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Report I

(Revised January 2025)

Management Practices on U.S. Feedlots, 2021

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Items of Note

From March through August 2021, the USDA's National Animal Health Monitoring System (NAHMS), in collaboration with the National Agricultural Statistics Service, conducted a national study focusing on cattle health and management on U.S. feedlots with at least 50 head. The NAHMS Feedlot 2021 study was designed to provide a snapshot of current feedlot cattle health and management practices and to allow for the analysis of trends from previous NAHMS feedlot studies conducted in 2017, 2011, 1999, and 1994 (https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/monitoring-and-surveilance/nahms).

When interpreting estimates in the report, it is helpful to keep in mind that feedlots with 1,000 or more head capacity contained 77.2 percent of the cattle on feed but made up only 5.2 percent of the feedlots in the United States. This is shown in Appendix II and the 2017 NASS Census of Agriculture.

Unless otherwise specified, the time period for estimates in the report is January 1 through December 31, 2020, (i.e., calendar year 2020). Four feedlot capacity categories were used in the report based on number of head: small (50-499), medium (500-999), large (1,000-4,999), and very large (5,000 or more). Highlights of the report appear below.

When this report was first published, the "Suggested bibliographic citation for this report" section erroneously listed "2023" as the publication year for the report. This has been changed to the correct year, which is 2024.

This report was updated in January 2025. Data analysis from the second questionnaire administered during the Feedlot 2021 study indicated that a few of the percentages on antibiotic use in this report, which are from the first questionnaire, are likely underestimated. Specifically, the percentage of feedlots that used any antibiotics by any route of administration and the percentage of feedlots that used antibiotics in feed in this report are lower than the corresponding values from the second questionnaire. Slight differences in how questions were worded in the first and second questionnaires likely contributed to the lower estimates seen in this report. The second questionnaire included additional trade names not included in the first questionnaire. This wording impacted tables G.2.a., G.2.b., G.5.a., and G.5.b., and we recommend using corresponding values from the upcoming Report II (publication expected in mid-2025).

Outside sources of cattle

Feedlots in the United States typically do not raise cattle from birth and instead obtain cattle after weaning to be placed in the feedlot. In some cases, they purchase cattle ("feeder cattle") to be placed in the feedlot, but they can also "custom feed" cattle owned by someone else, often the cow-calf operation of origin.

Over half of feedlots (55.9 percent) placed at least some cattle born and raised on the operation, but only 7.3 percent of cattle placed were born and raised on the operation. Among the outside sources of cattle, the highest percentage of feedlots (39.7 percent) obtained at least some cattle from a sale barn.

A higher percentage (36.0 percent) of small feedlots had all cattle placed being born and raised on the feedlot compared with medium, large, and very large feedlots (13.8, 11.5, and 8.3 percent, respectively). A higher percentage (38.0 percent) of cattle placed on small feedlots were born and raised on the operation compared with the other feedlot sizes.

Slightly over half (54.7 percent) of cattle placed were born and raised on the operation or came directly from a cow-calf, backgrounding, or stocker operation, which means the health history of these cattle (regarding vaccinations and other practices) was likely known prior to placement of these cattle in the feedlot. Over one-third (38.2 percent) of cattle placed were obtained from a sale barn, and health history is typically not known for cattle obtained from a sale barn.

For feedlots that placed any cattle not born and raised on the operation, the highest percentage of cattle placed in 2020 (37.3 percent) originated from Region 2 (MT, ND, SD, WY, NE, UT, CO, KS).

Use of ear tags for animal identification

Identification of animals is important for traceability, disease control, and for managing animal performance. Ear tags are often applied to cattle to provide a means of distinguishing one animal from another. This is helpful in keeping track of information such as cattle weight and treatment history.

The vast majority of feedlots (85.4 percent) had at least some cattle individually identified with an ear tag placed on the feedlot or prior to arrival. There were no differences by feedlot capacity in the percentage of feedlots that individually identified any cattle with an ear tag. About two-thirds (65.5 percent) of cattle were individually identified with an ear tag placed either on the feedlot or prior to arrival.

Marketing claims regarding antibiotics or hormones

Marketing claims, such as “raised without antibiotics,” can give a competitive advantage over products without any claims. Meat products without specific marketing claims are regarded as “conventional.” Over three-fourths (78.4 percent) of feedlots marketed at least some cattle conventionally, without any specific marketing claims regarding antibiotics or hormones. Similar percentages of feedlots marketed at least some cattle with a claim of no or limited antibiotic use (13.1 percent) or no hormone use (13.5 percent). A low percentage of feedlots (3.0 percent) marketed at least some cattle as meeting the standards in the USDA National Organic Program (i.e., certified USDA organic).

The vast majority of cattle (85.1 percent) were placed with the intention to not meet any marketing claims regarding antibiotics or hormones. Similar percentages of cattle were placed with the intention to meet claims of no or limited antibiotic use (8.4 percent) and no hormone use (10.2 percent). There were no differences by feedlot capacity in the percentages of cattle by marketing claim used.

Antibiotic use

Just as with humans, cattle sometimes become sick and need to be given antibiotics. A higher percentage of medium, large, and very large feedlots (85.1, 91.5, and 90.6 percent, respectively) administered injectable antibiotics to individual cattle that became sick compared with small feedlots (59.7 percent).

Antibiotics were administered to cattle as a group on 22.4 percent of feedlots. A higher percentage of large and very large feedlots (41.4 and 39.9 percent, respectively) administered injectable antibiotics to cattle as a group compared with small feedlots (18.2 percent).

About two-thirds (64.2 percent) of feedlots strongly agreed or agreed with this statement: “On January 1, 2017, I felt I had all the resources (e.g., access to veterinarians knowledgeable about the Veterinary Feed Directive (VFD), training, finances) necessary to manage the VFD rule change on this feedlot.”

Use of a veterinarian

Veterinarians are involved in disease prevention and diagnosis on feedlots. Veterinarians can help producers select appropriate antibiotics and educate them on their appropriate and judicious use. For the purposes of this report, use of a veterinarian could mean the veterinarian was physically present on the feedlot, and it could also mean the veterinarian was consulted by telephone, video conference, or at a veterinary clinic where the veterinarian was not present on the feedlot.

Most feedlots (85.1 percent) used the services of a veterinarian in calendar year 2020. A lower percentage of small feedlots (81.2 percent) used a veterinarian in calendar year 2020 compared with medium, large, and very large feedlots (93.1, 97.2, and 99.2 percent, respectively).

For feedlots that did not use a veterinarian in calendar year 2020, the vast majority (90.7 percent) reported they did not need a veterinarian.

For feedlots that used a veterinarian in 2020, about half (50.7 percent) used a private veterinary clinic or consulting practice **not** making routine visits but called as needed. A higher percentage of very large feedlots (71.0 percent) used a private veterinary clinic or consulting practice making routine visits and called as needed as their primary veterinarian compared with large, medium, and small feedlots (34.6, 42.3, and 33.7 percent, respectively).

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All participants are to be commended, particularly the producers whose voluntary efforts made this study possible.

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Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory program of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). NAHMS is designed to help meet the Nation's animal health information needs and has collected data on animal health and management practices on U.S. feedlots via four previous studies.

The NAHMS 1994 Cattle on Feed Evaluation (COFE) provided the first national information on the health and management practices of feedlots in the United States. Data were collected from 3,214 feedlots from 13 major cattle-on-feed States, which accounted for 85.8 percent of the U.S. cattle-on-feed inventory on January 1, 1994.

The NAHMS Feedlot '99 study was designed to provide participants and those affiliated with the cattle-feeding industry with information on the Nation's feedlot-cattle population to be used for education and research. For Feedlot '99, a statistically valid sample was selected so that inferences could be made to 100 percent of the cattle on feed in feedlots with a capacity of 1,000 head or more on January 1, 1999, in 12 participating States. These feedlots represented 82.1 percent of all cattle on feed on January 1, 2000, in the 50 States.

The NAHMS Feedlot 2011 study took an in-depth look at large U.S. feedlots (1,000 head or more capacity) in 12 States and small feedlots (fewer than 1,000 head capacity) in 13 States. Large feedlots accounted for 82.1 percent of the January 1, 2011, inventory in all U.S. feedlots but only 2.8 percent of all feedlots. The 12 participating States accounted for over 95 percent of the inventory in large feedlots (NASS, "Cattle on Feed" February 18, 2011).

The NAHMS Antimicrobial Use and Stewardship on U.S. Feedlots, 2017 study represented the first time that NAHMS conducted a targeted study on antimicrobial use and stewardship, and it was also the first time that NAHMS collected detailed information on antimicrobial use in feed and water on feedlots with a capacity of 50 to 999 head. The Antimicrobial Use and Stewardship on U.S. Feedlots, 2017 study was conducted in 22 top cattle-producing States. The 13 States from which small feedlots were selected represented 93.2 percent of U.S. cattle inventory on feedlots with 50 to 999 head and 91.3 percent of feedlots with a capacity of 50 to 999 head. The 16 States from which large feedlots were selected represented 92.8 percent of U.S. cattle inventory on feedlots with 1,000 or more head capacity and 92.3 percent of feedlots with 1,000 or more head capacity.

The NAHMS Health Management on U.S. Feedlots, 2021 study continued collecting detailed information on antimicrobial use and stewardship that began with the Antimicrobial Use and Stewardship on U.S. Feedlots, 2017 study. However, it also included questions on general management practices used on feedlots, similar to the NAHMS Feedlot studies conducted in 1994, 1999, and 2011. Many of the management practices on which data were collected could potentially relate to antimicrobial use. For example, if calves are preconditioned prior to placement in a feedlot, they are at lower risk of disease and may be less likely to require antibiotics in the feedlot, so some questions were asked about knowledge of preconditioning practices used on cattle prior to arrival at the feedlot. The study was initially to be conducted in 2020 but was postponed to 2021 due to COVID-19. Twenty-two States participated, with small feedlots selected from 18 States and large feedlots from 17 States. The 18 States for the small component represented 95.7 percent of the inventory on feedlots with 50 to 999 head and 94.0 percent of feedlots with 50 to 999 head. The 17 States for the large component represented 95.5 percent of the cattle on feed on feedlots with 1,000 or more head inventories and 94.4 percent of feedlots with 1,000 or more head inventory.

Terms Used in This Report

Antibiotic: An antimicrobial that inhibits and/or kills certain bacteria. Appropriately utilized antibiotics are very effective against illnesses caused by bacteria.

Antimicrobial: Any substance of natural, semisynthetic, or synthetic origin that kills or inhibits the growth of microorganisms. All antibiotics are antimicrobials, but not all antimicrobials are antibiotics. For the purposes of this report, the terms “antimicrobial” and “antibiotic” are considered synonymous.

Antimicrobial stewardship and judicious use: Includes keeping records on antimicrobial use, offering employees training regarding use of antimicrobials, periodically undergoing facility audits or assessments, using a veterinarian for guidance on antimicrobial use, having a valid veterinarian-client-patient-relationship, and taking steps to prevent disease.

Antimicrobial use definitions (excerpted from American Veterinary Medical Association (AVMA) website - https://www.avma.org/policies/avma-definitions-antimicrobial-use-treatment-control-and-prevention):

> **Antimicrobial prevention of disease (prophylaxis):** On a population basis, prevention is the administration of an antimicrobial to a group of animals, none of which have evidence of disease or infection, when transmission of existing undiagnosed infections, or the introduction of pathogens, is anticipated based on history, clinical judgement, or epidemiological knowledge.
> **Antimicrobial control of disease (metaphylaxis):** On a population basis, control is the use of antimicrobials to reduce the incidence of infectious disease in a group of animals that already has some individuals with evidence of infectious disease or evidence of infection.
> **Antimicrobial treatment of disease**: On a population basis, treatment is the administration of an antimicrobial to those animals within the group with evidence of infectious disease.

Backgrounder operation: Often used interchangeably with a stocker operation, a backgrounder operation is a farm or ranch that raises weaned calves prior to entering a feedlot. Calves that have spent time on backgrounder/stocker operations have recovered from the stress of weaning and tend to adapt more smoothly to a feedlot environment compared with freshly weaned calves. Sometimes, distinctions are made between backgrounder and stocker operations. For example, stocker operations are more likely to keep calves for longer periods than backgrounder operations, which typically keep calves just long enough for them to get over the stress of weaning or leaving the farm or ranch of origin before they enter a feedlot environment. In addition, backgrounder operations typically haul feed to the calves, while stocker operations expect calves to graze on pasture for most of their nutritional needs. In general, a backgrounder or stocker operation is an intermediate step for calves between the farm or ranch of origin and a feedlot.

Beef Quality Assurance (BQA): A national program that raises consumer confidence by offering science-based management techniques and showcasing a commitment to quality through every segment of the beef industry. Nearly every U.S. State has an active BQA program. BQA’s mission is to guide producers towards continuous improvement using science-based production practices that assure cattle well-being, beef quality, and safety. The program links all beef producers with livestock production specialists, veterinarians, nutritionists, marketers, and food purveyors interested in continuously improving the quality of the beef they produce. BQA programs promote best practices and principles around cattle handling, facility management, cattle transportation, good record keeping, and protecting herd health, which all result in better outcomes for cattle and producers. In addition, BQA programming focuses on educating and training cattle producers, farm advisors, and veterinarians on animal husbandry practices, as well as issues regarding food safety and quality. The BQA program is executed through a State and National partnership to create standardized educational opportunities. Producers can obtain BQA certification by completing several hours of training, in person or online, and are required to recertify every three years. Information on resources and certification can be found at www.bqa.org.

BQA Feedyard Assessment: An onsite educational tool that allows for assessing and benchmarking key indicators of animal care and welfare as well as feedyard conditions. The assessment has areas of focus covering animal health records, animal handling observations, animal health and employee training protocols, and facilities/equipment evaluation. It is developed to be in close alignment with commonly used feedyard audit tools. Assessments might be utilized as a self-assessment, completed by a second-party, or conducted by a third-party assessor. It can be accessed at www.bqa.org.

Cattle on feed: Cattle being fed a high-energy ration consisting of components such as grain, silage, hay, and/or protein supplement before being sent to slaughter. Operations with cattle being "backgrounded only" for later sale as feeders or for placement in another feedlot were excluded from this study. This report is restricted to steers and heifers.

Cattle placed/placement: This report is restricted to steers and heifers placed in a feedlot and fed a ration that will produce a "select or better" carcass at slaughter. Placement refers to the time that cattle entered the feedlot.

Feeding period: The time span beginning when cattle enter the feedlot and ending when cattle are marketed (i.e., shipped for slaughter).

Feedlot: An operation that feeds cattle for the slaughter market.

Feedlot capacity: The total number of cattle that could be accommodated in the feedlot at one time. For this study, feedlots were categorized as small/medium or large/very large for sampling stratification and as small, medium, large, or very large for reporting:

Small: Feedlot capacity of 50 to 499 head.
Medium: Feedlot capacity of 500 to 999 head.
Large: Feedlot capacity of 1,000 to 4,999 head.
Very Large: Feedlot capacity of 5,000 or more head.

Note: Although feedlots were selected from the NASS list frame based on having 50 or more cattle on feed, a small number of participating feedlots reported a feedlot capacity of fewer than 50 head on the day of the interview. These feedlots were included in the Small category (50–499).

Grow yard: Another name for backgrounding operation.

Heifer: A bovine female less than 3 years of age that has not borne a calf. Young cows that have had their first calf are sometimes called "first-calf heifers," but for the purposes of this study, any animal that has had a calf is considered a cow.

Ionophore: A drug administered in feed that promotes the efficient use of feedstuffs by altering the fermentation pattern in the rumen. Monensin, lasalocid, and laidlomycin are the three ionophores approved for use in cattle. All three are approved for improving feed efficiency. Monensin and lasalocid are also approved for prevention and control of coccidiosis. Ionophores are categorized by the FDA as not medically important antimicrobials for humans.

Medically important antimicrobial: Any antimicrobial the FDA deems medically important with respect to the use of that class of antimicrobials for therapeutic use in human medicine. As of January 1, 2017, medically important antimicrobials are no longer approved by the FDA for use in food-producing animals for growth promotion purposes, and medically important antimicrobials used in animal feed or water require veterinary oversight. In addition, the FDA's Guidance for Industry #263 requires, as of June 11, 2023, that all medically important antibiotics will be under veterinarian oversight for distribution and use.

Percent cattle: The total number of cattle on all feedlots with a certain attribute divided by the total number of cattle on all feedlots (or on all feedlots within a certain category, e.g., capacity).

Percent feedlots: The number of feedlots with a certain attribute divided by the total number of feedlots (or by the total number of feedlots within a certain category, e.g., capacity). Percentages will sum to 100 if attributes are mutually exclusive (e.g., percentage of feedlots within a capacity category). Percentages will not sum to 100 if attributes are not mutually exclusive (e.g., the percentage of feedlots using treatment methods in which feedlots might have used more than one method).

Placement weight: The weight of cattle at the time they enter (are placed in) the feedlot. Placement weight can give an idea of disease risk upon entering the feedlot. For example, cattle placed at less than 400 lb tend to have the highest disease risk while cattle placed at 900 lb or more generally have the lowest risk. Some data in this report were collected according to the following placement weights:

Less than 400 lb at placement
400–699 lb at placement
700–899 lb at placement
900 or more lb at placement

Population estimates: Point estimates in this report (weighted percentages or averages) are provided with a measure of precision called the standard error. A 95-percent confidence interval can be approximated with bounds equal to the estimate, plus or minus two standard errors. If the only error is sampling error, the confidence intervals created in this manner will contain the true population mean 95 out of 100 times. An estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). When the estimates are reported as being “higher” or “lower”, a statistical difference is implied but not tested. Not all statistically different estimates are mentioned in the text of this report. All estimates in this report are rounded to the nearest tenth. If the estimate rounded to 0, the standard error was reported (0.0). If there were no reports of the event (0.0 percent) or if all operations reported the event (100.0 percent), no standard error was reported (—).

Preconditioning practices: Practices that help a calf become ready to leave the operation of origin and reduce the calf’s stress when adjusting to a new location, such as a feedlot. Typical recommended preconditioning practices include keeping the calf on the operation of origin for at least 45 days after weaning, dehorning (if horned), castrating bulls, administering appropriate vaccines, deworming, and getting the calf used to eating from a feed bunk and drinking from a water tank. Preconditioned calves are at lower risk of disease upon arrival at a feedlot.

Region: Some of the data in this report are broken out by region. For this study, feedlot regions were defined as follows:

East: IN, MI, OH, PA, WI
Midwest: IL, IA, MN, MO
Central: CO, KS, NE, OK, TX
West: CA, ID, MT, ND, SD, UT, WA, WY

Route of administration:

Feed: Antimicrobials are added to feed for preventing, controlling, or treating disease, or for increasing rate of gain and/or improving feed efficiency.
Water: Antimicrobials are added to drinking water for control or treatment of disease in a group of cattle.
Injection (individual treatment): Individual sick animals treated with injectable antimicrobials for disease treatment.
Injection (group treatment): For the purposes of this report, “treated as a group” means that the majority of cattle in a pen or group were treated with an injectable antimicrobial for preventing, controlling, or treating a disease outbreak, such as bovine respiratory disease or shipping fever.

Steer: A castrated male bovine.

Stocker operation: Often used interchangeably with a backgrounder operation, a stocker operation is a farm or ranch that raises weaned calves prior to feedlot entry. Calves that have spent time on backgrounder/stocker operations have recovered from the stress of weaning and tend to adapt more smoothly to a feedlot environment compared with freshly weaned calves. Sometimes, distinctions are made between backgrounder and stocker operations. For example, stocker operations are more likely to keep calves for longer periods than backgrounder operations, which typically keep calves just long enough for them to get over the stress of weaning or leaving the farm or ranch of origin before they enter a feedlot environment. In addition, backgrounder operations typically haul feed to the calves, while stocker operations expect calves to graze on pasture for most of their nutritional needs. In general, a backgrounder or stocker operation is an intermediate step for calves between the farm or ranch of origin and a feedlot.

Veterinary Feed Directive (VFD): An authorization by a veterinarian to allow for use of a medically important antibiotic in animal feed. A prescription is used for medically important antibiotics given by injection or in drinking water, and a VFD is similar to a prescription except the VFD pertains to animal feed. Businesses selling prescription medicine typically require the presence of a licensed pharmacist due to pharmacy laws. The VFD was created by the FDA in the 1990s so feed mills would not need a licensed pharmacist or other medical professional to be present during dispensing of antibiotics in animal feed.

Section I: Survey Results

Where applicable, column or row totals are shown as 100.0 to aid in interpretation; however, estimates may not always sum to 100.0 due to rounding.

Note: Unless otherwise specified, the time period for all tables is January 1 through December 31, 2020, i.e., calendar year 2020.

A. Cattle Breeds and Arrival Weights

Feedlots in the United States often do not raise cattle from birth and instead obtain cattle after weaning to be placed in the feedlot. In some cases, they purchase cattle ("feeder cattle") to be placed in the feedlot, but they can also "custom feed" cattle owned by someone else, often the cow-calf operation of origin.

Most cattle placed in feedlots are beef breeds. In the past, Holstein steers were the primary dairy animals placed in feedlots. However, sexed semen has become popular on dairy operations where the best cows or heifers are bred with sexed semen to produce females to be added to the milking string. Then cows or heifers with less genetic potential are bred to beef bulls to produce crossbred calves to be used for beef, which makes those calves more valuable than Holstein steers.

Beef breeds less than 400 lb upon arrival on the feedlot are recently weaned and are considered to be at higher risk of contracting diseases. In contrast, cattle with arrival weights of 900 lb or more are considered to be at lower risk for disease upon placement on the feedlot.

1. Breeds and arrival weights of cattle placed in calendar year 2020

A higher percentage of feedlots (60.0 percent) placed beef breeds 400–699 lb at arrival compared with the other breeds and weight classes at arrival. One quarter of feedlots (25.8 percent) placed any dairy breeds or dairy crossbreeds.

