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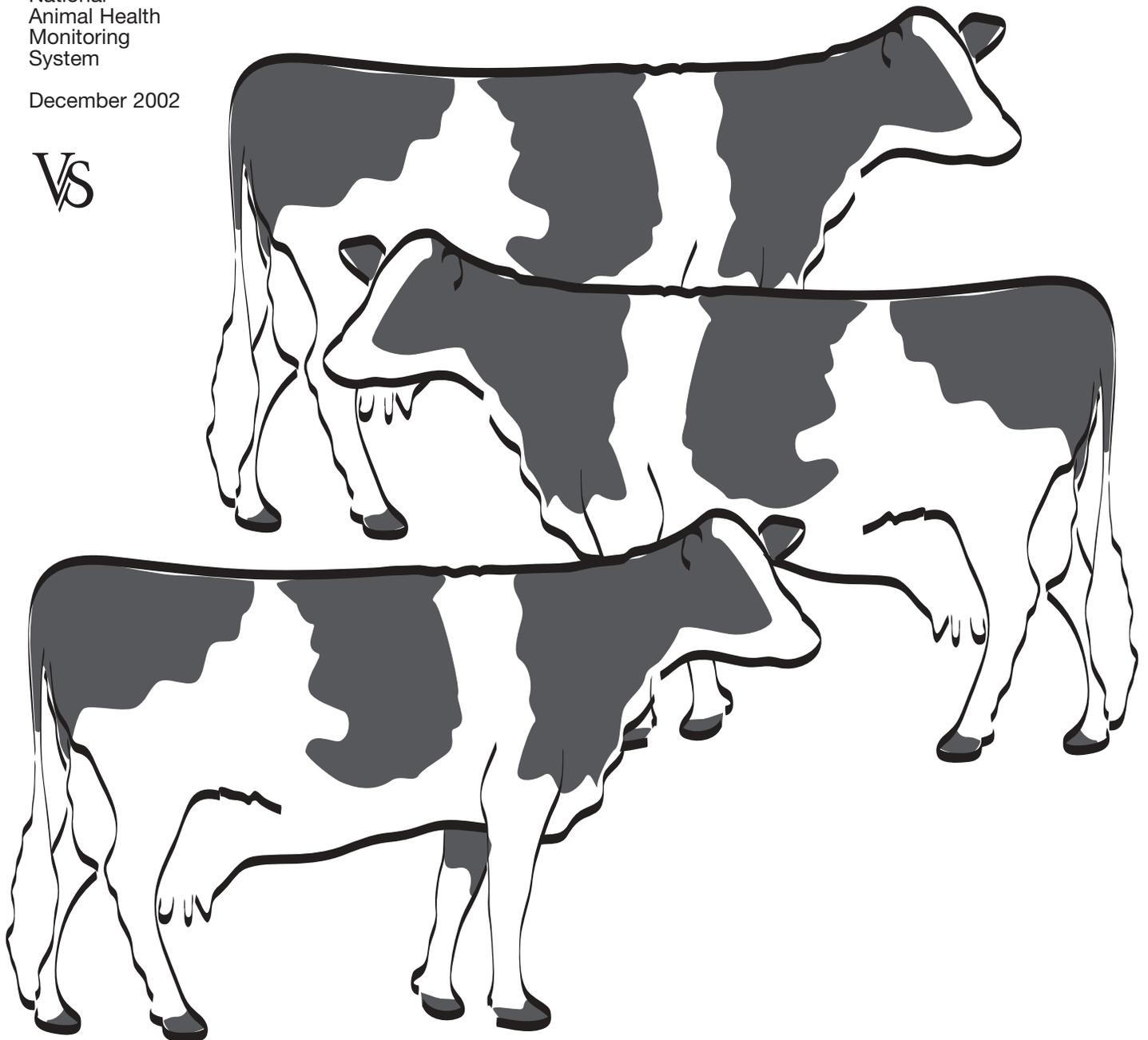
National
Animal Health
Monitoring
System

December 2002



Dairy 2002

Part I: Reference of Dairy Health and Management in the United States, 2002



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USDA:APHIS:VS:CEAH
NRRC Building B., M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970.494.7000
E-mail: NAHMSweb@aphis.usda.gov
www.aphis.usda.gov/vs/ceah/cahm

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Thomas E. Walton
Director
Centers for Epidemiology and Animal Health

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Contacts for further information:

Questions or comments on Dairy 2002 study methods or requests for additional data analysis: Dr. Brian McCluskey: 970.494.7000

Information on reprints or other NAHMS reports: Mr. Brad Doty: 970.494.7000

E-mail: NAHMSweb@aphis.usda.gov

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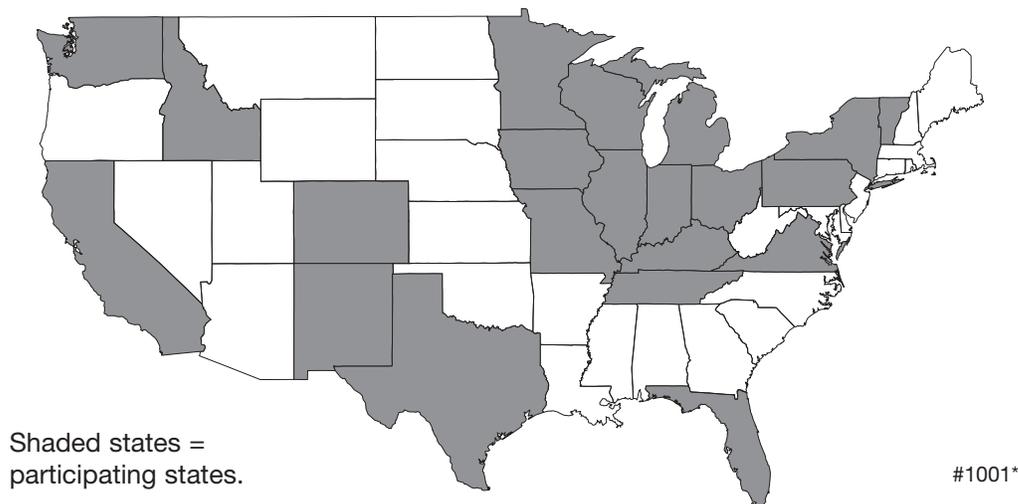
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Introduction

The National Animal Health Monitoring System (NAHMS) is a nonregulatory division of the United States Department of Agriculture (USDA) designed to help meet animal health information needs. NAHMS has collected data on dairy health and management practices through two previous studies.

The NAHMS 1991-92 National Dairy Heifer Evaluation Project (NDHEP) provided the dairy industry's first national baseline information on the health and management of dairy cattle in the United States. Just months after the study's first results were released in 1993, cases of acute bovine viral diarrhea (BVD) surfaced in the United States following a 1993 outbreak in Canada. NDHEP information on producer vaccination and biosecurity practices helped officials address the risk of disease spread and target educational efforts on vaccination protocols. In addition, vital information on the prevalence of *Cryptosporidium parvum* and shedding by calves was available to officials and the public during a spring 1993 outbreak of related human illness in Milwaukee, Wisconsin. Later that year, another outbreak of human illness was reported in the Pacific Northwest, this time related to *Escherichia coli* O157:H7. NDHEP data on the bacteria's prevalence in dairy cattle helped officials define public risks as well as research needs. This baseline picture of the industry also helped identify additional research and educational efforts in various production areas, such as feed management and weaning age.

Dairy 2002 Participating States



*Identification numbers are assigned to each graph in this report, for public reference.

Information from the NAHMS Dairy '96 study helped the U.S. dairy industry identify educational needs and prioritize research efforts on such timely topics as antibiotic usage and Johne's disease, as well as digital dermatitis, bovine leukosis virus (BLV), and potential foodborne pathogens, including *E. coli*, *Salmonella*, and *Campylobacter*.

Part 1: Reference of Dairy Health and Management in the United States, 2002 is the first in a series of reports containing national information from the NAHMS Dairy 2002 study conducted in 21 major dairy States (see map). Dairy 2002 was designed to provide information to both participants and industry from operations representing 82.8 percent of the U.S. dairy operations and 85.5 percent of the U.S. dairy cows. Data were collected from December 31, 2001, through February 12, 2002.

The methods used and number of respondents in the study can be found at the end of this report.

Further information on NAHMS studies and reports is available online at : www.aphis.usda.gov/vs/ceah/cahm

For questions about this report or additional copies, please contact:

USDA:APHIS:VS:CEAH
NRRRC Building B., M.S. 2E7
2150 Centre Avenue,
Fort Collins, CO 80526-8117
970.494.7000

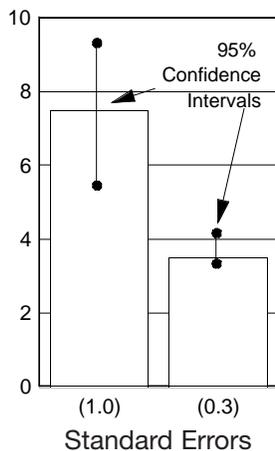
Terms Used in This Report

Cow: Female dairy bovine that has calved at least once.

Cow Average: The average value for all cows; the reported value for each operation multiplied by the number of cows on that operation is summed over all operations and divided by the number of cows on all operations. This way, results are adjusted for the number of cows on each operation. For instance, on page 13 the average rolling herd milk production for each operation is multiplied by the number of cows on each operation. This product is then summed over all operations and divided by the sum of cows over all operations. The result is the average rollong herd milk production for all cows.

Heifer: Female dairy bovine that has not yet calved.

Examples of a 95% Confidence Interval



#1002

Operation average: The average value for all operations: A single value for each operation is summed over all operations reporting divided by the number of operations reporting. For example, operation average age at first calving (shown on page 13) is calculated by summing reported average age over all operations divided by the number of operations.

Population estimates: Estimates in this report are provided with a measure of precision called the **standard error**. A 95 percent confidence interval can be created with bounds equal to the estimate, plus or minus two standard errors. If the only error is sampling error, the confidence intervals created in this manner will contain the true population mean 95 out of 100 times. In the example at left, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two-times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of 2. In general, when comparing point estimates between categories, estimates with confidence levels that overlap are not considered different. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported.

Sample profile: Information that describes characteristics of the sites from which Dairy 2002 data were collected.

Herd size: Herd size is based on January 1, 2002, inventory. Small herds are those with less than 100 head; medium herds are those with 100 to 499 head; and large herds are those with 500 or more head.

Regions:

West: California, Colorado, Idaho, New Mexico, Texas, Washington

Midwest: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

Northeast: New York, Pennsylvania, Vermont

Southeast: Florida, Kentucky, Tennessee, Virginia

Section I: Population Estimates

A. Dairy Herd Information & Management Practices

1. Record-keeping systems

Some type of record-keeping system was used to help manage animals on almost all (95.2 percent) operations, which accounted for 97.9 percent of all cows. Almost half (44.8 percent) of operations were enrolled in the Dairy Herd Improvement Association (DHIA), accounting for 50.2 percent of all dairy cows. Although a small percentage (19.4 percent) of operations used on-farm computer record systems, they accounted for nearly half (49.6 percent) of all cows. Large operations were more likely to have computer record systems than small operations.

a. Percentage of operations (and percentage of dairy cows on these operations) by type of individual animal record-keeping systems used for the dairy operation:

| Record-keeping System | Percent Operations | Standard Error | Percent Dairy Cows | Standard Error |
|---|--------------------|----------------|--------------------|----------------|
| Hand written, such as a ledger or notebook | 74.3 | (1.1) | 58.5 | (1.2) |
| Dairy Herd Improvement Association (DHIA) | 44.8 | (1.3) | 50.2 | (1.3) |
| Off-farm computer record system other than DHIA | 5.0 | (0.5) | 8.5 | (0.8) |
| On-farm computer data record system | 19.4 | (0.9) | 49.6 | (1.1) |
| Other system | 4.1 | (0.5) | 4.3 | (0.5) |
| Any record-keeping system | 95.2 | (0.6) | 97.9 | (0.3) |

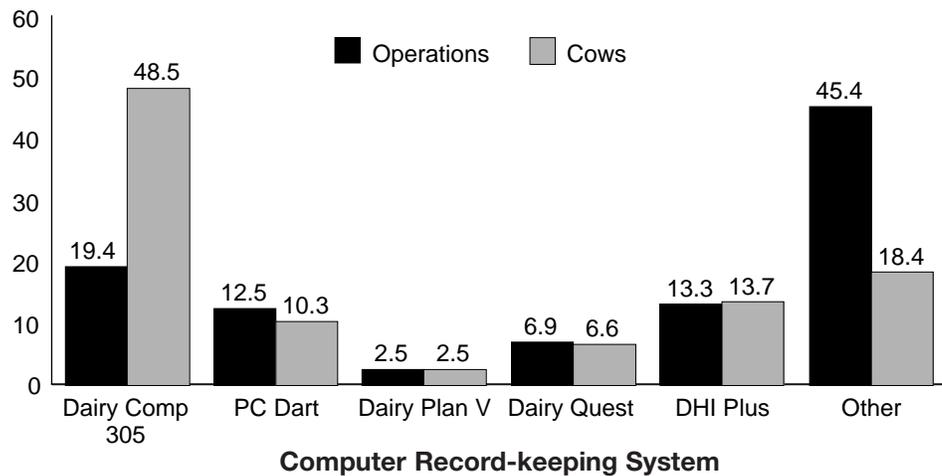
The majority (45.4 percent) of farms with on-farm computer record systems reported "other" as the primary type of computerized record system used, which included homemade spreadsheets (Excel, etc.), Westfalia, Boumatic, and some smaller programs. Although only 19.4 percent of operations used Dairy Comp 305, these operations accounted for almost half (48.5 percent) the cows whose records were kept via on-farm computer. Computerized record-keeping systems may assist producers in managing their operations more efficiently and effectively.

b. For operations using on-farm computer data record systems, percentage of operations (and percentage of dairy cows on these operations) by primary computerized record system used:

| Primary On-farm Record System Used | Percent Operations | Standard Error | Percent Cows | Standard Error |
|------------------------------------|--------------------|----------------|--------------|----------------|
| Dairy Comp 305 | 19.4 | (1.7) | 48.5 | (1.9) |
| PC Dart | 12.5 | (1.4) | 10.3 | (0.8) |
| Dairy Plan V | 2.5 | (0.6) | 2.5 | (0.5) |
| Dairy Quest | 6.9 | (1.2) | 6.6 | (0.9) |
| DHI Plus | 13.3 | (1.7) | 13.7 | (1.3) |
| Other | 45.4 | (2.7) | 18.4 | (1.4) |
| Total | 100.0 | | 100.0 | |

Percent of Operations* (and Percent of Dairy Cows on These Operations) by Primary Type of Computer Record-keeping System Used

Percent



*For operations using on-farm computer record-keeping system.

