Food Safety and Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Antemortem and Postmortem Inspection and Disposition

CATTLE

PHV Refresher Course

Learning Objectives

- Describe the general procedures for antemortem and postmortem inspection of cattle.
- 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 antemortem and post-mortem dispositions.

Resources

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

Directives	Regulations	Other
6000.1	9 CFR Part 309	PHIS QR Guide
6100.1	9 CFR Part 310	PHIS Help Button
6100.2	9 CFR Part 311	
6100.4		
6100.6		
6240.1		

Review of Antemortem Procedures

100% of cattle presented for slaughter must be observed at rest and in motion.

Use your discretion to determine if animals presented for slaughter should also be observed from both sides.

This would be based on the age, sub-class, breed, and history of disease incidence observed at the establishment.

Review of Antemortem Procedures

In determining whether or not to observe animals from both sides, consider some conditions common to cattle that often present unilaterally:

- Actinomycosis / Actinobacillosis ("acti")
- Epithelioma of the eye ("cancer eye")
- Mastitis
- Surgical incisions, e.g., displaced abomasum surgery

Special Procedures

Remember that bovines (bulls, cows, steers, heifer, and calves) are **not eligible** for the following special antemortem procedures:

- Delayed slaughter
- Emergency slaughter
- Voluntary segregation

Non-ambulatory Disabled (NAD)

Reminder:

Per 9 CFR 309.3(e), any bovine that cannot stand and/or walk is considered non-ambulatory disabled (NAD) and may not be presented for slaughter. Animals must be able to ambulate without mechanical or other assistance, such as hobbles or slings.

They must be U.S. Condemned by the PHV at antemortem and **promptly** euthanized.

Non-ambulatory Disabled (NAD)

***Another* Reminder:**

Occasionally, cattle may "go down" *after* having passed antemortem inspection. When a bovine becomes non-ambulatory/disabled, for example, in the chute leading to the stunning area, the establishment must notify the PHV, who will make a determination as to whether the animal is truly NAD vs. a case where the animal has slipped and is trapped, but would otherwise be able to get up and walk.

In other words, the PHV is to use judgement and discretion as to whether or not these animals can still be slaughtered.

Review of Antemortem Procedures

As you observe cattle in the pens or while they are being moved, remember to look for:

- Lame or non-ambulatory animals
- Animals isolating themselves from the herd
- Pronounced coughing, sneezing, dyspnea, or nasal discharge
- Visible external swellings or fistulous tracts
- Poor body condition
- Rough or patchy coat, skin conditions
- Clinical signs indicating foreign/reportable diseases (e.g., vesicles)
- CNS signs

Antemortem Condemnations

Cattle may be condemned at antemortem and recorded in the PHIS Animal Disposition Reporting (ADR) module for any of the following:

- Central Nervous System Disorder*
- Dead
- Epithelioma ("cancer eye") w/ severe cachexia
- Moribund
- Non-ambulatory
- Other Reportable Diseases*
- Other: State disposition
- Pneumonia (severe, with cachexia)
- Pyrexia
- Rabies*
- TB Reactor (febrile, cachexic)*
- Tetanus
- Vesicular Diseases*

*

Postmortem Inspection Procedures – Carcass

Beef and veal carcasses are typically hung by their hindlimbs on either a single or two-ended (gambrel) hook.

The carcasses are usually split, though smaller veal carcasses may be left intact, provided IPP can adequately inspect the internal cavities.

The kidneys are typically removed and presented with the viscera, though they may remain attached so long as they are removed from their capsules.

IPP should observe all surfaces and observe the lymph nodes (e.g., prescapular, cervical, and inguinal).

Postmortem Inspection Procedures – Viscera

The viscera of cattle are presented on either a stationary or moving viscera tray. The plucks (heart, lungs, esophagus, trachea) are separated from the abdominal viscera. The liver may or may not remain attached to the other abdominal organs.

You will need a knife and node hook to make several incisions:

For full postmortem procedures, refer to FSIS Directive 6100.2, Chapter III.

Postmortem Dispositions – Public Health Significance

The various conditions on the remaining slides are going to fall into one of two categories:

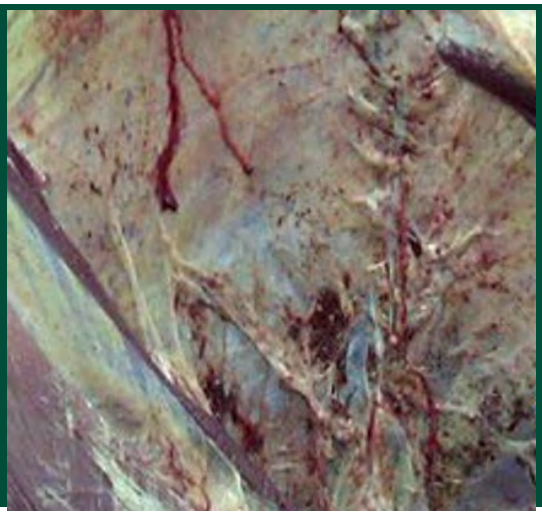
- **Diseases and Conditions of Public Health Significance**
  These conditions are usually acute and generalized, wherein a pathogen has overwhelmed the animal's immune system and entered the bloodstream, such as with septicemia, toxemia, or pyemia. Gross contamination would also fall into this category.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

Postmortem Dispositions

Pathology Sampling:

PHVs are encouraged to use all tools available to them to assist in making sound and supportable dispositions. This includes submitting tissue samples to the FSIS Eastern Laboratory for pathology testing when they are unable to make a disposition based on gross pathology alone.

Septicemia

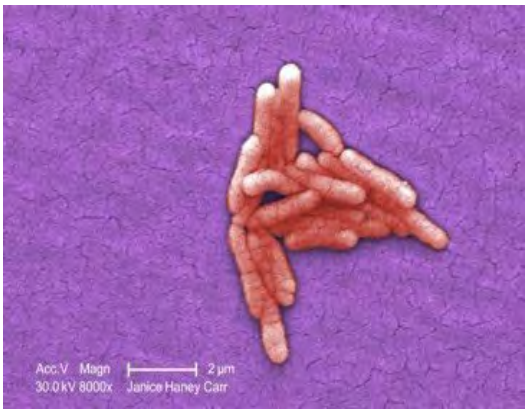


Septicemia

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

At antemortem, 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 antemortem.