A.1.a. Percentage of feedlots that placed any cattle on feed of the following breed types and arrival weights in calendar year 2020, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Breed type and arrival weight (lb)	**Small** (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
	Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Breed type										
Any beef breeds	82.6	(1.7)	92.5	(2.3)	97.4	(0.8)	97.5	(1.4)	86.0	(1.2)
Any dairy breeds or dairy crossbreeds	30.3	(1.9)	16.0	(3.4)	8.9	(2.8)	18.9	(6.6)	25.8	(1.4)
Arrival weight (lb)										
Less than 400	42.8	(2.2)	22.6	(3.9)	34.3	(5.8)	23.5	(5.0)	38.0	(1.7)
400 to 699	66.6	(2.1)	70.5	(4.1)	69.8	(5.3)	84.9	(3.2)	68.2	(1.7)
700 to 899	25.8	(2.0)	35.2	(4.5)	50.2	(5.5)	78.6	(7.2)	31.3	(1.7)
900 or more	11.6	(1.5)	14.5	(3.1)	28.6	(5.0)	52.4	(6.7)	14.9	(1.3)

Beef breed arrival weights (lb)										
Less than 400	29.4	(2.1)	17.5	(3.6)	30.3	(5.8)	19.3	(4.8)	27.1	(1.7)
400 to 699	56.9	(2.2)	66.2	(4.3)	66.4	(5.5)	77.5	(6.5)	60.0	(1.8)
700 to 899	21.8	(1.9)	35.0	(4.5)	49.3	(5.5)	77.7	(7.2)	28.3	(1.6)
900 or more	8.3	(1.3)	13.5	(3.0)	25.8	(4.8)	52.4	(6.7)	12.2	(1.1)
Dairy breed or dairy crossbreed arrival weights (lb)										
Less than 400	20.4	(1.7)	8.2	(2.4)	6.9	(2.7)	7.7	(2.2)	16.8	(1.2)
400 to 699	13.6	(1.5)	7.6	(2.6)	5.0	(2.6)	14.2	(6.5)	11.9	(1.2)
700 to 899	5.5	(1.0)	0.8	(0.6)	4.6	(2.6)	6.6	(2.1)	4.7	(0.8)
900 or more	3.5	(0.8)	2.5	(1.4)	3.9	(2.5)	2.5	(1.2)	3.4	(0.7)

A lower percentage (70.7 percent) of feedlots in the East region placed beef breeds compared with feedlots in the other regions, and a higher percentage of feedlots in the East (51.8 percent) placed dairy breeds or dairy crossbreeds compared with feedlots in the other regions.

A.1.b. Percentage of feedlots that placed any cattle on feed of the following breed types and arrival weights in calendar year 2020, by region:

Percent Feedlots

Region

	West		**Central**		**Midwest**		**East**	
Breed type and arrival weight (lb)	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Breed type								
Any beef breeds	90.9	(3.1)	98.8	(0.9)	86.6	(2.0)	70.7	(3.2)
Any dairy breeds or dairy crossbreeds	11.3	(3.4)	5.7	(1.9)	26.4	(2.4)	51.8	(3.3)
Arrival weight (lb)								
Less than 400	24.9	(4.5)	25.4	(3.8)	38.2	(2.8)	57.8	(3.5)
400 to 699	77.6	(4.3)	78.0	(3.6)	66.4	(2.8)	56.3	(3.5)
700 to 899	31.9	(4.8)	38.4	(3.8)	33.2	(2.7)	21.6	(2.8)
900 or more	17.4	(3.9)	21.8	(3.0)	11.4	(1.9)	13.9	(2.4)
Beef breed arrival weights (lb)								
Less than 400	20.8	(4.2)	24.5	(3.8)	27.7	(2.7)	32.7	(3.3)
400 to 699	72.6	(4.6)	76.6	(3.8)	56.3	(2.9)	43.7	(3.5)
700 to 899	31.4	(4.8)	38.2	(3.8)	28.8	(2.6)	16.9	(2.5)

900 or more	17.3 (3.9)	20.9 (2.9)	8.3 (1.6)	8.5 (1.8)
Dairy breed or dairy crossbreed arrival weights (lb)				
Less than 400	4.3 (2.1)	1.6 (0.5)	17.1 (2.2)	38.1 (3.4)
400 to 699	6.9 (2.8)	2.8 (1.4)	13.7 (2.0)	19.9 (2.9)
700 to 899	0.7 (0.4)	1.3 (0.4)	7.0 (1.6)	6.2 (1.8)
900 or more	0.1 (0.1)	2.3 (1.3)	3.5 (1.2)	6.3 (1.8)

The vast majority of cattle placed (93.0 percent) in 2020 were beef breeds compared with dairy breeds (7.0 percent). A lower percentage (4.0 percent) of beef breeds less than 400 lb at arrival were placed compared with the other weight classes of beef breeds at arrival.

A.1.c. Percentage of cattle* placed on feed in calendar year 2020 by breed type and arrival weight, and by feedlot capacity:

Percent Cattle

	Feedlot capacity (number head)				
	Small (50–499)	**Medium** (500–999)	**Large** (1,000–4,999)	**Very Large** (5,000 or more)	**All feedlots**
Breed type and arrival weight (lb)	**Pct.** **Std. error**	**Pct.** **Std. error**	**Pct.** **Std. error**	**Pct.** **Std. error**	**Pct.** **Std. error**
Breed type					
Any beef breeds	75.8 (2.4)	89.1 (2.6)	95.2 (1.6)	95.0 (1.9)	93.0 (1.4)
Any dairy breeds or dairy crossbreeds	24.2 (2.4)	10.9 (2.6)	4.8 (1.6)	5.0 (1.9)	7.0 (1.4)
Total	100.0	100.0	100.0	100.0	100.0
Arrival weight (lb)					
Less than 400	22.9 (2.0)	9.9 (2.3)	13.1 (3.1)	5.8 (2.0)	8.3 (1.6)
400 to 699	49.6 (2.8)	52.9 (4.8)	34.8 (3.4)	29.0 (2.9)	33.5 (2.3)
700 to 899	20.0 (2.4)	27.7 (3.7)	40.7 (3.7)	48.8 (2.5)	43.7 (2.0)
900 or more	7.5 (2.1)	9.5 (2.4)	11.3 (2.0)	16.4 (1.8)	14.5 (1.4)
Total	100.0	100.0	100.0	100.0	100.0
Beef breed arrival weights (lb)					
Less than 400	10.3 (1.2)	5.5 (1.6)	10.3 (3.1)	2.2 (0.9)	4.0 (0.8)
400 to 699	42.4 (2.7)	47.9 (4.7)	33.9 (3.4)	28.3 (2.9)	31.9 (2.3)
700 to 899	18.0 (2.4)	27.5 (3.7)	39.9 (3.7)	48.4 (2.5)	43.1 (2.0)
900 or more	5.1 (1.7)	8.2 (2.2)	11.0 (2.0)	16.1 (1.8)	14.0 (1.4)
Total	75.8 (2.4)	89.1 (2.6)	95.2 (1.6)	95.0 (1.9)	93.0 (1.4)

Dairy breed or dairy crossbreed arrival weights (lb)										
Less than 400	12.7	(1.6)	4.4	(1.5)	2.8	(0.9)	3.6	(1.8)	4.3	(1.3)
400 to 699	7.2	(1.2)	5.0	(2.0)	0.9	(0.4)	0.7	(0.2)	1.6	(0.3)
700 to 899	2.0	(0.6)	0.2	(0.1)	0.8	(0.4)	0.4	(0.2)	0.6	(0.1)
900 or more	2.3	(1.3)	1.3	(0.8)	0.3	(0.2)	0.3	(0.2)	0.5	(0.2)
Total	24.2	(2.4)	10.9	(2.6)	4.8	(1.6)	5.0	(1.9)	7.0	(1.4)

* As a percentage of total cattle placed during 2020.

The East region placed a higher percentage of dairy breeds or dairy crossbreeds (41.6 percent) compared with the Central and Midwest regions.

A.1.d. Percentage of cattle* placed on feed in calendar year 2020 by breed type and arrival weight, and by region:

Percent Cattle

Region

	West		**Central**		**Midwest**		**East**	
Breed type and arrival weight (lb)	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Breed type								
Any beef breeds	82.0	(11.2)	96.8	(1.0)	86.2	(2.1)	58.4	(5.5)
Any dairy breeds or dairy crossbreeds	18.0	(11.2)	3.2	(1.0)	13.8	(2.1)	41.6	(5.5)
Total	100.0		100.0		100.0		100.0	
Arrival weight (lb)								
Less than 400	20.6	(10.9)	4.8	(1.3)	13.5	(1.9)	39.3	(5.0)
400 to 699	46.0	(7.1)	31.1	(2.8)	39.9	(3.2)	32.4	(4.4)
700 to 899	22.2	(4.2)	48.3	(2.3)	37.5	(3.0)	16.3	(4.1)
900 or more	11.2	(2.9)	15.8	(1.7)	9.2	(1.7)	12.0	(3.8)
Total	100.0		100.0		100.0		100.0	
Beef breed arrival weights (lb)								
Less than 400	5.5	(1.9)	2.9	(0.9)	6.2	(1.3)	18.0	(4.4)
400 to 699	43.6	(6.8)	30.5	(2.8)	35.0	(3.1)	22.5	(3.8)
700 to 899	22.1	(4.2)	47.9	(2.3)	36.3	(3.1)	12.9	(3.9)
900 or more	10.8	(2.9)	15.5	(1.7)	8.8	(1.7)	5.0	(2.4)
Total	82.0	(11.2)	96.8	(1.0)	86.2	(2.1)	58.4	(5.5)

Dairy breed or dairy crossbreed arrival weights (lb)								
Less than 400	15.1	(11.5)	1.9	(0.9)	7.3	(1.4)	21.3	(3.6)
400 to 699	2.4	(1.4)	0.6	(0.2)	4.9	(1.3)	10.0	(2.6)
700 to 899	0.0	(0.0)	0.4	(0.2)	1.2	(0.4)	3.4	(1.3)
900 or more	0.3	(0.3)	0.3	(0.1)	0.4	(0.2)	7.0	(3.4)
Total	18.0	(11.2)	3.2	(1.0)	13.8	(2.1)	41.6	(5.5)

* As a percentage of total cattle placed during 2020.

2. Change in placements due to COVID-19

About a quarter of feedlots (24.9 percent) placed a different number of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects.

A.2.a. Percentage of feedlots that placed a different number of cattle in calendar year 2020 compared to the number of cattle placed in calendar year 2019 due to COVID-19 or its effects, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
23.6	(2.0)	25.6	(4.2)	30.8	(5.4)	34.9	(5.7)	24.9	(1.6)

There were no regional differences in the percentage of feedlots that placed a different number of cattle in calendar year 2020 compared with calendar year 2019 due to COVID-19 or its effects.

A.2.b. Percentage of feedlots that placed a different number of cattle in calendar year 2020 compared to the number of cattle placed in calendar year 2019 due to COVID-19 or its effects, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
32.4	(4.9)	27.4	(3.9)	23.0	(2.5)	20.8	(2.9)

For feedlots that reported a change in placements between calendar years 2020 and 2019 due to COVID-19 or its effects, about two-thirds (66.9 percent) placed a lower number of cattle in 2020 compared with 2019. In comparison with feedlots of other capacities, a higher percentage of medium feedlots (60.5 percent) placed a higher number of cattle in 2020 compared with 2019.

A.2.c. For the 24.9 percent of feedlots that placed a different number of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table A.2.a.), percentage of feedlots by change in number of cattle placed, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Change in cattle placed	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
More than 2019	28.3	(4.3)	60.5	(8.8)	23.3	(8.4)	24.7	(7.0)	33.1	(3.6)
Fewer than 2019	71.7	(4.3)	39.5	(8.8)	76.7	(8.4)	75.3	(7.0)	66.9	(3.6)
Total	100.0		100.0		100.0		100.0		100.0	

For feedlots that reported a change in placements between calendar years 2020 and 2019 due to COVID-19 or its effects, there were no regional differences in the percentage of feedlots that placed more or fewer cattle in calendar year 2020 compared with 2019.

A.2.d. For the 24.9 percent of feedlots that placed a different number of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table A.2.a.), percentage of feedlots by change in number of cattle placed, and by region:

Percent Feedlots

Region

Change in cattle placed	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
More than 2019	36.1	(8.7)	35.2	(8.2)	30.7	(5.6)	32.6	(7.2)
Fewer than 2019	63.9	(8.7)	64.8	(8.2)	69.3	(5.6)	67.4	(7.2)
Total	100.0		100.0		100.0		100.0	

For feedlots that placed fewer cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, the average reduction in number of cattle placed in 2020 compared with 2019 was 399 head.

A.2.e. For feedlots that placed more or fewer cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table A.2.c.),* average change in number of cattle placed, by feedlot capacity:

Average Change in Number of Cattle Placed

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Change in cattle placed	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**
More than 2019	49	(10)	159	(24)	463	(136)	2,331	(769)	190	(40)
Fewer than 2019	56	(7)	339	(158)	766	(78)	4,033	(916)	399	(62)

* Refers to the 8.2 and 16.7 percent of feedlots overall that placed more or fewer cattle, respectively, in calendar year 2020 compared to calendar year 2019 due to COVID-19. These estimates come from the 24.9 percent of feedlots that placed a different number of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 (Table A.2.a.), of which 33.1 and 66.9 percent placed more or fewer cattle, respectively, in calendar year 2020 compared to calendar year 2019 due to COVID-19 (Table A.2.c.).

For feedlots that placed fewer cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, there was a larger average reduction in number of cattle placed in 2020 compared with 2019 on feedlots in the Central region (1,389 head) compared with feedlots in the other regions.

A.2.f. For feedlots that placed more or fewer cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table A.2.c.),* average change in number of cattle placed, by region:

Average Change in Number of Cattle Placed

Region

	West		Central		Midwest		East	
Change in cattle placed	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**
More than 2019	264	(84)	412	(157)	58	(15)	60	(16)
Fewer than 2019	243	(75)	1,389	(307)	114	(22)	97	(27)

* Refers to the 8.2 and 16.7 percent of feedlots overall that placed more or fewer cattle, respectively, in calendar year 2020 compared to calendar year 2019 due to COVID-19. These estimates come from the 24.9 percent of feedlots that placed a different number of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 (Table A.2.a.), of which 33.1 and 66.9 percent placed more or fewer cattle, respectively, in calendar year 2020 compared to calendar year 2019 due to COVID-19 (Table A.2.c.).

B. Days on Feed

1. Average days on feed

"Days on feed" refers to the number of days an animal spends in the feedlot from placement (when the animal arrives at the feedlot) to closeout (when the animal leaves for slaughter). The age of the animal at placement affects the number of days on feed. As expected, cattle that arrived at the feedlot under 400 lb spent a longer average number of days on feed (369 days) compared with cattle that arrived at the feedlot at 400 lb or heavier.

B.1.a. For feedlots that placed the following types of cattle on feed in calendar year 2020 (Table A.1.a.), average number of days cattle were on feed, by breed type, arrival weight, and by feedlot capacity:

Average Number of Days on Feed

Feedlot capacity (number head)

Breed type and arrival weight (lb)	**Small** (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
	Avg.	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**
Any										
Any breed type or arrival weight	286	(6)	239	(8)	235	(15)	206	(5)	270	(4)
Breed type										
Any beef breeds	265	(6)	228	(7)	229	(16)	198	(6)	251	(4)
Any dairy breeds or dairy crossbreeds	375	(12)	369	(19)	363	(37)	287	(12)	371	(10)
Arrival weight (lb)										
Less than 400	378	(11)	360	(17)	335	(40)	291	(27)	369	(10)
400 to 699	268	(6)	244	(10)	231	(11)	232	(6)	258	(4)
700 to 899	197	(8)	185	(6)	174	(7)	178	(4)	189	(5)
900 or more	136	(11)	152	(6)	141	(8)	148	(5)	143	(5)
Beef breed arrival weights (lb)										
Less than 400	360	(13)	336	(19)	320	(43)	281	(28)	350	(11)
400 to 699	258	(6)	239	(10)	224	(10)	227	(5)	249	(5)
700 to 899	192	(8)	184	(7)	177	(9)	177	(4)	186	(5)
900 or more	128	(8)	153	(6)	139	(10)	148	(5)	140	(4)
Dairy breed or dairy crossbreed arrival weights (lb)										
Less than 400	412	(14)	397	(23)	448	(36)	353	(5)	411	(12)
400 to 699	335	(13)	329	(24)	326	(19)	286	(12)	331	(11)
700 or more*	207	(25)	213	(31)	194	(3)	204	(13)	205	(20)

* The categories for dairy breeds or dairy crossbreeds 700–899 and 900 or more at placement were combined due to low numbers of observations.

Feedlots in the East region had a longer average number of days on feed (333 days) compared with feedlots in the other regions.

B.1.b. For feedlots that placed the following types of cattle on feed in calendar year 2020 (Table A.1.a.), average number of days cattle were on feed, by breed type, arrival weight, and by region:

Average Number of Days on Feed

Region

Breed type and arrival weight (lb)	**West**		**Central**		**Midwest**		**East**	
	Avg.	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**	**Avg.**	**Std. error**
Any								
Any breed type or arrival weight	232	(11)	211	(6)	282	(7)	333	(11)
Breed type								
Any beef breeds	212	(9)	210	(7)	265	(7)	313	(12)
Any dairy breeds or dairy crossbreeds	372	(29)	286	(13)	364	(13)	384	(19)
Arrival weight (lb)								
Less than 400	288	(44)	274	(20)	392	(12)	403	(16)
400 to 699	239	(11)	224	(8)	267	(6)	306	(11)
700 to 899	174	(14)	173	(6)	203	(8)	194	(14)
900 or more	136	(7)	142	(6)	152	(12)	130	(9)
Beef breed arrival weights (lb)								
Less than 400	214	(24)	272	(20)	379	(15)	400	(18)
400 to 699	228	(11)	222	(8)	257	(6)	300	(12)
700 to 899	173	(14)	173	(6)	198	(7)	198	(16)
900 or more	137	(8)	142	(6)	140	(8)	134	(11)
Dairy breed or dairy crossbreed arrival weights (lb)								
Less than 400	430	(62)	355	(5)	412	(11)	410	(23)
400 to 699	342	(12)	281	(10)	330	(14)	336	(24)
700 or more*	213	(31)	204	(13)	219	(26)	163	(25)

* The categories for dairy breeds or dairy crossbreeds 700–899 and 900 or more at placement were combined due to low numbers of observations.

For feedlots that placed cattle with arrival weights under 400 lb, a higher percentage of feedlots fed dairy breeds or dairy crossbreeds under 400 lb (91.1 percent) for 271 days or more compared with the percentage of feedlots that fed beef breeds under 400 lb for 271 days or more (76.9 percent).

B.1.c. For feedlots that placed the following types of cattle on feed in calendar year 2020 (Table A.1.a.), percentage of feedlots by average number of days cattle were on feed, by breed type and arrival weight:

	Percent Feedlots								
	Average Number of Days on Feed								
	1–150		151–210		211–270		271 or more		Total
Breed type and arrival weight (lb)	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**
Any									
Any breed type or arrival weight	14.2	(1.5)	23.9	(1.8)	17.7	(1.7)	44.1	(2.0)	100.0
Breed type									
Any beef breeds	15.2	(1.6)	27.9	(2.0)	19.6	(1.9)	37.3	(2.1)	100.0
Any dairy breeds or dairy crossbreeds	6.2	(2.0)	5.9	(2.1)	5.9	(2.2)	82.0	(3.4)	100.0
Arrival weight (lb)									
Less than 400	6.1	(1.8)	9.1	(2.3)	4.5	(1.6)	80.3	(3.1)	100.0
400 to 699	11.2	(1.7)	21.9	(2.2)	25.3	(2.3)	41.6	(2.6)	100.0
700 to 899	26.7	(3.4)	50.1	(3.8)	16.1	(2.7)	7.0	(2.1)	100.0
900 or more	72.9	(5.0)	24.6	(4.8)	0.0	(—)	2.5	(2.1)	100.0
Beef breed arrival weights (lb)									
Less than 400	5.6	(2.2)	11.1	(3.1)	6.4	(2.2)	76.9	(4.0)	100.0
400 to 699	12.0	(1.8)	24.4	(2.4)	26.6	(2.5)	37.0	(2.7)	100.0
700 to 899	26.6	(3.4)	52.6	(3.8)	14.0	(2.6)	6.7	(2.1)	100.0
900 or more	73.5	(5.1)	26.2	(5.1)	0.0	(—)	0.3	(0.3)	100.0
Dairy breed or dairy crossbreed arrival weights (lb)									
Less than 400	4.7	(2.1)	4.2	(2.1)	0.0	(—)	91.1	(2.9)	100.0
400 to 699	3.4	(2.4)	5.7	(3.2)	8.2	(4.0)	82.8	(5.3)	100.0
700 to 899	28.1	(11.5)	22.9	(10.7)	33.5	(11.9)	15.6	(9.6)	100.0
900 or more	76.6	(16.1)	5.4	(4.1)	0.0	(—)	18.0	(15.9)	100.0

2. Changes in days on feed due to COVID-19

In 2020, the first year of the COVID-19 outbreak, some slaughter plants were shut down temporarily or were operating at reduced capacity. Due to these reductions in slaughter capacity, cattle may have been on feed longer than normal. Overall, 31.7 percent of feedlots had a different average number of days on feed for any cattle breed type in 2020 compared with 2019 due to COVID-19 or its effects.

B.2.a. For feedlots that placed the following breed types in calendar year 2020 (Table A.1.a.), percentage of feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, by breed type and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Breed type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Beef breeds	27.8	(2.2)	38.2	(4.8)	45.3	(5.8)	43.9	(6.5)	32.0	(1.9)
Dairy breeds or dairy crossbreeds	23.0	(3.4)	31.5	(11.0)	51.5	(16.0)	31.4	(13.8)	24.8	(3.1)
Any breed type	27.8	(2.0)	39.1	(4.6)	45.9	(5.6)	43.7	(6.4)	31.7	(1.7)

A higher percentage of feedlots in the Central region (47.2 percent) than in the other regions had a different average number of days on feed for any cattle breed type in 2020 compared with 2019 due to COVID-19 or its effects.

