer considered to be of public health concern.
- Affected tissues may be trimmed and discarded, and the remaining carcass and viscera may be passed for use as human food.
- If chronic changes are so widespread as to make trimming impracticable, or significant degenerative changes are present throughout the carcass making it unwholesome, you would condemn the carcass and viscera.

Inflammatory Conditions Residue Testing

- The PHV is to perform an in-plant residue (KIS™) test on any carcass suspected of containing violative levels of chemical residues.
- A positive KIS™ test will result in submission of tissues to the lab (1 lb. each kidney, liver, muscle) for confirmatory testing (inspector-generated sample).
- PHVs should use the list of pathologies and conditions listed in **FSIS Directive 10800.3** in conjunction with their professional judgement to prioritize selection of carcasses for KIS™ Testing.
- Refer to **FSIS Directives 10800.1 thru 10800.4** for full residue sampling instructions.

Neoplasia

9 CFR 311.11

Description:

Lymphosarcoma (leukemia, lymphoma) is the most common malignancy in pigs, followed by:

- Nephroblastoma
- Melanoma
- Primary and secondary liver malignancies

PHVs may send pathology samples to the FSIS Eastern Laboratory for histopathology to assist in making the gross disposition.

Embryonal Nephroma

9 CFR 311.11

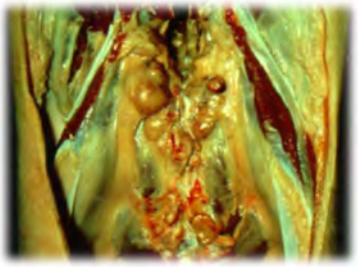
- Rough, fibrous raised tumors of the kidney.
- Generally benign (i.e., non-malignant); however, metastasis to the renal lymph nodes, lungs, or liver is possible.
- Occur more commonly in young animals.

Malignant Lymphoma

9 CFR 311.11(b)

- There are many manifestations of malignant lymphoma, so it can be confused with other diseases, such as granulomas, abscesses, or other types of neoplasia.

Large lymph nodes with smooth surface indicative of malignant lymphoma

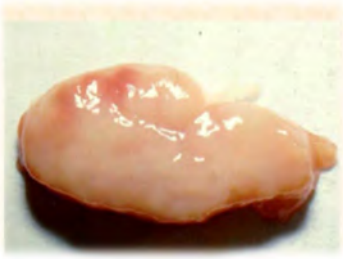


Malignant lymphoma in renal lymph nodes inside carcass

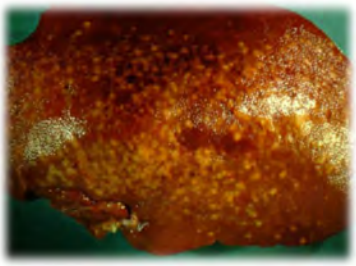
Malignant lymphoma in mesenteric lymph nodes

Malignant Lymphoma (cont.)

Malignant lymphoma infiltrating kidney, notice several raised bumps or plaques

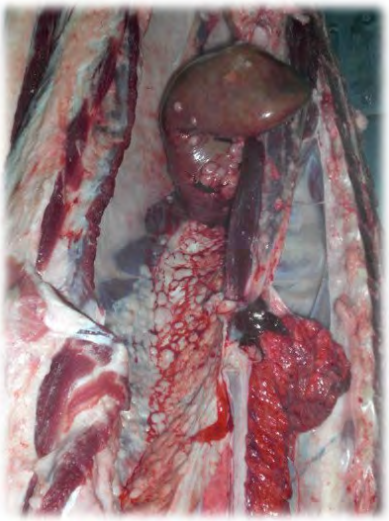


Smooth appearance on cut surface, the normal outer lymph node and center are obliterated with tumor cells



