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Goat 2019

Part III: Reference of Health and Management Practices on Dairy Goat Operations in the United States, 2019



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Items of Note

NAHMS Goat 2019 was conducted in 24 of the Nation's major goat-producing States (see map on p. 2) and provides valuable information to study participants, stakeholders, and the goat industry as a whole. At the time of the study, these States represented 75.8 percent of U.S. goat operations with five or more adult goats and 80.4 percent of adult goats in the United States.

Overall, 20.4 percent of all operations had milked any does in the previous 12 months. Some of these operations kept a few dairy goats for feeding kids, but also raised meat, fiber or other goat types, and dairy milk production was not their primary purpose.

Primary milk producing operations were the focus of this survey, therefore this report was limited to operations that had 5 or more dry or in-milk dairy does on September 1, 2019. Overall, 14.3 percent of all operations had 5 or more dry or in-milk dairy does on September 1, 2019.

All remaining estimates in this section are from the 14.3% of operations that milked any dairy does in the previous 12 months and had 5 or more does.

Operations were placed in one of three size categories based on their July 1, 2019, doe inventory: small (5-19), medium (20-99), and large (100 or more).

The peak percentage of does milked represents the highest percentage of dairy does milked at one time in the previous 12 months. Milking a greater number of does at one time allows for concentrated kidding management practices, and the ability to market a larger amount of milk at one time. The peak percentage of does milked in the previous 12 months was 82.1 percent of the doe inventory. A higher peak percentage of does were milked on large operations (88.4 percent) than on small operations (66.7 percent).

About one-third of operations (34.8 percent) added does to the milking string at an average of 1-4 days post-kidding. A higher percentage of large operations (80.2 percent) added does to the milking string 1-4 days post-kidding than small and medium operations (30.2 and 42.4 percent, respectively). A higher percentage of small and medium operations (25.0 and 23.3 percent, respectively) added does to the milking string 10-49 days post-kidding than large operations (1.2 percent).

The highest percentage of operations (75.2 percent) usually milked does twice a day. A higher percentage of small operations (28.3 percent) milked does once a day than large operations (4.3 percent). No operations milked does more often than twice a day.

The highest percentage of operations (84.9 percent) milked does for 100-499 days. No large operations milked does for fewer than 100 days. The percentage of operations that milked does for 250-499 days increased as herd size increased, with 32.0 percent of small, 58.8 percent of medium, and 90.1 percent of large operations milking does for 250-499 days.

Most operations (88.7 percent) skipped milkings before completely drying off does.

Most operations (92.3 percent) had does dry for an average of 50-249 days. A higher percentage of large operations (90.1 percent) had does dry for 50-99 days than small or medium operations (33.7 and 58.5 percent, respectively).

The average kidding interval on all operations was 12.2 months.

Over one-half of operations left kids with their dams to nurse as the typical feeding protocol during weeks 1, 2, 3, and 4 of life (58.3, 55.8, 54.7, and 54.8 percent of operations, respectively). A higher percentage of large operations separated kids from the dam and offered milk during weeks 1 and 2 of life (83.1 and 84.2 percent, respectively) than small and medium operations during week 1 of life (38.0 and 46.5 percent, respectively) and week 2 of life (40.1 and 51.6 percent, respectively). A higher percentage of large operations separated kids from the dam and offered milk during week 3 and week 4 of life (84.2 and 84.5 percent, respectively) than small operations during the same weeks of life (40.9 and 40.9 percent, respectively).

Somatic cell count (SCC) testing on the milk from the herd was routinely performed in the previous 12 months by 19.8 percent of all operations. A higher percentage of medium and large operations (39.7 and 66.5 percent, respectively) routinely performed SCC testing on the milk than small operations (12.4 percent).

About one third of operations (33.7 percent) had any does with clinical mastitis in the previous 12 months. A higher percentage of large operations (88.2 percent) had any does with clinical mastitis than small operations (26.6 percent).

Milk was fed to kids on 82.3 percent of all operations, 50.8 percent of all operations made milk into cheese on the farm, and 53.9 percent of operations made milk into other milk products, such as candy, yogurt, ice cream, or soap on the farm. A higher percentage of small and medium operations (86.9 and 77.0 percent, respectively) than large operations (30.3 percent) fed milk to kids. A higher percentage of small and medium operations (58.2 percent and 68.2 percent, respectively) consumed milk as unpasteurized/raw milk by employees or family than large operations (18.3 percent).

A higher percentage of medium operations (58.8 percent) made milk into cheese on the farm than large operations (21.8 percent), and a higher percentage of small operations (56.5 percent) made milk into other milk products on the farm than large operations (19.3 percent). A higher percentage of large operations (91.3 percent) sold, traded, or gave away milk as liquid milk than small or medium operations (40.5 and 60.3 percent, respectively).

On operations that sold, traded, or gave away any goat milk in the previous 12 months, the highest percentage of all operations (61.7 percent) distributed milk directly to the public (including internet sales, farmers markets, etc.). A higher percentage of small and medium operations (71.1 and 55.9 percent, respectively) distributed goat milk directly to the public than large operations (11.3 percent). As herd size increased, the percentage of operations that distributed goat milk to a wholesaler, dealer, or processor increased, with 0.1 percent of small operations, 23.3 percent of medium operations, and 72.9 percent of large operations distributing goat milk to a wholesaler, dealer, or processor. A higher percentage of operations in the East region (15.6 percent) distributed goat milk to a wholesaler, dealer, or processor than operations in the West region (3.5 percent). A higher percentage of operations in the West region (54.2 percent) distributed goat milk by an “other” method than operations in the East region (12.5 percent).

Nearly one-fifth (18.1 percent) of all operations marketed raw (unpasteurized) goat milk or raw goat milk products intended for human consumption in the previous 12 months.

Milking procedures may vary by operation to fit their business goals, or to help address any challenges or constraints on the operation. Routinely following proper milking procedures can greatly impact the overall quality of milk and health of the dairy goats.

The highest percentage of all operations (59.0 percent) hand-milked does on the operation. As expected, a higher percentage of small operations (66.9 percent) hand-milked does than medium operations (32.7 percent).

The highest percentage of all operations (75.2 percent) usually milked does twice a day. A higher percentage of small operations (28.3 percent) milked does once a day than large operations (4.3 percent). No operations milked does more often than twice a day.

Cleaning and disinfecting hands prior to milking is critical in reducing bacteria in the milking parlor, and disposable glove usage can be even more efficient at decreasing the risk of bacterial transfer to doe teats. Just 17.7 percent of milker sometimes or always wore disposable gloves when milking.

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Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory program of the United States 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 the health and management practices of the U.S. goat industry in one previous study, Goat 2009.

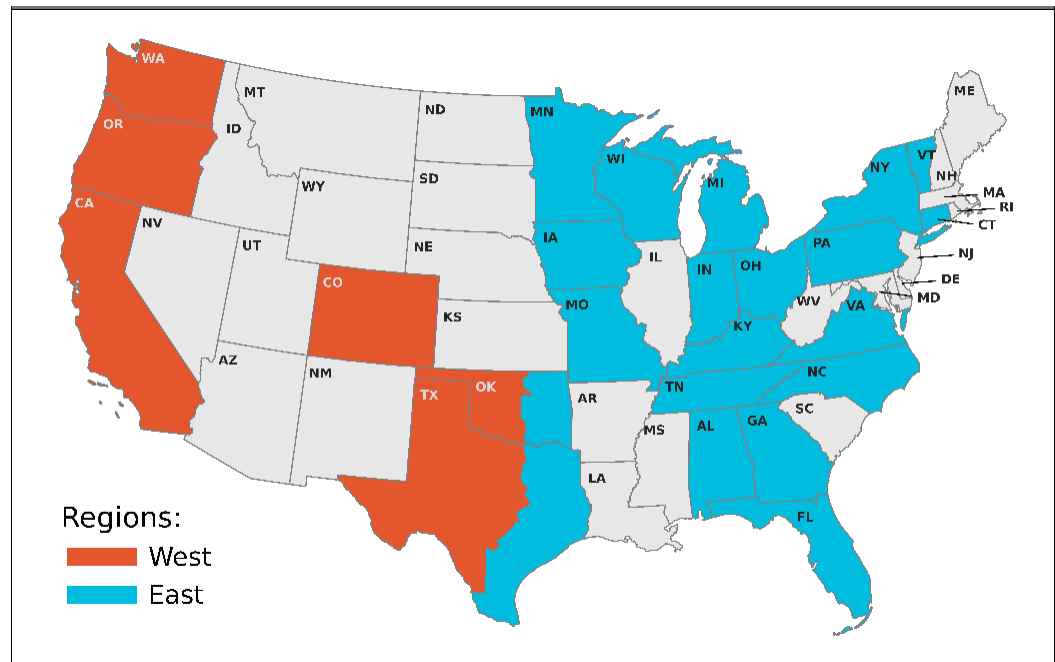
NAHMS Goat 2019 was conducted in 24 of the Nation's major goat-producing States (see map on p. 2). At the time of the study, these States represented 75.8 percent of U.S. goat operations with five or more adult goats and 80.4 percent of adult goats in the United States (NASS 2017 Census of Agriculture). Unlike the Goat 2009 study, in which operations with one or more goats were selected for participation, the Goat 2019 study selected only operations with five or more adult goats, thereby reducing the number of noncommercial operations (i.e., operations that kept goats as pets) participating in the study. In addition, Goat 2019 takes a closer look at the dairy and agritourism segments of the U.S. goat industry.

Goat milk production in the United States has experienced continuous expansion. Dairy goat inventory increased by 60.7 percent in the last decade from 334,754 head in 2007 to 537,799 head in 2017 (NASS, 2007; NASS, 2017). Furthermore, the number of farms raising dairy goats has increased from 27,481 farms in 2007 to 35,682 farms in 2017. Between the NAHMS Goat 2009 study and the NAHMS Goat 2019 study, there was a 57 percent increase in dairy goat operations, with 11.9 percent and 18.7 percent of goat operations in 2009 and 2019, respectively. For more information regarding expansion of milk goats in the United States, please visit the NASS Sheep and Goats report, which collects inventory data annually ([https://www.nass.usda.gov/Surveys/Guide to NASS Surveys/Sheep and Goat Inventory/index.php](https://www.nass.usda.gov/Surveys/Guide%20to%20NASS%20Surveys/Sheep%20and%20Goat%20Inventory/index.php)).

Goat milk is used for many purposes, including feeding goat kids, lambs, veal calves, and piglets, and for human consumption. In the United States, goat milk and goat milk products, such as cheese, yogurt, candy, soaps, and lotions, have experienced an increase in demand. Due to goat milk's unique nutritional and biochemical properties, goat milk is increasingly consumed, especially by those experiencing cow milk allergies or gastrointestinal disorders secondary to consumption of cow milk.

In general, management and biosecurity practices should be more rigorous on dairy goat operations than meat or other goat operations due to more intensive management required for milk production. Enhanced management and biosecurity practices help to ensure milk quality and goat health. Additionally, operation size and location of a dairy goat operation may directly impact production and marketing of goat milk and milk products. Large operations may market their milk through various avenues, including cooperatives and directly to the consumer, whereas small operations are more likely to use the milk for personal consumption.

This report, "Part III: Reference of Health and Management Practices on Dairy Goat Operations in the United States, 2019," is the third in a series of reports containing national information from the NAHMS Goat 2019 study.

States/regions participating in the NAHMS Goat 2019 study

Note: Texas and Oklahoma were divided on a line corresponding to Interstate 35. The western halves of the States were included in the West region, and the eastern halves in the East region. For more detailed information regarding the counties involved, see Appendix II on page 128.

Detailed information on study methods and number of respondents can be found in the Methodology section on page 114.

Terms Used in This Report

Antibiotic—A chemical compound generally produced by molds that inhibits and/or kills certain 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.

Breed association—Groups that work toward breed recognition and/or improvement. They are also a resource for more information on breeds, breed history, and where to locate breeding stock. Breed associations also monitor the populations of respective breeds.

Brix refractometer—A device built to measure the sucrose content of a sample through refraction. This meter can be used to estimate the total solids in colostrum fed to kids, which is generally correlated to the immunoglobulins (IgG).

Buck—An uncastrated male goat.

Bulk tank—A large storage container used for cooling and holding milk at a cold temperature to preserve freshness and safety until it is processed.

Certified organic milk—An official label for dairy products which indicates that a product is produced under USDA organic requirements. The label implies specific requirements for feed and treatment protocols (e.g., organic feed must be fed and antibiotics are not allowed) as well as land management, pasture requirements, and housing.

Colostrometer—A hydrometer that provides a measure of colostrum quality by using the correlation between colostrum density and IgG concentration. This tool uses a scale to relate the colostrum density to the IgG concentration to give an approximate value.

Colostrum—Colostrum, the first secretion from the mammary gland, provides essential nutrients and passive immunity to kids through immunoglobulins. Colostrum is critical for kids to resist infections in the first few weeks of life. Colostrum also contains energy and important nutrients, such as protein, fat, vitamins, minerals, and provides heat when fed at body temperature.

Cull—Animals permanently removed from the herd. Operations cull animals for various reasons such as old age or infertility, disease or injury, to reduce herd size for reasons such as high feed costs, or to improve genetics or desirable phenotypic traits.

Dairy goat—A goat kept for the production of milk. Normally, dairy goats are dairy breeds or dairy-breed mixes.

Dairy Herd Improvement (DHI)—A national program consisting of regional associations (Dairy Herd Improvement Association, DHIA) to help dairy producers create and manage records and data about their goats for use in making management decisions.

Dam—A female parent of a goat kid(s).

Doe—A female goat.

Doe average—The average value for all does; the single reported value for each operation multiplied by the number of does on that operation is summed over all operations and divided by the number of does on all operations. This way, the result is adjusted for the number of does on each operation.

Drug residues—Any compound present in milk or meat that results from the use of a drug, and includes the drug, its metabolites, and any other substance formed in milk or meat because of the drug's use. The U.S. Food and Drug Administration (FDA) defines a violative level as one that is above what is considered safe.

Dry doe—An adult doe that has had at least one kid and is not currently lactating.

Dry-off—The cessation of milking with the goal to stop lactation.

Forestripping—The process by which the first several streams of milk are expressed from the teats before milking begins. Forestripping allows the milker to evaluate the milk for any abnormalities, such as clots, and evaluate the teats and udder for any heat, swelling, or pain.

Fresh goat—A goat that has recently given birth to a kid(s). The term “freshen” is usually used to designate the act of kidding and the initiation of lactation.

Herd size—Herd size is based on September 1, 2019 doe inventory, whether dry or in milk. Operations were placed in three size categories: small (5-19), medium (20-99), and large (100 or more).

Intramammary (IMM) antibiotics—Delivery of an antibiotic directly in the mammary gland through intramammary infusion. It is one of the most effective and commonly used methods to treat and/or prevent mastitis.

Kid—A young goat, generally less than 1 year old.

Kidding interval—The time from one kidding to the next kidding for an individual doe.

Lactation—The period of time that a goat produces milk after kidding. This begins at the time of kidding and continues until the goat is dried off (stops milking) in preparation for the next kidding.

Mastitis—Inflammation of the udder, usually caused by bacteria, that reduces milk production and milk quality. Clinical mastitis is detected by visible abnormalities in the milk or udder, such as clots in milk or udder swelling. Subclinical mastitis, which does not have visible abnormalities, is usually detected by increased numbers of somatic cells in milk, referred to as a high somatic cell count (SCC). The primary economic loss caused by mastitis occurs from decreased milk production.

Milk culture—A laboratory-based procedure used to diagnose the causative bacteria responsible for cases of clinical and sub-clinical mastitis. Laboratories grow the bacteria present in the milk from infected goats and then identify the bacteria likely causing the infection.

Milking herd—A group of goats that are currently lactating and being milked regularly.

Milking string—A specific group of goats from a milking herd that are being milked and managed similarly. The terms "milking string" and "milking herd" may be used interchangeably on some operations.

Operation—An area of land managed as a unit by an individual, partnership, or hired manager. The term "operation" might be used interchangeably with the term "premises" in this report.

Operation average—The average value for all operations. A single value for each operation is summed over all operations reporting and divided by the number of operations reporting.

Parlor type—

Parallel (side by side)—A parlor design where the milking stalls are situated parallel to one another and are indexed at a 90-degree angle to the center of the parlor. Goats stand side by side on an elevated platform facing directly away from a central area where the milkers are located. All does milked on one side of the parlor exit at the same time after milking.

Herringbone (fishbone)—A parlor design where the milking stalls are situated parallel to one another but are indexed at a slight angle (~35°) to the center of the parlor. Goats stand side by side on an elevated platform facing away at a slight angle from the central area where the milkers are located. All does milked on one side of the parlor exit at the same time after milking.

Rotary (carousel)—A parlor design where the goats stand on a circular raised platform that rotates slowly. Goats enter and exit the platform one at a time and face inward toward the center of the carousel. The operator area, where the milkers are located, is around the exterior of the carousel.

Pasteurization—A process that utilizes heat to destroy pathogens in foods. For the dairy industry, "pasteurization," "pasteurized," and similar terms reference the process of heating every milk or milk product particle in properly designed and operated equipment to a specific time and temperature. The most common method of pasteurization in the United States today is High Temperature Short Time (HTST) pasteurization, which uses metal plates and hot water to raise milk temperatures to at least 161° F for not less than 15 seconds, followed by rapid cooling.

Population estimates—Estimates in this report are provided with a measure of precision called the standard error. The confidence intervals used to make comparisons in the text of this report were computed using the methods described in Section II.D.2 (p. 119). These confidence intervals require more information than is published in the report to compute, but an approximate 95-percent confidence interval can be computed 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 value about 95 out of 100 times. For example, an estimated proportion of 7.5 with a standard error of 1.0 results in limits of 5.5 and 9.5 (two times the standard error above and below the estimate). When estimates are reported as being "higher" or "lower," a statistical difference is implied by the overlap or absence of overlap between 95-percent confidence intervals for the estimates being compared but was not directly tested. Not all statistically different estimates are mentioned in the text of this report.

Post dipping—The application of a disinfectant to the teat skin post-milking to prevent the spread of contagious pathogens, which can cause mastitis between does during milking.

Pre-dipping—The application of a disinfectant to achieve an appropriate level of decontamination of the teats prior to milking. Pre-dipping should be completed after removal of debris and organic matter with a towel or thorough washing has been completed.

Quality assurance program—An organized program that can help dairy producers manage their operations in ways that will ensure quality milk as well as produce other products that will meet consumer expectations. A dairy quality assurance program can help play a critical role in the production of safe, high-quality milk.

Regions*

West—California, Colorado, Oregon, Washington, Western Oklahoma, * Western Texas*

East—Alabama, Connecticut, Eastern Oklahoma, * Eastern Texas, * Florida, Georgia, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, Wisconsin

*Texas and Oklahoma were divided on a line corresponding to north-south Interstate 35. The western halves of the States were included in the West region, and the eastern halves were included in the East region. For more detailed information regarding the counties involved, see Appendix II.

Somatic cell count (SCC)—A measure of the number of white blood cells and mammary gland epithelial secretory cells per milliliter of milk. Each bulk tank of milk is usually tested for SCC as an indication of milk quality. Individual goats can be tested for SCC, usually through routine Dairy Herd Improvement Association (DHIA) monitoring.

Withhold or withdrawal period—The period following the last treatment of a drug during which the animal may not be offered for slaughter, and milk may not be offered for sale. The withdrawal period is determined by residue studies conducted under the labeled conditions of use (type of animal, dosage, route of administration) and is based upon the time necessary for drug residues in the animal to deplete to levels that are shown to be safe. Adhering to these times is important to avoid violative drug residues entering the food supply.

Section I: Population Estimates

Where applicable, table 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. Most estimates in this report are rounded to the nearest tenth. If the estimate was rounded to 100.0 or 0.0, or the standard error is rounded to less than 0.1, the standard error was reported as (0.0). If the estimate was exactly 100.0 or 0.0, no standard error was reported (—).

When estimates are reported as being "higher" or "lower," a statistical difference is implied by the overlap or absence of overlap between 95-percent confidence intervals (see Methods Section II.D.2 p. 119). Not all statistically different estimates are mentioned in the text of this report. Unless otherwise noted, estimates in this report refer to the period from September 1, 2018, to August 31, 2019, the dates following the 12 months prior to questionnaire administration. To simplify the report, this period is referred to as "in the previous 12 months."

Additionally, after the first two tables (tables A.1. and A.2.), estimates in the subsequent tables apply to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, whether dry or in milk, on September 1, 2019.

A. Dairy Inventory

Goats are an important commodity to the U.S. food production system and economy as they are sources of meat, fiber, milk, and milk-based products such as cheese, lotion, and soap. Additionally, in the last decade, goats have become common companion animals and are often kept for show purposes, such as 4-H. In the U.S. over the last decade, the number of dairy goats and dairy goat operations have increased substantially. Operations may milk does for various reasons, including for milk and cheese production, to make artisanal products, or for show purposes.

Overall, 20.4 percent of all operations had milked does in the previous 12 months. Some of these operations kept a few dairy goats for feeding kids, but also raised meat, fiber, or other goat types, and dairy milk production was not their primary purpose. There were no regional differences.

A.1. Percentage of operations that milked any dairy does in the previous 12 months, by region:

Percent Operations					
Region					
West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
17.9	(3.6)	21.6	(2.6)	20.4	(2.1)

Primary milk producing operations were the focus of this survey, therefore this report was limited to operations that had five or more dry or in-milk does, on September 1, 2019. Overall, 14.3 percent of all operations had five or more dry or in-milk does on September 1, 2019.

A.2. Percentage of operations that milked any dairy does in the previous 12 months and had 5 or more does, whether dry or in milk, on September 1, 2019, by region:

Percent Operations					
Region					
West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
12.0	(2.2)	15.3	(2.2)	14.3	(1.7)

Note: for the remainder of the report, estimates apply to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more dry or in-milk does on September 1, 2019.

Overall, 74.7 percent of all operations had any does being milked on September 1, 2019. The percentage of operations that had does in milk on the operation on September 1, 2019, increased as herd size increased, with 69.2 percent of small, 92.5 percent of medium, and 100.0 percent of large operations having does in milk. There were no regional differences in the percentage of operations that had in-milk or dry adult does on the operation on September 1, 2019.

A.3. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations with dairy does on the operation on September 1, 2019, by doe type, herd size, and region:

Percent Operations												
Doe type	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
In-milk	69.2	(5.5)	92.5	(3.4)	100.0	(—)	83.0	(5.1)	72.1	(5.5)	74.7	(4.4)
Dry	88.8	(4.8)	86.3	(4.4)	75.8	(9.7)	94.8	(2.5)	85.4	(4.9)	87.7	(3.8)

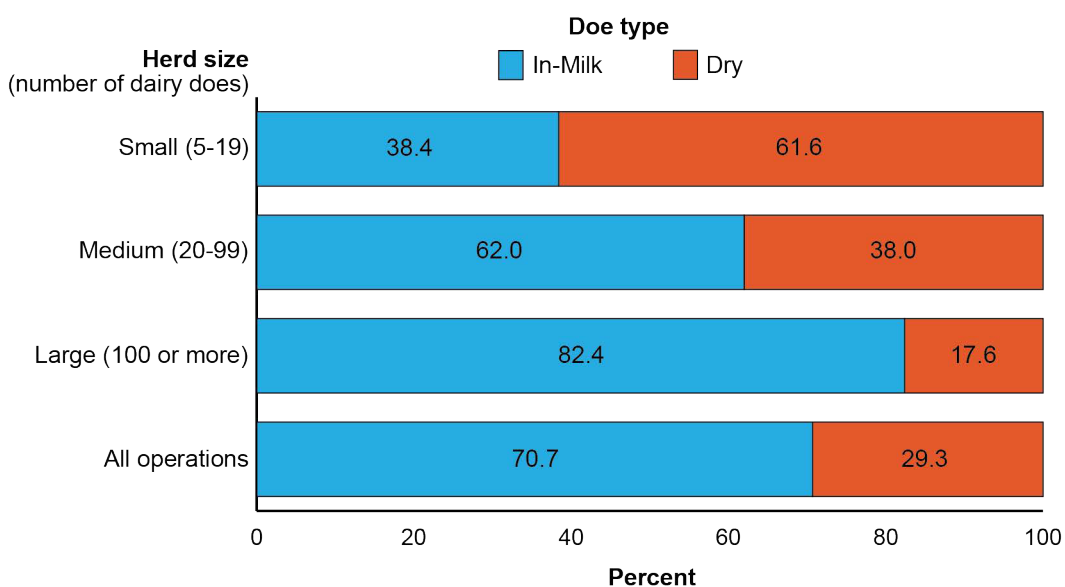
The percentage of does in-milk on September 1, 2019, increased as herd size increased, with 38.4 percent of does on small operations, 62.0 percent of does on medium operations, and 82.4 percent of does on large operations in milk on September 1, 2019. On small operations, there was a higher percentage of dry does (61.6 percent) than milked does (38.4 percent) on September 1, 2019. There were no regional differences.