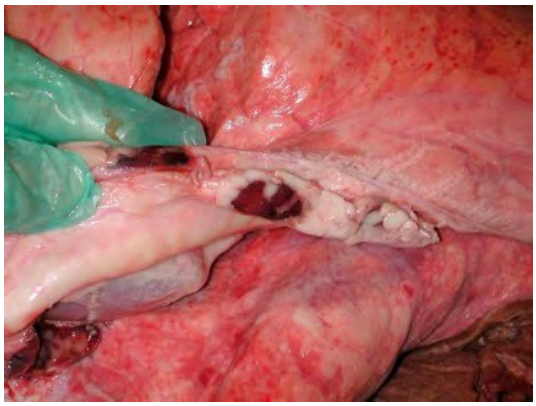
Septicemia



PM findings

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

Septicemia



Differentials

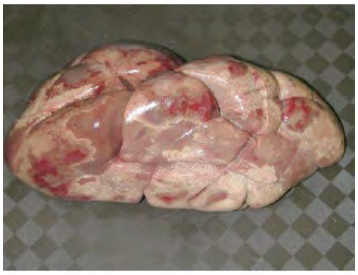
- Toxemia
- Pyemia
- Other identifiable underlying condition
- Other dropsical condition (edema, ascites)

Septicemia

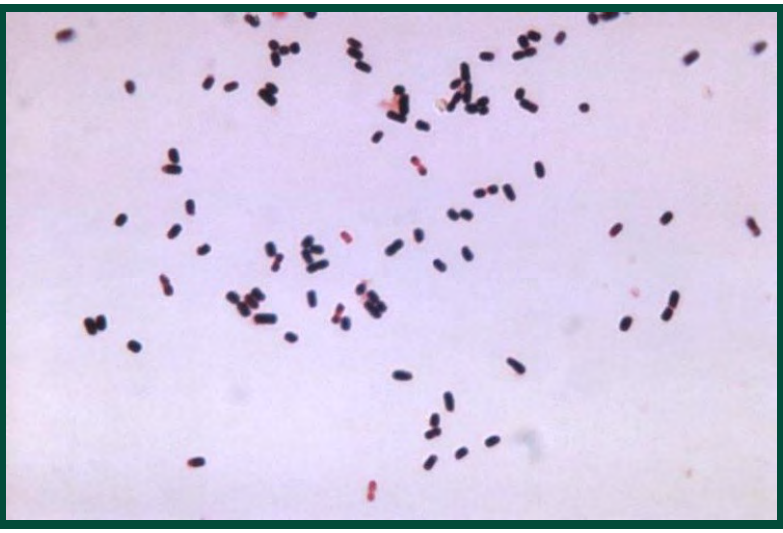
9 CFR 311.16 and 311.16(a)(2)

PM Disposition

- When a specific underlying condition cannot be identified for the signs described, condemn for **Septicemia**
- If signs appear localized +/- chronic, pass after trimming affected tissues



Toxemia



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 antemortem, 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 antemortem.

Toxemia

PM findings

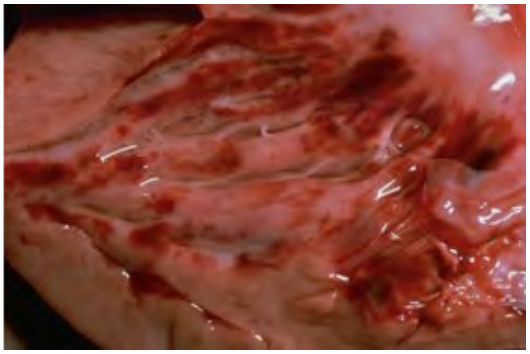
- Diffuse inflammation with reactive, hyperemic, or edematous lymph nodes (acute lymphadenopathy)
- Gangrenous or necrotic tissue
- Abnormal coagulation (petechiae, ecchymoses, bruising, hyperemic tissues)
- Degenerative changes to organs
- Fluid effusions +/- dehydrated tissues

Toxemia

9 CFR 311.16

PM Disposition

- When a specific underlying condition cannot be identified for the signs described, condemn for Toxemia
- If signs appear localized +/- chronic, pass after trimming affected tissues



Pyemia

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.

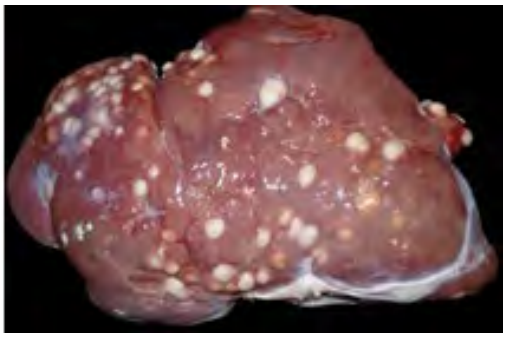
At antemortem, the animal may appear sick and may be febrile; however, this is not always the case. External abscesses may or may not be present. Therefore, it is unlikely you would condemn an animal for pyemia at antemortem.

Pyemia should *not* be named as the condition when multiple, localized, well-encapsulated (chronic) abscesses are found.

Pyemia

PM 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

Differentials

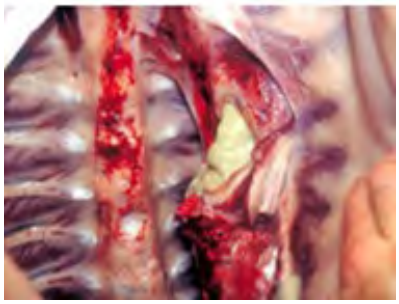
- Septicemia
- Toxemia
- Coccidioidal granuloma
- Tuberculosis
- Necrobacillosis
- Neoplasm with necrotic center

Pyemia

9 CFR 311.16 and 311.16(a)(2)

PM Disposition

- When a specific underlying condition cannot be identified for diffuse acute abscessation, condemn for **Abscess/Pyemia**
- If signs appear localized +/- chronic, pass after trimming affected tissues



Differentiating Septicemia, Toxemia, & Pyemia

First, 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 dispositions

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 the disposition when the abscessation is in the acute, diffuse phase and the underlying cause of pyogenesis cannot be identified

Differentiating Septicemia, Toxemia, & Pyemia

Important Note:

Remember that when differentiating among these three conditions, your disposition does not always have to be **RIGHT**, but it must be **DEFENSIBLE**. You should use all the information available to you to come to a sound and supportable disposition. Condemning an entire beef carcass can have a significant economic impact on the establishment and their clients, so when entering your dispositions into PHIS, do not hesitate to include a description of your findings in the "Remarks" box.

Contamination

Contamination

Description:

FSIS takes a "zero tolerance" approach to contamination of carcasses and edible viscera 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

PM 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 (non-food safety concern)

Contamination

Differentials

- 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)

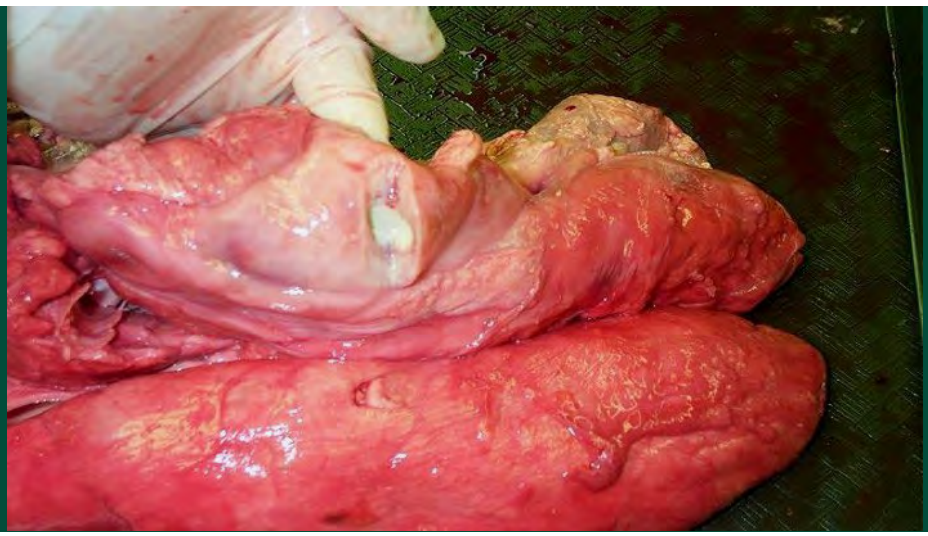
Contamination

9 CFR 310.18(a)

PM Disposition

- When contamination is so extensive as to make trimming impracticable, the entire carcass should be condemned for **Contamination**
- If contamination is at all trimmable, any unaffected parts may be salvaged for use as food