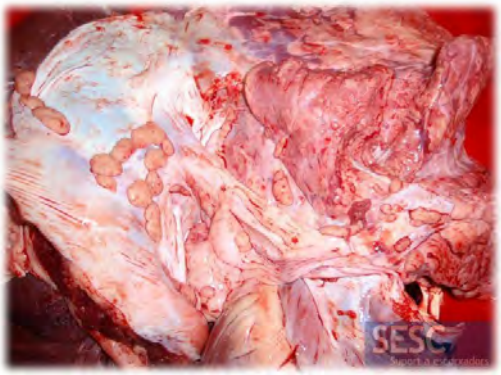
Malignant lymphoma infiltration of enlarged liver

Neoplasia Post-Mortem Findings



- Tumors of varying morphology and distribution
- Lymphoid hypertrophy (either local or diffuse) or abnormal lymphoid tissue
- May see fluid effusions

Neoplasia Differential Diagnoses



- Abscess/pyemia
- Actinobacillosis/actinomycosis
- Coccidioidal granuloma
- Tuberculosis
- Parasitic cysts

* Tumors with necrotic centers may be easily confused for abscesses or granulomas.

Neoplasia Post-Mortem Disposition

General rules:

- For most neoplasms, you will make the post-mortem disposition based on extent. If the neoplasm has metastasized with generalized lymph node involvement, you will condemn the carcass and parts **9 CFR 311.11(a).**
- Even if the neoplasm has not metastasized, if the size or nature of the tumor has created a generalized effect on the animal, you will condemn the carcass and parts.
- If the extent of the tumor is localized and limited, the carcass and viscera may be passed after removal of affected tissues.
- Malignant lymphoma - condemn the carcass and parts **9 CFR 311.11(b).**

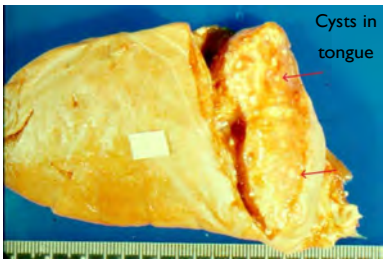
Parasitic Conditions

Description:

Swine may be affected by a number of parasitic organisms. Most are considered zoonotic. Therefore, their effect on the carcasses and viscera of those animals will be considered to be of Public Health Significance.

On the next slides, we will discuss the organisms most commonly encountered during slaughter. Note that parasites are not typically discovered at ante-mortem, and therefore dispositions would not apply.

Cysticercosis



Cysticercosis

9 CFR 311.24

Cysticercosis of Swine (Pork Measles)

- Condition caused by the larval form of the swine tapeworm *Taenia solium*.
- Transmissible to humans.
- Rare but reportable disease.
- Should be considered any time multiple small cysts are observed in large muscle cuts, heart, diaphragm, or weasand (esophagus).

***Taenia solium* Life Cycle**

Cysticercosis Post-Mortem Findings & Disposition

Post-mortem findings:

- Muscle is edematous or discolored.
- One to several dozen cysts in muscle of heart, tongue, weasand, or carcass.
- Grape-like clusters in tissue underneath the tongue or attached to the heart.
- Cysts may occasionally be found in fat and viscera.

Post-mortem disposition:

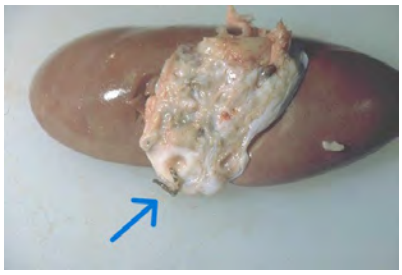
- Refer to **FSIS Directive 6100.6** for special post-mortem examination procedures and regulatory dispositions when cysticercosis is discovered **9 CFR 311.24.**
- **IPP Help PHV Disposition Guidance.**
- Record under **Cysticercosis** in PHIS ADR.

Stephanuriasis

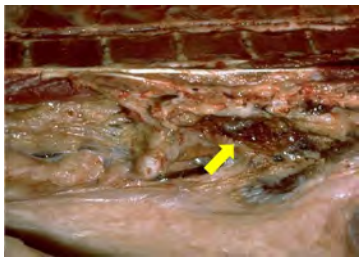
9 CFR 311.25(a)

***Stephanurus dentatus* (Swine Kidney Worms)**

- **Stephanuriasis** is a parasitic condition due to presence of *Stephanurus dentatus* in carcass and visceral tissues.
- Not transmissible to humans.
- Most likely seen in swine raised outdoors in the South Atlantic and South Central parts of the U.S.