A.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of dairy does on the operation on September 1, 2019, by doe type, herd size, and region:

Percent Does*												
Herd size (number of dairy does)							Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations		
Doe type	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
In-milk	38.4	(3.5)	62.0	(3.6)	82.4	(5.4)	60.9	(4.6)	74.1	(6.4)	70.7	(5.6)
Dry	61.6	(3.5)	38.0	(3.6)	17.6	(5.4)	39.1	(4.6)	25.9	(6.4)	29.3	(5.6)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*As a percentage of the total dairy doe inventory on September 1, 2019.

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of dairy does* on the operation on September 1, 2019, by doe type and herd size



*As a percentage of the total dairy doe inventory on September 1, 2019.

Overall, 62.6 percent of operations had at least one first-lactation doe born on the operation and added to the milking herd in the previous 12 months. The percentage of operations that had any first-lactation does born on the operation and added to the milking herd increased as herd size increased, with 53.8 percent of small, 91.8 percent of medium, and 100.0 percent of large operations. There were no regional differences.

A.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that had any first-lactation does* born on the operation and added to the milking herd in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
53.8	(6.7)	91.8	(2.8)	100.0	(—)	57.2	(12.3)	64.3	(6.2)	62.6	(5.6)

*This includes kid does that were born on the operation and raised off site.

Just over one-fourth (28.3 percent) of does were first-lactation does born on the operation and added to the milking herd in the previous 12 months. A higher percentage of does on large operations (34.3 percent) compared with does on medium (20.0 percent) and small operations (15.5 percent) were first-lactation does born on the operation and added to the milking herd in the previous 12 months. There were no regional differences.

A.6. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of first-lactation does¹ born on the operation and added to the milking herd in the previous 12 months, by herd size and region:

Percent Does ²											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
15.5	(2.2)	20.0	(1.6)	34.3	(5.2)	21.7	(2.9)	30.5	(5.3)	28.3	(4.5)

¹This includes kid does that were born on the operation and raised off site.

²As a percentage of the total dairy doe inventory on September 1, 2019.

Just 4.5 percent of does were purchased/leased and added to the milking herd in the previous 12 months. There were no herd size or regional differences.

A.7. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of purchased/leased does added to the milking herd in the previous 12 months, by herd size and region:

Percent Does*											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
11.3	(4.7)	4.3	(1.3)	2.6	(1.7)	5.0	(3.5)	4.3	(1.8)	4.5	(1.6)

*As a percentage of the total dairy doe inventory on September 1, 2019

Overall, 14.3 percent of adult dairy does on operations were permanently removed (culled) from the herd in the previous 12 months. There were no herd size or regional differences.

A.8. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of adult dairy does that were permanently removed (culled)¹ from the herd in the previous 12 months, by herd size and region:

Percent Does ²											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
21.2	(4.5)	15.8	(1.8)	11.9	(2.6)	19.9	(4.5)	12.4	(2.1)	14.3	(2.3)

¹Excludes does that died.

²As a percentage of the total dairy doe inventory on September 1, 2019.

A small percentage (6.0 percent) of adult does died on goat milking operations in the previous 12 months. There were no herd size or regional differences.

A.9. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of adult dairy does that died in the previous 12 months, by herd size and region:

Percent Does*											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
7.9	(2.6)	5.6	(1.2)	5.7	(0.8)	6.3	(1.1)	6.0	(0.9)	6.0	(0.8)

*As a percentage of the total dairy doe inventory on September 1, 2019.

The peak percentage of does milked represents the highest percentage of dairy does milked at one time in the previous 12 months. Milking a greater number of does at one time allows for concentrated kidding management practices, and the ability to market a larger amount of milk at one time. The peak percentage of does milked on operations in the previous 12 months was 82.1 percent of the doe inventory. A higher peak percentage of does were milked on large operations (88.4 percent) than on small operations (66.7 percent). No regional differences were noted.

A.10. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), peak percentage of does milked on the operation at any time in the previous 12 months, by herd size and region:

Percent Does*											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
66.7	(3.2)	76.1	(2.6)	88.4	(4.7)	73.2	(4.4)	85.1	(4.3)	82.1	(4.0)

*As a percentage of the total dairy doe inventory on September 1, 2019.

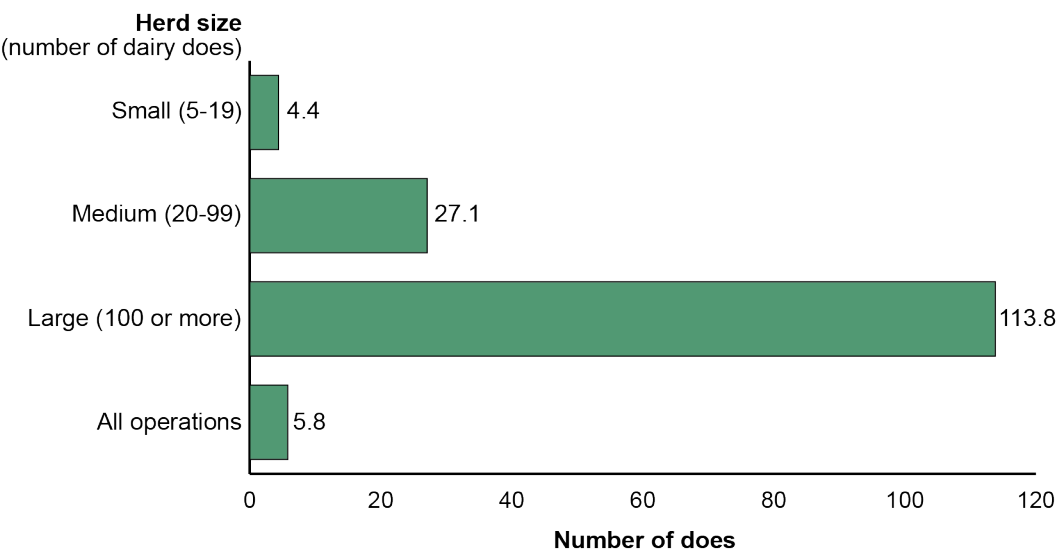
The median peak number of does milked on operations in the previous 12 months was 5.8 does. The median peak number of does milked increased as herd size increased with 4.4, 27.1, and 113.8 does for small, medium, and large operations, respectively. There were no regional differences.

A.11. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), median peak number of does milked on the operation at any time in the previous 12 months, by herd size and region:

Median Peak Number of Does*											
Herd size (number of dairy does)						Region					
Small		Medium		Large		West		East		All Operations	
(5–19)		(20–99)		(100 or More)							
Med.	Std. Error	Med.	Std. Error	Med.	Std. Error	Med.	Std. Error	Med.	Std. Error	Med.	Std. Error
4.4	(0.6)	27.1	(5.6)	113.8	(17.2)	4.5	(2.0)	6.1	(0.6)	5.8	(0.6)

*Estimates are calculated by taking the peak number of does milked on each operation at any time within each herd size, region, and all operations categories, and then the median is calculated for each category.

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), median peak number of does* milked on the operation at any time in the previous 12 months, by herd size



*Estimates are calculated by taking the peak number of does milked on each operation at any time within each herd size and all operations categories, and then the median is calculated for each category.

The highest percentage of operations (69.2 percent) milked a peak of 1-9 does at any time in the previous 12 months. The highest percentage of small operations (86.7 percent) milked a peak of 1-9 does in the previous 12 months. The highest percentage of medium operations (66.3 percent) milked a peak of 10-49 does while the majority of large operations (84.2 percent) milked a peak of 100-499 does in the previous 12 months. A higher percentage of operations in the East region (5.7 percent) milked a peak of 100-499 does than operations in the West region (1.2 percent).

A.12. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by peak number of does milked on the operation at any time in the previous 12 months, by herd size and region:

Percent Operations												
Peak number	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–9	86.7	(3.6)	10.2	(3.0)	0.0	(—)	68.1	(10.4)	69.6	(4.0)	69.2	(3.9)
10–49	13.2	(3.6)	66.3	(6.3)	0.0	(—)	27.8	(10.3)	19.6	(3.3)	21.6	(3.5)
50–99	0.0	(—)	22.5	(5.5)	6.6	(3.8)	2.0	(0.8)	4.9	(1.4)	4.2	(1.0)
100–499	0.1	(0.1)	1.0	(0.7)	84.2	(6.0)	1.2	(0.4)	5.7	(1.8)	4.6	(1.3)
500–999	0.0	(—)	0.0	(—)	4.6	(2.9)	0.5	(0.3)	0.2	(0.2)	0.2	(0.1)
1,000 or more	0.0	(—)	0.0	(—)	4.6	(2.8)	0.5	(0.3)	0.2	(0.2)	0.2	(0.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

More than half (52.1 percent) of all operations never weighed milk produced on the operation in the previous 12 months. A higher percentage of small operations (58.4 percent) never weighed milk produced on the operation in the previous 12 months compared with medium and large operations (32.8 and 18.8 percent, respectively). There were no regional differences.

A.13. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how often milk produced on the operation was weighed, by herd size and region:

Percent Operations												
Frequency	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Daily	18.4	(4.5)	18.8	(4.9)	23.3	(7.6)	23.5	(10.3)	17.2	(3.5)	18.7	(3.6)
Monthly	11.6	(3.0)	18.0	(5.1)	17.4	(5.8)	7.8	(2.3)	14.7	(3.3)	13.0	(2.5)
Less frequently than monthly	11.6	(4.6)	30.4	(8.9)	40.5	(15.3)	9.8	(4.0)	18.3	(5.1)	16.2	(4.0)
Any	41.6	(6.4)	67.2	(5.7)	81.2	(6.7)	41.1	(11.4)	50.2	(5.9)	47.9	(5.3)
Never	58.4	(6.4)	32.8	(5.7)	18.8	(6.7)	58.9	(11.4)	49.8	(5.9)	52.1	(5.3)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For operations that weighed milk produced on the operation, the average milk production was 6.3 pounds per doe per day. There were no herd size or regional differences.

A.14. For operations that weighed milk produced on the operation* (table A.13.), average (mean) milk production (pounds) per doe per day, by herd size and region:

Average (Mean) Number of Pounds Per Doe Per Day											
Herd size (number of dairy does)						Region					
Small		Medium		Large		West		East		All Operations	
(5–19)		(20–99)		(100 or More)							
Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
6.3	(0.5)	6.9	(0.9)	4.5	(1.5)	6.8	(0.6)	6.1	(0.5)	6.3	(0.4)

*Refers to the 6.8 percent of operations that weighed milk produced on the operation. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 47.9 percent of those operations weighed milk produced on the operation (table A.13.).

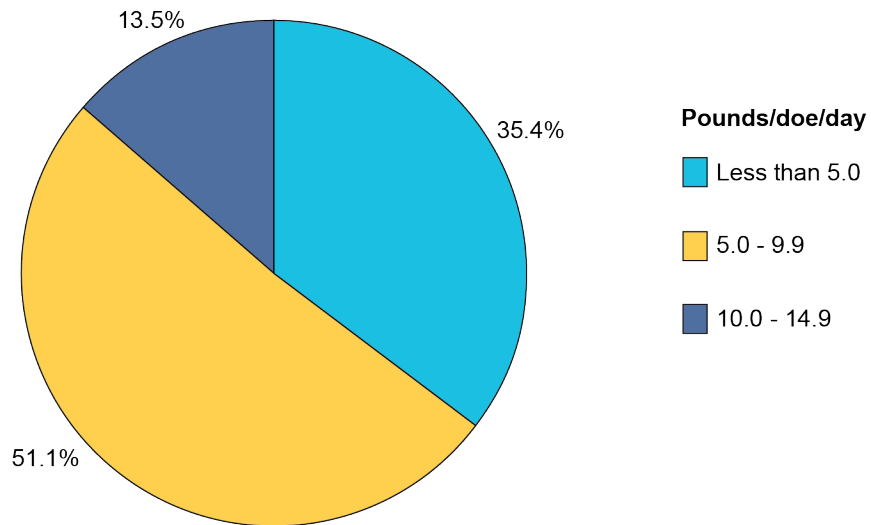
For operations that weighed milk produced on the operation, over half (51.1 percent) of operations reported an average milk production between 5.0-9.9 pounds per doe per day, irrespective of breed. There were no herd size or regional differences.

A.15. For operations that weighed milk produced on the operation* (table A.13.), percentage of operations by average milk production (pounds) per doe per day, by herd size and region:

Percent Operations												
Pounds/doe/ day	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less than 5.0	37.2	(8.9)	29.4	(8.3)	39.6	(19.8)	22.0	(8.5)	39.3	(7.8)	35.4	(6.5)
5.0–9.9	50.8	(9.7)	49.0	(11.2)	58.8	(19.4)	68.7	(11.2)	46.0	(8.0)	51.1	(7.1)
10.0–14.9	12.0	(5.7)	21.6	(13.4)	1.6	(1.5)	9.2	(6.4)	14.8	(6.5)	13.5	(5.3)
15.0 or more	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 6.8 percent of operations that weighed milk produced on the operation. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 47.9 percent of those operations weighed milk produced on the operation (table A.13.).

**For operations that weighed milk produced on the operation* (table A.13.),
percentage of operations by average milk production (pounds) per doe per day**



*Refers to the 6.8 percent of operations that weighed milk produced on the operation. This estimate comes from the 14.3 percent of operations that milked any dairy goats (does) in the previous 12 months and had 5 or more does (table A.2.), of which 47.9 percent of those operations weighed milk produced on the operation (table A.13.).

B. General Management

Note: Estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more dry or in-milk does, on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

Breed association involvement, lactation length, and days dry may vary based on operation size, location, and milk use. Operations that are milking for personal consumption may have different management practices than operations that sell their milk for consumption or cheese production. Additionally, operations in areas with heavier snow in the winter or extremely hot summers may choose to milk seasonally.

Overall, 66.7 percent of operations had any dairy goats registered with a breed association and 24.9 percent of goats on these operations were registered with a breed association. A higher percentage of medium operations (78.9 percent) had any does registered with a breed association than large operations (36.6 percent). A higher percentage of does on small and medium operations (56.8 and 55.9 percent, respectively) were registered with a breed association than does on large operations (6.8 percent). There were no regional differences in either the percentage of operations with any goats registered or in the percentage of does that were registered with a breed association.

B.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations with any dairy goats registered with a breed association and percentage of dairy goats* that were registered with a breed association, by herd size and region:

Parameter	Percent											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Percent operations	66.1	(6.5)	78.9	(5.1)	36.6	(11.3)	81.6	(5.1)	61.9	(6.4)	66.7	(5.3)
Percent does	56.8	(5.5)	55.9	(6.6)	6.8	(3.1)	28.1	(8.7)	23.8	(7.6)	24.9	(6.3)

*As a percentage of the total dairy doe inventory on September 1, 2019.

Few operations (1.3 percent) produced milk certified as organic by USDA in the previous 12 months. There were no herd size or regional differences.

B.2. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that produced any certified organic dairy milk in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1.4	(1.0)	1.1	(1.0)	1.2	(1.1)	2.5	(2.3)	0.9	(0.7)	1.3	(0.8)

Just 10.9 percent of operations milked any dairy cows in the previous 12 months. There were no herd size or regional differences.

B.3. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that milked any dairy **cows** in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
8.4	(4.4)	14.7	(4.9)	36.2	(15.8)	4.1	(2.4)	13.1	(4.7)	10.9	(3.7)

The operation average number of days after kidding that does were added to the milking string was 24.1 days post kidding. Large operations added does to the milking string earlier (average of 5.1 days post kidding) than small and medium operations (average of 27.3 and 14.8 days post kidding, respectively).

Similarly, as herd size increased, the doe average number of days post kidding that does were put into the milking string decreased; does on small operations were added to the milking string at an average of 28.8 days post kidding, on medium operations at 12.9 days, and on large operations at 3.7 days. The operation median number of days post kidding that does were put into the milking string was also earlier on large operations (2.4 days) than small and medium operations (7.3 and 5.1 days, respectively). Small and medium operations may choose to add does to the milking string later and allow kids to nurse for a longer period. Large operations may add does to the milking string after the does have transitioned from colostrum to milk. There were no regional differences in the operation average or median number of days post kidding that does were put into the milking string. There were no regional differences in the doe average or median number of days post kidding that does were put into the milking string.

B.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average, operation median, doe average, and doe median number of days post-kidding that does are put into the milking string, by herd size and region:

Average and Median Number of Days												
Parameter	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	27.3	(4.4)	14.8	(2.9)	5.1	(1.8)	20.2	(4.1)	25.3	(4.4)	24.1	(3.5)
Operation median	7.3	(1.7)	5.1	(1.2)	2.4	(0.2)	6.9	(1.7)	6.5	(1.5)	6.7	(1.2)
Doe average	28.8	(5.5)	12.9	(2.2)	3.7	(0.9)	7.7	(1.8)	10.6	(2.8)	9.9	(2.1)
Doe median	8.6	(1.7)	5.4	(1.2)	(D)*	(D)	2.5	(0.2)	2.6	(0.3)	2.6	(0.2)

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

About one-third of operations (34.8 percent) added does to the milking string at an average of 1-4 days post kidding. A higher percentage of large operations (80.2 percent) added does to the milking string 1-4 days post kidding than small and medium operations (30.2 and 42.4 percent, respectively). A higher percentage of small and medium operations (25.0 and 23.3 percent, respectively) added does to the milking string 10-49 days post kidding than large operations (1.2 percent). There were no regional differences.

B.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average number of days post-kidding that does are put into the milking string, by herd size and region:

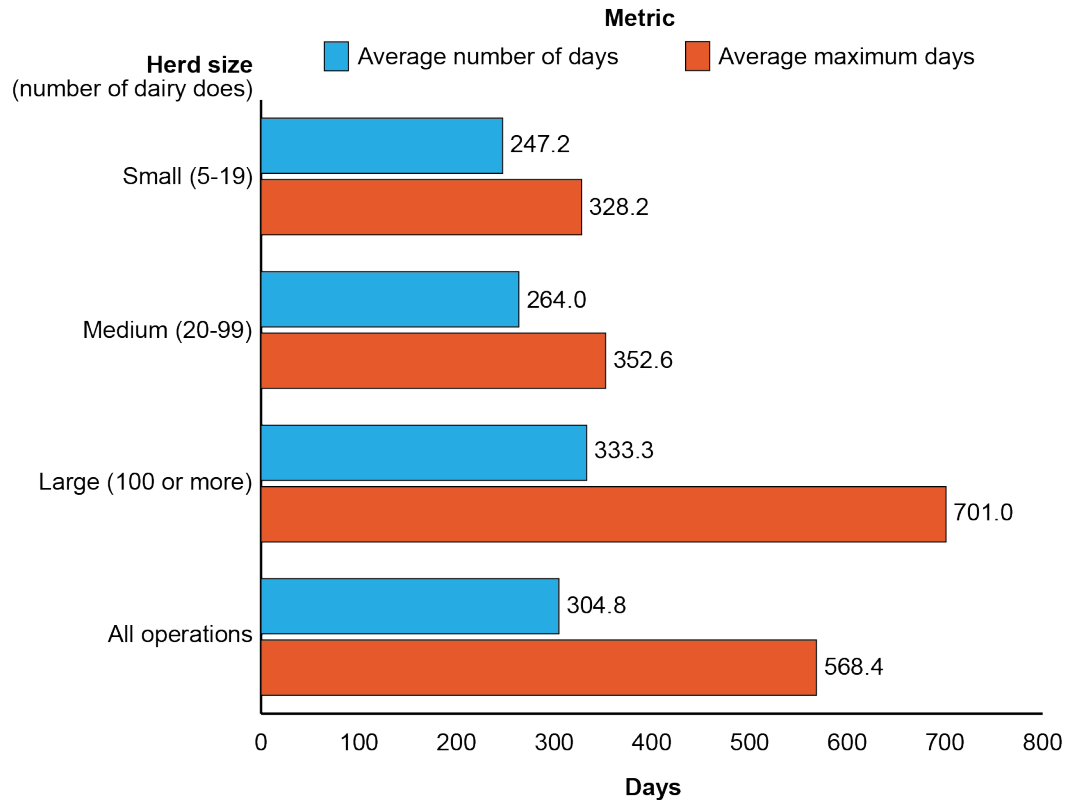
Average Number of Days	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–4	30.2	(6.7)	42.4	(6.7)	80.2	(9.1)	22.2	(10.1)	39.0	(6.1)	34.8	(5.3)
5–9	21.1	(5.2)	25.8	(8.5)	15.2	(8.5)	29.5	(9.7)	19.0	(4.6)	21.6	(4.3)
10–49	25.0	(5.3)	23.3	(5.6)	1.2	(1.1)	33.0	(11.2)	20.4	(4.2)	23.5	(4.2)
50–99	19.4	(5.3)	6.4	(2.7)	3.5	(3.3)	10.6	(3.7)	18.3	(5.4)	16.4	(4.2)
100 or more	4.3	(1.9)	2.1	(1.2)	0.0	(—)	4.7	(3.6)	3.4	(1.6)	3.7	(1.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

Operations milked the majority of their does for an average of 239.3 days. Large operations milked does longer than small and medium operations (323.8, 230.2, and 255.6 days, respectively). There were no regional differences.

B.6. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average and doe average length of lactation (days milked) for the majority of does on the operation, by herd size and region:

Average Number of Days												
Parameter	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	230.2	(13.7)	255.6	(8.7)	323.8	(17.2)	261.3	(20.0)	232.2	(12.9)	239.3	(10.9)
Doe average	247.2	(16.2)	264.0	(8.8)	333.3	(16.2)	275.3	(10.7)	315.0	(16.4)	304.8	(14.8)

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), doe average length of lactation (days milked) for the majority of does on the operation and doe average maximum length of lactation (days milked) for any doe milked on the operation in the last 12 months, by herd size



Most operations (84.9 percent) milked does for an average of 100-499 days. The average lactation length on large operations was greater than 100 days, while some (12.5 percent) small operations had an average lactation length of between 1-99 days. The percentage of operations that milked does for 250-499 days increased as herd size increased, with 32.0 percent of small, 58.8 percent of medium, and 90.1 percent of large operations milking does for 250-499 days. There were no regional differences.

B.7. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average length of lactation (days milked) for the majority of does on the operation, by herd size and region:

Average Number of Days	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–99	12.5	(3.3)	0.4	(0.4)	0.0	(—)	8.2	(3.7)	10.3	(3.2)	9.8	(2.6)
100–249	49.4	(6.3)	39.2	(6.4)	4.1	(2.7)	39.1	(9.0)	47.4	(6.3)	45.4	(5.2)
250–499	32.0	(5.5)	58.8	(6.6)	90.1	(5.0)	45.3	(7.3)	37.6	(5.7)	39.5	(4.6)
500 or more	6.2	(2.2)	1.6	(1.6)	5.8	(4.1)	7.4	(4.2)	4.7	(1.8)	5.4	(1.7)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

The operation average maximum length of lactation for any doe milked on all operations in the last 12 months was 332.7 days. The operation average maximum length of lactation was longer on large operations (601.5 days) than on small and medium operations (313.1 and 342.0 days, respectively). Similarly, the doe average maximum length of lactation was longer on large operations (701.0 days) than on small and medium operations (328.2 and 352.6 days, respectively). There were no regional differences.

B.8. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average and doe average maximum length of lactation (days milked) for any doe milked on the operation in the last 12 months, by herd size and region:

Average Maximum Days												
Parameter	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)		West		East		All Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	313.1	(34.6)	342.0	(19.0)	601.5	(92.1)	314.0	(25.0)	338.7	(35.4)	332.7	(27.5)
Doe average	328.2	(31.7)	352.6	(16.8)	701.0	(92.6)	402.4	(47.1)	625.5	(91.1)	568.4	(82.7)

Most operations (94.1 percent) had a maximum length of lactation of greater than 100 days for any doe milked on the operation in the last 12 months. A higher percentage of medium operations (62.7 percent) had a maximum lactation length of 250-499 days than small operations (30.7 percent). There were no regional differences.

B.9. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by maximum length of lactation (days milked) for any doe milked on the operation in the last 12 months, by herd size and region:

Maximum Number of Days	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–99	7.7	(2.5)	0.0	(—)	0.0	(—)	6.2	(3.5)	5.9	(2.2)	6.0	(1.9)
100–249	45.1	(6.2)	22.8	(5.4)	0.0	(—)	31.3	(9.7)	41.6	(6.1)	39.1	(5.2)
250–499	30.7	(4.6)	62.7	(7.0)	53.2	(13.0)	47.5	(7.8)	33.9	(5.1)	37.3	(4.2)
500 or more	16.5	(4.9)	14.5	(4.5)	46.8	(13.0)	15.0	(4.6)	18.5	(4.9)	17.7	(3.9)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

A dry period when goats are not being milked allows for mammary cell proliferation in preparation for the next lactation and for the goats to regain body condition. The operation average doe dry period duration was 139.2 days. As herd size increased the operation average number of days does were dry decreased, with dry periods lasting for an average of 151.7 days on small operations, 105.3 days on medium operations, and 63.9 days on large operations. The doe average number of days dry followed a similar trend. As herd size increased the doe average number of days dry decreased, with does being dry for an average of 147.1 days on small operations, 97.2 days on medium operations, and 51.2 days on large operations. There were no regional differences.