Abscesses



Abscesses

Description:

Abscesses are walled-off accumulations of purulent material of many different etiologies. They may or may not be visible externally during antemortem 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

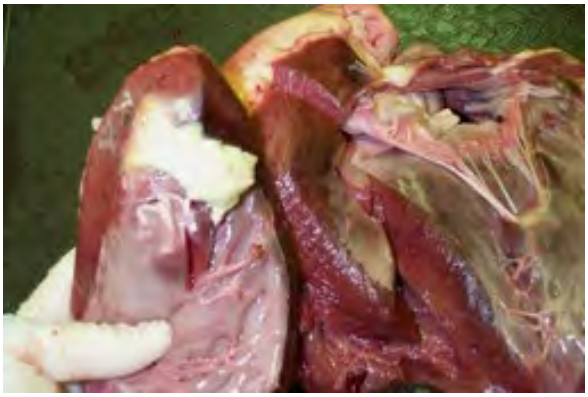
PM findings

- 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 possible hyperemic (acute)

Abscesses

Differentials

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



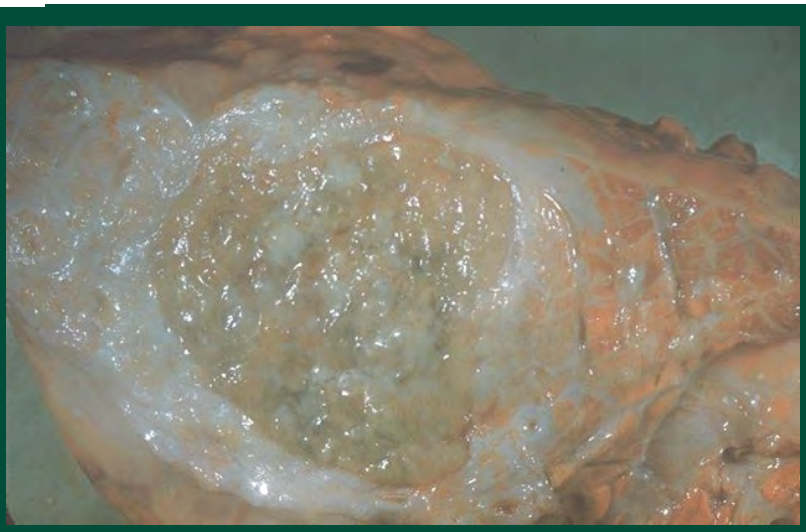
Abscesses

9 CFR 311.14 and 311.16

PM Disposition

- 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, the remaining carcass and viscera may be passed after trimming
- Any contamination from ruptured abscesses must be trimmed

Granulomatous Conditions



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.

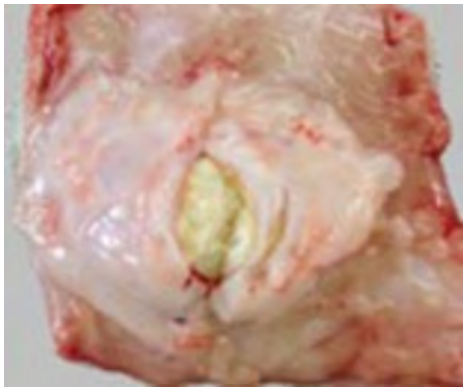
Granulomas can be roughly described as clustered accumulations of purulent or caseous material separated by septa (which may or may not be easy to discern).

As with abscesses, granulomas may or may not be visible externally at antemortem.

Granulomatous Conditions

PM findings

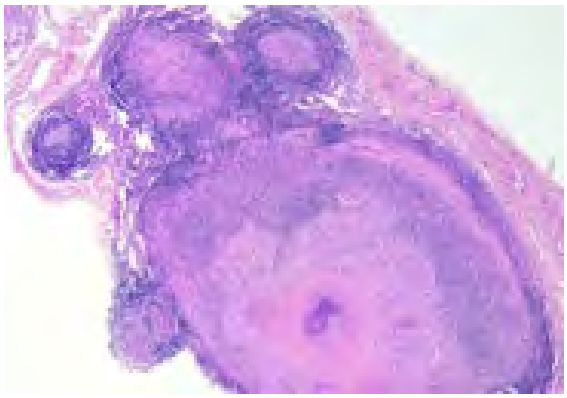
- Single or multiple accumulations of purulent or caseous material with a distinctive granulomatous appearance
- May be small and widely distributed or may be localized
- Capsule may be thick and well-defined (chronic) or may be limited and possibly hyperemic (acute)



Granulomatous Conditions

Differentials

- Abscess/Pyemia
- Actinobacillosis/actinomycosis
- Coccidioidal granuloma
- Tuberculosis
- Mesothelioma
- Other neoplasm with central liquefactive necrosis
- Cysticercosis or other parasitic cyst



Granulomatous Conditions 9 CFR 311.14

PM Disposition

- Always consider tuberculosis as a differential--collect samples and submit to NVSL if TB is suspected (9 CFR 311.2)
- 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
Tuberculosis

Bovine tuberculosis (TB) is a chronic, progressive disease caused by the bacterium *Mycobacterium bovis*. Though regional surveillance and eradication programs have been largely successful, it is still endemic in the United States. This is largely unavoidable due to the frequent interstate and international movement of live animals, as well as the harborage of TB in wildlife populations (especially cervids).

Granulomatous Conditions
Tuberculosis

The Animal and Plant Health Inspection Service (APHIS) performs field testing of herds, and when TB is detected, TB reactor, TB suspect, and TB exposed animals are typically sent to slaughter as a group.

Though incidental findings of TB at slaughter do occur, the bulk of TB-positive cattle presented for slaughter will arrive identified with the APHIS-VS Form 1-27.

Granulomatous Conditions
Tuberculosis

Antemortem:

Recall that FSIS Directive 6240.1 defines four APHIS classifications of affected animals:

- TB Reactors
- TB Suspects
- TB Exposed - Category 1
- TB Exposed - Category 2

Granulomatous Conditions
Tuberculosis

Antemortem:

When TB reactors, suspects, and exposed cattle are presented at the official establishment, the PHV is responsible for ensuring that the establishment segregates the animals and provides adequate facilities and personnel to perform a thorough examination (including temperature check) of every animal.

Refer to FSIS Directive 6240.1, Chapter IV for procedures.

Granulomatous Conditions
Tuberculosis

Antemortem (Special Note):

Though FSIS prescribes procedures for examination of TB-restricted cattle in all 4 categories, in reality, the large majority of cattle sent for slaughter fall into the **exposed** categories. When cattle in the field test positive on primary and secondary screening tests (reactors or suspects), only in *some* cases will APHIS allow them to be sent to slaughter.