2. Individual animal identification

Individual animal identification is important, especially on dairy farms. Although individual identification was used on 41.2 percent of farms for evaluating milk production, its other uses include genetic monitoring/evaluation and animal disease control/eradication. Most (85.8 percent) operations, representing 92.2 percent of dairy cows, used some form of ear tags as their primary animal identification method. A small percentage (6.3 percent) of operations and a smaller percentage (2.7 percent) of cows had no individual animal identification.

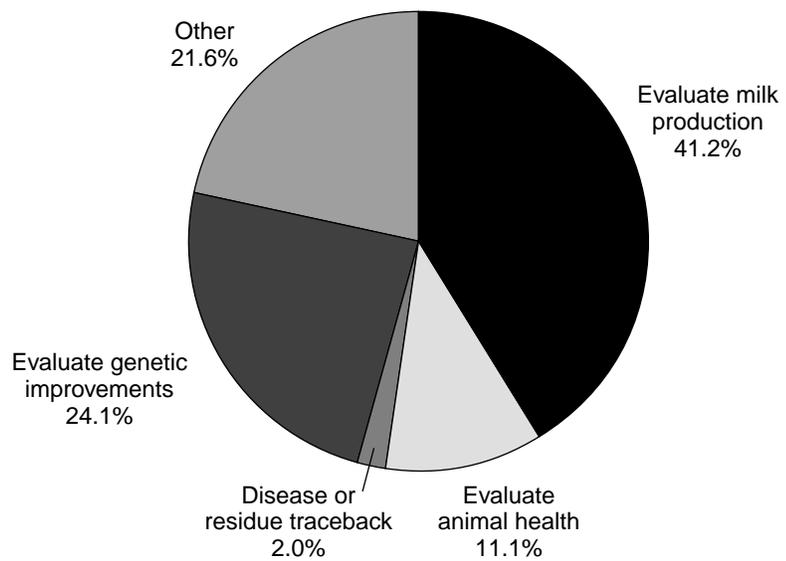
a. Percentage of operations (and percentage of dairy cows) by type of individual *animal* identification used:

| Identification Type | Percent Operations | Standard Error | Percent Dairy Cows | Standard Error |
|---|--------------------|----------------|--------------------|----------------|
| Ear tags (all kinds) | 85.8 | (1.0) | 92.2 | (0.5) |
| Collars | 16.8 | (1.0) | 13.3 | (0.7) |
| Photographs or sketches | 14.1 | (0.9) | 6.6 | (0.5) |
| Branding (all methods) | 4.9 | (0.5) | 15.3 | (1.0) |
| Implanted electronic ID | 0.1 | (0.1) | 0.6 | (0.3) |
| Tattoos (other than tattoo for brucellosis) | 8.8 | (0.7) | 8.1 | (0.7) |
| Other | 10.8 | (0.8) | 7.0 | (0.6) |
| None | 6.3 | (0.8) | 2.7 | (0.3) |

b. For operations that used individual animal identification, percentage of operations by primary reason individual animal identification was used:

| Primary Reason for Animal Identification | Percent Operations | Standard Error |
|--|--------------------|----------------|
| For evaluating milk production | 41.2 | (1.3) |
| For evaluating animal health | 11.1 | (0.9) |
| For disease or residue traceback | 2.0 | (0.4) |
| For evaluating genetic improvements | 24.1 | (1.2) |
| Other | 21.6 | (1.1) |
| Total | 100.0 | |

Percent of Operations by Primary Reason for Using Individual Animal Identification



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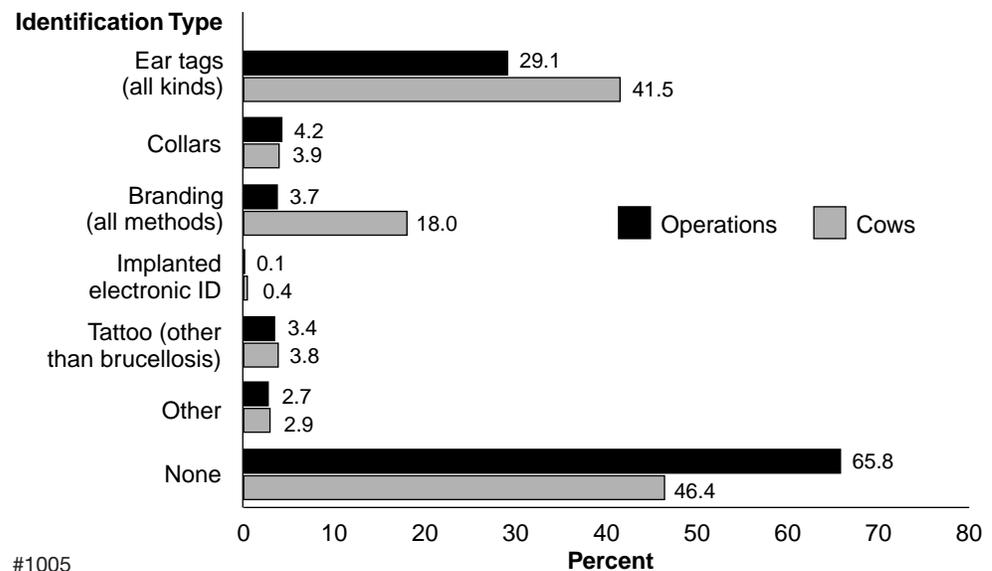
3. Herd identification

Most (65.8 percent) operations and the majority (46.4 percent) of cows had no form of herd identification (identification indicating the animal belongs to a specific herd or operation). Ear tags were a form of herd identification on 29.1 percent of operations, which accounted for 41.5 percent of dairy cows. Branding also was reported on 3.7 percent of operations, representing 18.0 percent of dairy cows. Larger operations had a method of identifying animals as part of their herd more often than smaller operations.

a. Percentage of operations (and percentage of dairy cows) by type of **herd** identification used:

| Identification Type | Percent Operations | Standard Error | Percent Dairy Cows | Standard Error |
|--|--------------------|----------------|--------------------|----------------|
| Ear tags (all kinds) | 29.1 | (1.1) | 41.5 | (1.2) |
| Collars | 4.2 | (0.5) | 3.9 | (0.5) |
| Branding (all methods) | 3.7 | (0.3) | 18.0 | (1.1) |
| Implanted electronic ID | 0.1 | (0.0) | 0.4 | (0.2) |
| Tattoo (other than tattoo for brucellosis) | 3.4 | (0.4) | 3.8 | (0.5) |
| Other | 2.7 | (0.4) | 2.9 | (0.4) |
| None | 65.8 | (1.1) | 46.4 | (1.1) |

Percent of Operations (and Percent of Dairy Cows) by Type of Herd Identification Used



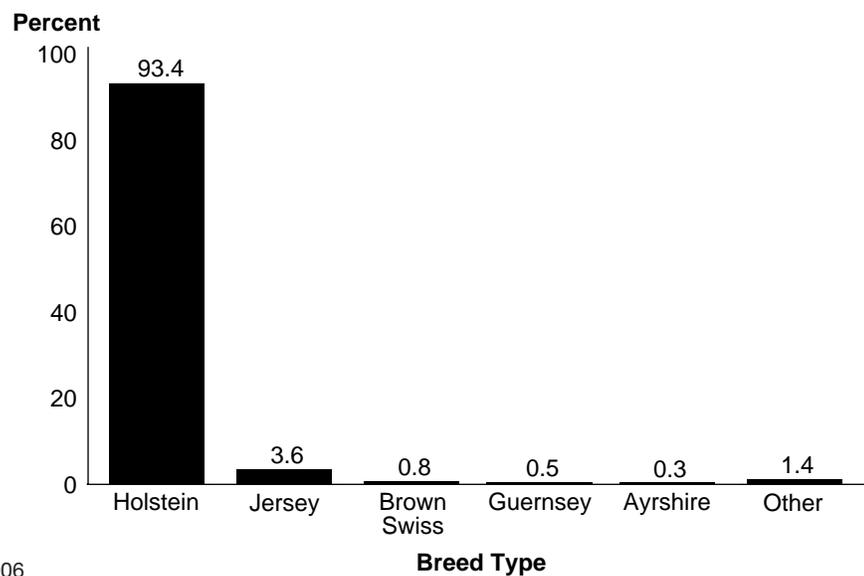
4. Breed of dairy cows

Holsteins were the most prevalent breed on the majority (95.6 percent) of operations and accounted for 93.4 percent of dairy cows. Jerseys were the next most common breed, but comprised only 3.6 percent of all dairy cows. Producers were asked to report all breeds present on the operation, so the total percentage of operations exceeds 100.0 percent.

a. Percentage of operations (and percentage of dairy cows) by breed:

| Breed | Percent Operations | Standard Error | Percent Dairy Cows | Standard Error |
|-------------|--------------------|----------------|--------------------|----------------|
| Holstein | 95.6 | (0.6) | 93.4 | (0.5) |
| Jersey | 17.1 | (1.0) | 3.6 | (0.4) |
| Ayrshire | 4.2 | (0.6) | 0.3 | (0.1) |
| Brown Swiss | 7.1 | (0.7) | 0.8 | (0.1) |
| Guernsey | 3.2 | (0.5) | 0.5 | (0.1) |
| Other | 10.4 | (0.9) | 1.4 | (0.2) |
| Total | | | 100.0 | |

Percent of Dairy Cows by Breed



#1006

Holsteins were the main breed on 92.4 percent of operations. Jerseys were the main breed on 3.8 percent of operations.

b. Percentage of operations by main breed:

| Breed | Percent Operations | Standard Error |
|-------------|--------------------|----------------|
| Holstein | 92.4 | (0.7) |
| Jersey | 3.8 | (0.5) |
| Ayrshire | 0.3 | (0.1) |
| Brown Swiss | 0.9 | (0.2) |
| Guernsey | 1.1 | (0.3) |
| Other | 1.5 | (0.4) |
| Total | 100.0 | |

5. Cow registration

Large herds had the smallest percentage (7.2 percent) of dairy cows registered, compared to medium herds (18.5 percent) and small herds (15.9 percent). The majority (71.6 percent) of operations surveyed did not own any registered dairy cows, while 7.6 percent of operations owned registered dairy cows exclusively. Most (76.9 percent) operations had less than 10.0 percent of their dairy cows registered.

a. Percentage of dairy cows registered with a breed association, by herd size:

| Percent Dairy Cows | | | | | | | |
|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 15.9 | (1.1) | 18.5 | (1.3) | 7.2 | (1.1) | 13.5 | (0.7) |

b. Percentage of operations by percentage of dairy cows registered:

| Percent of Dairy Cows Registered | Percent Operations | Standard Error |
|---|---------------------------|-----------------------|
| 0 | 71.6 | (1.2) |
| 1 to 24.9 | 9.4 | (0.7) |
| 25 to 49.9 | 4.0 | (0.6) |
| 50 to 74.9 | 3.2 | (0.4) |
| 75 to 99.9 | 4.2 | (0.5) |
| 100 | 7.6 | (0.7) |
| Total | 100.0 | |

c. Percentage of operations by registration level (percentage of dairy cows registered) and by herd size:

| Percent of Dairy Cows Registered | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
|---|---|-------------------|-----------------------------|-------------------|--------------------------------|-------------------|-----------------------|-------------------|
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Percent Oper. | Std. Error |
| | Percent Oper. | Std. Error | Percent Oper. | Std. Error | Percent Oper. | Std. Error | Percent Oper. | Std. Error |
| Less than 10 | 78.3 | (1.4) | 69.9 | (1.9) | 85.7 | (1.8) | 76.9 | (1.1) |
| 10 to 75.9 | 11.1 | (1.0) | 15.5 | (1.5) | 10.2 | (1.5) | 12.0 | (0.8) |
| 76 or more | 10.6 | (1.0) | 14.6 | (1.4) | 4.1 | (1.1) | 11.1 | (0.8) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

