

Post-mortem Inspection

OBJECTIVES

1. Define the purpose of post-mortem inspection.
2. Identify the statutes that provide FSIS the authority for conducting post-mortem inspection.
3. Identify the regulations that cover post-mortem inspection.
4. List the Directives that provide instructions on conducting post-mortem inspection procedures.
5. Identify the establishment responsibilities with regard to conducting post-mortem inspection.
6. Describe the process of conducting post-mortem inspection procedures.
7. Define how the establishment must dispose of condemned product.
8. Describe how to complete post-mortem reports.

INTRODUCTION

Post-mortem inspection covers the inspection of the carcasses and parts of meat and poultry used for human food. It takes place after ante-mortem inspection and after the animal or poultry has been slaughtered thus the term “post-mortem,” meaning “after death” in Latin. Post-mortem inspection covers the steps in the slaughter process that begin at stunning and ends at the step where the carcass is placed in the cooler.

The purpose of post-mortem inspection is to protect the public health by ensuring that the carcasses and parts that enter commerce are wholesome, not adulterated, and properly marked, labeled, and packaged. This means that any carcasses or parts that are unwholesome or adulterated, and thereby unfit for human food, do not enter commerce. In performing inspection methods, making regulatory decisions, documenting findings, and taking enforcement actions when appropriate, in relation to post-mortem inspection we are guided by the following statutes, regulations, directives, and notices.

If you are assigned to work in a large establishment, you will be supervising inspectors who perform the post-mortem inspection procedures. However, it may be necessary for you to perform the post-mortem inspection procedures for the inspectors while they take their breaks. If you are assigned to work in a very small establishment, you may be performing some or all of these procedures.

Statutes covering post mortem inspection

The statutory authority for post-mortem inspection is as follows.

Livestock:

FMIA Section 604. *“Post-mortem examination of carcasses and marking or labeling; destruction of carcasses condemned; reinspection. For the purposes hereinbefore set forth the Secretary shall cause to be made by inspectors appointed for that purpose a post-mortem examination and inspection of the carcasses and parts thereof of all cattle, sheep, swine, goats, horses, mules, and other equines to be prepared at any slaughtering, meat canning, salting, packing, rendering, or similar establishment in any State, Territory, or the District of Columbia as articles of commerce which are capable of use as human food; and the carcasses and parts thereof of all such animals found to be not adulterated shall be marked, stamped, tagged, or labeled as “Inspected and passed;” and said inspectors shall label, mark, stamp, or tag as “Inspected and condemned” all carcasses and parts thereof of animals found to be adulterated; and all carcasses and parts thereof thus inspected and condemned shall be destroyed for food purposes by the said establishment in the presence of an inspector, and the Secretary may remove inspectors from any such establishment which fails to so destroy any such condemned carcass or part thereof, and said inspectors, after said first inspection, shall, when they deem it necessary, reinspect said carcasses or parts thereof to determine whether since the first inspection the same have become adulterated, if any carcass or any part thereof shall, upon examination and inspection subsequent to the first examination and inspection, be found to be adulterated, it shall be destroyed for food purposes by the said establishment in the presence of an inspector, and the Secretary may remove inspectors from any establishment which fails to so destroy any such condemned carcass or part thereof.”*

Poultry:

PPIA Section 455(b). *“Post-mortem inspection: quarantine, segregation, and reinspection. The Secretary, whenever processing operations are being conducted, shall cause to be made by inspectors, post-mortem inspection of the carcass of each bird processed, and at any time such quarantine, segregation, and reinspection as he deems necessary of poultry and poultry products capable of use as human food in each official establishment processing such poultry or poultry products for commerce or otherwise subject to inspection under this chapter.”*

Regulations covering post-mortem inspection

The regulations that cover post-mortem inspection for livestock are as follows.

- 9 CFR 310.2 – States that the establishment must have a system that is used to identify livestock carcasses and parts to be used in the preparation of meat food products or in medical products (e.g., head, tail, tongue, thymus, viscera, blood, and other parts) as being derived from the particular animal involved until the post-mortem inspection of the carcass and parts is completed.
- 9 CFR 310.3 – States that any carcasses, organs, or parts in which any lesion or other condition is found that might render the meat or any part unfit for human food, or otherwise adulterated must be retained for veterinary disposition. The identity of the carcass, organs, and parts must be maintained until final disposition has been completed. Retained carcasses shall not be washed or trimmed unless authorized by FSIS.
- 9 CFR 310.4 – Identifies that U.S. Retained tags will be used to temporarily identify any carcasses, organs, or parts retained for veterinary disposition. These tags can only be removed by an FSIS employee.
- 9 CFR 310.5 – States that any carcass or part found upon final inspection to be unsound, unhealthful, unwholesome, or otherwise adulterated shall be conspicuously marked as U.S. Condemned. These carcasses or parts must remain in the custody of FSIS and disposed of according to the regulations before the close of the day upon which they are condemned.
- 9 CFR 310.6 – States that carcasses and parts that are passed for cooking only shall be marked U.S. Passed for Cooking, and must remain in the custody of FSIS until they are cooked according to 9 CFR 315.
- 9 CFR 310.8 – Describes passing and marking carcasses and parts. Those that are found to be sound, healthful, wholesome and otherwise not adulterated are marked U.S. Inspected and Passed. Those that show localized lesions are passed for food or for cooking, and the U.S. Retained tag is attached until the affected tissue is removed and condemned.
- 9 CFR 310.18(a) – States that *“carcasses, organs, and other parts shall be handled in a sanitary manner to prevent contamination with fecal material, urine, bile, hair, dirt, or foreign matter; however if contamination occurs it shall be promptly removed in a manner satisfactory to the inspector”*.
- 9 CFR 310.21 – Covers residues in post-mortem inspection. We will address this in a separate section of the training.
- 9 CFR 310.25 – Covers contamination of livestock carcasses and parts with microorganisms; process control verification criteria and testing; and pathogen reduction standards. You will learn about this in more detail when you attend the Food Safety Regulatory Essentials (FSRE) class.

- 9 CFR 311 – Covers diseased and otherwise adulterated carcasses and parts. You will learn more details about the specific diseases and disposition principles in the module called Multi-Species Dispositions.
- 9 CFR 314 – Covers how establishments must handle condemned and inedible carcasses and parts.
- 9 CFR 315 – Covers rendering or other disposal of carcasses and parts, and product that has been passed for cooking during post-mortem inspection.

The regulations that cover post-mortem inspection for poultry are as follows.

- 9 CFR 381.76 – Covers post-mortem inspection procedures for five systems: traditional systems, Streamlined Inspection System (SIS), New Line Speed (NELS) Inspection System, the New Turkey Inspection (NTI) System, and the Ratite Inspection System. Section 381.76(a) states that *“a post-mortem inspection shall be made on a bird-by-bird basis on all poultry eviscerated in an official establishment.”* Section 381.76(b) outlines the inspection procedures for each of these four inspection systems. It includes responsibilities of the establishment helper and trimmers, and requirements of establishment facilities. It also defines the maximum inspection rate, which is the line speed that is allowed for each inspection system. Inspection procedures and actions are outlined, as well as reinspection duties.
- 9 CFR 381.77 – Covers carcasses held for further examination. It indicates that each carcass or any parts in which there is a lesion of disease or other condition which might render it adulterated and with respect to which a final decision cannot be made upon first examination by the inspector shall be held for further examination. The identity of the carcass and all parts must be maintained until a final examination has been completed.
- 9 CFR 381.78 – Covers condemnation of carcasses and parts; and separation of poultry suspected of containing biological residues. Section 381.78(a) states that at any time during inspection a carcass or part is found to be adulterated, it shall be condemned, except any articles that may be made not adulterated by reprocessing if reprocessed under the supervision of an inspector and then found to be not adulterated. Section 381.78(b) states that *“when a lot of poultry suspected of containing biological residues is inspected in an official establishment, all carcasses and any parts of the carcasses in such lot which are condemned shall be kept separate from all other condemned carcasses or parts.”*
- 9 CFR 381.79 – States that *“each carcass and all organs and other parts of carcasses which are found to be not adulterated shall be passed for human food.”*

- 9 CFR 381.80 – Addresses biological residues. Section 381.80(a) states that the carcasses or parts found during post-mortem inspection or at any subsequent inspection to be affected with any diseases or conditions named in other sections of this subpart shall be disposed of in accordance to the section that pertains to the disease or condition. It states that because it is impractical to formulate rules for all diseases or conditions, the decision as to the disposal of all carcasses, organs, or other parts will be left to the inspector in charge, and if the inspector in charge is in doubt of the disposition to be made, he or she shall forward specimens from the carcasses to the laboratory for diagnosis. Section 381.80(b) states that all carcasses, organs, and parts shall be condemned if it is determined on the basis of a sound statistical sample that they are adulterated because of the presence of any biological residue.
- 9 CFR 381.81 – States that *“carcasses of poultry affected with tuberculosis shall be condemned.”*
- 9 CFR 381.82 – States that *“carcasses of poultry affected with any one or more of the several forms of the avian leukosis complex shall be condemned.”*
- 9 CFR 381.83 – States that *“carcasses of poultry showing evidence of any septicemic or toxemic disease, or showing evidence of an abnormal physiologic state, shall be condemned.”*
- 9 CFR 381.84 – States that *“carcasses of poultry with evidence of extensive involvement of the air sacs with airsacculitis or those showing airsacculitis along with systemic changes shall be condemned. Less affected carcasses may be passed for human food after complete removal and condemnation of all affected tissues including the exudate.”*
- 9 CFR 381.85 – States that *“carcasses of poultry showing evidence of any disease which is characterized by the presence, in the meat or other edible parts of the carcass, or organisms or toxins dangerous to the consumer, shall be condemned.”*
- 9 CFR 381.86 – States that *“any organ or other part of a carcass which is affected by an inflammatory process shall be condemned and, if there is evidence of general systemic disturbance, the whole carcass shall be condemned.”*
- 9 CFR 381.87 – States that *“any organ or other part of a carcass which is affected by a tumor shall be condemned when there is evidence of metastasis or that the general condition of the bird is found to have been affected by the size, position, or nature of the tumor, the whole carcass shall be condemned.”*
- 9 CFR 381.88 – States that *“organs or other parts of carcasses which are found to be infested with parasites, or which show lesions of such infestation shall be condemned and, if the whole carcass is affected, the whole carcass shall be condemned.”*

- 9 CFR 381.89 – States that *“any part of a carcass which is badly bruised shall be condemned and, if the whole carcass is affected as a result of the bruise, the whole carcass shall be condemned. Parts which show only a slight reddening from a bruise may be passed for food.”*
- 9 CFR 381.90 – States that *“carcasses of poultry showing evidence of having died from causes other than slaughter shall be condemned.”*
- 9 CFR 381.91 – 381.91(a) states *“that carcasses of poultry contaminated by volatile oils, paints, poisons, gasses, scald vat water in the air sac system, or other substances which render the carcasses adulterated shall be condemned.”* Section 381.91(b)(1) states that any carcass accidentally contaminated during slaughter with the contents of the digestive tract shall not be condemned if promptly reprocessed under the supervision of an inspector and subsequently found not to be adulterated. Contaminated surfaces that are cut shall be removed only by trimming. Contaminated inner surfaces that are not cut may be cleaned by trimming, or at an approved reprocessing station away from the main processing line may be cleaned by a method that will removed the contamination, such as vacuuming, washing, and trimming. All visible specks of contamination must be removed and if the inner surface is reprocessed by a method other than trimming alone, all surfaces of the carcasses shall be treated with chlorinated water. Section 381.91(b)(2) states the conditions under which FSIS will approve a reprocessing station.
- 9 CFR 381.92 – States that *“carcasses of poultry that have been overscalded, resulting in a cooked appearance of the flesh, shall be condemned.”*
- 381.93 – Section 381.93(a) states that putrefied or stinking carcasses shall be condemned. Section 381.93(b) states that any part of a carcass which is green struck shall be condemned, and if the whole carcass is affected it shall be condemned. Section 381.93(c) states that carcasses affected by post-mortem changes that are superficial can be passed for human food after removal and condemnation of affected parts.
- 9 CFR 381.94 – Covers contamination with microorganisms; process control verification criteria and testing; and pathogen reduction standards. You will learn more about these requirements and the procedures that you perform to verify compliance when you attend the Food Safety Regulatory Essentials (FSRE) training.
- 9 CFR 381.95 – Covers the disposal of condemned poultry products.

Directives and Notices related to post-mortem inspection

The Directives that cover the procedures for post mortem inspection are found in the 6000 series. Following are some examples of these directives.

- [FSIS Directive 6100.1, Post-mortem Livestock Inspection](#)
- [FSIS Directive 6100.3, Ante-mortem and Post-mortem Poultry Inspection](#)
- [FSIS Directive 6120.1, Finished Product Standards Program for the New Line Speed Inspection System and the Streamlined Inspection System](#)
- [FSIS Directive 6170.1, Ratite Ante-mortem and Post-mortem Inspection](#)
- [FSIS Directive 6210.2, Inspection of Poultry Feet that are Presented as Eligible to Receive the Grant of Inspection](#)
- [FSIS Directive 6240.1, Inspection, Sampling, and Disposition of Animals for Tuberculosis](#)

- [FSIS Notice 08-11 Inspection Responsibilities and Authorities for Slaughter or Evisceration Line Speed Process Control](#)

The regulations and directives provide the instructions for performing inspection procedures, making regulatory determinations, documenting noncompliance when appropriate, and taking regulatory actions.

ESTABLISHMENT RESPONSIBILITIES

The primary responsibility of the establishment is to ensure that its production processes result in the safe and wholesome product. In addition, FSIS regulations outline some responsibilities of the establishment that are specifically related to post-mortem inspection. There are two of these responsibilities:

- sanitary practices in preparing the carcass for post-mortem inspection,
- presenting carcasses and parts for inspection in a specified manner (called presentation), and
- facility requirements at the inspection stations

In general, the establishment's procedures to prepare livestock or poultry for inspection must take place in sanitary conditions and must use sanitary procedures to prevent contamination of the carcasses and parts (9 CFR 310.18, 381.91, and 416). For example, during livestock slaughter, the establishment must use sanitary dressing procedures to remove and skin the head, dehide or dehair and eviscerate the carcass, wash the head and carcass, and split and trim the carcass. In poultry slaughter, the establishment must use sanitary procedures to removing feathers and feet, open the carcasses, eviscerate, and shackle the carcasses.

The establishment must also ensure that the carcasses are presented for inspection in a specified manner (307, 381.76). For example, they must be hung on the line in a specified manner and spaced appropriately. The organs of livestock must be displayed in a specified order so that the inspector does not have to spend time locating them before he or she performs inspection procedures. Proper presentation helps to ensure consistent and accurate inspection. There are variations in the ways in which an establishment will present carcasses and parts for inspection. You will learn about these during the in-plant portion of your training.

The establishment is also responsible for providing appropriate inspection stations that meet regulatory requirements (307.2, 381.76). The requirements vary depending on the type of equipment used at the establishment. For example, in large livestock slaughter establishments, there may be separate inspection stations for heads, viscera, and carcasses. In large poultry slaughter establishments, there may be separate inspection stations for carcasses and for carcasses that are salvaged and reprocessed. However, if you are assigned to a very small establishment, inspection for all of the regulatory requirements may take place in one location. Regardless of the number or placement of the inspection stations, the following conditions must be provided by the establishment.

- Adequate space for conducting inspection (e.g., the size and height of the on line inspection station) (307.2(m)(1), 381.36)
- Adequate lighting for conducting inspection (307.2(b), 307.2(m)(2), 381.36)
- Hand rinsing facilities to ensure that sanitary conditions are maintained (307.2(m)(3), 381.36(c)(1)(viii))
- Condemned containers for disposal of condemned carcasses or parts (307.2(e), 381.36)

These requirements are necessary to ensure that there are adequate provisions to allow for inspection duties to be conducted appropriately.

POST-MORTEM INSPECTION PROCESS

Overview

During this section of the training, we will cover the post-mortem inspection procedures. Just as was true in ante-mortem inspection, there are three possible outcomes of the inspection.