Stephanuriasis Post-Mortem Findings



- Adult kidney worms
- Lesions:
  - Pelvic inlet, pelvic and femoral canal
  - Abdominal lining
  - Muscle: primarily loin, ham muscles
  - Organs: primarily kidney, liver, pancreas, spleen, lungs
  - Brownish-lemon color of skin and fat

Stephanuriasis Post-Mortem Disposition

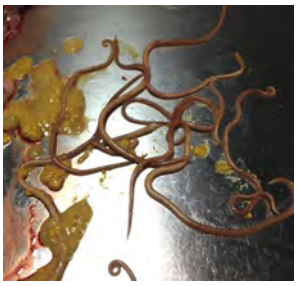
- Refer to **detailed examination procedure** when evidence of kidney worms is discovered.
- **9 CFR 311.25**
- **IPP Help PHV Disposition Guidance**
- Record under **Misc. Parasitic Conditions** in PHIS ADR.

Ascarids

9 CFR 311.25

***Ascaris suum* (Roundworms)**

- May be observed in the intestines, bile ducts, and gall bladders of market hogs.
- Leading cause of icterus in swine is obstruction of bile duct by ascarids.
- Larval migration of ascarids causes "milk spots" on pork livers and damage to lungs.
- Slight scarring may be trimmed (spotting the liver).



***Ascaris suum* Life Cycle**

Ascarids Post-Mortem Findings & Disposition

Post-mortem findings:

- Parasites in the bile duct and/or liver parenchyma
- Parasite migration tracts

Post-mortem disposition: **9 CFR 311.25**

- When the bile duct and/or liver is affected, condemn the liver.
- As a general rule for parasites, you will condemn affected parts and pass the carcass unless the carcass is so infested as to make removal of affected tissues impracticable, in which case you will condemn the carcass and viscera.
- Record under **Misc. Parasitic Conditions** in PHIS ADR.

Porcine Stress Syndrome (PSS)

- Very common condition seen in market swine.
- Covers a group of conditions associated with an autosomal recessive gene.
- Similar diseases:
  - Twisted Bowel
  - Internal Hemorrhage
  - Pyelonephritis
  - Mulberry Heart Disease
  - Hypocalcemia

PSS Post-Mortem Findings and Disposition

Post-mortem findings:

- Early, rapid and complete rigor mortis, pulmonary edema and pale, soft musculature often containing hemorrhages.
- Carcasses of slaughtered swine with PSS are blanched, wet and may drip excessive amounts of fluid.
- The meat is referred to as **pale, soft, exudative (PSE) pork.**

Post-mortem disposition:

- **9 CFR 311.35**
- Condemn if muscular lesions are found to be distributed in a manner that removal is impractical.
- Record under **Gen. Miscellaneous** in PHIS ADR.

Swine Erysipelas

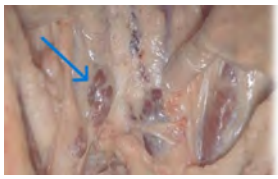
9 CFR 311.5

Erysipelothrix rhusiopathiae

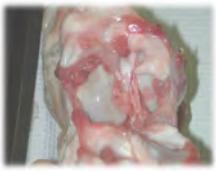
Diamond Skin (skin form of swine erysipelas)

- Chronic form of erysipelas is recognized as "diamond skin" disease (see **9 CFR 311.6**).
- Disease of market hogs.
- Bacteria carried by up to 50% of pigs.
- Reportable in some states.

Swine Erysipelas Post-Mortem Findings



Hemorrhagic iliac lymph nodes due to erysipelas in stifle joint



Fibrinous arthritis with blood exudate

- Arthritis
- Diamond shaped skin lesions, may vary from acute to chronic
- In acute disease, generalized lymphadenitis
- Petechial hemorrhages
- Degeneration of tissues or organs
- Vegetative valvular endocarditis

Swine Erysipelas Post-Mortem Disposition

Condemn carcasses affected with swine erysipelas which is acute or generalized, or which show systemic change **9 CFR 311.5.**

- Record condition as **Swine Erysipelas** in PHIS ADR.