6. Number of bulls used

Most (54.9 percent) operations used bulls as a component of their breeding program, and 89.3 percent of these bulls were dairy bulls.

a. Percentage of operations by the number of bulls in the January 1, 2002, inventory used for breeding dairy cows or heifers:

| Number of Bulls Used | Percent Operations | Standard Error |
|-----------------------------|---------------------------|-----------------------|
| 0 | 45.1 | (1.4) |
| 1 | 31.1 | (1.3) |
| 2 to 4 | 19.1 | (1.0) |
| 5 or more | 4.7 | (0.3) |
| Total | 100.0 | |

b. Percentage of bulls used for breeding dairy cows or heifers that were dairy bulls:

| Percent Dairy Bulls | Standard Error |
|----------------------------|-----------------------|
| 89.3 | (1.3) |

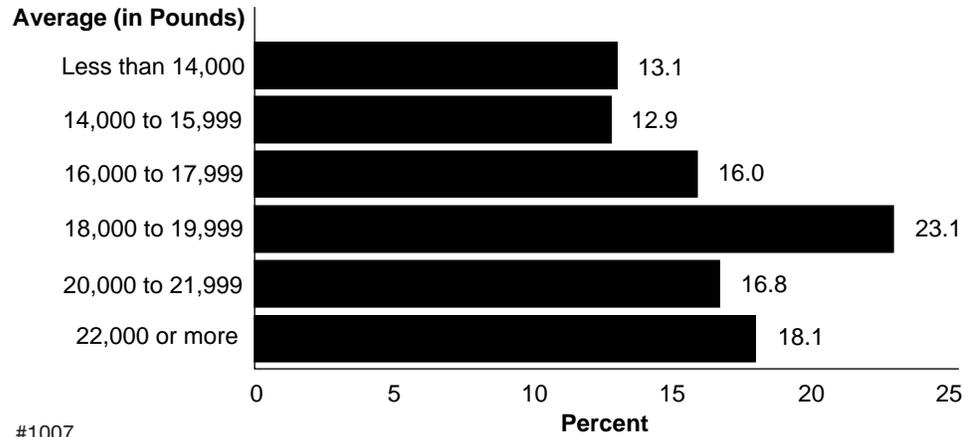
7. Rolling herd average milk production

The rolling herd average (RHA) was 18,235 pounds per cow (averaged across all operations) and 20,210 pounds per cow (averaged across all cows). RHA increased as herd size increased.

a. Percentage of operations by rolling herd average milk production:

| Average (in Pounds) | Percent Operations | Standard Error |
|----------------------------|---------------------------|-----------------------|
| Less than 14,000 | 13.1 | (1.0) |
| 14,000 to 15,999 | 12.9 | (0.9) |
| 16,000 to 17,999 | 16.0 | (0.9) |
| 18,000 to 19,999 | 23.1 | (1.1) |
| 20,000 to 21,999 | 16.8 | (1.0) |
| 22,000 or more | 18.1 | (0.9) |
| Total | 100.0 | |

Percent of Operations by Rolling Herd Average Milk Production



i. Operation average (and cow average) rolling herd milk production (pounds per cow), by herd size:

| Measure | Average | | | | | | | |
|-----------|--------------------------|------------|---------------------|------------|------------------------|------------|----------------|--------|
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Pounds | Std. Error | Pounds | Std. Error | Pounds | Std. Error | | Pounds |
| Operation | 17,677 | (129) | 19,642 | (144) | 21,902 | (174) | 18,235 | (103) |
| Cow | 18,273 | (120) | 20,038 | (138) | 22,052 | (152) | 20,210 | (80) |

Operations with on-farm computer record-keeping systems had a higher rolling herd average (RHA) (20,024 pounds) than operations with off-farm computer record-keeping systems (19,631 pounds) and operations with no computer record-keeping systems (16,371 pounds). Operations with easy access to production and health information may be able to make better management decisions.

b. Operation average (and cow average) rolling herd milk production, by computer usage:

| Computer Usage | Operation Average | Standard Error | Cow Average | Standard Error |
|-----------------------|--------------------------|-----------------------|--------------------|-----------------------|
| Computer off-farm | 19,631 | (141) | 20,053 | (129) |
| Computer on-farm | 20,024 | (214) | 21,641 | (130) |
| No computer | 16,371 | (167) | 17,346 | (158) |

Operations comprised primarily of Holsteins (over 50.0 percent of herd) had a higher rolling herd average (18,590 pounds) compared to operations comprised of mainly non-Holstein dairy breeds.

c. Operation average (and cow average) rolling herd milk production, by primary breed (over 50.0 percent of herd was Holstein):

| Breed | Operation Average | Standard Error | Cow Average | Standard Error |
|------------------------|--------------------------|-----------------------|--------------------|-----------------------|
| Primarily Holstein | 18,590 | (102) | 20,467 | (79) |
| Not primarily Holstein | 13,799 | (370) | 14,992 | (331) |

8. Days dry

Research has shown that a dairy cow requires a period of rest between lactations in order to achieve maximum production. A 60-day dry period based on production during the subsequent lactation is reported to be optimal. Overall, the operation average days dry was 60.6 days. Small operations reported 60.3 days dry, medium operations 61.2 days dry, and large operations had the longest average dry period of 63.6 days.

a. Operation average days dry during 2001, by herd size:

| Operation Average Days Dry | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Average | Std. Error | Average | Std. Error | Average | Std. Error | Average | Std. Error |
| 60.3 | (0.4) | 61.2 | (0.5) | 63.6 | (0.5) | 60.6 | (0.3) |

Overall, 56.6 percent of operations reported average days dry of 60 to 69 days. A substantial percentage (25.9 percent) of operations reported average days dry of less than 60 days, while 17.5 percent reported a dry period of 70 or more days. Dry-period length is affected by management decisions (e.g., based on milk production), accuracy of pregnancy staging (establishment of fetal age), and early calving/abortion.

b. Percentage of operations by average number of days dry:

| Average Days Dry | Percent Operations | Standard Error |
|-------------------------|---------------------------|-----------------------|
| Less than 60 | 25.9 | (1.2) |
| 60 to 69 | 56.6 | (1.4) |
| 70 or more | 17.5 | (1.1) |
| Total | 100.0 | |

9. Calving interval

Dairy cows are most productive when they conceive within 90 days after calving, calve and reach peak milk production as quickly and as often as possible. Calving interval is a measure of reproductive efficiency, and the recommended interval is 12 to 13 months. Overall, operations reported an average calving interval of 13.3 months. As farm size increased, the calving interval increased slightly.

a. Operation average calving interval (in months) for dairy cows during 2001, by herd size:

| Operation Average (in Months) | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Average | Std. Error | Average | Std. Error | Average | Std. Error | Average | Std. Error |
| 13.2 | (0.1) | 13.4 | (0.1) | 13.7 | (0.1) | 13.3 | (0.0) |

Most (53.1 percent) operations reported a calving interval of less than 13 months. Only 3.9 percent of operations reported a 16-month or longer calving interval.

b. Percentage of operations by calving interval (in months) for dairy cows:

| Number of Months | Percent Operations | Standard Error |
|-------------------------|---------------------------|-----------------------|
| Less than 13 | 53.1 | (1.4) |
| 13 to 15 | 43.0 | (1.3) |
| 16 or more | 3.9 | (0.6) |
| Total | 100.0 | |

10. Age at first calving

Research has shown that heifers that calve at 22 to 24 months of age produce more milk over their lifetimes and are less expensive to raise than heifers that freshen after 24 months. The average age at first calving for all operations was 25.4 months. The average age at first calving decreased as herd size increased, but the difference was small.

a. Operation average age (months) at first calving, by herd size:

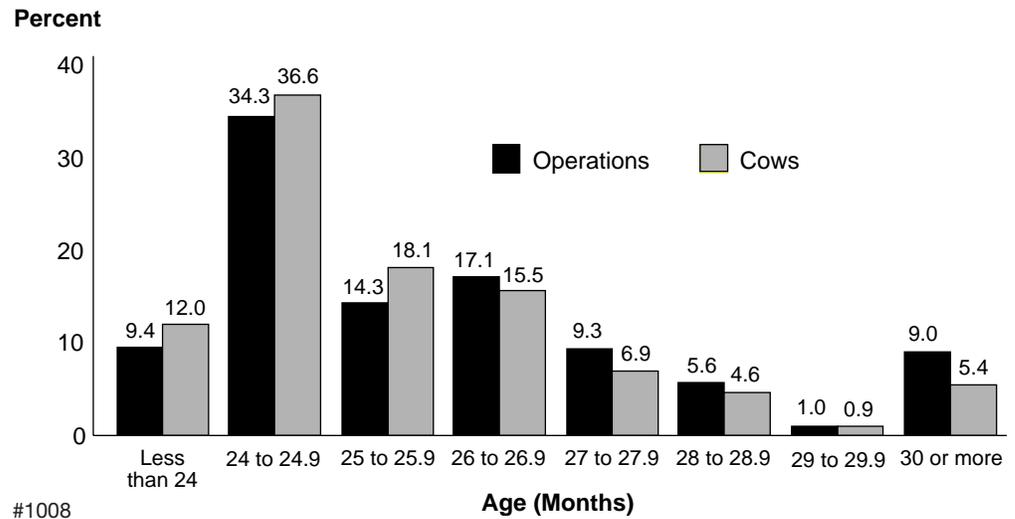
| Operation Average (in Months) | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Average | Std. Error | Average | Std. Error | Average | Std. Error | Average | Std. Error |
| 25.5 | (0.1) | 25.3 | (0.1) | 24.6 | (0.1) | 25.4 | (0.1) |

Overall, 43.7 percent of operations representing 48.6 percent of cows had heifers freshening at less than 25 months of age, while 9.0 percent of operations and 5.4 percent of cows were 30 months of age or older at the time of first calving.

b. Percentage of operations (and percentage of cows on these operations) by reported average age (in months) of cows at first calving:

| Average Age (in Months) | Percent Operations | Standard Error | Percent Cows | Standard Error |
|--------------------------------|---------------------------|-----------------------|---------------------|-----------------------|
| Less than 24 | 9.4 | (0.8) | 12.0 | (0.8) |
| 24 to 24.9 | 34.3 | (1.3) | 36.6 | (1.3) |
| 25 to 25.9 | 14.3 | (0.9) | 18.1 | (1.0) |
| 26 to 26.9 | 17.1 | (1.0) | 15.5 | (0.9) |
| 27 to 27.9 | 9.3 | (0.9) | 6.9 | (0.6) |
| 28 to 28.9 | 5.6 | (0.6) | 4.6 | (0.5) |
| 29 to 29.9 | 1.0 | (0.3) | 0.9 | (0.3) |
| 30 or more | 9.0 | (0.8) | 5.4 | (0.5) |
| Total | 100.0 | | 100.0 | |

Percent of Operations (and Percent of Cows on These Operations) by Average Age (in Months) of Cows at First Calving



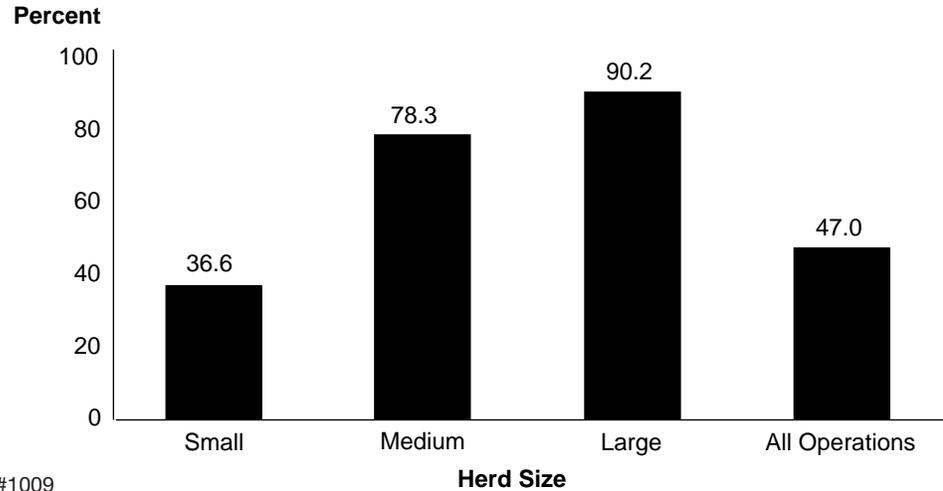
11. Feed rations

A properly prepared and delivered total mixed ration (TMR) provides cows with a balanced diet. The consistency of the diet helps maintain a normal digestive system and improves production. The majority (90.2 percent) of large operations fed a TMR, while 78.3 percent of medium operations and only 36.6 percent of small operations fed a TMR. Overall, 47.0 percent of all operations fed a TMR.

a. Percentage of operations that fed a total mixed ration, by herd size:

| Percent Operations | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 36.6 | (1.6) | 78.3 | (1.7) | 90.2 | (1.7) | 47.0 | (1.3) |