Granulomatous Conditions
Tuberculosis

Postmortem:

The PHV will perform postmortem examination of all TB reactors, suspects, and exposed cattle. Depending on the classification, they will perform the routine postmortem examination as described in FSIS Directive 6100.2, as well as either the expanded postmortem (EPM) or modified expanded postmortem (MEPM) as described in Guideline No. 4, "Inspection of Tuberculin reactors."

Note about DOA cattle: If any TB restricted cattle are found to be dead on arrival (DOA) at antemortem, those animals should be treated as reactors and receive a full necropsy (routine PM exam plus expanded postmortem (EPM)), and samples should be collected.

Granulomatous Conditions
Tuberculosis

Postmortem Location:

Note that the establishment must provide a location which, in the opinion of the SPHV, is suitable (safe, sanitary, and properly equipped) for performing postmortem examination procedures on TB restricted cattle, separate from where routine slaughter animals are examined.

Note: The location designated for postmortem examination of cattle diagnosed (or suspected of having) TB does not need to be a unique area separate from where routine postmortem examination takes place. As long as the routine and TB postmortem procedures are separated by time and space, that is sufficient. Of course, establishments must apply careful sanitation procedures to prevent cross-contamination.

Granulomatous Conditions
Tuberculosis

Differentials

- Actinobacillosis/actinomycosis
- Coccidioidal granuloma
- Necrobacillosis
- Neoplasia with central liquefactive necrosis
- Other granulomatous condition
- Pyemia

Granulomatous Conditions 9 CFR 311.2(a)

Tuberculosis

PM Disposition

Condemn the carcass when...

- Generalized lesions (evidence of hematogenous distribution)
- Fever at AM corresponding with TB lesions found at PM
- The animal is cachexic at AM
- TB lesion(s) found in bone, muscle, or intermuscular tissue (and corresponding lymph nodes)

Granulomatous Conditions 9 CFR 311.2(a)

Tuberculosis

PM Disposition

Condemn the **carcass** when...

- Extensive lesions in either thoracic or abdominal cavity
- TB lesions are multiple, acute, and actively progressive
- When the character or extent of lesions cannot otherwise be considered "localized"

Granulomatous Conditions

Tuberculosis

9 CFR 311.2(b)

PM Disposition

Condemn **organs or parts** when...

- They contain localized lesions of TB, or
- The corresponding lymph node contains TB lesion(s)

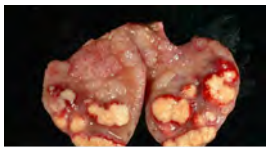
Granulomatous Conditions 9 CFR 311.2(d)

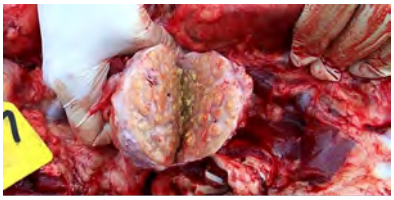
Tuberculosis

PM Disposition

Pass carcasses or portions of carcasses **for cooking** when...

- TB lesion(s) are localized or chronic
- The affected part is trimmed and condemned





Granulomatous Conditions 9 CFR 311.2(c)
Tuberculosis

PM Disposition

Pass carcasses **without restriction** when...

- The animal is *not* identified as a TB reactor
- TB suspect and TB exposed animals are found to be free of TB lesions at PM

Granulomatous Conditions
Tuberculosis

Sampling:

Regardless of the TB restriction category assigned by APHIS, *or* whether suspicious tissues are discovered during regular slaughter, the PHV should collect and submit samples to the National Veterinary Services Laboratory (NVSL) in Ames, Iowa. In additional to documenting all animal ID and traceback information, ID tags with tissue attached should be submitted as part of each sample (this is for the purpose of DNA analysis, if warranted).

Granulomatous Conditions
Tuberculosis

Sampling:

The PHV should especially look for granulomatous lesions in the head and thoracic cavity, as this is where bovine TB most commonly manifests. However, suspicious lesions found in other locations should certainly also be sampled.

APHIS's stated goal is to examine approximately 1 sample per 2,000 head of adult cattle slaughtered for surveillance purposes. However, FSIS guidance is more specific:

Granulomatous Conditions
Tuberculosis

Sampling Forms:

TB samples collected as part of postmortem examination of APHIS restricted (classified as either reactor, suspect, or exposed) cattle should be submitted to the NVSL.

Samples of suspicious granulomas collected during routine slaughter should usually be submitted to NVSL using the **VS Form 6-35**. Seek guidance from local APHIS (through supervisory channels) before using the **VS Form 10-4**.

Granulomatous Conditions

Actinobacillosis and Actinomycosis ("Acti")

Actinomyces bovis is the causative agent of "lumpy jaw," which causes large granulomatous swellings of the mandible and adjacent soft tissues, often with development of focal necrosis or fistulous tracts.

Actinobacillus lignieresii is the causative agent of "wooden tongue," an infection of the tongue and other soft tissues in the oral cavity.

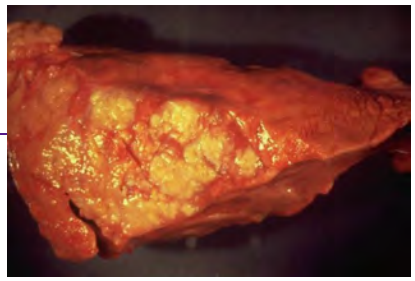
Because of the similar pathologies and localization, FSIS combines the conditions and disposition under one classification, and we use the colloquial term "acti" to refer to either or both.

Granulomatous Conditions

Actinobacillosis and Actinomycosis ("Acti")

Images:






Granulomatous Conditions
Actinobacillosis and Actinomycosis ("Acti")

Special Procedures for Antemortem Suspects:

Actinobacillosis and actinomycosis are among 3 conditions for which serially numbered U.S. Suspect tags are not applied at antemortem--the third condition being epithelioma of the eye, which we will cover later.

Additionally, the PHV does not need to fill out the FSIS Form 6150-1 (Identification Tag - Antemortem) for each individual animal affected with either actinobacillosis, actinomycosis, or epithelioma. See the excerpt from FSIS Directive 6100.1 here:

Granulomatous Conditions

Actinobacillosis and Actinomycosis ("Acti")

PM Findings

- Swelling of either the mandible or the tongue and soft tissues of the oral cavity
- Fistulous tracts and possible focal necrosis
- Granulomatous infiltration of lymph nodes of the head and neck
- Progression to bronchopneumonia is less common (usually due to inspiration of bacteria)
- Generalized granulomatous lymphadenopathy, emaciation in severe chronic cases (rare)

Granulomatous Conditions
Actinobacillosis and Actinomycosis

PM Disposition [9 CFR 311.9]

- Well-nourished carcasses with localized uncomplicated lesions = pass after trimming
- If disease of the jaw is limited (small lesion, no fistulous tracts), the tongue may be passed, if not affected
- If only lymph nodes are affected, they may be trimmed and the rest of the head passed
- If limited to the tongue, the tongue may be condemned and the rest of the head passed

Granulomatous Conditions
Actinobacillosis and Actinomycosis ("Acti")