B.10. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average and doe average number of days does are dry, by herd size and region:

Parameter	Average Number of Days											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	151.7	(8.1)	105.3	(8.1)	63.9	(2.1)	141.8	(16.5)	138.4	(7.1)	139.2	(6.7)
Doe average	147.1	(8.5)	97.2	(7.5)	51.2	(9.2)	90.7	(9.2)	71.8	(13.3)	76.7	(11.2)

Most operations (92.3 percent) had does dry for an average of 50-249 days. A higher percentage of large operations (90.1 percent) had does dry for 50-99 days compared with small or medium operations (33.7 and 58.5 percent, respectively). There were no regional differences.

B.11. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average number of days does were dry, by herd size and region:

Percent Operations												
Average Number of Days	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
1–49	1.8	(1.2)	3.0	(1.6)	7.0	(3.7)	3.3	(2.4)	2.0	(1.1)	2.3	(1.0)
50–99	33.7	(5.4)	58.5	(7.1)	90.1	(4.3)	37.9	(5.9)	41.8	(5.7)	40.8	(4.6)
100–249	58.0	(5.9)	36.6	(6.9)	3.0	(1.7)	51.7	(7.5)	51.4	(6.0)	51.5	(4.9)
250 or more	6.5	(2.5)	2.0	(1.5)	0.0	(—)	7.1	(4.2)	4.8	(2.2)	5.4	(2.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

C. Kidding Management

Note: Estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more dry or in-milk does, on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

Kidding management is an essential part of dairy operations. Doe kids can be used as replacement does to enter the milking herd and both doe and buck kids can be sold as a supplemental source of income. The time to first kidding and the average kidding interval may vary based on an operation's goals and management practices. Additionally, kid management, such as colostrum administration and feeding protocol may vary based on an operation's use of the milk and production goals. Good kidding management practices can help increase milk production and increase the number of kids that survive to be kept as replacement does or sold.

The operation average kidding interval was 12.2 months. There were no herd size or regional differences.

C.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average and doe average kidding interval* (in months) for dairy does in the previous 12 months, by herd size and region:

Parameter	Average Number of Months											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	12.1	(0.6)	12.4	(0.3)	13.0	(0.5)	12.9	(0.5)	12.0	(0.6)	12.2	(0.5)
Doe average	12.5	(0.5)	12.3	(0.2)	13.0	(0.3)	12.3	(0.2)	12.9	(0.3)	12.7	(0.2)

*Kidding interval is defined as the time from one kidding to the next kidding for an individual doe.

The highest percentage of operations (79.9 percent) had an average kidding interval of 12 months. There were no herd size or regional differences.

C.2. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average kidding interval* (in months) for dairy does in the previous 12 months, by herd size and region:

Average Number of Months	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less than 12	10.1	(4.7)	7.9	(3.3)	0.9	(0.8)	6.0	(2.7)	10.3	(4.8)	9.2	(3.7)
12	79.2	(5.3)	83.3	(4.6)	79.3	(7.1)	82.2	(5.3)	79.2	(5.3)	79.9	(4.2)
More than 12	10.7	(3.4)	8.8	(3.2)	19.8	(6.9)	11.8	(4.8)	10.5	(3.2)	10.8	(2.7)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Kidding interval is defined as the time from one kidding to the next kidding for an individual doe.

The operation average age at first kidding was 20.2 months. This was shorter on large operations (14.7 months) than small and medium operations (20.9 and 18.8 months, respectively). Similarly, does on large operations, on average, had their first kidding younger (13.2 months) than does on small and medium operations (20.6 and 18.3 months, respectively). Because larger operations have more does, the younger average age at first kidding on large operations had an impact on the overall average age of does at first kidding resulting in a younger doe average age (15.5 months) than the operation average age (20.2 months). There were no regional differences.

C.3. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average and doe average age (in months) of dairy does at the time of their first kidding in the previous 12 months, by herd size and region:

Average Age (months)												
Parameter	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	20.9	(0.8)	18.8	(0.6)	14.7	(0.4)	20.3	(1.2)	20.1	(0.7)	20.2	(0.6)
Doe average	20.6	(0.8)	18.3	(0.6)	13.2	(0.5)	15.9	(0.9)	15.3	(1.1)	15.5	(0.9)

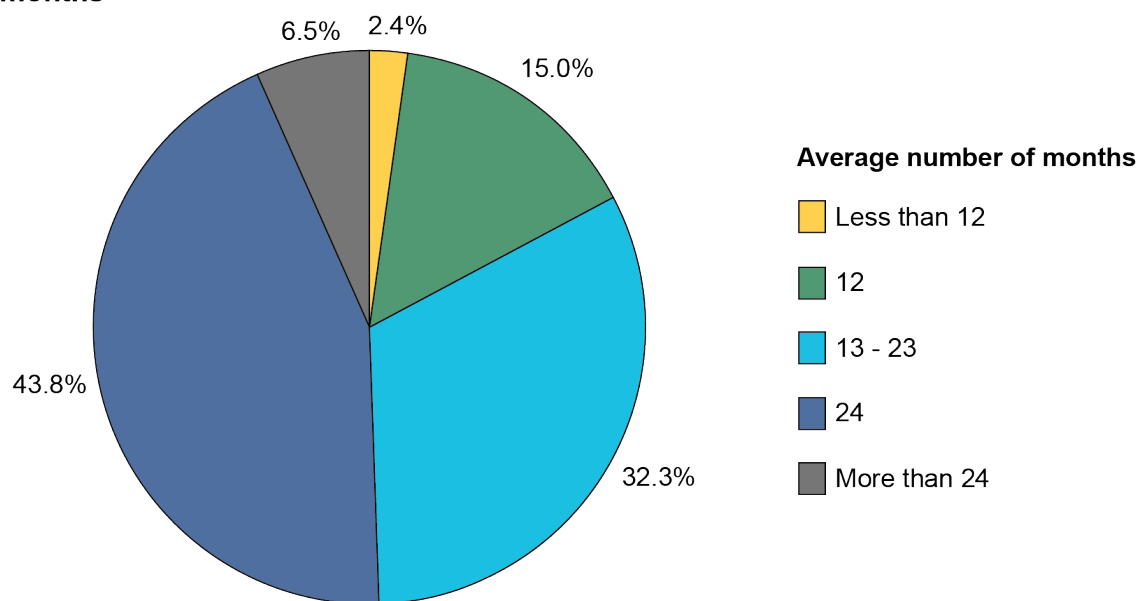
The average age of does at first kidding was 12 months or younger on 17.4 percent of all operations. A higher percentage of small and medium operations (47.7 and 37.4 percent, respectively) had an average age of does at first kidding at 24 months than large operations (6.4 percent).

A higher percentage of operations in the East region had an average age of 12 months for does at first kidding than operations in the West region (18.8 and 3.8 percent, respectively). A higher percentage of operations in the West region had an average age of 13-23 months for does at first kidding than operations in the East region (52.1 and 25.8 percent, respectively).

C.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average age (in months) of dairy does at the time of their first kidding in the previous 12 months, by herd size and region:

	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Average Number of Months												
Less than 12	2.6	(2.2)	1.5	(1.1)	1.8	(1.8)	0.4	(0.4)	3.0	(2.2)	2.4	(1.7)
12	13.6	(4.8)	17.3	(4.6)	28.9	(8.7)	3.8	(1.2)	18.8	(4.9)	15.0	(3.8)
13–23	28.1	(5.0)	42.6	(8.3)	61.7	(10.8)	52.1	(7.5)	25.8	(4.7)	32.3	(4.3)
24	47.7	(6.4)	37.4	(7.0)	6.4	(3.7)	36.1	(6.9)	46.3	(6.3)	43.8	(5.1)
More than 24	8.0	(2.9)	1.3	(0.9)	1.2	(1.1)	7.5	(3.7)	6.1	(2.7)	6.5	(2.2)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by average age (in months) of dairy does at the time of their first kidding in the previous 12 months



Providing high quality colostrum to newborn goats is critical to reducing disease and death and there are many methods available to determine colostrum quality. The volume of first milking colostrum is not a good indicator of colostrum quality. Just over one-half (56.4 percent) of all operations estimated colostrum quality. The highest percentage of operations that used any method to estimate colostrum quality used visual appearance (54.6 percent).

A small percentage of large operations used a colostrometer (1.8 percent) and a brix refractometer was used by small and large operations (0.4 and 1.8 percent respectively). Only operations in the East region used a colostrometer (0.1 percent). A brix refractometer was used by 0.3 percent of operations in the West region and 0.4 percent of operations in the East region.

C.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that used the following methods to estimate colostrum quality, by herd size and region:

Percent Operations												
Method	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Visual appearance	50.9	(6.6)	68.5	(5.8)	65.6	(10.0)	57.1	(11.5)	53.8	(5.8)	54.6	(5.2)
Volume of first milking colostrum (in pounds)	18.8	(5.2)	17.4	(4.5)	21.8	(9.3)	29.1	(12.9)	15.4	(3.0)	18.7	(4.1)
Colostrometer	0.0	(—)	0.0	(—)	1.8	(1.1)	0.0	(—)	0.1	(0.1)	0.1	(0.1)
Brix refractometer (handheld measuring device)	0.4	(0.2)	0.0	(—)	1.8	(1.0)	0.3	(0.3)	0.4	(0.2)	0.4	(0.2)
Other*	0.0	(—)	3.2	(1.7)	2.0	(1.3)	0.8	(0.4)	0.6	(0.4)	0.6	(0.3)
No method used	47.6	(6.5)	28.8	(5.7)	31.7	(9.5)	42.3	(11.5)	44.0	(5.7)	43.6	(5.1)
Any method	52.4	(6.5)	71.2	(5.7)	68.3	(9.5)	57.7	(11.5)	56.0	(5.7)	56.4	(5.1)

*Health of kid(s) receiving colostrum was the most common “other” method.

Over one-half of operations left kids with their dams to nurse as the typical feeding protocol during weeks 1, 2, 3, and 4 of life (58.3, 55.8, 54.7, and 54.8 percent of operations, respectively). A higher percentage of large operations separated kids from the dam and offered milk during week 1 and 2 of life (83.1 and 84.2 percent, respectively) than small and medium operations during week 1 of life (38.0 and 46.5 percent, respectively) and week 2 of life (40.1 and 51.6 percent, respectively). A higher percentage of large operations separated kids from the dam and offered milk during week 3 and week 4 of life (84.2 and 84.5 percent) than small operations during the same weeks of life (40.9 and 40.9 percent). There were no regional differences.

C.6. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that left kids with dams or separated kids from dams and offered milk at each feeding as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, by herd size and region:

Feeding protocol	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Week 1 of life												
Left with dam	62.0	(6.0)	53.5	(7.7)	16.9	(6.7)	71.8	(9.3)	54.4	(5.9)	58.3	(5.0)
Separated from dam and offered milk	38.0	(6.0)	46.5	(7.7)	83.1	(6.7)	28.2	(9.3)	45.6	(5.9)	41.7	(5.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 2 of life												
Left with dam	59.9	(6.0)	48.4	(8.2)	15.8	(6.4)	69.8	(9.5)	51.7	(6.0)	55.8	(5.0)
Separated from dam and offered milk	40.1	(6.0)	51.6	(8.2)	84.2	(6.4)	30.2	(9.5)	48.3	(6.0)	44.2	(5.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 3 of life												
Left with dam	59.1	(6.1)	45.9	(8.3)	15.8	(6.4)	66.2	(9.6)	51.4	(6.0)	54.7	(5.1)
Separated from dam and offered milk	40.9	(6.1)	54.1	(8.3)	84.2	(6.4)	33.8	(9.6)	48.6	(6.0)	45.3	(5.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 4 of life												
Left with dam	59.1	(6.1)	46.4	(8.4)	15.5	(6.2)	66.2	(9.6)	51.4	(6.0)	54.8	(5.1)
Separated from dam and offered milk	40.9	(6.1)	53.6	(8.4)	84.5	(6.2)	33.8	(9.6)	48.6	(6.0)	45.2	(5.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol, kids were fed on average 28.7, 34.3, 38.6, and 41.7 ounces during weeks 1, 2, 3, and 4 weeks of life, respectively). There were no herd size or regional differences.

C.7. For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life* (table C.6.), average number of ounces of milk typically offered per day, by herd size and region:

Average (Mean) Number of Ounces of Milk												
Week	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All	
	(5–19)		(20–99)		(100 or More)						Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
1	29.2	(2.0)	30.1	(3.8)	22.2	(2.5)	33.5	(2.0)	27.8	(1.6)	28.7	(1.5)
2	35.4	(1.8)	33.8	(2.6)	27.4	(3.7)	34.5	(1.7)	34.2	(1.6)	34.3	(1.4)
3	39.2	(3.1)	40.0	(3.6)	30.8	(5.0)	34.6	(4.0)	39.4	(2.6)	38.6	(2.3)
4	43.4	(2.5)	40.4	(2.6)	32.6	(5.5)	41.6	(3.8)	41.7	(2.1)	41.7	(1.9)

*Refers to the 6.0, 6.3, 6.5, and 6.5 percent of operations that separated kids from dams and offered milk at each feeding as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively. These estimates come from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 41.7, 44.2, 45.3, and 45.2 percent of those operations separated kids and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively (table C.6.).

For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol, 69.2 percent of all operations offered less than 32 ounces of milk per day to kids during week 1 of life. A higher percentage of large operations (53.5 percent) fed kids less than 32 ounces of milk during week 4 than small operations (11.9 percent). There were no herd size or regional differences.

C.8. For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life* (table C.6.), percentage of operations by typical amount of milk (ounces) that was offered per day, by herd size and region:

Percent Operations											
Ounces/day	Herd size (number of dairy does)						Region				
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct. Std. Error
Week 1 of life											
Less than 32	66.5	(9.0)	73.8	(7.6)	79.5	(8.2)	34.3	(14.9)	75.5	(5.6)	69.2 (6.5)
32–63	28.5	(8.8)	15.2	(4.9)	18.2	(7.5)	60.3	(16.4)	18.5	(5.1)	24.9 (6.4)
64 or more	5.1	(2.2)	11.0	(6.6)	2.3	(1.6)	5.3	(3.7)	6.0	(1.9)	5.9 (1.7)
Total	100.0		100.0		100.0		100.0		100.0		100.0
Week 2 of life											
Less than 32	36.4	(10.3)	41.9	(8.2)	71.0	(10.6)	18.4	(7.8)	44.8	(8.1)	40.8 (7.5)
32–63	60.0	(10.1)	53.0	(8.5)	26.7	(10.0)	76.3	(9.7)	51.7	(7.9)	55.4 (7.3)
64 or more	3.6	(1.4)	5.1	(2.5)	2.3	(1.5)	5.3	(3.5)	3.5	(1.1)	3.8 (1.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0
Week 3 of life											
Less than 32	36.5	(10.0)	34.7	(7.6)	51.8	(16.3)	52.6	(16.6)	34.5	(8.1)	37.5 (7.4)
32–63	57.0	(9.8)	57.0	(8.0)	42.2	(15.0)	39.7	(14.7)	58.9	(8.0)	55.6 (7.2)
64 or more	6.5	(3.3)	8.2	(3.1)	6.0	(2.9)	7.8	(3.9)	6.6	(2.8)	6.8 (2.4)
Total	100.0		100.0		100.0		100.0		100.0		100.0
Week 4 of life											
Less than 32	11.9	(4.6)	31.2	(7.4)	53.5	(15.6)	18.3	(9.4)	20.1	(5.1)	19.8 (4.5)
32–63	79.7	(6.0)	59.5	(8.0)	39.2	(14.2)	67.7	(12.5)	72.6	(6.0)	71.8 (5.4)
64 or more	8.4	(3.4)	9.3	(3.2)	7.3	(3.4)	14.0	(5.8)	7.3	(2.9)	8.4 (2.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0

*Refers to the 6.0, 6.3, 6.5, and 6.5 percent of operations that separated kids from dams and offered milk at each feeding as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively. These estimates come from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 41.7, 44.2, 45.3, and 45.2 percent of those operations separated kids and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively (table C.6.).

For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol, during week 1 of kids' lives, a higher percentage of operations (46.0 percent) fed kids four or more times than operations that fed kids two times a day (19.7 percent). During week 2, a higher percentage of operations (53.8 percent) fed kids three times per day than operations that fed kids two or four or more times per day (25.6 and 20.6 percent, respectively). During week 3, a lower percentage of operations (11.0 percent) fed kids four or more times per day than operations that fed kids two or three times per day (46.1 and 42.9 percent, respectively). During week 4, a higher percentage of operations (61.7 percent) fed kids two times per day than operations that fed kids three or four or more times per day (31.1 and 7.2 percent, respectively).

In general, large operations tended to feed kids less frequently during weeks 1 and 2 of life than small and medium operations: a higher percentage of large operations (75.4 and 76.0 percent, respectively) fed kids two times a day during week 1 and week 2 of life than small operations (9.2 and 14.4 percent, respectively). A higher percentage of small (50.2 and 21.9 percent, respectively) and medium (53.0 and 24.9 percent, respectively) operations fed kids four or more times a day during weeks 1 and 2 of life than large operations (2.3 and 2.3 percent, respectively). As the age of kids increased, the frequency of feedings generally decreased.

There were generally no regional differences by frequency of feedings. However, a higher percentage of operations in the East (28.6 percent) fed kids two times per day during week 3 of life than operations in the West (8.9 percent).

C.9. For operations that separated kids from their dams and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life* (table C.6.), percentage of operations by typical number of times per day that milk was offered, by herd size and region:

Percent Operations												
Frequency (feedings/day)	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Week 1 of life												
2	9.2	(4.4)	29.8	(8.4)	75.4	(11.8)	7.7	(4.2)	21.9	(5.5)	19.7	(4.8)
3	40.6	(10.9)	17.1	(5.1)	22.3	(11.6)	14.5	(6.4)	37.9	(9.2)	34.3	(8.2)
4 or more	50.2	(10.6)	53.0	(8.9)	2.3	(1.5)	77.9	(9.3)	40.2	(8.0)	46.0	(7.8)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 2 of life												
2	14.4	(6.4)	41.1	(7.9)	76.0	(11.5)	8.9	(4.5)	28.6	(6.6)	25.6	(5.7)
3	63.7	(9.5)	34.0	(7.6)	21.8	(11.3)	41.2	(16.1)	56.1	(7.7)	53.8	(7.3)
4 or more	21.9	(8.0)	24.9	(8.2)	2.3	(1.5)	50.0	(18.8)	15.3	(4.7)	20.6	(6.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 3 of life												
2	41.8	(10.5)	45.3	(7.7)	79.7	(11.1)	16.9	(6.7)	51.9	(8.2)	46.1	(7.5)
3	49.3	(10.1)	32.0	(7.6)	18.0	(10.9)	70.9	(11.8)	37.3	(7.6)	42.9	(7.3)
4 or more	8.8	(4.3)	22.8	(7.7)	2.3	(1.5)	12.3	(8.3)	10.8	(3.9)	11.0	(3.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	
Week 4 of life												
2	60.3	(8.4)	52.4	(8.3)	91.3	(3.7)	50.5	(16.8)	64.0	(6.8)	61.7	(6.2)
3	35.2	(8.0)	28.5	(7.3)	6.5	(3.0)	38.7	(14.5)	29.6	(6.2)	31.1	(5.7)
4 or more	4.5	(2.9)	19.0	(7.8)	2.2	(1.4)	10.9	(8.1)	6.4	(2.9)	7.2	(2.7)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 6.0, 6.3, 6.5, and 6.5 percent of operations that separated kids from dams and offered milk at each feeding as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively. These estimates come from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 41.7, 44.2, 45.3, and 45.2 percent of those operations separated kids and offered milk at each feeding to kids as their typical feeding protocol for weeks 1, 2, 3, and 4 of life, respectively (table C.6.).

D. Milk Marketing

Note: Estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more dry or in-milk does, on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

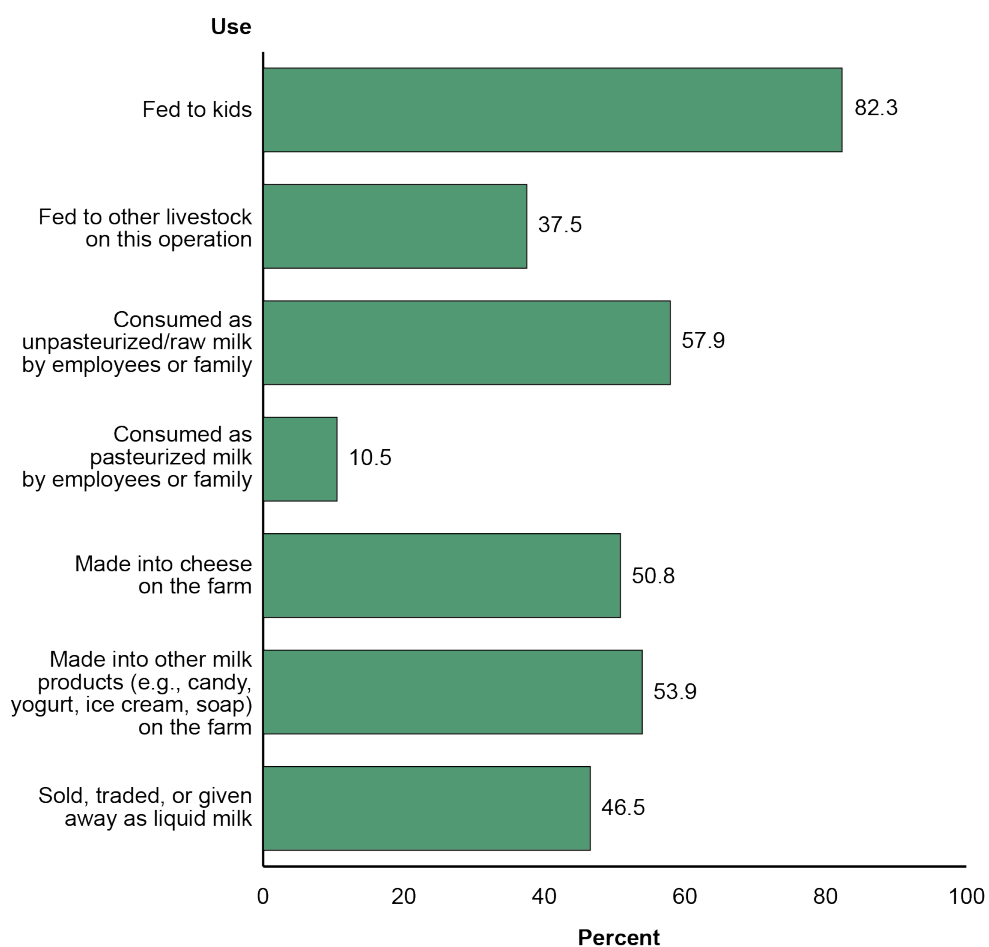
Milk produced on goat dairies can be used for various reasons, including feeding kids and personal consumption. However, selling milk and milk products may be an important source of income for many goat dairies. Consumer demand and available markets, amount of milk produced, consistency of the milk supply, and the quality of the milk may influence the uses and overall distribution of goat milk and goat milk products.

The largest percentage (82.3 percent) of operations fed milk to kids, 50.8 percent made milk into cheese on the farm, and 53.9 percent made milk into other milk products, such as candy, yogurt, ice cream, or soap on the farm. A higher percentage of small and medium operations (86.9 and 77.0 percent, respectively) than large operations (30.3 percent) fed milk to kids. A higher percentage of small and medium operations (58.2 percent and 68.2 percent, respectively) consumed milk as unpasteurized/raw milk by employees or family than large operations (18.3 percent). A higher percentage of medium operations (58.8 percent) made milk into cheese on the farm than large operations (21.8 percent) and a higher percentage of small operations (56.5 percent) made milk into other milk products on the farm than large operations (19.3 percent). A higher percentage of large operations (91.3 percent) sold, traded, or gave away milk as liquid milk than small or medium operations (40.5 and 60.3 percent, respectively). There were no regional differences.

D.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that utilized any milk produced on the operation for the following uses in the previous 12 months, by herd size and region:

Use	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Fed to kids	86.9	(2.9)	77.0	(8.9)	30.3	(10.0)	79.2	(5.8)	83.3	(3.6)	82.3	(3.1)
Fed to other livestock on this operation	38.2	(6.7)	43.9	(7.8)	5.8	(2.8)	29.0	(10.8)	40.3	(6.1)	37.5	(5.4)
Consumed as unpasteurized/raw milk by employees or family	58.2	(5.6)	68.2	(6.2)	18.3	(6.4)	61.4	(9.0)	56.8	(5.4)	57.9	(4.6)
Consumed as pasteurized milk by employees or family	10.7	(3.4)	9.2	(3.5)	13.3	(8.6)	10.1	(3.8)	10.7	(3.4)	10.5	(2.7)
Made into cheese on the farm	51.0	(6.5)	58.8	(6.3)	21.8	(9.3)	53.7	(12.3)	49.9	(5.8)	50.8	(5.3)
Made into other milk products (e.g., candy, yogurt, ice cream, soap) on the farm	56.5	(5.9)	52.6	(7.3)	19.3	(8.9)	51.8	(7.8)	54.6	(5.8)	53.9	(4.8)
Sold, traded, or given away as liquid milk	40.5	(6.6)	60.3	(6.9)	91.3	(4.2)	51.8	(12.2)	44.7	(5.9)	46.5	(5.3)

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that utilized any milk produced on the operation for the following uses in the previous 12 months



The highest average percentage of milk used on operations (37.5 percent) was fed to kids. An average 14.1 percent of milk produced on operations were consumed as unpasteurized/raw milk by employees or family.