1. passed, and thus eligible to receive the marks of inspection (310.8, 381.79);
2. suspect, which must be retained for veterinary disposition (310.3, 381.77); and
3. condemned, which is not eligible to receive the marks of inspection and cannot enter commerce (310.5, 381.78)

As the public health veterinarian, you may be responsible for making dispositions on carcasses and parts that are suspect. We will introduce the diseases and conditions in this module, but we will cover the specific details of veterinary disposition in another module, “Multi Species Disposition.” It is during this step that the final determination is made whether to pass or condemn the carcass and parts. The primary guiding principle is whether the carcass, organ, or part is adulterated, or whether it is wholesome and fit for human food.

Sanitation

You and all other inspection personnel must always maintain proper employee hygiene when conducting inspection procedures. In most cases, the establishment will have a set of requirements, such as standard operating procedures, that are required for establishment employees. These are required by 9 CFR 416.5. For example, they may include requirements for employee hygiene such as hand washing, hair and beard nets, and using foot washes when moving between edible and inedible areas of the establishment. You must meet or exceed those standards. In addition, off line inspectors are responsible for verifying that the establishment is preparing the carcass and parts in a sanitary manner. This includes ensuring that the equipment, utensils, or any other such item used in preparing the carcass and parts are sanitary, and that the conditions in the establishment are sanitary. The establishment is required to have and to follow a set of procedures to maintain sanitary operations. We will cover the regulatory requirements and how they are verified for employee hygiene and sanitary operating procedures later when we cover the Sanitation Performance Standards and the Sanitation Standard Operating Procedures (Sanitation SOPs) that are in 9 CFR 416.

Safety

You must maintain safety with regard to the use tools, such as hooks and knives, which are used as part of the inspection process. You will learn the appropriate techniques to maintain safety, such as knife sharpening techniques and how to use hooks, during your in-plant training. There is also a separate module on in-plant safety practices.

General methods of post-mortem inspection

The general methods you will use to detect diseases, abnormalities, and contamination will involve your senses. These include:

- Sight – observing a disease lesion (abscess, tumor).
- Feel – palpating (feeling an abnormal lump in tissues, feeling abnormal firmness in an organ).
- Smell – smelling the urine odor of uremia, smelling the contents of a broken abscess).

- Hearing – listening to a carcass fall off the line on to the floor.

The importance of lymph nodes in livestock post-mortem inspection

In order to detect diseases and contamination, you have to direct your attention to an area where they are likely to be observed. Diseases, abnormalities, and contamination can occur at any place on the carcass or its parts. However, diseases and abnormalities are mostly likely to produce visible or palpable lesions in specific locations. Of primary importance in organoleptic detection of disease is the lymphatic system. The lymphatics consist of vessels throughout all tissues which lead to lymph nodes. Lymph nodes range in size from just visible to 3 to 4 inches across. Their appearance has been variously described as “egg shaped” to “cigar shaped” to “spherical.” All these shapes can be normal. The consistency (firmness) is between that of warm fat and muscle. The color ranges from grey-brown to fat-colored. Some have light and dark markings. The normal range of appearances is wide, depending on the age of the animal, breed, species, and location in the body. The best way to learn what is “normal” is to look at all the lymph nodes you can under the direction of your mentor who will explain what you see.

Lymph nodes function as filters for disease microorganisms and abnormal or toxic chemicals in the tissue fluids of the body. An example you may have seen is “blood poisoning” in a hand or finger of a person. Red streaks that are not blood vessels become visible up the arm and a lump, with swelling and pain, develops in the armpit. The red streaks are inflamed lymph vessels. These are normally invisible to the eye. The lump is formed by the inflamed proper axillary lymph nodes. Under the skin you can see the redness and enlargement of the nodes. When diseased organisms or toxins begin to spread around the body, the lymph nodes are among the first tissues to become visibly affected. This is the inspector’s signal that something is wrong.

The major lymph nodes are located in specific places and the fluids draining through their filter mechanism comes from specific areas of the body. The veterinarian examines the carcasses and parts retained by the inspectors. The lymph nodes and tissue responses found during these detailed examinations indicate the location and severity of the condition, and whether or not the disease has begun to spread around the animal’s body. By evaluating these and the ante mortem findings, plus laboratory results if necessary, the veterinarian determines the acceptability of the carcass and parts for human food.

Some lymph nodes and tissues need to be incised so that the internal portions can be observed. The incision technique is critical. First, the cut edges must be smooth, not ragged or torn. Otherwise, the lesions of certain important diseases are difficult to detect. Lymph nodes should be sliced in thin parallel slices to expose the body of the node. Tuberculosis lesions, some abscesses, and other conditions are exposed by incision of lymph nodes. The wrist rolling motion that you will learn from your mentor permits you to observe both sides of the slice.

Livestock post-mortem inspection

The post-mortem inspection process for livestock involves the following steps:

- head inspection,
- viscera inspection, and
- carcass inspection

No step in the inspection process may be omitted.

In large establishments, inspectors are assigned to cover one of these areas and rotate to different sites according to a rotation pattern. At small or very small establishments, the inspector may perform all of the post-mortem inspection procedures on each animal. The inspection routines differ for each inspection site in each species. The differences reflect variations in anatomy, diseases, and method of dressing that the establishment uses.

In general, when abnormalities are observed while performing inspection, the following actions must take place:

1. If the disease or condition of the head, organ, or carcass is localized, have the establishment trim the affected tissues.
2. If the disease or condition is generalized and affects the majority of the head, organ, or carcass retain it for veterinary disposition.

The specific details for the inspection procedures for each of the livestock species covered by the regulations – cattle, sheep, and swine, equine – differ. However, there are similarities. We will walk through the general steps involved in swine post-mortem inspection as an example of post mortem inspection procedures. The post-mortem inspection procedures for other species are shown in the Appendix of this module. You will learn more about making veterinary dispositions when we cover the module Multi Species Dispositions.

In order to perform inspection procedures appropriately, you must be familiar with the anatomy of a livestock carcass and its parts. For example, for swine post mortem, the example we will be using, you will need to learn how to locate and identify the mandibular lymph nodes in the head; the mesenteric, hepatic, and tracheobrochial lymph nodes in the viscera; the lungs, heart, and the liver; and the kidneys of a carcass. The Appendix provides schematics outlining livestock anatomy.

Example: Swine head inspection

The head inspection procedures for swine are as follows:

1. Observe head and cut surfaces – the eyes, fat, cheek muscles, and other tissues for abnormalities.
2. Incise and observe the right and left mandibular lymph nodes – examine the closest tissues first.
3. When abnormal conditions are observed, retain the head for veterinary disposition.

Your veterinary mentor will show you how to perform these procedures in detail.

Here are some common abnormal conditions observed during head inspection.

- 311.2 - Tuberculosis may be detected during head inspection in varying degrees. The inspector must condemn the head if any amount of tuberculosis is found in the head during head inspection. The head is usually stamped at the viscera inspection station and the nodes in the jowls removed and condemned as required. Ensure that the carcass is also identified with a retain tag.
- Abscesses are another common finding during the inspection of the head. When slight, small, well-encapsulated abscesses are found on head inspection, the carcass should be tagged. When well-marked or extensive abscesses are seen, the carcass should be tagged by the head inspector. Ultimately, the disposition of the extensive or well-marked abscessed head will be condemnation (probably at the viscera inspection station) and the affected areas in the jowl will be removed and condemned.
- At the head inspection station you may see atrophic rhinitis. Swine with atrophic rhinitis may have a characteristic nose disfiguration, absence of nasal turbinate bones, and small amounts of pus or exudate in the nasal sinuses. The turbinate soft tissues may be present, but they are folded against the nasal cavity wall since the supporting bony structure has disappeared. Since this condition is usually localized, head tissues can be removed without contamination and saved for food.

In addition to observing abnormal conditions in heads, post-mortem inspectors also identify improper presentation by the establishment. Here are some examples of improper presentation of swine for inspection:

- Head missing – the head can't be inspected if it is missing. Remember, you must be able to determine at all times which parts belong to a carcass (310.23). Therefore, the establishment must have a method of identifying the carcass and all its parts (e.g., tag).

- Mandibular lymph nodes left in the neck instead of on the head.
- Hog rings — these should have been removed as part of the cleaning operation prior to head inspection.
- Ear tags and rosin contamination.

Based on the severity and the frequency of the improper presentation, certain actions should be taken by inspection.

1. First, direct the designated establishment personnel to immediately remove the condition of improper presentation and delay inspection procedures until the condition is removed.
2. If action in #1 does not result in proper presentation, direct the designated establishment employee to stop the line and remove the condition if it cannot be removed prior to the carcass leaving the inspection area.
3. If conditions exist to the extent that the line has to be stopped repeatedly, delay inspection and ask establishment management to correct the problem.
4. The IIC may require the establishment to reduce the line speed until the conditions are favorable.

Note: Examples for head inspection of different species (e.g., cattle) are shown in the Appendix.

Example: Swine viscera inspection

Viscera include the contents (organs) of the animal's abdominal cavity. You must be able to determine at all times which parts belong to a carcass. Therefore, the establishment must have a method of identifying the carcass and all its parts (e.g., tag).

Viscera inspection includes the following steps:

1. Observe the eviscerated carcass, viscera, and parietal l (top) surface of spleen.
2. Observe and palpate mesenteric lymph nodes.
3. Palpate portal lymph nodes.
4. Observe dorsal (curved) surface of lungs.
5. Palpate bronchial lymph nodes – right and left.
6. Observe mediastinal lymph nodes.
7. Turn lungs over and observe ventral (flat) surfaces.
8. Observe heart.
9. Observe dorsal (curved) surface of liver.

10. Turn the liver over and observe ventral (flat) surface.

Your veterinary mentor will show you how to perform these procedures in detail.

When abnormal conditions are observed, retain the viscera for veterinary disposition.

Here are common abnormal conditions that are observed during viscera inspection.

- 311.7 - Arthritis--joints with localized arthritis and corresponding lymph nodes shall be removed and condemned during dressing operations and before inspection is completed.
- 311.16(a)(1) - Pleuritis--localized, chronic pleuritis with adhesions may be "peeled out" with the remainder of the carcass passed for food. If pleuritis is acute, extensive, or other associated pathology is present, the carcass and its parts should be retained for veterinary examination.
- 311.16(a)(1) - Pneumonia--lungs that have been contaminated with scald vat water resemble lungs with pneumonia
- 311.16(a)(7) - Nephritis--one or both kidneys may be affected. Localized conditions require the affected kidney(s) to be removed and condemned. If there is doubt as to whether the condition is localized to the kidney or if other pathology exists, the carcass should be retained.
- 311.16(a)(7) - Embryonal nephroma--these are tumors of the kidney. Generally, they are benign and occur more commonly in young animals. These should be retained for veterinary disposition.
- 311.16(a)(7) - Hydronephrosis--one of both kidneys literally become a "bag of water". Normal kidney tissue is replaced by fluid. There is generally no effect upon the carcass. Affected kidneys are removed and condemned.
- 311.20 - Sexual odor--each boar hog that is slaughtered should be screened for the pungent sexual odor that is characteristic in some boar hogs. If sexual odor is detected by the viscera inspector, the carcass and viscera should be retained for veterinary disposition.
- 311.16(a) - Pericarditis--if acute, extensive, or other pathology is detected, retain for veterinary disposition. If pericarditis is localized and chronic (adhesions of the pericardial sac to the wall of the heart), the heart and pericardium is condemned, but the carcass may be passed for food.

- 311.24 - Cysticercosis (pork measles)--a parasitic condition caused by a tapeworm cyst (*Taenia solium cysticercus*). Similar to beef measles, it can affect any muscle tissue in the carcass. In pork, the heart seems to be the most common site. The carcass and parts must be retained for the veterinarian to examine.
- 311.19 - Icterus--the carcass has a lemon-yellow appearance. Icterus particularly affects connective tissues (tendons, ligaments, sclera of the eye, etc.). Carcasses affected with any degree of icterus are retained for veterinary disposition.
- 311.3 - Hog cholera--identified by such findings as hemorrhagic lymph nodes and red spots on belly and legs, and possibly a "turkey egg" kidney. If abnormal hemorrhages are observed, the carcass should be retained for veterinary disposition.
- 311.17 - Septicemia--a generalized inflammatory conditions caused by pathogenic bacteria and associated toxins in the blood. Most, or all, of the body lymph nodes may be enlarged, hemorrhagic, and edematous. Kidneys may have petechiae (small pinpoint hemorrhages). Other pathology may be present. Retain the carcass for veterinary disposition.
- 311.24 - Ascarids--the larva of these roundworms frequently migrate through the liver and cause scarring on the livers surface. "Slight" scarring may be trimmed (spotting the liver). More than slight evidence of ascarids requires the liver to be condemned.
- 311.14 - Abscesses--If the carcass has been tagged by the head inspector for a slight cervical abscess and the viscera inspector finds tuberculosis (TB) in the viscera, the carcass and viscera must be retained for veterinary disposition. If no lesions are found in the viscera, the viscera inspector will permit the head to be used for food after complete removal and condemnation of the mandibular and adjacent lymph nodes in the jowls. However, if the establishment does not choose to trim as described, the head and jowls will be condemned.
- 311.12 - Tuberculosis (TB)--the primary seats of TB are defined as the mandibular, the mesenteric, and the mediastinal lymph nodes in swine. These sites are regarded as the primary seats for disposition purposes only and do not necessarily have any correlation with the frequency at which tuberculosis is found in any location. Probably the most common sites at which tuberculosis lesions would be found would be the mandibular and mesenteric nodes and the liver. The food inspector is authorized to make a limited disposition for tuberculosis on a swine carcass with TB lesions in only one primary seat. For example, if tuberculosis is found in the mesenteric lymph nodes only, it is not necessary to tag the carcass and retain it. However, if there is TB in more than one primary seat or in any site other than a primary seat, then that carcass and viscera must be retained for veterinary disposition.

- 311.30 – Suffocation (Asphyxia) - a scarlet red appearance of the carcass and organs that are engorged with blood; must be retained for veterinary disposition.

As in head inspection, there are various forms of improper presentation that occur at the viscera inspection station. Contamination with feces or ingesta is one of the most common defects. Hair, toenails, pus, bile, and parts of viscera missing are other common examples of improper presentation. When improper presentation occurs, take the same actions as when it occurs at head inspection, which includes the following.

1. First, direct the designated establishment personnel to immediately remove the condition of improper presentation and delay inspection procedures until the condition is removed.
2. If action in #1 does not result in proper presentation, direct the designated establishment employee to stop the line and remove the condition if it cannot be removed prior to the carcass leaving the inspection area.
3. If conditions exist to the extent that the line has to be stopped repeatedly, delay inspection and ask establishment management to correct the problem.
4. The IIC may require the establishment to reduce the line speed until the conditions are favorable.

Note: Examples for viscera inspection of different species (e.g., cattle) are shown in the Appendix.

Example: Swine carcass inspection

There are four steps to carcass inspection.

1. Observe the back of the carcass. This may involve observing it in a mirror, or turning the carcass manually
2. Observe the front parts and the inside of the carcass.
 - a. Observe all cut surfaces.
 - b. Observe all body cavities (pelvic, abdominal, and thoracic).
 - c. Observe the lumbar region.
 - d. Observe the neck region.
3. Grasp, turn, and observe the kidneys (both sides).

Your veterinary mentor will show you how to perform these procedures in detail.

If abnormal conditions seen on carcass inspection do not require veterinary disposition, the inspector can have the establishment employee properly trim the carcass. However, some abnormal conditions require retention for veterinary disposition. Here are some examples of abnormal conditions that may be seen during carcass inspection.

- 311.7 - Arthritis--arthritis in a joint may be indicated by the appearance of the lymph nodes associated with that joint. For example, enlarged, darkened internal iliac lymph nodes are a common finding with arthritis in the hindquarters.
- 311.14 - Abscesses--abscesses may be found anywhere in the carcass or its parts.
- 311.6 - Diamond skin disease--these carcasses should be retained for veterinary disposition. While most are trimmed and passed for food, the veterinarian may find systemic involvement and condemn the carcass.
- 311.16(a)(7) - Nephritis
- 311.24 - Cysticercosis--cysticercosis (measles), or cysts, can be found in any muscle tissue. Retain for veterinary disposition.
- 311.13 - Melanoma--these are tumors that contain black pigment (melanin). Retain these for veterinary disposition.
- 311.11 - Neoplasm (malignant lymphoma)--these tumors are commonly found in and around lymph nodes, but may be detected anywhere. They are always considered malignant and must be retained for the veterinarian. Anytime you detect an abnormal mass (tumor), you should retain the carcass for veterinary disposition.
- 311.16(a)(7) - Cystic kidney--clear, fluid filled cysts of varying sizes. Condemn the kidneys (unless the condition is slight) and pass the carcass for food.
- 311.16(a)(7) - Embryonal nephroma--retain for veterinary disposition.
- 311.24 - Kidney worms--this condition can also be seen in the soft tissue of the carcass and abdominal viscera. Generally this is a localized condition. Condemn the kidney and affected tissues.
- Adhesions--these fibrous bands form as a chronic response to inflammation and are an attempt by the body to heal. They cause parts/organs to be joined abnormally. Condemn affected parts and pass the carcass if no other pathology is noted.