B.2.b. For feedlots that placed the following breed types in calendar year 2020 (Table A.1.a.), percentage of feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, by breed type and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Breed type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Beef breeds	26.5	(4.7)	47.6	(4.4)	31.3	(2.8)	20.7	(3.5)
Dairy breeds or dairy crossbreeds	5.6	(3.4)	20.9	(8.9)	21.7	(5.0)	31.1	(4.7)
Any breed type	24.6	(4.4)	47.2	(4.4)	30.1	(2.7)	27.0	(3.2)

The vast majority of feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects had cattle on feed longer in 2020 compared with 2019. This was true for all feedlot sizes, regardless of breed types placed.

B.2.c. For feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table B.2.a.), percentage of feedlots by direction of change in average number of days on feed, by breed type and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Change in feeding period	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Beef breeds										
Longer than 2019	87.6	(3.2)	87.0	(6.0)	95.2	(1.8)	91.1	(3.8)	88.6	(2.3)
Shorter than 2019	12.4	(3.2)	13.0	(6.0)	4.8	(1.8)	8.9	(3.8)	11.4	(2.3)
Total	100.0		100.0		100.0		100.0		100.0	
Dairy breeds or dairy crossbreeds										
Longer than 2019	89.1	(5.3)	100.0	(—)	100.0	(—)	76.9	(14.4)	90.6	(4.2)
Shorter than 2019	10.9	(5.3)	0.0	(—)	0.0	(—)	23.1	(14.4)	9.4	(4.2)
Total	100.0		100.0		100.0		100.0		100.0	
Any breed type										
Longer than 2019	87.8	(2.8)	88.2	(5.5)	95.3	(1.7)	91.3	(3.7)	88.9	(2.1)
Shorter than 2019	12.2	(2.8)	11.8	(5.5)	4.7	(1.7)	9.9	(3.9)	11.1	(2.1)

For feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, there were no regional differences in the percentage of feedlots with a longer or shorter feeding period in 2020 compared with 2019.

B.2.d. For feedlots with a different average number of days on feed in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table B.2.a.), percentage of feedlots by direction of change in average number of days on feed, by breed type and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Change in feeding period	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Beef breeds								
Longer than 2019	84.0	(8.5)	89.5	(3.8)	91.8	(3.0)	81.0	(7.4)
Shorter than 2019	16.0	(8.5)	10.5	(3.8)	8.2	(3.0)	19.0	(7.4)
Total	100.0		100.0		100.0		100.0	
Dairy breeds or dairy crossbreeds								
Longer than 2019	100.0	(—)	76.9	(14.4)	92.3	(7.4)	90.2	(5.4)
Shorter than 2019	0.0	(—)	23.1	(14.4)	7.7	(7.4)	9.8	(5.4)
Total	100.0		100.0		100.0		100.0	
Any breed type								
Longer than 2019	84.5	(8.2)	89.5	(3.8)	91.2	(3.1)	86.2	(4.7)
Shorter than 2019	15.5	(8.2)	10.7	(3.8)	8.8	(3.1)	13.8	(4.7)

C. Deaths

For beef breeds, a higher percentage of cattle with arrival weights under 400 lb (2.5 percent) died compared with arrival weights of 700 lb or more (1.2 percent).

C.1. For feedlots that placed the following types of cattle on feed in calendar year 2020 (Table A.1.a.), percentage of cattle* that died in the feedlot in 2020, by breed type, arrival weight, and by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Breed type and arrival weight (lb)	**Small** (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
	Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Any										
Any breed type or arrival weight	2.6	(0.3)	1.9	(0.3)	1.9	(0.2)	1.5	(0.2)	1.7	(0.1)
Breed type										
Any beef breeds	2.0	(0.2)	1.6	(0.2)	1.8	(0.2)	1.4	(0.2)	1.5	(0.1)
Any dairy breeds or dairy crossbreeds	4.7	(1.0)	4.7	(1.5)	5.4	(1.5)	2.3	(1.1)	3.5	(0.8)
Arrival weight (lb)										
Less than 400	4.1	(0.5)	3.3	(0.6)	3.5	(0.8)	2.5	(0.9)	3.1	(0.6)
400 to 699	2.0	(0.2)	2.1	(0.4)	2.1	(0.2)	2.0	(0.2)	2.0	(0.1)
700 or more	2.5	(0.9)	1.3	(0.3)	1.4	(0.1)	1.1	(0.2)	1.2	(0.2)
Beef breed arrival weights (lb)										
Less than 400	3.1	(0.5)	2.6	(0.8)	2.4	(0.6)	2.1	(0.4)	2.5	(0.3)
400 to 699	1.9	(0.2)	1.7	(0.2)	2.1	(0.2)	2.0	(0.2)	2.0	(0.1)
700 or more	1.6	(0.3)	1.3	(0.3)	1.4	(0.1)	1.2	(0.2)	1.2	(0.2)
Dairy breed or dairy crossbreed arrival weights (lb)										
Less than 400	5.0	(0.8)	4.0	(0.8)	7.1	(2.8)	2.8	(1.5)	3.7	(1.1)
400 to 699	2.7	(0.5)	5.8	(3.1)	4.3	(1.6)	1.6	(0.6)	3.5	(1.1)
700 or more	7.4	(4.3)	2.8	(0.9)	1.7	(0.4)	0.3	(0.2)	2.9	(1.9)

* As a percentage of cattle placed in the respective breed type(s) and arrival weight class(es) during 2020.

A higher percentage of dairy breeds or dairy crossbreeds died in the Midwest region (5.7 percent) compared with the West region (0.8 percent).

C.2. For feedlots that placed the following types of cattle on feed in calendar year 2020 (Table A.1.a.), percentage of cattle* that died in the feedlot in 2020, by breed type, arrival weight, and by region:

Percent Cattle

Region

Breed type and arrival weight (lb)	**West**		**Central**		**Midwest**		**East**	
	Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Any								
Any breed type or arrival weight	1.3	(0.2)	1.6	(0.2)	2.3	(0.2)	2.8	(0.6)
Breed type								
Any beef breeds	1.5	(0.1)	1.5	(0.2)	1.8	(0.1)	1.9	(0.4)
Any dairy breeds or dairy crossbreeds	0.8	(0.7)	3.5	(1.0)	5.7	(1.1)	4.1	(1.2)
Arrival weight (lb)								
Less than 400	0.5	(0.3)	3.5	(0.6)	5.1	(0.9)	3.3	(0.4)
400 to 699	1.6	(0.2)	2.0	(0.2)	2.5	(0.4)	1.9	(0.3)
700 or more	1.6	(0.2)	1.2	(0.2)	1.4	(0.2)	3.2	(2.0)
Beef breed arrival weights (lb)								
Less than 400	1.1	(0.2)	2.4	(0.4)	3.0	(0.5)	3.2	(0.8)
400 to 699	1.4	(0.1)	2.0	(0.2)	2.1	(0.2)	1.9	(0.3)
700 or more	1.6	(0.2)	1.2	(0.2)	1.4	(0.2)	0.8	(0.3)
Dairy breed or dairy crossbreed arrival weights (lb)								
Less than 400	0.3	(0.3)	5.2	(1.0)	6.9	(1.3)	3.3	(0.4)
400 to 699	4.4	(1.0)	1.6	(0.6)	5.4	(2.5)	1.9	(0.5)
700 or more	0.9	(0.1)	0.3	(0.2)	1.5	(0.4)	7.8	(4.2)

* As a percentage of cattle placed in the respective breed type(s) and arrival weight class(es) during 2020.

D. Source of Cattle

1. Born and raised on the operation

In some cases, cattle are born and raised on the feedlot operation, which can occur when feedlots also operate a cow-calf operation or a dairy. A higher percentage (36.0 percent) of small feedlots had all cattle placed being born and raised on the feedlot compared with medium, large, and very large feedlots.

D.1.a. Percentage of feedlots by percentage of cattle placed on feed that were born and raised on the operation, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Percentage of cattle born and raised on the operation	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
0	39.2	(2.2)	54.9	(4.6)	57.6	(5.6)	61.6	(7.4)	44.1	(1.8)
0.1–99.9	24.8	(2.0)	31.4	(4.4)	30.8	(5.2)	30.0	(7.6)	26.6	(1.7)
100	36.0	(2.2)	13.8	(3.3)	11.5	(3.8)	8.3	(6.5)	29.3	(1.7)
Total	100.0		100.0		100.0		100.0		100.0	
Any cattle born and raised on the operation	60.8	(2.2)	45.1	(4.6)	42.4	(5.6)	38.4	(7.4)	55.9	(1.8)

A higher percentage (45.8 percent) of feedlots in the West region had all cattle placed being born and raised on the feedlot compared with feedlots in the other regions.

D.1.b. Percentage of feedlots by percentage of cattle placed on feed that were born and raised on the operation, by region:

Percent Feedlots

Region

Percentage of cattle born and raised on the operation	West		Central		Midwest		East	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
0	27.2	(4.7)	42.3	(4.1)	46.7	(2.9)	53.3	(3.5)
0.1–99.9	27.0	(4.6)	35.6	(4.4)	25.9	(2.6)	20.0	(2.8)
100	45.8	(5.2)	22.1	(4.0)	27.4	(2.6)	26.7	(3.2)
Total	100.0		100.0		100.0		100.0	
Any cattle born and raised on the operation	72.8	(4.7)	57.7	(4.1)	53.3	(2.9)	46.7	(3.5)

2. Outside sources of cattle

Cattle can better acclimate to a new feedlot environment if they have been preconditioned, which can include practices such as vaccination, castration, dehorning (if necessary), and introduction to a feed bunk. Information about preconditioning practices performed on a group of cattle is more likely to be available when obtaining cattle directly from a cow-calf operation or backgrounder/stocker operation and is often not available when purchasing cattle at a sale barn. In the table below, "directly from a cow-calf operation" includes operations not associated with the feedlot as well as cow-calf operations owned or associated with the feedlot but not in the same location as the feedlot.

Over half of feedlots (55.9 percent) placed at least some cattle born and raised on the operation. Among the outside sources of cattle, the highest percentage of feedlots (39.7 percent) obtained at least some cattle from a sale barn.

D.2.a. Percentage of feedlots by source of at least some cattle, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Source	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
Directly from cow-calf operation[1]	24.9	(2.0)	33.2	(4.6)	41.8	(5.6)	61.9	(7.6)	28.9	(1.7)
Directly from backgrounding or stocker operation or grow yard[2]	10.3	(1.4)	22.7	(3.9)	24.5	(4.0)	45.7	(6.4)	14.8	(1.2)
Obtained through a sale barn	32.1	(2.2)	56.0	(4.8)	59.7	(5.5)	72.2	(7.6)	39.7	(1.9)
Directly from a dairy operation[3]	12.6	(1.5)	9.4	(2.9)	4.7	(2.6)	6.8	(2.2)	11.2	(1.2)
Obtained from other source	1.2	(0.4)	3.3	(1.9)	5.8	(3.2)	6.7	(2.1)	2.1	(0.5)
Obtained from unknown source	1.0	(0.3)	2.0	(1.1)	0.4	(0.3)	2.3	(1.3)	1.1	(0.3)
Born and raised on the operation	60.8	(2.2)	45.1	(4.6)	42.4	(5.6)	38.4	(7.4)	55.9	(1.8)

[1] Including cow-calf operations owned by or associated with this feedlot.
[2] Includes cattle purchased by video auction.
[3] Including dairy breed calf raiser.

A higher percentage of feedlots (24.4 percent) in the East region obtained at least some cattle directly from a dairy operation compared with feedlots in the other regions.

D.2.b. Percentage of feedlots by source of at least some cattle, and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Source	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Directly from cow-calf operation[1]	21.3	(4.0)	47.8	(4.6)	27.6	(2.7)	21.2	(2.9)
Directly from backgrounding or stocker operation or grow yard[2]	8.6	(2.9)	16.1	(2.5)	16.3	(2.1)	15.4	(2.4)
Obtained through a sale barn	36.8	(5.1)	56.9	(4.6)	40.0	(2.9)	26.8	(3.2)
Directly from a dairy operation[3]	6.3	(2.8)	1.3	(0.4)	10.6	(1.9)	24.4	(3.1)
Obtained from other source	1.5	(1.5)	3.4	(1.4)	1.8	(0.8)	1.8	(0.9)
Obtained from unknown source	0.6	(0.5)	0.4	(0.2)	0.4	(0.3)	3.4	(1.1)
Born and raised on the operation	72.8	(4.7)	57.7	(4.1)	53.3	(2.9)	46.7	(3.5)

[1] Including cow-calf operations owned by or associated with this feedlot.
[2] Includes cattle purchased by video auction.
[3] Including dairy breed calf raiser.

Information about preconditioning practices performed on a group of cattle is more likely to be available when obtaining cattle directly from a cow-calf operation or backgrounder/stocker operation and is often not available when purchasing cattle at a sale barn. Slightly over half (54.7 percent) of cattle placed were born and raised on the operation (7.3 percent) or came from a cow-calf (16.7 percent), backgrounding, or stocker operation (30.7 percent). A higher percentage (38.0 percent) of cattle placed on small feedlots were born and raised on the operation compared with the other feedlot sizes.

D.2.c. Percentage of cattle[1] by source and by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Source	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Directly from cow-calf operation[2]	13.1	(1.7)	13.9	(3.1)	19.4	(2.5)	17.1	(3.3)	16.7	(2.4)
Directly from backgrounding or stocker operation or grow yard[3]	11.2	(2.0)	16.4	(3.3)	20.1	(2.7)	37.0	(5.0)	30.7	(3.7)
Obtained through a sale barn	28.0	(2.8)	45.3	(4.6)	40.6	(3.8)	38.0	(4.4)	38.2	(3.2)
Directly from a dairy operation[4]	7.9	(1.3)	6.3	(2.1)	1.5	(0.6)	3.7	(2.0)	4.1	(1.4)
Obtained from other source	0.9	(0.5)	2.9	(1.9)	5.3	(2.9)	2.3	(0.9)	2.6	(0.7)
Obtained from unknown source	0.8	(0.4)	1.0	(0.7)	0.2	(0.2)	0.4	(0.3)	0.5	(0.2)
Born and raised on the operation	38.0	(2.7)	14.2	(2.7)	12.9	(2.9)	1.5	(0.6)	7.3	(0.9)
Total	100.0		100.0		100.0		100.0		100.0	

[1] As a percentage of cattle placed during 2020.
[2] Including cow-calf operations owned by or associated with this feedlot.
[3] Includes cattle purchased by video auction.
[4] Including dairy breed calf raiser.

A lower percentage of cattle placed in the West region (5.6 percent) came from a backgrounding or stocker operation or grow yard compared with cattle placed in the other regions. A lower percentage (3.1 percent) of cattle placed were born and raised on operations in the Central region compared with the other regions.

D.2.d. Percentage of cattle[1] by source and by region:

Percent Cattle

Region

	West		Central		Midwest		East	
Source	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Directly from cow-calf operation[2]	18.9	(3.8)	16.9	(3.1)	14.7	(2.2)	12.1	(3.7)
Directly from backgrounding or stocker operation or grow yard[3]	5.6	(1.9)	35.7	(4.7)	23.3	(2.6)	20.4	(4.6)
Obtained through a sale barn	29.4	(5.8)	40.0	(4.2)	39.1	(3.3)	22.1	(5.8)
Directly from a dairy operation[4]	16.0	(11.5)	1.7	(0.8)	5.7	(1.5)	15.6	(3.5)
Obtained from other source	5.0	(3.6)	2.2	(0.8)	3.1	(1.4)	2.0	(1.3)
Obtained from unknown source	0.3	(0.2)	0.4	(0.2)	0.3	(0.3)	3.5	(1.7)
Born and raised on the operation	24.8	(4.8)	3.1	(0.7)	13.9	(1.9)	24.2	(5.5)
Total	100.0		100.0		100.0		100.0	

[1] As a percentage of cattle placed during 2020.
[2] Including cow-calf operations owned by or associated with this feedlot.
[3] Includes cattle purchased by video auction.
[4] Including dairy breed calf raiser.

3. Change in source of cattle due to COVID-19

For feedlots that placed any cattle not born and raised on the operation, 10.6 percent of feedlots reported a change in the source of cattle placed in calendar year 2020 compared to 2019 due to COVID-19 or its effects.

D.3.a. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that changed the source of cattle coming to the feedlot in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
9.8	(1.8)	11.8	(3.3)	11.3	(3.1)	14.4	(4.9)	10.6	(1.4)

For feedlots that placed any cattle not born and raised on the operation, there were no regional differences in the percentage of feedlots that reported a change in the source of cattle placed in calendar year 2020 compared to 2019 due to COVID-19 or its effects.

D.3.b. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that changed the source of cattle coming to the feedlot in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, by region:

Percent Feedlots

Region

West		Central		Midwest		East	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
10.9	(4.5)	13.7	(3.5)	8.3	(1.8)	11.8	(2.6)

For feedlots that changed the source of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects, a sale barn was the primary source of cattle placed in 2019 for the highest percentage of operations (53.2 percent).

D.3.c. For feedlots that changed the source of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 or its effects (Table D.3.a.),* percentage of feedlots by primary source of cattle in calendar year 2019, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Primary source of cattle	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Cow-calf operation	24.4	(8.4)	24.2	(12.3)	18.2	(7.3)	22.9	(11.2)	23.6	(5.9)
Backgrounding, stocker operation, or grow yard	0.0	(—)	13.2	(8.7)	35.3	(11.5)	11.0	(7.1)	7.1	(2.3)
Sale barn	49.8	(9.5)	62.6	(13.8)	43.7	(16.2)	66.1	(14.5)	53.2	(6.8)
Dairy operation, including dairy breed calf raiser	22.7	(7.4)	0.0	(—)	0.0	(—)	0.0	(—)	13.8	(4.6)
Other	3.2	(3.1)	0.0	(—)	2.8	(2.6)	0.0	(—)	2.2	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	

* Refers to the 7.5 percent of feedlots overall that changed the source of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19. This estimate comes from the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), of which 10.6 percent (70.7*0.106=7.5) changed the source of cattle in calendar year 2020 compared to calendar year 2019 due to COVID-19 (Table D.3.a.).

4. Average distance cattle were shipped from source

Transporting cattle from the farm of origin to a feedlot can be stressful for cattle, and longer distances can be more stressful than shorter distances. For feedlots that placed any cattle not born and raised on the operation, a higher percentage (44.2 percent) of cattle on small feedlots traveled 50 miles or less to the feedlot compared with cattle placed on medium, large, or very large feedlots.

D.4.a. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle* by distance traveled to the feedlot from the most recent location, and by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Distance traveled (mi)	**Small** (50–499) Pct.	Std. error	**Medium** (500–999) Pct.	Std. error	**Large** (1,000–4,999) Pct.	Std. error	**Very Large** (5,000 or more) Pct.	Std. error	**All feedlots** Pct.	Std. error
50 or less	44.2	(3.5)	25.6	(4.4)	12.5	(2.7)	6.5	(1.3)	11.2	(1.3)
51–250	32.0	(3.7)	37.4	(5.1)	45.7	(4.4)	32.6	(4.1)	34.5	(3.1)
251–500	13.2	(3.0)	21.4	(3.6)	29.7	(4.8)	29.6	(3.6)	27.8	(2.7)
501–1000	8.6	(2.7)	12.8	(3.7)	10.3	(2.2)	20.4	(2.7)	17.9	(2.0)
Greater than 1000	0.0	(—)	0.5	(0.4)	1.8	(0.9)	5.2	(1.4)	4.1	(1.0)
Distance unknown	2.0	(0.9)	2.3	(2.2)	0.0	(—)	5.7	(4.0)	4.5	(3.0)
Total	100.0		100.0		100.0		100.0		100.0	

* As a percentage of cattle placed on feed in 2020 that were not born and raised on the operation.

For feedlots that placed any cattle not born and raised on the operation, a higher percentage (46.8 percent) of cattle on feedlots in the East region traveled 50 miles or less to the feedlot from the most recent location compared with cattle placed on feedlots in the West, Central, or Midwest regions.

D.4.b. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle* by distance traveled to the feedlot from the most recent location, and by region:

Percent Cattle

Region

Distance traveled (mi)	**West** Pct.	Std. error	**Central** Pct.	Std. error	**Midwest** Pct.	Std. error	**East** Pct.	Std. error
50 or less	20.0	(6.2)	8.1	(1.3)	17.2	(2.3)	46.8	(5.4)
51–250	35.9	(8.7)	34.3	(3.8)	33.5	(4.2)	37.2	(5.6)
251–500	31.0	(13.6)	28.6	(3.2)	24.5	(3.1)	13.7	(3.5)
501–1000	6.2	(3.0)	19.6	(2.5)	18.4	(3.2)	1.9	(1.3)
Greater than 1000	0.9	(0.5)	4.8	(1.3)	2.2	(1.1)	0.0	(—)
Distance unknown	5.9	(4.5)	4.6	(3.8)	4.2	(2.4)	0.4	(0.3)
Total	100.0		100.0		100.0		100.0	

* As a percentage of cattle placed on feed in 2020 that were not born and raised on the operation.

For feedlots that placed any cattle not born and raised on the operation, a higher percentage (68.7 percent) of small feedlots placed at least one animal that traveled 50 miles or less to the feedlot from the most recent location compared with medium, large, or very large feedlots (48.7, 40.5, and 42.2 percent, respectively).

D.4.c. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that had any cattle that traveled the distances in the table below from the most recent location to the feedlot, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Distance traveled (mi)	**Small** (50–499) Pct.	Std. error	**Medium** (500–999) Pct.	Std. error	**Large** (1,000–4,999) Pct.	Std. error	**Very Large** (5,000 or more) Pct.	Std. error	**All feedlots** Pct.	Std. error
50 or less	68.7	(2.7)	48.7	(5.2)	40.5	(6.2)	42.2	(6.0)	60.7	(2.2)
51–250	34.1	(2.8)	51.5	(5.2)	71.6	(4.9)	76.1	(7.1)	43.2	(2.2)
251–500	8.3	(1.6)	35.1	(5.0)	40.3	(6.0)	62.5	(6.6)	19.3	(1.7)
501–1000	4.1	(1.1)	18.2	(4.1)	12.9	(2.4)	48.5	(6.7)	10.0	(1.2)
Greater than 1000	0.0	(—)	0.2	(0.1)	4.4	(2.2)	13.7	(3.0)	1.1	(0.2)
Distance unknown	2.7	(1.0)	1.0	(1.0)	0.0	(—)	4.7	(1.9)	2.2	(0.7)

For feedlots that placed any cattle not born and raised on the operation, a higher percentage of feedlots in the West and Central regions (58.8 and 61.5 percent, respectively) placed at least one animal that traveled from 51–250 miles to the feedlot from the most recent location compared with feedlots in the Midwest and East regions.