Pass carcasses affected with diamond-skin disease when localized and no systemic changes, after removal and condemnation of any abnormal tissue **9 CFR 311.6.**

- Record condition as **Misc. Inflammatory Diseases** or **Misc. Infectious Diseases** in PHIS ADR.

Erysipelas Disposition Decision Tree pdf

Other Dispositions

In this section, we will briefly review the other disposition options listed in the Animal Disposition Reporting (ADR) module of PHIS.

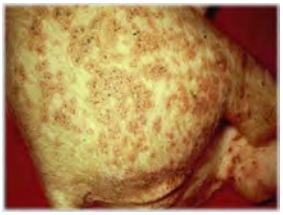
This provides guidance relative to the most common abnormal conditions seen in market hogs that are not directly associated with food safety, but require sorting, trimming, or disposal depending on the nature, degree, or extent of the condition.

Icterus and Pigmentary Conditions

- These are post-mortem dispositions (would not be identifiable or confirmable at ante-mortem).
- **Icterus** - Condemn carcass and viscera regardless of extent **9 CFR 311.19.**
- Any other **Pigmentary Condition** - Condemn affected parts only, unless it is so extensive that removal would be impracticable **9 CFR 311.13.**

Skin Conditions

Greasy Pig Disease



Staphylococcal Skin Lesions

- **Skin conditions** vary and many are very nonspecific, including conditions such as dermatitis, insect bites, erythema, urticaria, and photosensitization **9 CFR 311.21** and **9 CFR 311.22.**
- Only five major diseases: greasy pig disease, mange, necrosis, sunburn, and the vesicular diseases.
- Used as cause for condemnation only when the condition is so extensive as to make trimming impracticable, or when there is generalized effects secondary to the skin condition.

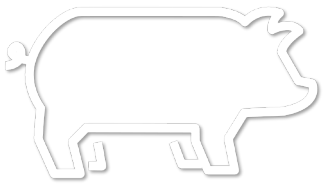
Injuries/Bruises

Condemn when the carcass is so extensively affected by bruising (with or without associated cellulitis) that trimming would be impracticable.

Record disposition under **Injuries** in PHIS ADR.

9 CFR 311.14

Foreign Animal Diseases and Reportable Animal Diseases



Foreign Animal Diseases (FAD)/Reportable Animal Diseases (RAD)

In this section, we will review:

- **FAD/RAD Description**
- **Emergency Response Roles**
- **PHV Responsibilities for Reportable Conditions**

- **Diseases**
  - Classical Swine Fever
  - African Swine Fever
  - Swine Vesicular Disease
  - Vesicular Stomatitis
  - Vesicular Exanthema of Swine
  - Senecavirus A
  - Brucellosis
  - PRRS

FAD/RAD Description

Foreign Animal Diseases:

- Reportable diseases
- Not currently found in this country

Reportable Diseases:

- World Organisation of Animal Health (WOAH)
- List of Notifiable Diseases

Resource Links:

WOAH Animal Diseases

National List of Reportable Diseases

USDA APHIS Swine Disease

FSIS Directive 6000.1

Emergency Response Roles

APHIS Veterinary Services Role

FSIS Role

Department of Homeland Security

PHV Responsibilities for Reportable Conditions

Refer to **FSIS Directive 6000.1**

- **REPORT** all suspected FADs/RADs; report if you see vesicular lesions, as many vesicular diseases have similar signs, you cannot differentiate just by looking.
- Notify the DO as soon as possible.
- DO will notify the APHIS Area Veterinarian-in-Charge (AVIC) or State Animal Health Official (SAHO).
- The AVIC or SAHO will determine how the case is to be handled.

Resources:

- **Foreign Animal Disease Investigation Manual pdf**
- **APHIS VS Procedures and Policy for the Investigation of Potential FAD/EDI pdf**
- **PHV Quick Immersion Training Reportable and FAD Module pdf**

Classical Swine Fever (CSF)

9 CFR 311.3

Classical Swine Fever, Family *Flaviviridae*, genus *Pestivirus*

- CSF is a highly contagious viral disease of swine.
- Formerly known as Hog Cholera (HC).
- Occurs in an acute, subacute, chronic, or persistent form.
- Has been eradicated from the U.S.