- 311.14 - Abscess in the backbone--always check carefully along the backbone of the split carcass. It is possible to see abscesses, neoplasms (tumors), or evidence of trauma (fractures and bruising).
- 311.14 - Bruises--bruised tissue should be trimmed and condemned. If evidence of infection exists, retain the carcass for veterinary disposition.
- 311.2 - Cervical tuberculosis – retain the carcass for veterinary disposition.
- 311.14 - Slight cervical abscess, or well-marked or extensive abscess – retain the carcass for veterinary disposition.
- 311.30 – Suffocation (Asphyxia) - a scarlet red appearance of the carcass and organs that are engorged with blood; must be retained for veterinary disposition.
- 310.18(a) - Contamination (Overscald) – carcasses that have been overscalded will have a cooked appearance and will usually have varying degrees of mutilation and contamination of tissues with scald vat water.

Once again, when improper presentation occurs, take the same actions as when it occurs at head or viscera inspection, which includes the following.

1. First, direct the designated establishment personnel to immediately remove the condition of improper presentation and delay inspection procedures until the condition is removed.
2. If action in #1 does not result in proper presentation, direct the designated establishment employee to stop the line and remove the condition if it cannot be removed prior to the carcass leaving the inspection area.
3. If conditions exist to the extent that the line has to be stopped repeatedly, delay inspection and ask establishment management to correct the problem.
4. The IIC may require the establishment to reduce the line speed until the conditions are favorable.

Note: Examples for carcass inspection of different species (e.g., cattle) are shown in the Appendix.

Poultry post-mortem inspection

Post-mortem inspection for poultry focuses on each carcass, its organs, and parts. The specifics of the procedures will vary depending on which of the five inspection systems – traditional, SIS, NELS, NTIS, or Ratite – is being used at the establishment. You will learn the specifics of the inspection procedures in-plant with your mentor. However, following is a general overview of the

procedures that must be performed. If you are working at a very small or a small establishment, you may perform all of the inspection procedures yourself. If you work at a large establishment, there will be inspection stations where different inspection procedures are performed.

The purpose of post-mortem inspection is to make a decision about the wholesomeness of each poultry carcass inspected. One of the following outcomes will result from post-mortem inspection.

- If the carcass is wholesome and normal without any localized disease condition, it is passed and allowed to continue down the line. (381.79)
- If the carcass is wholesome except for a localized disease condition, it is retained (381.77). It is typically routed to an area where it can be trimmed so that the unwholesome or diseased portions are removed. These removed materials are considered to be inedible and are condemned. The remainder of the carcass which is now wholesome or free of disease is allowed to continue after removal of the affected areas to become passed product.
- If there are conditions that make the carcass exhibits abnormal signs that indicate it is unwholesome or diseased, the entire carcass is condemned (381.78(a)).

The final consideration for carcass disposition is questionable carcasses that require further examination. Borderline or questionable carcasses are placed on the hang back or retain rack pending further review. When the inspector is undecided about the proper disposition of a carcass, the helper is notified to place the carcass on the hang back or retain rack. The public health veterinarian reviews all such carcasses and makes a final disposition of whether to pass, trim, or condemn the bird.

The philosophy of carcass disposition is based on the interpretation of an interrupted disease process. Dispositions are made on carcasses based on the stage of disease development and the resolution of the disease or processes at the time of slaughter. If a disease process exists in the live animal, the pathogenesis of the disease stops at the time of slaughter, but the lesions of the disease will remain. Our responsibility as regulators is to evaluate and interpret the pathological lesions present after the animal is slaughtered and prepared for post mortem inspection. Consider the following factors.

At the time of slaughter:

- Is there evidence that the disease process is being resolved?
- Has it developed into an irreversible stage?
- If it is being resolved, it will show evidence of healing (e.g., connective tissue walling off lesions, minimal evidence of inflammation, and a return to functional activity of the tissues).

- If there is systemic involvement, the carcass is unwholesome and shall be condemned.
- If only a part or a localized area of the carcass is affected, remove the affected portion and pass the remainder of the carcass as wholesome.

The Regulations specifically tell us what to do in the case of some disease conditions. The conditions are listed on FSIS Form 6000-16 (Lot Tally Sheet), and the criteria for condemnation in each category is as follows.

FSIS Directive 6210.1 covers post-mortem disposition of poultry products.

Let's review the disease conditions and inspection determinations that you must make.

- 381.81 - Tuberculosis

Avian tuberculosis (TB) is caused by the bacterium *Mycobacterium avium* and usually is a chronic, slowly developing disease. For this reason, it is not identified in young healthy uniform flocks of poultry, as are typically presented for slaughter in large establishments. In addition, this disease has largely been eradicated in domestic poultry in the U.S. but is still found occasionally in mature birds.

Birds with TB develop a wasting condition characterized by loss of weight and diarrhea. At post mortem examination their carcasses are typically emaciated. Gray to yellow, firm nodules (tubercles) are often scattered along the intestines and may be found in various organs, especially the liver and spleen. Lungs generally have no gross lesions although, in advanced cases, any organ or tissue can be involved.

Avian tuberculosis can infect humans but is not considered to be a serious threat to people with healthy immune systems.

One definitive lesion is all that is required to condemn a poultry carcass for tuberculosis.

- 381.82 - Leukosis

This category includes several neoplastic diseases caused by various viruses. All produce tumors in domestic poultry and present similar gross lesions.

The age and species of bird affected by leukotic tumors suggests which viral agent is involved.

The most common manifestations of the leukosis complex are:

- ▶ Marek's disease, which is an important disease only in young chickens less than six months of age
- ▶ Lymphoid leukosis, which is most common in semi-mature and mature chickens
- ▶ Reticuloendotheliosis, which occasionally produces liver and spleen tumors in turkeys and, rarely, runting disease in chickens
- ▶ Lymphoproliferative disease, which affects turkeys, producing a greatly enlarged spleen as well as tumors in other organs.

There is no evidence that viruses of the leukosis complex are pathogenic for humans.

One definitive lesion justifies condemnation of the carcass. Definitive means a lesion that can be defended grossly as a lesion of leukosis.

- 381.83 - Septicemia/toxemia

Septicemia is a disease state caused by pathogenic (disease producing) microorganisms in the blood that have produced systemic change within the bird. Systemic change affects the body as a whole, rather than localized portions of it.

In septicemia, the normal functions of the bird's organ systems are disrupted. The cells of the body deteriorate. This deterioration may be very rapid when highly virulent microorganisms are the cause, or it may be more gradual if less virulent ones are involved.

In some cases, the changes produced by septicemia overwhelm the bird and result in death. In other cases, the bird's immune system overcomes the causative organism before irreversible damage occurs and it recovers.

Septicemia is manifested by a group of clinical signs, not all of which will be present in a single carcass. Therefore, judgment plays an important part in correct dispositions for this condemnation category. Septicemic carcasses frequently have:

- ▶ petechial (pinpoint) hemorrhages on the heart, liver, kidneys, muscles, and serous membranes

- ▶ blood-tinged exudate in the body cavity (this can also be seen when birds are improperly stunned, so other changes must also be evident)
- ▶ swollen and hyperemic (contain an excess of blood) liver and spleen (remove most of the bacteria from the circulating blood)
- ▶ swollen and congested kidneys
- ▶ hyperemic skin (must be differentiated from changes seen in cadavers)
- ▶ muscle wasting (Some of this is caused by loss of appetite but most skeletal muscle breakdown is the result of changes in muscle metabolism that triggers protein degradation.)

Depending upon the cause and duration of septicemia, carcasses might be hyperemic, cyanotic, anemic, dehydrated, edematous, or exhibit a combination of these signs. It is important to remember that no single carcass will show all of these signs.

Toxemia is poisoning caused by the absorption of toxins produced by infective organisms, shows signs similar to septicemia. Both conditions often exist simultaneously. It is not necessary for the food inspector to differentiate between these two conditions. The Agency considers both conditions under the general category of septicemia/toxemia, commonly referred to as sep/tox. If a carcass shows systemic change, as described above, it is condemned for sep/tox.

- 381.86 - Synovitis

Synovitis is caused by a number of organisms, most often members of the genus *Mycoplasma*. Injury and nutritional deficiencies also lead to synovitis. The result is acute or chronic inflammation of the membranes lining one or more joints and tendon sheaths.

Joints are often noticeably swollen and might contain varying amounts of exudate. The liver, kidneys, and spleen may be swollen. In addition, the liver is sometimes stained green from bile stasis because the bird was too painful to move, and therefore did not eat. Lesions vary depending upon whether or not the condition is confined to the joints or has overwhelmed the bird's defense mechanisms and caused systemic changes.

A carcass with synovitis is not condemned *unless* it also shows systemic or sep/tox changes.

- 381.87 - Tumors

This category refers to tumors other than those of the leukosis complex and keratoacanthomas. Some of the more common tumors include squamous cell carcinomas, adenocarcinomas, leiomyomas, and fibromas.

- ▶ Adenocarcinomas generally are located on abdominal organs and are common in older birds.
- ▶ Leiomyomas are most often identified in the oviduct of fowl.
- ▶ Fibromas may develop in any connective tissue. They are more common in older birds.
- ▶ Numerous other types of tumors occur in domestic poultry but at a low frequency.
- ▶ There is no evidence that any of these types of tumors are a health threat to humans.

Condemn a carcass for tumors if there is gross evidence of metastasis (more than one tumor indicating spread). The *general rule* is: one tumor - trim and pass; two or more tumors - condemn. This general rule does *not* apply to keratoacanthomas or to tumors of the leukosis complex.

Keratoacanthomas (squamous cell carcinomas): Keratoacanthomas (squamous cell carcinomas) are skin tumors found in young chickens. Condemn young chickens showing *generalized* signs of avian keratoacanthoma (squamous cell carcinomas) with large coalescing, or large multiple dermal ulcers. Trim all tumors and pass chickens with localized or only a few small keratoacanthoma lesions.

- 381.89 - Bruises

If bruises cause systemic change in a carcass, or if there is *no* part of the carcass that can be salvaged, the carcass is condemned and recorded under this category. Otherwise, if *any part can* be salvaged from the carcass, the bruises are trimmed and the remainder of the carcass is passed.

- 381.91 - Cadaver

Poultry that die from causes other than slaughter are condemned under the cadaver category. These birds are not dead when they enter the scald vat. When submerged in the water, they drown, and their physiological reaction to the heat is to dilate the vasculature in the skin. This is what causes the skin to become red. Birds that die from slaughter are dead when they enter the

scald vat, and their bodies are not able to react physiologically to the heat of the scald water. Therefore, their skin does not become red.

- 381.91 - Contamination

This category is for carcasses that are so contaminated they cannot be inspected. This includes carcasses:

- ▶ contaminated with bile or feces to the extent that the inspector cannot determine whether the carcass is wholesome
- ▶ that fall into open sewers or evisceration troughs

- 381.92 - Overscald

Carcasses that are cooked are condemned. The muscle must be cooked through the level of the *deep pectoral* muscle in order to be classified as an overscald. Simply having a superficial cooked appearance does not make a carcass overscalded. Many times overscalded carcasses will also be mutilated by picking machines. However, carcasses that are not cooked to the level of the deep pectoral muscle may also be mutilated by the picking machines. These carcasses should not be condemned for overscald, but should either be salvaged or condemned for contamination, depending upon the extent of the damage. If a carcass is to be condemned for overscald, the deep pectoral muscle must have a cooked appearance.

- 381.74 - Airsacculitis

Numerous microorganisms cause airsacculitis, which is inflammation of air sacs. Many times there is more than one infectious agent identified in an outbreak. Bacteria of the genus *Mycoplasma* are frequently involved in cases of airsacculitis. Birds are more susceptible to infections of the air sacs when they are under stress. Vaccination, other disease, poor nutrition, insanitary conditions, and poor ventilation are contributing factors.

The lesions of airsacculitis can be acute or chronic. Their appearance ranges from slight clouding of air sac membranes and small amounts of watery exudates (which is generally an acute lesion) to thickened, opaque membranes and large amounts of thick, white-to-cream colored and/or cheesy exudates (which is generally a chronic lesion). The exudates can be confined to the air sacs and their diverticuli, or they may be found in other areas of the body if the air sac membranes are ruptured.

Pneumonia, pericarditis, and perihepatitis might be present. In some cases all portions of the respiratory tract (nasal passages, sinuses, trachea, bronchi, lungs, and air sacs and their diverticuli) are affected. In other cases little involvement beyond the air sacs is evident. Systemic change can occur with airsacculitis.

One organism that causes airsacculitis in birds, *Chlamydia psittaci*, also can cause disease in humans. Outbreaks of this disease are sporadic and generally occur in turkeys rather than chickens. The turkey industry watches closely for any evidence of chlamydiosis, so infected flocks are usually identified and treated before slaughter. However, PHVs must stay alert for any poultry that show signs suspicious for this disease.

Carcasses are condemned if airsacculitis is extensive or prevents evaluation of the wholesomeness of the carcass. If the exudate cannot be effectively removed, the carcass is condemned. Carcasses are also condemned if airsacculitis occurs in conjunction with systemic change.

- Other

Several subgroups are recorded in this category.

- ▶ Inflammatory Process (IP) - When the condition is generalized, condemn the carcass (381.86).
- ▶ Establishment rejects - When the establishment rejects a carcass before inspection, condemn as a "Plant Reject". Carcasses rejected by the establishment at salvage should also be recorded under this category.
- ▶ Carcasses condemned because there are no viscera to inspect - Carcasses are classified as no viscera if none of the three major organs- heart, liver, and spleen- are present for inspection. Disposition of no-viscera carcasses are determined by the veterinarian in charge and are based upon flock incidence of disease. Carcasses should be hung back and the veterinarian in charge notified.
- ▶ Ascites- carcasses with ascites fluid in the body cavity should be condemned only when the fluid prevents inspection of the interclavicular air sacs.

Veterinary supervisors may check the accuracy of inspector dispositions by observing birds upstream or downstream from the inspector or by checking birds and parts in the condemn barrel.

Parts Disposition

Only condemnation of carcass parts is required for some localized conditions. If there is an unwholesome portion or part that can be effectively removed, the remainder of the carcass is considered wholesome. Some organs or parts that may be condemned because of localized conditions without condemning the whole carcass are:

- Livers

Condemn livers with:

- ▶ fatty degeneration
- ▶ extensive petechiae
- ▶ inflammation
- ▶ an abscess
- ▶ a necrotic area
- ▶ necrosis
- ▶ cirrhosis
- ▶ a single non-leukotic tumor
- ▶ cysts
- ▶ discoloration due to a biliary system disorder or post mortem changes
- ▶ contamination from intestinal content or noxious materials

- Kidneys

Condemn kidneys when:

- ▶ the carcass has renal or splenic pathology, or hepatic lesions that cause liver condemnation
- ▶ there are pathological conditions requiring condemnation of all viscera

▶ there is airsacculitis (vacuum the kidneys from carcass or salvaged posterior portion)

- 381.91 - Fractures

A fracture with no associated hemorrhage is passed. A fracture with hemorrhage in the affected part is trimmed and the remainder of the carcass is passed. A compound fracture, one in which the bone goes through skin, is trimmed whether or not there is hemorrhage present.

- 381.91 - Luxations

Luxation is a simple disjointment without breaking the skin and without hemorrhage. It does not have to be trimmed. If hemorrhage does not extend into the musculature, trim or slit/wash out the hemorrhage. Do not trim simple redness of skin. Disposition of luxations is the same as it is for fractures.