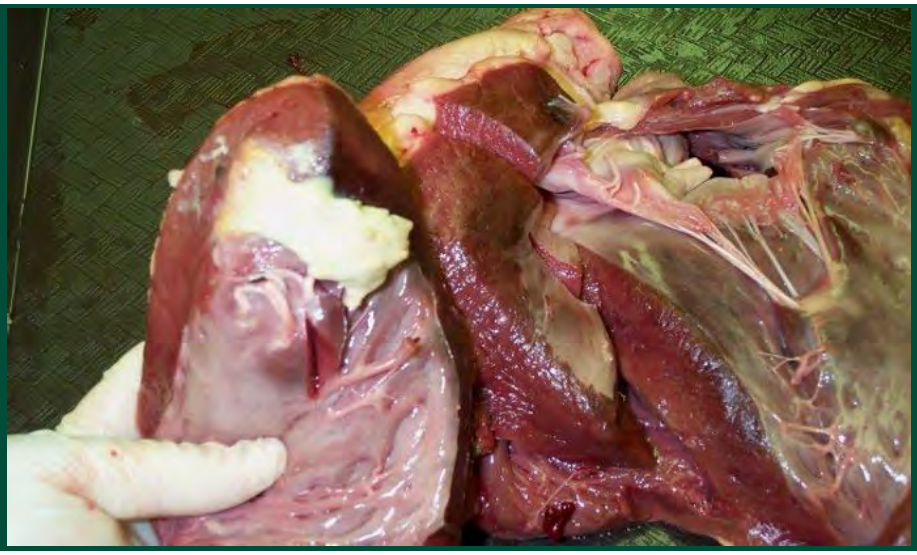
9 CFR 311.9

PM Disposition - continued

- "Acti" is not considered generalized if it spreads from the head to the lungs and associated lymph nodes
- "Acti" is established in the lungs via inspiration, not hematogenously
- If active* lesions are found beyond the head and lungs (and associated lymph nodes), the condition is considered generalized and the carcass should be condemned

*Active lesions are those which are poorly encapsulated and show acute inflammation

Inflammatory Conditions



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 antemortem condemnation **unless** the animal is also pyrexic or severely debilitated

Inflammatory Conditions

AM Findings (by condition):

- **Pneumonia or pleuritis** - Dyspnea, coughing, nasal discharge, poor body condition, rough coat, neck extension, hypersalivation, pain
- **Pericarditis** - Dyspnea/polypnea, pain, ventral edema
- **Gastroenteritis** or **peritonitis** - Diarrhea, painful tucked-up abdomen, reluctance to move, evidence of dehydration
- **Nephritis/pyelonephritis** - Polyuria with or without visible hematuria or calciuria
- **Arthritis** - Visible swollen joints, reluctance to stand or walk

These lists are not exhaustive, and all may be accompanied by fever or varying degrees of weight loss or debilitation.

Inflammatory Conditions

PM 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

PM Findings (chronic conditions)

- Generally, when inflammatory conditions have reached a chronic phase, the affected tissues are no longer considered to be of public health concerns
- Affected tissues may be trimmed and condemned, and the remaining carcass and viscera may be passed for use as human food
- If chronic changes are so extensive as to make trimming impracticable, you may have to condemn the carcass and viscera

Inflammatory Conditions

PM Disposition (acute conditions)

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

- Pneumonia
- Pleuritis
- Pericarditis
- Peritonitis
- Gastroenteritis
- Nephritis/pyelitis
- Arthritis
- Mastitis
- Metritis

Inflammatory Conditions

PM Disposition (acute conditions)

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

- Septicemia
- Toxemia
- Pyemia
- Misc. Inflammatory Diseases

Inflammatory Conditions

PM Dispositions (chronic conditions)

- Generally, when inflammatory conditions have reached a chronic stage, the affected tissues are no longer considered to be of public health concern
- Affected tissues may be trimmed and condemned, and the remaining carcass and viscera may be passed for use as human food
- If chronic changes are so extensive as to make trimming impracticable, you may have to condemn the carcass and viscera

Inflammatory Conditions

Residue Testing

- Remember that observing signs of acute inflammation--especially generalized inflammation-- should prompt you to perform in-plant residue (KIS™) testing
- Positive KIS results in submission of tissues (1 lb. each kidney, liver, lean skeletal muscle) for laboratory testing (inspector-generated sampling)
- Refer to FSIS Directive 10,800.3 for prioritization of inspector-generated residue sampling
- Refer to FSIS Directive 10,800.1 through 4 for full residue sampling instructions
- Findings of injection and surgical sites should also prompt you to perform residue testing
- PHVs will use professional judgement in determining whether or not to perform residue testing

Neoplasia

Neoplasia

Description:

It is not uncommon to encounter neoplastic conditions such as malignant lymphoma, epithelioma, nerve sheath tumors, adrenal gland tumors, and others, particularly in mature cattle.

When tumors or other abnormal tissue cannot be definitively identified by gross pathology alone, PHVs are encouraged to use all tools available to them to assist them when making the gross disposition, including sending samples to the FSIS Eastern Laboratory for histopathological analysis.

In this section, we will cover the general rules for disposition of neoplastic conditions, as well as a few examples specific to cattle.

Neoplasia

Antemortem

Neoplastic conditions are occasionally--but not always--detectable during antemortem examination. When a neoplastic condition is observed at antemortem, the PHV will almost always designate the animal as U.S. Suspect so that he/she can perform a more thorough postmortem examination.

There are two notable exceptions to this rule:

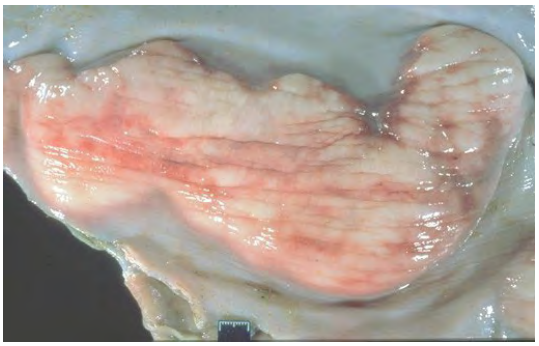
Neoplasia

Differentials

- Abscess/Pyemia
- Actinobacillosis/actinomycosis
- Coccidioidal granuloma (or other granuloma)
- Tuberculosis
- Parasitic cysts

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

Neoplasia



PM Findings

- Tumors of varying morphology and distribution
- Lymphoid hypertrophy or space-occupying lesions (evidence of metastasis)
- May see fluid effusions

Neoplasia

PM Disposition - General Rules **9 CFR 311.11**

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

Neoplasia
Epithelioma

Description:

Epithelioma of the eye--often referred to as "cancer eye"--is an aggressive neoplasm that originates at the corneoscleral junction and progresses to consume the tissues of the eye and surrounding orbital structures (including bone). It readily metastasizes, first to the parotid lymph nodes, and then to the lungs and other parts of the body. Because of its rapid growith, the tumor often experiences central liquefactive necrosis, resulting in a foul-smelling, suppurating mass on the side of the head.

It usually affects adult cattle (though it has no age preference) and is most commonly associated with Herefords and other lightly-pigmented breeds, though any breed may be susceptible. **9 CFR 311.11(b)**

Neoplasia

Epithelioma

9 CFR 309.6

Antemortem:

Because epithelioma is one of the few neoplasms that is readily observed at antemortem, there are some basic principles for making an antemortem disposition:

Condemn - When epithelioma has destroyed or obscured the eye and orbital structures, and is accompanied by extensive infection, suppuration, and necrosis or when epithelioma is accompanied by visible cachexia.