A higher average percentage of milk on small and medium operations (40.9 and 32.6 percent, respectively) was fed to kids on the operation than large operations (3.3 percent). As herd size increased, the percentage of milk consumed as unpasteurized/raw milk by employees or family decreased, with 16.5 percent on small operations, 7.0 percent on medium operations, and 1.0 percent on large operations being consumed as unpasteurized/raw milk by employees or family. A higher percentage of milk on small operations (13.9 percent) was made into other milk products on the farm than on large operations (2.1 percent). As herd size increased, the percentage of milk sold, traded, or given away as liquid milk increased, with 8.6 percent on small operations, 29.9 percent on medium operations, and 75.9 percent of milk on large operations being sold, traded, or given away as liquid milk. There were no regional differences.

D.2. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), operation average percentage of milk produced on the operation by use in the previous 12 months, and by herd size and region:

Operation Average Percentage of Milk												
Use	Herd size (number of dairy does)						Region				All Operations	
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East			
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error		
Fed to kids	40.9	(4.0)	32.6	(5.0)	3.3	(1.3)	41.4	(8.6)	36.3	(3.2)	37.5	(3.3)
Fed to other livestock on this operation	8.3	(2.2)	9.5	(2.8)	1.4	(0.9)	4.9	(1.5)	9.2	(2.2)	8.2	(1.8)
Consumed as unpasteurized/raw milk by employees or family	16.5	(2.5)	7.0	(1.4)	1.0	(0.5)	14.3	(2.6)	14.1	(2.5)	14.1	(2.0)
Consumed as pasteurized milk by employees or family	2.4	(1.0)	0.6	(0.3)	0.1	(0.1)	2.0	(1.3)	2.0	(1.0)	2.0	(0.8)
Made into cheese on the farm	9.5	(1.6)	14.2	(3.1)	16.3	(8.4)	15.0	(4.0)	9.2	(1.4)	10.6	(1.4)
Made into other milk products (e.g., candy, yogurt, ice cream, soap) on the farm	13.9	(3.4)	6.2	(1.5)	2.1	(1.2)	8.7	(2.5)	13.0	(3.4)	11.9	(2.7)
Sold, traded, or given away as liquid milk	8.6	(1.6)	29.9	(4.9)	75.9	(9.2)	13.8	(3.3)	16.2	(2.6)	15.6	(2.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

On operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months, 60.6 percent of operations sold, traded, or gave it away for human consumption and 59.1 percent of operations sold, traded, or gave it away to be made into cheese or other milk products. A higher percentage of small and medium operations sold, traded, or gave away liquid milk for pet consumption (50.1 and 45.3 percent, respectively) than large operations (4.1 percent). There were no regional differences.

D.3. For operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months* (table D.1.), percentage of operations that sold, traded, or gave away any liquid milk for the following uses, by herd size and region:

Use	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Human consumption	67.9	(9.8)	41.3	(10.1)	58.4	(12.4)	57.3	(12.7)	61.8	(8.8)	60.6	(7.4)
Pet consumption	50.1	(11.4)	45.3	(11.6)	4.1	(2.1)	53.9	(11.3)	40.0	(10.5)	43.9	(8.2)
Livestock consumption	38.6	(11.3)	32.3	(12.5)	1.3	(1.2)	16.9	(5.2)	39.4	(10.5)	33.0	(8.2)
Making into cheese	17.6	(7.5)	29.9	(8.1)	39.7	(12.0)	16.6	(7.7)	25.4	(7.1)	22.9	(5.5)
Making into other milk products (e.g., candy, yogurt, ice cream, soap)	42.3	(11.0)	21.8	(6.6)	30.6	(18.2)	50.5	(11.9)	30.5	(8.6)	36.2	(7.5)

*Refers to the 6.6 percent of operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 46.5 percent of those operations sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months (table D.1.).

On operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months, the highest average percentage of milk (46.8 percent) used for all operations was for human consumption. A higher average percentage of milk on small and medium operations (16.8 and 29.5 percent, respectively) was for pet consumption than on large operations (1.7 percent). A higher average percentage of milk on large operations (37.3 percent) was made into cheese than on small operations (4.5 percent). There were no regional differences.

D.4. For operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months* (table D.1.), operation average percentage by use of the liquid milk that was sold, traded, or given away, and by herd size and region:

Operation Average Percentage of Milk												
Use	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Human consumption	55.5	(9.2)	30.5	(8.2)	30.3	(11.0)	41.6	(9.8)	48.9	(8.7)	46.8	(7.0)
Pet consumption	16.8	(6.2)	29.5	(13.0)	1.7	(1.0)	31.9	(10.6)	12.8	(5.5)	18.2	(5.4)
Livestock consumption	12.9	(4.4)	11.5	(3.8)	1.3	(1.2)	10.0	(3.1)	11.8	(4.0)	11.3	(3.0)
Making into cheese	4.5	(2.8)	24.3	(7.5)	37.3	(11.3)	4.7	(2.6)	15.9	(4.3)	12.8	(3.0)
Making into other milk products (e.g., candy, yogurt, ice cream, soap)	10.3	(3.7)	4.3	(1.5)	29.4	(18.2)	11.8	(3.6)	10.7	(4.7)	11.0	(3.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 6.6 percent of operations that sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 46.5 percent of those operations sold, traded, or gave away milk produced on the operation as liquid milk in the previous 12 months (table D.1.).

Overall, 61.9 percent of operations sold, traded, or gave away goat milk or milk products in the previous 12 months. A higher percentage of large operations (91.3 percent) sold, traded, or gave away goat milk than small or medium operations (40.5 and 60.3 percent, respectively). There were no regional differences.

D.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that sold, traded, or gave away any goat milk or milk products* in the previous 12 months, by herd size and region:

Percent Operations												
Product type	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Milk	40.5	(6.6)	60.3	(6.9)	91.3	(4.2)	51.8	(12.2)	44.7	(5.9)	46.5	(5.3)
Milk products	34.3	(5.7)	39.1	(6.5)	27.7	(9.9)	35.1	(11.0)	34.7	(5.0)	34.8	(4.6)
Any	56.4	(6.6)	75.8	(5.7)	99.1	(0.8)	59.6	(12.5)	62.6	(5.7)	61.9	(5.3)

*Milk products include cheese or other milk products, such as candy, yogurt, ice cream and soap.

On operations that sold, traded, or gave away any goat milk in the previous 12 months, the highest percentage of all operations (61.7 percent) distributed milk directly to the public (including internet sales, farmers markets, etc.). A higher percentage of small and medium operations (71.1 and 55.9 percent, respectively) distributed goat milk directly to the public than large operations (11.3 percent). As herd size increased, the percentage of operations that distributed goat milk to a wholesaler, dealer, or processor increased, with 0.1 percent of small operations, 23.3 percent of medium operations, and 72.9 percent of large operations distributing goat milk to a wholesaler, dealer, or processor. A higher percentage of operations in the East region (15.6 percent) distributed goat milk to a wholesaler, dealer, or processor than operations in the West region (3.5 percent). A higher percentage of operations in the West region (54.2 percent) distributed goat milk by an “other” method than operations in the East region (12.5 percent).

D.6. For operations that sold, traded, or gave away any goat milk in the previous 12 months¹ (table D.5.), percentage of operations by method of distribution, and by herd size and region:

Method of distribution	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Directly to the public (including internet sales, farmers markets, etc.)	71.1	(8.5)	55.9	(9.7)	11.3	(4.5)	42.3	(10.4)	69.0	(7.0)	61.7	(6.8)
To retail establishments, restaurants, or other commercial sales	4.1	(2.9)	4.7	(1.8)	13.6	(9.1)	6.3	(4.5)	4.8	(2.6)	5.2	(2.3)
To a cooperative or as part of a cooperative	1.5	(0.8)	15.4	(7.1)	1.3	(1.2)	1.6	(1.1)	5.1	(2.4)	4.1	(1.7)
To a wholesaler, dealer, or processor (e.g., cheese plant)	0.1	(0.1)	23.3	(5.2)	72.9	(10.8)	3.5	(1.2)	15.6	(4.5)	12.2	(3.1)
Other ²	28.8	(8.5)	15.7	(4.7)	8.9	(4.5)	54.2	(10.9)	12.5	(4.1)	23.9	(5.8)

¹Refers to the 6.6 percent of operations that sold, traded, or gave away any goat milk in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 46.5 percent of those operations sold, traded, or gave away any goat milk in the previous 12 months (table D.5.).

²A common “other” response was other producers and friends in the local community.

On operations that sold, traded, or gave away any goat milk products in the previous 12 months, the highest percentage of all operations (91.9 percent) distributed products directly to the public (including internet sales, farmers markets, etc.). A higher percentage of large operations (79.7 percent) distributed products to retail establishments, restaurants, or other commercial sales than small operations (17.4 percent). There were no differences by region in the percentage of operations by method of distribution for goat milk products.

D.7. For operations that sold, traded, or gave away any goat milk products¹ in the previous 12 months² (table D.5.), percentage of operations by method of distribution, and by herd size and region:

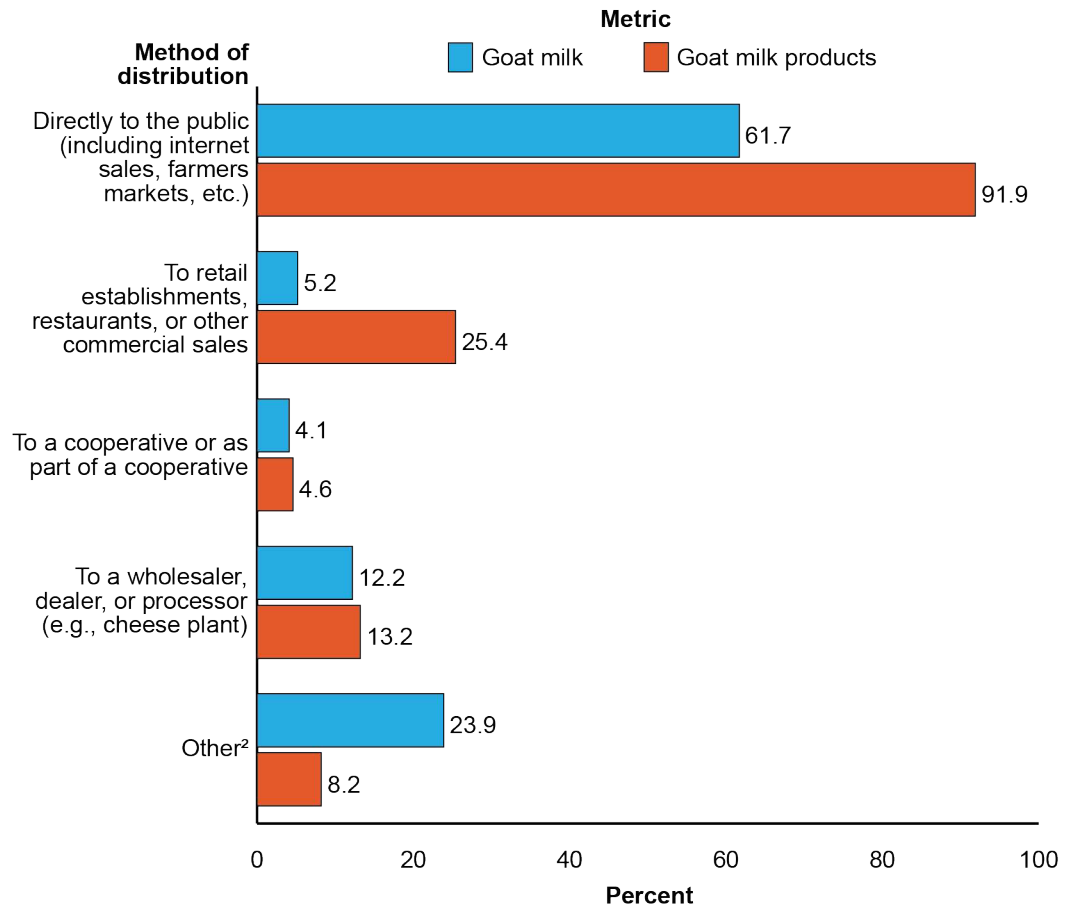
Method of distribution	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Directly to the public (including internet sales, farmers markets, etc.)	90.9	(4.7)	97.3	(2.6)	87.0	(8.5)	92.2	(6.6)	91.8	(4.3)	91.9	(3.7)
To retail establishments, restaurants, or other commercial sales	17.4	(6.1)	46.5	(8.4)	79.7	(10.4)	18.9	(8.3)	27.5	(5.9)	25.4	(5.0)
To a cooperative or as part of a cooperative	3.2	(2.5)	6.5	(4.3)	24.0	(12.9)	3.1	(1.4)	5.2	(2.8)	4.6	(2.2)
To a wholesaler, dealer, or processor (e.g., cheese plant)	11.9	(5.6)	16.4	(5.9)	23.0	(12.6)	2.8	(1.6)	16.6	(5.7)	13.2	(4.5)
Other ³	9.1	(4.7)	2.7	(2.6)	17.1	(9.6)	8.5	(6.7)	8.1	(4.3)	8.2	(3.7)

¹Milk products include cheese or other milk products, such as candy, yogurt, ice cream, and soap.

²Refers to the 5.0 percent of operations that sold, traded, or gave away any goat milk products in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 34.8 percent of those operations sold, traded, or gave away any goat milk products in the previous 12 months (table D.5.).

³A common "other" response was other producers and friends in the local community.

For operations that sold, traded, or gave away any goat milk in the previous 12 months (table D.5), percentage of operations by method of distribution, and for operations that sold, traded, or gave away any goat milk products¹ in the previous 12 months (table D.5), percentage of operations by method of distribution



¹Milk products include cheese or other milk products, such as candy, yogurt, ice cream, and soap.

²A common "other" response was other producers and friends in the local community.

On operations that sold, traded, or gave away any goat milk or goat milk products in the previous 12 months, 12.7 percent were paid a premium for certain positive milk characteristics. A higher percentage of large operations (72.5 percent) were paid a premium due than small or medium operations (2.9 and 19.2 percent, respectively). A higher percentage of large operations (68.9 percent) were paid a premium for high protein content than small and medium operations (2.3 and 12.3 percent, respectively). A higher percentage of large operations (45.8 percent) were paid a premium for out of season milk than small and medium operations (0.5 and 6.3 percent, respectively). Producing out-of-season milk may require manipulating light cycles, use of hormones, increasing doe lactation length or using specific breeds that are not seasonal breeders. Breeding does between April and August, (out-of-season), keeps a more consistent milk supply throughout the year. As herd size increased the percentage of operations that were paid a premium for low bacteria counts and low somatic cell counts increased.

A higher percentage of operations in the East region (15.4 percent) were paid any premium than operations in the West region (3.4 percent). A higher percentage of operations in the East region were paid a premium for high protein content and low bacteria counts than operations in the West region.

D.8. For operations that sold, traded, or gave away any goat milk or milk products in the previous 12 months¹ (table D.5.), percentage of operations that were paid a premium for the following product characteristics, and by herd size and region:

Product characteristics	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
High protein content	2.3	(2.3)	12.3	(3.9)	68.9	(10.8)	1.9	(0.8)	12.9	(3.7)	10.4	(2.8)
Low bacteria counts	0.1	(0.1)	17.3	(6.0)	70.4	(10.6)	2.8	(0.9)	12.4	(3.3)	10.2	(2.6)
Low somatic cell count	0.0	(—)	8.0	(3.2)	60.0	(12.4)	2.3	(0.8)	8.5	(2.9)	7.1	(2.3)
Out-of-season milk	0.5	(0.5)	6.3	(2.3)	45.8	(12.7)	2.3	(0.9)	6.8	(1.2)	5.8	(0.9)
Other ²	0.1	(0.1)	7.1	(2.6)	17.6	(6.4)	1.5	(0.8)	3.7	(0.9)	3.2	(0.7)
Any	2.9	(2.3)	19.2	(6.1)	72.5	(10.3)	3.4	(1.1)	15.4	(4.0)	12.7	(3.1)

¹Refers to the 8.9 percent of operations that sold, traded, or gave away any goat milk or milk products in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 61.9 percent of those operations sold, traded, or gave away any goat milk or milk products in the previous 12 months (table D.5.).

²A common "other" response was high fat content.

Overall, 15.3 percent of all operations routinely performed on-farm pasteurization of goat milk intended for human consumption in the previous 12 months. There were no herd size or regional differences.

D.9. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations in the previous 12 months that routinely performed on-farm pasteurization* of goat milk intended for human consumption, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
15.2	(4.1)	15.5	(4.1)	15.0	(8.5)	11.4	(3.8)	16.5	(4.3)	15.3	(3.3)

*Pasteurization is a process that utilizes heat to destroy pathogens in foods. For the dairy industry, the terms "pasteurization," "pasteurized," and similar terms reference the process of heating every milk or milk product particle in properly designed and operated equipment to a specific time and temperature. The most common method of pasteurization in the United States today is High Temperature Short Time (HTST) pasteurization, which uses metal plates and hot water to raise milk temperatures to at least 161° F for not less than 15 seconds, followed by rapid cooling.

Nearly one-fifth (18.1 percent) of all operations marketed raw (unpasteurized) goat milk or raw goat milk products intended for human consumption in the previous 12 months. There were no herd size or regional differences.

D.10. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that marketed any raw (unpasteurized) goat milk or raw goat milk products intended for human consumption (including direct purchase and goat shares) in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
15.3	(4.8)	27.4	(6.2)	31.0	(16.5)	14.9	(3.9)	19.2	(5.1)	18.1	(4.0)

Overall, 16.6 percent of all operations participated in either a Dairy Herd Improvement (DHI) program or a quality assurance program. There were no herd size or regional differences.

D.11. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that participated in the following programs in the previous 12 months, by herd size and region:

Program	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Dairy Herd Improvement (DHI) program	11.8	(4.1)	27.5	(5.7)	25.3	(7.8)	18.7	(9.5)	14.0	(3.2)	15.1	(3.4)
A quality assurance program*	1.6	(0.7)	5.5	(2.4)	2.0	(1.3)	4.0	(2.1)	1.7	(0.6)	2.3	(0.7)
Either type of program	12.9	(4.1)	30.4	(5.9)	26.2	(8.0)	21.6	(9.8)	14.9	(3.2)	16.6	(3.4)

*An organized program that can help dairy producers manage their operations in ways that will ensure quality milk, as well as produce other products that will meet consumer expectations. A dairy quality assurance program can help play a critical role in the production of safe, high-quality milk.

Section E. Milking Procedures

Note: Estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, whether dry or in milk, on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

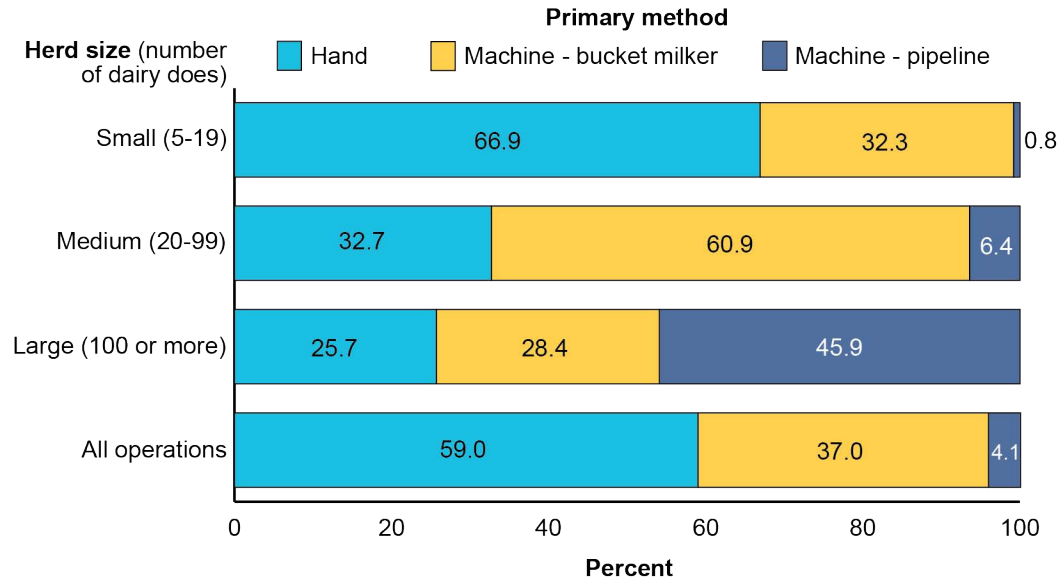
Milking procedures may vary by operation to fit their business goals, or to help address any challenges or constraints on the operation. Routinely following proper milking procedures can greatly impact the overall quality of milk and health of the dairy goats.

The highest percentage of all operations (59.0 percent) hand-milked does on the operation. As expected, a higher percentage of small operations (66.9 percent) hand-milked does than medium operations (32.7 percent). A higher percentage of medium operations (60.9 percent) used a bucket milker than small operations (32.3 percent). A higher percentage of large operations (45.9 percent) used a milking machine with a pipeline than small and medium operations (0.8 and 6.4 percent, respectively). There were no regional differences.

E.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by primary method used to milk does on the operation, and by herd size and region:

Primary method	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Hand	66.9	(5.6)	32.7	(6.5)	25.7	(17.7)	54.8	(11.8)	60.3	(5.2)	59.0	(4.9)
Machine— bucket milker	32.3	(5.6)	60.9	(7.0)	28.4	(8.8)	39.5	(11.5)	36.1	(5.1)	37.0	(4.8)
Machine— pipeline	0.8	(0.7)	6.4	(2.3)	45.9	(12.7)	5.7	(2.5)	3.5	(0.9)	4.1	(0.9)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by primary method used to milk does on the operation, and by herd size



For the operations that used a pipeline system as their primary method for milking does, the majority of operations (88.1 percent) used a side by side (parallel) parlor.

E.2. For operations that used a pipeline system as their primary method of milking does on the operation* (table E.1.), percentage of operations by primary milking parlor used:

Primary milking parlor	Percent operations	Standard error
Side by side (parallel)	88.1	(4.7)
Herringbone (fishbone)	5.0	(2.7)
Rotary (carousel)	4.4	(3.2)
Other	2.6	(1.7)
Total	100.0	

*Refers to the 0.6 percent of operations that used a pipeline system as their primary method of milking does on the operation. This estimate comes from the 14.3 percent of operations that milked any dairy goats (does) in the previous 12 months and had 5 or more does (table A.2.), of which 4.1 percent of those operations used a pipeline system as their primary method of milking does on the operation (table E.1.).

The highest percentage of all operations (75.2 percent) usually milked does twice a day. A higher percentage of small operations (28.3 percent) milked does once a day than large operations (4.3 percent). No operations milked does more often than twice a day. There were no regional differences.

E.3. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how many times per day does were usually milked in the previous 12 months, and by herd size and region:

	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
Milking frequency	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less often than once a day	0.0	(—)	1.3	(1.2)	0.0	(—)	0.0	(—)	0.3	(0.3)	0.2	(0.2)
Once a day	28.3	(4.9)	13.5	(3.6)	4.3	(2.1)	41.2	(8.9)	19.2	(3.6)	24.6	(3.9)
Twice a day	71.7	(4.9)	85.2	(3.9)	95.7	(2.1)	58.8	(8.9)	80.5	(3.6)	75.2	(3.9)
More often than twice a day	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

The highest percentage of all operations (88.6 percent) had owner(s)/operator(s) who milked the majority of the does on the operation in the previous 12 months. As herd size increased the percentage of operations that had owner(s)/operator(s) as the primary milker decreased, with 93.6 percent of small operations, 80.6 percent of medium operations, and 39.1 percent of large operations having the owner(s)/operator(s) as the primary milker.

A higher percentage of large operations had family members and hired workers (39.3 and 21.6 percent, respectively) milk the majority of the does than small operations (4.8 and 1.6 percent, respectively). A majority of large operations (60.9 percent) had family members and hired workers as the primary milker. There were no regional differences.