D.4.d. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that had any cattle that traveled the distances in the table below from the most recent location to the feedlot, by region:

Percent Feedlots

Region

Distance traveled (mi)	**West** Pct.	Std. error	**Central** Pct.	Std. error	**Midwest** Pct.	Std. error	**East** Pct.	Std. error
50 or less	52.4	(7.2)	60.3	(4.8)	56.6	(3.4)	72.6	(3.5)
51–250	58.8	(7.1)	61.5	(4.9)	34.6	(3.3)	33.6	(3.9)
251–500	14.8	(4.6)	34.6	(4.5)	19.6	(2.7)	8.0	(2.1)
501–1000	7.3	(3.7)	16.3	(3.1)	12.6	(2.2)	1.1	(0.8)
Greater than 1000	0.6	(0.3)	3.0	(0.6)	0.9	(0.5)	0.0	(—)
Distance unknown	2.9	(2.7)	0.8	(0.4)	2.7	(1.2)	2.0	(1.3)

5. Region of sourced cattle

In this report, “region” represents the area where a participating feedlot was located. In the next four tables, a new term, “source region,” is introduced. This represents the region of the farm or ranch of origin for cattle prior to entering the feedlot. For example, it could represent the region of the cow-calf operation where cattle were born and raised prior to being placed in the feedlot. For feedlots that placed any cattle not born and raised on the operation, the highest percentage of cattle placed in 2020 (37.3 percent) originated from Region 2 (MT, ND, SD, WY, NE, UT, CO, KS).

D.5.a. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle* by region from which they were sourced, and by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Source region	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Region 1 (CA, OR, WA, ID, NV, AK, HI)	0.3	(0.2)	0.7	(0.4)	0.9	(0.6)	7.9	(2.4)	6.0	(1.8)
Region 2 (MT, ND, SD, WY, NE, UT, CO, KS)	24.1	(3.5)	52.2	(5.3)	58.3	(5.4)	33.2	(3.5)	37.3	(2.8)
Region 3 (AZ, NM, TX, OK)	2.3	(1.4)	5.4	(1.9)	6.8	(3.6)	31.3	(4.4)	24.3	(3.5)
Region 4 (MN, IA, MO, WI, IL, MI, IN, OH)	60.9	(3.8)	29.8	(4.8)	23.6	(4.3)	5.7	(1.4)	13.4	(1.5)
Region 5 (AR, LA, MS, AL, GA, FL, NC, SC, TN, KY, WV, VA)	7.1	(2.5)	9.2	(3.3)	8.7	(2.0)	11.3	(2.2)	10.5	(1.7)
Region 6 (MD, DE, PA, NJ, NY, VT, NH, MA, CT, RI, ME)	3.9	(1.3)	1.5	(0.8)	0.3	(0.3)	0.0	(0.0)	0.4	(0.1)
Region 7 (Mexico)	0.0	(—)	0.0	(—)	0.0	(—)	4.4	(1.5)	3.2	(1.0)
Region 8 (Canada)	0.0	(—)	0.0	(—)	0.0	(—)	0.5	(0.3)	0.4	(0.3)
Unknown region	1.3	(0.6)	1.2	(0.8)	1.3	(0.8)	5.7	(4.1)	4.5	(3.0)
Total	100.0		100.0		100.0		100.0		100.0	

* As a percentage of cattle placed on feed in 2020 that were not born and raised on the operation.

For feedlots that placed any cattle not born and raised on the operation, cattle originating from Mexico were only placed in the Central region in 2020. There was not a predominant region of origin for cattle placed in the West and Central regions. The highest percentage of cattle placed in the Midwest and East regions (53.9 and 72.8 percent, respectively) originated from Region 4 (MN, IA, MO, WI, IL, MI, IN, OH**).**

D.5.b For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle* by region from which they were sourced, and by feedlot region:

Percent Cattle

Feedlot Region

	West		Central		Midwest		East	
Source region	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Region 1 (CA, OR, WA, ID, NV, AK, HI)	32.9	(12.4)	4.3	(1.5)	0.3	(0.2)	0.0	(—)
Region 2 (MT, ND, SD, WY, NE, UT, CO, KS)	58.0	(11.3)	38.5	(3.5)	24.5	(3.1)	2.4	(1.5)
Region 3 (AZ, NM, TX, OK)	2.2	(1.7)	30.9	(4.2)	2.9	(1.1)	0.4	(0.3)
Region 4 (MN, IA, MO, WI, IL, MI, IN, OH)	6.0	(4.5)	5.5	(1.3)	53.9	(3.8)	72.8	(4.8)
Region 5 (AR, LA, MS, AL, GA, FL, NC, SC, TN, KY, WV, VA)	0.3	(0.2)	11.1	(2.1)	14.5	(3.0)	8.1	(2.3)
Region 6 (MD, DE, PA, NJ, NY, VT, NH, MA, CT, RI, ME)	0.0	(—)	0.0	(0.0)	0.6	(0.4)	11.0	(3.3)
Region 7 (Mexico)	0.0	(—)	4.2	(1.4)	0.0	(—)	0.0	(—)
Region 8 (Canada)	0.5	(0.4)	0.4	(0.3)	0.5	(0.5)	0.0	(—)
Unknown region	0.1	(0.1)	5.2	(3.9)	2.7	(1.7)	5.4	(2.8)
Total	100.0		100.0		100.0		100.0	

* As a percentage of cattle placed on feed in 2020 that were not born and raised on the operation.

For feedlots that placed any cattle not born and raised on the operation, the highest percentage of all feedlots (60.7 percent) placed at least one animal originating from Region 4 (MN, IA, MO, WI, IL, MI, IN, OH).

D.5.c. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots by region from which at least one animal was sourced, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Source region	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Region 1 (CA, OR, WA, ID, NV, AK, HI)	0.3	(0.2)	3.0	(1.7)	2.9	(1.2)	21.7	(4.0)	2.1	(0.4)
Region 2 (MT, ND, SD, WY, NE, UT, CO, KS)	22.0	(2.2)	59.5	(4.8)	62.3	(6.1)	70.9	(6.7)	35.8	(1.7)
Region 3 (AZ, NM, TX, OK)	1.7	(0.8)	14.3	(3.9)	14.3	(5.3)	59.2	(6.2)	8.2	(1.1)
Region 4 (MN, IA, MO, WI, IL, MI, IN, OH)	73.3	(2.3)	39.4	(4.8)	34.5	(5.5)	33.1	(5.9)	60.7	(1.7)
Region 5 (AR, LA, MS, AL, GA, FL, NC, SC, TN, KY, WV, VA)	3.9	(1.0)	12.6	(3.3)	11.8	(3.2)	34.8	(5.3)	7.9	(1.0)
Region 6 (MD, DE, PA, NJ, NY, VT, NH, MA, CT, RI, ME)	2.5	(0.6)	2.2	(1.1)	0.6	(0.5)	0.6	(0.6)	2.2	(0.5)
Region 7 (Mexico)	0.0	(—)	0.0	(—)	0.0	(—)	8.8	(2.1)	0.4	(0.1)
Region 8 (Canada)	0.0	(—)	0.0	(—)	0.0	(—)	2.8	(1.3)	0.1	(0.1)
Unknown region	1.8	(0.7)	2.0	(1.3)	2.1	(1.4)	3.2	(1.6)	1.9	(0.6)

For feedlots that placed any cattle not born and raised on the operation, the highest percentage of feedlots in the Midwest and East regions (85.3 and 89.2 percent, respectively) placed cattle originating from Region 4 (MN, IA, MO, WI, IL, MI, IN, OH). The highest percentage of feedlots in the West and Central regions (89.4 and 80.0 percent, respectively) placed cattle originating from Region 2 (MT, ND, SD, WY, NE, UT, CO, KS).

D.5.d. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots by region from which at least one animal was sourced, and by feedlot region:

Percent Feedlots

Feedlot Region

	West		Central		Midwest		East	
Source region	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Region 1 (CA, OR, WA, ID, NV, AK, HI)	7.1	(1.4)	3.3	(0.7)	1.2	(0.8)	0.0	(—)
Region 2 (MT, ND, SD, WY, NE, UT, CO, KS)	89.4	(3.8)	80.0	(3.4)	16.0	(2.4)	2.0	(1.2)
Region 3 (AZ, NM, TX, OK)	4.1	(2.7)	29.4	(3.7)	3.0	(1.1)	0.9	(0.9)
Region 4 (MN, IA, MO, WI, IL, MI, IN, OH)	11.5	(5.0)	10.3	(2.2)	85.3	(2.3)	89.2	(1.9)
Region 5 (AR, LA, MS, AL, GA, FL, NC, SC, TN, KY, WV, VA)	0.3	(0.2)	12.5	(2.6)	8.6	(1.7)	6.7	(1.7)
Region 6 (MD, DE, PA, NJ, NY, VT, NH, MA, CT, RI, ME)	0.0	(—)	0.1	(0.1)	1.1	(0.8)	7.1	(1.4)
Region 7 (Mexico)	0.0	(—)	2.0	(0.4)	0.0	(—)	0.0	(—)
Region 8 (Canada)	0.2	(0.1)	0.4	(0.3)	0.1	(0.1)	0.0	(—)
Unknown region	0.3	(0.3)	2.0	(1.2)	1.4	(0.7)	3.7	(1.7)

6. Commingling of cattle from different sources

Commingling of cattle originating from different farms or ranches often occurs when cattle are placed in feedlots. Cattle from different sources can have different disease and vaccination histories, and commingling of cattle from different sources can increase risk of diseases, such as respiratory disease. For feedlots that placed any cattle not born and raised on the operation, the majority of feedlots (57.7 percent) commingled at least some cattle from different sources in the first 45 days of feeding.

D.6.a. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that allowed commingling of cattle from different sources in the first 45 days of feeding, by arrival weight* and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Arrival weight (lb)	**Small** (50–499) Pct.	Std. error	**Medium** (500–999) Pct.	Std. error	**Large** (1,000–4,999) Pct.	Std. error	**Very Large** (5,000 or more) Pct.	Std. error	**All feedlots** Pct.	Std. error
Less than 400	37.7	(4.6)	41.5	(11.5)	20.9	(10.1)	51.9	(9.7)	37.1	(3.9)
400–699	52.1	(3.8)	54.7	(6.7)	49.9	(7.7)	50.4	(8.0)	52.4	(2.9)
700–899	52.5	(6.3)	55.5	(8.5)	59.3	(8.6)	50.7	(7.6)	53.9	(4.0)
900 or more	47.0	(9.7)	21.3	(9.3)	28.7	(10.7)	38.4	(6.1)	36.5	(5.4)
Any arrival weight	57.7	(3.1)	58.4	(5.3)	54.6	(6.7)	61.5	(7.4)	57.7	(2.4)

***** For feedlots that placed any cattle during 2020 in the respective arrival weight class from outside the operation.

For feedlots that placed any cattle not born and raised on the operation, there were no regional differences in the percentage of feedlots that commingled at least some cattle from different sources in the first 45 days of feeding.

D.6.b. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of feedlots that allowed commingling of cattle from different sources in the first 45 days of feeding, by arrival weight* and by region:

Percent Feedlots

Region

Arrival weight (lb)	**West** Pct.	Std. error	**Central** Pct.	Std. error	**Midwest** Pct.	Std. error	**East** Pct.	Std. error
Less than 400	45.6	(20.7)	35.8	(9.6)	31.1	(6.4)	42.2	(5.7)
400–699	62.4	(8.9)	48.8	(5.5)	49.5	(4.6)	55.9	(5.7)
700–899	44.5	(12.1)	64.0	(6.4)	49.6	(6.2)	57.7	(10.5)
900 or more	32.5	(13.9)	34.5	(7.9)	37.4	(11.3)	41.8	(11.8)
Any arrival weight	66.3	(7.6)	59.6	(4.7)	55.2	(3.9)	56.0	(4.4)

***** For feedlots that placed any cattle during 2020 in the respective arrival weight class from outside the operation.

For feedlots that placed any cattle not born and raised on the operation, about a third of cattle placed (32.7 percent) were commingled with cattle from different sources in the first 45 days of feeding.

D.6.c. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle[1] that commingled with cattle from different sources in the first 45 days of feeding, by arrival weight[2] and by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Arrival weight (lb)	**Small** (50–499) Pct.	Std. error	**Medium** (500–999) Pct.	Std. error	**Large** (1,000–4,999) Pct.	Std. error	**Very Large** (5,000 or more) Pct.	Std. error	**All feedlots** Pct.	Std. error
Less than 400	30.9	(5.8)	27.3	(9.0)	20.0	(10.4)	12.0	(4.5)	17.7	(3.9)
400–699	44.8	(4.5)	46.8	(7.1)	48.2	(6.5)	22.7	(4.8)	30.8	(3.9)
700–899	60.3	(8.8)	36.7	(8.2)	53.5	(8.5)	33.0	(5.7)	35.8	(4.7)
900 or more	82.4	(9.1)	19.2	(9.4)	36.8	(14.8)	31.0	(9.1)	32.2	(7.4)
Any arrival weight	55.0	(4.5)	41.9	(5.5)	47.5	(6.3)	28.1	(4.5)	32.7	(3.6)

[1] As a percentage of total cattle placed during 2020 in the respective arrival weight class.
[2] For feedlots that placed any cattle during 2020 in the respective arrival weight class from outside the operation.

For feedlots that placed any cattle not born and raised on the operation, a lower percentage of cattle in the Central region (25.3 percent) in the 400–699 lb arrival weight category was commingled with cattle from different sources in the first 45 days of feeding compared with cattle in the West and East regions (52.0 and 61.9 percent, respectively) in the 400–699 lb arrival weight category.

D.6.d. For the 70.7 percent of feedlots that placed any cattle on feed that were not born and raised on the operation (Table D.1.a.), percentage of cattle[1] that commingled with cattle from different sources in the first 45 days of feeding, by arrival weight[2] and by region:

Percent Cattle

Region

Arrival weight (lb)	**West** Pct.	Std. error	**Central** Pct.	Std. error	**Midwest** Pct.	Std. error	**East** Pct.	Std. error
Less than 400	11.1	(3.1)	13.8	(5.3)	27.7	(9.1)	30.5	(7.7)
400–699	52.0	(7.0)	25.3	(4.6)	42.4	(5.2)	61.9	(8.8)
700–899	44.8	(10.8)	34.2	(5.4)	46.0	(6.7)	53.0	(20.6)
900 or more	32.3	(14.8)	31.2	(8.8)	29.9	(9.9)	63.3	(20.3)
Any arrival weight	41.4	(8.9)	30.0	(4.4)	43.1	(4.2)	49.4	(7.5)

[1] As a percentage of total cattle placed during 2020 in the respective arrival weight class.
[2] For feedlots that placed any cattle during 2020 in the respective arrival weight class from outside the operation.

E. Animal identification

1. Any use of ear tags for individual animal identification

Ear tags are often applied to cattle to provide a means of distinguishing one animal from another. This is helpful in keeping track of information such as cattle weight and treatment history. Individual-animal ID is important for disease traceback purposes. For example, if an animal is not properly identified before arriving at slaughter and turns out to be positive for an important disease such as tuberculosis, it can be difficult or impossible to identify where that animal originated, which might allow the disease to persist in the herd of origin. The vast majority of feedlots (85.4 percent) identified any cattle on feed with an individual identification ear tag placed after arrival to the feedlot or prior to arrival. There were no differences by feedlot capacity in the percentage of feedlots that identified any cattle on feed with an individual identification ear tag.

E.1.a. Percentage of feedlots that identified any cattle on feed with an individual identification ear tag placed after arrival to the feedlot or prior to arrival, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
85.2	(1.8)	86.7	(3.6)	84.6	(4.5)	84.7	(7.6)	85.4	(1.5)

There were no regional differences in the percentage of feedlots that identified any cattle on feed with an individual identification ear tag placed after arrival to the feedlot or prior to arrival.

E.1.b. Percentage of feedlots that identified any cattle on feed with an individual identification ear tag placed after arrival to the feedlot or prior to arrival, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
75.2	(5.2)	87.5	(3.2)	86.6	(2.3)	88.2	(2.5)

About two-thirds (65.5 percent) of cattle were identified with an individual identification ear tag placed after arrival to the feedlot or prior to arrival**.**

E.1.c. Percentage of cattle* identified with an individual identification ear tag placed after arrival to the feedlot or prior to arrival, by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
78.8	(2.5)	76.9	(4.3)	76.0	(3.9)	61.2	(7.4)	65.5	(5.6)

* As a percentage of total cattle placed during 2020.

There were no regional differences in the percentage of cattle that were identified with an individual identification ear tag placed after arrival to the feedlot or prior to arrival**.**

E.1.d. Percentage of cattle* identified with an individual identification ear tag placed after arrival to the feedlot or prior to arrival, by region:

Percent Cattle

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
72.6	(6.6)	62.3	(7.0)	79.3	(2.8)	79.5	(5.8)

* As a percentage of total cattle placed during 2020.

2. Types of ear tags used for individual animal identification

Radio Frequency Identification (RFID) electronic ear tags have a microchip responder that can easily be read with a wand or other device and uploaded to a data storage device or database. RFID ear tags allow easier tracking of cattle movements compared with non-electronic ear tags. For feedlots that individually identified any cattle on feed with an ear tag, nearly all (90.0 percent) used visual (non-electronic) ear tags for identification of cattle.

E.2.a. For the 85.4 percent of feedlots that identified any cattle on feed with an individual identification ear tag placed either on the feedlot or prior to arrival (Table E.1.a.), percentage of feedlots by type of individual identification used on most cattle, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Type of identification	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Electronic (RFID) ear tag, ultra-high frequency*	2.2	(0.6)	5.2	(2.5)	7.7	(5.0)	18.3	(9.3)	3.7	(0.8)
Electronic (RFID) ear tag, low frequency	4.8	(0.9)	7.2	(2.6)	9.9	(4.0)	7.1	(2.9)	5.7	(0.8)
Visual (non-electronic) ear tag	92.3	(1.1)	86.9	(3.5)	82.1	(6.0)	73.4	(9.0)	90.0	(1.1)
Other	0.7	(0.4)	0.7	(0.7)	0.4	(0.3)	1.2	(1.1)	0.7	(0.3)
Total	100.0		100.0		100.0		100.0		100.0	

* The questionnaire originally had three categories for RFID tags: ultra-high frequency, high frequency, and low frequency. The categories of “ultra-high frequency” and “high frequency” were combined into a single “ultra-high” category due to confusion over terminology.

A higher percentage of feedlots in the East region (14.3 percent) used low frequency RFID ear tags for individual-animal ID compared with the other regions.

E.2.b. For the 85.4 percent of feedlots that identified any cattle on feed with an individual identification ear tag placed either on the feedlot or prior to arrival (Table E.1.a.), percentage of feedlots by type of individual identification used on most cattle, and by region:

Percent Feedlots

Region

Type of identification	West		Central		Midwest		East	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Electronic (RFID) ear tag, ultra-high frequency*	0.9	(0.4)	6.3	(2.7)	2.0	(1.1)	6.0	(1.6)
Electronic (RFID) ear tag, low frequency	1.4	(1.0)	5.5	(2.1)	1.9	(1.0)	14.3	(2.2)
Visual (non-electronic) ear tag	96.0	(1.6)	86.8	(3.6)	96.0	(1.4)	79.1	(2.2)
Other	1.8	(1.2)	1.4	(1.2)	0.1	(0.1)	0.6	(0.6)
Total	100.0		100.0		100.0		100.0	

* The questionnaire originally had three categories for RFID tags: ultra-high frequency, high frequency, and low frequency. The categories of “ultra-high frequency” and “high frequency” were combined into a single “ultra-high” category due to confusion over terminology.

Individual-animal ID can be official or unofficial. Official ID is an identification tag approved by APHIS that bears an official identification number for individual animals. The design, size, shape, color, and other characteristics of the official ear tag will depend on the needs of the users, subject to the approval of the

Administrator. The official ear tag must be tamper-resistant and have a high retention rate in the animal. Official ID is used for official animal testing or interstate movement, and these ear tags are marked with the “U.S.” shield. At the time this study was conducted in 2021, types of official ear tags included brucellosis vaccination ear tags; National Uniform Ear Tagging System (NUES) ear tags (e.g., brite tags); and Animal Identification Number (AIN) or 840-prefixed ear tags (for cattle born in the U.S), and official ear tags applied during this study remain official for the life of the animals. However, beginning in 2024, ear tags must be readable both visually and electronically to be recognized for use as official ear tags for interstate movement of cattle and bison. For feedlots that individually identified any cattle with an ear tag, less than one-quarter (21.5 percent) identified any cattle with official ear tags.

E.2.c. For the 85.4 percent of feedlots that identified any cattle on feed with an individual identification ear tag placed either on the feedlot or prior to arrival (Table E.1.a.), percentage of feedlots that identified any cattle on feed with official ear tags*, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Any cattle with official ear tags?*	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	20.0	(1.9)	24.2	(4.5)	22.5	(4.8)	34.7	(7.8)	21.5	(1.6)
No	51.3	(2.6)	41.2	(5.4)	42.6	(6.7)	34.4	(5.8)	48.3	(2.2)
Don’t know	28.6	(2.4)	34.6	(5.3)	34.8	(6.4)	30.9	(6.6)	30.2	(2.0)
Total	100.0		100.0		100.0		100.0		100.0	

* Official ear tags are characterized by the official U.S. shield, and when this study was conducted in 2021, official ear tags could be either visual or electronic. Beginning in 2024, official ear tags must be readable both visually and electronically.