Suspect - When epithelioma is observed but does not meet the criteria for condemnation **or** when an eye appears to have been surgically removed.

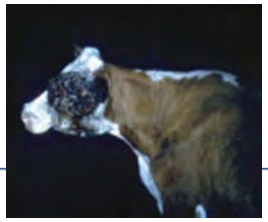
9 CFR 311.11(b)

Neoplasia
Epithelioma

PM Disposition

Condemn the entire carcass and viscera when...

- Osseous structures of the head are affected, with infection, suppuration, and necrosis
- There is metastasis from the eye or orbit to the parotid lymph nodes or any other part of the body (regardless of the size and extent of the primary tumor)
- The carcass exhibits evidence of emaciation or other secondary changes

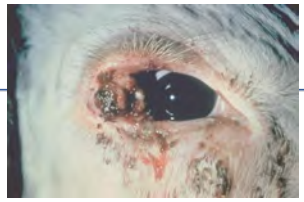


Neoplasia
Epithelioma

PM Disposition **9 CFR 311.12(b)**

Condemn the head and tongue and pass the carcass and viscera when...

- Osseous structures of the head are not affected
- There is no evidence of infection, suppuration, and necrosis
- There is no evidence of metastasis
- There is no evidence of emaciation or other secondary changes



Neoplasia

Malignant Lymphoma

Description:

Lymphoma can affect animals of any age and species and is not an uncommon finding in cattle at slaughter. As a cancer of circulating lymphocytes, it is by its very nature malignant. While it commonly manifests in the spleen, lymph nodes, and other lymphoid tissues, visible lesions may appear in any organ or tissue. They may be distinct tumors, or they may appear as simple plaques or discolorations.

Since there is no distinct morphology for lymphoma, and because any lymphoma lesion is cause for condemnation of the entire carcass, the PHV may use the FSIS Eastern Laboratory to support their disposition when it cannot be made based on gross pathology alone.

Neoplasia

Malignant Lymphoma

Antemortem:

Lymphoma cannot be positively identified at antemortem and therefore you would never use it as justification for an antemortem condemnation.

Lymphoma may not be evident at antemortem. IPP may or may not identify enlarged superficial lymph nodes, and occasionally retrobulbar lymphoma may cause a visible exophthalmos.

In any case, even if you have reason to suspect lymphoma, it is best to designate the animal as U.S. Suspect and perform a thorough postmortem examination.

9 CFR 311.11(b)

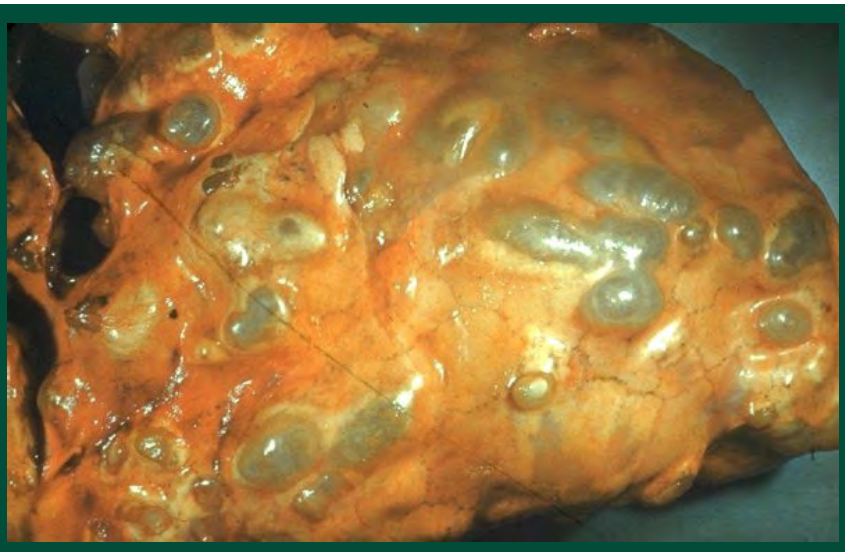
Neoplasia

Malignant Lymphoma

Differentials

It would be difficult to list differentials for malignant lymphoma. Generally, it will manifest as gross enlargement and irregularity of lymph nodes, as well as other lymphatic organs, such as the spleen or thymus. However, it can also create tumors, plaques, or discolorations in just about any organ, including the musculoskeletal system.

Parasitic Conditions



Parasitic Conditions

Description:

Cattle may be affected by a number of parasitic organisms. Most are not considered zoonotic. Therefore, their effect on the carcasses and viscera of those animals will be considered to be not of public health significance, but rather a matter of wholesomeness. Some present as cysts (oncospheres) in muscle or other tissues, whereas others present in the adult form and IPP may observe migration tracts.

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

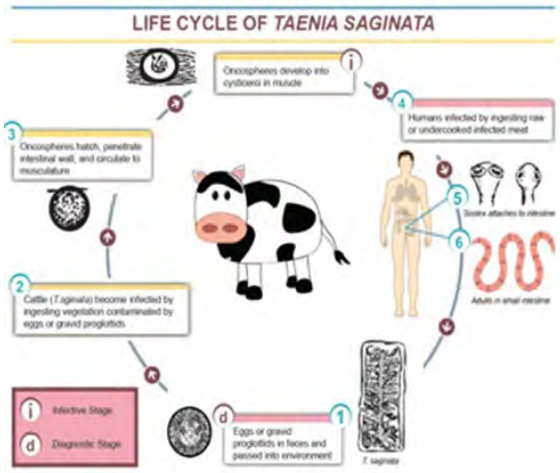
Parasitic Conditions
Cysticercosis

Cysticercosis (*Taenia saginata*) or "beef measles":

- Transmissible to humans via ingestion
- **Reportable condition**
- Larvae form cysts (often calcified) in active muscle tissues (heart, tongue, muscles of mastication, esophagus, diaphragm, skeletal muscle)
- May cause meat to become watery or discolored

Refer to FSIS Directive 6100.6, Rev. 1, Chapter II, Part I. for special postmortem examination procedures and regulatory dispositions when Cysticercosis is discovered.

Parasitic Conditions
Cysticercosis



- Note that human infection occurs when raw or undercooked meat containing active cysticerci are ingested

Parasitic Conditions
Cysticercosis

PM Disposition

When on-line IPP identify lesions suggestive of cysticercosis, they are to retain the carcass and viscera for PHV examination and disposition.

The PHV then follows the special procedures in FSIS Directive 6100.6, Chapter II, Section I.C. to make a disposition based on the extent and distribution of the lesions. Additionally, the PHV will need to perform the special procedures on all carcasses and viscera *from the same producer*.

Parasitic Conditions
Cysticercosis

PM Disposition 9 CFR 311.23(a)(1)

Condemn the carcass when...