E.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by who milked the majority of does on the operation in the previous 12 months, and by herd size and region:

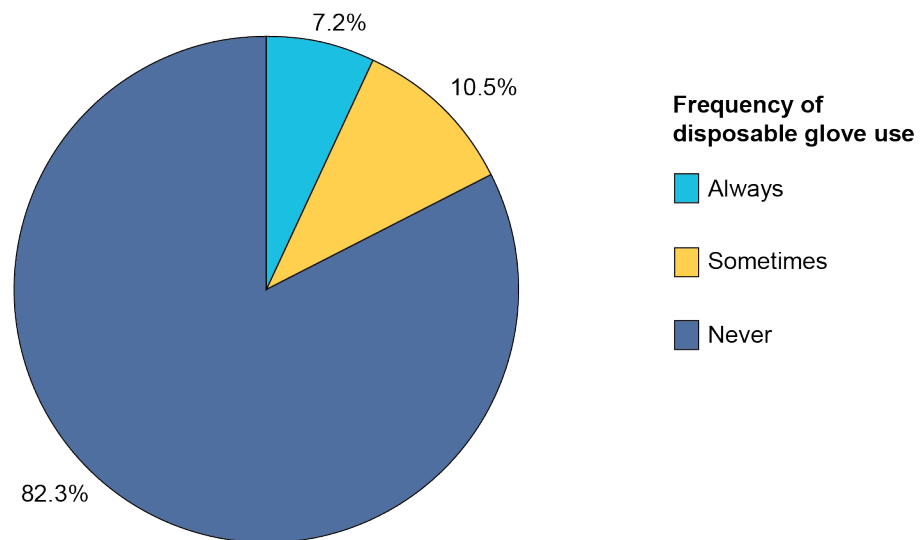
Percent Operations												
Personnel	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Owner(s)/operator(s)	93.6	(1.9)	80.6	(4.8)	39.1	(11.1)	86.9	(4.0)	89.2	(2.6)	88.6	(2.2)
Family member(s) of owner	4.8	(1.8)	12.6	(4.3)	39.3	(15.2)	5.5	(3.1)	8.7	(2.4)	7.9	(2.0)
Hired worker(s) (nonfamily member)	1.6	(0.8)	6.3	(2.4)	21.6	(9.3)	7.3	(2.7)	2.1	(0.8)	3.4	(0.9)
Other	0.0	(—)	0.4	(0.4)	0.0	(—)	0.3	(0.3)	0.0	(—)	0.1	(0.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

Cleaning and disinfecting hands prior to milking is critical in reducing bacteria in the milking parlor, and disposable glove usage can be even more efficient at decreasing the risk of bacterial transfer to doe teats. Just 17.7 percent of milker sometimes or always wore disposable gloves when milking. Milkers on a higher percentage of medium and large operations (20.5 and 30.2 percent, respectively) always wore gloves compared with milkers on small operations (2.8 percent). There were no regional differences.

E.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how often milkers wore disposable gloves when milking in the previous 12 months, and by herd size and region:

	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
Frequency of disposable glove use	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Always	2.8	(1.0)	20.5	(5.0)	30.2	(10.7)	10.0	(3.3)	6.3	(1.2)	7.2	(1.2)
Sometimes	10.2	(4.5)	11.9	(3.3)	10.1	(4.4)	9.7	(3.0)	10.7	(4.6)	10.5	(3.5)
Any use	13.0	(4.5)	32.4	(6.0)	40.3	(12.0)	19.7	(4.5)	17.0	(4.5)	17.7	(3.6)
Never	87.0	(4.5)	67.6	(6.0)	59.7	(12.0)	80.3	(4.5)	83.0	(4.5)	82.3	(3.6)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how often milkers wore disposable gloves when milking in the previous 12 months



Nearly half of operations (48.8 percent) provided any training to milkers on milking procedures, but 35.2 percent of operations only trained new milkers. A higher percentage of medium and large operations (7.8 and 21.3 percent, respectively) trained milkers on milking procedures more often than once a year than small operations (0.8 percent). There were no differences by region in the percentage of operations by how frequently milkers were trained on milking procedures.

E.6. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how frequently milkers are trained on milking procedures, and by herd size and region:

Frequency	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
As new milkers only	34.6	(5.9)	37.1	(7.0)	39.3	(11.1)	42.8	(11.8)	32.8	(5.0)	35.2	(4.8)
Less often than once a year	6.6	(4.4)	1.4	(1.0)	1.2	(1.1)	1.3	(0.6)	6.8	(4.5)	5.4	(3.5)
Once a year	4.2	(2.2)	10.7	(3.8)	0.9	(0.8)	3.8	(1.2)	5.5	(2.4)	5.1	(1.8)
More often than once a year	0.8	(0.3)	7.8	(3.0)	21.3	(9.1)	3.3	(1.2)	2.9	(0.9)	3.0	(0.8)
Any training	46.1	(6.6)	57.0	(8.3)	62.7	(15.6)	51.1	(12.3)	48.0	(6.0)	48.8	(5.4)
No training for milkers	53.9	(6.6)	43.0	(8.3)	37.3	(15.6)	48.9	(12.3)	52.0	(6.0)	51.2	(5.4)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

Clipping excessive hair on udders and teats of does can reduce dirt and bacterial contamination of milk. One-half of operations clipped/singed the hair on the udders of milking does. There were no differences by herd size or region in the percentage of operations that clipped/singed the hair on the udders of milking does.

E.7. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that clipped/singed the hair on the udders of milking does, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
46.3	(6.7)	68.2	(5.6)	46.9	(14.0)	57.7	(12.7)	47.6	(6.0)	50.0	(5.5)

Forestripping is the manual removal of milk at the beginning of milking. This should be done to promote milk let down, remove milk that may have a high concentration of somatic cells, and to evaluate foremilk for signs of mastitis. About three-quarters of all operations (76.0 percent) performed forestripping on any does. Over half of all operations (58.5 percent) performed forestripping on does with mastitis and all other does. There were no differences by herd size or region in the percentage of operations that performed any forestripping by doe type.

E.8. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that performed any forestripping¹ in the previous 12 months, by doe type, herd size and region:

Percent Operations

Doe type	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Fresh does	72.8	(5.1)	73.4	(6.3)	52.7	(13.9)	83.5	(4.7)	68.1	(5.3)	71.9	(4.2)
Does with mastitis ²	56.8	(6.5)	70.3	(7.1)	47.6	(12.9)	66.8	(8.4)	56.1	(6.1)	58.5	(5.3)
All other does	57.7	(6.2)	60.7	(7.3)	29.9	(8.9)	68.3	(6.2)	53.1	(6.1)	56.8	(5.0)
Any does	77.5	(5.3)	75.3	(6.2)	55.4	(14.5)	85.2	(4.5)	73.0	(5.5)	76.0	(4.4)
Forestripping not performed on any does	22.5	(5.3)	24.7	(6.2)	44.6	(14.5)	14.8	(4.5)	27.0	(5.5)	24.0	(4.4)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

¹Answer choices included "At each milking," "At least once a day," "At least once a week," "Other," and "Not performed."

²For operations that had does with mastitis.

Overall, 63.9 percent of operations used forestripping on fresh does at each milking, and 50.8 percent of operations used forestripping on does with mastitis at each milking.

E.9. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by frequency of forestripping in the previous 12 months, by doe type, herd size and region:

Percent Operations						
Doe type						
Does with						
Fresh does			mastitis*		All other does	
Frequency	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
At each milking	63.9	(4.8)	50.8	(5.4)	52.6	(4.9)
At least once a day	4.9	(3.4)	0.9	(0.4)	0.9	(0.5)
At least once a week	0.8	(0.6)	0.1	(0.0)	0.5	(0.3)
Other	2.3	(1.2)	6.8	(2.5)	2.7	(1.9)
Not performed	28.1	(4.2)	41.5	(5.3)	43.2	(5.0)
Total	100.0		100.0		100.0	

*For operations that had does with mastitis.

For operations that performed forestripping on any does, a higher percentage of operations (66.2 percent) performed forestripping after teat washing compared with operations that performed forestripping before teat washing (14.1 percent). A higher percentage of medium operations (79.8 percent) completed forestripping after teat washing than large operations (36.1 percent). A higher percentage of large operations (49.6 percent) performed forestripping without teat washing than medium operations (9.1 percent). There were no regional differences in the percentage of operations that performed any forestripping on any does by when the forestripping was performed.

E.10. For operations that performed forestripping on any type of doe* (table E.8.), percentage of operations by when forestripping was performed, and by herd size and region:

Percent Operations												
Timing	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Before teat washing	14.7	(4.2)	11.1	(4.7)	14.2	(6.2)	7.4	(3.6)	16.6	(4.5)	14.1	(3.4)
After teat washing	64.8	(7.4)	79.8	(5.7)	36.1	(7.3)	80.1	(11.6)	61.0	(6.8)	66.2	(6.0)
Before or after teat washing	79.5	(6.9)	90.9	(3.3)	50.4	(8.0)	87.4	(10.9)	77.6	(6.3)	80.3	(5.5)
Forestripping with no teat washing	20.5	(6.9)	9.1	(3.3)	49.6	(8.0)	12.6	(10.9)	22.4	(6.3)	19.7	(5.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 10.9 percent of operations that performed forestripping on any type of doe. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 76.0 percent of those operations performed forestripping on any type of doe (table E.8.).

A good practice for any goat dairy operation is to ensure proper washing and drying of teats prior to milking. This can improve teat health and increase milk quality. Use of water alone to clean teats and udders can carry bacteria from the udder to the teat ends, where bacteria are most likely to enter the teat canal. About three-quarters of operations (76.3 percent) washed teats prior to milking in the previous 12 months. A higher percentage of small and medium operations (77.3 percent and 83.2 percent) washed teats prior to milking than large operations (39.4 percent). There were no regional differences in the percentage of operations by washing method used or in the percentage of operations that performed any washing of teats prior to milking.

E.11. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how teats were usually washed prior to milking in the previous 12 months, and by herd size and region:

Method	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Commercial udder/teat wipes	20.1	(4.9)	29.9	(8.7)	7.5	(4.3)	23.7	(10.1)	20.3	(4.4)	21.1	(4.2)
Udder/teat wash or disinfectant solution used with single-use cloth/paper towels	40.2	(6.2)	37.1	(7.0)	23.4	(9.4)	43.3	(8.6)	37.3	(6.0)	38.8	(5.0)
Udder/teat wash or disinfectant solution used with multiple-use cloth/paper towels	13.1	(4.7)	11.6	(3.8)	7.3	(3.7)	15.5	(4.7)	11.6	(4.8)	12.5	(3.7)
Washed with water only	2.9	(1.4)	4.6	(2.1)	1.2	(1.1)	2.7	(1.0)	3.2	(1.5)	3.1	(1.2)
Other	0.9	(0.6)	0.0	(—)	0.0	(—)	1.7	(1.7)	0.4	(0.3)	0.7	(0.5)
Any washing	77.3	(6.0)	83.2	(3.7)	39.4	(11.7)	87.0	(9.3)	72.8	(5.6)	76.3	(4.8)
No washing	22.7	(6.0)	16.8	(3.7)	60.6	(11.7)	13.0	(9.3)	27.2	(5.6)	23.7	(4.8)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

Over half of operations (59.1 percent) did not dry teats prior to milking. There were no herd size or regional differences by the method used to dry teats prior to milking. Using multiple-use cloth or paper towel can allow for the transfer of bacteria from one goat to another.

E.12. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by how teats were usually dried prior to milking in the previous 12 months, and by herd size and region:

Method	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Teats not dried prior to milking	60.1	(6.1)	52.1	(8.0)	67.9	(10.9)	72.4	(6.1)	54.8	(6.0)	59.1	(5.0)
Single-use cloth/paper towel	31.3	(5.7)	41.5	(8.3)	28.5	(10.3)	17.9	(4.9)	37.8	(5.9)	32.9	(4.7)
Multiple-use cloth/paper towel	8.6	(4.4)	6.4	(3.1)	3.5	(2.6)	9.7	(3.8)	7.4	(4.5)	8.0	(3.5)
Other	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

A higher percentage of large operations (35.9 percent) typically pre-dipped teats prior to milking than small operations (8.2 percent). There were no regional differences in the percentage of operations that typically pre-dipped teats prior to milking.

E.13. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that typically pre-dipped teats prior to milking in the previous 12 months, and by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
8.2	(2.8)	16.8	(4.4)	35.9	(11.2)	8.4	(2.4)	11.9	(3.0)	11.0	(2.4)

Overall, 63.0 percent of operations used any post-milking teat disinfection. A higher percentage of medium operations (38.4 percent) used a commercial post-dip product than small operations (14.3 percent). A higher percentage of small operations (14.9 percent) used a nonlabelled/homemade solution for teat disinfection than medium and large operations (0.8 and 0.0 percent, respectively). There were no regional differences in the percentage of operations by primary post-milking procedures used for teat disinfection.

E.14. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by primary post-milking procedure used for teat disinfection in the previous 12 months, and by herd size and region:

Procedure	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Dip teats with commercial post-dip product	14.3	(3.4)	38.4	(8.2)	25.3	(8.0)	19.8	(4.8)	18.7	(3.9)	19.0	(3.2)
Dip teats with non-labeled/homemade solution	14.9	(6.1)	0.8	(0.5)	0.0	(—)	29.5	(13.2)	6.0	(4.4)	11.7	(4.8)
Spray teats with commercial post-dip product	26.8	(4.4)	29.6	(6.4)	16.3	(5.9)	21.4	(5.1)	28.4	(4.5)	26.7	(3.6)
Foam teats with commercial post-dip	2.1	(1.8)	3.8	(3.1)	12.1	(8.5)	0.0	(—)	3.8	(2.1)	2.9	(1.6)
Other	3.0	(1.6)	1.9	(1.5)	0.0	(—)	2.4	(1.8)	2.8	(1.6)	2.7	(1.3)
Any post-milking teat disinfection	61.1	(6.5)	74.4	(5.4)	53.7	(14.1)	73.1	(10.7)	59.7	(5.8)	63.0	(5.2)
No post-milking teat disinfection	38.9	(6.5)	25.6	(5.4)	46.3	(14.1)	26.9	(10.7)	40.3	(5.8)	37.0	(5.2)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

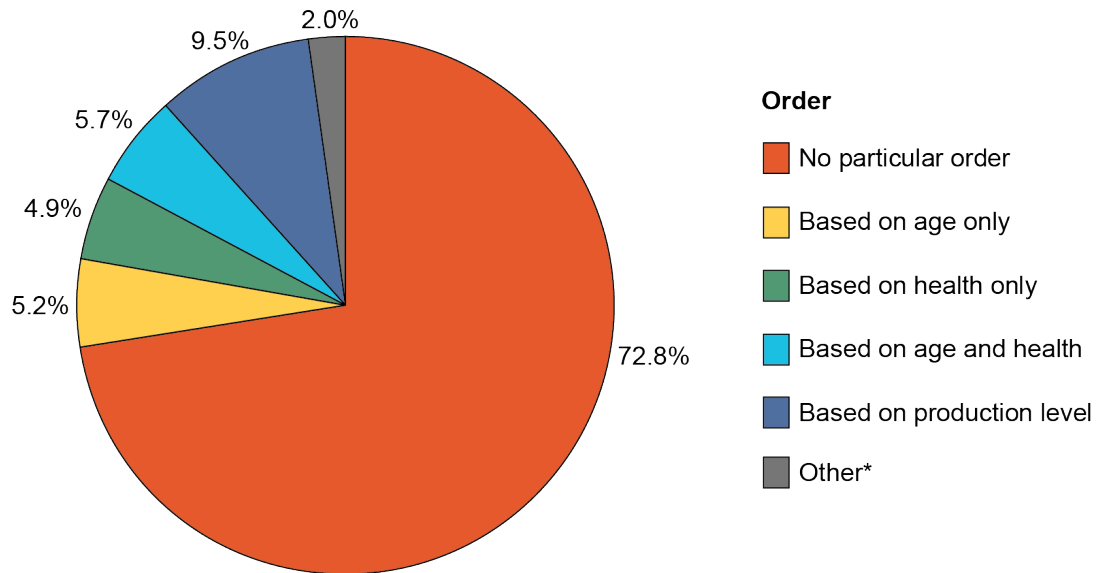
The highest percentage of all operations (72.8 percent) milked does in no particular order. There were no herd size or regional differences in the percentage of operations by the order in which does were milked.

E.15. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by the order in which goats were milked, and by herd size and region:

Order	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
No particular order	75.1	(4.7)	66.4	(7.0)	57.9	(12.0)	76.4	(5.9)	71.6	(4.8)	72.8	(3.9)
Based on age only	5.0	(2.5)	3.7	(1.7)	12.2	(4.7)	3.8	(2.4)	5.6	(2.5)	5.2	(2.0)
Based on health only	2.5	(1.8)	16.4	(5.5)	3.2	(2.5)	3.4	(2.0)	5.3	(2.3)	4.9	(1.8)
Based on age and health	4.6	(2.4)	7.5	(3.5)	15.9	(8.8)	2.1	(0.9)	6.9	(2.6)	5.7	(2.0)
Based on production level	10.2	(2.8)	5.6	(2.3)	10.8	(4.3)	9.2	(3.7)	9.6	(2.7)	9.5	(2.3)
Other*	2.5	(1.5)	0.3	(0.3)	0.0	(—)	5.1	(3.6)	1.0	(1.0)	2.0	(1.2)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*A common "other" response was pen order.

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by the order in which goats were milked



*A common 'other' response was pen order.

F. Milk Quality

Note: Estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more dry or in-milk does on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

There is considerable variation in the somatic cell count (SCC) in goat milk due to physiologic factors such as stage of lactation and parity, and other factors such as goat breed. This makes it more challenging to use individual animal SCC to identify does with subclinical intra-mammary infection. However, bulk tank somatic cell count can be used as an indicator of milk quality for a goat herd. The legal limit for bulk tank SCC for goats is 1,500,000 per ml. Although the California Mastitis test (CMT) can be a tool to help identify subclinical mastitis, milk culture remains the gold standard for identifying goats with intramammary infection and monitoring. Goats that develop signs of clinical mastitis may be treated with antibiotics and non-steroidal anti-inflammatory drugs. Goats may also be treated at dry-off with intramammary antibiotics. Adherence to milk withhold times, where the milk from treated goats is withheld from the bulk tank for a specified amount of time is an important management practice to prevent violative drug residues in bulk tank milk. Producers may also perform on-farm testing for drug residues; however, all milk transported to USDA-approved plants is tested for residues prior to processing.

Nearly one-fifth (19.8 percent) of operations routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months. A higher percentage of medium and large operations (39.7 and 66.5 percent, respectively) routinely performed somatic cell count (SCC) testing on the milk than small operations (12.4 percent). There were no regional differences.

F.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
12.4	(4.2)	39.7	(7.0)	66.5	(16.3)	18.8	(9.5)	20.1	(3.7)	19.8	(3.6)

For operations that routinely performed somatic cell count (SCC) testing on the milk from the herd, the operation average was 439,783 cells/mL. The operation average somatic cell count was higher on large operations (692,160 cells/mL) than small operations (304,168 cells/mL). There were no differences by region in the operation mean for operations that routinely performed SCC testing on the milk from the herd in the previous 12 months. The legal limit for bulk tank SCC for goats is 1,500,000 per ml. Operation average somatic cell count reported below was not verified by any records. It is possible that some producers interpreted somatic cell reports incorrectly. Additionally, herds that milk seasonally may miss the late lactation rise of somatic cell counts and therefore report lower levels.

F.2. For operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months¹ (table F.1.), operation average somatic cell count (cells/mL) for milk tested in the previous 12 months, by herd size and region:

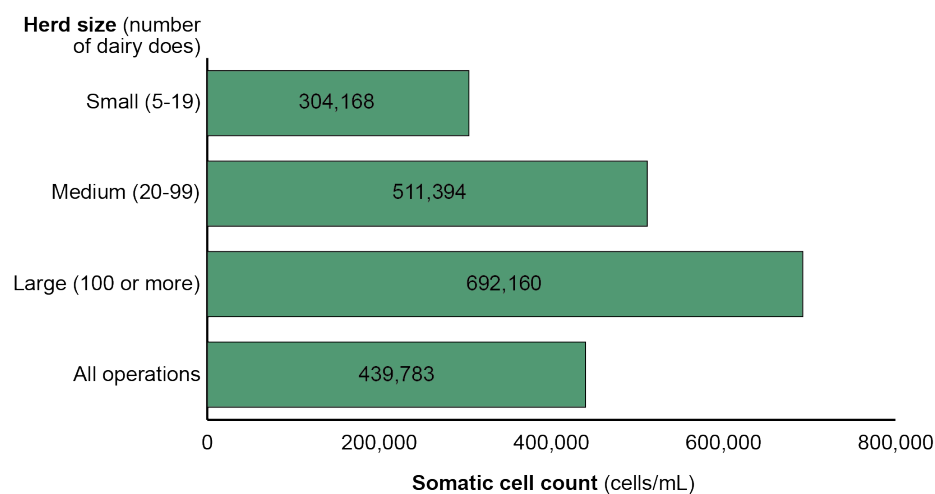
Operation Average Somatic Cell Count (cells/mL)

Parameter	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error	Avg.	Std. Error
Operation average	304,168	(110,033)	511,394	(62,614)	692,160	(34,517)	247,446	(77,154)	498,212	(78,198)	439,783	(69,822)
Operation median	92,171	(47,852)	402,978	(91,467)	728,634	(55,913)	(D) ²	(D)	391,159	(123,212)	332,796	(114,834)

¹Refers to the 2.8 percent of operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 19.8 percent of those operations routinely performed SCC testing on the milk from the herd in the previous 12 months (table F.1.).

²Values of (D) denote too few to report.

For operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months* (table F.1.), operation average somatic cell count (cells/mL) for milk tested in the previous 12 months, by herd size



*Refers to the 2.8 percent of operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy goats (does) in the previous 12 months and had 5 or more does (table A.2.), of which 19.8 percent of those operations routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months (table F.1.).

For operations that routinely performed somatic cell count (SCC) testing on the milk from the herd, the highest percentage of all operations (60.4 percent) reported an average somatic cell count less than 500,000 cells/mL. A higher percentage of small operations (80.5 percent) reported an average somatic cell count less than 500,000 cells/ml than large operations (18.9 percent). A higher percentage of medium and large operations (40.2 and 73.2 percent, respectively) reported an average somatic cell count between 500,000 and 999,999 cells/ml than small operations (6.2 percent). There were no differences by region in the percentage of operations by reported average somatic cell count.

F.3. For operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months* (table F.1.), percentage of operations by herd average somatic cell count (cells/mL) for milk tested in the previous 12 months, by herd size and region:

Percent Operations												
SCC (cells/mL)	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Less than 500,000	80.5	(10.1)	51.7	(9.7)	18.9	(6.8)	80.0	(10.9)	54.4	(8.8)	60.4	(8.0)
500,000–999,999	6.2	(3.5)	40.2	(9.2)	73.2	(8.0)	20.0	(10.9)	31.8	(7.1)	29.0	(6.3)
1,000,000–1,499,999	13.2	(9.4)	6.7	(4.7)	7.9	(4.6)	0.0	(—)	13.2	(6.2)	10.1	(4.9)
1,500,000 or more	0.0	(—)	1.4	(1.3)	0.0	(—)	0.0	(—)	0.6	(0.6)	0.5	(0.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 2.8 percent of operations that routinely performed somatic cell count (SCC) testing on the milk from the herd in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 19.8 percent of those operations routinely performed SCC testing on the milk from the herd in the previous 12 months (table F.1.).

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, 3.2 percent of all operations tested milk on-farm for antibiotic residues in the previous 12 months. Overall, 30.6 percent of all operations reported no antibiotics were used on the operation in the previous 12 months. The percentage of operations that tested milk on-farm for antibiotic residues increased as herd sized increased, with 0.1 percent of small, 9.2 percent of medium, and 39.8 percent of large operations testing milk on-farm for antibiotic residues. There were no differences by region in the percentage of operations that tested milk on-farm for antibiotic residues in the previous 12 months.

F.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that tested milk on-farm for antibiotic residues in the previous 12 months, by herd size and region:

Tested	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Yes	0.1	(0.1)	9.2	(2.9)	39.8	(9.1)	2.1	(0.8)	3.6	(1.0)	3.2	(0.8)
No	65.5	(6.4)	74.4	(5.8)	44.7	(8.1)	65.1	(11.3)	66.5	(5.8)	66.2	(5.2)
NA (no antibiotics used)	34.4	(6.4)	16.4	(5.0)	15.6	(5.6)	32.8	(11.2)	29.9	(5.7)	30.6	(5.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

For operations that tested milk on-farm for antibiotic residues, a higher percentage of all operations (57.2 percent) used the Delvotest® testing kit than the percentage of all operations that used the Snap® kit, CITE Probe®, Charm Farm, or Pensyme® Milk Test.

F.5. For operations that tested milk on-farm for antibiotic residues in the previous 12 months¹ (table F.4.), percentage of operations by the most commonly used antibiotic residue testing kits:

Testing kit	Percent operations	Standard error
Snap® kit (beta lactam or tetracycline)	7.5	(5.6)
Delvotest®	57.2	(10.5)
CITE Probe®	0.0	(—)
Charm Farm	7.6	(5.8)
Pensyme® Milk Test	2.9	(2.7)
Other ²	24.9	(8.5)
Total	100.0	

¹Refers to the 0.5 percent of operations that tested milk on-farm for antibiotic residues in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy goats (does) in the previous 12 months and had 5 or more does (table A.2.), of which 3.2 percent of those operations tested milk on-farm for antibiotic residues in the previous 12 months (table F.4.).

²Common "other" responses included "unknown" and "other Charm Sciences kits."