Classical Swine Fever Ante-Mortem Findings

- High fever, huddle or pile up
- Dullness
- Conjunctivitis
- Weight loss
- Weak, stagger
- Ataxia, posterior paresis
- Skin discoloration
- High morbidity/mortality (acute form)

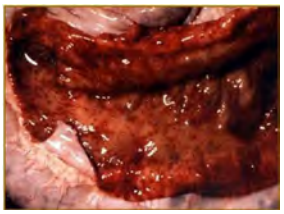
Classical Swine Fever Post-Mortem Findings

- Hemorrhages
- Edema
- Turkey egg kidney

Hemorrhagic, edematous lymph nodes in CSF

Hemorrhagic intestinal mucosa CSF

Classic "turkey egg kidney" lesions of CSF



Hemorrhagic enteritis CSF

African Swine Fever (ASF)

African Swine Fever, Family *Asfarviridae, genus Asfivirus*

- Caused by the highly contagious African Swine Fever virus.
- Deadly viral disease affecting both domestic and feral swine of all ages.
- NOT a threat to human health and cannot be transmitted from pigs to humans.
- NOT a food safety issue but would have significant impact on U.S. livestock producers and the economy.
- Has NEVER been found in the U.S., but more recently, it has spread to the Dominican Republic and Haiti.

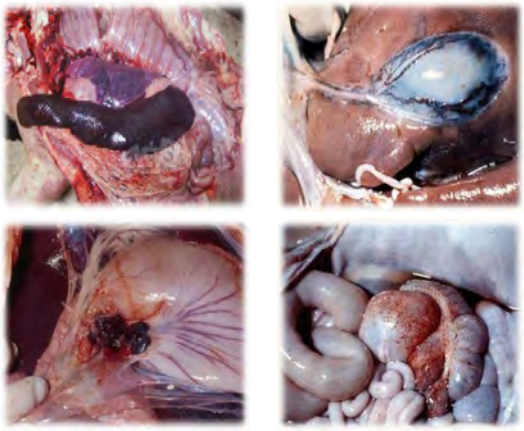
USDA's African Swine Message from USDA Secretary Tom Vilsack

African Swine Fever Ante-Mortem Findings

ASF: Know the Signs and Sy mptoms pdf

- High fever, huddle or pile up
- Weakness
- Vomiting, diarrhea
- Skin discoloration, necrotic skin lesions
- Weight loss
- Respiratory signs
- Dullness
- Conjunctivitis

African Swine Fever Post-Mortem Findings



- Hemorrhages
- Congestive splenomegaly
- Turkey egg kidney
- Edema in mesenteric structures
- Excessive pleural, pericardial, and peritoneal fluid

ASF: A Producer's Guide to the Federal Emergency Response Process pdf

Swine Vesicular Diseases

9 CFR 311.32

- Viral, most vesicular diseases are zoonotic.
- All vesicular diseases are characterized by fever, vesicles, and subsequent erosions; unable to distinguish between them based on gross pathology.
- If vesicles are observed on ante-mortem inspection, PHVs are to follow **Directive 6000.1** for reporting those to APHIS and/or the SAHO.
- Vesicular disease differentials in swine:
  - Vesicular Stomatitis (VS)
  - Swine Vesicular Disease (SVD)
  - Vesicular Exanthema of Swine (VES)
  - Seneca Valley Virus (SVV)
  - Foot and Mouth Disease (FMD)

Vesicular Stomatitis (VS)

Ante-mortem findings:

- Salivation, drooling from lesions in the mouth
- Lameness associated with lesions on the feet
- CNS signs

VS virus cases have been reported in the U.S. in 2023. See the **Situation Report**

***REPORTABLE**

Vesicular Exanthema of Swine (VES)

Vesicular Exanthema of Swine Virus, Family *Caliciviridae*, genus *Vesivirus*.