Percent of Operations that Fed a Total Mixed Ration, by Herd Size

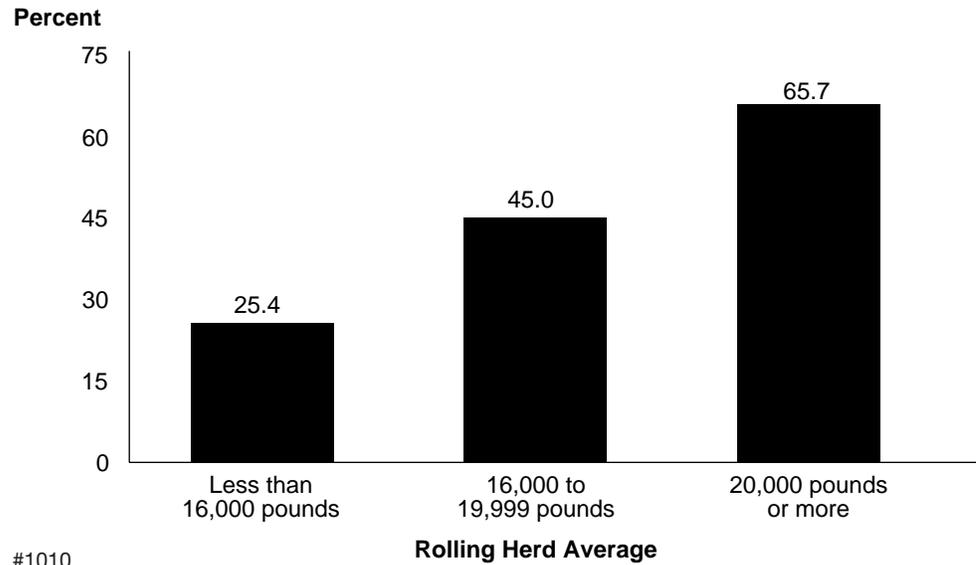


Of operations with a rolling herd average (RHA) of 20,000 pounds or more, 65.7 percent fed a total mixed ration (TMR), while 45.0 percent with an RHA of 16,000 to 19,999 pounds and 25.4 percent with an RHA less than 16,000 pounds fed a TMR.

b. Percentage of operations that fed a total mixed ration, by rolling herd average:

| Percent Operations | | | | | |
|---------------------------|---------------------------|--|---------------------------|-----------------------|---------------------------|
| Less than 16,000 | | Average Pounds 16,000 to 19,999 | | 20,000 or more | |
| Percent | Standard Error | Percent | Standard Error | Percent | Standard Error |
| 25.4 | (2.3) | 45.0 | (2.2) | 65.7 | (2.1) |

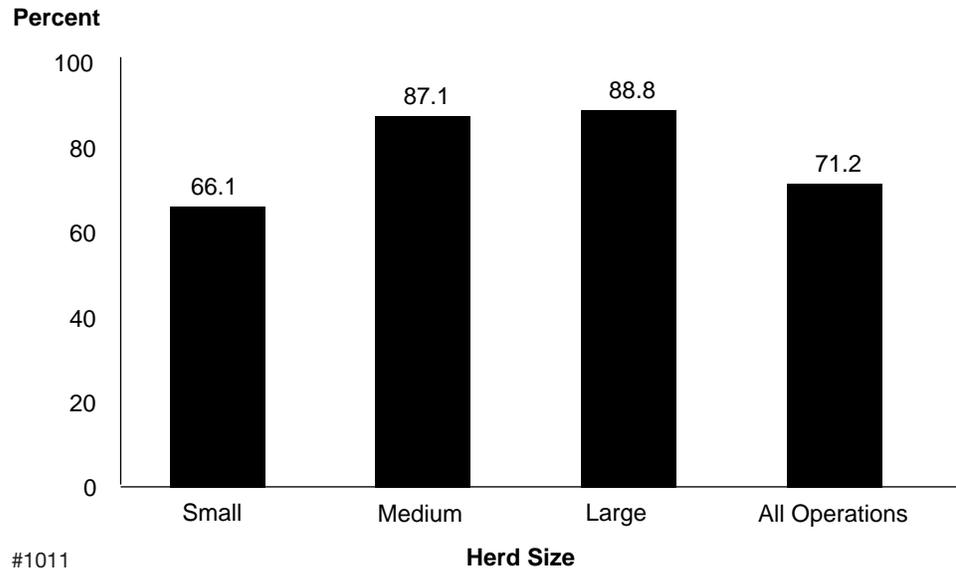
**Percent of Operations that Fed a Total Mixed Ration,
by Rolling Herd Average**



Forage testing allows producers to optimize purchased feeds and also manage consumption of nutrients. Ration formulation balances nutrients, including protein, energy, fiber, and minerals. For example, increased potassium intake by dry cows increases the probability that they will develop hypocalcemia (milk fever) at freshening, and potassium intake can be decreased when the forage level is known. Most (71.2 percent) operations used forage test results to balance feed rations. Large and medium operations used forage results more often (88.8 percent and 87.1 percent, respectively) than small operations (66.1 percent).

c. Percentage of operations that used forage test results to balance feed rations, by herd size:

| Percent Operations | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 66.1 | (1.6) | 87.1 | (1.3) | 88.8 | (1.8) | 71.2 | (1.2) |

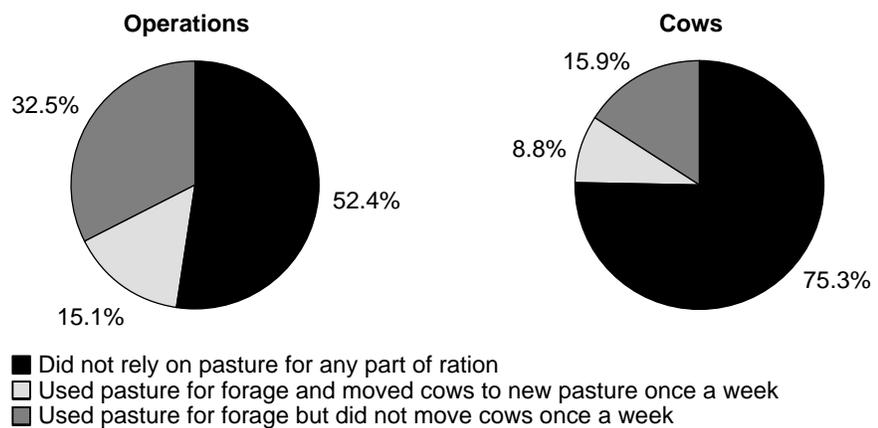
Percent of Operations That Used Forage Test Results to Balance Feed Rations, by Herd Size**12. Pasture management**

The majority (75.3 percent) of lactating cows and more than half (52.4 percent) of operations did not rely on pasture for any part of their forage rations. Operations that relied on rotational grazing accounted for 15.1 percent of all operations and represented 8.8 percent of all lactating dairy cows. Rotational grazing has become a cost effective alternative to confinement operations in some areas of the United States due to decreased labor and feed costs. Lactating cows that were pastured, but where intensive rotational grazing was not used, represented 15.9 percent of cows and 32.5 percent of operations.

a. Percentage of operations (and percentage of cows on these operations) by practice that best describes the operations' use of pasture during the growing season as part of forage rations for lactating cows:

| Pasture Usage | Percent Operations | Standard Error | Percent Cows | Standard Error |
|--|--------------------|----------------|--------------|----------------|
| Did not rely on pasture for any part of lactating cows' rations | 52.4 | (1.3) | 75.3 | (0.8) |
| Relied on pasture to provide forage for lactating cows and moved cows to new pasture at least once a week | 15.1 | (1.0) | 8.8 | (0.6) |
| Relied on pasture to provide forage for lactating cows but did not move cows to new pasture at least once a week | 32.5 | (1.3) | 15.9 | (0.7) |
| Total | 100.0 | | 100.0 | |

Percent of Operations (and Percent of Cows) by Practice that Best Describes the Operations' Use of Pasture as Part of Forage Rations for Lactating Cows



#1012

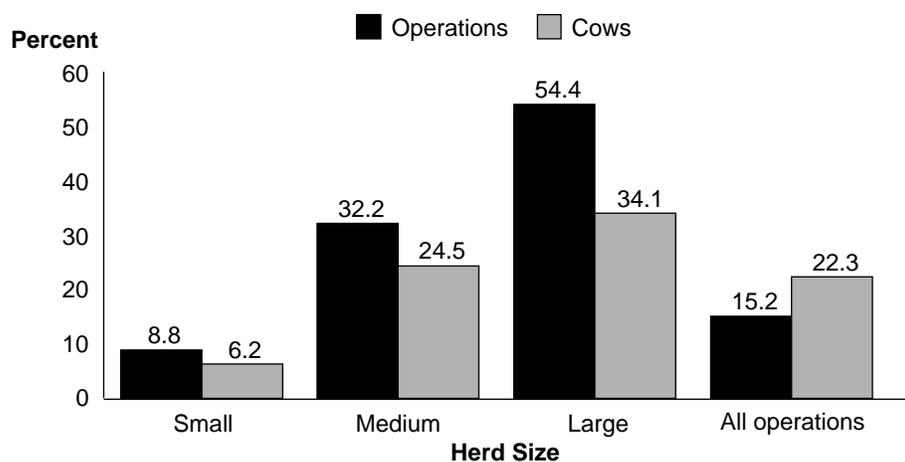
13. Bovine somatotropin (bST)

Bovine somatotropin (bST) is a hormone that increases milk production. Overall, 15.2 percent of operations used bST, while 22.3 percent of cows received the hormone. Large operations used bST most commonly (54.4 percent), followed by the medium operations (32.2 percent) and small operations (8.8 percent).

a. Percentage of operations (and percentage of cows milked on January 1, 2002) that used bST in cows during the current lactation (at the time of the Dairy 2002 interview), by herd size:

| Measure | Percent | | | | | | | |
|------------|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Operations | 8.8 | (0.8) | 32.2 | (1.9) | 54.4 | (2.6) | 15.2 | (0.8) |
| Cows | 6.2 | (0.7) | 24.5 | (1.5) | 34.1 | (1.8) | 22.3 | (0.8) |

Percent of Operations (and Percent Cows*) that Used bST in Cows During the Current Lactation (at the Time of Interview), by Herd Size



#1013

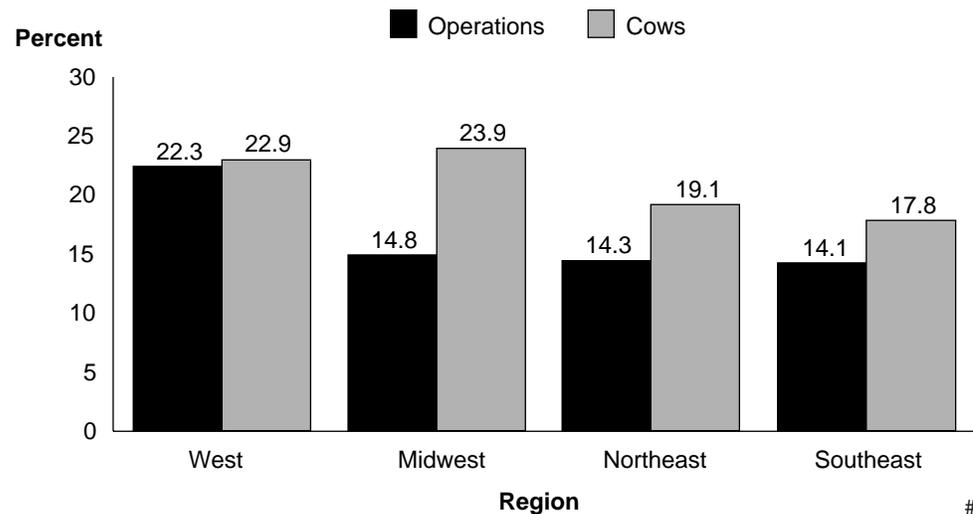
* Cows milked on January 1, 2002

Operations in the West region had the highest percentage (22.3 percent) of bST usage, compared to the other regions. Operations in the Midwest, Northeast, and Southeast regions reported very similar usage of bST (14.8 percent, 14.3 percent, and 14.1 percent, respectively).

b. Percentage of operations (and percentage of cows milked on January 1, 2002) that used bST in cows during the current lactation (at the time of the Dairy 2002 interview), by region:

| Measure | Percent | | | | | | | |
|------------|---------|------------|---------|------------|-----------|------------|-----------|------------|
| | West | | Midwest | | Northeast | | Southeast | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Operations | 22.3 | (1.8) | 14.8 | (1.0) | 14.3 | (1.5) | 14.1 | (2.8) |
| Cows | 22.9 | (1.6) | 23.9 | (1.3) | 19.1 | (1.5) | 17.8 | (2.3) |

Percent of Operations (and Percent of Cows*) that Used bST in Cows During the Current Lactation (at the Time of Interview), by Region



#1014

* Cows milked on January 1, 2002

According to the bST product label, for optimal efficiency bST should be administered to cows 57 to 70 days after calving. Overall, 49.6 percent of operations followed the manufacturer's guidelines, while 43.5 percent administered bST 71 or more days after calving. Delayed administration of bST may benefit reproduction in first-calf heifers as well as cows with lower body condition scores. A total of 5.0 percent of operations administered bST 31 to 56 days after calving, and 1.9 percent administered the hormone 30 days or less after calving.

c. For operations that used bST, percentage of operations by number of days after calving that the *initial* dose of bST was administered:

| Number Days After Calving Initial Dose of bST Administered | Percent Operations | Standard Error |
|---|---------------------------|-----------------------|
| 30 or less | 1.9 | (0.8) |
| 31 to 56 | 5.0 | (1.9) |
| 57 to 70 | 49.6 | (3.6) |
| 71 or more | 43.5 | (3.6) |
| Total | 100.0 | |

