

# Federal inspection of cattle: Procedures and outcomes

J. VanHook, DVM, MPH  
USDA Food Safety and Inspection Service

## Abstract

Producers routinely cull breeding cattle from production herds; these animals are often sent to slaughter for human consumption. Federal inspectors assess each animal before and after slaughter for wholesomeness of the meat; animals and carcasses with significant pathology or potential pharmaceutical residues are inspected by a veterinarian. Animals and carcasses deemed unfit for human consumption are condemned by federal veterinarians and removed from the human food chain, which can result in economic loss to the producer. This article presents a broad overview of federal inspection processes and the regulatory thought process utilized by federal veterinarians when assessing slaughtered beef carcasses.

**Key words:** FSIS, inspection, disposition, regulatory thought process

## Introduction

The United States breeding beef industry in July 2021 included 31.4 million cows and 2.1 million bulls; the dairy industry in July 2021 included 9.5 million milking cows.<sup>9</sup> In 2020, approximately 3.26 million beef cows, 518,000 bulls, and 3 million dairy cows were slaughtered for human consumption in the United States.<sup>10</sup> When culling cattle, producers have 2 general options for how to remove the animals from their herd: euthanize on the farm or sell to another producer or for slaughter.<sup>1</sup> When culled cattle are sold directly to slaughter facilities on a grade and yield basis, condemnation of the live animal or of the dressed carcass results in an economic loss to the producer. Therefore, the producer is incentivized to make an informed decision regarding the potential for animal or carcass condemnation.

## Overview of federal inspection

The United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS) inspection personnel are responsible for ensuring the nation's meat supply is safe, wholesome, not adulterated, and is labeled correctly.<sup>8</sup> To achieve this mission, FSIS personnel inspect each cow both before and after slaughter, observing for symptoms or lesions that could result in the meat or edible by-products from that animal being unfit for human consumption.<sup>2,3</sup>

During ante mortem inspection, FSIS inspection personnel observe cattle both at rest and in motion.<sup>2</sup> If the inspector observes symptoms or lesions potentially indicating significant pathology or pharmaceutical residues, the animal is segregated and held for inspection by an FSIS veterinarian.<sup>2</sup> The veterinarian conducts a careful inspection and determines 1 of 3 dispositions for each animal: condemned on ante mortem, tagged as U.S. Suspect for veterinary review on post-mortem inspection, or passed for slaughter.<sup>2</sup>

During post-mortem inspection, FSIS personnel observe the entire carcass and organs and palpate and incise specific tissues and organs.<sup>3</sup> If inspectors find lesions potentially indicating

significant pathology or pharmaceutical residues, the carcass and associated organs are segregated and held for inspection by an FSIS veterinarian.<sup>3</sup> The veterinarian then conducts a careful inspection and determines 1 of 3 dispositions for each carcass: trim and pass for human consumption, pass with restriction, or condemn.<sup>4</sup>

The regulatory thought process for veterinary disposition can be summarized as: acute and systemic lesions usually result in condemnation; chronic and localized lesions usually result in trimming of observed lesions; and associated tissues and passing of the rest of the carcass and parts for human consumption.<sup>4,20</sup> However, all veterinary dispositions are made based on the specific pathology observed in the individual animal or carcass being inspected.<sup>4,20</sup>

## Select ante mortem symptoms and lesions

By regulation, FSIS personnel are required to condemn at ante mortem inspection livestock determined to show certain conditions. First, livestock found dead prior to slaughter are automatically condemned, as are all animals observed to be moribund or in a dying condition.<sup>15</sup> Second, any ruminant (bovine, ovine or caprine) found to have a central body temperature above 105°F (40.5 C) is automatically condemned.<sup>16</sup> Third, any livestock showing symptoms of central nervous system (CNS) disorders, such as rabies or listeriosis, must be condemned.<sup>19</sup> Additionally, all bovine condemned for CNS disorders are tested for bovine spongiform encephalopathy (BSE).<sup>6</sup> Finally, any bovine, from bob veal to mature cow or bull, that is either unable to rise from recumbency unaided or unable to walk unaided is classified as non-ambulatory disabled and must be condemned on ante mortem inspection.<sup>13,17</sup> Hobbles are considered an aid to rising and walking, and therefore will be cut or removed before ante mortem inspection.<sup>2</sup>

FSIS veterinarians are also required by regulation to conduct post-mortem veterinary inspection on livestock showing symptoms on ante mortem inspection consistent with several specific conditions. These animals are identified as U.S. Suspect with individually numbered silver ear tags and are maintained under FSIS control throughout the slaughter and carcass dressing process.<sup>18</sup> First, a bovine with cancerous lesions affecting the eye or surrounding tissues ("cancer eye") must be segregated as U.S. Suspect.<sup>14</sup> Second, cattle showing lesions consistent with Actinomyces ("lumpy jaw") or Actinobacter ("wooden tongue") infection of the head are segregated as U.S. Suspect.<sup>2</sup> Third, the veterinarian can designate any animal as U.S. Suspect if it may have a condition or disease that would merit condemnation on post-mortem inspection but is not so severely affected as to be condemnable on ante mortem inspection.<sup>12</sup>