On operations that tested milk on-farm for antibiotic residues in the previous 12 months, a higher percentage of operations (76.9 percent) tested samples from the bulk tank—before processor pickup than the percentage of operations that tested samples from fresh does or string samples (35.1 and 14.4 percent, respectively).

F.6. For operations that tested milk on-farm for antibiotic residues in the previous 12 months¹ (table F.4.), percentage of operations that tested milk samples for antibiotic residues from the following sources:

Percent Operations							
Response							
	Yes		No		NA ²		Total
Source	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.
Fresh does	35.1	(11.6)	51.2	(11.2)	13.7	(7.0)	100.0
Individual does recently treated with antibiotics	69.5	(9.0)	26.6	(8.6)	3.8	(2.5)	100.0
Bulk tank—before processor pickup	76.9	(8.6)	23.1	(8.6)	0.0	(—)	100.0
String samples (samples representing a group/pen of does)	14.4	(12.3)	85.6	(12.3)			100.0
Other	2.1	(1.9)	97.9	(1.9)			100.0

¹Refers to the 0.5 percent of operations that tested milk on-farm for antibiotic residues in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 3.2 percent of those operations tested milk on-farm for antibiotic residues in the previous 12 months (table F.4.).

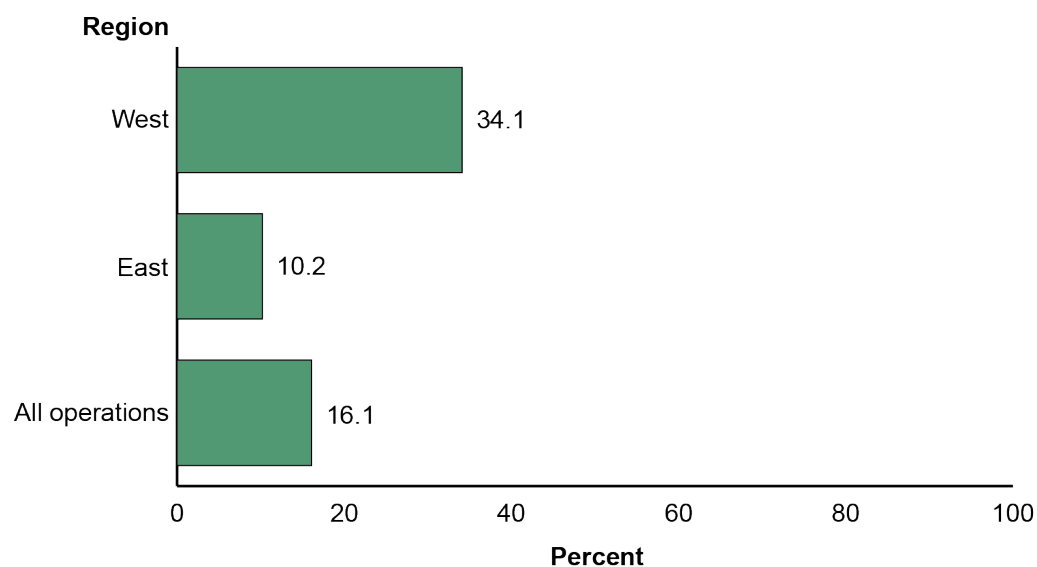
²NA refers to fresh does not milked or not treated, individual does removed from milking herd or not treated, or no bulk tank.

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, 16.1 percent of all operations performed any cultures on milk produced by the operation. There were no differences by herd size in the percentage of operations that performed any cultures. A higher percentage of operations in the West region (34.1 percent) performed any cultures than operations in the East region (10.2 percent).

F.7. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that performed any cultures on milk produced on the operation in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
15.3	(3.3)	17.8	(5.2)	21.5	(7.2)	34.1	(6.0)	10.2	(3.1)	16.1	(2.8)

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that performed any cultures on milk produced on the operation in the previous 12 months, by region



For operations that performed any milk cultures in the previous 12 months, milk cultures were most frequently performed on milk from individual does (92.6 percent), followed by bulk-tank milk (13.3 percent), and milk from string samples (2.5 percent).

F.8. For operations that performed any cultures on milk produced on the operation in the previous 12 months¹ (table F.7.), percentage of operations that performed milk cultures from the following sources:

Percent Operations							
Response							
	Yes		No		NA ²		Total
Milk source	Pct.	Std. error	Pct.	Std. error	Pct.	Std. error	Pct.
Milk from individual does	92.6	(2.5)	7.4	(2.5)			100.0
Bulk-tank milk	13.3	(3.4)	47.8	(17.2)	38.9	(16.9)	100.0
String samples (samples representing a group/pen of does)	2.5	(1.0)	97.5	(1.0)			100.0

¹Refers to the 2.3 percent of operations that performed any milk cultures on milk produced on the operation in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 16.1 percent of those operations performed any milk cultures on milk produced on the operation in the previous 12 months (table F.7.).

²NA refers to no bulk tank.

For operations that performed cultures on milk from individual does, there was no predominant doe type that was typically selected for milk cultures. A higher percentage of medium and large operations (42.3 and 16.5 percent, respectively) performed milk cultures on milk from individual does with chronic clinical mastitis than small operations (1.8 percent). No operations in the West region selected fresh does for milk culturing, whereas 14.0 percent of operations in East region selected fresh does for milk culturing. A higher percentage of operations in the West region (59.1 percent) selected does for an “other” reason for milk culturing than operations in the East region (14.5 percent).

F.9. For operations that performed milk cultures on milk from individual does in the previous 12 months* (table F.8.), percentage of operations by the type of does typically selected for milk culturing, and by herd size and region:

Doe type	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Fresh does	6.4	(6.1)	9.4	(8.9)	0.0	(—)	0.0	(—)	14.0	(10.5)	6.5	(4.9)
All clinical mastitis cases	26.6	(10.1)	57.9	(18.6)	66.9	(14.2)	25.0	(9.5)	44.5	(16.2)	34.1	(8.5)
Chronic clinical mastitis cases	1.8	(1.0)	42.3	(18.5)	16.5	(8.4)	4.3	(1.8)	14.7	(8.7)	9.1	(4.0)
Clinical mastitis cases that did not respond to treatment	4.7	(3.5)	47.5	(18.6)	11.5	(7.2)	10.0	(5.1)	14.1	(8.6)	11.9	(4.8)
High somatic cell count does	23.9	(12.3)	75.5	(12.4)	46.1	(15.2)	15.9	(6.8)	53.8	(16.7)	33.5	(9.7)
Other	47.4	(10.3)	5.2	(5.2)	10.0	(5.9)	59.1	(9.0)	14.5	(12.0)	38.4	(7.4)

*Refers to the 2.1 percent of operations that performed milk cultures from individual does in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 16.1 percent of those operations performed milk cultures on milk produced on the operation (table F.7.), of which 92.6 percent of those operations performed milk cultures from individual does (table F.8.), or 2.1 percent of operations overall ($0.143 \times 0.161 \times 0.926 \times 100 = 2.1$ percent).

For operations that performed any milk cultures in the previous 12 months, there was no predominant type of laboratory used to perform any of the milk culture testing. No small operations used an on-farm laboratory, whereas 33.1 percent of medium operations and 9.5 percent of large operations used an on-farm laboratory. There were no differences by region in the percentage of operations by who performed any of the milk culture testing.

F.10. For operations that performed any cultures on milk produced on the operation in the previous 12 months* (table F.7.), percentage of operations by type of laboratory used for milk culture testing, and by herd size and region:

Type of laboratory	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
On-farm lab	0.0	(—)	33.1	(15.2)	9.5	(5.7)	10.3	(6.4)	3.5	(2.9)	7.0	(3.8)
State or university diagnostic lab	43.6	(21.7)	54.3	(15.6)	24.3	(8.6)	41.4	(28.1)	47.4	(15.2)	44.3	(16.3)
Commercial lab	39.3	(12.1)	30.2	(11.5)	62.1	(13.2)	16.2	(9.5)	64.2	(13.1)	39.2	(9.3)
Private veterinary lab (veterinary clinic)	6.9	(3.9)	2.5	(2.4)	24.3	(13.6)	8.5	(4.9)	6.0	(3.7)	7.3	(3.2)

*Refers to the 2.3 percent of operations that performed any milk cultures on milk produced on the operation in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 16.1 percent of those operations performed any milk cultures on milk produced on the operation in the previous 12 months (table F.7.).

For operations that performed any milk cultures in the previous 12 months, there was no predominant organism identified on all operations. A higher percentage of large operations (38.0 percent) identified *Staphylococcus aureus* from any milk cultures than small operations (4.8 percent). Only large operations identified any *Mannheimia spp.* (5.4 percent) and *Streptococcus agalactiae* (26.7 percent) from any milk cultures.

Additionally, a higher percentage of large operations (33.7 percent) identified environmental *Streptococcus spp. non-agalactiae* from any milk cultures than small operations (1.2 percent). A higher percentage of operations in the East region (33.9 percent) identified Coagulase negative *Staphylococcus* (CNS) non-*aureus* from any milk cultures than the West region (3.3 percent). Only operations in the West region identified *Mannheimia spp.* (0.7 percent) from any milk cultures and only operations in the East region identified *Streptococcus agalactiae* (4.0 percent) from any milk cultures.

F.11. For operations that performed any cultures on milk produced on the operation in the previous 12 months¹ (table F.7.), percentage of operations by the organisms identified from cultured milk, and by herd size and region:

Organism	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Coagulase negative <i>Staphylococcus</i> (CNS) non- <i>aureus</i>	21.1	(11.7)	9.1	(7.0)	9.5	(5.7)	3.3	(1.5)	33.9	(16.2)	18.0	(9.0)
<i>Staphylococcus aureus</i>	4.8	(2.3)	22.5	(10.7)	38.0	(12.7)	8.7	(2.8)	12.6	(5.8)	10.6	(3.0)
<i>Mannheimia spp.</i> (<i>Pasteurella</i>)	0.0	(—)	0.0	(—)	5.4	(4.7)	0.7	(0.6)	0.0	(—)	0.4	(0.3)
<i>Mycoplasma spp.</i>	1.7	(1.7)	2.5	(2.4)	0.0	(—)	0.9	(0.9)	2.6	(2.6)	1.7	(1.3)
<i>E. coli/ Pseudomonas/ Klebsiella/</i> other gram negative bacteria	5.6	(3.7)	34.2	(15.4)	16.5	(8.7)	11.1	(5.1)	12.7	(7.7)	11.9	(4.5)
<i>Streptococcus agalactiae</i>	0.0	(—)	0.0	(—)	26.7	(14.3)	0.0	(—)	4.0	(2.9)	1.9	(1.3)
Environmental <i>streptococcus spp. non-agalactiae</i>	1.2	(0.8)	13.0	(8.9)	33.7	(11.9)	4.1	(1.6)	7.7	(4.3)	5.8	(2.2)
Other ²	16.3	(11.9)	18.9	(14.3)	9.5	(5.7)	5.0	(2.9)	28.5	(16.9)	16.3	(9.2)

¹Refers to the 2.3 percent of operations that performed any milk cultures on milk produced on the operation in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 16.1 percent of those operations performed any milk cultures on milk produced on the operation in the previous 12 months (table F.7.).

²A common "other" response was *Bacillus spp.*

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, 33.7 percent of operations had any does with clinical mastitis in the previous 12 months. A higher percentage of large operations (88.2 percent) had any does with clinical mastitis than small operations (26.6 percent), which is expected since large operations have more goats that could be susceptible to mastitis. There were no differences by region in the percentage of operations that had any does with clinical mastitis in the previous 12 months.

F.12. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations with any does with clinical mastitis in the previous 12 months, by herd size and region:

Percent Operations										
Herd size (number of dairy does)						Region				
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.
26.6	(5.4)	50.3	(7.6)	88.2	(8.3)	21.1	(4.7)	37.8	(5.7)	33.7
										(4.5)

For operations with does that had clinical mastitis in the previous 12 months, there was no predominant method used for milking does with mastitis for all operations. A higher percentage of medium and large operations (45.4 and 47.3 percent, respectively) used a separate milking unit for does with mastitis than small operations (9.5 percent). There were no differences by region in the percentage of operations by method usually used to milk does with clinical mastitis in the previous 12 months.

F.13. For operations with does that had clinical mastitis in the previous 12 months* (table F.12.), percentage of operations by method usually used to milk does with clinical mastitis in the previous 12 months, and by herd size and region:

Method	Percent Operations											
	Herd size (number of dairy does)						Region				All Operations	
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East			
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
At the end of milking	44.3	(11.2)	42.0	(11.5)	13.5	(5.9)	35.4	(10.1)	40.3	(8.6)	39.6	(7.4)
In a separate string from healthy goats	31.7	(13.5)	3.1	(1.6)	8.3	(4.5)	3.9	(2.5)	24.6	(10.7)	21.4	(9.3)
Using a separate milking unit from healthy goats	9.5	(3.9)	45.4	(13.2)	47.3	(13.8)	45.1	(10.3)	19.7	(6.3)	23.6	(5.8)
No specific procedure followed	5.1	(4.3)	5.4	(3.6)	27.5	(19.3)	3.8	(2.6)	9.0	(5.1)	8.2	(4.4)
Other	6.4	(4.5)	0.0	(—)	0.0	(—)	2.0	(1.8)	4.3	(3.3)	3.9	(2.8)
Any method	96.9	(2.1)	95.9	(2.5)	96.7	(2.4)	90.2	(7.1)	97.8	(1.0)	96.6	(1.5)
NA (any does with mastitis are dried off)	3.1	(2.1)	4.1	(2.5)	3.3	(2.4)	9.8	(7.1)	2.2	(1.0)	3.4	(1.5)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 4.8 percent of operations with does that had clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had does with clinical mastitis in the previous 12 months (table F.12.).

For operations with does that had clinical mastitis in the previous 12 months, a higher percentage of all operations used intramammary antibiotics or oral or injectable antibiotics (51.7 and 44.4 percent, respectively) than organic/homeopathic remedies (14.2 percent). There were no differences by herd size or region in the percentage of operations by procedures used to treat mastitis.

F.14. For operations with does that had clinical mastitis in the previous 12 months* (table F.12.), percentage of operations by procedures used to treat mastitis, and by herd size and region:

Treatment protocol	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Intramammary (IMM) antibiotics (excluding dry doe treatment)	61.6	(10.5)	41.6	(11.2)	25.4	(8.6)	49.3	(9.7)	52.1	(9.4)	51.7	(8.1)
Oral or injectable antibiotics	43.1	(11.0)	54.7	(11.8)	31.2	(9.8)	41.9	(9.3)	44.8	(9.1)	44.4	(7.8)
Organic/homeopathic remedies	10.9	(5.3)	17.9	(6.6)	22.8	(8.0)	23.5	(10.1)	12.6	(4.0)	14.2	(3.9)
Pain medications (anti-inflammatories, analgesics)	14.6	(5.9)	39.7	(14.1)	25.5	(8.6)	34.8	(8.7)	20.1	(6.9)	22.3	(6.1)
Other	2.7	(2.7)	21.3	(16.5)	1.0	(0.9)	10.9	(9.9)	6.4	(5.8)	7.1	(5.2)

*Refers to the 4.8 percent of operations with does that had clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had does with clinical mastitis in the previous 12 months (table F.12.).

For operations with does that had clinical mastitis in the previous 12 months, there was no predominant method used for managing mastitis for all operations. A higher percentage of medium operations (67.2 percent) dried does off early to manage mastitis than large operations (22.2 percent). There were no differences by region in the percentage of operations by procedures used to manage mastitis.

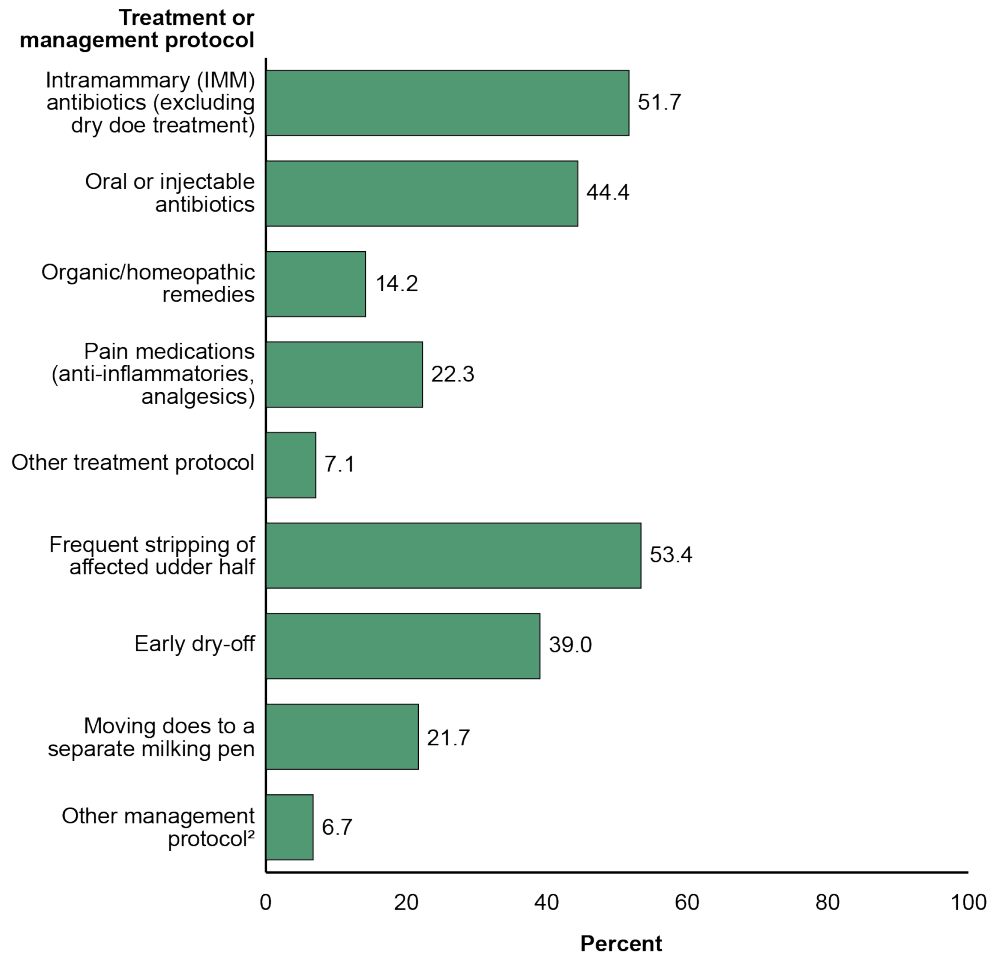
F.15. For operations with does that had clinical mastitis in the previous 12 months¹ (table F.12.), percentage of operations by protocol used to manage mastitis, and by herd size and region:

Management protocol	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Frequent stripping of affected udder half	51.2	(11.7)	66.5	(9.5)	39.3	(11.7)	60.8	(10.6)	52.1	(9.4)	53.4	(8.2)
Early dry-off	31.2	(9.4)	67.2	(9.0)	22.2	(7.8)	27.0	(8.6)	41.2	(8.7)	39.0	(7.4)
Moving does to a separate milking pen	19.2	(13.9)	28.0	(15.5)	21.3	(7.5)	10.6	(4.1)	23.7	(10.8)	21.7	(9.4)
Other ²	1.9	(1.9)	12.7	(7.5)	17.5	(6.8)	9.8	(7.0)	6.1	(2.5)	6.7	(2.4)

¹Refers to the 4.8 percent of operations with does that had clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had does with clinical mastitis in the previous 12 months (table F.12.).

²A common "other" response was culling the affected doe(s).

For operations with does that had clinical mastitis in the previous 12 months¹ (table F.12.), percentage of operations by procedures used to treat mastitis by treatment protocol and by management protocol



¹Refers to the 4.8 percent of operations with does that had clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy goats (does) in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had does with clinical mastitis in the previous 12 months (table F.12.).

²A common 'other' response was culling the affected doe(s).

For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis, 3.0 percent of all does on these operations received an IMM antibiotic. The percentage of does that were treated with IMM antibiotics decreased as herd size increased, with 20.4 percent of does on small operations, 7.3 percent of does on medium operations, and 1.0 percent of does on large operations treated with an IMM antibiotic for mastitis. There were no differences by region in the percentage of does treated with an IMM antibiotic for mastitis.

F.16. For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis in the previous 12 months¹ (table F.14.), percentage of does with clinical mastitis on these operations treated with IMM antibiotics, by herd size and region:

Percent Does ²											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
20.4	(4.4)	7.3	(1.1)	1.0	(0.5)	3.7	(1.3)	2.9	(1.7)	3.0	(1.6)

¹Refers to the 2.5 percent of operations that used IMM antibiotics to treat does with clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat those mastitic does (table F.14.), or 2.5 percent of operations overall ($0.143 \times 0.337 \times 0.517 \times 100 = 2.5$ percent).

²As a percentage of the total dairy doe inventory on September 1, 2019.

For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis, there was no predominant reason for using IMM antibiotics to treat does with clinical mastitis for all operations. Overall, 39.3 percent of small operations and 46.1 percent of medium operations used IMM antibiotics because they were recommended by other producers, however this was not a reason reported by large operations.

F.17. For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis in the previous 12 months* (table F.14.), percentage of operations by reason IMM antibiotics were used for mastitis treatment, and by herd size and region:

Reason	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Veterinary recommendation	26.8	(12.4)	65.6	(11.4)	67.3	(12.1)	60.4	(10.3)	33.2	(11.9)	37.2	(10.9)
Recommendation from other producers	39.3	(18.4)	46.1	(12.1)	0.0	(—)	25.8	(8.3)	40.2	(15.9)	38.1	(13.9)
Previous treatment effectiveness	37.6	(14.7)	84.0	(7.7)	66.3	(12.6)	68.8	(11.9)	45.3	(14.1)	48.8	(12.7)
Previous culture and antimicrobial sensitivity results	7.4	(4.4)	8.3	(5.5)	34.8	(12.6)	31.2	(12.1)	5.6	(3.0)	9.4	(3.8)
Individual doe culture results before therapy	15.3	(11.4)	14.2	(12.3)	9.1	(5.4)	8.0	(4.2)	15.9	(10.2)	14.7	(8.7)
Other	0.8	(0.8)	1.3	(1.2)	0.0	(—)	4.0	(3.6)	0.3	(0.3)	0.8	(0.6)

*Refers to the 2.5 percent of operations that used IMM antibiotics to treat does with clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat those mastitic does (table F.14.), or 2.5 percent of operations overall ($0.143 \times 0.337 \times 0.517 \times 100 = 2.5$ percent).

The IMM antibiotics in the tables below are all approved by the Food and Drug Administration for use in lactating dairy cows, and withdrawal times printed on the label are established for dairy cow milk and meat. There are no IMM antibiotics that have gone through the approval process for use in dairy goats. Thus, use of these antibiotics in goats is performed in an extra-label fashion, which is legal if certain conditions are met.

For the operations that treated does with intramammary (IMM) antibiotics as part of a treatment protocol for clinical mastitis, a higher percentage of operations (71.5 percent) used ToDAY® /Cefa-Lak® (cephapirin) than other IMM antibiotics. There were no differences by herd size or region in the percentage of operations that gave the listed antibiotics to treat does with clinical mastitis.

F.18. For operations that treated does with intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis in the previous 12 months* (table F.14.), percentage of operations that gave the following antibiotics, by herd size and region:

Antibiotic	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Spectramast® LC (ceftiofur hydrochloride)	20.1	(11.9)	40.9	(12.0)	32.3	(11.7)	41.5	(11.5)	22.3	(10.6)	25.1	(9.4)
ToDAY® /Cefa-Lak® (cephapirin)	77.3	(12.2)	58.5	(12.7)	46.8	(12.6)	59.4	(11.5)	73.6	(11.1)	71.5	(9.8)
DariClox® (cloxacillin)	1.0	(0.7)	0.0	(—)	0.0	(—)	2.3	(2.2)	0.4	(0.4)	0.7	(0.5)
Pirsue® (pirlimycin hydrochloride)	6.0	(3.6)	29.7	(10.2)	23.4	(10.8)	19.0	(7.1)	10.7	(4.6)	11.9	(4.2)
Masti-Clear™ (penicillin)	11.7	(8.8)	1.6	(1.6)	15.5	(10.2)	9.0	(4.9)	10.0	(7.5)	9.9	(6.5)
Polymast™ (hetacillin potassium)	0.0	(—)	0.0	(—)	20.7	(11.9)	0.0	(—)	1.6	(1.1)	1.3	(0.9)
Amoximast® (amoxicillin)	0.0	(—)	5.2	(4.7)	0.0	(—)	0.0	(—)	1.2	(1.2)	1.0	(1.0)
Hetacin-K® (hetacillin potassium)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Other	0.5	(0.5)	0.0	(—)	0.0	(—)	2.3	(2.2)	0.0	(—)	0.3	(0.3)

*Refers to the 2.5 percent of operations that used IMM antibiotics to treat does with clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat those mastitic does (table F.14.), or 2.5 percent of operations overall ($0.143 \times 0.337 \times 0.517 \times 100 = 2.5$ percent).