1. Cysts are identified in 2 or more of the **usual inspection sites** and
2. Cysts are identified in 2 or more **additional sites** as exposed by the PHV during examination

Parasitic Conditions
Cysticercosis

PM Disposition 9 CFR 311.23(a)(2)

Pass the carcass **with a restriction** when one or more lesions of cysticercosis are identified, but the extent and distribution is less than that described on the previous slide (9 CFR 311.23(a)(1)). The carcass may be:

1. Passed for refrigeration: carcasses must be held at 15°F of less for a minimum of 10 days.
2. Passed for heating: boned meat in boxes or other containers must be held at 15°F or less for a minimum 20 days.
   Note: Product must be retained under FSIS control until the restriction is achieved.

Parasitic Conditions
Cysticercosis

PM Disposition [9 CFR 311.23(b)]

Edible viscera and offal receive the same disposition as their corresponding carcasses. For example, if the carcass is passed for refrigeration, the viscera and offal may be passed with the same treatment.

If cysticercosis lesions are found in the viscera and offal, those parts will be condemned regardless of the disposition of the carcass.

Parasitic Conditions

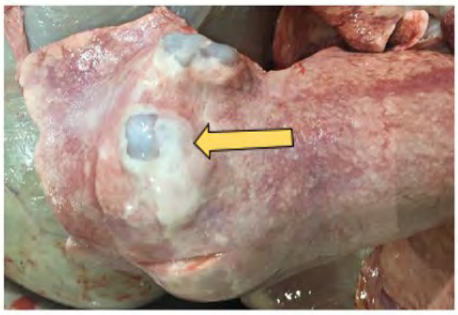
PM Disposition - General Rules (parasites not transmissible to humans) **9 CFR 311.25**

- Lesions localized and of such character that they can be effectively trimmed, the carcass may be passed after removal and condemnation of the affected part(s)
- If an organ or part is affected to such an extent that the lesions cannot be effectively trimmed, the organ or part is condemned
- If infestation of a carcass is extensive, it shall be condemned
- If infestation of a carcass is moderate, it may be passed for cooking
- Livers affected by flukes or fringed tapeworms shall be condemned

Parasitic Conditions

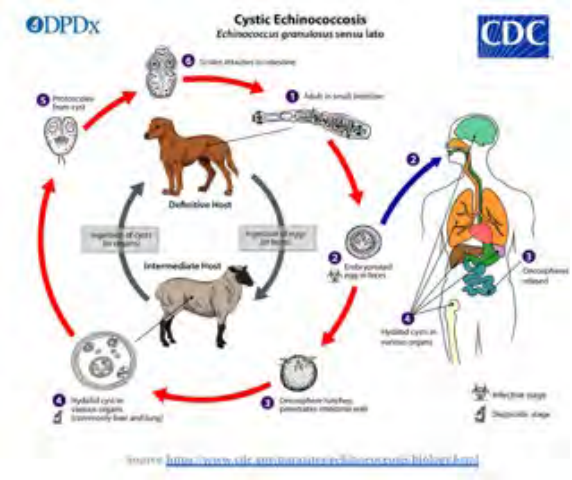
Echinococcosis (*Echinococcus granulosus*)

- Referred to as "hydatid cysts" in policy documents and PHIS
- Not considered a food safety risk
- Considered a notifiable condition, per FSIS Directive 6000.1, Attachment 1
- Follow general disposition rules listed on previous slide (**9 CFR 311.25(d)**)



Parasitic Conditions

Echinococcosis (*Echinococcus granulosus*)

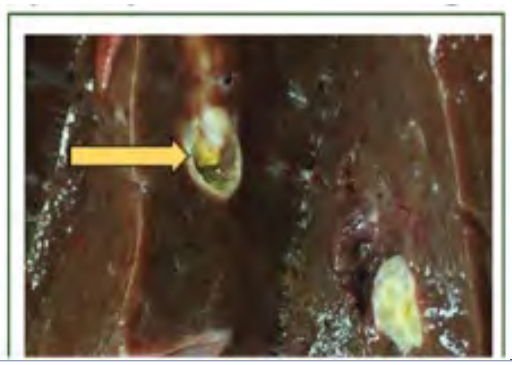


Note: Info Sheet found here

Parasitic Conditions

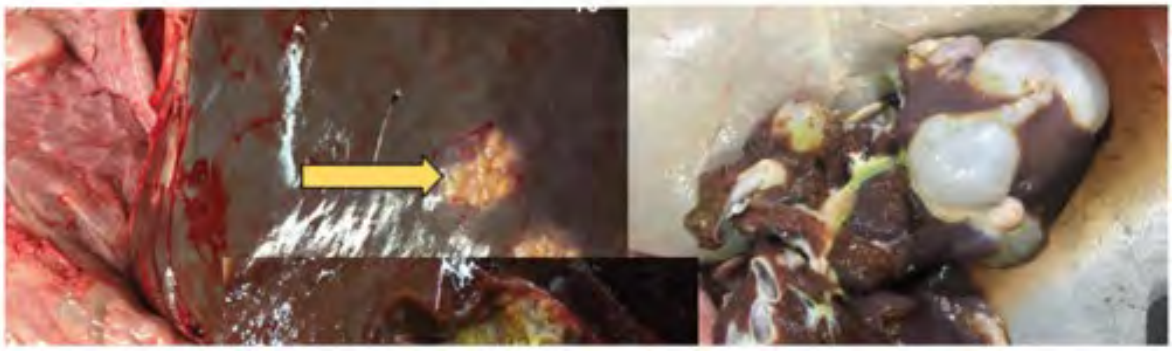
Echinococcosis (*Echinococcus granulosus*)

Liver Lesions (Yellow Arrows) are Hydatid Cysts (*Echinococcus* Life Stage)



Parasitic Conditions

Echinococcosis (*Echinococcus granulosus*)



Other Dispositions

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

Other Dispositions

Central Nervous System Disorder
Rabies
Tetanus
Moribund or **Dead**

- These would all be ANTEMORTEM dispositions (not identifiable at postmortem)
- Animals showing clear signs of CNS disturbances should be condemned, and APHIS notified
- Without diagnostics, the PHV may default to **Central Nervous System Disorder** in the ADR module

Other Dispositions

Icterus

Pigmentary Conditions

- These are POSTMORTEM dispositions (would not be identifiable or confirmable at antemortem)
- **Icterus** - Condemn carcass and viscera regardless of extent
- Any other **pigmentary condition** - Condemn affected parts only, unless it is so extensive that removal would be impracticable

Other Dispositions

Non-ambulatory Injuries

- All cattle, regardless of sub-class, are to be condemned at antemortem if found to be non-ambulatory
- **Injuries** should be used as the disposition when the carcass of an animal is so extensively affected by bruising (or other secondary effects, such as cellulitis) that trimming would be impracticable

Other Dispositions

Residues

- When there are lesions/signs of an underlying condition, positive/violative residue testing results may *support* a condemnation, but the reason for the disposition should remain the underlying condition (e.g., pneumonia, mastitis)
- When there is no sign of an underlying condition, but the PHV suspects residues may be present (e.g., possible beta-agonist use, injection site), and testing yields a positive/violative result, then **Residues** can be listed as the reason for condemnation

Other Dispositions

Skin Conditions

- Skin conditions may occasionally be identified at antemortem, though would not result in AM condemnation
- Examples including parasitic causes (mange, scab) or photosensitization
- May result in postmortem condemnation if a generalized effect is observed
- Be careful to distinguish possible vesicular/ulcerative conditions, which are reportable, from other skin conditions