For all operations, 81 days was the average number of days after calving that the initial dose of bST was administered.

d. Operation average number of days after calving that the *initial* dose of bST was administered:

| Operation Average Days | Standard Error |
|-------------------------------|-----------------------|
| 81 | (2.2) |

Approximately 80 percent of operations administered the final dose of bST 250 days or more after calving, while 47.5 percent gave the last dose of bST 250 to 299 days after calving, and 32.6 percent administered the final dose 300 or more days post-calving.

e. For operations that used bST, percentage of operations by number of days after calving that the *last* dose of bST was administered:

| Number Days After Calving Last Dose of bST Administered | Percent Operations | Standard Error |
|--|---------------------------|-----------------------|
| Less than 200 | 10.1 | (1.8) |
| 200 to 249 | 9.8 | (2.3) |
| 250 to 299 | 47.5 | (3.6) |
| 300 or more | 32.6 | (3.1) |
| Total | 100.0 | |

The industry goal for dry-off is 305 days post-calving. The manufacturer suggests administering bST 14 days before dry-off (291 days after calving). For all operations, 270 days was the average number of days after calving that the final dose of bST was given.

f. Operation average number of days into lactation that the *last* dose of bST was administered:

| Operation Average Days | Standard Error |
|-------------------------------|-----------------------|
| 270 | (4.3) |

The majority of operations that reported “other” cited a combination of cost, animal health, public health, and too difficult to administer as the primary reason bST was not used.

g. For operations not using bST, percentage of operations by primary reason bST was not used:

| Reason bST Not Used | Percent Operations | Standard Error |
|-----------------------------|---------------------------|-----------------------|
| Cost | 19.7 | (1.2) |
| Animal health | 26.1 | (1.3) |
| Public health | 7.9 | (0.8) |
| Too difficult to administer | 9.1 | (0.9) |
| Other | 37.2 | (1.5) |
| Total | 100.0 | |

14. Drenching

Oral drenching with an energy source at the time of calving may be effective in reducing energy deficits and improving milk production (Stokes, et. al.). Overall, 20.1 percent of operations reported drenching. Only 28.9 percent of cows received an oral drench at the time of freshening. Routine drenching was most common on large operations (39.4 percent) and least common on small operations (18.9 percent).

a. Percentage of operations (and percentage of cows on these operations) that routinely drenched (oral liquid or paste) dairy cows with propylene glycol or another energy source (e.g., glycerol, calcium propionate), by herd size:

| Measure | Percent | | | | | | | |
|----------------|---|----------------|----------------------------|----------------|-------------------------------|----------------|-------------------|-----------------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | All Operations |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | |
| Operations | 18.9 | (1.3) | 21.3 | (1.7) | 39.4 | (2.7) | 20.1 | (1.1) |
| Cows | 21.8 | (1.5) | 23.8 | (1.9) | 39.3 | (2.6) | 28.9 | (1.2) |

15. Quality assurance programs

Quality assurance programs (QAPs) provide guidelines designed to ensure that management, animal health, and husbandry practices are followed in order to produce quality products. Overall, 40.6 percent of all operations participated in one or more QAP¹. Across all herd sizes, local milk cooperative/processor sponsored programs had the highest overall percentage of participants (35.2 percent of operations). Regardless of herd size, national industry sponsored programs had the lowest percentage of participants (2.8 percent of operations). Participation in QAPs decreased as herd size decreased.

a. Percentage of operations that participated in the following types of quality assurance programs during 2001, by herd size:

| Quality Assurance Program | Percent Operations | | | | | | | |
|--|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| State sponsored | 5.6 | (0.7) | 14.3 | (1.4) | 15.9 | (1.9) | 7.8 | (0.6) |
| Local milk cooperative/ processor sponsored | 32.3 | (1.6) | 42.7 | (2.0) | 54.5 | (2.7) | 35.2 | (1.3) |
| National industry sponsored | 2.5 | (0.5) | 3.5 | (0.8) | 4.5 | (1.1) | 2.8 | (0.4) |
| Other | 2.7 | (0.5) | 2.6 | (0.7) | 5.0 | (1.1) | 2.8 | (0.4) |
| Any of the above | 36.6 | (1.6) | 51.4 | (2.1) | 62.6 | (2.7) | 40.6 | (1.3) |

¹Each category of QAPs may not have been available to all operations. There are currently no minimum accepted standards or requirements for QAPs.

The West region led all regions with 57.9 percent overall participation in one or more quality assurance program (QAP). The other regions had nearly 40 percent participation. The West region had the highest percentage of local milk cooperative/processor sponsored involvement as well. The Southeast region had the lowest local milk cooperative/processor sponsored involvement (27.1 percent of operations).

b. Percentage of operations that participated in the following types of quality assurance programs during 2001, by region:

| Quality Assurance Program | Percent Operations | | | | | | | |
|--|--------------------|------------|---------|------------|-----------|------------|-----------|------------|
| | West | | Midwest | | Northeast | | Southeast | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| State sponsored | 12.7 | (2.0) | 7.7 | (0.9) | 5.2 | (1.0) | 13.4 | (2.7) |
| Local milk cooperative/processor sponsored | 51.6 | (3.1) | 34.0 | (1.8) | 34.8 | (2.3) | 27.1 | (3.4) |
| National industry sponsored | 4.6 | (1.5) | 3.2 | (0.6) | 1.5 | (0.7) | 2.1 | (0.9) |
| Other | 2.3 | (0.7) | 3.2 | (0.6) | 2.1 | (0.7) | 2.2 | (0.9) |
| Any of the above | 57.9 | (3.0) | 39.7 | (1.8) | 37.9 | (2.4) | 37.6 | (3.5) |

B. Dairy Heifers

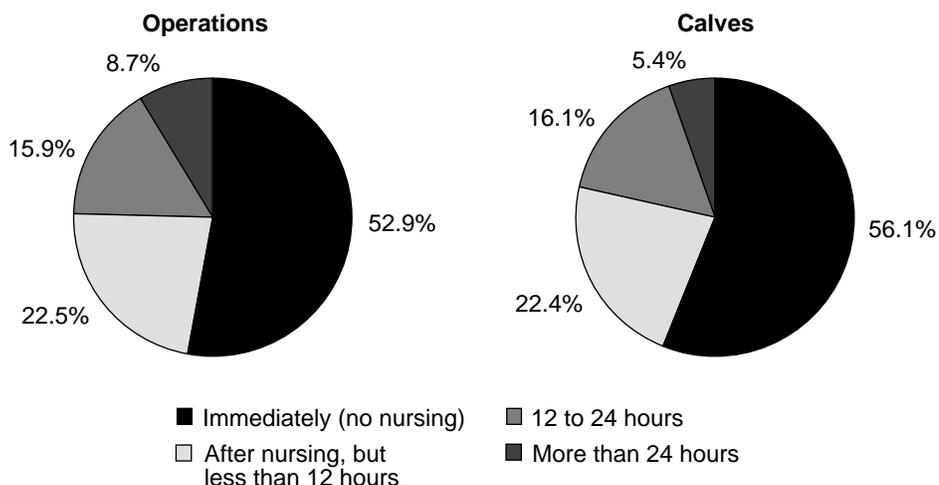
1. Colostrum management

Immediately removing calves from their mothers following birth decreases their risk of exposure to environmental pathogens. Overall, 52.9 percent of operations reported removing dairy heifer calves from their mothers immediately following birth. This percentage represents 56.1 percent of dairy heifer calves; thus, 43.9 percent of calves were not being immediately removed and were at increased risk of pathogen exposure.

a. Percentage of operations (and percentage dairy heifer calves born during 2001 on these operations) by time following birth when newborn dairy heifer calves were normally separated from their mothers:

| Age (Hours) | Percent Operations | Standard Error | Percent Calves | Standard Error |
|---------------------------------------|--------------------|----------------|----------------|----------------|
| Immediately (no nursing) | 52.9 | (1.3) | 56.1 | (1.2) |
| After nursing, but less than 12 hours | 22.5 | (1.1) | 22.4 | (1.1) |
| 12 to 24 hours | 15.9 | (1.0) | 16.1 | (1.0) |
| More than 24 hours | 8.7 | (0.8) | 5.4 | (0.5) |
| Total | 100.0 | | 100.0 | |

Percent of Operations (and Percent of Dairy Heifer Calves*) by Time Following Birth When Newborn Calves were Separated from Their Mothers



#1015

* Dairy heifer calves born on these operations during 2001

By not immediately removing calves from their dams, the first feeding of colostrum may occur through nursing, therefore making it difficult to guarantee that an adequate amount of colostrum is consumed by the newborn calves. Colostrum feeding at first nursing occurred on 30.5 percent of operations, representing 23.1 percent of calves. Hand-feeding colostrum from a bucket or bottle occurred on 64.8 percent of operations, representing 63.5 percent of dairy heifer calves. A much smaller percentage (4.4 percent) of operations used esophageal feeders to feed newborn dairy heifer calves.

b. Percentage of operations (and percentage of dairy heifer calves born during 2001 on these operations) by method used normally for first feeding of colostrum to newborn dairy heifers:

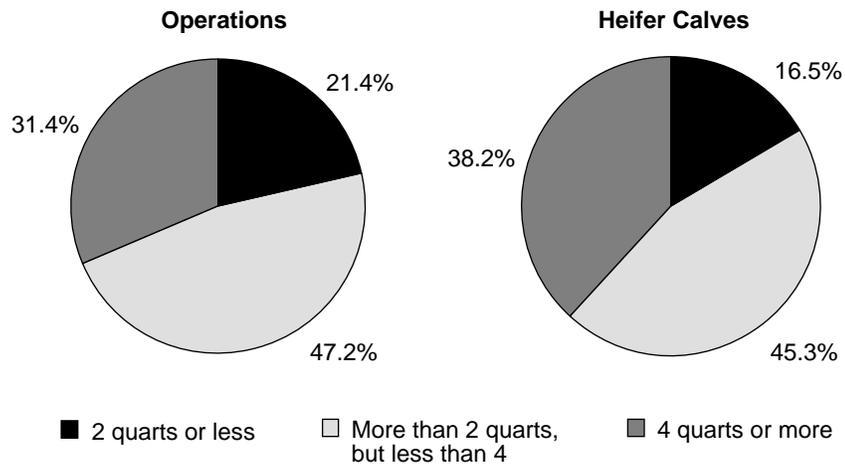
| Method of Delivery | Percent Operations | Standard Error | Percent Calves | Standard Error |
|----------------------------------|---------------------------|-----------------------|-----------------------|-----------------------|
| During first nursing | 30.5 | (1.2) | 23.1 | (1.0) |
| Hand-fed from bucket or bottle | 64.8 | (1.3) | 63.5 | (1.2) |
| Hand-fed using esophageal feeder | 4.4 | (0.5) | 12.7 | (0.9) |
| Did not get colostrum | 0.3 | (0.1) | 0.7 | (0.3) |
| Total | 100.0 | | 100.0 | |

The Bovine Alliance on Management and Nutrition's *Guide to Colostrum and Colostrum Management for Dairy Calves* suggests that 3 quarts of high quality colostrum be fed to calves by nipple bottle within 1 hour of birth and repeated in 12 hours; or that 4 quarts of high quality colostrum be fed by esophageal feeder within 1 hour of birth. These methods ensure that newborn calves get adequate colostrum. For operations that hand-fed colostrum: 31.4 percent of operations, representing 38.2 percent of calves, were feeding 4 quarts or more of colostrum; 47.2 percent of operations, representing 45.3 percent of calves, were feeding more than 2 quarts but less than 4 quarts; and 21.4 percent of operations, representing 16.5 percent of calves, were feeding 2 quarts or less. Therefore, most hand-fed calves received at least 2 quarts of colostrum. However, there were still a number of calves that were not receiving an adequate quantity of colostrum.

c. For operations that hand-fed colostrum, percentage of operations (and percentage of dairy heifer calves born during 2001 on these operations) by amount of colostrum normally fed by hand during the first 24 hours:

| Amount | Percent Operations | Standard Error | Percent Calves | Standard Error |
|--|--------------------|----------------|----------------|----------------|
| 2 quarts or less | 21.4 | (1.4) | 16.5 | (1.1) |
| More than 2 quarts, but less than 4 quarts | 47.2 | (1.7) | 45.3 | (1.6) |
| 4 quarts or more | 31.4 | (1.5) | 38.2 | (1.5) |
| Total | 100.0 | | 100.0 | |

For Operations that Hand-fed Colostrum, Percent of Operations (and Percent of Dairy Heifer Calves*) by Amount of Colostrum Fed by Hand During the First 24 Hours



#1016

* Dairy heifer calves born on these operations during 2001

Only a very small percentage (3.9 percent) of operations measured the quality of colostrum, although 28.6 percent of large operations had adopted this practice.

d. For operations that normally hand-fed colostrum or let calves get colostrum at first nursing, percentage of operations that measured immunoglobulin (Ig) levels in colostrum, by herd size:

| Percent Operations | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 1.5 | (0.4) | 8.6 | (1.1) | 28.6 | (2.4) | 3.9 | (0.4) |

e. For operations that measured immunoglobulin (Ig) levels, percentage of operations by primary method used for measuring immunoglobulin:

| Primary Method Used | Percent Operations | Standard Error |
|----------------------------|---------------------------|-----------------------|
| Colostrometer | 87.7 | (4.3) |
| Other | 12.3 | (4.3) |
| Total | 100.0 | |