For does with clinical mastitis that were treated with intramammary (IMM) antibiotics, there was no predominant IMM antibiotic used to treat does with clinical mastitis. A higher percentage of does with clinical mastitis on small and medium operations (59.7 and 63.1 percent, respectively) were treated with ToDAY®/Cefa-Lak® (cephapirin) than on large operations (6.7 percent). No does with clinical mastitis on small or medium operations were treated with Polymast™ (hetacillin potassium), but 71.4% of does on large operations were treated with Polymast™ (hetacillin potassium). No does with clinical mastitis in the West region were treated with Polymast™ (hetacillin potassium), but 67.0 percent in the East region were treated with Polymast™ (hetacillin potassium).

F.19. For does with clinical mastitis that were treated with intramammary (IMM) antibiotics as part of a treatment protocol in the previous 12 months¹ (table F.16.), percentage of these does that were given the following antibiotics, by herd size and region:

Antibiotic	Percent Does ²											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Spectramast® LC (ceftiofur hydrochloride)	34.6	(19.0)	27.8	(9.2)	8.9	(8.3)	14.9	(7.4)	12.2	(9.6)	12.5	(8.7)
ToDAY®/Cefa-Lak® (cephapirin)	59.7	(18.3)	63.1	(10.7)	6.7	(5.3)	49.8	(19.4)	11.5	(7.9)	15.7	(9.4)
DariClox® (cloxacillin)	1.0	(0.7)	0.0	(—)	0.0	(—)	0.3	(0.3)	0.0	(0.0)	0.1	(0.1)
Pirsue® (pirlimycin hydrochloride)	9.4	(5.9)	33.4	(10.6)	11.8	(10.5)	42.3	(21.1)	10.1	(8.4)	13.6	(9.6)
Masti-Clear™ (penicillin)	12.1	(8.8)	1.0	(1.0)	1.3	(1.4)	3.2	(2.2)	1.9	(1.7)	2.0	(1.6)
Polymast™ (hetacillin potassium)	0.0	(—)	0.0	(—)	71.4	(22.6)	0.0	(—)	67.0	(23.4)	59.7	(24.7)
Amoximast® (amoxicillin)	0.0	(—)	1.6	(1.4)	0.0	(—)	0.0	(—)	0.2	(0.2)	0.1	(0.2)
Hetacin-K® (hetacillin potassium)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Other	1.0	(1.0)	0.0	(—)	0.0	(—)	0.6	(0.7)	0.0	(—)	0.1	(0.1)

¹Refers to the 3.0 percent of mastitic does treated with IMM antibiotics on the 2.5 percent of operations that used IMM antibiotics to treat does with clinical mastitis in the previous 12 months. These estimates come from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat 3.0 percent of their does (table F.14. and table F.16., respectively).

²As a percentage of the total dairy doe inventory on September 1, 2019.

The IMM antibiotics in the table below are all approved by the Food and Drug Administration for use in lactating dairy cows, and the withdrawal times printed on the label are established for dairy cow milk and meat. These IMM antibiotics are not approved for use in goats and no standard withdrawal time for goats is provided. Dairy goat producers may follow a different withdrawal time than that recommended for dairy cows, such as a withdrawal time recommended by their veterinarian. Producers were asked what withdrawal time they followed after use of IMM antibiotic, but the wording of the question did not specify whether the withdrawal time referred to milk or meat, and most producers likely interpreted that we were asking for the milk withdrawal time.

Because the other antibiotics in the table below were used by too few producers or not at all, there are only four antibiotic withdrawal times listed below. There were no differences in withdrawal times for these four antibiotics. The reported withdrawal times were different from the withdrawal times used for dairy cows. For example, the average withdrawal time treatment with Spectramast® LC (ceftiofur hydrochloride) was 12.2 days, with a 72-hour milk discard period and a 2-day pre-slaughter withdrawal period for dairy cows. The average withdrawal time for mastitic does treated with Pirsue® (pirlimycin hydrochloride) was 7.6 days, with a 36-hour milk discard period and a 9-day pre-slaughter withdrawal period for dairy cows.

F.20. For does treated with the specific intramammary (IMM) antibiotics listed below as part of a treatment protocol for does with clinical mastitis in the previous 12 months¹ (table F.19.), average withdrawal time (in days) for each of the IMM antibiotics:

Antibiotic	Average doe withdrawal time (days)	Standard error
Spectramast® LC (ceftiofur hydrochloride)	12.2	(4.1)
ToDAY®/Cefa-Lak® (cephapirin)	6.5	(0.8)
DariClox® (cloxacillin)	(D) ²	(D)
Pirsue® (pirlimycin hydrochloride)	7.6	(0.6)
Masti-Clear™ (penicillin)	7.5	(2.0)
Polymast™ (hetacillin potassium)	(D)	(D)
Amoximast® (amoxicillin)	(D)	(D)
Hetacin-K® (hetacillin potassium)	NA ³	NA
Other	(D)	(D)

¹Refers to mastitic does treated with the IMM antibiotics listed above in the previous 12 months. This refers to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat 3.0 percent of their does (table F.14. and table F.16., respectively), of which the IMM antibiotics listed above were used on those does (table F.19.).

²Values of (D) denote too few to report.

³Values of NA denotes that specific antibiotic was not used on any does.

For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis, a higher percentage of all operations (87.9 percent) typically administered a whole tube of the antibiotic into one teat than the other methods of administration in the table below.

All large operations typically administered the whole tube of IMM antibiotics into one teat, whereas some small and medium operations (8.8 and 28.5 percent, respectively), split the IMM antibiotic between two teats. There were no differences by region in the percentage of operations by how IMM antibiotics were typically administered to does with clinical mastitis.

F.21. For operations that used intramammary (IMM) antibiotics as part of a treatment protocol for does with clinical mastitis in the previous 12 months* (table F.14), percentage of operations by how IMM antibiotics were typically administered to mastitic does, and by herd size and region:

Administration	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
The whole tube administered into one teat	91.2	(6.2)	71.5	(10.2)	100.0	(—)	80.9	(7.3)	89.1	(5.9)	87.9	(5.3)
A tube split between two teats	8.8	(6.2)	28.5	(10.2)	0.0	(—)	19.1	(7.3)	10.9	(5.9)	12.1	(5.3)
Other	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*Refers to the 2.5 percent of operations that used IMM antibiotics to treat does with clinical mastitis in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 33.7 percent of those operations had any does with clinical mastitis (table F.12.), of which 51.7 percent of those operations used IMM antibiotics to treat those mastitic does (table F.14.), or 2.5 percent of operations overall ($0.143 \times 0.337 \times 0.517 \times 100 = 2.5$ percent).

G. Dry Doe Procedures

Note: As a reminder, estimates in this report apply only to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, whether dry or in milk, on September 1, 2019. The previous 12 months refer to the period from September 1, 2018, to August 31, 2019.

Drying off does requires many important management decisions for dairy goat operations. Operations may choose to dry-off does for multiple reasons, such as on a set schedule due to seasonal milking, a decrease in milk production, or for health reasons. The method used to dry-off does and any management practices, such as limiting feed or water at the time of dry-off or using intramammary antibiotics at dry-off may be implemented based on the operation's goals and the health of the goats.

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does, a higher percentage of operations used a set schedule or milk production level (55.7 and 50.8 percent of operations, respectively) to determine when to dry-off any does compared with presence of mastitis or high somatic cell count or other protocols. There were no differences by herd size or region in the percentage of operations by protocol used to dry-off does in the previous 12 months.

G.1. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that used the following protocols to dry-off any does in the previous 12 months, by herd size and region:

Percent Operations												
Protocol	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Set schedule (e.g., based on number of days prior to kidding)	54.1	(6.4)	57.0	(8.1)	75.4	(7.8)	65.1	(6.7)	52.7	(6.4)	55.7	(5.2)
Milk production level	51.0	(6.3)	47.1	(7.6)	59.1	(14.7)	39.0	(7.0)	54.6	(6.1)	50.8	(5.1)
Presence of mastitis or high somatic cell count	10.7	(4.7)	24.8	(8.9)	27.6	(10.0)	5.6	(2.2)	16.8	(5.2)	14.1	(4.0)
Other*	14.8	(3.7)	28.3	(9.1)	4.3	(2.8)	12.7	(4.1)	17.8	(4.3)	16.5	(3.4)

*Common "other" responses included end of show season, producer's health, producer's preference, time of year, and no longer needing milk.

A higher percentage of does (48.1 percent) were dried off based on milk production level than does dried off based on presence of mastitis, somatic cell count, or “other” reasons for drying off. A higher percentage of does on large operations (58.2 percent) were dried off based on milk production level than does on medium operations (25.3 percent). There were no differences by region in the percentage of does that were dried off by the protocols listed.

G.2. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of does that were dried off based on the following protocols in the previous 12 months, by herd size and region:

Percent Does ¹												
Protocol	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Set schedule (e.g., based on number of days prior to kidding)	45.0	(5.4)	44.1	(8.4)	21.8	(9.8)	30.3	(10.4)	29.9	(10.2)	30.0	(8.1)
Milk production level	36.1	(4.9)	25.3	(5.7)	58.2	(7.6)	64.9	(11.6)	42.4	(5.0)	48.1	(5.3)
Presence of mastitis or high somatic cell count	5.2	(3.3)	2.7	(1.4)	0.9	(0.7)	0.6	(0.4)	2.4	(1.2)	2.0	(0.9)
Other ²	13.7	(4.2)	27.9	(11.6)	19.1	(11.9)	4.2	(1.7)	25.2	(8.8)	19.9	(7.9)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

¹As a percentage of the total dairy doe inventory on September 1, 2019.

²Common “other” responses included end of show season, producer’s health, producer’s preference, time of year, and no longer needing milk.

Most operations (88.7 percent) skipped milkings before completely drying off does. There were no herd size or regional differences.

G.3. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that used the following methods for drying off any does in the previous 12 months, by herd size and region:

Method	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Abruptly stop milking	19.1	(5.1)	32.3	(6.5)	35.2	(10.1)	15.1	(4.5)	24.5	(5.1)	22.2	(4.1)
Skip milkings before complete dry-off (e.g., milk once a day instead of twice a day for a number of days)	90.8	(2.9)	83.8	(4.9)	74.4	(8.1)	90.5	(3.9)	88.2	(3.1)	88.7	(2.5)
Other	0.3	(0.3)	0.0	(—)	0.0	(—)	0.0	(—)	0.3	(0.3)	0.2	(0.2)

There were no differences in the percentage of does on all operations that were dried off by the two most common methods for drying off does: abruptly stopping milking (54.8 percent) and skipping milkings before completely drying off (45.2 percent). However, a higher percentage of does on large operations (74.7 percent) were dried off by abruptly stopping milking than does on small and medium operations (13.1 and 25.6 percent, respectively). A higher percentage of does on small and medium operations (86.9 and 74.4 percent, respectively) were dried off by skipping milkings before complete dry-off compared with does on large operations (25.3 percent). There were no regional differences in the percentage of does that were dried off using the methods in the table below.

G.4. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of does that were dried off using the following methods in the previous 12 months, by herd size and region:

Percent Does*												
Method	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Abruptly stop milking	13.1	(3.0)	25.6	(6.5)	74.7	(11.2)	58.4	(13.3)	53.6	(15.2)	54.8	(11.7)
Skip milkings before complete dry-off (e.g., milk once a day for a number of days)	86.9	(3.0)	74.4	(6.5)	25.3	(11.2)	41.6	(13.3)	46.4	(15.2)	45.2	(11.7)
Other	0.1	(0.1)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(0.0)	0.0	(0.0)
Total	100.0		100.0		100.0		100.0		100.0		100.0	

*As a percentage of the total dairy doe inventory on September 1, 2019.

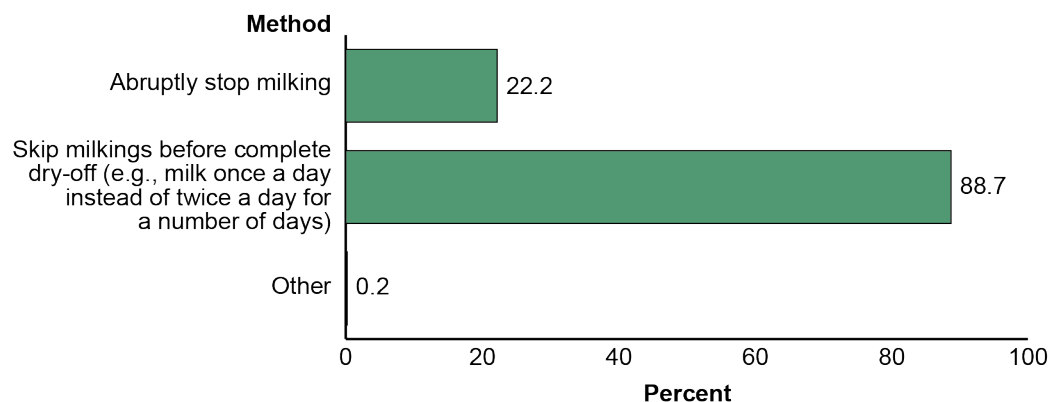
The management practice routinely used at dry-off for the largest percentage of all operations was reducing the quality/energy content of feed (55.0 percent). A higher percentage of medium operations reduced the quality/energy content of feed at dry-off (79.6 percent) than small or large operations (50.8 and 36.1 percent, respectively). A higher percentage of medium operations (10.4 percent) reduced access to water at dry-off than small and large operations (0.2 and 0.0 percent, respectively). A higher percentage of large operations (19.2 percent) performed the California mastitis test (CMT) or other individual-doe SCC test at dry-off than small operations (3.2 percent).

There were no differences by herd size in the percentage of operations that implemented any of the listed management practices at dry-off. There were no regional differences in management practices routinely used on operations at dry-off.

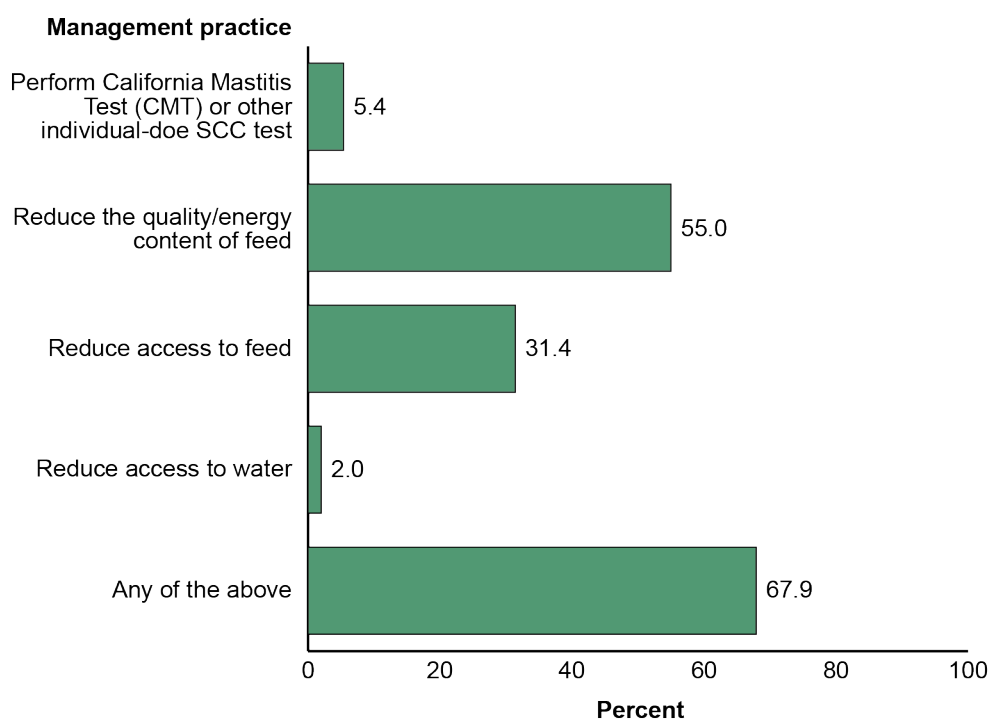
G.5. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by management practices routinely used at dry-off in the previous 12 months, and by herd size and region:

Management practice	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Perform California Mastitis Test (CMT) or other individual-doe SCC test	3.2	(1.5)	11.0	(4.1)	19.2	(6.4)	5.0	(2.1)	5.5	(1.7)	5.4	(1.4)
Reduce the quality/energy content of feed	50.8	(7.0)	79.6	(4.2)	36.1	(10.1)	66.2	(11.3)	51.3	(6.3)	55.0	(5.6)
Reduce access to feed	29.7	(5.0)	40.6	(7.0)	25.0	(9.8)	24.8	(6.4)	33.5	(5.2)	31.4	(4.2)
Reduce access to water	0.2	(0.1)	10.4	(9.4)	0.0	(—)	0.6	(0.4)	2.4	(2.4)	2.0	(1.8)
Any of the above	65.0	(6.9)	84.4	(3.7)	55.8	(14.3)	75.2	(10.5)	65.5	(6.4)	67.9	(5.5)

For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that used the following methods for drying off any does in the previous 12 months



For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations by management practices routinely used at dry-off in the previous 12 months



Approximately one-fifth (21.1 percent) of all operations treated any does at dry-off with intramammary (IMM) antibiotics. There were no regional or herd size differences.

G.6. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that treated any does at dry-off with intramammary (IMM) antibiotics in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
18.7	(5.6)	31.7	(8.8)	21.2	(9.4)	23.6	(10.6)	20.3	(5.2)	21.1	(4.7)

Of all operations that treated does with intramammary (IMM) antibiotics at dry-off, 64.7 percent of does were treated with an intramammary (IMM) antibiotic. There were no regional or herd size differences.

G.7. For operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months¹ (table G.6.), percentage of does on these operations that were treated with dry-doe IMM antibiotics at dry-off, by herd size and region:

Percent Does ²											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
82.3	(6.8)	44.1	(21.4)	82.5	(10.7)	82.9	(6.9)	59.9	(17.3)	64.7	(14.7)

¹Refers to the 3.0 percent of operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics in the previous 12 months (table G.6.).

²As a percentage of the total dairy doe inventory on September 1, 2019.

Of the operations that treated any does with intramammary (IMM) antibiotics at dry-off, there were no differences in the percentage of operations that treated all does versus those that treated some, but not all does. There were no herd size or regional differences.

G.8. For operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months* (table G.6.), percentage of operations that treated some (but not all) does or all does at dry-off with dry-doe IMM antibiotics, by herd size and region:

Percent Operations											
Does Treated	Herd size (number of dairy does)						Region				
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct. Std. Error
Some (but not all) does	21.6	(9.6)	56.2	(17.0)	26.4	(14.9)	18.7	(9.4)	35.5	(13.0)	30.9 (10.1)
All does	78.4	(9.6)	43.8	(17.0)	73.6	(14.9)	81.3	(9.4)	64.5	(13.0)	69.1 (10.1)
Total	100.0		100.0		100.0		100.0		100.0		100.0

*Refers to the 3.0 percent of operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics in the previous 12 months (table G.6.).

Of the operations that routinely treated some, but not all does with intramammary (IMM) antibiotics at dry-off, a higher percentage (90.3 percent) treated does with a history of mastitis than operations that treated does due to high somatic cell count, low milk production, adverse weather, or other reasons.

G.9. For operations that treated some (but not all) does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months¹ (table G.8.), percentage of operations by reason IMM antibiotics were given to does at dry-off:

Reason	Percent Operations	Standard error
High somatic cell count (SCC)	37.3	(15.1)
History of mastitis (clinical/chronic)	90.3	(5.1)
Low milk production	17.1	(9.5)
Adverse weather	1.9	(1.4)
Other ²	7.7	(4.5)

¹Refers to the 0.9 percent of operations that treated at least one doe but less than 100% of does at dry-off with dry-doe IMM antibiotics in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics (table G.6.), of which 30.9 percent of those operations used these IMM antibiotics at dry-off to treat at least one doe but less than 100% of does (table G.8.), or 0.9 percent of operations overall ($0.143 \times 0.211 \times 0.309 \times 100 = 0.9$ percent).

²A common "other" response was uneven udders.

The intramammary (IMM) antibiotics listed in tables G.10 and G.11 are approved by the Food and Drug Administration for use in lactating dairy cows, and milk and meat withdrawal times are established, and printed on the label. No IMM antibiotics that have been approved for use in dairy goats. Thus, use of these antibiotics in goats is performed in an extra-label fashion, which is legal if certain conditions are met.

Of the operations that treated any does with IMM antibiotics at dry-off, the highest percentage of operations (80.7 percent) used Tomorrow®/Cefa-Dri (cephapirin benzathine). A higher percentage of medium and large operations (54.7 and 57.9 percent, respectively) used Spectramast® DC (ceftiofur hydrochloride) than small operations (5.9 percent). There were no regional differences.

G.10. For operations that treated any does with intramammary (IMM) antibiotics at dry-off in the previous 12 months* (table G.6.), percentage of operations that gave the following antibiotics to any does at dry-off, by herd size and by region:

Antibiotic	Percent Operations											
	Herd size (number of dairy does)						Region					
	Small		Medium		Large		West		East		All Operations	
	(5–19)		(20–99)		(100 or More)							
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Spectramast® DC (ceftiofur hydrochloride)	5.9	(3.1)	54.7	(17.3)	57.9	(20.2)	12.0	(6.8)	30.7	(12.7)	24.5	(9.7)
ToMORROW®/Cefa-Dri (cephapirin benzathine)	92.8	(3.4)	52.6	(19.2)	100.0	(—)	85.6	(7.8)	78.2	(12.7)	80.7	(9.2)
Bovaclox™, Dry-Clox®, Dry-Clox® intramammary infusion, Orbenin®-DC (cloxacillin benzathine)	0.6	(0.6)	2.3	(2.3)	4.2	(3.7)	2.1	(2.2)	1.0	(0.6)	1.4	(0.8)
Gallimycin-Dry (erythromycin)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Biodry® (novobiocin)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Vet Go Dry™/ Hanford's US (penicillin G procaine)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Quartermaster® Dry Doe Treatment (penicillin G procaine/ dihydrostreptomycin)	3.8	(3.2)	1.6	(1.6)	4.2	(3.7)	2.9	(2.2)	3.3	(2.9)	3.1	(2.0)
Albadry Plus® Suspension (penicillin G procaine/novobiocin)	0.6	(0.6)	0.0	(—)	16.6	(12.2)	1.1	(1.0)	1.6	(1.2)	1.5	(0.9)
Other	0.0	(—)	1.1	(1.2)	42.8	(25.1)	1.1	(1.1)	4.1	(4.0)	3.1	(2.7)

*Refers to the 3.0 percent of operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics in the previous 12 months (table G.6.).

For does on operations that treated any does with intramammary (IMM) antibiotics at dry-off, a higher percentage were treated with Tomorrow®/Cefa-Dri (cephapirin benzathine) or Spectramast® DC (ceftiofur hydrochloride) than with the remaining antibiotics listed in the table below (not including “other” antibiotics). A higher percentage of does on medium operations (57.8 percent) were treated with Spectramast® DC (ceftiofur hydrochloride) than on small operations (7.9 percent). A higher percentage of does on small operations (90.5 percent) were treated with Tomorrow®/Cefa-Dri (cephapirin benzathine) than on medium operations (40.0 percent). There were no regional differences.

G.11. For operations that treated any does with intramammary (IMM) antibiotics at dry-off in the previous 12 months¹ (table G.6.), percentage of does on these operations that were given the following antibiotics at dry-off, by herd size and by region:

Antibiotic	Percent Does ²											
	Herd size (number of dairy does)						Region					
	Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
Spectramast® DC (ceftiofur hydrochloride)	7.9	(4.2)	57.8	(21.0)	41.5	(21.1)	10.7	(5.3)	49.9	(16.8)	41.3	(15.3)
ToMORROW®/Cefa-Dri (cephapirin benzathine)	90.5	(4.6)	40.0	(20.0)	87.6	(7.0)	82.7	(7.0)	60.7	(18.3)	65.5	(15.4)
Bovaclox™, Dry-Clox®, Dry-Clox® intramammary infusion, Orbenin®-DC (cloxacillin benzathine)	0.5	(0.5)	1.1	(1.1)	2.5	(2.1)	2.3	(2.3)	1.1	(0.8)	1.4	(0.8)
Gallimycin-Dry (erythromycin)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Biodry® (novobiocin)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Vet Go Dry™/ Hanford's US (penicillin G procaine)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)	0.0	(—)
Quartermaster® Dry Doe Treatment (penicillin G procaine/ dihydrostreptomycin)	1.1	(1.0)	0.3	(0.3)	0.8	(0.7)	1.8	(1.3)	0.3	(0.3)	0.6	(0.4)
Albadry Plus® Suspension (penicillin G procaine/novobiocin)	0.0	(0.0)	0.0	(—)	1.4	(1.0)	0.5	(0.4)	0.4	(0.4)	0.4	(0.3)
Other	0.0	(—)	0.9	(1.0)	33.8	(23.0)	2.0	(2.0)	12.4	(11.6)	10.1	(9.1)

¹Refers to the 3.0 percent of operations that treated any does at dry-off with dry-doe intramammary (IMM) antibiotics in the previous 12 months. This estimate comes from the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.) of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics in the previous 12 months (table G.6.).