Currently considered eradicated worldwide.

Swine are the only species known to be susceptible to VES.

Senecavirus A (Seneca Valley Virus)

- **Senecavirus A (SVA), Family *Picornaviradae*.**
- Foot and Mouth Disease Virus (FMDV) and swine vesicular disease virus (SVDV) are members of the same viral family.
- Has also been termed idiopathic vesicular disease in swine.
- SVA causes vesicular lesions that are clinically indistinguishable from Foot and Mouth Disease and other FADs.
- Historically, this has been a low production-consequence virus.

Senecavirus A Quick Facts Sheet pdf

Senecavirus A (Seneca Valley Virus)

Ante-mortem findings:

- Vesicles (intact or ruptured) on the snout, oral mucosa, feet and around the coronary band (vesicles may be the ONLY ante-mortem sign).
- Lethargy and decreased appetite.
- Acute Lameness.
  - Redness and blanching around the coronary bands.
  - Ulcerative lesions on or around the hoof wall with eventual sloughing of the hoof wall.
- Early in course of disease, fevers up to 105°F reported.

***REPORTABLE**

Swine Brucellosis

Swine Brucellosis, *Brucella suis* biovars 1 or 3

- Potentially a zoonotic disease (reportable disease).
- Swine exposed to *B. suis* develop a bacteremia; infection can then localize in various tissues.
- Causes chronic inflammatory lesions in the reproductive organs which can cause abortions, infertility and low milk production.
- May also localize in joints, leading to lameness.

Commercial swine in all 50 states, Puerto Rico, and the U.S. Virgin Islands are free from swine brucellosis. However, feral and domestic swine in close contact with them remain a reservoir in the U.S.

Swine Brucellosis

APHIS Link: Swine Brucellosis

Ante-mortem findings:

Following acute bacteremia, symptoms can vary depending on the area of localization:

- Abortion
- Lameness
- Posterior paralysis
- Stillborn, mummified, or weak piglets

Swine brucellosis should be reported immediately upon diagnosis or suspicion of the disease.

Porcine Reproductive and Respiratory Syndrome (PRRS)

Ante-mortem findings:

- Fever in acute stages; some variation
- Anorexia and lethargy
- Mild cyanosis of the ears, abdomen, and vulva
- Respiratory distress or vomiting

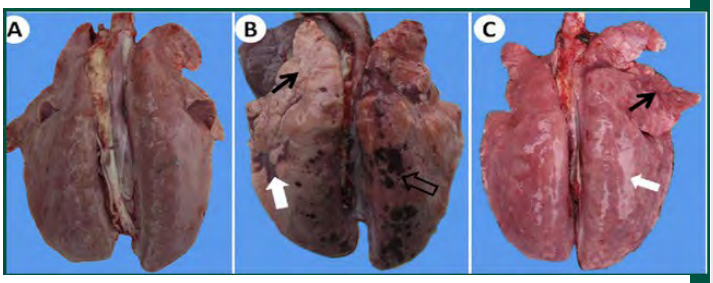
Ante-mortem disposition:

- **Condemn:** if fever and signs are present, indicating carcass would be condemned on post-mortem.
- **Suspect:** if clinical signs indicate PRRS, but insufficient for condemnation.

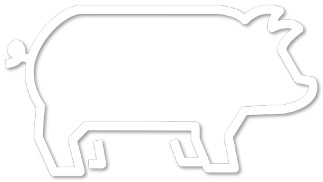
Porcine Reproductive and Respiratory Syndrome (PRRS)

Post-mortem findings:

- Mild to severe lesions in lungs and lymph nodes
- Interstitial pneumonia
- Lungs appear mottled and tan but are highly variable in extent
- Lymph nodes are generally swollen, tan and edematous or cystic



Case Studies



Case Study #1

At ante-mortem, you are presented a pen containing 23 market hogs. A few appear like this:



Most animals appear well-fleshed, alert, and are eating feed, though a few are reluctant to move. You take the temperature of the affected animals, and they are 104.9°F.

What is your diagnosis and ante-mortem disposition for the affected animals you observe?