Pooling colostrum from more than one cow increases the risk of spreading milk-borne pathogens to more than one calf. Overall, 27.0 percent of operations pooled colostrum. A much higher percentage (70.6 percent) of large operations pooled colostrum than did medium (37.4 percent) and small (22.1 percent) operations.

f. For operations that normally hand-fed colostrum, percentage of operations that pooled colostrum from more than one cow, by herd size:

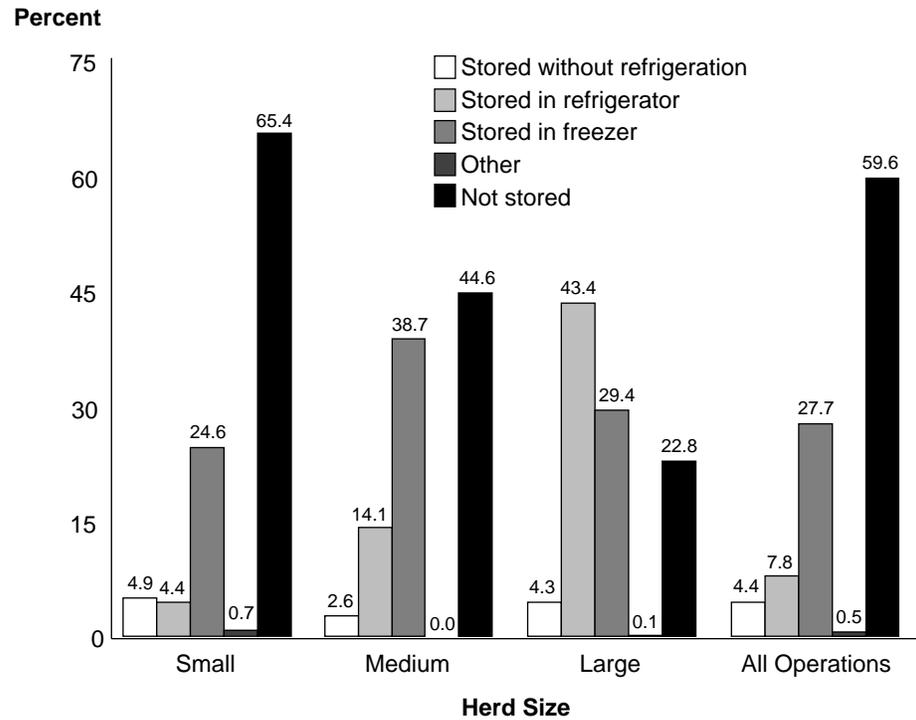
| Percent Operations | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 22.1 | (1.4) | 37.4 | (2.0) | 70.6 | (2.4) | 27.0 | (1.1) |

Proper storage of excess colostrum protects its quality and increases the amount of immunoglobulin delivered to the newborn calf. Colostrum, if fed to calves immediately after collection, does not require storage. No storage of colostrum occurred on 59.6 percent of operations. The most common storage methods were freezing (27.7 percent of operations) and refrigeration (7.8 percent of operations). A much higher percentage of large operations used some form of colostrum storage than did medium and small operations.

g. For operations that normally hand-fed colostrum, percentage of operations by primary method of excess colostrum storage and by herd size:

| Storage Method | Percent Operations | | | | | | | |
|------------------------------|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Stored without refrigeration | 4.9 | (0.8) | 2.6 | (0.6) | 4.3 | (1.2) | 4.4 | (0.6) |
| Stored in refrigerator | 4.4 | (0.6) | 14.1 | (1.4) | 43.4 | (2.7) | 7.8 | (0.6) |
| Stored in freezer | 24.6 | (1.4) | 38.7 | (2.0) | 29.4 | (2.4) | 27.7 | (1.1) |
| Other | 0.7 | (0.3) | 0.0 | (--) | 0.1 | (0.1) | 0.5 | (0.2) |
| Not stored | 65.4 | (1.6) | 44.6 | (2.1) | 22.8 | (2.4) | 59.6 | (1.3) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

Percent of Operations by Primary Method of Excess Colostrum Storage and by Herd Size



#1017

h. For operations that normally hand-fed colostrum, percentage of operations that pasteurized colostrum, by herd size:

| Percent Operations | | | | | | | |
|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 0.4 | (0.2) | 0.8 | (0.3) | 3.6 | (0.9) | 0.6 | (0.2) |

Waste milk was fed to dairy heifer calves on 87.2 percent of operations. Waste milk was pasteurized prior to feeding on only 1.0 percent of operations. However, a higher percentage (11.3 percent) of large operations pasteurized waste milk compared to medium (1.0 percent) and small (0.5 percent) operations. Pasteurizing waste milk reduces and in some cases eliminates pathogens in milk, thus reducing calves' exposure to these pathogens.

i. Percentage of operations that pasteurized waste milk fed to dairy heifer calves, by herd size:

| Pasteurized | Percent Operations | | | | | | | |
|--------------------|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Yes | 0.5 | (0.2) | 1.0 | (0.4) | 11.3 | (1.6) | 1.0 | (0.2) |
| No | 87.0 | (1.1) | 85.3 | (1.6) | 74.2 | (2.4) | 86.2 | (0.9) |
| Not fed waste milk | 12.5 | (1.1) | 13.7 | (1.5) | 14.5 | (2.0) | 12.8 | (0.9) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

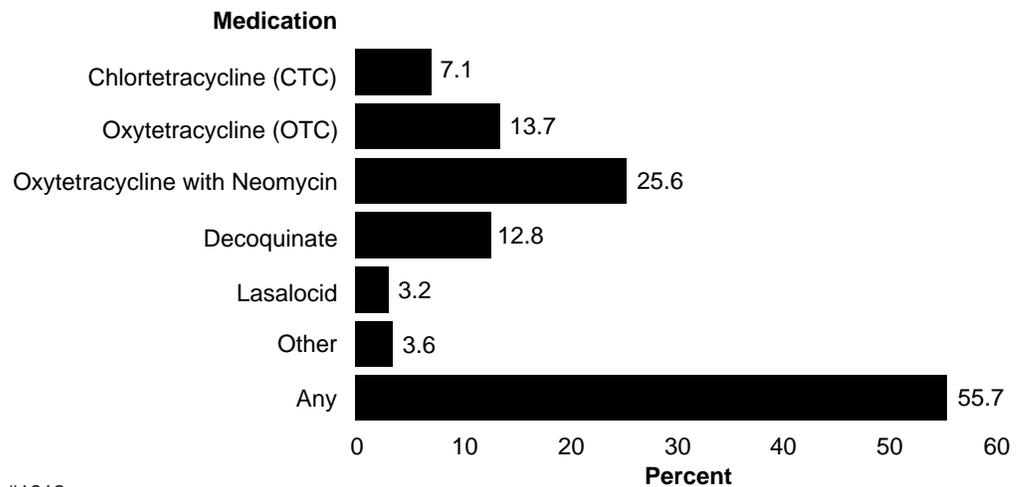
2. Medicated milk-replacer

Unweaned dairy heifers are commonly fed milk-replacers, many of which contain various medications. These medications are intended to decrease the incidence of common diseases during the neonatal period (e.g., scours and pneumonia). A total of 55.7 percent of operations used milk replacer that contained medication. Oxytetracycline with neomycin was the most common medication (25.6 percent of operations). Oxytetracycline alone was the second most common medication (13.7 percent of operations).

a. Percentage of operations that fed medicated milk-replacer to dairy heifer calves during 2001, by medication used:

| Medication Used | Percent Operations | Standard Error |
|---|--------------------|----------------|
| Chlortetracycline (CTC) | 7.1 | (0.7) |
| Oxytetracycline (OTC) | 13.7 | (0.8) |
| Oxytetracycline with neomycin (OTC/NEO) | 25.6 | (1.2) |
| Decoquinatate | 12.8 | (0.9) |
| Lasalocid | 3.2 | (0.4) |
| Other | 3.6 | (0.5) |
| Any | 55.7 | (1.3) |

Percent of Operations that Fed Medicated Milk-replacer to Dairy Heifer Calves During 2001, by Medication Used



#1018

3. Weaning age

The average weaning age of dairy heifer calves for all operations was 8.4 weeks. There were only small differences across the different herd sizes: 7.9 weeks for small herds; 8.1 weeks for medium herds; and 9.0 weeks for large herds.

a. Average age at weaning (in weeks) of dairy heifer calves, by herd size:

| Average Age (in weeks) | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Average | Std. Error | Average | Std. Error | Average | Std. Error | Average | Std. Error |
| 7.9 | (0.1) | 8.1 | (0.1) | 9.0 | (0.1) | 8.4 | (0.1) |

b. Percentage of operations by average weaning age of dairy heifer calves:

| Average Weaning Age (In Weeks) | Percent Operations | Standard Error |
|---------------------------------------|---------------------------|-----------------------|
| 3 or less | 0.6 | (0.2) |
| 4 | 4.7 | (0.6) |
| 5 | 6.0 | (0.7) |
| 6 | 18.2 | (1.1) |
| 7 | 8.6 | (0.7) |
| 8 | 36.8 | (1.3) |
| 9 | 3.6 | (0.5) |
| 10 | 8.0 | (0.7) |
| 11 | 1.0 | (0.3) |
| 12 | 9.7 | (0.8) |
| 13 or more | 2.8 | (0.4) |
| Total | 100.0 | |

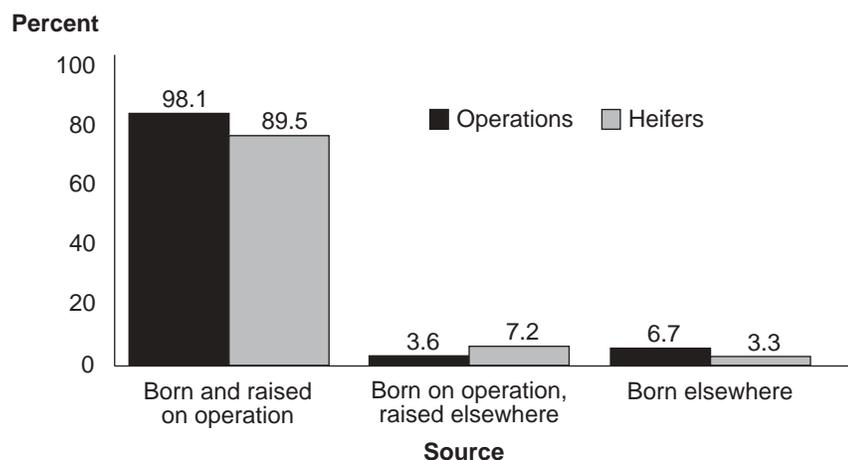
4. Source of heifers

A total of 98.1 percent of producers reported that heifers were born and raised on their operation, accounting for 89.5 percent of dairy heifers. Producers reported that heifers were born on the operation but raised elsewhere on 3.6 percent of operations, accounting for 7.2 percent of dairy heifers. These operations sent heifers primarily to contract heifer raisers. Heifers not born on the operation were a source of heifers on 6.7 percent of operations, accounting for 3.3 percent of heifers. These categories are not mutually exclusive. For example, some producers may have reported that they both raised some heifers on the operation and also sent heifers off the farm to be raised, which is why the total percentage of operations exceeds 100 percent.

a. Percentage of operations and percentage of dairy heifer (dairy cow replacements and dairy heifer calves) inventory on January 1, 2002, by source of dairy heifers:

| Source | Percent Operations | Standard Error | Percent Dairy Heifers | Standard Error |
|--|--------------------|----------------|-----------------------|----------------|
| Heifers were born and raised on the operation | 98.1 | (0.3) | 89.5 | (1.0) |
| Heifers were born on the operation and raised somewhere else | 3.6 | (0.4) | 7.2 | (0.8) |
| Heifers were born elsewhere (off the operation) | 6.7 | (0.7) | 3.3 | (0.8) |
| Total | | | 100.0 | |

Percent of Operations and Percent of Dairy Heifer Inventory* on January 1, 2002, by Source of Dairy Heifers



#1019

*Dairy cow replacements and dairy heifer calves

5. Home-raised heifers

a. Percentage of operations by percentage of milking string that was home-raised replacements¹:

| Percent of Home-raised Replacements | Percent Operations | Standard Error |
|--|---------------------------|-----------------------|
| 0 | 8.4 | (0.8) |
| 0.1 to 10.0 | 3.9 | (0.6) |
| 10.1 to 20.0 | 23.2 | (1.2) |
| 20.1 to 30.0 | 33.1 | (1.3) |
| 30.1 to 40.0 | 23.2 | (1.1) |
| 40.1 or more | 8.2 | (0.7) |
| Total | 100.0 | |

¹Number of home-raised replacements that entered the milking string during 2001, as a percentage of the January 1, 2002, dairy cow inventory.