Other Dispositions

Vesicular Diseases

- Cattle may be affected by foot and mouth disease (FMD), vesicular stomatitis (VS), malignant catarrhal fever (MCF), and others
- If vesicles are identified, retain animals as U.S. Suspect and contact APHIS through supervisory channels for diagnostic assistance
- Would only use **Vesicular Diseases** as the reason for disposition after laboratory confirmation

Other Dispositions

Misc. Degen. And Dropsical Conditions

- Antemortem - If extensive generalized interstitial edema (anasarca) is identified, condemn
- If edema is less extensive, animal would be designated as U.S. Suspect and examined by the PHV at postmortem
- PM disposition would be based on extent of edema and its effect on normal tissue - condemn if extensive and generalized
- If localized, trim and pass

Other Dispositions

Eosinophilic Myositis (EM)

- Most common lesions are irregularly distributed yellow-green, yellow-white, or red spindle shaped lesions in the heart and tongue
- May also find large, well-defined lesions in active muscle groups (round, shoulder, esophagus, brisket), but slight lesions may be found in other muscles
- Often only found after carcasses are fabricated into primal or smaller cuts
- Most readily detected in warm carcasses

Other Dispositions

Eosinophilic Myositis (EM)

When IPP identify possible EM lesions in muscle tissues, the PHV will perform a detailed examination as described in FSIS Directive 6100.6, Chapter II, Part II.

Click here for a review of the examination procedures:

Other Dispositions

Eosinophilic Myositis (EM)

PM Disposition

- Condemn affected parts when lesions are localized and only certain parts (heart, tongue, esophagus, head, etc.) are affected
- If carcass muscles other than the diaphragm and pillars are affected, refer to 311.35
- Condemn carcass if lesions are extensive and removal is impracticable
- Pass for cooked comminuted product after removal of lesions when lesions are slight and easily removable
- Carcasses condemned for EM may be eligible for use as animal food (requires FLS permission) - 9 CFR 314.11

Other Dispositions

Other Pigmentary Conditions

Xanthosis

- Usually a condition in older cattle, causes a brownish discoloration of muscle tissues
- Issue of wholesomeness - carcass may be passed if affected tissues can be trimmed

Carotenosis

- Excess intake of carotene in feed causes and orange-yellow discoloration usually affecting the liver
- Issue of wholesomeness - carcass may be passed after the liver is condemned

Metabolic storage diseases and other conditions may cause pigmentation of organs or muscle tissue. Disposition is based entirely on the extent of the condition.

Knowledge Check

The following quiz questions are for practice and review only

Knowledge Check

During antemortem inspection, which of the following would lead you to instruct IPP to observe animals from both sides?

a. You have recently issued several NRs for humane handling noncompliance
b. The establishment is slaughtering veal calves
c. The establishment is slaughtering cull dairy cows
d. The establishment is slaughtering steers and heifers under 30 months of age
e. High incidence of "acti" among cattle slaughtered at the establishment

Answer: The establishment is slaughtering veal calves, cull dairy cows, and high incidence of “acti” among cattle slaughtered at the establishment

Knowledge Check

Establishments may perform voluntary segregation procedures only with young cattle (6-24 months of age):

True or False

Answer: False

Knowledge Check

Which of the following findings (either at antemortem or postmortem) would be considered a **reportable** condition?

a. Actinobacillosis or actinomycosis
b. Traumatic reticulopericarditis (hardware disease)
c. Septicemia
d. Evidence of a central nervous system disorder
e. Observation of vesicles at antemortem

Answer: Evidence of a central nervous system disorder

Knowledge Check

Cattle that have had an inconclusive response to a tuberculin test administered in the field are categorized as:

a. TB Suspects
b. TB Reactors
c. TB Exposed Category 2
d. TB Exposed Category 1

Answer: TB Suspects

Knowledge Check

At postmortem, you are presented with the carcass and viscera of a 12-month-old heifer with an obvious **acute pericarditis**. You also observe a generalized lymphadenopathy, transudative fluid in the abdomen and thorax, and evidence of abnormal coagulation. When documenting your condemnation in PHIS, your **best choice** of reason for condemnation is:

a. Miscellaneous dropsical conditions
b. Pericarditis
c. Abscess/Pyemia
d. Septicemia

Answer: Pericarditis

Knowledge Check

A beef carcass is railed out for you because of suspected beef measles (cysticercosis). IPP identified suspicious gritty cysts in the heart and tongue. Having found lesions in two of the regular sites exposed during routine dressing and inspection, you know you will need to perform a more detailed examination to look for cysts at additional sites.

Which of the following is NOT part of your further examination for cysticercosis?

a. Transverse incision through the triceps brachii 2-3 inches above the point of the olecranon
b. Careful observation and palpation of the tongue and esophagus
c. Transverse incision through the round
d. Multiple parallel incisions into the liver

Answer: Multiple parallel incisions into the liver

Knowledge Check

While performing antemortem inspection of a pen of Hereford cattle, you notice one cow's right eye is obscured by a large mass that appears blackened and necrotic, with exudative fluid weeping from the site. You notice a foul odor even from about 10 feet away, and there are flies buzzing around the cow's head. She appears to be in good flesh. What is your antemortem disposition?

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

Answer: U.S. Condemned

Knowledge Check

If lesions of eosinophilic myositis (EM) are so extensive as to make trimming and removal impracticable, the carcass may still be passed for use in cooked comminuted product:

True or False

Answer: False

Knowledge Check

A cull dairy cow was presented in the SUSPECT pen at antemortem with a severely gangrenous mastitis in the left front quarter of the udder and a temperature of 105.7 degrees Fahrenheit. What is your *best* disposition option?

a. Antemortem condemn for Pyrexia
b. Designate as U.S. Suspect
c. Antemortem condemn for Mastitis
d. Postmortem condemn for Mastitis

Answer: Antemortem condemn for Pyrexia

Summary

- All bovines presented for antemortem inspection must be observed **at rest and in motion**
- Certain sub-classes should be observed from **both sides** (cull dairy cows, bob veal calves); for other sub-classes, the PHV is to use professional judgement
- Recall the special antemortem instructions for epithelioma of the eye, actinobacillosis/ actinomycosis, and tuberculosis
- Understand the general rules for disposition of inflammatory conditions: acute vs. chronic, localized vs. generalized
- Know the circumstances under which PHVs are expected to perform in-plant and collector-generated residue testing
- Know the general rules for disposition of neoplastic diseases, including specific rules for epithelioma and malignant lymphoma

The End

You have completed the **PHV Refresher Course - Cattle**!

Return to the course homepage to review resources, complete the Course Evaluation form, and return to AgLearn to complete your certification.

Slide	Score / Total
Slide 116: Antemortem Observation	**0/3**
Slide 117: Untitled True/False Question	**0/1**
Slide 118: Untitled Multiple Choice	**0/2**
Slide 119: Untitled Single Choice Set	**0/4**
Slide 120: Untitled Multiple Choice	**0/1**
Slide 121: Untitled Single Choice Set	**0/3**
Slide 122: Untitled Multiple Choice	**0/1**
Slide 123: Untitled True/False Question	**0/1**
Slide 124: Untitled Multiple Choice	**0/1**
Total Score	**0/17**

Show solutions Retry