For feedlots that individually identified any cattle with an ear tag, a lower percentage of feedlots in the West region (9.3 percent) used official ear tags. The lower percentage of feedlots in the West that used official ear tags could be due to the widespread use of brands to identify cattle in the West. In this study, brands were not offered as an option of official ID because the question on identification was limited to ear tags. However, brands can be considered official ID for interstate movement provided the brand is registered with a recognized brand inspection authority, and the animal is accompanied by an official brand inspection certificate. In addition, both the shipping and receiving State veterinarians must agree to accept the brands as official ID.

E.2.d. For the 85.4 percent of feedlots that identified any cattle on feed with an individual identification ear tag placed either on the feedlot or prior to arrival (Table E.1.a.), percentage of feedlots that identified any cattle on feed with official ear tags*, by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Any cattle with official ear tags?*	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	9.3	(1.6)	20.8	(4.1)	19.5	(2.8)	32.0	(3.1)
No	50.9	(6.4)	48.2	(5.1)	51.8	(3.5)	41.1	(3.7)
Don't know	39.8	(6.4)	30.9	(4.8)	28.7	(3.1)	26.9	(3.5)
Total	100.0		100.0		100.0		100.0	

* Official ear tags are characterized by the official U.S. shield, and when this study was conducted in 2021, official ear tags could be either visual or electronic. Beginning in 2024, official ear tags must be readable both visually and electronically.

Slightly less than one-fourth (23.0 percent) of cattle were identified with official ear tags. There were no differences by feedlot capacity in the percentage of cattle that were identified with official ear tags.

E.2.e. Percentage of cattle[1] on feed that were identified with official ear tags[2], by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
21.0	(2.9)	20.9	(4.7)	18.1	(3.9)	24.3	(6.6)	23.0	(4.7)

[1] As a percentage of total cattle placed during 2020.
[2] Official ear tags are characterized by the official U.S. shield, and when this study was conducted in 2021, official ear tags could be either visual or electronic. Beginning in 2024, official ear tags must be readable both visually and electronically.

A lower percentage of cattle in the West region (6.9 percent) were identified with official ear tags.

E.2.f. Percentage of cattle[1] on feed that were identified with official ear tags[2], by region:

Percent Cattle

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
6.9	(1.9)	24.3	(6.0)	19.6	(3.2)	36.8	(5.8)

[1] As a percentage of total cattle placed during 2020.
[2] Official ear tags are characterized by the official U.S. shield, and when this study was conducted in 2021, official ear tags could be either visual or electronic. Beginning in 2024, official ear tags must be readable both visually and electronically.

F. Primary Housing Type

Over three-fourths (80.9 percent) of feedlots used open lots with (43.8 percent) or without (37.1 percent) a barn or shed as the primary housing type.

F.1. Percentage of feedlots by primary housing type used for cattle, and by feedlot capacity:

	Percent Feedlots									
	Feedlot capacity (number head)									
	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Housing type	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Open lot without barn or shed (with or without shade structures)	27.5	(1.9)	58.4	(4.4)	56.9	(5.7)	85.6	(4.8)	37.1	(1.5)
Open lot with open shed/loafing shed	52.7	(2.2)	21.0	(3.8)	25.9	(5.3)	11.7	(4.8)	43.8	(1.7)
Shed or barn (i.e., confinement barn) with slatted floors with no open lot	3.2	(0.8)	6.1	(1.9)	6.3	(2.4)	1.3	(0.8)	3.8	(0.7)
Shed or barn (i.e., confinement barn) with solid floor with no open lot	16.4	(1.5)	14.5	(3.2)	10.8	(3.1)	1.4	(0.7)	15.1	(1.2)
Other	0.3	(0.3)	0.0	(—)	0.2	(0.2)	0.0	(—)	0.2	(0.2)
Total	100.0		100.0		100.0		100.0		100.0	
Shed or barn (i.e., confinement barn) with slatted or solid floors and no open lot	19.6	(1.7)	20.5	(3.6)	17.1	(3.8)	2.7	(1.1)	18.9	(1.3)

Feedlots in western States are often open pens (dry lots) with no barn or shed. In eastern States, dry lots are not as common due to the increased rain received in these States. If pens in eastern States have dirt surfaces, they turn to mud when it rains, which can increase the effort needed for cattle to move around, thereby reducing average daily gains. Feedlots in the east may be more likely to have concrete surfaces instead of dirt or to use confinement barns where cattle have no access to pens outside the barns. A higher percentage of feedlots in the East and Midwest regions (37.5 and 21.0 percent, respectively) used a shed or barn (i.e., confinement barn) with slatted or solid floors and no open lot as the primary housing type for cattle compared with feedlots in the West and Central regions (6.7 and 2.3 percent, respectively).

F.2. Percentage of feedlots by primary housing type used for cattle, and by region:

	Percent Feedlots							
	Region							
	West		Central		Midwest		East	
Housing type	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Open lot without barn or shed (with or without shade structures)	70.1	(5.0)	82.5	(3.6)	20.5	(2.3)	5.9	(1.7)
Open lot with open shed/loafing shed	23.1	(4.6)	15.1	(3.4)	58.0	(2.9)	56.6	(3.2)
Shed or barn (i.e., confinement barn) with slatted floors with no open lot	2.0	(1.5)	1.3	(0.9)	5.5	(1.3)	4.3	(1.4)
Shed or barn (i.e., confinement barn) with solid floor with no open lot	4.7	(2.2)	1.1	(0.9)	15.6	(2.2)	33.2	(3.0)
Other	0.0	(—)	0.0	(—)	0.5	(0.5)	0.0	(—)
Total	100.0		100.0		100.0		100.0	
Shed or barn (i.e., confinement barn) with slatted or solid floors and no open lot	6.7	(2.7)	2.3	(1.3)	21.0	(2.4)	37.5	(3.1)

Ventilation for confinement barns used for cattle is accomplished by natural (e.g., wind) or mechanical means. For feedlots that used a shed or barn with slatted or solid floors and no open lot, few (5.0 percent) used mechanical ventilation. Natural ventilation from large side openings or from large side openings combined with ridge vents were used by the highest percentage of feedlots (33.7 and 45.8 percent, respectively).

F.3. For the 18.9 percent of feedlots that used a shed or barn with no open lot with slatted or solid floors (Table F.1.), percentage of feedlots by type of ventilation present in the shed or barn, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Ventilation type	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
Natural from ridge vents	13.0	(3.5)	D*	(D)	7.2	(3.3)	D	(D)	13.9	(3.1)
Natural from large side openings	36.4	(4.9)	D	(D)	33.7	(10.2)	D	(D)	33.7	(4.1)
Natural from both ridge vents and large side openings	42.1	(5.0)	D	(D)	59.0	(11.3)	D	(D)	45.8	(4.3)
Mechanical system	6.4	(2.4)	D	(D)	0.0	(—)	D	(D)	5.0	(1.8)
Other	2.2	(1.4)	D	(D)	0.0	(—)	D	(D)	1.7	(1.0)
Total	100.0		100.0		100.0		100.0		100.0	

* Values of (D) denote too few to report.

There were no differences between the Midwest and East regions in the type of ventilation used for confinement barns. Too few feedlots in the West and Central regions used confinement barns for ventilation data to be reported.

F.4. For the 18.9 percent of feedlots that used a shed or barn with no open lot with slatted or solid floors (Table F.1.), percentage of feedlots by type of ventilation present in the shed or barn, and by region:

Percent Feedlots

Region

Ventilation type	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
Natural from ridge vents	D*	(D)	D	(D)	19.2	(5.7)	11.3	(3.5)
Natural from large side openings	D	(D)	D	(D)	32.6	(6.5)	31.9	(5.2)
Natural from both ridge vents and large side openings	D	(D)	D	(D)	43.8	(7.0)	46.9	(5.6)
Mechanical system	D	(D)	D	(D)	2.6	(2.5)	8.1	(3.1)
Other	D	(D)	D	(D)	1.9	(1.9)	1.7	(1.3)
Total	100.0		100.0		100.0		100.0	

* Values of (D) denote too few to report.

G. Antibiotic Use and Stewardship

1. Marketing claims

Marketing claims, such as “raised without antibiotics,” can give a competitive advantage over products without any claims. Meat products without specific marketing claims are regarded as “conventional.” Over three-fourths (78.4 percent) of feedlots marketed at least some cattle without any specific marketing claims. Similar percentages of feedlots marketed at least some cattle with a claim of no or limited antibiotic use (13.1 percent) or no hormone use (13.5 percent). A low percentage of feedlots (3.0 percent) marketed at least some cattle as meeting the standards in the USDA National Organic Program (i.e., certified USDA organic).

G.1.a. Percentage of feedlots with at least one animal typically placed on the feedlot with the intention to meet the following specific marketing label claims, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Marketing claim	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Certified USDA organic	3.2	(0.8)	4.0	(2.0)	1.4	(1.1)	0.0	(—)	3.0	(0.7)
Claim of no or limited antibiotic use (excluding USDA organic)	13.6	(1.6)	13.2	(3.2)	8.7	(2.2)	13.3	(4.8)	13.1	(1.3)
Claim of no hormone use (non-hormone treated cattle program)	14.8	(1.7)	7.8	(2.4)	14.1	(4.6)	14.0	(3.1)	13.5	(1.3)
No specific marketing label claim regarding antibiotics or hormones	75.6	(2.0)	83.3	(3.5)	88.4	(3.2)	89.2	(4.7)	78.4	(1.6)

There were no regional differences in marketing claims used for at least some cattle.

G.1.b. Percentage of feedlots with at least one animal typically placed on the feedlot with the intention to meet the following specific marketing label claims, by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Marketing claim	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Certified USDA organic	4.5	(2.2)	3.7	(1.8)	2.5	(1.0)	2.4	(1.1)
Claim of no or limited antibiotic use (excluding USDA organic)	14.2	(3.6)	11.5	(2.7)	12.7	(1.9)	14.4	(2.5)
Claim of no hormone use (non-hormone treated cattle program)	18.2	(4.1)	14.5	(3.2)	12.6	(2.0)	11.1	(2.1)
No specific marketing label claim regarding antibiotics or hormones	73.9	(4.7)	82.5	(3.5)	78.5	(2.5)	78.1	(2.9)

The vast majority of cattle (85.1 percent) were placed with the intention to be raised conventionally and not meet any marketing claims. Similar percentages of cattle were placed with the intention to meet claims of no or limited antibiotic use (8.4 percent) and no hormone use (10.2 percent). There were no differences by feedlot capacity in the percentages of cattle by marketing claim used.

G.1.c. Percentage of cattle* that are typically placed on the feedlot with the intention to meet the following specific marketing label claims, by feedlot capacity:

	Percent Cattle									
	Feedlot capacity (number head)									
	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Marketing claim	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Certified USDA organic	2.6	(1.0)	3.0	(1.5)	0.3	(0.3)	0.0	(—)	0.5	(0.2)
Claim of no or limited antibiotic use (excluding USDA organic)	11.2	(2.0)	12.7	(3.7)	7.1	(2.1)	7.7	(3.0)	8.4	(2.2)
Claim of no hormone use (non-hormone treated cattle program)	9.6	(1.8)	6.4	(2.6)	7.3	(2.4)	11.3	(3.7)	10.2	(2.7)
No specific marketing label claim regarding antibiotics or hormones	78.1	(2.7)	81.0	(4.2)	88.2	(2.8)	85.9	(4.2)	85.1	(3.0)

* As a percentage of total cattle placed during 2020. Columns sum to >100.0 percent because some cattle were placed with the intention to market under more than one label claim, for instance, no hormone use and no or limited antibiotic use.

There were no regional differences in the percentage of cattle by marketing claims used.

G.1.d. Percentage of cattle* that are typically placed on the feedlot with the intention to meet the following specific marketing label claims, by region:

	Percent Cattle							
	Region							
	West		Central		Midwest		East	
Marketing claim	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Certified USDA organic	1.7	(1.0)	0.3	(0.2)	1.1	(0.5)	0.9	(0.5)
Claim of no or limited antibiotic use (excluding USDA organic)	26.3	(10.7)	6.4	(2.5)	7.2	(1.7)	11.4	(2.9)
Claim of no hormone use (non-hormone treated cattle program)	25.4	(10.8)	9.4	(3.2)	5.3	(1.7)	7.9	(2.7)
No specific marketing label claim regarding antibiotics or hormones	66.4	(9.9)	86.9	(3.7)	87.8	(2.3)	80.7	(3.9)

* As a percentage of total cattle placed during 2020. Columns sum to >100.0 percent because some cattle were placed with the intention to market under more than one label claim, for instance, no hormone use and no or limited antibiotic use.

For feedlots that placed cattle with the intention to meet any of the three marketing claims in the table below, over 90 percent of cattle placed finished in the assigned program. There were no differences by feedlot capacity in the percentage of cattle that finished in the programs of limited or no antibiotic use or no hormone use.

G.1.e. For feedlots that placed cattle with the intention to meet the given specific marketing label claims (Table G.1.a.), percentage of cattle[1] that typically finish in their assigned program, by feedlot capacity:

Percent Cattle

Feedlot capacity (number head)

Marketing claim	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
Certified USDA organic	D[2]	(D)	D	(D)	D	(D)	NA[3]	(NA)	97.1	(3.0)
Claim of no or limited antibiotic use (excluding USDA organic)	96.9	(1.3)	86.9	(9.1)	95.2	(1.8)	92.0	(3.0)	92.2	(2.3)
Claim of no hormone use (non-hormone treated cattle program)	98.3	(0.9)	87.4	(8.0)	94.2	(2.9)	93.6	(1.5)	93.6	(1.4)

[1] As a percentage of total cattle placed during 2020 from the above marketing claims.
[2] Values of (D) denote too few to report.
[3] Values of NA denote no feedlots of that size fed cattle to meet that marketing claim.

For feedlots that placed cattle with the intention to meet any of the three marketing claims in the table below, a higher percentage of cattle in the East region (99.5 percent) finished under a marketing claim of no hormone use compared with the West and Central regions (90.5 and 94.3 percent, respectively).

G.1.f. For feedlots that placed cattle with the intention to meet the given specific marketing label claims (Table G.1.a.), percentage of cattle[1] that typically finish in their assigned program, by region:

Percent Cattle

Region

Marketing claim	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
Certified USDA organic	D	(D)	D	(D)	D	(D)	D	(D)
Claim of no or limited antibiotic use (excluding USDA organic)	90.1	(1.8)	94.6	(3.0)	86.8	(10.1)	85.7	(10.8)
Claim of no hormone use (non-hormone treated cattle program)	90.5	(2.1)	94.3	(1.7)	97.1	(1.9)	99.5	(0.3)

[1] As a percentage of total cattle placed during 2020 from the above marketing claims.
[2] Values of (D) denote too few to report.

There are various claims regarding use of antibiotics in beef products, such as “no antibiotics ever.” Another type of marketing claim relates to reduction in the use of antibiotics. For example, part of Wendy’s® beef supply comes from producers who have made a commitment to at least a 20 percent reduction in the use of tylosin, a medically important antibiotic. Medically important antibiotics are those

antibiotics important for therapeutic use in humans. To meet this commitment, these producers may withhold tylosin during the last month or more prior to slaughter. For feedlots that had any cattle that were fed to meet a marketing label claim of no or limited antibiotic use (excluding Certified USDA organic), a lower percentage (17.0 percent) of feedlots marketed cattle under a "no medically important antibiotics ever" claim compared with feedlots that marketed cattle under claims for "no antibiotics ever" or "no antibiotics in the last 25–100 days prior to slaughter (44.9 and 57.6 percent, respectively.

G.1.g. For the 13.1 percent of feedlots that had any cattle that were fed to meet a marketing label claim of no or limited antibiotic use (excluding Certified USDA organic) [Table G.1.a.], percentage of feedlots by specific label claims regarding antibiotic use under which cattle are marketed, and by feedlot capacity:

Percent Feedlots

	Feedlot capacity (number head)									
	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Specific marketing claim	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
No antibiotics ever[1]	42.3	(7.8)	50.2	(18.2)	57.7	(13.9)	50.4	(26.1)	44.9	(6.6)
No medically important antibiotics ever[2]	20.7	(6.9)	4.5	(4.5)	6.1	(5.7)	16.4	(12.3)	17.0	(5.3)
No antibiotics in the last 25–100 days prior to slaughter	59.1	(7.9)	54.3	(18.1)	48.1	(14.6)	57.8	(22.7)	57.6	(6.6)
Other claim regarding antibiotic use	0.0	(—)	0.0	(—)	4.1	(3.7)	0.0	(—)	0.3	(0.2)

[1] Includes "raised without antibiotics."
[2] For example, only ionophores were used.

There were no regional differences in the percentage of feedlots by specific label claims regarding antibiotic use under which cattle were marketed.

G.1.h. For the 13.1 percent of feedlots that had any cattle that were fed to meet a marketing label claim of no or limited antibiotic use (excluding Certified USDA organic) (Table G.1.a.), percentage of feedlots by specific label claims regarding antibiotic use under which cattle are marketed, and by region:

Percent Feedlots

	Region							
	West		**Central**		**Midwest**		**East**	
Specific marketing claim	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
No antibiotics ever[1]	42.9	(18.3)	47.2	(15.4)	47.6	(10.6)	40.0	(11.1)
No medically important antibiotics ever[2]	32.1	(22.8)	12.1	(6.6)	11.1	(7.4)	23.9	(9.7)
No antibiotics in the last 25–100 days prior to slaughter	25.0	(14.1)	64.0	(14.5)	51.4	(10.8)	75.5	(9.0)
Other claim regarding antibiotic use	0.0	(—)	0.0	(—)	0.6	(0.5)	0.0	(—)

[1] Includes "raised without antibiotics."
[2] For example, only ionophores were used.

2. Any antibiotic use

Just as with humans, cattle sometimes become sick and need to be given antibiotics. Antibiotics are used in feedlot cattle for four main purposes: disease treatment, disease control, disease prevention, and growth promotion/feed efficiency. Antibiotics can be given in feed or water, by injection, by bolus (pill given by mouth), by drench (liquid given by mouth), or topically (paste applied on skin or eyes).

Beginning on January 1, 2017, the U.S. Food and Drug Administration (FDA) completed implementation of policy changes regarding the use of antibiotics in food-producing animals. These changes included: 1) eliminating the use of medically important antibiotics for growth promotion purposes in food-producing animals, and 2) requiring veterinary oversight for use of medically important antibiotics in animal feed or water. These policy changes eliminated the use of medically important antibiotics for growth promotion purposes in food-producing animals. In addition, a prescription or Veterinary Feed Directive (VFD) became needed to use medically important antibiotics in water or feed of food-producing animals.

On June 11, 2023, the FDA implemented additional policy changes that require veterinary oversight for use of all medically important antibiotics in animals, including both food-producing and companion animals. These new changes primarily mean that medically important injectable antibiotics (e.g., penicillin, oxytetracycline, tylosin) now require a prescription for purchase. These products were previously available over the counter in establishments such as feed and farm stores. On January 1, 2018, the State of California began requiring a prescription for purchase of all medically important injectable antibiotics, so California was a few years ahead of the rest of the United States in this regard. While the June 11, 2023 FDA rule changes will affect antibiotic use in cattle going forward, these changes were not in place at the time this study was conducted.

As mentioned in the Items of Note, the data in tables G.2.a. and G.2.b. are likely underestimates. The Report II percentages should be used when estimating the percentage of feedlots that used any antibiotics in 2020.

A higher percentage of medium, large, and very large feedlots (89.9, 91.6, and 91.1 percent, respectively) used antibiotics in 2020 by any means of administration compared with small feedlots (66.2 percent).

G.2.a. Percentage of feedlots *(please see footnote)* that used any antibiotics on the feedlot in 2020 (for example, injectable, in feed, and/or in water), by feedlot capacity:

Percent Feedlots*

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
66.2	(2.2)	89.9	(2.9)	91.6	(3.3)	91.1	(4.5)	73.1	(1.7)

*NAHMS believes the percentages in this table are underestimates, and we recommend using Report II estimates on the percentage of feedlots that used any antibiotics in 2020.

A lower percentage of feedlots in the East region (64.7 percent) used any antibiotics compared with feedlots in the Central region (83.4 percent).

G.2.b. Percentage of feedlots *(please see footnote)* that used any antibiotics on the feedlot in 2020 (for example, injectable, in feed, and/or in water), by region:

Percent Feedlots*

Region

West		Central		Midwest		East	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
78.1	(4.4)	83.4	(3.4)	71.0	(2.7)	64.7	(3.5)

*NAHMS believes the percentages in this table are underestimates, and we recommend using Report II estimates on the percentage of feedlots that used any antibiotics in 2020.

3. Antibiotics for groups of cattle

Feedlots sometimes give injectable antibiotics to cattle as a group, meaning the majority of the cattle in a pen are given injectable antibiotics at the same time. This could occur if the pen is experiencing an outbreak of respiratory disease or other ailment, but it more often occurs shortly after cattle arrive at a feedlot during arrival processing procedures. In addition to administering antibiotics, these arrival procedures can also include vaccinations, application of identification, deworming, dehorning, and castration, among others. Injectable antibiotics may be administered to a pen for the control of respiratory disease in cattle that are at high risk of developing bovine respiratory disease associated with *Mannheimia haemolytica*, *Pasteurella multocida*, or *Histophilus somni*.

Antibiotics were administered to cattle as a group on 22.4 percent of feedlots. A higher percentage of large and very large feedlots (41.4 and 39.9 percent, respectively) administered injectable antibiotics to cattle as a group compared with small feedlots (18.2 percent).

G.3.a. Percentage of feedlots that administered any injectable antibiotics to cattle as a group*, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
18.2	(1.8)	28.1	(4.3)	41.4	(6.0)	39.9	(5.7)	22.4	(1.6)

* Injectable antibiotics were given to the majority of cattle in the pen at the same time, for example, for treatment, prevention, or control of bovine respiratory disease.

There were no regional differences in the percentage of feedlots that administered antibiotics to cattle as a group.

G.3.b. Percentage of feedlots that administered any injectable antibiotics to cattle as a group*, by region:

Percent Feedlots							
Region							
West		Central		Midwest		East	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
25.7	(4.6)	27.4	(3.8)	22.7	(2.5)	15.6	(2.6)

* Injectable antibiotics were given to the majority of cattle in the pen at the same time, for example, for treatment, prevention, or control of bovine respiratory disease.