Salvage of Carcasses Away From the Post-mortem Inspection Station (381.76)

The term salvage refers to the actions the establishment takes to trim away any unwholesome or diseased portion of a carcass that is localized (381.76). The establishment is not required to have a written procedure for each type of salvage; however the procedure must be verifiable. The procedures must be done under sanitary conditions, with adequate facilities, and personnel must be available to conduct the procedures. There should be a continuous product flow without pileup or delay.

Facilities at salvage stations should include:

- adequate space located in the eviscerating area
- a retain rack designed to prevent cross-contamination
- a trough or table sloped and properly drained
- a singer, if there is not one in the picking room
- containers for chilling the product
- a spray nozzle with proper fittings to clean carcasses
- a facility for washing hands, tools, etc., such as a gooseneck

Contamination Knife Salvage

When a carcass is designated for knife salvage because of body cavity contamination, most establishments follow a salvage technique similar to the following:

- remove the viscera
- hang the carcass in a designated area on the retain rack
- transfer the carcass to the salvage station and hang in such a way as to distinguish it from a salvageable airsacculitis carcass (This varies by establishment. Some establishments choose to hang some types of salvage birds by the neck, whereas others have a specific mark that is placed on the carcass to designate the type of salvage procedure)
- wash external carcass surfaces thoroughly before any cutting
- properly trim the carcass without cutting into the body cavity or opening cut surfaces
- usually save both wings, both legs, and the breast muscle, including the deep and superficial pectoral muscles

All knife salvage must be done in a sanitary manner and must not produce contaminated or adulterated product.

Airsacculitis Knife Salvage

Special attention must be given to salvaging carcasses with airsacculitis because of the complexity of the interclavicular air sac and the associated diverticuli. If the visible part of the interclavicular air sac is inflamed, assume all of it is inflamed and salvage the carcass accordingly. All exudates and the kidneys must be removed, and the viscera must be condemned.

When a carcass is designated for knife salvage because of airsacculitis, most establishments follow a salvage technique similar to the following:

- The salvaged carcass with airsacculitis is usually marked and hung in such a way as to distinguish it from a salvageable contaminated carcass.
- Other steps, such as removing the viscera, transferring the carcass to the salvage station, etc. are also followed for carcasses with airsacculitis.

- The following portions of the carcasses are usually salvageable: the wings (minus the portion containing the humeral bones), the legs, and the breast muscle. The area of the breast muscle around the first wing joint is condemned and the deep pectoral muscle anterior to breastbone bursa is condemned. All the rest is eligible for salvage.

All knife salvage must be done in a sanitary manner and must not produce contaminated or adulterated product.

Airsacculitis Salvage

When the interclavicular air sacs are not involved in airsacculitis, knife salvage is not required. The requirement for this type of salvage is removal of all exudates and the kidneys. This can be accomplished by vacuuming the carcass with a vacuuming device, or by removing all exudates and kidneys by hand. This type of salvage is appropriate when there is involvement of the abdominal and/or thoracic air sacs without involvement of the interclavicular air sacs, because the thoracic and abdominal air sacs do not have diverticuli that extend into bone.

Reprocessing of Carcasses Away From the Postmortem Inspection Station

Contamination Reprocessing

Carcasses that have their body cavities contaminated with digestive tract contents may be rendered unadulterated by prompt washing, trimming, and/or vacuuming instead of knife salvage. The procedure for removing digestive tract content is called reprocessing. Reprocessing is still a procedure that requires FSIS approval of a written procedure. There must be adequate facilities, trained personnel, and the procedure must be accomplished sanitarily without pileup or delay.

Facilities required at the reprocessing station are:

- adequate space in the eviscerating room or a suitable adjacent area
- a retain rack designed to prevent cross-contamination
- a trough or table that is sloped and properly drained
- containers for chilling product
- a knife rack or stand
- conveniently located hand-washing facilities
- spray nozzle with proper fitting for cleaning carcasses
- water containing 20 ppm available chlorine for rinsing all reprocessed carcasses (CFR 381.91(b)(1))

When a carcass is designated for reprocessing because of body-cavity contamination, the establishment is required to:

- remove the viscera and hang the carcass in a designated area on the retain rack
- transfer the carcass to the reprocessing station and suspend it to prevent contamination during reprocessing
- remove the crop
- wash the external surface thoroughly
- remove contaminants by trimming, vacuuming, and/or washing. Any contamination of cut surfaces must be removed by trimming
- thoroughly rinse with water containing at least 20 ppm available chlorine (CFR 381.91(b)(1))
- measure and record the chlorine concentration at least once a day
- monitor reprocessed birds
- make birds available for reinspection by the FSIS inspector

If retain racks at the USDA inspection station or reprocessing station are filled, the IIC should allow the establishments the option of disposing of contaminated carcasses or adjusting the production rate. Carcasses disposed of by the establishment because of reprocessing pile ups should be recorded as “Plant Rejects”, because the establishment is choosing not to reprocess those carcasses.

RESTRICTED PRODUCTS

The livestock slaughter regulations outline requirements related to restricted products (315). A restricted product is defined as any meat or meat food product that has been inspected and passed but cannot be released for human consumption until it has been subjected to a required treatment because it has a disease or condition that might be transmitted to humans if the meat is not treated. There are four types of restricted product treatments. They are:

- Refrigeration (311.23(a)(2))
- Heating (311.23(a)(2))
- Cooking (311.2(d)(f)(g), 311.18(e), 311.24, 311.25)
- Use in comminuted cooked meat food product (311.20(b), 311.35(c), 311.37)

Restricted product will be used for human food after required treatments are complete. For this reason, condemned and inedible products are not examples of restricted product.

The establishment must maintain control over all restricted product. FSIS inspection personnel must verify that the establishment has met the conditions associated with the restrictions before this type of product is allowed to be used as human food. Failure to adequately control certain products may result in the transfer of disease or pathogen from the product to the consumer.

Control of any restricted product begins at the time the veterinarian makes a disposition. First, a decision is made to pass the carcass with a restriction. A thorough check is made to see that all visible lesions are removed from the carcass (311.23). Then, the carcass is retained. If any additional lesions are discovered at a later time (while the carcass is being boned for example), the veterinarian will make a new disposition based on the new findings.

Some establishments have adequate facilities for treating restricted product (e.g., cooking, freezing). For establishments that do not have such facilities, the establishment is allowed by regulation to ship restricted product to another official establishment that has the needed facilities (316.18). To maintain security, the restricted product must be shipped under official government (FSIS) seal.

In certain cases, establishments may elect to bone a restricted carcass prior to the carcass undergoing a specified treatment. For example, the establishment manager may request that, in order to bone a carcass with beef measles passed with a freezing restriction, the establishment be allowed to remove it from the retain cage. An inspector must release the carcass from the retain cage and accompany the establishment employee as he/she takes the carcass to the boning area. Once the carcass is in the boning area, it must be boned in a manner that prevents it from being intermingled with non-restricted product. If the restricted product is to be boned out prior to regular boning operations, all restricted product must be removed and the entire boning area must be thoroughly cleaned before regular boning commences. This must include employee equipment such as knives, hooks, and scabbards used while boning restricted product. To avoid a complete cleaning of the boning area, the establishment may elect to bone the restricted product after regular boning operations are completed. This is acceptable, however, all non-restricted product must be prevented from contacting, or becoming intermingled with non-restricted product. Anytime restricted product is being handled, it must be under the direct control of inspection. For boning, this means under direct visual surveillance, or secured in a locked or sealed boning room.

Records must be kept on boneless restricted product, as well as other restricted product. The records should be kept on file in the government office. The records should contain the following information:

1. U.S. Retain tag numbers(s).
2. Quantity of restricted product (e.g., number of carcasses, pounds boned, or pounds boxed).
3. Quantity of condemned material (i.e., trimmed visible lesions).
4. Destination of product (if shipped under seal).

5. Inspector's name
6. Date

Let's review each of the four categories involving restricted product.

Passed for refrigeration

Only carcasses that are moderately affected with beef cysticercosis (beef measles) may be passed with a refrigeration restriction (311.23(a)(2)). This actually means the carcass or boned meat must be frozen. Freezing this product destroys any tapeworm cysts that were not identified and removed during inspection.

The regulations list separate and specific time/temperature treatment requirements for carcasses and boxed boned meat affected with beef measles that have been designated "Passed for Refrigeration" by the veterinarian. The carcass may be branded with a "U.S. Inspected and Passed" brand prior to placing it in the freezer because it is very difficult to apply a legible brand to a frozen carcass. After a successful 10-day treatment period, the establishment is then free to ship the carcass. Carcasses may be boned under control prior to freezing. During boning, the establishment is permitted to place the boned meat from restricted carcasses directly into boxes bearing the mark of inspection. The boxes can then be retained in the freezer for the 20-day period. The establishment is allowed to do this to avoid considerable unnecessary work in transferring unmarked frozen meat to boxes bearing the mark of inspection.

Passed for heating

There are two conditions that may be "Passed for Heating" by the veterinarian. One is cysticercosis of sheep (sheep measles), the other cysticercosis of beef (beef measles) (311.23(a)(2)). Notice that beef measles may be passed for refrigeration or passed for heating. A cattle or sheep carcass, or meat derived from such carcasses passed with a heating restriction, must be heated throughout to a minimum internal temperature of 140°F.

Passed for cooking

Carcasses with the following diseases or conditions may be "Passed for Cooking."

- Tuberculosis – 311.2
- Caseous lymphadenitis – 311.18(e)

- Swine cysticercosis (pork measles) – 311.24
- Carcasses with parasites not transmissible to humans – 311.25

Carcasses passed for cooking must reach a minimum temperature of 170°F for not less than 30 minutes. These carcasses are marked with a "US Passed for Cooking" stamp by the veterinarian when he or she makes this disposition.

Rendering the restricted carcass and parts into lard, pork fat, or tallow will accomplish the 170°F for 30 minutes requirement. The cooking and rendering of restricted product must be performed under the control of inspection. Once the restricted product is placed into the rendering tank, the tank must be secured with an official government lock or seal to maintain control and prevent removal of its contents. The inspector removes the seal and releases the product after the time/temperature requirements have been met.

Passed for use in comminuted cooked product

The fourth group of restricted product consists of those carcasses passed for use in comminuted cooked product. There is a difference between this restricted product category and "Passed for Cooking." Passed for cooking requires subjecting the product to 170°F for not less than 30 minutes. There is not such a time/temperature requirement with product passed for comminuted cooked product. The only restriction imposed on these products is that they be used only in comminuted cooked products. Comminuted cooked food products are those that are finely ground and have a uniform appearance, such as frankfurters and bologna. These products are normally cooked at a temperature near 160°F.

There are two conditions for which carcasses may be passed for use in comminuted cooked product by the veterinarian. The first is certain carcasses affected with eosinophilic myositis (EM) (311.35(c)). The establishment may ship these carcasses prior to meeting the required restrictions. As with control of other restricted product, carcasses with EM passed for use in comminuted cooked product must be shipped under official seal.

The other product in this restricted category is boar carcasses with less than pronounced sexual odor (311.20(b), 311.37). As in the case with all restricted product, inspection must have positive control over these carcasses. A retain tag is used to identify carcasses passed for use in comminuted cooked product. If boar carcasses or parts with less than pronounced sexual odor are to be shipped elsewhere for boning, rendering, or use in comminuted cooked product, they must be shipped under seal like all other restricted product. However, if the boned, boxed meat from these carcasses is properly packaged and labeled "Boar Meat for Use in Comminuted Cooked Product Only," shipping under seal is not necessary. Restricted boar meat properly packaged and labeled this way is the only exception to the rule that restricted products must be shipped from one establishment to another under seal.

For review purposes, the following chart lists those conditions that the veterinarian may pass with a restriction, the regulation reference and the specific restrictions.

CONDITION	REG.	FREEZING (15°F) Days: 10-carcass 20-boxed	COOKING 170°F/ 30 min.	HEATING 140°F	COMM. COOKED PRODUCT
Beef Measles	311.23	X		X	
Sheep Measles	311.25			X	
Pork Measles	311.24		X		
Tuberculosis	311.2		X		
Caseous Lymphadenitis	311.18		X		
Parasites (not transmissible to humans)	311.25		X		
Sexual Odor Of Swine	311.20				X
Eosinophilic Myositis (EM)	311.35				X

Trichinosis

Trichinosis is a disease in humans that may be contracted from swine carcasses infested with the parasite *Trichinella spiralis*. Some pork products are treated to destroy trichinae. These pork products, however, are not considered as passed with a restriction. Trichinae control in the U.S. relies on consumer education. That is, all pork muscle products are considered potentially contaminated and must be thoroughly cooked before being eaten.

This is quite different from many European countries. They often utilize special techniques to examine carcasses for the presence of trichinae and, therefore, when product from the United States is exported to these countries, an export certificate certifying that products have been treated to destroy trichinae must accompany the shipment.

Our regulations state that all pork products having the appearance of being ready-to-eat must be treated to destroy trichinae before leaving the establishment. Regulation 318.10 describes in detail acceptable methods that may be used to destroy trichinae. The three methods currently approved for treating pork for trichinae are:

- Heating
- Refrigeration (Freezing)
- Curing

Irradiation (gamma irradiation) is also approved for trichinae control. However, it is considered to be an "additive" rather than a treatment.

Certain pork products have been exempted from the requirement that they be treated to destroy trichinae. They include:

- Pork hearts, stomachs, and livers.
- Pork products that will normally be cooked sufficiently in the home, such as fresh pork, bacon, jowls, and unsmoked fresh sausage.
- Pork from carcasses or carcass parts that have been analyzed by an approved laboratory and found free of trichinae.

As a safety factor, inspection personnel should consider all pork to be potentially contaminated with trichinae. This is why pork products must be kept separate from meat products of all other species. If pork and beef are both boned in the same establishment, a complete separation of the two products must be maintained at all times. This must either be a physical separation of the products or the two products must be worked at different times. For example, if pork is boned on a table in the morning, and beef is to be boned on the same table later in the day, a thorough cleanup of the area and all equipment must be done before the beef is processed in order to prevent cross-contamination. An alternative to this would be for the establishment to process pork at the end of the day after all other product has been removed and there is no possibility that non-pork products could come in contact with pork products. The same rule applies to grinding product. A small amount of pork tissue left in the grinder could potentially contaminate beef if there was not a thorough cleaning and sanitizing of the grinder between the two products. If pork products were ground after all other product had been ground and removed from the area, a cleanup of the grinder would not be required. One final example: Some establishments may be allowed to reuse shipping containers if the containers are in good condition. You would not allow this

practice if the containers had previously been used to package pork products and the establishment wished to use them again for beef, lamb, or some other species. Always be alert for potential cross-contamination and its possible deleterious effects on public health.

ESTABLISHMENT RESPONSIBILITY FOR DEALING WITH CONDEMNED AND INEDIBLE PRODUCT

Condemned product is product that has been determined through inspection to be diseased or condition that renders it unfit for human consumption. It is prohibited from entering commerce for use as human food (314, 318.95).

Inedible product is any product that is adulterated, uninspected, or not intended for use as human food. The term inedible refers to product that by its nature is not handled as human food (301.2). Examples include bones, uncleaned intestines, lungs, reproductive organs, feet, etc. If inedible product is diseased or has the appearance of edible product, it must be handled as condemned.

Both condemned and inedible products are not fit for human consumption. Due to the edible appearance of condemned product, its control is most crucial and the requirements found in the regulations are very specific. Edible product may have a similar appearance to condemned product and some inedible product.

Principles of control

FSIS control of condemned and inedible product involves five principles:

- Identification
- Custody
- Separation
- Destruction
- Documentation

FSIS personnel must monitor the establishment's handling procedures of condemned and inedible product to assure that it is properly identified, maintained in custody, kept separate from edible product, and properly destroyed. Additionally, all actions taken must be appropriately documented.

Identification

As has been discussed, condemned products may look edible. For this reason they must be properly identified. The regulations require that each condemned carcass, part, or visceral organ be marked with the "U.S. Inspected and Condemned" brand (312.6(a)(5), 381.101). If the condemned product cannot be branded because of its size or texture, it must be placed in a container identified with the words "U.S. Condemned." Condemned product is to be disposed of by tanking.