Case Study #1

- What ante-mortem regulation (Part 309) supports your ante-mortem disposition?
- What are the options for this condition for ante-mortem dispositions?
  Hint **9 CFR 309.2(h)** vs **9 CFR 309.9**
- Can you condemn this hog on ante-mortem for pyrexia? Why or why not?
- What regulation supports your decision regarding your pyrexia disposition determination?

Case Study #1

At the post-mortem inspection station, you are presented with two hog carcasses that you designated as U.S. Suspect on ante-mortem.

Describe the lesions identified on the two carcasses:

Carcass lymph nodes

Kidney and renal lymph nodes

Renal lymph nodes
(closer view)

Case Study #1

Describe any abnormalities or lesions:

Lungs

Spleen

Carcass - skin

Case Study #1

- What is your diagnosis and post-mortem disposition for these carcasses? What regulation applies?
- Would this condition prompt you to perform an in-plant KIS™ residue test?
- What actions might you take if you were finding multiple hogs with fevers at ante-mortem, and you were subsequently having to condemn several of them on post-mortem? The rail-out loop was getting filled with carcasses, some with chronic diamond-skin lesions and some with signs of acute diseases, as shown?

Case Study #2

A market hog is railed out for PHV post-mortem disposition:

Grossly enlarged lymph nodes

Liver infiltration

Enlarged portal lymph node

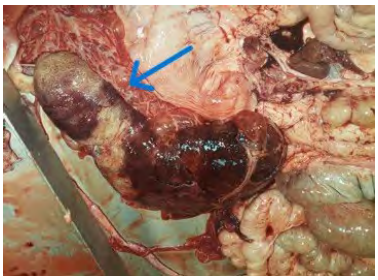
Case Study #2

- What is your diagnosis and post-mortem disposition for this carcass?

- What regulation applies?

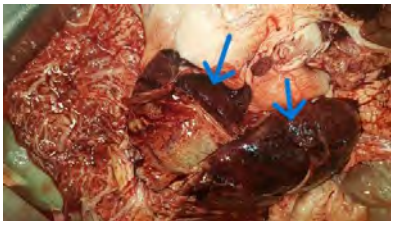
Case Study #3

A market hog is railed out for PHV post-mortem disposition due to the spleen; the carcass appears normal:



Necrotic portion of spleen

Torsion at base of spleen



Spleen crumbles when squeezed

Case Study #3

- What is your diagnosis and post-mortem disposition for this carcass?

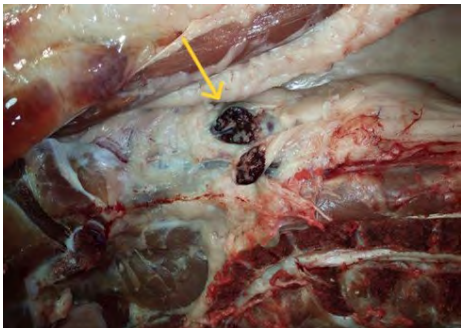
- What condemnable condition can be easily confused with this splenic lesion?

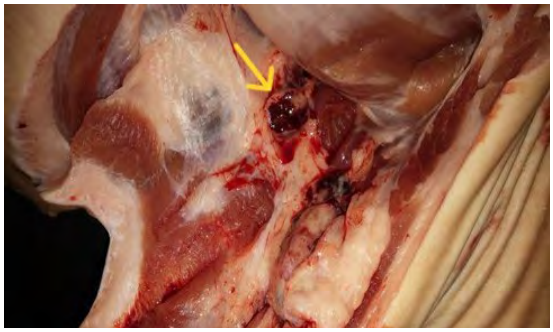
Case Study #4

A market hog is railed out for PHV post-mortem disposition; the carcass showed the following signs:

Case Study #4

Widespread hemorrhagic lymph nodes



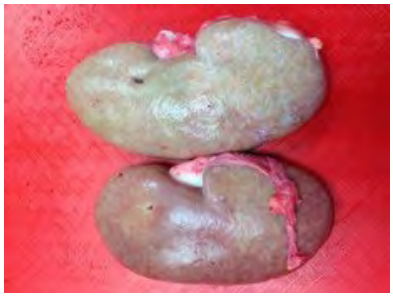


Case Study #4

- What is your diagnosis and post-mortem disposition for this carcass?
- What regulation applies?
- Would this condition prompt you to perform an in-plant KIS™ residue test?