Record-keeping of antibiotic use can help prevent illegal drug residues in food products made from treated animals. Drug residues are small amounts of leftover drug or parts of the drug that aren't completely broken down by the animal's body. The withdrawal period is the time from when the animal was last treated with the drug to when the animal can be slaughtered for food. The withdrawal period allows for drug residues in the animal's body to decline/reach levels that are at or below acceptable levels as determined by the Food and Drug Administration. If the withdrawal period is followed, food products made from treated animals are safe to enter the food supply.

For feedlots that administered antibiotics to cattle as a group, more than 60 percent always recorded the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.3.c. For the 22.4 percent of feedlots that administered injectable antibiotics to cattle as a group* (Table G.3.a.), percentage of feedlots by type of treatment information recorded and by frequency information was recorded:

	Percent Feedlots								
	Frequency								
	Never		Sometimes		Most of the time		Always		
Information	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Date(s) treated	15.6	(3.0)	9.4	(2.5)	13.4	(2.7)	61.7	(4.0)	100.0
Antibiotic given	15.4	(3.0)	7.7	(2.2)	13.0	(2.8)	63.8	(4.0)	100.0
Antibiotic dose, regimen, or protocol	14.4	(2.9)	10.8	(2.7)	12.5	(2.7)	62.3	(4.0)	100.0
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	16.0	(3.1)	5.4	(1.9)	6.7	(1.9)	71.9	(3.7)	100.0

* Injectable antibiotics were given to the majority of cattle in the pen at the same time, for example, for treatment, prevention, or control of bovine respiratory disease.

For feedlots that administered antibiotics to cattle as a group, a higher percentage of very large feedlots ever recorded (sometimes, most of the time, or always) the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period compared with small feedlots.

G.3.d. For the 22.4 percent of feedlots that administered injectable antibiotics to cattle as a group* (Table G.3.a.), percentage of feedlots that ever recorded the following treatment information, by feedlot capacity:

Percent Feedlots

	Feedlot capacity (number head)									
	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Date(s) treated	79.9	(4.5)	83.4	(6.7)	97.5	(1.4)	97.9	(1.3)	84.4	(3.0)
Antibiotic given	79.1	(4.7)	89.6	(5.3)	93.0	(5.0)	96.0	(2.2)	84.6	(3.0)
Antibiotic dose, regimen, or protocol	80.8	(4.5)	88.9	(5.3)	93.0	(5.0)	97.9	(1.3)	85.6	(2.9)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	77.3	(4.9)	94.1	(3.7)	88.2	(7.1)	97.9	(1.3)	84.0	(3.1)

For feedlots that administered antibiotics to cattle as a group there were no regional differences in the percentage of feedlots that ever recorded (sometimes, most of the time, or always) the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.3.e. For the 22.4 percent of feedlots that administered injectable antibiotics to cattle as a group* (Table G.3.a.), percentage of feedlots that ever recorded the following treatment information, by region:

Percent Feedlots

	Region							
	West		**Central**		**Midwest**		**East**	
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Date(s) treated	87.9	(6.3)	92.0	(4.7)	75.5	(5.6)	91.4	(5.2)
Antibiotic given	84.2	(7.8)	87.6	(5.8)	81.4	(5.0)	88.7	(5.8)
Antibiotic dose, regimen, or protocol	90.0	(6.0)	87.6	(5.8)	81.4	(5.0)	88.2	(6.0)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	83.3	(7.9)	85.2	(6.2)	83.4	(5.0)	84.3	(6.9)

* Injectable antibiotics were given to the majority of cattle in the pen at the same time, for example, for treatment, prevention, or control of bovine respiratory disease.

4. Injectable antibiotic use for sick cattle

A higher percentage of medium, large, and very large feedlots (85.1, 91.5, and 90.6 percent, respectively) administered injectable antibiotics to individual cattle that became sick compared with small feedlots (59.7 percent).

G.4.a. Percentage of feedlots that administered injectable antibiotics to any individual cattle that became sick, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
59.7	(2.3)	85.1	(3.4)	91.5	(3.3)	90.6	(4.5)	67.6	(1.8)

A higher percentage of feedlots in the Central region (79.6 percent) administered injectable antibiotics to individual cattle that became sick compared with feedlots in the Midwest and East regions (64.8 and 60.1 percent, respectively).

G.4.b. Percentage of feedlots that administered injectable antibiotics to any individual cattle that became sick, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
71.0	(4.8)	79.6	(3.7)	64.8	(2.8)	60.1	(3.5)

For feedlots that administered injectable antibiotics to individual cattle that became sick, the majority of feedlots always recorded the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.4.c. For the 67.6 percent of feedlots that administered injectable antibiotics to any individual cattle that became sick (Table G.4.a.), percentage of feedlots by type of treatment information recorded and by frequency information was recorded:

Percent Feedlots

	Frequency								
	Never		**Sometimes**		**Most of the time**		**Always**		
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Date(s) treated	12.5	(1.6)	11.5	(1.5)	16.1	(1.7)	59.8	(2.3)	100.0
Antibiotic given	13.3	(1.6)	9.6	(1.4)	15.6	(1.7)	61.5	(2.3)	100.0
Antibiotic dose, regimen, or protocol	15.7	(1.7)	9.9	(1.4)	15.4	(1.7)	58.9	(2.3)	100.0
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	17.2	(1.8)	6.3	(1.1)	9.2	(1.3)	67.2	(2.2)	100.0

For feedlots that administered injectable antibiotics to individual cattle that became sick, a higher percentage of large and very large feedlots ever recorded (sometimes, most of the time, or always) the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period compared with small feedlots.

G.4.d. For the 67.6 percent of feedlots that administered injectable antibiotics to any individual cattle that became sick (Table G.4.a.), percentage of feedlots that ever recorded the following treatment information, by feedlot capacity:

Percent Feedlots

	Feedlot capacity (number head)									
	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Date(s) treated	84.2	(2.3)	90.1	(3.0)	95.8	(2.3)	100.0	(—)	87.5	(1.6)
Antibiotic given	82.7	(2.3)	91.0	(2.7)	95.8	(2.3)	100.0	(—)	86.7	(1.6)
Antibiotic dose, regimen, or protocol	79.7	(2.5)	89.6	(2.9)	94.0	(2.5)	100.0	(—)	84.3	(1.7)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	78.3	(2.5)	87.9	(3.1)	91.6	(3.4)	99.1	(0.8)	82.8	(1.8)

For feedlots that administered injectable antibiotics to individual cattle that became sick, there were no regional differences in the percentage of feedlots that ever recorded (sometimes, most of the time, or always) the date treated, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.4.e. For the 67.6 percent of feedlots that administered injectable antibiotics to any individual cattle that became sick (Table G.4.a.), percentage of feedlots that ever recorded the following treatment information, by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Date(s) treated	89.5	(4.1)	91.2	(3.1)	86.9	(2.6)	82.7	(3.5)
Antibiotic given	91.6	(3.6)	90.4	(3.3)	84.9	(2.7)	81.9	(3.6)
Antibiotic dose, regimen, or protocol	90.4	(3.7)	88.3	(3.5)	82.9	(2.9)	77.6	(3.8)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	91.1	(3.6)	85.6	(3.8)	80.3	(3.0)	77.5	(3.8)

5. Antibiotic use in feed

On January 1, 2017, rules went into effect where medically important antibiotics (antibiotics important for human use) could no longer be used for growth promotion/feed efficiency purposes in livestock feed. However, non-medically important antibiotics, such as ionophores, can still be used for growth promotion/ feed efficiency purposes in cattle feed. Ionophores lack utility in human medicine and their use in animals, primarily as coccidiostats, does not pose cross-resistance concerns; thus, they do not have the same human health risks as medically important antibiotics. Medically important antibiotics can be used in cattle feed for disease treatment, control, and prevention purposes. Some of the medically important antibiotics used in cattle feed are chlortetracycline, which is often used for control of respiratory disease, and tylosin, which is used for reduction of the incidence of liver abscesses.

As mentioned in the Items of Note, the data in tables G.5.a. and G.5.b. are likely underestimates. The Report II estimates should be used when estimating the percentage of feedlots that used in-feed antibiotics for any cattle in 2020.

A higher percentage of small feedlots (65.4 percent) did not use antibiotics in feed compared with medium, large, and very large feedlots (35.8, 37.1, and 34.7 percent, respectively).

G.5.a. Percentage of feedlots *(please see footnote)* that used in-feed antibiotics for any cattle, by type of antibiotic and by feedlot capacity:

	Percent Feedlots*									
	Feedlot capacity (number head)									
	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Type of in-feed antibiotic	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Medically and non-medically important antibiotics in feed	12.8	(1.6)	32.7	(4.5)	28.8	(5.3)	39.4	(6.6)	18.3	(1.5)
Only medically important antibiotics in feed	18.0	(1.8)	26.3	(4.3)	27.1	(4.9)	17.4	(3.6)	20.1	(1.6)
Only non-medically important antibiotics in feed	3.8	(0.8)	5.1	(1.9)	7.0	(3.8)	8.5	(2.6)	4.4	(0.7)
No antibiotics in feed	65.4	(2.2)	35.8	(4.4)	37.1	(5.8)	34.7	(6.4)	57.2	(1.9)
Total	100.0		100.0		100.0		100.0		100.0	
Any antibiotics in feed (either medically important or non-medically important)	34.6	(2.2)	64.2	(4.4)	62.9	(5.8)	65.3	(6.4)	42.8	(1.9)

* NAHMS believes the percentages in this table are underestimates, and we recommend using Report II estimates on the percentage of feedlots that used in-feed antibiotics in 2020.

A higher percentage of feedlots in the East region (69.6 percent) did not use any antibiotics in feed compared with feedlots in the West and Central regions (48.8 and 48.2 percent, respectively).

G.5.b. Percentage of feedlots *(please see footnote)* that used in-feed antibiotics for any cattle, by type of antibiotic and by region:

	Percent Feedlots*							
	Region							
	West		Central		Midwest		East	
Type of in-feed antibiotic	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Medically and non-medically important antibiotics in feed	18.8	(4.2)	25.0	(3.8)	20.4	(2.4)	9.0	(2.1)
Only medically important antibiotics in feed	28.3	(5.0)	21.9	(3.6)	19.0	(2.4)	14.8	(2.5)
Only non-medically important antibiotics in feed	4.1	(1.8)	5.0	(1.9)	3.0	(1.0)	6.6	(1.8)
No antibiotics in feed	48.8	(5.4)	48.2	(4.5)	57.6	(2.9)	69.6	(3.3)
Total	100.0		100.0		100.0		100.0	
Any antibiotics in feed (either medically important or non-medically important)	51.2	(5.4)	51.8	(4.5)	42.4	(2.9)	30.4	(3.3)

* NAHMS believes the percentages in this table are underestimates, and we recommend using Report II estimates on the percentage of feedlots that used in-feed antibiotics in 2020

For feedlots that gave in-feed antibiotics, approximately 70 percent always recorded the date antibiotic use began, the date antibiotic use ended, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period. Some antibiotics used in cattle feed, such as ionophores and tylosin, do not have a withdrawal period.

G.5.c. For the 42.8 percent of feedlots that used in-feed antibiotics for any cattle (Table G.5.a.), percentage of feedlots by type of treatment information recorded and by frequency information was recorded:

	Percent Feedlots								
	Frequency								
	Never		Sometimes		Most of the time		Always		
Information	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
Date antibiotic use began	9.8	(1.7)	8.2	(1.7)	13.9	(2.1)	68.1	(2.8)	100.0
Date antibiotic use ended	13.8	(2.1)	7.1	(1.5)	11.7	(2.1)	67.4	(2.9)	100.0
Antibiotic given	10.8	(1.9)	5.2	(1.3)	12.4	(2.1)	71.7	(2.8)	100.0
Antibiotic dose, regimen, or protocol	11.1	(1.9)	8.5	(1.7)	11.2	(2.0)	69.3	(2.8)	100.0
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter*	17.0	(2.5)	7.0	(1.8)	7.5	(1.8)	68.5	(3.1)	100.0

* For feedlots that administered any in-feed antibiotics that had a withdrawal period.

For feedlots that gave in-feed antibiotics, between 83.0 and 90.2 percent ever recorded (sometimes, most of the time, or always) the date antibiotic use began, the date antibiotic use ended, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.5.d. For the 42.8 percent of feedlots that used in-feed antibiotics for any cattle (Table G.5.a.), percentage of feedlots that ever recorded the following treatment information, by feedlot capacity:

	Percent Feedlots									
	Feedlot capacity (number head)									
	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Information	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Date antibiotic use began	84.6	(2.8)	98.9	(0.9)	93.7	(3.9)	98.0	(1.4)	90.2	(1.7)
Date antibiotic use ended	79.2	(3.3)	95.5	(2.6)	93.2	(3.9)	98.0	(1.4)	86.2	(2.1)
Antibiotic given	82.8	(3.1)	98.9	(0.9)	93.3	(3.9)	98.0	(1.4)	89.2	(1.9)
Antibiotic dose, regimen, or protocol	82.6	(3.1)	98.9	(0.9)	92.1	(4.0)	98.0	(1.4)	88.9	(1.9)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter*	76.1	(3.9)	92.7	(3.5)	85.4	(6.4)	98.5	(1.0)	83.0	(2.5)

* For feedlots that administered any in-feed antibiotics that had a withdrawal period.

For feedlots that gave in-feed antibiotics, a lower percentage of feedlots in the East region ever recorded (sometimes, most of the time, or always) the date antibiotic use began, the date antibiotic use ended, antibiotic given, and the antibiotic dose, regimen, or protocol compared with feedlots in the Central region.

G.5.e. For the 42.8 percent of feedlots that used in-feed antibiotics for any cattle (Table G.5.a.), percentage of feedlots that ever recorded the following treatment information, by region:

	Percent Feedlots							
	Region							
	West		Central		Midwest		East	
Information	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Date antibiotic use began	94.1	(3.6)	99.3	(0.5)	89.6	(2.8)	74.8	(5.8)
Date antibiotic use ended	85.0	(5.7)	97.0	(2.0)	85.3	(3.4)	74.8	(5.9)
Antibiotic given	90.6	(4.8)	99.3	(0.5)	87.9	(3.1)	76.8	(5.8)
Antibiotic dose, regimen, or protocol	94.1	(3.6)	98.9	(0.6)	85.9	(3.3)	76.8	(5.8)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter*	85.9	(6.1)	89.4	(4.4)	84.4	(3.7)	66.6	(7.0)

* For feedlots that administered any in-feed antibiotics that had a withdrawal period.

6. Antibiotic use in water

A low percentage (4.5 percent) of feedlots gave any antibiotics in water to cattle. There were no differences by feedlot capacity in the percentage of feedlots that gave antibiotics in water.

G.6.a. Percentage of feedlots that gave any cattle antibiotics in water, by feedlot capacity:

Percent Feedlots									
Feedlot capacity (number head)									
Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
3.5	(0.7)	6.8	(2.3)	8.9	(4.4)	3.5	(1.6)	4.5	(0.7)

There were no regional differences in the percentage of feedlots that gave antibiotics in water to cattle.

G.6.b. Percentage of feedlots that gave any cattle antibiotics in water, by region:

Percent Feedlots							
Region							
West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
1.7	(0.7)	5.4	(2.3)	4.3	(1.2)	6.1	(1.5)

For feedlots that gave antibiotics in water to cattle, less than half of feedlots always recorded the date antibiotic use began, the date antibiotic use ended, and the antibiotic dose, regimen, or protocol.

G.6.c. For the 4.5 percent of feedlots that gave any cattle antibiotics in water (Table G.6.a.), percentage of feedlots by type of treatment information recorded and by frequency information was recorded:

	Percent Feedlots								
	Frequency								
	Never		**Sometimes**		**Most of the time**		**Always**		
Information	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Total**
Date antibiotic use began	13.9	(5.6)	20.1	(6.7)	18.9	(7.4)	47.1	(8.7)	100.0
Date antibiotic use ended	13.9	(5.6)	20.1	(6.7)	18.9	(7.4)	47.1	(8.7)	100.0
Antibiotic given	13.9	(5.6)	17.3	(6.4)	15.6	(5.9)	53.1	(8.4)	100.0
Antibiotic dose, regimen, or protocol	16.3	(5.9)	17.3	(6.4)	24.0	(7.8)	42.4	(8.6)	100.0
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	16.1	(6.0)	21.2	(7.1)	9.7	(4.6)	53.0	(8.5)	100.0

For feedlots that gave antibiotics in water to cattle, there were no differences by feedlot capacity in the percentage of feedlots that ever recorded the date antibiotic use began, the date antibiotic use ended, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.6.d. For the 4.5 percent of feedlots that gave any cattle antibiotics in water (Table G.6.a.), percentage of feedlots that ever recorded the following treatment information, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Information	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
Date antibiotic use began	77.9	(9.0)	100.0	(—)	90.6	(8.0)	100.0	(—)	86.1	(5.6)
Date antibiotic use ended	77.9	(9.0)	100.0	(—)	90.6	(8.0)	100.0	(—)	86.1	(5.6)
Antibiotic given	77.9	(9.0)	100.0	(—)	90.6	(8.0)	100.0	(—)	86.1	(5.6)
Antibiotic dose, regimen, or protocol	73.7	(9.5)	100.0	(—)	90.6	(8.0)	100.0	(—)	83.7	(5.9)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	78.5	(8.9)	86.0	(11.6)	97.3	(2.8)	100.0	(—)	83.9	(6.0)

For feedlots that gave antibiotics in water to cattle, there were no regional differences in the percentage of feedlots that ever recorded the date antibiotic use began, the date antibiotic use ended, antibiotic given, antibiotic dose, regimen, or protocol, and the date the animal completed the withdrawal period.

G.6.e. For the 4.5 percent of feedlots that gave any cattle antibiotics in water (Table G.6.a.), percentage of feedlots that ever recorded the following treatment information, by region:

Percent Feedlots

Region

Information	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
Date antibiotic use began	84.0	(14.6)	100.0	(—)	75.9	(11.7)	89.4	(7.8)
Date antibiotic use ended	84.0	(14.6)	100.0	(—)	75.9	(11.7)	89.4	(7.8)
Antibiotic given	84.0	(14.6)	100.0	(—)	75.9	(11.7)	89.4	(7.8)
Antibiotic dose, regimen, or protocol	84.0	(14.6)	100.0	(—)	75.9	(11.7)	81.8	(10.1)
Date animal has completed antibiotic withdrawal period and may be shipped to slaughter	100.0	(—)	100.0	(—)	73.7	(12.0)	81.8	(10.1)

H. Electronic Record-Keeping

There are several commercial electronic (i.e., computer-, tablet-, or smartphone-based) record-keeping systems designed for use on feedlots, such as Turnkey, Micro-Technologies™, or Hi-Plains Systems. Feedlots may also use custom software designed specifically for their own feedlot, general spreadsheet or database software such as Microsoft Excel or Access, or nonelectronic methods for keeping records. The next few tables are focused on electronic record-keeping methods.

A higher percentage of very large feedlots (79.7 percent) used electronic record-keeping systems to store production and/or animal health information compared with large, medium, and small feedlots (49.3, 31.9, and 10.7 percent, respectively).

H.1. Percentage of feedlots that used electronic record-keeping systems to store production and/or animal health information, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
10.7	(1.4)	31.9	(4.5)	49.3	(5.9)	79.7	(7.5)	19.8	(1.4)

A higher percentage of feedlots in the Central region (37.3 percent) used electronic record-keeping systems to store production and/or animal health information compared with feedlots in the Midwest and East regions (16.0 and 10.5 percent, respectively).

H.2. Percentage of feedlots that used electronic record-keeping systems to store production and/or animal health information, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
22.4	(3.9)	37.3	(4.1)	16.0	(2.1)	10.5	(2.2)

For feedlots that used electronic record-keeping systems to store production and/or animal health information, a similar percentage of feedlots used commercially available software designed for use in feedlots (40.9 percent) or general spreadsheet or database software (43.5 percent). A lower percentage of small feedlots (20.0 percent) used commercially available software compared with medium, large, or very large feedlots (50.5, 49.6, and 68.4 percent, respectively). A higher percentage of small feedlots (67.7 percent) used general spreadsheet or database software compared with large or very large feedlots (30.0 and 5.2 percent, respectively).

H.3. For the 19.8 percent of feedlots that used electronic record-keeping systems to store production and/or animal health information (Table H.1.), percentage of feedlots by primary type of record-keeping system, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Electronic record-keeping system	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Commercially available software designed for use in feedlots (e.g., Turnkey, Micro-Technologies, Hi-Plains)	20.0	(5.4)	50.5	(8.9)	49.6	(7.7)	68.4	(8.1)	40.9	(3.9)
Custom software, specifically designed for use by consulting practice or by this feedlot	9.1	(4.3)	7.9	(4.4)	18.0	(6.0)	17.2	(5.8)	11.7	(2.5)
Other spreadsheet or general database software (e.g., Microsoft Excel or Access)	67.7	(6.7)	38.7	(8.6)	30.0	(6.9)	5.2	(2.2)	43.5	(4.1)
Other	3.2	(3.1)	2.9	(2.8)	2.5	(2.4)	9.2	(8.3)	3.9	(2.0)
Total	100.0		100.0		100.0		100.0		100.0	

For feedlots that used electronic record-keeping systems to store production and/or animal health information, a lower percentage of feedlots in the Central region (24.9 percent) used general spreadsheet or database software compared with feedlots in the East region (74.2 percent).

H.4. For the 19.8 percent of feedlots that used electronic record-keeping systems to store production and/or animal health information (Table H.1.), percentage of feedlots by primary type of record-keeping system, and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Electronic record-keeping system	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Commercially available software designed for use in feedlots (e.g., Turnkey, Micro-Technologies, Hi-Plains)	39.6	(9.1)	53.2	(6.7)	36.5	(6.8)	18.0	(8.8)
Custom software, specifically designed for use by consulting practice or by this feedlot	5.2	(2.2)	18.1	(5.1)	9.8	(4.4)	7.8	(6.2)
Other spreadsheet or general database software (e.g., Microsoft Excel or Access)	46.0	(9.8)	24.9	(6.2)	51.3	(7.3)	74.2	(10.0)
Other	9.1	(6.7)	3.8	(3.7)	2.4	(2.3)	0.0	(—)
Total	100.0		100.0		100.0		100.0	

For feedlots that used electronic record-keeping systems to store production and/or animal health information, a lower percentage of feedlots (36.0 percent) viewed comparing their feedlot to other feedlots as a very important use of the electronic record-keeping system compared with comparing current information to historical information for their feedlot, determining and recording when animals have completed antibiotic withdrawal periods, tracking production, and tracking economic records (64.5, 68.1, 75.4, and 73.9 percent of feedlots, respectively).