An exception in the regulations allows the salvage of certain classes of condemned product for the production of pet animal food (314.11). One example is beef livers condemned for human consumption but allowed for use in pet food. The system used to identify product that is condemned versus product that is allowed for animal food must be consistent.

Custody

The FMIA requires that the inspector be able to certify that all condemned product is properly destroyed. To assure this, security of condemned product is essential. The regulations state that all condemned product must be kept in custody (security) of inspection personnel until it is destroyed for human purposes on or before the close of the day on which it was condemned. Destruction can be accomplished by incineration, rendering (tanking), or denaturing (314.1, 314.3). Custody involves direct supervision or security. This means that the condemned product must either be within sight of an inspector at all times or be placed in a secure container or room equipped with an official lock or seal. Therefore it is not permissible for inspection personnel to allow establishment personnel to leave indentured condemned or inedible product on the kill floor during lunch or other break periods. Once condemned and inedible product is destroyed, or properly denatured, custody is no longer required.

Organs and parts (e.g., stomachs, intestines, bones, and feet) may be saved for edible (human) food at some establishments. Others may save these organs and parts as inedible product for animal food production. This is permitted provided that the establishment properly identifies the organs and parts. If the organs and parts are not used for either purpose, the product doesn't require any special security if kept separate from edible product. If it is shipped off premises for rendering, the product doesn't require denaturing as long as the establishment's handling of the product results in an inedible appearance (e.g., denaturing). Hair, hide, horns, and hooves of any animal are products considered naturally inedible. It is not necessary to require special identification or denaturing, but they must be kept separate from edible product.

Separation

Condemned and inedible products must be kept separate from edible products. A physical separation of edible and inedible facilities must be maintained to avoid cross-contamination. Contamination of edible products with materials from inedible and condemned

product has potentially grave public health consequences. Inedible containers brought into edible departments must be watertight, acceptably clean, and properly identified. There are two types of inedible product containers. Containers for product condemned to tankage are marked "U.S. Inspected and Condemned." Those for product condemned for human use (inedible) but eligible for pet animal food are identified as "Inedible."

Carcasses of animals found dead or animals condemned on ante mortem inspection are not to be brought into or through an edible product area (314.8). Dead animals, except those that die en-route and are received with other livestock to be slaughtered, may not be brought onto the premises (314.7). Depending on the establishment facilities, ante mortem condemned animals may be skinned and slashed or slashed through the skin into major body muscles and the body cavities followed by the application of denaturant to all parts of the carcass. Many states, however, have regulations prohibiting the transport of opened carcasses, so an alternate method is approved. The denaturant may be injected into major muscles and cavities. This method is approved for carcasses of animals condemned on ante mortem inspection but not for carcasses condemned on postmortem inspection.

Bile historically has been regarded as inedible and when contamination of edible product occurs it must be removed before completion of inspection by FSIS personnel. There are provisions allowing that inedible bile can be saved for manufacturing uses and stored in edible product areas. Where it is allowed, bile must be segregated, handled, and labeled as an edible product.

Destruction

There are three basic methods approved for making condemned and inedible meat products incapable of being used as human food. They are:

- Rendering (314.1)
- Incineration (314.3)
- Application of approved denaturants (314.4)

Inedible rendering is a process by which materials are heated sufficiently to destroy them for human food. When the establishment has its own facilities to perform the rendering process this is termed "on-premises" rendering. Many establishments do not have such facilities. Instead, they may ship condemned and inedible materials to an outside rendering facility. This is referred to as "off-premise" rendering.

Tanking is when condemned product is placed in a rendering tank under the supervision of an inspector who would then seal the tank. Once the contents are heated adequately to destroy them for human purposes, the inspector will then remove the seal, thereby releasing it from his/her custody. This method is rarely, if ever, used today. Establishments that perform their own "on-premises" rendering today generally utilize hashers and/or pre-breakers as a pre-tanking preparation of condemned product. This gives an

inedible character and appearance to the product. For this reason, custody is not necessary once the material has been hashed. In addition, there is no requirement to use denaturant on this product to be rendered on-premises. However, prior to hashing, custody of the product must be maintained. This includes all equipment prior to the hasher. For example, if an auger is used to convey condemned material to the hasher, it must be covered and sealed or be located in a secured room.

Whenever condemned materials are to be shipped to another site, they must be properly denatured. This is true whether the material has been hashed or not.

If the establishment doesn't have inedible tanking facilities and it does not send condemned product for off premises rendering, all condemned product must be destroyed (under inspector custody) by incineration or by the application of an approved denaturant. A listing of acceptable denaturing agents may be found in two sources: the Regulations and the "List of Proprietary substances and Nonfood Compounds." Before an approved denaturing agent is applied, the product must be freely slashed so that pieces are less than 4" in diameter. This allows the denaturant to contact all parts of the product. Denaturants change the color and/or odor of products sufficiently to destroy them for food purposes.

In addition to any approved denaturant compounds found in the "List of Proprietary substances and Nonfood Compounds," there are three types of denaturants approved for use on product condemned to tankage. They are:

- Crude carbolic acid
- Cresylic disinfectants
- A formula consisting of FD&C green color No. 3, oil of citronella, detergent, and water

A different group of denaturants are used on inedible product condemned for human food but salvaged for animal food. This is because the above agents would make the product unfit for even animal food. Animal food denaturants include:

- FD&C green color No. 3
- FD&C blue color No. 1
- FD&C blue color No. 2
- Powdered Charcoal
- Any compound approved for such use in the "List of Proprietary substances and Nonfood Compounds" book

Documentation

Inspection actions regarding the control of condemned products must be properly documented. On ante mortem, actions might be recorded on FSIS Form 6150-1 (Identification Tag-Antemortem) or FSIS Form 6502-1 (MP 35) (US Reject/Retain Tag). FSIS Form 6750-1 (Daily Tanking Report) is a report (used at the option of the frontline supervisor) to document the control of condemned

products in slaughter establishments. All establishments that ship condemned or inedible product must have the appropriate permissions from local, state, or federal officials. The documents must be available for FSIS review.

Specimens of condemned or inedible materials for educational, research or other nonfood purposes may be released from the establishment under a permit issued by the IIC. The application is FSIS Form 6700-2 (MP 403-10) (Application and Permit to Obtain Specimens from Official Establishments). If institutions or individuals wish to obtain specimens on an ongoing basis, the permit must be renewed annually.

This form is also the permit to ship undenatured lungs for pharmaceutical or animal food use. Undenatured lungs for pharmaceutical purposes must be labeled "Inedible [Species] Lungs - For Pharmaceutical Use Only." If an establishment wishes to ship undenatured lungs for animal food, several requirements must be met. Permission must be obtained in writing from the district manager. The lungs must be shipped directly to an animal food manufacturer, zoo, mink farm, or storage warehouse. Shipping containers must be labeled "[Species Lungs - Not Intended for Human Food]" and return copies of the shipping certificate must indicate to the inspector that the shipment reached its destination.

Shipment of undenatured condemned carcasses eligible for use as animal food may be approved. This requires a special permit issued by the District Manager. This product must be shipped directly to a manufacturer of inedible products. Additionally, there are special labeling and container sealing requirements.

Poultry

The regulations related to the handling and disposal of condemned or other inedible poultry products are similar to the meat regulations. They are found in 9 CFR 381.95. Here's a brief summary of this regulation. FSIS inspectors must verify that the establishment disposes of condemned and inedible products using one of the appropriate methods outlined in the regulation.

Condemned and inedible poultry products may be disposed of by one of the following methods.

- Steam (381.95(a))
- Burying (381.95(e))
- Incineration (burning) (381.95(b))
- Chemical denaturing (381.95(c))
- Dye denaturing (381.95(c)(3))

Only burying and burning may be used for products condemned for biological residues.

LINE SPEEDS

Maximum line speeds established by FSIS are permitted on the slaughter or eviscerating line when optimum conditions exist (381.65(a), 381.67, 381.68, 381.76 and 310.1(b) (1)). When there are less than optimum conditions, line speed adjustment is required to ensure that IPP can perform a post-mortem inspection of poultry and livestock carcasses. The IIC is responsible for directing establishment management to reduce the line speed to permit adequate inspection. When the IIC is satisfied that the situation that necessitated the line speed reduction has been corrected, he or she will permit increase in the line speed.

FSIS may require the establishment to adjust line speed to a slower rate than the maximum when process control of line speeds is not maintained because of inconsistencies in size, weight, class of animal or bird, health, pathology, contamination, sanitary dressing or presentation.

Poultry

PHVs or IICs assigned to poultry slaughter establishments are to perform or assign presentation checks using appropriate presentation forms or otherwise assess presentation line speed process control, and evaluate the health status of the flock, as often as necessary. The factors to assess include the following:

- poultry class and the size of the birds in the class
- presentation errors, such as viscera on the wrong side or not presented in a consistent manner
- high level of disease incidence in birds
- establishment personnel's inability to accomplish eviscerating procedures sanitarily with a minimum of contamination
- establishment facilities

FSIS does *not* require line speed adjustments for excessive feathers on carcasses at post mortem inspection.

PHVs or IICs are to assess evisceration line speed control when on-line IPP report to them potential problems with presentation, sanitary dressing, contamination, and pathology or disease status of the birds. If conditions do not allow IPP to perform the proper inspection procedures at a given line speed, PHVs or IICs are to:

- reduce line speeds according to instructions provided on presentation forms (FSIS Form 6510 series) or to a speed at which IPP can perform the proper inspection procedures;
- document the reduction of line speed on a non-compliance record (NR) only when the maximum line speed is exceeded or the allowable number of presentation errors that call for an immediate reduction in line speed is reached. The NR should describe findings that support the reduction in line speed and cite appropriate regulations (9 CFR 381.76, 381.67, 381.68, and 381.65) under the Other Verification Task in PHIS.

Livestock

PHVs or IICs assigned to livestock slaughter establishments are to perform or assign verifications to determine when the inspection procedures cannot be adequately performed at the current line speed. This could be because of particular deficiencies in carcass preparation and presentation by the establishment at that higher speed or because the health condition of the particular animals indicates a need for a more extensive inspection (9 CFR 310.1(b)(1)). PHVs or IICs should also perform or assign verification activities to determine whether the establishment's slaughter and sanitary dressing procedures are controlling contamination that may impact IPP's ability to perform proper post-mortem inspection procedures. This should be done in conjunction with specific verifications of slaughter line speed process control.

PHVs or IICs are to assess slaughter line speed control in conjunction with sanitary dressing verifications, as appropriate, when on-line IPP report potential problems with presentation, sanitary dressing, contamination or pathology and health status of the animals.

If conditions do not allow IPP to perform the proper inspection procedures at a given line speed, PHVs or IICs are to:

- reduce line speed to a speed at which IPP can perform the proper post-mortem inspection procedures;
- use the Livestock Sanitary Dressing task in PHIS to document noncompliance in accordance with FSIS Directive 6410.1 when the IIC determines there is evidence that the insanitary condition created has resulted in the inability of the on-line IPP to adequately perform the proper post-mortem inspection procedures;
- use the Other Verification Task in PHIS to document noncompliance only when the maximum line speed has been exceeded or when particular deficiencies in carcass preparation and presentation has resulted in the PHV or IIC slowing the line speed. The NR should describe findings that support the reduction in line speed, citing 9 CFR 310.1(b)(1).

PHVs or IICs are responsible for ensuring that each on-line inspector is aware of his or her authority. The PHV or IIC also has the responsibility to regularly correlate appropriate Agency standards and monitor performance for each inspector to assure uniformity of inspection procedures and actions.

MARKS OF INSPECTION

Once the carcass and parts have been passed for inspection, the carcass may be washed, branded, and sent to the cooler. Parts may also be washed. Skimmings from such washing cannot be used for edible purposes.

For livestock carcasses, the marks of inspection are applied just prior to the carcass entering the cooler. Each carcass must contain at least one mark of inspection on each half before entering the cooler if the carcass is completely split in half. If the sides of the carcass are held together by natural (skin) attachments, one mark of inspection is sufficient. The marks of inspection for meat products are shown in 9 CFR 312. The marks of inspection for poultry products are shown in 9 CFR 381.98. FSIS Directive 6810.2 covers marking meat carcasses and products.

FSIS Notice 35-08 "Verification of Carcasses that an Establishment Further Processes Without an Official Inspection Legend" (5/5/08) allows inspected and passed carcasses to leave the slaughter floor if the establishment processes the carcasses at the establishment, requests that such carcasses not be marked on the slaughter floor, and the establishment maintains appropriate control of the carcasses. See FSIS Notice 35-08 for additional information on FSIS verification activities.

STORAGE AND SHIPPING

Inspection procedures related to the regulatory requirements regarding sanitation and documentation must be performed in relation to product storage and shipping.

Condensation in coolers is a common problem. It is caused by hot air contacting a cold surface and causing moisture to form. It is the establishment's responsibility to prevent product contamination from condensation. If contamination from condensation does occur, the inspector should retain contaminated product and reject the area until the condition is corrected. Any condensation on product is considered to be contamination.

Wooden pallets may be used for temporary in-plant storage of packages or properly protected product provided they are structurally acceptable, clean, and do not contribute to unsanitary conditions or product contamination.

The inspector assigned to coolers, shipping, and receiving may be responsible for officially sealing product being shipped from one official establishment to another. The product may consist of unmarked or restricted inspected and passed product (i.e. Passed for cooking, refrigeration, or other restriction) being shipped in a truck or railcar. The truck or railcar is sealed by a program employee with an official seal. FSIS Form 7350-1, *Request and Notice of Shipment of Sealed Meat/Poultry* is required to identify the shipment to the inspector at the receiving establishment.

Unmarked inspected and passed product intended for further processing may be shipped under official seal from one official establishment to another (316.8). For unmarked product to be shipped under seal, *at least 25%* of the product in the vehicle must be unmarked. This is to prevent the establishment from purposely placing a small amount of unmarked product into each vehicle and having them sealed with an official government seal and warning tag for the purpose of discouraging theft. If the shipment does not meet this requirement for sealing, then all products must be properly marked or labeled. The 25% requirement *does not apply when restricted product is being shipped*.

A vehicle carrying restricted product may be sealed or an alternate method may be used. This method is to pack the product into individual containers, sealing the containers by firmly applying a pressure-sensitive tape around each container in two directions, and then stamping the intersection of the tape with the 2 1/2 inch rubber brand. A U.S Retained tag must be affixed to each container and an FSIS Form 7350-1 used for each shipment.

In many establishments, it is common for product to be returned from unofficial establishments, such as retail stores. In order that the inspection program can control returned product, it must be delivered to this area as soon as practical. The establishment should not sort, remove, or otherwise handle the returned product until it has been reinspected (318.2). After sorting by the establishment, inspect the product the establishment has elected to save. Any product found to be wholesome and bearing the official mark of federal inspection is released for use to the establishment. Any product found to be unwholesome or unidentifiable is condemned. The product must be accompanied by inspection personnel to be either tanked or denatured.

When unclean or unsound product is received from another establishment the inspector will complete an FSIS Form 8140-1, *Notice of Receipt of Adulterated or Misbranded Product*. This form is executed only when the conditions reflect negligent procedures on the part of the originating establishment, such as kill floor dressing, contamination, rail dust, etc. The form should not be used for conditions that cannot be controlled by the originating establishment. An example of an uncontrollable condition would be off-condition product resulting from failure of the refrigeration unit during transit. The form is intended for internal use of the inspection program and is not to be issued to the establishment. For the FSIS Form 8140-1 to be effective, information entered on it must be specific - the type of contamination, where it was located on the carcasses or parts, and the number or amount of product affected.

Establishments are permitted to ship properly marked or labeled product without an inspector on duty if they have a good history of shipping clean acceptable product in acceptable vehicles. If an establishment continuously receives FSIS Form 8140-1, Notice of Receipt of Adulterated or Misbranded Product, the privilege of shipping without an inspector on duty may be revoked by the Frontline Supervisor

POST-MORTEM INSPECTION REPORTS

Inspection personnel must also record information about the number of animals or birds slaughtered, the number and types of products condemned, and other details. The types of reports required are described in FSIS Directive 6100.2, "Post-Mortem Livestock Inspection" and FSIS Directive 6100.3, "Ante-Mortem and Post-Mortem Poultry Inspection". The data found on the slaughter reports and the poultry post-mortem reports reflects an accurate record of the prevalence of diseases encountered by the food inspectors performing post-mortem inspection.