## Select post-mortem lesions

By regulation, FSIS veterinarians are required to condemn at post-mortem inspection carcasses determined to have any of several conditions. First, carcasses identified as showing any degree of icterus must be condemned.<sup>27</sup> Second, all carcasses affected with malignant lymphoma must be condemned.<sup>25</sup> Third, all carcasses showing lesions of septicemia, toxemia or pyemia must be condemned; additionally, these carcasses are typically sampled for pharmaceutical residues.<sup>7, 26</sup> Fourth, all carcasses determined to exhibit emaciation must be condemned; however, a lean carcass or a carcass showing mucoid degeneration of the heart cap and renal pelvic fat but is otherwise well-nourished would not be classified as emaciated.<sup>30</sup> Fifth, all carcasses identified with a pronounced urine odor, generally described as 'uremic', must be condemned.<sup>31</sup> Finally, all carcasses or tissues that contain a violative pharmaceutical residue as defined by the Food and Drug Administration must be condemned.<sup>32</sup>

For carcasses with other pathologic lesions, FSIS veterinarians are expected to exercise their professional judgement and carefully examine each carcass.<sup>20</sup> Carcasses systemically affected are generally condemned, as the carcass has no unaffected, wholesome tissues that could be passed for human consumption.<sup>20</sup> For lesions that do not affect the whole carcass, the veterinarian can condemn just the affected tissues; once the veterinarian verifies the condemned tissues have been trimmed and removed, the wholesome portions of the carcass and organs are then passed for human consumption.<sup>20</sup> When the nature or scope of observed pathology cannot be determined by gross examination, the FSIS veterinarian will collect representative samples for histopathologic examination and retain the carcass and organs until a final disposition is rendered.<sup>4, 21</sup>

Carcasses affected by tuberculosis infection require additional specific inspection procedures and have strict regulatory requirements for carcass disposition.<sup>5</sup> FSIS' standard inspection techniques are intended to detect tuberculosis lesions: inspectors incise eight cranial lymph nodes and 5 pulmonary lymph nodes and palpate the lungs of every bovine carcass; any lesion consistent with tuberculosis will result in the carcass being segregated and held for veterinary inspection and disposition.<sup>3</sup> During veterinary inspection, the entire carcass will be carefully assessed to determine the extent of tuberculosis lesions as well as any associated systemic lesions such as cachexia or septicemia.<sup>5</sup> If the veterinarian determines there are no tuberculosis lesions in the carcass, such as when the initial lesion is determined to be a non-tuberculoïd granulomatous abscess, then the carcass may be passed for human food.<sup>5, 23</sup> If the veterinarian determines the tuberculosis lesions are systemic, such as identifying distribution of lesions consistent with systemic circulation or identifying lesions within the muscles or joints, the carcass must be condemned.<sup>22</sup> However, if the veterinarian determines the tuberculosis lesions are localized, mineralized and encapsulated, the affected tissues must be condemned, and the rest of the carcass may be passed with restriction, specifically passed for cooking.<sup>24</sup> To salvage the non-affected portions of the carcass, FSIS inspectors will maintain control of the carcass until the establishment has cooked the carcass to a minimum of 170°F (76.7 C) for a minimum of 30 minutes.<sup>33</sup>

Carcasses infested with zoonotic tapeworms also require specific inspection procedures and regulatory requirements for carcass disposition.<sup>4</sup> The primary species of concern is *Taenia* sp., the larvae of which have historically been described as

*Cysticercus*.<sup>4</sup> FSIS' standard inspection techniques are intended to detect tapeworm infestation: inspectors incise the internal and external cheek muscles and the heart, palpate the tongue and diaphragm, and observe the esophagus and pillars of the diaphragm.<sup>3</sup> Any cystic lesions consistent with tapeworm infestation will result in the carcass being segregated and held for veterinary disposition.<sup>3</sup> During veterinary inspection, the entire carcass will be carefully assessed to determine the extent of tapeworm infestation as well as any associated systemic lesions such as edema.<sup>4, 28</sup> If the veterinarian determines the tapeworm infestation is extensive, the entire carcass must be condemned.<sup>28</sup> If the veterinarian determines the tapeworm infestation is not extensive, then all tissues and organs with observed cysts are condemned and the non-affected portions may be passed with restriction, specifically passed for refrigeration.<sup>29</sup> To salvage the non-affected portions of the carcass, FSIS inspectors will maintain control of the carcass until the establishment has held the intact carcass at no higher than 15°F (-9.4 C) continuously for a minimum of 10 days, or has held the deboned meat from the carcass at no higher than 15°F (-9.4 C) continuously for a minimum of 20 days.<sup>29</sup>

## Conclusion

Overall, well-nourished animals without systemic disease are likely to pass ante mortem and post-mortem inspection; marginal animals with systemic effects of disease are more likely to be condemned either on ante mortem or post-mortem inspection. This brief overview of the FSIS inspection and disposition thought process can be used by producers or veterinarians to assist in determining which culling method is economically prudent for specific animals being removed from production herds.