H.5. For the 19.8 percent of feedlots that used electronic record-keeping systems to store production and/or animal health information (Table H.1.), percentage of feedlots by importance of the electronic record-keeping systems for the following tasks:

Percent Feedlots

Importance

	Very Important		Somewhat Important		Not Important		Total
Task	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**
Comparing this feedlot to other feedlots	36.0	(3.8)	30.7	(3.8)	33.3	(3.8)	100.0
Comparing current information to historical information for this feedlot	64.5	(3.9)	23.5	(3.3)	12.0	(2.8)	100.0
Determining and recording when animals have completed antibiotic withdrawal periods	68.1	(3.7)	17.3	(3.0)	14.6	(3.0)	100.0
Tracking production	75.4	(3.5)	17.7	(3.1)	6.9	(2.3)	100.0
Tracking economic records	73.9	(3.7)	18.5	(3.3)	7.6	(2.3)	100.0

For feedlots that used electronic record-keeping systems to store production and/or animal health information, most feedlots (85 percent or greater) reported that comparing current information to historical information for their feedlot, determining and recording when animals have completed antibiotic withdrawal periods, tracking production, and tracking economic records were at least somewhat important tasks accomplished by the electronic record-keeping system.

H.6. For the 19.8 percent of feedlots that used electronic record-keeping systems to store production and/or animal health information (Table H.1.), percentage of feedlots that reported that their electronic record-keeping systems were at least somewhat important for the following tasks, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Task	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Comparing this feedlot to other feedlots	51.3	(7.2)	74.7	(7.2)	70.8	(6.6)	85.9	(3.5)	66.7	(3.8)
Comparing current information to historical information for this feedlot	75.5	(6.3)	96.1	(2.7)	93.9	(2.7)	97.9	(1.2)	88.0	(2.8)
Determining and recording when animals have completed antibiotic withdrawal periods	71.7	(6.6)	95.9	(1.9)	87.7	(5.2)	98.3	(1.2)	85.4	(3.0)
Tracking production	89.7	(4.6)	94.9	(4.4)	92.6	(4.6)	99.1	(0.6)	93.1	(2.3)
Tracking economic records	90.9	(3.9)	91.7	(5.3)	92.2	(4.6)	97.6	(1.4)	92.4	(2.3)

For feedlots that used electronic record-keeping systems to store production and/or animal health information, a lower percentage of feedlots in the Midwest region (78.4 percent) reported that comparing current information to historical information for the feedlot was at least somewhat important compared with feedlots in the East region (96.9 percent).

H.7. For the 19.8 percent of feedlots that used electronic record-keeping systems to store production and/or animal health information (Table H.1.), percentage of feedlots that reported that their electronic record-keeping systems were at least somewhat important for the following tasks, by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Task	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Comparing this feedlot to other feedlots	55.7	(9.9)	80.9	(4.7)	60.5	(7.0)	58.3	(11.3)
Comparing current information to historical information for this feedlot	86.0	(6.9)	94.9	(3.7)	78.4	(5.9)	96.9	(2.1)
Determining and recording when animals have completed antibiotic withdrawal periods	79.3	(8.8)	93.2	(3.4)	84.4	(5.2)	74.2	(9.7)
Tracking production	84.0	(8.5)	96.6	(2.4)	92.6	(3.9)	98.4	(1.5)
Tracking economic records	91.0	(6.4)	93.2	(3.4)	92.5	(3.9)	91.8	(6.4)

I. Beef Quality Assurance

Beef Quality Assurance (BQA) is a national program designed to raise consumer confidence through proper management techniques and a commitment to quality within every segment of the beef industry. BQA's mission is to guide producers towards continuous improvement using science-based production practices that assure cattle well-being, beef quality, and safety. BQA programming focuses on educating and training cattle producers, farm advisors, and veterinarians on preventing issues in cattle food safety and quality through promotion of best practices and principles in cattle handling, facility management, cattle transportation, record keeping, and protecting herd health. It also provides tools for developing animal care and training protocols in addition to verifying and documenting animal husbandry practices.

The BQA program combines scientific knowledge with accepted husbandry techniques to raise cattle under optimal management and environmental conditions. A primary objective of the program is promotion of sound management practices that improve animal welfare, human safety, and safety and quality of beef animals, while recognizing that management practices affect consumers' view of the beef industry as well as their acceptance of beef. The BQA program is executed through a State and National partnership to create standardized educational opportunities. Producers can obtain BQA certification by completing several hours of training, in person or online, and are required to recertify every 3 years.

Nearly three-fourths (73.4 percent) of feedlots had a representative from the feedlot attend or complete a Beef Quality Assurance (BQA) meeting or training session (online, National, State, or local) in the last 5 years. A higher percentage of medium feedlots (86.0 percent) had a representative complete a BQA meeting or training session in the last 5 years compared with small feedlots (69.6 percent).

I.1. Percentage of feedlots that had a representative from the feedlot attend or complete a Beef Quality Assurance (BQA) meeting or training session (online, National, State, or local) in the last 5 years, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Attended or completed BQA meeting or training	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Yes	69.6	(2.1)	86.0	(3.2)	74.6	(4.8)	86.5	(6.5)	73.4	(1.7)
No	24.8	(2.0)	10.0	(2.7)	11.6	(3.2)	2.4	(1.4)	20.4	(1.5)
Don’t know	5.6	(1.0)	4.0	(1.9)	13.7	(4.1)	11.1	(6.5)	6.2	(0.9)
Total	100.0		100.0		100.0		100.0		100.0	

There were no regional differences in the percentage of feedlots that had a representative from the feedlot attend or complete a Beef Quality Assurance (BQA) meeting or training session (online, National, State, or local) in the last 5 years.

I.2. Percentage of feedlots that had a representative from the feedlot attend or complete a Beef Quality Assurance (BQA) meeting or training session (online, National, State, or local) in the last 5 years, by region:

Percent Feedlots

Region

Attended or completed BQA meeting or training	West		Central		Midwest		East	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Yes	65.0	(4.9)	77.3	(3.8)	78.1	(2.5)	67.5	(3.3)
No	28.6	(4.7)	14.1	(3.2)	16.8	(2.3)	26.4	(3.1)
Don’t know	6.4	(2.5)	8.6	(2.7)	5.0	(1.2)	6.1	(1.6)
Total	100.0		100.0		100.0		100.0	

A BQA Feedyard Assessment is an onsite educational tool that allows for assessing and benchmarking key indicators of animal care and welfare as well as feedyard conditions. The assessment has areas of focus covering animal health records, animal handling observations, animal health and employee training protocols, and facilities/equipment evaluation. It was developed to be in close alignment with commonly used feedyard audit tools. Assessments might be utilized as a self-assessment, completed by a second party (i.e., consulting veterinarian, nutritionist, feedyard staff, extension personnel, BQA coordinator, other resource team member), or conducted by a third-party assessor. It is recommended that the BQA Feedyard Assessment be repeated on a periodic basis.

About a quarter (27.9 percent) of feedlots participated in a Beef Quality Assurance (BQA) Feedyard Assessment in the last 5 years. A higher percentage of very large feedlots (71.6 percent) participated in a Beef Quality Assurance (BQA) Feedyard Assessment in the last 5 years compared with large, medium, and small feedlots (40.9, 39.2, and 21.6 percent, respectively).

I.3. Percentage of feedlots that participated in a Beef Quality Assurance (BQA) Feedyard Assessment in the last 5 years, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Participated in BQA Feedyard Assessment	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	21.6	(1.9)	39.2	(4.6)	40.9	(5.3)	71.6	(7.1)	27.9	(1.7)
No	63.1	(2.2)	49.1	(4.7)	32.2	(5.0)	8.8	(2.4)	56.3	(1.9)
Don’t know	15.3	(1.7)	11.7	(3.1)	26.8	(5.1)	19.6	(7.3)	15.8	(1.4)
Total	100.0		100.0		100.0		100.0		100.0	

A higher percentage of feedlots in the Central region (36.6 percent) participated in a Beef Quality Assurance (BQA) Feedyard Assessment in the last 5 years compared with feedlots in the West region (18.1 percent).

I.4. Percentage of feedlots that participated in a Beef Quality Assurance (BQA) Feedyard Assessment in the last 5 years, by region:

Percent Feedlots

Region

	West		**Central**		**Midwest**		**East**	
Participated in BQA Feedyard Assessment	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	18.1	(3.9)	36.6	(4.1)	30.7	(2.7)	22.9	(2.9)
No	59.9	(5.1)	47.9	(4.4)	53.2	(2.9)	66.2	(3.3)
Don’t know	22.0	(4.4)	15.4	(3.3)	16.1	(2.1)	11.0	(2.2)
Total	100.0		100.0		100.0		100.0	

J. Use of a Veterinarian

1. Any use of a veterinarian

Veterinarians are involved in disease prevention and diagnosis on feedlots. Veterinarians can help producers select appropriate antibiotics and educate them on their appropriate and judicious use. Most feedlots (85.1 percent) used the services of a veterinarian in calendar year 2020. A lower percentage of small feedlots (81.2 percent) used a veterinarian in calendar year 2020 compared with medium, large, and very large feedlots (93.1, 97.2, and 99.2 percent, respectively). For the purposes of this report, use of a veterinarian could mean the veterinarian was physically present on the feedlot, and it could also mean the veterinarian was consulted by telephone, video conference, or at a veterinary clinic where the veterinarian was not present on the feedlot.

J.1.a. Percentage of feedlots that used the services of a veterinarian in calendar year 2020, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Used the services of a veterinarian	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	81.2	(1.7)	93.1	(2.6)	97.2	(1.5)	99.2	(0.7)	85.1	(1.3)
No	18.8	(1.7)	6.9	(2.6)	2.8	(1.5)	0.8	(0.7)	14.9	(1.3)
Total	100.0		100.0		100.0		100.0		100.0	

A higher percentage of feedlots in the West and Central regions (90.8 and 90.5 percent, respectively) used a veterinarian in 2020 compared with feedlots in the East region (77.0 percent).

J.1.b. Percentage of feedlots that used the services of a veterinarian in calendar year 2020, by region:

Percent Feedlots

Region

	West		**Central**		**Midwest**		**East**	
Used the services of a veterinarian	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Yes	90.8	(3.0)	90.5	(2.8)	84.7	(2.1)	77.0	(3.0)
No	9.2	(3.0)	9.5	(2.8)	15.3	(2.1)	23.0	(3.0)
Total	100.0		100.0		100.0		100.0	

For the 14.9 percent of feedlots that did not use a veterinarian in calendar year 2020, the vast majority (90.7 percent) reported they did not need a veterinarian.

J.1.c. For the 14.9 percent of feedlots that did not use a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by primary reason for not using a veterinarian:

Percent Feedlots

Reason

Veterinarian available in the local area but not knowledgeable about beef cattle		Veterinarian not available in the local area		Too expensive		Not needed		Other		Total	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
1.3	(1.3)	3.0	(1.8)	3.8	(1.9)	90.7	(3.0)	1.2	(1.2)	100.0	

2. Type of veterinarian used

For feedlots that used a veterinarian in 2020, about half (50.7 percent) used a private veterinary clinic or consulting practice **not** making routine visits but called as needed. A higher percentage of very large feedlots (71.0 percent) used a private veterinary clinic or consulting practice making routine visits and called as needed as their primary veterinarian compared with large, medium, and small feedlots (34.6, 42.3, and 33.7 percent, respectively).

J.2.a. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by type of primary veterinarian used, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Type of veterinarian	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
Full-time veterinarian on staff*	13.0	(1.7)	12.7	(3.2)	8.5	(2.6)	7.7	(2.3)	12.3	(1.4)
Private veterinary clinic or consulting practice making routine visits and called as needed	33.7	(2.4)	42.3	(4.9)	34.6	(5.8)	71.0	(5.5)	37.0	(2.0)
Private veterinary clinic or consulting practice **not** making routine visits but called as needed	53.4	(2.6)	44.8	(4.9)	56.9	(6.0)	21.3	(5.1)	50.7	(2.1)
Other	0.0	(—)	0.3	(0.2)	0.0	(—)	0.0	(—)	0.0	(0.0)
Total	100.0		100.0		100.0		100.0		100.0	

* Includes if the owner of the feedlot is a veterinarian.

For feedlots that used a veterinarian in 2020, there were no regional differences in the type of primary veterinarian used.

J.2.b. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by type of primary veterinarian used, and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Type of veterinarian	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Full-time veterinarian on staff*	11.3	(3.3)	13.0	(3.1)	12.5	(2.2)	12.2	(2.6)
Private veterinary clinic or consulting practice making routine visits and called as needed	36.2	(5.4)	39.7	(4.4)	36.7	(3.1)	35.5	(3.9)
Private veterinary clinic or consulting practice **not** making routine visits but called as needed	52.2	(5.6)	47.3	(4.6)	50.8	(3.3)	52.3	(4.0)
Other	0.3	(0.3)	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0		100.0	

* Includes if the owner of the feedlot is a veterinarian.

3. Numbers of visits and consultations with a veterinarian

For feedlots that used a veterinarian in 2020, a veterinarian was physically present on the feedlot an average of 7.9 times and a median of 2.5 times during the year. In some cases, the owner of the feedlot was a veterinarian, and then the number of visits during the year could be very large. Thus, the median is probably a better measure of the number of times a veterinarian was present on the feedlot in 2020. A veterinarian was present on the feedlot for a higher median number of visits on very large feedlots (14.0 visits) compared with small, medium, and large feedlots (1.8, 4.9, and 5.5 visits, respectively). In addition, a veterinarian was present on the feedlot for a higher median number of visits on large and medium feedlots (4.9, and 5.5 visits, respectively) compared with small feedlots (1.8 visits).

Differences between average and median: An average (or mean) is the sum of the numbers in a data set divided by the number of data points. A median is the middle number in a data set when all the numbers are ordered sequentially. For example, the average of 1, 4, 10 is 5 while the median of these numbers is 4. The median can be preferable to the average when a data set contains extreme values (outliers). For example, if homes in a neighborhood sold for $275,000, $325,000, $375,000, $425,000, and $1,200,000, the average selling cost is $520,000 while the median cost is $375,000. In this case (with a limited data set), the median value is a better estimate of home prices in the neighborhood because the extreme value of $1,200,000 inflates the average value.

J.3.a. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), average and median number of times a veterinarian was physically present on the feedlot, by feedlot capacity:

Average/Median Number of Visits

Feedlot capacity (number head)

Measure	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
Average	5.4	(1.2)	12.1	(4.2)	11.3	(2.0)	24.9	(3.3)	7.9	(1.2)
Median	1.8	(0.1)	4.9	(0.6)	5.5	(1.2)	14.0	(1.8)	2.5	(0.2)

For feedlots that used a veterinarian in 2020, there were no regional differences in the median number of visits by a veterinarian in calendar year 2020.

J.3.b. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), average and median number of times a veterinarian was physically present on the feedlot, by region:

Average/Median Number of Visits

Region

Measure	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
Average	5.5	(1.0)	14.5	(4.5)	6.6	(1.5)	6.8	(2.5)
Median	2.3	(0.4)	3.5	(0.6)	2.5	(0.3)	1.9	(0.2)

For feedlots that used a veterinarian in 2020, a veterinarian was present on the feedlot 1–3 times during 2020 on the majority of feedlots (52.0 percent). Feedlots could have used the services of a veterinarian in 2020 by consulting with them over the phone or at a veterinary clinic without the veterinarian being physically present on the feedlot, which may explain why on some feedlots the veterinarian visited the feedlot zero times.

J.3.c. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by number of times a veterinarian was physically present on the feedlot, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Number of visits	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
0	6.7	(1.4)	2.1	(1.3)	2.2	(1.5)	0.0	(—)	5.2	(1.0)
1–3	62.8	(2.6)	32.6	(4.8)	26.9	(5.8)	4.7	(2.0)	52.0	(2.1)
4–9	22.6	(2.3)	29.0	(4.7)	31.6	(5.6)	18.6	(5.7)	24.4	(1.9)
10–29	6.7	(1.3)	33.8	(4.9)	28.6	(5.4)	52.2	(5.6)	15.3	(1.5)
30 or more	1.2	(0.6)	2.5	(1.5)	10.7	(4.5)	24.5	(4.3)	3.1	(0.6)
Total	100.0		100.0		100.0		100.0		100.0	

For feedlots that used a veterinarian in 2020, a veterinarian was present on the feedlot 1–3 times during 2020 on a higher percentage of feedlots in the East region (67.9 percent) compared with feedlots in the Central and Midwest regions (44.2 and 47.0 percent, respectively).

J.3.d. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by number of times a veterinarian was physically present on the feedlot, and by region:

Percent Feedlots

Region

	West		Central		Midwest		East	
Number of visits	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
0	5.2	(2.7)	1.5	(1.3)	8.5	(1.9)	1.6	(1.2)
1–3	53.9	(5.8)	44.2	(5.0)	47.0	(3.3)	67.9	(4.0)
4–9	25.7	(5.1)	23.1	(4.2)	27.1	(3.0)	18.6	(3.3)
10–29	14.2	(3.7)	22.4	(3.7)	15.1	(2.3)	10.2	(2.6)
30 or more	0.9	(0.5)	8.8	(2.3)	2.3	(0.9)	1.6	(1.2)
Total	100.0		100.0		100.0		100.0	

For feedlots that used a veterinarian in 2020, medium, large, and very large feedlots were in contact with a veterinarian by a means other than in person (e.g., by telephone, video conference, or data transfer) for a higher median number of times (8.2, 9.2, and 13.6 times, respectively) compared with small feedlots (1.8 times).

J.3.e. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), average and median number of times the feedlot was in contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer), by feedlot capacity:

Average/Median Number of Contacts

Feedlot capacity (number head)

	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Average	4.6	(0.5)	11.0	(1.2)	16.8	(2.7)	29.0	(4.3)	7.6	(0.5)
Median	1.8	(0.2)	8.2	(1.0)	9.2	(1.4)	13.6	(2.1)	3.0	(0.3)

For feedlots that used a veterinarian in 2020, feedlots in the Central region were in contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) for a higher median number of times (4.9 times) compared with feedlots in the East region (1.6 times).

J.3.f. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), average and median number of times the feedlot was in contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer), by region:

Average/Median Number of Contacts

Region

	West		**Central**		**Midwest**		**East**	
Measure	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
Average	6.8	(1.1)	13.4	(1.7)	6.9	(0.7)	5.1	(0.8)
Median	3.2	(0.6)	4.9	(1.2)	2.9	(0.5)	1.6	(0.3)

For feedlots that used a veterinarian in 2020, the number of contacts with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) varied widely, with between 20.2 to 29.5 percent of feedlots having a number of contacts other than in person from 0 to 29 times.

J.3.g. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by number of times the feedlot was in contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer), and by feedlot capacity:

	Percent Feedlots									
	Feedlot capacity (number head)									
	Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Number of contacts	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
0	24.1	(2.3)	14.6	(3.6)	8.1	(2.2)	3.4	(1.3)	20.2	(1.7)
1–3	37.7	(2.6)	10.9	(2.9)	13.9	(4.7)	4.6	(2.2)	29.5	(2.0)
4–9	24.8	(2.4)	23.0	(4.5)	26.1	(6.0)	19.7	(6.6)	24.4	(1.9)
10–29	11.4	(1.6)	43.6	(5.2)	34.5	(5.9)	43.7	(5.6)	20.5	(1.7)
30 or more	2.0	(0.8)	7.8	(2.7)	17.4	(5.2)	28.6	(4.9)	5.3	(0.9)
Total	100.0		100.0		100.0		100.0		100.0	

For feedlots that used a veterinarian in 2020, a higher percentage of feedlots in the East region (28.3 percent) than in the Central region (12.0 percent) had zero contacts with a veterinarian other than in person (for example, by telephone, video conference, or data transfer). A higher percentage of feedlots in the Central region (12.4 percent) than in the East region (2.6 percent) had 30 or more contacts with a veterinarian other than in person (for example, by telephone, video conference, or data transfer).

J.3.h. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots by number of times the feedlot was in contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer), and by region:

	Percent Feedlots							
	Region							
	West		**Central**		**Midwest**		**East**	
Number of contacts	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
0	16.3	(4.4)	12.0	(3.3)	21.2	(2.7)	28.3	(3.9)
1–3	32.6	(5.6)	20.7	(4.5)	29.5	(3.1)	34.4	(4.0)
4–9	28.5	(5.5)	27.2	(4.8)	24.1	(2.9)	19.3	(3.3)
10–29	19.1	(4.2)	27.8	(4.4)	20.7	(2.7)	15.5	(2.9)
30 or more	3.5	(1.9)	12.4	(3.1)	4.5	(1.3)	2.6	(1.5)
Total	100.0		100.0		100.0		100.0	

4. Change in use of a veterinarian due to COVID-19

For feedlots that used a veterinarian in 2020, a higher percentage of very large feedlots (27.4 percent) than small, medium, or large feedlots (8.3, 8.5, and 9.5 percent, respectively) had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects.

J.4.a. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots that had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
8.3	(1.4)	8.5	(3.0)	9.5	(3.8)	27.4	(5.6)	9.3	(1.2)

For feedlots that used a veterinarian in 2020, there were no regional differences in the percentage of feedlots that had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects.

J.4.b. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots that had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
7.4	(2.9)	12.7	(3.1)	8.0	(1.7)	10.2	(2.5)

For feedlots that had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects, about two-thirds of feedlots (64.9 percent) had a veterinarian physically present on the feedlot fewer times in 2020 compared to 2019 due to COVID-19 or its effects.