Case Study #5

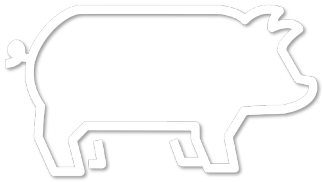
Market hogs are railed out for PHV post-mortem disposition due to their kidneys; the carcasses and other organs all appear normal:



Case Study #5

- What is your diagnosis and post-mortem disposition for these carcasses?
- What regulation applies?
- Would this condition prompt you to perform an in-plant KIS™ residue test?

Knowledge Check Questions



Knowledge Check 1

Any swine having a temperature of _____ on ante-mortem shall be identified as U.S. Condemned.

a. 104°F or higher

b. 105°F or higher

c. 106°F or higher

Answer: 106 degrees Fahrenheit or higher

Knowledge Check 2

Similar to cattle, all non-ambulatory disabled swine shall be identified as U.S. Condemned on ante-mortem.

True or False

Answer: False

Knowledge Check 3

Which of the following conditions should prompt the PHV to perform a KIS™ residue test?

a. Chronic pericarditis

b. Acute pericarditis

c. "Milk spots" caused by ascarid larval migration on a pork liver

Answer: Acute pericarditis

Knowledge Check 4

Malignant lymphoma lesions in swine can be trimmed and the carcass passed when lesions do not appear to be generalized.

True or False

Answer: False

Knowledge Check 5

You identify a pen of market hogs on ante-mortem with signs of blisters and ulcerative lesions on their snouts, mouths, and feet. You should:

a. Make the diagnosis yourself based on your findings and condemn the lot, no need to notify your supervisor if you are comfortable with the diagnosis.
b. Notify the District Office through your supervisory chain of command and report your findings.
c. Notify APHIS or the State Animal Health Official yourself.

Answer: Notify the District Office through your supervisory chain of command and report your findings.

Knowledge Check 6

When the establishment implements a voluntary segregation program, you only have to examine 5 to 10 percent of animals "at rest" during ante-mortem inspection.

True or False

Answer: False

Knowledge Check 7

Finding an injection lesion or a surgical site should prompt the PHV to perform KIS™ residue testing on the carcass.

True or False

Answer: True

Knowledge Check 8

Overall, carcasses showing generalized and/or acute conditions may be passed after abnormal tissues are trimmed and disposed of, while carcasses showing chronic and/or localized conditions are condemned.

True or False

Answer: False

Knowledge Check 9

A non-ambulatory disabled market hog presented for ante-mortem inspection with nasal discharge and a temperature of 104°F should be identified as:

a. Passed for Slaughter
b. U.S. Suspect
c. U.S. Condemned

Answer: U.S. Suspect

Knowledge Check 10

An inspector retained a market hog for PHV post-mortem disposition; the carcass showed the following signs:

What is your PHV disposition?

a. U.S. Inspected and Passed
b. U.S. Suspect
c. U.S. Condemned

Answer: U.S. Condemned

Summary

- Perform ante-mortem inspection on all animals, observe at rest and in motion.
- Conditions which may result in **ante-mortem condemnation:**
  - CNS disorders
  - Pyrexia (temperature 106°F or higher)
  - Severe debilitation and/or cachexia associated with a disease condition
  - Moribund or dead animals
- Conditions which may result in **post-mortem condemnation:**
  - Extensive abscessation or injuries (bruising), or contamination where trimming is impracticable
  - Septicemia/toxemia/pyemia...or acute, generalized inflammatory conditions
  - Metastatic neoplasia
  - Extensive parasitism
  - Any other condition with a generalized effect where trimming is impracticable

The End

You have completed the PHV Refresher Course - Swine module!

Please close this window to return to the AgLearn course page.

Be sure to place a checkmark in the box to mark the course complete for credit.