Example: Poultry Post-mortem Reports

Inspection personnel are required to keep track of the number of poultry carcasses condemned on post-mortem inspection for each condemnation category. This information is collected on the lot tally sheet, FSIS Form 6000-16, at the inspection station. The food inspectors are responsible for the maintenance of the Lot Tally Sheet. During the shift, the "inspector's helper" records condemnations on the Lot Tally Sheet.

Completing the Documentation on FSIS Form 6000-16 (Lot Tally Sheet) for Poultry Post-Mortem inspection

The Food Inspector is to complete the appropriate sections of the Lot Tally Sheet including the:

- a. inspection date
- b. shift of inspection
- c. establishment number
- d. specific production (lot number)
- e. class of poultry
- f. condemnation reason
- g. number of condemnations for each category

The Food Inspector gives the Lot Tally Sheet to the "inspector's helper" at the beginning of each shift. The "inspector's helper" records the condemnations throughout the shift. The Food inspector ensures the CSI or designee receives the Lot Tally Sheet at the end of the shift.

At the end of the shift, the lot tally sheets from all on-line inspectors are collected by the CSI or their designee. The CSI will total the condemnations for each condemnation category from the Lot Tally Sheets of the on-line inspectors. They will also record on the Lot Tally Sheet the number of establishment rejects. Establishment rejects are carcasses rejected by the establishment before inspection or re-inspection. These totals are acquired from establishment personnel during the shift.

Enter the information from each Lot Tally Sheet into the Animal Disposition Reporting (ADR) section of PHIS.

Establishment management is responsible for collecting and supplying information to inspection personnel on the total number of live birds and their live weight per lot, and the total pounds condemned at ante mortem inspection. This will include the dead on arrival carcasses (DOAs). Establishment management must also supply inspection with the total weight in pounds of carcasses and of parts condemned on postmortem, and with the total weight in pounds of chilled and frozen product from that lot. Establishment management supplies inspection with these data on FSIS Form 6510-7, the Poultry Lot Information sheet.

All of the above information is to be recorded by the inspector into the ADR section of PHIS. The ADR data is collected and reported on a lot basis for each shift. This means that there may be multiple sets of numbers reported for each shift.

A condemnation certificate must be completed for each lot of poultry slaughtered. The condemnation certificate, FSIS Form 9061-2, is completed and signed by the inspector in charge. The condemnation certificate contains both ante mortem and post mortem condemnation information. The condemnation certificate is generated by PHIS, using the information entered in the ADR section.

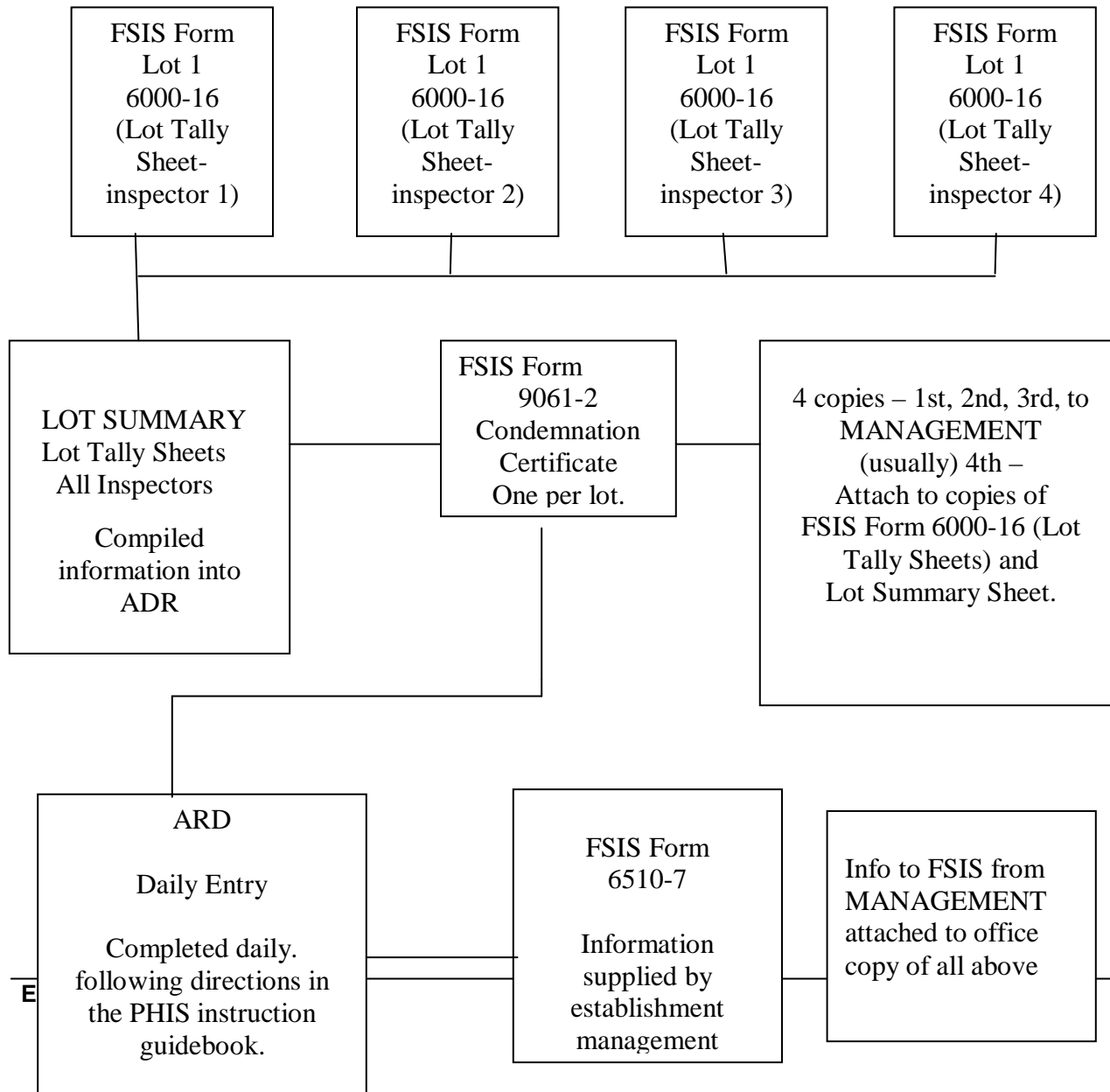
Once all of the required forms have been completed and information gathered, they must be properly filed, entered, and/or distributed, as follows:

1. FSIS Form 6000-16, the lot tally sheets, are kept in the government office attached to the summary for each lot;
2. FSIS Form 6510-7, the Poultry Lot Information sheet from establishment management, is filed in the government office with the other records for each lot;
3. The ADR data is collected and reported on a per-lot, per-shift basis.
4. FSIS Form 9061-2, the condemnation certificate, is distributed as follows: after establishment management signs the form, the first 3 copies are given to establishment management, and the fourth copy is filed in the government office with the other records from each lot.

The following page contains a flow chart of the distribution of all FSIS forms related to postmortem reports.

FLOW CHART FOR POST-MORTEM REPORTS

Example for a Establishment with 4 line Inspectors



APPENDIX

Post-Mortem Inspection Procedures

CATTLE

Head inspection

There are four steps in head inspection.

1. Step one is to observe the outer surface of the head and eyes.

There are some specific conditions that may be identified during head inspection. For example, when inspecting cattle heads, during step one, the observation of the head's surface and eyes, the diseases and conditions that may be detected include contamination (e.g., hide, hair, dirt, rust, and grease), epithelioma, actinomycosis, actinobacillosis, and abscesses.

2. Step two is to incise and observe the four pairs of lymph nodes – mandibular, parotid, lateral retropharyngeal (atlantal), and medial retropharyngeal (suprapharyngeal).

The type of diseases and conditions that may be detected when performing step two (incising and observing lymph nodes of the head in cattle) include tuberculosis, actinobacillosis, epithelioma, and abscesses.

3. Step three is to incise and observe the masticatory or cheek muscles.

The diseases and conditions that may be detected during the performance of step three, incising and observing the masticatory muscles during cattle head inspection include cysticercosis, eosinophilic myositis, bruises, steatosis, and xanthosis.

4. Step four is to observe and palpate the tongue.

The diseases and conditions that may be detected when performing step four (observing and palpating the tongue while performing cattle head inspection) include actinobacillosis, and foreign bodies such as thorns.

You will learn more about what to do when these diseases or conditions are observed when we cover the Multi Species Dispositions module.

Carcass Inspection

Almost all establishments handle the carcass the same way until the time the head is removed. Once the head is removed however, any one of several methods may be used to complete the carcass dressing. Almost all the different methods being used today are variations of two basic operations. One of those basic methods is called a "bed" dress operation. The other is called an "on-the-rail" method was dressing operation. The bed dress method is by far the oldest method and probably date back to the time when animals were "field dressed." This method is still widely used; however, it is most often used in the low-volume establishments. After the head has been removed, the carcass is lowered to the skinning bed. The skinning bed may be cradle or it may be the floor. The "on-the-rail" method was designed with volume in mind. The animal is moved around the slaughter floor by means of a rail and instead of one employee dressing the entire animal several specialists will perform their jobs as the carcass moves past them.

In either dressing method there are several sanitary dressing requirements you need to be alert to. First, *all* grubs, contamination, bruises, etc, *must* be trimmed from the back of the carcass in the path the saw is to proceed, before splitting.

Secondly, even though it is not required that the saw be sanitized after each use, on normal carcasses, it *must* be sanitized when used on a retained carcass or when a hidden abscess or other pathology is contacted.

The two halves are moved to the carcass (rail) inspection station. The establishment is responsible for assigning an employee prior to the inspection station to trim and remove all bruises, blood clots, grubs, and the like. The establishment employee must *not* remove any abnormality that could affect the disposition of the carcass.

Frequently on the bed dress operation, the carcass will be trimmed and rail inspection accomplished by the viscera inspector while the split carcass is in the same area where it was eviscerated.

After the rail inspection is completed the carcass will be moved, or proceed on the chain, to the final wash area.

Any carcasses located on the "final" rail must be physically separated from other carcasses. This will prevent cross-contamination from one carcass to another. In no case will a retained carcass be washed or trimmed unless authorized by a program employee.

The following steps are those to follow when inspecting the carcasses.

Hindquarter inspection

1. Observe back of skinned carcass while eviscerated.
2. Palpate scrotal (superficial inguinal), or mammary (supramammary), and medial iliac (internal iliac) lymph nodes.
3. Observe body cavities.

Forequarter inspection

1. Observe cut surfaces of muscles and bones, diaphragm's pillars and peritoneum.
2. Observe and palpate kidneys and diaphragm.
3. Observe pleura, neck and carcass exterior.

Carcass inspection

1. Palpate superficial inguinal, or supramammary, and internal iliac lymph nodes. Observe lumbar region.
2. Observe and palpate kidneys.
3. Observe diaphragm's pillars and peritoneum.
4. Observe and palpate diaphragm.
5. Observe pleura, cut surfaces of muscles and bones, neck, and carcass exterior.

You are usually doing two dexterity actions during each step. For example, you may be required to *observe* and *palpate*, or *incise* and *observe*.

If you observe a disease or condition that requires you to retain a carcass, tag each half-carcass, request that the viscera and head be retrieved, and apply one tag to each.

Products, parts, etc., that are removed and condemned for various reasons are usually placed in a container near the rail inspector and the viscera inspector. These containers must be properly identified for their intended purpose. The inspector who is responsible for the area where the containers are located must also be responsible for seeing that the containers are either locked, sealed with an official seal, or under visual security at all times. You would not leave the area before the container was locked or sealed. We will cover this in more detail later during this module.

In most operations, a final inspection rail or final disposition room is located immediately following the rail inspection station. The rail inspector must be alert to require that *all* carcasses that need a final inspection by the veterinarian or further trimming to insure they are wholesome, are removed to this area.

Viscera Inspection

Viscera separation is the dividing of the internal organs of the body such as the heart, lungs, liver, kidneys, intestines, etc., into various offal products. Offal parts are animal parts other than the carcass (body).

The following steps are performed in viscera inspection.

1. Observe cranial and caudal mesenteric (mesenteric) lymph nodes, and abdominal viscera.
2. Observe and palpate rumino-reticular junction.
3. Observe esophagus and spleen.
4. Incise and observe lungs lymph nodes - mediastinal [caudal (posterior), middle, cranial (anterior)], and tracheobronchial (bronchial) right and left.
5. Observe and palpate costal (curved) surfaces of lungs.
6. Incise heart, from base to apex or vice versa, through the interventricular septum, and observe cut and inner surfaces.
7. Turn lungs over; observe ventral (flat) surfaces and heart's outer surface.
8. Incise and observe hepatic (portal) lymph nodes.
9. Open the bile duct (both directions) and observe its contents.
10. Observe and palpate liver's ventral surface.
11. Turn liver over, palpate renal impression, observe and palpate parietal (dorsal) surface.

Here are some further details about viscera inspection.

Inspection of the Abdominal Viscera

Abscesses are frequently detected during the palpation and observation of the rumino-reticular junction. These abscesses are usually localized and required only that the viscera be condemned. You should be alert though, to the overall condition of the carcass, and thoracic viscera. If abscesses are found in other locations, in addition to the abdominal viscera, it could be an indication of a generalized condition, in which case you would retain the carcass and all parts for the veterinarian to make a final disposition.

The mesenteric lymph nodes may show evidence of tuberculosis, neoplasms, and in some cases pigmentary color changes.

You must retain the carcass and all parts when you detect tuberculosis and tumors.

Most pigmentary color changes in the lymph nodes may be due to the animal's age or the environment in which the animal has been maintained and is usually of little concern. As with all abnormal conditions, though, if you were unsure of the cause or involvement of a condition, you would retain the carcass and parts for the final disposition by the veterinarian.

The small intestines may appear dark red to purple; this would indicate a condition called enteritis. The determination whether the condition is acute or chronic must be made.

There are several other conditions detectable at the time you observe the abdominal viscera. These may vary from a slight redness or odor in the uterus or pyometra (metritis), to a retained placenta or fetus. In these instances, you should evaluate the degree of involvement, the remaining viscera condition, the condition.

Evidence of adhesions may be seen. Again, if the condition appears localized, or chronic, and no further carcass or viscera involvement is observed, the abdominal viscera would be condemned and the carcass retained for trimming.

Inspection of the Spleen

The inspection of the spleen is done by observation. If tuberculosis is suspected, the carcass and all parts will be retained for veterinary disposition. You will see physical differences between normal and abnormal. There may be a definite swelling or size difference, or a color difference. When an abnormal spleen is detected, retain it as well as the carcass and all parts. The spleen may be helpful in making a final disposition on any carcass. Ensure that the spleen is included with the viscera whenever a carcass is retained for a disease condition.

Inspection of the Esophagus

Observe the esophagus for *Cysticercus* (measles); eosinophilic myositis (EM); and evidence of grub infestation. *Cysticercus* and EM conditions require retention. Grub infestation is usually a localized condition requiring affected organs and areas be trimmed or condemned, but the carcass will usually be passed without retention

Inspection of the Pluck (Lungs and Heart)

Pneumonia and pleuritis are the most common abnormalities observed. Acute pneumonia is characterized by enlarged, edematous lymph nodes and/or dark red to purple sections or spots in the lung tissue. Retain this carcass and all parts for disposition.

A chronic pneumonia may be characterized by a localized abscess within the lungs, or many times evidence that the lung has become adhered to the pleura (lining of the thoracic cavity), frequently called pleuritis. Observe the rest of the viscera and carcass to look for evidence that the condition is generalized. For example, you may detect other sections of the carcass with swollen lymph nodes, or other adhesions. The carcass may appear degenerated. There may be water tissue, fat sloughing, etc. Any of these would indicate a generalized condition. You will retain the carcass and all parts upon detecting a generalized condition. When the condition is strictly localized, the lungs would be condemned, as well as any contaminated organs, and the carcass retained for removal of the adhesions.

Tuberculosis may also be detected during incision of the lung's lymph nodes. When TB lesions are detected, the carcass and all parts must be retained.

Another condition you may detect while incising the mediastinal lymph nodes is the thoracic granuloma. A granuloma may appear as an abscess or pus pocket in the lymph node. Retain the viscera, especially the pluck, for disposition. You may collect and submit samples of the granuloma lesion. The granuloma could be TB related. We will cover this in more detail during the module on Multi Species Dispositions.