C. Culled Cows**1. Removals from herd**

Overall, 25.5 percent of all dairy cows were removed permanently from their respective herd during 2001. Large operations had the highest percentage (27.5 percent) of cows removed.

a. Percentage of dairy cows removed permanently from the herd during 2001, as a percentage of the January 1, 2002, dairy cow inventory, by herd size:

| Percent Cows | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 24.9 | (0.6) | 23.9 | (0.5) | 27.5 | (0.6) | 25.5 | (0.3) |

The West region had the highest percentage (26.7 percent) of dairy cows removed permanently from the herd during 2001, and the Southeast region had the lowest percentage (22.6 percent) of dairy cows removed.

b. Percentage of dairy cows removed permanently from the herd during 2001, as a percentage of the January 1, 2002, dairy cow inventory, by region:

| Percent Cows | | | | | | | |
|--------------|------------|---------|------------|-----------|------------|-----------|------------|
| Region | | | | | | | |
| West | | Midwest | | Northeast | | Southeast | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 26.7 | (0.6) | 25.4 | (0.5) | 24.2 | (0.7) | 22.6 | (0.8) |

Of the dairy cows removed permanently from the herd during 2001, 94.3 percent were culled and 5.7 percent were sent directly to another dairy.

c. For dairy cows removed permanently from the herd during 2001, percentage of cows by where they were sent following removal:

| Sent | Percent Cows | Standard Error |
|---------------------------|--------------|----------------|
| Directly to another dairy | 5.7 | (0.6) |
| Culled | 94.3 | (0.6) |
| Total | 100.0 | |

2. Destination

Of the dairy cows culled during 2001, the majority (78.5 percent) went to a market, auction, or stockyard. Cows that went directly to a packer or slaughter plant accounted for 20.8 percent of culled cows. As herd size increased so did the percentage of cows that went directly to a packer or slaughter plant.

a. For operations that culled dairy cows during 2001, percentage of culled dairy cows by destination and by herd size:

| Percent Culled Cows | | | | | | | | |
|---|---|-------------------|-----------------------------|-------------------|--------------------------------|-------------------|-----------------------|-------------------|
| Destination | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Percent | Std. Error |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Market, auction, or stockyard | 83.6 | (1.2) | 78.2 | (1.6) | 75.1 | (2.2) | 78.5 | (1.1) |
| Directly to a packer or slaughter plant | 15.8 | (1.2) | 21.0 | (1.6) | 24.2 | (2.2) | 20.8 | (1.1) |
| Sent elsewhere | 0.6 | (0.2) | 0.8 | (0.3) | 0.7 | (0.3) | 0.7 | (0.2) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

b. For operations that culled dairy cows during 2001, percentage of culled dairy cows by destination and by region:

| Percent Culled Cows | | | | | | | | |
|---|----------------|-------------------|----------------|-------------------|------------------|-------------------|------------------|-------------------|
| Destination | Region | | | | | | | |
| | West | | Midwest | | Northeast | | Southeast | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| Market, auction, or stockyard | 76.3 | (2.2) | 80.0 | (1.4) | 80.2 | (1.8) | 79.9 | (2.9) |
| Directly to a packer or slaughter plant | 22.9 | (2.2) | 19.7 | (1.4) | 18.5 | (1.7) | 19.7 | (2.9) |
| Sent elsewhere | 0.8 | (0.3) | 0.3 | (0.1) | 1.3 | (0.4) | 0.4 | (0.2) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

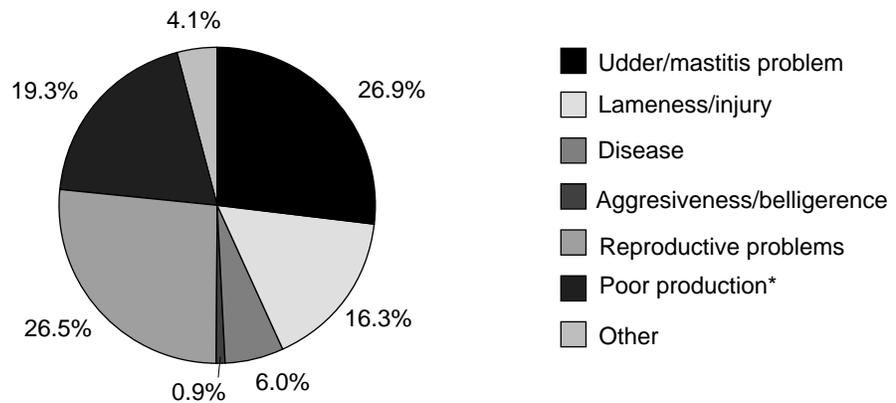
3. Reason for culling

Culled dairy cows represent a significant income loss to dairy producers. Producers and veterinarians must continue to focus on the major reasons for culling and look to improve strategies that reduce culling. The majority of cows were culled for udder health and reproductive problems, 26.9 percent and 26.5 percent, respectively. Poor production not related to the listed problems accounted for 19.3 percent of culled cows, followed by lameness/injury at 16.3 percent.

a. For operations that culled dairy cows, percentage of dairy cows culled, by producer-reported reason for culling:

| Producer-reported Reason | Percent Cows | Standard Error |
|--|--------------|----------------|
| Udder or mastitis problem | 26.9 | (0.5) |
| Lameness or injury | 16.3 | (0.4) |
| Disease | 6.0 | (0.3) |
| Aggressiveness or belligerence (kickers) | 0.9 | (0.1) |
| Reproductive problems | 26.5 | (0.5) |
| Poor production not related to listed problems | 19.3 | (0.7) |
| Other | 4.1 | (0.4) |
| Total | 100.0 | |

Percent of Dairy Cows Culled, by Producer-reported Reason for Culling



#1020

*Unrelated to the other listed problems

D. Health Management

1. Vaccination

For **dairy heifers**, large operations reported the highest percentage of vaccine usage across all vaccine types, with the exception of parainfluenza, *Hemophilus somnus*, and *Mycobacterium paratuberculosis* vaccines, where medium operations reported the highest percentage of usage. A total of 15.6 percent of operations did not give any vaccinations to dairy heifers, with 18.3 percent, 7.5 percent, and 2.9 percent of small, medium, and large operations, respectively, administering no vaccinations. It is interesting to note that only 51.0 percent of all operations vaccinated dairy heifers for brucellosis, a 12.8 percent decrease since the NAHMS Dairy '96 study, where 63.8 percent of operations vaccinated heifers for brucellosis. This decrease may be indicative of the United States advancing toward the eradication of bovine brucellosis.

a. Percentage of operations that normally vaccinated **dairy heifers** for the following diseases, by herd size:

| Disease | Percent Operations | | | | | | | |
|---|----------------------------------|-------|---------------------|-------|------------------------|-------|----------------|-------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | |
| Bovine viral diarrhea (BVD) | 67.5 | (1.6) | 83.3 | (1.5) | 88.2 | (2.0) | 71.5 | (1.2) |
| Infectious bovine rhinotracheitis (IBR) | 62.8 | (1.6) | 79.6 | (1.7) | 84.6 | (2.1) | 67.0 | (1.3) |
| Parainfluenza Type 3 (PI3) | 55.9 | (1.7) | 73.3 | (1.8) | 72.3 | (2.6) | 60.0 | (1.3) |
| Bovine respiratory syncytial virus (BRSV) | 53.9 | (1.7) | 70.8 | (1.9) | 76.5 | (2.4) | 58.2 | (1.3) |
| <i>Hemophilus somnus</i> | 29.0 | (1.5) | 39.1 | (2.0) | 38.0 | (2.5) | 31.4 | (1.2) |
| Leptospirosis | 61.3 | (1.7) | 76.4 | (1.8) | 79.9 | (2.3) | 65.1 | (1.3) |
| <i>Salmonella</i> | 14.2 | (1.2) | 22.3 | (1.7) | 42.0 | (2.6) | 16.8 | (1.0) |
| <i>E. coli</i> mastitis | 16.1 | (1.2) | 34.9 | (2.0) | 52.8 | (2.7) | 21.3 | (1.0) |
| Clostridia | 27.4 | (1.4) | 47.3 | (2.0) | 63.2 | (2.7) | 32.8 | (1.1) |
| Brucellosis | 47.8 | (1.6) | 58.6 | (2.0) | 74.4 | (2.3) | 51.0 | (1.3) |
| <i>Mycobacterium paratuberculosis</i> (Johne's disease) | 4.1 | (0.7) | 6.2 | (1.1) | 4.1 | (0.9) | 4.6 | (0.5) |
| Neospora | 3.0 | (0.5) | 4.8 | (0.9) | 9.2 | (1.6) | 3.6 | (0.4) |
| Other | 6.5 | (0.7) | 8.9 | (1.2) | 6.0 | (1.2) | 6.9 | (0.6) |
| None | 18.3 | (1.4) | 7.5 | (1.1) | 2.9 | (0.7) | 15.6 | (1.1) |

For **dairy heifers**, operations in the West region reported the highest percentage of vaccine usage across all vaccine types, with the exception of *Hemophilus somnus*, leptospirosis, and clostridia, where usage was similar for the West and Southeast regions. Clostridial vaccine was used on the highest percentage of operations in the Southeast region. The Northeast region had the highest percentage of operations that administered no vaccines (23.3 percent), followed by the Midwest (14.7 percent), Southeast (6.1 percent) and the West (3.5 percent) regions.

i. Percentage of operations that normally vaccinated *dairy heifers* for the following diseases, by region:

| Disease | Percent Operations | | | | | | | |
|---|--------------------|------------|---------|------------|-----------|------------|-----------|------------|
| | West | | Midwest | | Northeast | | Southeast | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bovine viral diarrhea (BVD) | 84.3 | (2.4) | 73.0 | (1.7) | 62.3 | (2.5) | 80.7 | (3.8) |
| Infectious bovine rhinotracheitis (IBR) | 79.2 | (2.5) | 68.4 | (1.7) | 58.3 | (2.6) | 75.6 | (3.9) |
| Parainfluenza Type 3 (PI3) | 69.4 | (2.7) | 61.6 | (1.8) | 53.1 | (2.6) | 63.0 | (4.5) |
| Bovine respiratory syncytial virus (BRSV) | 68.4 | (3.0) | 59.2 | (1.8) | 52.1 | (2.6) | 62.2 | (4.4) |
| <i>Hemophilus somnus</i> | 34.5 | (2.9) | 31.3 | (1.7) | 29.6 | (2.1) | 36.7 | (4.2) |
| Leptospirosis | 74.3 | (2.6) | 64.7 | (1.8) | 60.4 | (2.5) | 78.1 | (3.4) |
| <i>Salmonella</i> | 30.1 | (2.8) | 16.5 | (1.4) | 11.2 | (1.6) | 27.8 | (4.1) |
| <i>E. coli</i> mastitis | 39.8 | (3.0) | 21.8 | (1.5) | 13.7 | (1.6) | 25.4 | (3.3) |
| Clostridia | 61.1 | (3.0) | 33.6 | (1.7) | 14.0 | (1.6) | 71.8 | (4.2) |
| Brucellosis | 86.4 | (2.1) | 56.0 | (1.9) | 25.8 | (2.1) | 66.4 | (4.1) |
| <i>Mycobacterium paratuberculosis</i> (Johne's disease) | 7.1 | (1.9) | 5.2 | (0.8) | 2.3 | (0.8) | 4.7 | (1.4) |
| Neospora | 6.4 | (1.2) | 3.5 | (0.6) | 2.5 | (0.7) | 5.4 | (1.5) |
| Other | 6.6 | (1.3) | 4.8 | (0.8) | 12.4 | (1.4) | 4.3 | (1.7) |
| None | 3.5 | (1.0) | 14.7 | (1.4) | 23.3 | (2.4) | 6.1 | (2.3) |

For **dairy cows**, large operations reported the highest percentage of vaccine usage across all vaccine types, with the exception of parainfluenza, where the percentage was comparable to medium operations. A total of 17.2 percent of operations did not administer any vaccinations, with 20.7 percent, 7.5 percent, and 0.5 percent of small, medium, and large operations, respectively, administering no vaccinations.

b. Percentage of operations that normally vaccinated **dairy cows** for the following diseases, by herd size:

| Disease | Percent Operations | | | | | | | |
|---|----------------------------------|-------|---------------------|-------|------------------------|-------|----------------|-------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | |
| Bovine viral diarrhea (BVD) | 70.0 | (1.6) | 86.3 | (1.4) | 92.1 | (1.5) | 74.2 | (1.2) |
| Infectious bovine rhinotracheitis (IBR) | 65.1 | (1.6) | 82.0 | (1.6) | 85.3 | (2.1) | 69.3 | (1.3) |
| Parainfluenza Type 3 (PI3) | 58.2 | (1.6) | 74.6 | (1.8) | 74.3 | (2.4) | 62.2 | (1.3) |
| Bovine respiratory syncytial virus (BRSV) | 57.1 | (1.7) | 72.8 | (1.8) | 78.9 | (2.2) | 61.1 | (1.3) |
| <i>Hemophilus somnus</i> | 30.1 | (1.5) | 39.7 | (2.0) | 40.4 | (2.5) | 32.4 | (1.2) |
| Leptospirosis | 66.0 | (1.6) | 81.7 | (1.6) | 89.6 | (1.8) | 70.1 | (1.3) |
| <i>Salmonella</i> | 13.7 | (1.2) | 24.6 | (1.8) | 44.6 | (2.7) | 17.1 | (1.0) |
| <i>E. coli</i> mastitis | 24.1 | (1.4) | 52.2 | (2.1) | 74.1 | (2.4) | 31.7 | (1.2) |
| Clostridia | 19.8 | (1.3) | 38.3 | (2.0) | 58.8 | (2.6) | 25.0 | (1.1) |
| Neospora | 2.5 | (0.5) | 4.8 | (0.9) | 10.9 | (1.9) | 3.3 | (0.4) |
| Other | 6.8 | (0.8) | 8.6 | (1.2) | 5.9 | (1.2) | 7.2 | (0.6) |
| None | 20.7 | (1.4) | 7.5 | (1.2) | 0.5 | (0.5) | 17.2 | (1.1) |