²As a percentage of the total dairy doe inventory on September 1, 2019.

The IMM antibiotics listed in table G.12. are all approved by the Food and Drug Administration for use as therapy in dry dairy cows, and milk and meat withdrawal times are established, and printed on the label. There are no IMM antibiotics approved for use as therapy in dry dairy goats. Thus, use of these antibiotics in goats is performed in an extra-label fashion, which is legal as long as certain conditions are met. Because these IMM antibiotics are not approved for use in goats, no standard withdrawal time for goats is provided, and dairy goat producers could follow a different withdrawal time than that recommended for dairy cows. Thus, producers were asked what withdrawal time they followed after use of IMM antibiotic. However, the wording of the question did not specify whether the withdrawal time referred to milk or meat, but most producers likely interpreted that we were asking for the milk withdrawal time.

The reported withdrawal times were different from the withdrawal times used for dairy cows. For example, the average withdrawal time was 32.1 days for does treated with Spectramast® DC (ceftiofur hydrochloride) at dry-off, however Spectramast® DC used in dry dairy cows requires a minimum 30 day dry period and a 16 day pre-slaughter withdrawal period. Producer's average withdrawal time for does treated with ToMORROW®/Cefa-Dri (cephapirin benzathine) was 54.5 days. ToMORROW®/Cefa-Dri in dairy cows requires a minimum 30 day dry period and a 72 hour milk withhold and a 42 day pre-slaughter withdrawal period.

G.12. For does treated with the intramammary (IMM) antibiotics listed below at dry-off in the previous 12 months¹ (table G.11.), average withdrawal time (in days) for each of the IMM antibiotics:

Antibiotic	Average withdrawal time (days)	Standard error
Spectramast® DC (ceftiofur hydrochloride)	32.1	(6.1)
ToMORROW®/Cefa-Dri (cephapirin benzathine)	54.5	(9.6)
Bovaclox™, Dry-Clox®, Dry-Clox® intramammary infusion, Orbenin®-DC (cloxacillin benzathine)	12.4	(6.8)
Gallimycin-Dry (erythromycin)	NA ²	NA
Biodry® (novobiocin)	NA	NA
Vet Go Dry™/ Hanford's US (penicillin G procaine)	NA	NA
Quartermaster® Dry Doe Treatment (penicillin G procaine/ dihydrostreptomycin)	8.6	(1.9)
Albadry Plus® Suspension (penicillin G procaine/novobiocin)	9.4	(2.9)
Other	(D) ³	(D)

¹Refers to the does treated with the IMM antibiotics listed above at dry-off in the previous 12 months. This refers to the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), of which 21.1 percent of those operations treated any does at dry-off with dry-doe IMM antibiotics in the previous 12 months (table G.6.), of which the IMM were used (table G.11.).

²Values of NA denotes that specific antibiotic was not used on any does.

³Values of (D) denote too few to report.

A small percentage (6.5 percent) of operations used internal or external teat sealants on does at dry-off. There were no herd size or regional differences.

G.13. For the 14.3 percent of operations that milked any dairy does in the previous 12 months and had 5 or more does (table A.2.), percentage of operations that used internal or external teat sealants at dry-off on any does in the previous 12 months, by herd size and region:

Percent Operations											
Herd size (number of dairy does)						Region					
Small (5–19)		Medium (20–99)		Large (100 or More)		West		East		All Operations	
Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error	Pct.	Std. Error
7.1	(3.6)	3.7	(1.9)	5.9	(2.9)	14.8	(10.1)	3.8	(1.7)	6.5	(2.8)

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, goat 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 Goat 2019 study was to identify critical information needs concerning goat management and health. The online survey gathered opinions from a variety of stakeholders regarding goat management priorities, health priorities, industry burdens, and participation incentives for the study. The survey was available online from July 31, 2017, through September 8, 2017. The online questionnaire was distributed via email lists, newsletters, and goat associations, including breed, fiber, dairy, meat, and pack goat associations. All individuals involved in the goat industry were encouraged to participate, regardless of goat ownership. In total, 1,272 individuals from 50 States completed the study's needs assessment survey.

Respondents to the needs assessment survey represented the following affiliations:

- Goat owner (operators, hobby/pet owners)—80 percent of respondents
- Veterinarians/nutritionists—11 percent of respondents
- Government and university employees—8 percent of respondents
- Other affiliation—1 percent of respondents

A complete report on the needs assessment survey can be found on the NAHMS Goat 2019 study Web site, or by clicking this link:

https://www.aphis.usda.gov/sites/default/files/goat19_needsassess.pdf

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 changes in animal health, nutrition, and management practices in the U.S. goat industry from 2009-2019.
2. Describe practices operators use to control internal parasites and reduce anthelmintic resistance.
 - a. Examine anthelmintic treatment efficacy through fecal egg count reduction test.
 - b. Examine cost of parasitism and resistance in the United States.
3. Describe antimicrobial stewardship on goat operations and estimate the prevalence of enteric pathogens and patterns of antimicrobial resistance.
 - a. Estimate the prevalence of *Salmonella*, *E. coli*, *Campylobacter*, *Giardia*, and *Cryptosporidium* in the United States.
 - b. Examine antibiotic susceptibility in *Enterococcus*, *Salmonella*, *E. coli*, and *Campylobacter*.
4. Describe management practices associated with economically important goat diseases, occurrence of which was reported by the operator.
 - a. Describe the prevalence of scrapie-resistant codons S146 and K222 in U.S. goats by breed.
5. Characterize the U.S. dairy goat industry.
6. Provide a serologic bank for future research.

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.

Using population data held by the National Agricultural Statistics Service (NASS), States were selected for inclusion in the study based on their percentage of U.S. goat inventory and operations, their geographic and primary production type representativeness, and expected response burden. A memo identifying these States was provided to the USDA–APHIS–VS CEAH director, and in turn, the VS regional directors. Each regional director sought input from the respective States about being included or excluded from the study.

The final 24 states selected for study inclusion were Alabama, California, Colorado, Connecticut, Florida, Georgia, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Tennessee, Texas, Vermont, Virginia, Washington, and Wisconsin. These States represented 80.4 percent of U.S. goats on operations with five or more goats and 75.8 percent of the U.S goat operations with five or more goats (individual State counts of operations and inventory not shown, but proxy counts are presented in Appendix II). In addition, because the study's needs assessment indicated a desire for a focus on dairy operations, the 24 participating States represent at least 70.0 percent of goat inventory and goat operations within each of the primary production types: dairy, meat, and other.

2. Operation selection

The list frame from which operations were sampled is managed by NASS and was updated with information from the 2017 Census of Agriculture prior to sample selection. A stratified random sampling design was planned, and 4,770 operations were selected to be part of the sample. Stratification was State-based on primary production (dairy, meat and other, and unknown), and herd size (5-19, 20-99, and 100 or more adult goats).

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 size, based on a weighted average number of goat operations and the total goat inventory within the strata. This sampling design allows for logistical efficiencies in administering the survey, prespecified precision for estimates, and oversampling of larger operations. Both larger operations and dairy operations were selected in the sample at a higher rate than they appear in the population, to ensure that they were adequately represented in the sample.

3. Population inferences

Goat operations in the United States with five or more adult goats were the study's target population. Operations with fewer than five adult goats are most likely to keep goats as pets or for other noncommercial uses, and were not targeted in the study. Inferences cover the population of operations with at least 5 adult goats in the study's 24 participating States. These States accounted for 80.4 percent of U.S. goats on operations with five or more goats and 75.8 percent of the U.S. goat operations with five or more goats.

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.

SUDAAN software (RTI, version 11.0.3) 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: General Goat Management Questionnaire

Estimates for Phase I represent 62.5 percent of U.S. goat operations with 5 or more adult goats in the 24 study States, 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).

b. Phase IIa: VS Initial Questionnaire

Estimates for Phase IIa represent 61.9 percent of U.S. goat operations with 5 or more adult goats in the 24 study States, after taking into account the survey design and weighting (see Section II.E.2 for more information on the calculation of the weighted response rate).

Turnover weights were constructed by adjusting the Phase I response rates for nonresponse of operations turning over consent forms for the opportunity to participate in Phase IIa of the study. The sampling weights for Phase IIa start with these turnover weights, which were adjusted for nonresponse at the second phase of the study using a propensity score model, trimmed for outlying weights, and calibrated to original weight totals.

c. Phase IIb: Dairy Operation Questionnaire

Estimates for Phase IIb represent 24.1 percent of U.S. goat operations with 5 or more adult goats in the 24 study States, after taking into account the survey design and weighting (see Section II.E.3 for more information on the calculation of the weighted response rate).

The sampling weights for Phase IIb start with the Phase IIa turnover weights, which were adjusted for nonresponse using a propensity score model, trimmed for outlying weights, and calibrated to original weight totals as the final weights used for the analysis presented in this report.

C. Data Collection

1. Phase I: General Goat Management Questionnaire

From July 1, 2019, through August 9, 2019, NASS enumerators administered the NAHMS Goat 2019 general management questionnaire via personal interviews. The interview took an average of 115 minutes to complete.

2. Phase IIa: VS Initial Questionnaire

Producers who indicated during Phase I that they would like to participate in Phase IIa of the Goat 2019 study were contacted by VS Veterinary Medical Officers (VMOs) and/or Animal Health Technicians (AHTs) from September 10, 2019, through March 20, 2020. The VMOs/AHTs set up a time that was convenient for the producers to make a face-to-face visit to the operation to administer the Phase IIa questionnaire. The Phase IIa questionnaire interview took an average of 87 minutes to complete.

3. Phase IIb: Dairy Operation Questionnaire

After completion of the Phase IIa questionnaire, VS field staff also carried out up to three additional tasks (if the producer elected to do so for each task) during the same visit as completing the Phase IIa questionnaire or at a subsequent visit: (1) performed biologics testing, (2) administered the Phase IIb questionnaire, and (3) administered the Phase IIc (On-site Agritourism) questionnaire. The Phase IIb questionnaire interview took an average of 40 minutes to complete.

D. Data Analysis

1. Validation

Phase I data were entered by NASS staff into a SAS data file and checked for validity. For Phase IIa, Phase IIb, and Phase IIc, VMOs/AHTs sent the completed questionnaires to their respective NAHMS State Coordinators, who reviewed the questionnaire responses for accuracy. Reviewed questionnaires were then sent to NAHMS headquarters and were reviewed independently by NAHMS staff and entered into a SAS electronic database.

For all phases of the study, 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 goat inventory); and if-then checks (e.g., if no buck kids will be castrated on the operation, then there should not be a reported average age of buck kids at castration).

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 hard copies of questionnaires were 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 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, with numbers and estimation code reviewed by a second analyst to ensure accurate reporting of estimates.

E. Sample Evaluation

E. Sample evaluation

The purpose of this section is to provide counts and percentages of operations 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 operations 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 operations 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 4,770 operations selected for participation, 1,515 were ineligible (no goats, out of business, or otherwise out of scope). Of the 3,255 eligible operations, 532 were not contacted (office holds, purposefully not contacted, and inaccessible operations). Of the 2,723 eligible operations that were contacted, 1,840 (1,320 + 520) provided complete questionnaire data. Of those, 1,320 operations agreed to be contacted for the Phase II of the study.

Response category group label	Response category group	Response Category	Number operations	Percent operations	Weighted percent operations*
(a)	In-scope-complete	Completed NASS interview for baseline report, signed consent for Phase II	1,320	27.7	22.0
		Completed NASS interview for baseline report, refused consent for Phase II	520	10.9	10.6
(b)	In-scope-refused	Refused	883	18.5	13.9
(c)	Out of scope	Zero adult goats on hand on July 1, 2019	490	10.3	12.4
		Out of business	522	10.9	16.2
		Out of scope (including having more than 0 total goats, but fewer than 5 adult goats on July 1, 2019)	503	10.6	14.2
(d)	Not contacted	Office hold	55	1.1	1.1
		Inaccessible	477	10.0	9.7
		Total	4,770	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,

$$\rho = \frac{(a+b)}{(a+b+c)} = \frac{2,723}{4,238} \approx 0.643.$$

Thus, the OMB guidance-based response rate for Phase I of the NAHMS Goat 2019 study is calculated as follows:

$$\frac{1,840}{2,723+0.643*532} = 0.600.$$

Approximately 60.0 percent of eligible operations completed the Phase I questionnaire. The weighted OMB guidance-based response rate for Phase I of the NAHMS Goat 2019 study is 62.5 percent (calculated using the initial sampling weights), which means that Phase I questionnaire information is available for approximately 62.5 percent of goat operations with at least 5 adult goats in the 24 participating States, after taking into account the survey design and weighting.

2. Phase IIa response rates

Of the 1,320 operations that elected to turn their contact information over to participate in Phase IIa of the Goat 2019 study, 26 were ineligible (no goats). Of the 1,294 eligible operations, 243 were not contacted (inaccessible operations). Of the 1,051 eligible operations that were contacted, 779 provided complete questionnaire data.

Response category group label	Response category group	Response Category	Number operations	Percent operations	Weighted percent operations*
(a)	In-scope-complete	Completed VMO interview for health and management practices report	779	59.0	59.8
(b)	In-scope-refused	Poor time of year or no time	108	8.2	6.1
		Does not want anyone on the operation	8	0.6	0.5
		Bad experience with government veterinarians	3	0.2	0.1
		Does not want to do another survey or divulge information	45	3.4	2.7
		Told NASS they did not want to be contacted	0	0.0	0.0
		Other reason	108	8.2	6.9
(c)	Out of scope	Ineligible (no goats)	26	2.0	2.7
(d)	Not contacted	Inaccessible	243	18.4	21.2
		Total	1,320	100.0	100.0

*Weighted percentages calculated using the turnover weights.

Using the same approach to calculate the OMB guidance-based response rate as above in Section II.E.1, the proportion of the non-contacted operations expected to be in-scope is as follows

$$\rho = \frac{1,051}{1,077} \approx 0.976.$$

Thus, the OMB guidance-based response rate for Phase IIa of the NAHMS Goat 2019 study is calculated as follows:

$$\frac{779}{1,051 + 0.976 \times 243} = 0.605.$$

Approximately 60.5 percent of eligible operations completed the Phase IIa questionnaire. The weighted OMB guidance-based response rate for Phase IIa of the NAHMS Goat 2019 study is 61.9 percent (calculated using the turnover weights), which means that Phase IIa questionnaire information is available for approximately 61.9 percent of goat operations with at least 5 adult goats in the 24 participating States, after taking into account the survey design and weighting.

3. Phase IIb response rates

Of the 1,320 operations that elected to turn their contact information over to participate in Phase IIa of the Goat 2019 study, a smaller amount continued on to Phase IIb of the study. For the dairy operation questionnaire, 398 were ineligible (no goats or less than 5 dairy goats). Of the 922 eligible operations, 243 were not contacted (inaccessible operations). Of the 679 eligible operations that were contacted, 304 provided complete questionnaire data.

Response category group label	Response category group	Response Category	Number operations	Percent operations	Weighted percent operations*
(a)	In-scope-complete	Completed VMO interview for dairy operations report	304	23.0	10.4
(b)	In-scope-refused	Poor time of year or no time	108	8.2	6.1
		Does not want anyone on the operation	8	0.6	0.5
		Bad experience with government veterinarians	3	0.2	0.1
		Does not want to do another survey or divulge information	148	11.2	10.0
		Told NASS they did not want to be contacted	0	0.0	0.0
		Other reason	108	8.2	6.9
(c)	Out of scope	Ineligible (no goats or less than 5 dairy goats)	398	30.2	44.8
(d)	Not contacted	Inaccessible	243	18.4	21.2
		Total	1,320	100.0	100.0

*Weighted percentages calculated using the turnover weights.

Using the same approach to calculate the OMB guidance-based response rate as above in Section II.E.1, the proportion of the non-contacted operations expected to be in-scope is as follows

$$\rho = \frac{679}{1,077} \approx 0.630.$$

Thus, the OMB guidance-based response rate for Phase IIb of the NAHMS Goat 2019 study is calculated as follows:

$$\frac{304}{679 + 0.630 * 243} = 0.365.$$

Approximately 36.5 percent of eligible operations completed the Phase IIb questionnaire. The response rate for Phase IIb is lower than other study phases, partly due to stricter eligibility requirements. The weighted OMB guidance-based response rate for Phase IIb of the NAHMS Goat 2019 study is 24.1 percent (calculated using the turnover weights), which means that Phase IIb questionnaire information is available for approximately 24.1 percent of goat operations with at least 5 adult goats in the 24 participating States, after taking into account the survey design and weighting.

4. Communicating response rates

The unweighted response rates of 60.0, 60.5, and 36.5 for Phase I, Phase IIa, and Phase IIb, respectively, will be used to communicate response rates for the NAHMS Goat 2019 study. The unweighted response rate represents the likelihood that eligible operations completed each study Phase.

5. Nonresponse bias analysis

NAHMS staff performed an analysis to identify potential sources of nonresponse bias in using information collected for all sampled goat operations by NASS. This analysis was performed to identify whether there were differences in response behaviors based on known factors for respondents and nonrespondents and whether those differences could be accounted for using analysis techniques.

There were three response rates used to identify differences in response behaviors among three stratification variables (see Section II.B.2.). The three response rates include the contact rate, the in-scope rate, and the completion rate, as well as the stratification variables included herd size, region, and primary production type. The analysis was performed using a logistic regression model accounting for survey weighting and the complex survey design and performing pairwise comparison tests for the differences between each pair of stratification variable levels at the 95-percent confidence level.

To account for the observed differences, initial sampling weights were adjusted for nonresponse and calibrated to population totals. Bias was measured using

$$\textit{Bias} = \frac{|\hat{\lambda} - \hat{p}|}{\hat{\lambda}},$$

where $\hat{\lambda}$ is the value estimated using information from both respondents and nonrespondents, and $\hat{p}$ is the statistic estimated using information from respondents only.

a. Phase I: General Goat Management Questionnaire

For Phase I, differences observed included small operations (5-19 head) having lower in-scope rates than medium operations (20-99 head) and medium operations having lower in-scope rates than large operations (100 or more head). Also, small operations had lower completion rates than medium and large operations. Operations with an unknown type (not conclusively meat, dairy, and other) displayed lower contact, in-scope, and completion rates. Thus, if left uncorrected, there was evidence that response behavior differed by the levels of the stratification variables.

Bias was calculated for 17 estimates derived from 10 variables, including total land owned and operated, farm sales, total goat inventory, production expenses, an indicator for internet access, and whether the operation sold value-added products. The particular weight adjustments performed best than a number of different weight-adjustment techniques, after comparing the average, minimum, and maximum bias and the standard deviation of the weights.

After weight adjustments, the average bias was minimized among the weight adjustment options for the variables using the baseline weights adjusted for nonresponse with calibration to population totals. These variables were not used in the weight adjustment process, making these out-of-sample bias estimates. The average bias was 14.1 percent, with the minimum and maximum bias over the 17 estimates being 2.5 and 32.0 percent, respectively, and the standard deviation of the weights was 36.

b. Phase IIa: VS Initial Questionnaire

For Phase IIa, differences observed included large operations having higher in-scope rates than both medium and small operations. Also, dairy operations had higher contact rates than meat or unknown operations. Bias was calculated for 17 estimates derived from 10 variables. After weight adjustments, the average bias was minimized among the weight adjustment options for the variables using the Phase I weights adjusted for nonresponse with calibration to population totals. These variables were not used in the weight adjustment process, making these out-of-sample bias estimates. The average bias was 29.1 percent, with the minimum and maximum bias over the 17 estimates being 2.1 and 54.4 percent, respectively, and the standard deviation of the weights was 100.

c. Phase IIb: Dairy Operation Questionnaire

For Phase IIb, differences observed included large operations having higher in-scope and completion rates than both medium and small operations. Also, operations in the East region had higher contact rates than operations in the West region. Bias was calculated for 15 estimates derived from 9 variables. After weight adjustments, the average bias was minimized among the weight adjustment options for the variables using the Phase I weights adjusted for nonresponse with calibration to population totals. These variables were not used in the weight adjustment process, making these out-of-sample bias estimates. The average bias was 24.0 percent, with the minimum and maximum bias over the 15 estimates being 2.4 percent and 70.6 percent, respectively, and the standard deviation of the weights was 41.

Appendix I: Sample Profile

1. Herd size

Number of Responding Operations			
Herd Size (total adult goat inventory)	Phase I	Phase IIa	Phase IIb*
Small (5-19)	562	245	155
Medium (20-99)	820	360	100
Large (100 or more)	458	174	49
Total	1,840	779	304

*Herd size for Phase IIb was redefined to be total dairy goat inventory rather than all types of adult goats.

2. Regions

Number of Responding Operations			
Region*	Phase I	Phase IIa	Phase IIb
West (CA, CO, OK, OR, TX, WA)	729	281	100
East (AL, CT, FL, GA, IN, IA, KY, MI, MN, MO, NY, NC, OH, OK, PA, TN, TX, VA, VT, WI)	1,111	498	204
Total	1,840	779	304

*Texas and Oklahoma were divided on a line corresponding to north-south Interstate 35. The western halves of the States were included in the West region, and the eastern halves were included in the East region. For more detailed information regarding the counties involved, see Appendix II.

3. Primary production

Number of Responding Operations			
Primary Production	Phase I	Phase IIa	Phase IIb*
Meat	808	321	NA
Dairy	614	413	NA
Other	418	45	NA
Total	1,840	779	NA

*The Phase IIb questionnaire was directed to goat dairy producers only.

Appendix II: U.S. Goat Population and Operations

		Number of Goats		Number of Operations	
Region	State	On operations with 1 or more head ¹	On operations with 5 or more head ²	With 1 or more head ¹	With 5 or more head ²
West	California	133,330	130,385	3,938	2,763
	Colorado	48,869	46,456	2,803	1,856
	Oklahoma – West ³	40,302	– ⁵	1,878	– ⁵
	Oregon	45,378	42,157	3,289	1,987
	Texas – West ⁴	677,375	– ⁵	15,179	– ⁵
	Washington	29,392	26,544	2,609	1,440
East	Alabama	51,316	49,757	3,279	2,676
	Connecticut	5,524	4,836	592	326
	Florida	61,159	58,455	4,366	3,298
	Georgia	70,182	68,130	4,063	3,318
	Indiana	41,180	39,079	2,833	1,954
	Iowa	81,428	79,988	2,400	1,823
	Kentucky	59,822	56,508	4,330	3,031
	Michigan	29,226	26,510	2,614	1,462
	Minnesota	36,312	34,538	1,996	1,336
	Missouri	76,838	74,069	4,132	3,044
	New York	30,490	28,353	2,192	1,315
	North Carolina	57,717	54,857	4,084	3,007
	Ohio	59,612	55,355	4,841	3,087
	Oklahoma – East ³	56,452	– ⁵	3,520	– ⁵
	Pennsylvania	52,613	49,250	3,749	2,355
	Tennessee	97,880	94,644	5,802	4,570
	Texas – East ⁴	160,514	– ⁵	10,964	– ⁵
	Vermont	9,801	9,385	480	315

	Virginia	48,945	46,384	3,449	2,416
	Wisconsin	100,438	97,915	2,586	1,503
	Texas – Entire State	-	824,775 ⁵	-	21,032 ⁵
	Oklahoma – Entire State	-	93,310 ⁵	-	4,063 ⁵
Total (24 States)		2,162,095	2,091,640	101,968	73,977
Total U.S. (50 States)		2,698,636	2,600,846	136,442	97,546
24 States as a % of 50 States		80.1	80.4	74.7	75.8

¹Source: NASS, 2017 Census of Agriculture. State level estimates only available in conjunction with the Census of Agriculture every five years.

²Source: NASS, special tabulation for number of operations and inventory on operations with five or more goats from the 2017 Census of Agriculture.

³Eastern OK counties include: Adair, Atoka, Bryan, Cherokee, Choctaw, Coal, Craig, Creek, Delaware, Haskell, Hughes, Johnston, Latimer, Le Flore, Lincoln, Marshall, Mayes, McCurtain, McIntosh, Muskogee, Nowata, Okfuskee, Okmulgee, Osage, Ottawa, Pawnee, Pittsburg, Pontotoc, Pottawatomie, Pushmataha, Rogers, Sequoyah, Seminole, Tulsa, Wagoner, Washington

⁴Eastern TX counties include: Anderson, Angelina, Arkansas, Atascosa, Austin, Bastrop, Bee, Bowie, Brazoria, Brazos, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Collin, Colorado, Dallas, Delta, De Witt, Duval, Ellis, Fannin, Fayette, Fort Bend, Franklin, Freestone, Galveston, Goliad, Gonzales, Grayson, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Henderson, Hidalgo, Hopkins, Houston, Hunt, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kaufman, Kenedy, Kleberg, Lamar, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, McMullen, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Polk, Rains, Red River, Refugio, Robertson, Rockwall, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Starr, Titus, Trinity, Tyler, Upshur, Van Zandt, Victoria, Walker, Waller, Washington, Wharton, Willacy, Wilson, Wood, Zapata

⁵Numbers of operations and numbers of goats on operations with five or more goats were available only at the State-level for Texas and Oklahoma.