Neoplasms (tumors) may be detected during palpation of the lungs. These tumors would appear as nodules or lumps in or on the lung tissue. The carcass and all parts would be retained.

Inspection of the Heart

The inspection of the heart involves opening it by an incision from the base to the apex, or vice-versa. The usual procedure is to position the heart in a manner that will allow you to safely cut away from your body, and incise the left ventricle about an inch and one-half posterior to the lefts of large vessels leading into the chamber. Then grasp the opened edge of the ventricle and incise the septum. By rotating the knife 180 degrees with the cutting edge pointing up, complete opening the ventricles and great vessels with two incisions, causing the heart to lay flat or open.

In some establishments, the heart may be inspected without being opened. If this is the case, a company employee must invert the heart for you to complete your inspection, and you would normally make a slight incision in the septum walls in addition to observing the inner heart surfaces. This procedure is difficult except on older animals, where the heart muscle is thinner and more pliable. The company employee will also re-invert the heart for you to observe the heart's outer surface.

Some of the conditions you may detect while inspecting the heart include:

- Cysticercus* (tapeworm cysts, measles, etc.)
- Eosinophilic myositis (EM)
- Neoplasms (tumors)

Pericarditis is an inflammation of the pericardium or heart sac. When an inflammation of the inner lining of the heart occurs, the condition is referred to as endocarditis.

Inspection of the Liver

Liver Abscess

An abscess is a circumscribed area of pus with related swelling and/or inflammation caused by a variety of factors. Abscesses may be associated with specific diseases, but are usually seen as localized conditions. Many feedlot cattle (fat) have localized abscesses and the cause seems to be related to high-energy cereal diets, with unsanitary feedlot conditions also a factor. An abscess may appear on the surface and be quite obvious, or it may be located under the surface, and only detected when you palpate properly. (You must remember to palpate deeply to detect hidden or invisible conditions.) You may make as many incisions as you feel necessary to search for abnormal conditions, but remember you should not mutilate product unnecessarily. In *all* cases, a liver containing an abscess is condemned as not fit for human consumption. Benign abscesses (non-malignant, and judged *not* to be affecting surrounding tissue) may be salvaged for animal food *after* removal of the abscess itself.

"Sawdust" and Telangiectasis (Telang)

The condition in which a liver has pinkish-white to yellow-gray necrotic (dead) spots that make the liver appear as if sawdust had been sprinkled or scattered through it is called "Sawdust." The area around the spots appears normal and the liver's surface over the spots is usually smooth. The condition in which a liver has purple-red to bluish-black spots present both on the surface as well as throughout the organ is called telangiectasis and is referred to as "Telang." Usually the surface of the liver is slightly depressed when affected with Telang.

To determine the disposition of sawdust and Telang conditions, *three* degrees of involvement are used.

1. Slight: Where the lesions are small in size and slight in number. A liver meeting the slight criteria is passed for food without restriction.
2. More severe than slight but involves *less* than one-half of the organ: The portion of the liver that is *not* affected or only slightly involved may be passed for food without restriction, while the remainder of the liver is condemned.
3. More severe than slight and involves *more* than one-half of the organ: The entire organ is condemned. (It may be salvaged for animal food.)

Liver Flukes (Distoma)

The appearance of a fluke infested liver depends a great deal on the amount of fluke infestation. A slight infestation will probably not affect the liver tissue as such. A heavy infestation may cause a cirrhotic effect on the organ, with the surface becoming scarred. Many times there are bumpy, raised and/or depressed areas, and sometimes a discoloration showing dark blue to black sections on and within the tissue. The liver may take on a "hobnail appearance."

The primary purpose in opening the bile duct during liver inspection is to detect flukes. When there is a fluke infestation the bile duct may be thickened and sometimes swollen; frequently you will observe live flukes. The three liver flukes most often seen in domestic cattle today are: *Fascioloides magna*; *Fasciola hepatica*; *Dicrocoelium dentricum* (Lancet).

In all cases of liver fluke infestation the liver is condemned and not eligible for human consumption. The liver *may* be salvaged and used for animal food.

Carotenosis

A liver with carotenosis is characterized by a highly colored yellow-orange color or pigmentation. This condition is quite common in cattle livers and may cause the liver to become enlarged, soft, and friable (easily crumbled). Here's a practical test to assure the correct recognition of carotenosis. The test is made by placing a white paper towel or napkin on the cut surface of a liver suspected of being affected with carotene discoloration. An orange-bronze stain would be indicative of carotenosis. The liver is condemned and not eligible for use as human food but *may* be salvaged for animal food uses. The pale-colored liver found in near-term cows may resemble carotenosis. For this reason you must be sure of your diagnosis. The pale liver may vary from tan to yellow to gray in color and may be enlarged. Usually the cut surface feels greasy. The cause of this pale liver is thought to be the result of a change in fat metabolism of the near-term cow. Livers from cattle that are normal except for the pale color are passed without restriction.

Hydatid Tapeworm Cyst

Hydatid cysts may occasionally affect livestock. Most domestic food animals are the intermediate host for this tapeworm cyst, which usually is a result of the tapeworm (*Enchinococcus granulosus*) of dogs. While the animal eats or grazes, it consumes the eggs, probably deposited by the dog, and the eggs in turn change to larvae in the food animal's system. The larvae then end up in various organs via the blood stream.

The cyst will vary in size but may be as large as two to four inches in diameter. The fluid inside the cyst is usually clear and colorless. You must be careful not to confuse the hydatid cyst with an accessory gall bladder.

The organ or part affected with a hydatid cyst is condemned and is *not* suitable for use in animal food.

Tally of Condemned Livers

At the end of each day's operation you will make available to the veterinarian in charge a list showing the number of and reason for each liver condemned.

Control of Condemned Livers

Those livers that *are* condemned, but which the company has indicated it wishes to salvage for animal food, must be handled properly before they may be shipped from the establishment as animal food livers. Here is a summary of the steps to take.

1. The livers must be marked "U.S. Condemned."
2. The condemned livers may be held in containers on the slaughter floor, or may be worked as inedible product during the slaughter procedure.
 - a. When the condemned livers are placed in a container, the container must be plainly marked "inedible." Ensure that the product in these containers is maintained under security at *all* times. This means under your direct supervision, or locked or sealed in a container with an official device until such a time that the product *is* properly denatured.
 - b. When the establishment requests an opportunity to slash and denature the condemned livers during the slaughter operation, it *may* be done, provided it doesn't create problems of control, security, or contamination.

Liver Disposition Chart

Disease or Condition	Degree	Disposition
Telangiectasis Sawdust Spotted	Slight	Pass for human food
	The affected portion trimmed when less than 1/2 of liver is more than slight	Condemn/Use for animal food
	Balance of this liver is slight or less	Pass for human food
	More than slight involving 1/2 or more of liver	Condemn/Use for animal food
Contamination	Excessive	Condemn/Tank
Cirrhosis	Any amount	Condemn/Use for animal food
Nonmalignant change	Any amount	Condemn/Use for animal food
Abscesses-benign (trim)	Localized - Affected area	Condemn/Tank
	Localized - Non-affected area	Condemn/Use for animal food
Flukes	Any evidence of infestation	Condemn/Use for animal food
Hydatid Cyst	Any amount	Condemn/Tank
Abscesses (Not benign)	More than localized	Condemn/Tank
Carotenosis (yellow)	Any amount	Condemn/Use for animal food
Other Parasites	Numerous lesions and cannot be removed	Condemn/Use for animal food
	Localized: Affected area trimmed	Condemn/Use for animal food
	Localized: Non-affected area	Pass for human food

References: Regulation 311.25; 311.31, and 314.10

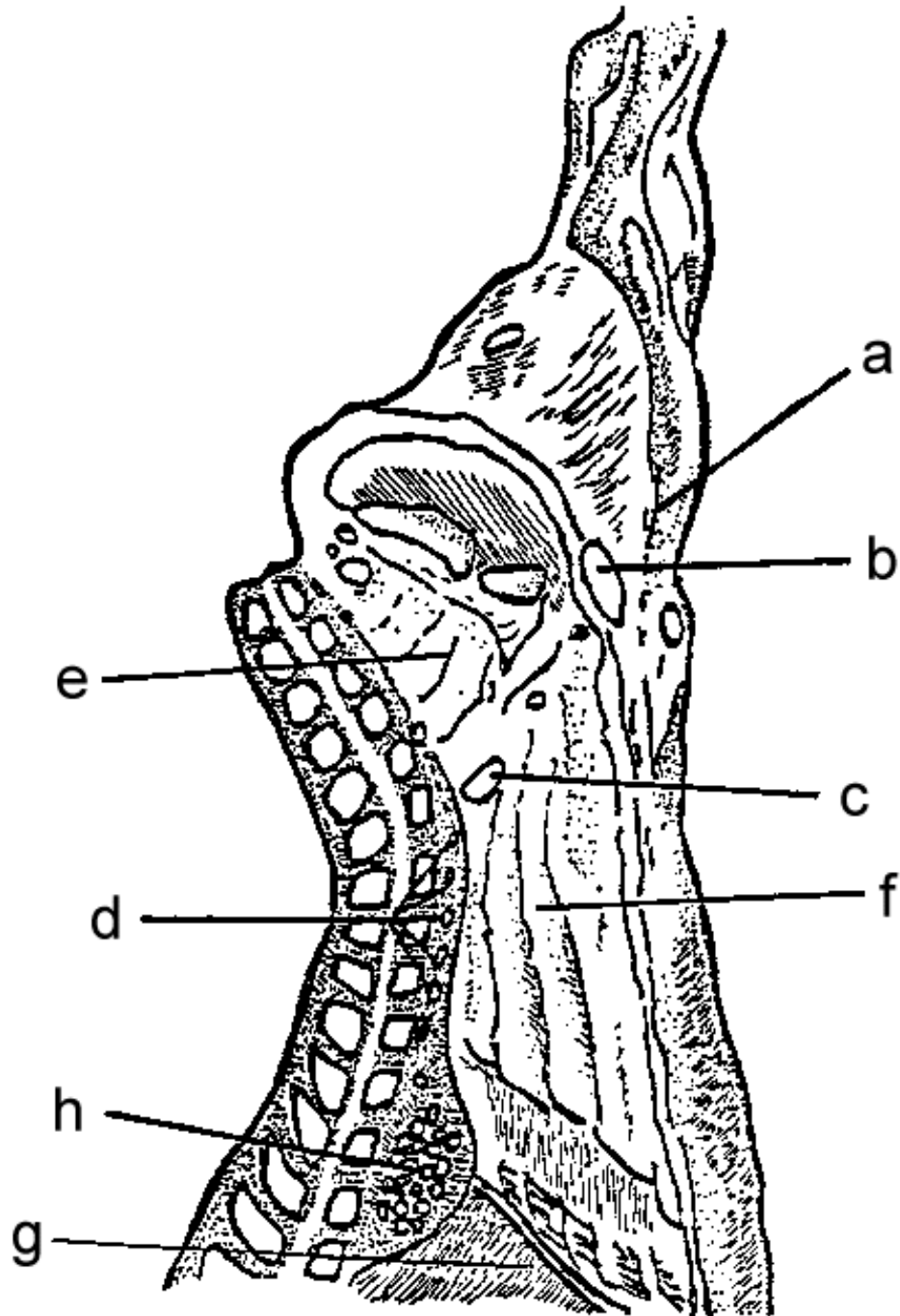
Presentation

During the evisceration procedure several improper presentations may occur. The following are examples:

- The liver may be placed with the parietal surface up.
- The hepatic (portal) lymph nodes may be missing from the liver.
- The bladder may be leaking urine onto exposed surfaces of the carcass or viscera.
- The paunch or intestines may be cut or broken, causing contamination.
- The pluck may be placed upside down, i.e., the ventral surfaces of the lungs pointing up.
- The liver, pluck, and viscera, or any one of these organs, may be pushed to or deposited on the opposite side of the table from your station, or literally missing.

There are many other examples of improper presentation. Generally, if an improper presentation occurs infrequently, delay inspection long enough to complete inspection duties. Also require that any contamination be removed. *A very important consideration is that your attention to the actual inspection procedures must not be distracted.* You may miss something you need to see.

If any improper presentations occur frequently, delay inspection, and meet with establishment management in an effort to get the problem(s) under control. *Your attention must not be distracted during the inspection procedure.*



LIVESTOCK ANATOMY SCHEMATICS



CALF INSPECTION

Calves of all sizes and ages are slaughtered. Some establishments slaughter "bob veal" calves. These calves are defined as, "under 150 pounds and less than three weeks of age". Although it is beyond the scope of this module to cover bob veal slaughter in detail, there are some aspects of these operations of which you should be aware. Historically, these very young calves have been a serious source of residue violations, particularly sulfa residues. Because of this, much of the work in establishments that slaughter bob veal calves involves the use of rapid in-plant tests to detect sulfas and antibiotics. The FAST test is used to detect residue violations. Should you be assigned to a bob veal operation in the future, become familiar with the statistical sampling plans and tests used.

Beyond three weeks of age, definite guidelines or definitions for what size constitutes a calf are not in FSIS publications. Some regions have established policies for size limitations on calves. This is important because inspection procedures for calves are not nearly as complete as those for mature cattle. It is important to note that large calves require an expanded inspection procedure that is identical to that for cattle inspection. This is because some abnormal conditions, such as measles (Cysticercosis), require a certain amount of time to develop. If in doubt about whether to use calf or cattle inspection procedures, it is essential to check with your supervisor to assure you perform the appropriate procedures.

Calves are dressed by one of two methods. Calves may be hot skinned. This method is essentially the same used for other livestock. The hide is removed on the kill floor at the time of slaughter. Alternatively, calves may be cold skinned. This is also referred to as dressed "hide-on." In this method the hides are not removed on the kill floor but rather in the cooler after the carcasses have chilled.

It is said that cold-skinned calves maintain their "bloom" (the bright red appearance of freshly dressed, properly chilled carcasses and meat) and shrink less than hot-skinned calves. This is because the hide prevents loss of moisture from the carcass during the chilling process, resulting in less weight loss.

Hot skinning

The same basic sanitary dressing requirements that apply to cattle are applicable to hot-skinned calves. They include:

- Daily cleaning of the knocking box.
- Keeping the animals as dry as possible.
- Not bleeding in the dry landing area if possible.

- Clean head skinning and removal (head with carcass identification).
- Sanitary hide and feet removal.
- Bung and bladder tying as necessary.
- Sanitizing brisket opening device between each use

Establishment management is responsible for handling all carcasses and parts in a sanitary manner regardless of the dressing method used.

Cold skinning or Hide on

The carcass (hide) must be completely clean of dandruff, dirt, and fecal material before heading or opening of the carcass. Cleaning is sometimes facilitated with "curry combs" or other scraping instruments, and always with potable water. There needs to be sufficient water pressure, volume, and a competent washer to accomplish complete cleaning. There is one exception to the rule that cleaning of the hide must precede heading or opening of the carcass. Should you ever be assigned to an establishment where Kosher slaughter is performed, you will note that the head may be removed before the hide is washed.

Monitoring the spacing of carcasses is a very critical point. After removal from the carcass, the head is thoroughly washed and the cavities flushed in the same manner as cattle heads (this is true of hot-skinned calves also). The head is then placed on a rack or hook for inspection. As in other species, when the head is removed from the carcass a method of identification acceptable to the IIC is necessary to assure that the identity of the head and its corresponding carcass is maintained until inspection is complete.

Some establishments may wish to save calf tongues but do not want the rest of the head and therefore do not want to expend the effort to skin the head. This is acceptable provided:

- the head is washed,
- medial retropharyngeal (suprapharyngeal) lymph nodes are exposed for inspection, and,
- tongues are washed individually

The hide is then opened and skinned back on the hock just far enough to allow insertion of the gambrel. The lower leg with the hide attached can then be removed. The front side of the hock should not be skinned until the hide is completely removed. *The hock is not to be exposed until final skinning.*

Next, the front feet are removed. Note that all procedures to this point have been performed prior to any opening being made in the carcass.