## References

1. Buza M, Bacigalupo-Sanguesa P, Abuelo A, et al. Planning tool for welfare culling during farm disrupted operations. <https://www.canr.msu.edu/news/planning-tool-for-welfare-culling-during-farm-disrupted-operations>. Accessed August 6, 2021.
2. Food Safety and Inspection Service. Directive 6100.1 Revision 3 Ante-Mortem Livestock Inspection. <https://www.fsis.usda.gov/policy/fsis-directives/6100.1>. Accessed August 6, 2021.
3. Food Safety and Inspection Service. Directive 6100.2 Revision 1 Post-Mortem Livestock Inspection. <https://www.fsis.usda.gov/policy/fsis-directives/6100.2>. Accessed August 6, 2021.
4. Food Safety and Inspection Service. Directive 6100.6 Revision 1 Post-Mortem Dispositions for Public Health Veterinarians. <https://www.fsis.usda.gov/policy/fsis-directives/6100.6>. Accessed August 6, 2021.
5. Food Safety and Inspection Service. Directive 6240.1 Revision 2 Inspection, Sampling, and Disposition of Animals for Tuberculosis (TB). <https://www.fsis.usda.gov/policy/fsis-directives/6240.1>. Accessed August 6, 2021.
6. Food Safety and Inspection Service. Directive 10,400.1 Revision 1 Sample Collection from Cattle Under the Bovine Spongiform Encephalopathy (BSE) Ongoing Surveillance Program. <https://www.fsis.usda.gov/policy/fsis-directives/10400.1>. Accessed August 6, 2021.
7. Food Safety and Inspection Service. Directive 10,800.1 Revision 1 Residue Sampling, Testing and Other Verification Procedures under the National Residue Program for Meat and Poultry Products. <https://www.fsis.usda.gov/policy/fsis-directives/10800.1>. Accessed August 6, 2021.

- 
8. Food Safety and Inspection Service. Strategic Plan 2017-2021. [https://www.fsis.usda.gov/sites/default/files/media\\_file/2020-07/Strategic-Plan-2017-2021.pdf](https://www.fsis.usda.gov/sites/default/files/media_file/2020-07/Strategic-Plan-2017-2021.pdf). Accessed August 6, 2021.
  9. National Agriculture Statistics Service. July Cattle Inventory Down 1 Percent. <https://usda.library.cornell.edu/concern/publications/h702q636h?locale=en>. Accessed August 6, 2021.
  10. National Agriculture Statistics Service. Livestock Slaughter 2020 Summary. [https://www.nass.usda.gov/Publications/Todays\\_Reports/reports/lisan0421.pdf](https://www.nass.usda.gov/Publications/Todays_Reports/reports/lisan0421.pdf). Accessed August 6, 2021.
  11. Title 9, Code of Federal Regulations 309.1.
  12. Title 9, Code of Federal Regulations 309.2(a).
  13. Title 9, Code of Federal Regulations 309.2(b).
  14. Title 9, Code of Federal Regulations 309.2(e).
  15. Title 9, Code of Federal Regulations 309.3(a).
  16. Title 9, Code of Federal Regulations 309.3(c).
  17. Title 9, Code of Federal Regulations 309.3(e).
  18. Title 9, Code of Federal Regulations 309.3(m).
  19. Title 9, Code of Federal Regulations 309.4(a).
  20. Title 9, Code of Federal Regulations 311.1(a).
  21. Title 9, Code of Federal Regulations 311.1(b).
  22. Title 9, Code of Federal Regulations 311.2(a).
  23. Title 9, Code of Federal Regulations 311.2(c).
  24. Title 9, Code of Federal Regulations 311.2(d).
  25. Title 9, Code of Federal Regulations 311.11(b).
  26. Title 9, Code of Federal Regulations 311.16(a).
  27. Title 9, Code of Federal Regulations 311.19.
  28. Title 9, Code of Federal Regulations 311.23(a)(1).
  29. Title 9, Code of Federal Regulations 311.23(a)(2).
  30. Title 9, Code of Federal Regulations 311.26.
  31. Title 9, Code of Federal Regulations 311.37.
  32. Title 9, Code of Federal Regulations 311.39.
  33. Title 9, Code of Federal Regulations 315.2.