J.4.c. For feedlots that had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects (Table J.4.a.)*, percentage of feedlots by change in the number of physical visits, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Change in physical visits	Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
More than 2019	36.8	(8.5)	48.5	(18.2)	22.5	(11.4)	16.7	(6.5)	35.1	(6.4)
Fewer than 2019	63.2	(8.5)	51.5	(18.2)	77.5	(11.4)	83.3	(6.5)	64.9	(6.4)
Total	100.0		100.0		100.0		100.0		100.0	

* Refers to the 7.9 percent of feedlots overall that had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects. This estimate comes from the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), of which 9.3 percent had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects (Table J.4.a.), or 7.9 percent of feedlots overall (85.1*.093=7.9).

For feedlots that had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects, there were no regional differences in the percentage of feedlots that had a veterinarian physically present on the feedlot more or fewer times in 2020 compared to 2019 due to COVID-19 or its effects.

J.4.d. For feedlots that had a veterinarian physically present on the feedlot a different number of times in 2020 than in 2019 due to COVID-19 or its effects (Table J.4.a.)*, percentage of feedlots by change in the number of physical visits, and by region:

Percent Feedlots

Region

Change in physical visits	West		Central		Midwest		East	
	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
More than 2019	30.4	(18.7)	17.7	(8.8)	39.8	(11.0)	50.5	(12.8)
Fewer than 2019	69.6	(18.7)	82.3	(8.8)	60.2	(11.0)	49.5	(12.8)
Total	100.0		100.0		100.0		100.0	

* Refers to the 7.9 percent of feedlots overall that had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects. This estimate comes from the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), of which 9.3 percent had a veterinarian physically present on the feedlot in 2020 a different number of times than in 2019 due to COVID-19 or its effects (Table J.4.a.), or 7.9 percent of feedlots overall (85.1*.093=7.9).

For feedlots that used a veterinarian in 2020, a higher percentage of very large feedlots (19.4 percent) than small feedlots (6.8 percent) had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in 2020 than in 2019 due to COVID-19 or its effects.

J.4.e. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots that had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects, by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Small (50–499)		**Medium** (500–999)		**Large** (1,000–4,999)		**Very Large** (5,000 or more)		**All feedlots**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
6.8	(1.3)	11.3	(3.4)	7.8	(3.5)	19.4	(3.9)	8.2	(1.1)

For feedlots that used a veterinarian in 2020, there were no regional differences in the percentage of feedlots that had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in 2020 than in 2019 due to COVID-19 or its effects.

J.4.f. For the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), percentage of feedlots that had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects, by region:

Percent Feedlots

Region

West		**Central**		**Midwest**		**East**	
Pct.	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**	**Pct.**	**Std. error**
11.8	(3.7)	8.1	(2.2)	6.3	(1.6)	9.3	(2.3)

For feedlots that had contact with a veterinarian other than in person a different number of times in 2020 than in 2019 due to COVID-19 or its effects, 59.9 percent had contact with a veterinarian other than in person more times in 2020 compared to 2019 due to COVID-19 or its effects.

J.4.g. For feedlots that had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects (Table J.4.e.)*, percentage of feedlots by change in the number of contacts, and by feedlot capacity:

Percent Feedlots

Feedlot capacity (number head)

Change in contacts	Small (50–499) Pct.	Std. error	Medium (500–999) Pct.	Std. error	Large (1,000–4,999) Pct.	Std. error	Very Large (5,000 or more) Pct.	Std. error	All feedlots Pct.	Std. error
More than 2019	49.7	(9.7)	72.0	(15.6)	82.9	(10.1)	72.1	(8.5)	59.9	(7.2)
Fewer than 2019	50.3	(9.7)	28.0	(15.6)	17.1	(10.1)	27.9	(8.5)	40.1	(7.2)
Total	100.0		100.0		100.0		100.0		100.0	

* Refers to the 7.0 percent of feedlots overall that had contact with a veterinarian other than in person a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects. This estimate comes from the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), of which 8.2 percent had contact with a veterinarian other than in person in 2020 a different number of times than in 2019 due to COVID-19 or its effects (Table J.4.e.), or 7.0 percent of feedlots overall (85.1*.082=7.0).

For feedlots that had contact with a veterinarian other than in person a different number of times in 2020 than in 2019 due to COVID-19 or its effects, there were no regional differences in the percentage of feedlots by change in the number of contacts in 2020 compared to 2019 due to COVID-19 or its effects.

J.4.h. For feedlots that had contact with a veterinarian other than in person (for example, by telephone, video conference, or data transfer) a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects (Table J.4.e.)*, percentage of feedlots by change in the number of contacts, and by region:

Percent Feedlots

Region

Change in contacts	West Pct.	Std. error	Central Pct.	Std. error	Midwest Pct.	Std. error	East Pct.	Std. error
More than 2019	58.6	(16.9)	62.0	(14.6)	52.5	(13.2)	69.3	(12.1)
Fewer than 2019	41.4	(16.9)	38.0	(14.6)	47.5	(13.2)	30.7	(12.1)
Total	100.0		100.0		100.0		100.0	

* Refers to the 7.0 percent of feedlots overall that had contact with a veterinarian other than in person a different number of times in calendar year 2020 than in 2019 due to COVID-19 or its effects. This estimate comes from the 85.1 percent of feedlots that used a veterinarian in calendar year 2020 (Table J.1.a.), of which 8.2 percent had contact with a veterinarian other than in person in 2020 a different number of times than in 2019 due to COVID-19 or its effects (Table J.4.e.), or 7.0 percent of feedlots overall (85.1*.082=7.0).

K. Impact of the Veterinary Feed Directive Rule

On January 1, 2017, the U.S. Food and Drug Administration (FDA) implemented Guidance for Industry (GFI) #213 revising the Veterinary Feed Directive (VFD) rule. Regarding this rule change, producers were asked to indicate how strongly they agreed or disagreed with the following statement:

> *On January 1, 2017, I felt I had all the resources (e.g., access to veterinarians knowledgeable about the VFD, training, finances) necessary to manage the VFD rule change on this feedlot.*

About two-thirds (64.2 percent) of feedlots strongly agreed or agreed with the statement above regarding the VFD rule.

K.1. Percentage of feedlots by level of agreement with the statement above regarding the VFD rule:

Percent Feedlots												
Level of Agreement												
Strongly agree		Agree		Neither agree nor disagree		Disagree		Strongly disagree		Not in business Jan. 1, 2017		
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Total
18.6	(1.5)	45.6	(1.9)	19.8	(1.5)	8.3	(1.1)	4.9	(0.9)	2.8	(0.6)	100.0

For feedlots that were in business on January 1, 2017, there were no differences by feedlot capacity in the percentage of feedlots that strongly agreed or agreed with the statement above regarding the VFD rule.

K.2. For the 97.2 percent of feedlots that were in business on January 1, 2017 (Table K.1.), percentage of feedlots that strongly agreed or agreed with the statement above regarding the VFD rule, by feedlot capacity:

Percent Feedlots									
Feedlot capacity (number head)									
Small (50–499)		Medium (500–999)		Large (1,000–4,999)		Very Large (5,000 or more)		All feedlots	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
64.3	(2.2)	70.9	(4.3)	65.2	(5.3)	78.6	(5.1)	66.1	(1.8)

For feedlots that were in business on January 1, 2017, a higher percentage of feedlots in the Midwest region (70.0 percent) strongly agreed or agreed with the statement above regarding the VFD rule compared with feedlots in the West region (52.5 percent).

K.3. For the 97.2 percent of feedlots that were in business on January 1, 2017 (Table K.1.), percentage of feedlots that strongly agreed or agreed with the statement above regarding the VFD rule, by region:

Percent Feedlots

Region

West		Central		Midwest		East	
Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error
52.5	(5.5)	71.8	(4.2)	70.0	(2.7)	63.6	(3.5)

Section II: Methodology

A. Needs Assessment

NAHMS develops study objectives by exploring existing literature and contacting industry members about their informational needs and priorities during a needs-assessment phase. A driving force of the needs assessment was the desire of NAHMS to receive as much input as possible from a variety of operators, as well as from industry experts and representatives, veterinarians, extension specialists, universities, cattle organizations, allied industry groups, and other stakeholders. Information was collected via a needs assessment survey.

The objective of the needs assessment survey for the NAHMS Health Management on U.S. Feedlots 2021 study was to identify critical information needs concerning cattle management and health on feedlots. The online survey gathered opinions from a variety of stakeholders regarding beef feedlot management priorities, health priorities, antimicrobial stewardship, industry burdens, and participation incentives for the study. The survey was available online from March 19 through April 30, 2019. The online questionnaire was distributed via email lists and stakeholder announcements. All individuals involved in the cattle industry were encouraged to participate, regardless of cattle ownership. In total, 206 individuals from 36 States completed the study's needs assessment survey.

Respondents to the needs assessment survey represented the following affiliations:

- Veterinary practitioners or consultants—42 percent of respondents.
- Beef producers (feedlot owners/managers, cow-calf producers)—27 percent of respondents.
- Government and university employees—21 percent of respondents.
- Other affiliation—10 percent of respondents.

Based on input from the needs assessment, reviews from the scientific literature, and input from government and industry researchers, primary study objectives were identified:

1. Describe health management practices on U.S. feedlots with 50 or more head
2. Estimate the prevalence of important feedlot cattle diseases
3. Describe antibiotic use and stewardship practices on U.S. feedlots
4. Describe trends in feedlot cattle health management practices and important feedlot cattle diseases

B. Sampling and Estimation

1. State selection

The goal for NAHMS national studies is to include states that account for at least 70 percent of the animals and operations being studied. This method helps to ensure that the representation of the sample collected, and the statistical inferences made based on the sample data, can be generalized to the target population.

States were selected for inclusion in the study based on the number of feedlots and the number of cattle in two capacity categories: small feedlots (50 to 999 head capacity) and large feedlots (1,000 or more head capacity). Small feedlots were selected from 18 States and large feedlots from 17 States.

Of the 18 States chosen for the small component, 5 (Indiana, Michigan, Ohio, Pennsylvania, and Wisconsin) were chosen only for the small component, and 13 (California, Colorado, Idaho, Illinois, Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, South Dakota, Texas, and Wyoming) were chosen for both the small and large components. Of the 17 States chosen for the large component, 4 were chosen only for the large component (Montana, Oklahoma, Utah, and Washington), and the 13 previously mentioned States were chosen for both the large and small components.

2. Feedlot selection

The list frame from which feedlots were sampled is managed by NASS and was updated with information from the 2017 Census of Agriculture prior to sample selection. Within each State, a stratified random sample was selected in which strata were defined by cattle on feed inventory. For small feedlots, a total sample of 3,165 feedlots was selected. All large feedlots (2,177) with 1,000 or more head inventories on the NASS list frame in the 17 participating States were selected.

For the small component of the study, the total sample size was computed to achieve prespecified precision criteria at the 95-percent confidence level, while accounting for the estimated population size, design effect, and expected response rate. The sample size was allocated to strata approximately proportional to feedlot capacity, based on a weighted average number of feedlots and the total inventory within the strata. For the large component of the study, there was no sample selection because all 2,177 feedlots with 1,000 or more head capacity in the 17 participating States were selected. This sampling design allows for logistical efficiencies in administering the survey and prespecified precision for estimates.

3. Population inferences

The 18 States for the small component accounted for at least 95.7 percent of the inventory on feedlots with 50 to 999 head and 94.0 percent of feedlots with 50 to 999 head. The 17 States for the large component accounted for at least 95.5 percent of the cattle on feed on feedlots with 1,000 or more head inventories, and 94.4 percent of feedlots with 1,000 or more head inventory.

SUDAAN software (RTI, version 11.0.4) was used to produce population estimates and their standard errors. The SUDAAN software allows estimation of standard errors for complex sampling designs using Taylor series linearization.

a. Phase I: Health Management on U.S. Feedlots 2021 Phase I questionnaire

To construct the Phase I survey weights, the inverse of the probability of selection (with probabilities being approximately proportional to stratum size) was used as the initial weight. Nonresponse was accounted for using an additional adjustment according to the proportion of nonrespondents within each stratum, using a propensity score model. Calibration to population totals was performed using information available for respondents and nonrespondents.

Estimates for Phase I represent 38.5 percent of feedlots in the 22 participating States (18 States for the 50 to 999 head small component and 17 States for the 1,000 or more head large component, with most

states participating in both the small and large components), after taking into account the survey design and weighting (see Section II.E.1. for more information on the calculation of the weighted response rate).

C. Data Collection

1. Phase I: Health Management on U.S. Feedlots 2021 Phase I questionnaire

Due to restrictions in place to prevent the spread of COVID-19, interviews took place over the telephone or through a web survey, rather than the in-person interviews around which the study was originally designed.

From March 1 through April 30, 2021, producers completed the Health Management on U.S. Feedlots 2021 Phase I questionnaire via a self-administered paper survey sent through the mail, a self-administered web survey, or a telephone interview with a NASS enumerator. Producers were provided with a phone number to a NASS enumerator and with a supplemental sheet to help them answer questions on the survey. The interview took an average of 58 minutes to complete.

Upon completion of the interview, producers were asked to provide consent to allow NASS to turn contact information over to APHIS for the opportunity to participate in Phase II of the study. This completed Phase I of the study. NASS provided the list of producers willing to participate in the second phase of the study to NAHMS so that NAHMS coordinators in each state could begin contacting consenting producers for Phase II of the study. Results from the Phase II questionnaire will be reported in future publications.

D. Data Analysis

1. Validation

Data were entered by NASS staff into a SAS data file and checked for validity. NAHMS staff independently performed data validation checks on the data set to identify consistency and statistical issues. Consistency issues include logical inconsistencies within a survey and were identified using summaries of responses to check for invalid responses (e.g., a response of ‘3’ for a 0/1 response variable); threshold checks (e.g., identifying invalid total sums of cattle on feed inventory); and, if-then checks (e.g., if all cattle were born and raised on the feedlot, then there should not be a source for added cattle).

Statistical issues were identified by investigating summary measures of responses for variables; extreme outliers were investigated by data analysts and subject-matter experts. Inconsistencies were identified using SAS software, and electronic questionnaire data was reviewed by data analysts and subject-matter experts. Identified inconsistencies were addressed using item-level imputation measures if appropriate values could be logically deduced.

2. Estimation and confidence interval calculations

Summarization and estimation were performed using SUDAAN software, which accounts for the stratified sampling study design. Confidence intervals were computed for estimate proportions, means, and ratios using the methods described in detail in the SUDAAN Language Manual for SUDAAN version 11[1] and described briefly here. For percentages, a logit transformation was used to enforce bounding of the confidence interval bounds between 0 and 1. Student’s *t* confidence interval bounds are computed on the logit scale and are then back transformed to the percentage scale. For means and ratios, standard Student’s *t* confidence intervals are computed directly on the scale of the data.

Estimates were generated by one analyst, and numbers and estimation code were reviewed by a second analyst, to ensure accurate reporting of estimates.

[1] Research Triangle Institute (2012). SUDAAN Language Manual, Volumes 1 and 2, Release 11. Research Triangle Park, NC: Research Triangle Institute.

E. Sample Evaluation

This section provides counts and percentages of feedlots by response category, which can be used to compute various measures of response. Historically, the term “response rate” was used as a catch-all parameter, but there are many ways to define and calculate response rates. Therefore, counts and percentages of feedlots by response code category are presented below so that response rates can be calculated according to the preferred definition of “response rate.”

Additionally, the Office of Management and Budget (OMB) has provided guidance regarding the calculation and reporting of response rates in their Standards and Guidelines for Statistical Surveys (2006), Section 3.2. The response rate advocated in the OMB guidance estimates the percentage of eligible feedlots that completed the questionnaire. The calculation of this specific response rate is presented for Phase I of the study below.

1. Phase I response rates

Of the 5,342 operations selected for participation, 1,300 were ineligible (no cattle on feed, out of business, backgrounder/stocker operation only, or otherwise out of scope). Of the 4,042 eligible operations, 1,967 were not contacted (office holds, purposefully not contacted, and inaccessible operations). Of the 2,075 eligible feedlots that were contacted, 1,025 (390 + 635) provided complete questionnaire data. Of those, 390 feedlots agreed to be contacted for the Phase II of the study.

Response category group label	Response category group	Response category	Number of operations	Percent operations	Weighted percent operations*
(a)	In-scope-complete	Completed Phase I interview, signed consent for Phase II	390	7.3	9.5
		Completed Phase I interview, refused consent for Phase II	635	11.9	14.6
(b)	In-scope-refused	Refused	1,050	19.7	16.7
(c)	Out of scope	Zero cattle on feed in calendar year 2020	155	2.9	2.9
		Out of business	274	5.1	6.8
		Backgrounder/stocker operation only	632	11.8	9.7
		Out of scope	239	4.5	5.0
(d)	Not contacted	Office hold	233	4.4	2.0
		Inaccessible	1,734	32.5	32.9
		Total	5,342	100.0	100.0

* Weighted percentages calculated using the initial sampling weights.

According to the OMB guidance, the response rate for this study would be calculated according to the following formula:

$$\frac{a}{(a+b)+\rho*(d)}$$

Letters $a, b,$ and d represent the counts (or percentages) of operations in each response-category group in the table above and ρ is the proportion of the noncontacted operations expected to be in-scope. Specifically,

$$\rho = \frac{(a+b)}{(a+b+c)} = \frac{2{,}075}{3{,}375} \approx 0.615$$

Thus, the OMB guidance-based response rate for Phase I of the NAHMS Health Management on U.S. Feedlots 2021 study is calculated as follows:

$$\frac{1{,}025}{2{,}075 + 0.615 * 1{,}967} \approx 0.312$$

Approximately 31.2 percent of eligible feedlots completed the Phase I questionnaire. The weighted OMB guidance-based response rate for Phase I of the NAHMS Health Management on U.S. Feedlots 2021 study is 38.5 percent (calculated using the initial sampling weights), which means that Phase I questionnaire information is available for approximately 38.5 percent of feedlots in the 22 participating States (18 States for the 50 to 999 head small component and 17 States for the 1,000 or more head large component, with most States participating in both the small and large components), after taking into account the survey design and weighting.

Additionally, due to the high number of operations that were not contacted, it is instructive to observe the cooperation rate (the American Association of Public Opinion Research's defined cooperation rate number 3)[2]. This rate is defined according to the following formula.

$$\frac{a}{(a+b)} = \frac{1{,}025}{2{,}075} \approx 0.494$$

Or approximately 49.4 percent of contacted eligible feedlots were willing to complete the Phase I questionnaire.

2. Communicating response rates

The unweighted response rate, 31.2 percent, for Phase I is the rate that will be used, generally, to communicate the response rate for Phase I of the NAHMS Health Management on U.S. Feedlots 2021 study, as it represents the likelihood that eligible feedlots completed the Phase I survey.

In addition, when communicating specifically about cooperation, the cooperation rate (49.4 percent for Phase I) will be used to communicate the likelihood that contacted, eligible producers were willing to complete Phase I of the NAHMS Health Management on U.S. Feedlots 2021 study.

[2] American Association of Public Opinion Research (2023) Standard Definitions, Final Dispositions of Case Codes and Outcome Rates for Surveys. https://aapor.org/wp-content/uploads/2023/05/Standards-Definitions-10th-edition.pdf.

Appendix I: Sample Profile

1. Feedlot capacity

Feedlot capacity (number head)	**Number of responding feedlots**
Small (50–499)	536
Medium (500–999)	159
Large (1,000–4,999)	209
Very large (5,000 or more)	121
Total	1,025

2. Regions

Region	**Number of responding feedlots**
West (CA, ID, MT, ND, SD, UT, WA, WY)	197
Central (CO, KS, NE, OK, TX)	235
Midwest (IL, IA, MN, MO)	375
East (IN, MI, OH, PA, WI)	218
Total	1,025

Appendix II: Target Population

		Number of cattle on feed[1]			Number of feedlots[1]		
Region	**State**	**All feedlots**	**Feedlots with 1,000 or more cattle on feed**	**Feedlots with 50–999 cattle on feed**	**All feedlots**	**Feedlots with 1,000 or more cattle on feed**	**Feedlots with 50–999 cattle on feed**
West	California	514,226	503,297	>9,777[2]	49	19	28
	Idaho	267,766	255,166	11,846	111	18	59
	Montana	47,215	>19,238	NA[3]	151	6	NA
	North Dakota	78,718	21,464	55,674	348	13	269
	South Dakota	541,201	251,751	282,724	1,308	92	964
	Utah	24,024	6,649	NA	162	4	NA
	Washington	217,509	212,617	NA	88	12	NA
	Wyoming	72,128	53,250	18,358	109	12	69
Central	Colorado	1,005,237	975,071	28,506	272	73	128
	Kansas	2,445,281	2,304,089	137,481	761	116	503
	Nebraska	2,910,262	2,593,968	308,919	1,737	408	1,058
	Oklahoma	329,926	>318,218	NA	110	14	NA
	Texas	2,656,923	2,631,279	23,084	360	95	168
Midwest	Illinois	243,703	61,527	159,500	1,797	33	858
	Iowa	1,644,497	680,414	927,711	4,942	271	3,316
	Minnesota	596,367	172,542	388,935	3,220	77	1,784
	Missouri	78,336	15,650	52,759	788	7	357
East	Indiana	89,280	NA	58,871	1,082	NA	407
	Michigan	158,925	NA	109,365	1,146	NA	557
	Ohio	176,893	NA	138,105	1,600	NA	747
	Pennsylvania	119,911	NA	95,329	1,380	NA	667
	Wisconsin	288,654	NA	230,143	3,070	NA	1,586
Total (included states)		14,506,982	>11,076,190	>3,037,087	24,591	1,270	13,525
Total U.S. (50 states)		15,025,052	11,599,603	3,174,070	25,776	1,345	14,392
Included states as a % of 50 states		96.6	>95.5	>95.7	95.4	94.4	94.0

[1] Source: NASS, 2017 Census of Agriculture. State level estimates only available in conjunction with the Census of Agriculture every 5 years. These represent counts of operations by actual inventory of cattle on feed, rather than capacity.

[2] Values with ">" denote values that are minimum counts. These are calculated by summing NASS 2017 Census of Agriculture estimates where at least one size category within the given inventory range and state was suppressed due to low sample size (suppressed estimates are not included in this count).

[3] Values of NA denote values that are suppressed because operations with the given inventory were not sampled from the given state in this study.