Brisket splitting, bung dropping, belly opening, and evisceration must be consistently done in a sanitary manner. Splitting the brisket may be done with a knife, saw, or other acceptable instrument. Whatever device is used, it must be sanitized following each use. The person opening the belly must take care to prevent unnecessary contamination of the carcass.

Bung tying in large calves is done as in cattle, i.e., the bung and bladder must be tied before evisceration unless the urinary bladder is removed and the bung does not cause contamination. The procedure in small calves is similar to that in sheep. The bung and bladder are grasped and the large intestine preceding the bung is stripped. The bung is severed and the bung and bladder are removed.

Now the carcass is ready to be eviscerated. Following evisceration, the viscera (abdominal viscera and pluck) are placed into a tray or truck for inspection.

Hot skinned calves

A. Head Inspection

1. Observe head's surfaces.
2. Incise and observe medial retropharyngeal (supratharyngeal) lymph nodes - left and right.

B. Viscera Inspection

1. Observe and palpate lungs' lymph nodes [tracheobronchial (bronchial) and mediastinal], costal (curved) surfaces of the lungs, and the heart.
2. Turn lungs over and observe ventral (flat) surfaces.
3. Observe spleen.
4. Observe and palpate dorsal surface of liver.
5. Turn liver over, observe ventral surface, and palpate hepatic (portal) lymph nodes.
6. Observe stomach and intestine.

C. Carcass Inspection

1. Observe outer and cut surfaces.
2. Lift forelegs and observe neck and shoulders.
3. Observe body cavities.
4. Observe and palpate medial (internal) iliac lymph nodes and kidneys.

Cold skinned hide-on calves

In addition to the above inspection procedures, inspection procedures of "hide-on" carcasses must include observation of the hid for contamination, parasitic conditions and other abnormalities, and palpation of the back for grubs. The skins of bruised calves and those affected with grubs, lice, warts, ringworm, and other skin conditions, as well as those found unclean, must be removed as part of the dressing operations at the time of slaughter. In all cases, skinning of calves must be done in a sanitary manner and unskinned carcasses must be adequately spaced.

Large calves

Recall that large calves require the same inspection procedure described for cattle. This expanded procedure is necessary on large calves because their age may have permitted abnormal conditions such as measles (*Cysticercosis*) to develop. Improper presentation of carcasses or viscera (such as dirt, hair, hide, ingesta, grease, pus, etc.) may occur as in other species. When this occurs, action must be taken by the inspector to correct the problem. Actions taken will depend on the nature and frequency of dressing errors. If in doubt about what actions need be taken, review the cattle and swine inspection modules for assistance.

Calf Post-mortem Pathology

When abnormal conditions are encountered on calf inspection, the proper reaction is to retain the carcass and parts for veterinary disposition, or retain just the carcass if only hide removal and/or extra trimming is necessary for the carcass to pass inspection. A two-section retain tag is usually used by placing one section on the carcass and one on the viscera if the carcass, head, and viscera are retained. The corresponding head is retained by use of the head-carcass house identification tag. If only the carcass is retained, both retain tags should be placed on the carcass. The large retain tag (US Retain/Reject tag) may be used to retain carcasses for dirty hides. Should you be assigned to a calf slaughter establishment you must become familiar with whatever means are utilized to identify retained carcasses and parts.

Calves are subject to disease and abnormalities as in other species, while some are unique to calves. A few examples of abnormal conditions that might be encountered include:

- Abscesses
- Pneumonia
- Nephritis
- Ringworm - This condition should be detected on ante mortem inspection. It is significant in hide-on calves and would require removal of the hide at the time of slaughter.
- Warts - See Ringworm.
- Grubs - Another hide condition that requires skinning the carcass. Grubs are the larvae of the heel fly, which infects cattle. The primary reason for palpating the backs of calves at postmortem inspection is to check for the presence of these parasites.
- Arthritis
- Icterus - The carcass and parts have a yellow appearance. In true icterus, normally white tissues (such as the tendons and sclera of the eye) are affected.

After carcasses are cold-skinned in the cooler, they must be examined for injection lesions, foreign bodies, parasites, bruises, or other pathology not detectable with the hide still on.

SHEEP AND GOAT INSPECTION

Viscera Inspection

1. Observe abdominal viscera, esophagus, mesenteric lymph nodes, and omental fat.
2. Observe bile duct and content and express gall bladder.
3. Observe and palpate liver (both sides) and costal surfaces of lungs.
4. Palpate bronchial and mediastinal lymph nodes.
5. Observe ventral surfaces of lungs.
6. Observe and palpate the heart.

When certain disease conditions are found, the viscera and carcass will be retained for the veterinarian's final disposition. The usual procedure for tagging is to use two small retain tags, each having identical serial numbers. One tag is attached to the viscera, and the other tag to the leading side of the carcass on the hind leg.

When an unacceptable or improper presentation occurs, you must evaluate the situation and require the establishment to take action you consider necessary. For example, a sheep pluck covered with paunch content is presented to you for inspection. You have been working the assignment all day and this is the first incident to occur today. You would delay your inspection of that pluck until it was cleaned up adequately for inspection. However, if the same situation was occurring frequently, you would have to stop the line and inform establishment management the problem had to be corrected.

Carcass and Head Inspection

1. Observe outer surfaces of carcass, body cavities (pelvic, abdominal, thoracic), and spleen.
2. Observe and palpate kidneys.
3. Palpate sub iliac, scrotal or mammary, and deep popliteal lymph nodes.
4. Palpate back and sides of carcass.
5. Palpate superficial cervical lymph nodes and shoulders and lift forelegs.
6. Observe neck, shoulders, and head.

Following are some of the more common disease conditions in sheep.

- Caseous lymphadenitis – a bacterial infection results in a disease that produces inflammation and resulting caseous (cheese-like) abscesses in lymph tissue. Retain for veterinary disposition.

- Tapeworm - a parasite found in the gall bladder and bile ducts (and occasionally pancreatic ducts). Livers affected with this parasite are condemned for human food; may be salvaged for pet food as an inedible product, provided they are properly handled.
- Nodular worms (*Oesophagostomum* species) – a parasite that produces pea-sized firm nodules on the surface of the small and large intestine, may be associated deterioration of the carcass (thinness, a poor carcass, or an otherwise run-down condition). Retain for veterinary disposition.
- Thin-necked bladder worm - large (3/4 inch or 2 cm), fluid-filled, clear cysts, usually attached to the surfaces of the liver, intestines, mesentery, and omentum. They are frequently also seen in the pelvic cavity. May take the form of an active (live) larva (clear soft cyst membrane and clear fluid contents) or may be degenerated (dead) and appear as firm nodules with a scar tissue or calcified consistency. Condemn organs affected with this parasite and have the pelvic cavity trimmed of any affected tissues, again after correlating with your supervisor.
- Sheep measles (*Cysticercus ovis*) – a parasite is similar to the measles found in cattle because it is found in muscle tissue such as the heart, diaphragm, esophagus, or carcass. The cysts are small (about 1/4 inch or 0.6 cm) and may appear as active, clear fluid-filled cysts or the degenerated firm nodules as described above for the bladder worm. Retain for veterinary disposition.
- Hydatid cysts – cysts are approximately 2-4 inches (5-10 cm) in diameter and may be multi-compartmented, with a white, thick-walled cyst membrane that contains an amber clear fluid that may contain sand-like granules. Occasionally, this thick white membrane will have a very slight clearing of the cyst wall, making it almost transparent. The cysts are most often seen in the lungs and/or the liver. The affected tissues must be condemned to tankage and never allowed for use in pet foods as is allowed with other parasitized product (9 CFR 314.10(a)).
- "Sarco" (*Sarcosporidiosis* sp.) - flat, white parasitic cysts are imbedded in muscle tissue (esophagus, heart, carcass, etc.), having a "rice grain" appearance and being "cigar-shaped bodies" about 1/4 inch (0.5 cm) long. Retain the carcass for veterinary disposition.
- Neoplasia, tumors - growths that can be bizarre or subtle changes of size and/or color of tissues and organs. Retain the carcass and parts for veterinary disposition.

- Pneumonia - an inflammatory disease in which the normal soft "foamy consistency" feel of the lungs and their normal "light-pinkish" color are changed. The color change may vary from a bright red, to reddish-brown, to brown, to gray, to white. The change in the consistency or feel of the lung may vary from the normal "foamy feeling" to firm (slightly or moderately or markedly). These changes may be accompanied by the occurrence of abscesses in the lung tissue itself or in the lung's lymph nodes. Retain the carcass for veterinary disposition.
- Nephritis - kidneys appear enlarged (swollen) or may be partially shrunken with a gristle-type scar tissue in the kidney tissue. Abscesses may be present. Petechiation, a hemorrhage from a small blood vessel, may be observed. The color change may vary from the kidney's normal color to pink, to blood red, to brick-red, to yellow or amber, to dark brown, to almost black. Various-colored radiating streaks can sometimes be seen on the kidney's surface in certain disease states. Retain for veterinary disposition.
- Abscesses - when this condition is localized, condemn the affected area and pass the remainder of the carcass. However, when it is not localized, retain the carcass and viscera for veterinary disposition. When an abscess has been cut into or opened, there is a real possibility that other parts of the carcass have been contaminated by this pus. Carcasses so contaminated must be trimmed to your satisfaction before you allow it to pass. If the establishment can accomplish this with a minimum of interference to their operations and you find their solution acceptable, you can allow operations to proceed; however, if not, you must delay your inspection (or stop operations if necessary) until the problem is corrected.
- Arthritis - inflammation of the animal's joints. These are often infected and should not be opened (cut into) on the line. The affected joints will be enlarged and regional lymph nodes generally also are enlarged and may be discolored. Several joints may be involved (polyarthritis), particularly in lambs. Other disease conditions may complicate arthritis, such as septicemia, toxemia, or pyemia. Retain for veterinary disposition.
- Emaciation - fat tissue loses its normal white color and semi-firm consistency and becomes a darker color (almost brown), with a jelly-like to fluid-like consistency. Fat around the heart seems to be the first area of the body affected. Retain for veterinary disposition, but if only the fat around the heart is affected, don't retain the carcass and viscera.
- All localized conditions like bruises, contamination, adhesions, etc., are to be removed by a establishment employee before the carcass enters the cooler. An exception is made in the case of "wild oats," otherwise known as "needle grass or grass awns." These are slender barbed bristles that are a part of the cereal grasses, which become embedded in the subcutaneous tissues of sheep as they graze on pasture. They are black or brown wooden-like slender awns about one-half the size of a wooden toothpick when seen on the carcass. They often can be seen but usually are readily palpable. They are not noticeable on the

live animal. They are found generally in the subcutaneous tissues over the abdomen (belly) and the thorax (chest) and occasionally on the back and legs. They are found only in certain parts of the country and therefore most lots are totally unaffected. When they are encountered on the production line the carcasses are trimmed, but when they are trimmed depends on how extensively the carcasses are affected and the proportion of carcasses in the lot affected and the establishments' history of cooperation in correcting the problem. If many of the carcasses (a high proportion) are affected and/or those affected carcasses have numerous grass awns in the tissues, FSIS will allow these carcasses to go into the cooler and be trimmed after cooling if the establishment will segregate or group all affected carcasses in one cluster. Further, if the establishment does not cooperate in this provision, then they must trim all affected carcasses in the presence of the FSIS inspector and before each carcass is passed. If there are just a few grass awns on affected carcasses and only a few (a low proportion) of these affected carcasses in the lot, the establishment should trim affected carcasses before they enter the cooler.

This module has not referred specifically to the slaughter and inspection of goats. Since the requirements and inspection procedures in goats are identical to those of sheep, the information on sheep contained herein can be extrapolated to goats.

RATITE INSPECTION

General Information

Ratites are flightless birds with small wings and flat breastbones. The name "ratite" is derived from the Latin word "ratis", meaning "raft", describing the shape of the sternum. The sternum of ratites has no keel, is convex to the outside, concave to the inside, and has a somewhat "raft-like" shape. Ostrich, emu, and rhea are members of this family. Ostrich is native to Africa. Emu is native to Australia. Rhea is native to South America. When fully grown, ostriches, which are the largest birds in the world, stand about seven to eight feet tall and can weigh 300 to 400 pounds. Emu are 6 feet tall and weigh 125 to 140 pounds. Adult rheas are 5 feet tall and weigh 60 to 100 pounds. Ratites are long lived. Ostriches can live to seventy years of age, with hens producing eggs for forty years. All ratites have acute hearing and keen eyesight. Their peripheral vision is almost 360°. Although they are unable to fly, they are excellent swimmers and are extremely agile. They have been around for 80 million years.

Ratite meat is available in innovative restaurants and some meat markets. They are the latest in meat products. The birds are 95% usable as meat, feathers, oil, and leather. It is lean and tastes like beef, but contains much less fat. Ratite meat is even lower in calories than chicken and turkey. Ratites are slaughtered at 10-13 months of age. Even though ratites are poultry, they are classified as "red" meat since the pH of their flesh is similar to beef. The raw meat is very dark cherry red. After cooking, the meat

looks like beef and the flavor is similar, but a little sweeter. Ratite meat is sold as steaks, fillet, medallions, roasts and ground meat. The most tender meat comes from the thigh or “fan”. Meat also comes from the drum and forequarter. Emu, ostrich, and rhea meat are considered specialty items.

Post-Mortem Inspection

A careful post-mortem examination and inspection will be performed on the carcasses and parts of all ratites slaughtered at official establishments. The purpose of post-mortem inspection is to make a decision about the wholesomeness of each ratite carcass inspected. One of the following outcomes will result from post-mortem inspection, the wholesome is passed, the unwholesome is condemned, and anything questionable is retained for veterinary review. The PHV is responsible for uniform dispositions made on carcasses presented to food inspectors.

If the carcass is wholesome, except for some localized disease condition, it is allowed to continue unrestricted after removal of the affected areas. The diseased portion that is removed is handled the same as any other condemned material. If the carcass is considered unwholesome, the entire carcass is condemned.

The factors to be considered at post mortem exam include:

1. At the time of slaughter, is there evidence that the disease process is being resolved?
**If it is being resolved it will show evidence of healing. This will be evidenced by connective tissue walling off lesions, minimal evidence of inflammation, and a return to functional activity of the tissues.*
2. Is there evidence that the disease process is remaining about the same?
**In chronic conditions, there will be areas of active inflammation, areas of inactivity, or areas of connective tissue representing a granulomatous reaction. Function will still be present in the affected tissues.*
3. Is there evidence that the disease process has developed into an irreversible stage?
**The lesions of the irreversible stage of an interrupted disease process represent extensive degeneration of parenchymatous organs. Classical signs of septicemia/toxemia (systemic change) are present. The bird would not have recovered from the disease if allowed to live.*

Localized lesions are restricted to a limited region or to one or more spots. The bird's immune system is able to keep the disease or condition confined.

Generalized lesions are systemic, affecting major organ systems. The physiologic functions of the interdependent organ systems are disrupted. The cells of the body are deprived of adequate maintenance to support normal function and they deteriorate. This deterioration may be very rapid when highly virulent microorganisms are the cause, or it can be more gradual if less virulent ones are involved.

Post-mortem Procedure

1. A careful post-mortem examination and inspection will be performed on the carcasses and parts of all ratites slaughtered at official establishments.
2. The heart is incised by establishment employees through the interventricular septum. The heart is observed and palpated by the inspector. The lungs are observed and palpated on all external surfaces. The abdominal and thoracic air sacs are observed.
3. The liver and spleen are observed and palpated.
4. The kidneys are observed with the carcass, then removed to an inspection tray and observed and palpated.
5. All other visceral organs are observed.
6. The neck, trachea, and esophagus are observed.
7. The head, eyes, and sinus openings are observed.
8. Internal and external carcass surfaces are observed.
9. Any carcass or viscera exhibiting abnormal physiological or pathological characteristics shall be tagged "U.S. Retained" and railed out for final inspection by a Public Health Veterinarian.
10. Each inspected carcass and all organs and other parts of carcasses which are not found to be adulterated will be passed for human food. The liver, heart, gizzard, and neck are considered edible byproducts if handled and processed in a sanitary manner. Ratite kidneys are presumed to concentrate heavy metals and therefore are condemned.

11. Each individual carcass is properly washed immediately after being passed for wholesomeness. Following final washing, carcasses are promptly chilled.
12. Official marks and devices to identify inspected and passed products of ratites are found in 9 CFR 381.96.