For **dairy cows**, operations in the West region reported the highest percentage of vaccine usage for bovine viral diarrhea, infectious bovine rhinotracheitis, bovine respiratory syncytial virus, *E. coli*, and clostridia. The Northeast region had the lowest percentage of operations administering all types of vaccines, with the exception of *Hemophilus somnus*, where the percentage of usage was similar to the other regions. The Northeast and Midwest regions reported the highest percentage of operations administering no vaccines, 19.1 percent and 18.3 percent, respectively.

i. Percentage of operations that normally vaccinated **dairy cows** for the following diseases, by region:

| Disease | Percent Operations | | | | | | | |
|---|--------------------|------------|---------|------------|-----------|------------|-----------|------------|
| | West | | Midwest | | Northeast | | Southeast | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Bovine viral diarrhea (BVD) | 81.9 | (2.7) | 75.4 | (1.6) | 68.9 | (2.5) | 75.2 | (4.1) |
| Infectious bovine rhinotracheitis (IBR) | 76.1 | (2.8) | 70.5 | (1.7) | 64.4 | (2.5) | 69.7 | (4.2) |
| Parainfluenza Type 3 (PI3) | 65.2 | (3.0) | 64.1 | (1.7) | 57.8 | (2.6) | 58.1 | (4.5) |
| Bovine respiratory syncytial virus (BRSV) | 67.2 | (3.0) | 62.4 | (1.8) | 57.1 | (2.6) | 57.8 | (4.5) |
| <i>Hemophilus somnus</i> | 35.8 | (2.9) | 31.6 | (1.7) | 32.7 | (2.2) | 34.1 | (4.2) |
| Leptospirosis | 80.1 | (2.6) | 69.1 | (1.8) | 67.9 | (2.5) | 76.6 | (3.3) |
| <i>Salmonella</i> | 30.6 | (2.8) | 17.1 | (1.4) | 11.0 | (1.5) | 25.9 | (4.1) |
| <i>E. coli</i> mastitis | 58.5 | (3.0) | 32.5 | (1.7) | 20.4 | (1.7) | 38.3 | (4.0) |
| Clostridia | 47.6 | (3.0) | 26.0 | (1.5) | 13.0 | (1.5) | 39.3 | (4.4) |
| Neospora | 6.4 | (1.2) | 3.4 | (0.6) | 1.9 | (0.6) | 4.8 | (1.4) |
| Other | 6.3 | (1.3) | 5.0 | (0.8) | 13.3 | (1.6) | 3.1 | (1.5) |
| None | 7.0 | (2.0) | 18.3 | (1.5) | 19.1 | (2.3) | 12.2 | (2.6) |

Vaccines for bovine viral diarrhea (BVD) virus were administered to **dairy heifers** on 71.5 percent of operations and to **dairy cows** on 74.2 percent of operations. Of these operations, killed and modified live BVD vaccines were given to **dairy heifers** on 50.6 percent and 49.2 percent of operations, respectively. Killed and modified live BVD vaccines were given to **dairy cows** on 61.9 percent and 36.7 percent of operations, respectively. For operations that gave BVD vaccinations to cows, 82.9 percent gave annual BVD booster vaccinations.

2. Types of BVD vaccine

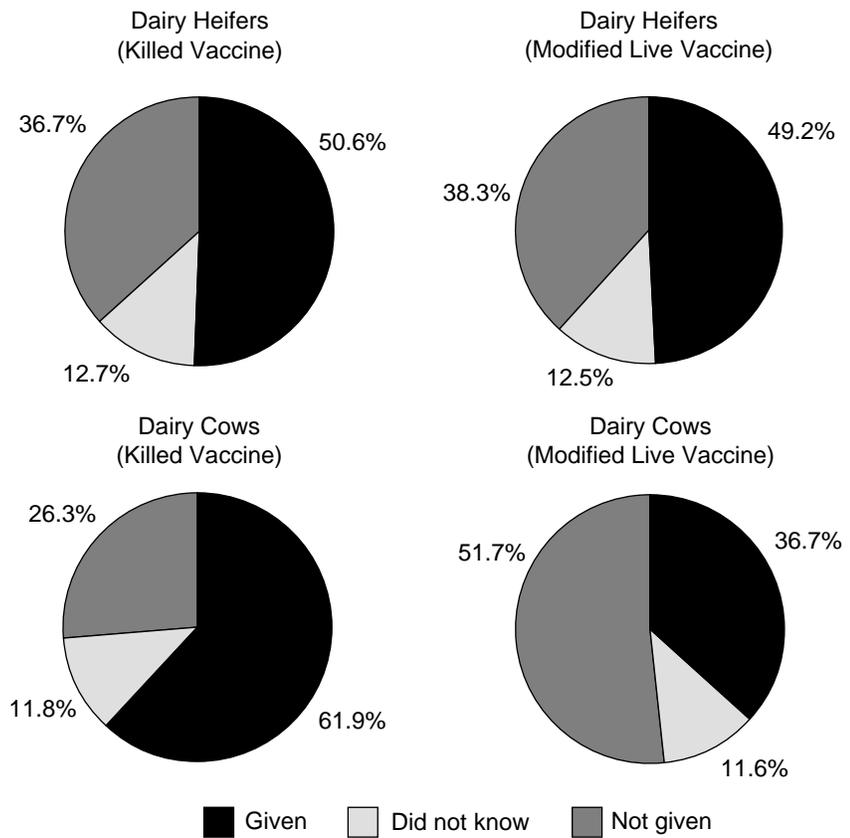
a. For operations that gave BVD vaccinations to **dairy heifers**, percentage of operations by type of BVD vaccine given:

| Percent Operations | | | | | | | |
|---------------------|-------|----------------|--------------|----------------|-----------|----------------|-------|
| Type of BVD Vaccine | Given | Standard Error | Did Not Know | Standard Error | Not Given | Standard Error | Total |
| Killed | 50.6 | (1.6) | 12.7 | (1.1) | 36.7 | (1.5) | 100.0 |
| Modified Live | 49.2 | (1.6) | 12.5 | (1.1) | 38.3 | (1.5) | 100.0 |

b. For operations that gave BVD vaccinations to **dairy cows**, percentage of operations by type of BVD vaccine given:

| Percent Operations | | | | | | | |
|---------------------|-------|----------------|--------------|----------------|-----------|----------------|-------|
| Type of BVD Vaccine | Given | Standard Error | Did Not Know | Standard Error | Not Given | Standard Error | Total |
| Killed | 61.9 | (1.5) | 11.8 | (1.1) | 26.3 | (1.3) | 100.0 |
| Modified Live | 36.7 | (1.5) | 11.6 | (1.1) | 51.7 | (1.5) | 100.0 |

Percent of Operations* by Type of BVD Vaccine Given to Dairy Heifers and Dairy Cows



#1021

*For operations that gave BVD vaccinations

c. For operations that gave BVD vaccinations to dairy cows, percentage of operations that gave annual BVD booster injections:

| Percent Operations | Standard Error |
|--------------------|----------------|
| 82.9 | (1.2) |

3. BVD strains used

Since the identification of Type II BVD virus in the early 1990s, the ability of one type of BVD vaccine to protect for the other type of BVD virus has been of concern to producers. Vaccines are available that contain Type I, Type II, or a combination of both. For operations that administered a BVD vaccine, 5.4 percent administered Type I vaccine only, 7.6 percent administered Type II vaccine only, and 39.4 percent administered BVD vaccine containing both types. Many operations (47.6 percent) did not know which type of BVD vaccine was administered.

a. For operations that gave BVD vaccinations, percentage of operations by strain of BVD contained in vaccine administered:

| BVD Strain | Percent | Standard Error |
|-----------------------------------|----------------|-----------------------|
| Type I only | 5.4 | (0.6) |
| Type II only | 7.6 | (0.9) |
| Combination of Type I and Type II | 39.4 | (1.4) |
| Did not know | 47.6 | (1.5) |
| Total | 100.0 | |

4. Preventive practices

Preventive practices for dairy replacement heifers were very common. Only 5.1 percent of operations, representing just 2.5 percent of heifers, did not use any preventive practices. The percentage of operations using each preventive practice has changed little since the NAHMS Dairy '96 study.

a. Percentage of operations (and percentage of weaned *dairy heifers* on these operations) by preventive practices normally used for dairy *replacement heifers*:

| Preventive Practice | Percent Operations | Standard Error | Percent Heifers | Standard Error |
|---|--------------------|----------------|-----------------|----------------|
| Dewormers | 69.0 | (1.2) | 61.7 | (1.3) |
| Coccidiostats in feed | 44.4 | (1.3) | 58.3 | (1.4) |
| Vitamins A, D, E injection | 15.3 | (1.0) | 20.8 | (1.3) |
| Vitamins A, D, E in feed | 72.7 | (1.2) | 73.6 | (1.3) |
| Selenium injection | 13.3 | (0.9) | 18.2 | (1.1) |
| Selenium in feed | 67.6 | (1.3) | 66.3 | (1.4) |
| Ionophores in feed (i.e., Rumensin, Bovatec) | 44.2 | (1.3) | 58.2 | (1.4) |
| Probiotics | 14.2 | (0.9) | 20.2 | (1.2) |
| Anionic salts in feed | 20.6 | (1.1) | 25.0 | (1.3) |
| Other | 3.8 | (0.5) | 3.2 | (0.5) |
| No preventives given | 5.1 | (0.6) | 2.5 | (0.4) |

Data from the NAHMS Dairy '96 study indicated that 8.1 percent of operations, representing 9.1 percent of dairy cows, used no preventive practices. In 2001, only 3.7 percent of operations, representing 3.3 percent of dairy cows, used no preventive practices. This is a significant improvement in the percentage of operations using some preventive practices. In 2001, more than a third (38.2 percent) of dairy cows were on operations that provided anionic salts in feed, and more than half (56.6 percent) of lactating cows were on operations that limited potassium in dry-cow rations. Both these practices are used to reduce diseases that occur just before and just after calving (e.g., milk fever, retained placenta, metritis, and displaced abomasum).

b. Percentage of operations (and percentage of *dairy cows* on these operations) by preventive practices normally used for *lactating cows*:

| Preventive Practice | Percent Operations | Standard Error | Percent Cows | Standard Error |
|-------------------------------------|--------------------|----------------|--------------|----------------|
| Dewormers | 60.3 | (1.3) | 46.1 | (1.1) |
| Vitamins A, D, E injection | 17.1 | (1.0) | 24.4 | (1.2) |
| Vitamins A, D, E in feed | 80.2 | (1.1) | 78.2 | (1.1) |
| Selenium injection | 18.0 | (1.0) | 24.1 | (1.1) |
| Selenium in feed | 75.7 | (1.1) | 72.3 | (1.1) |
| Probiotics | 20.4 | (1.0) | 28.1 | (1.2) |
| Anionic salts in feed | 27.0 | (1.2) | 38.2 | (1.2) |
| Limited potassium in dry cow ration | 45.0 | (1.3) | 56.6 | (1.3) |
| Other | 5.4 | (0.6) | 5.0 | (0.6) |
| No preventives given | 3.7 | (0.6) | 3.3 | (0.5) |

E. Births, Illnesses, and Deaths

1. Dairy calves born alive

Approximately 9 out of 10 (88.8 percent) cows and heifers produced live calves during 2001. The remaining 11.2 percent either had dead calves or other reproductive problems that led to an increased calving interval over 12 months.

a. Calves born alive during 2001, as a percentage of the January 1, 2002, dairy cow inventory:

| Percent | Standard Error |
|---------|----------------|
| 88.8 | (0.5) |

2. Abortions

Abortion rate is traditionally defined as fetal loss prior to term divided by all confirmed pregnancies. A reasonable goal for abortions would be 3 to 5 percent of confirmed pregnancies. In this study, abortion rate was calculated by dividing the reported number of cows that aborted by the total calves born alive plus the number of cows that aborted. Abortion occurred in 4.0 percent of pregnancies across all operations. Large operations had the highest percentage (4.9 percent) of abortions.

a. Percentage of abortions during 2001¹, by herd size:

| Percent Abortions | | | | | | | |
|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 3.6 | (0.1) | 3.4 | (0.1) | 4.9 | (0.3) | 4.0 | (0.1) |

¹Abortions calculated as a percentage of term pregnancies (calves born alive plus abortions).

The highest percentage (39.3 percent) of operations reported an abortion rate of less than 2 percent, while 5.8 percent of operations reported an abortion rate of 10 percent or higher.

b. Percentage of operations by reported abortion percentage:

| Abortion Percent | Percent Operations | Standard Error |
|-------------------------|---------------------------|-----------------------|
| Less than 2.0 | 39.3 | (1.3) |
| 2.0 to 4.9 | 34.6 | (1.2) |
| 5.0 to 9.9 | 20.3 | (1.1) |
| 10.0 to 14.9 | 4.7 | (0.7) |
| 15.0 or more | 1.1 | (0.3) |
| Total | 100.0 | |

3. Dairy cow morbidity

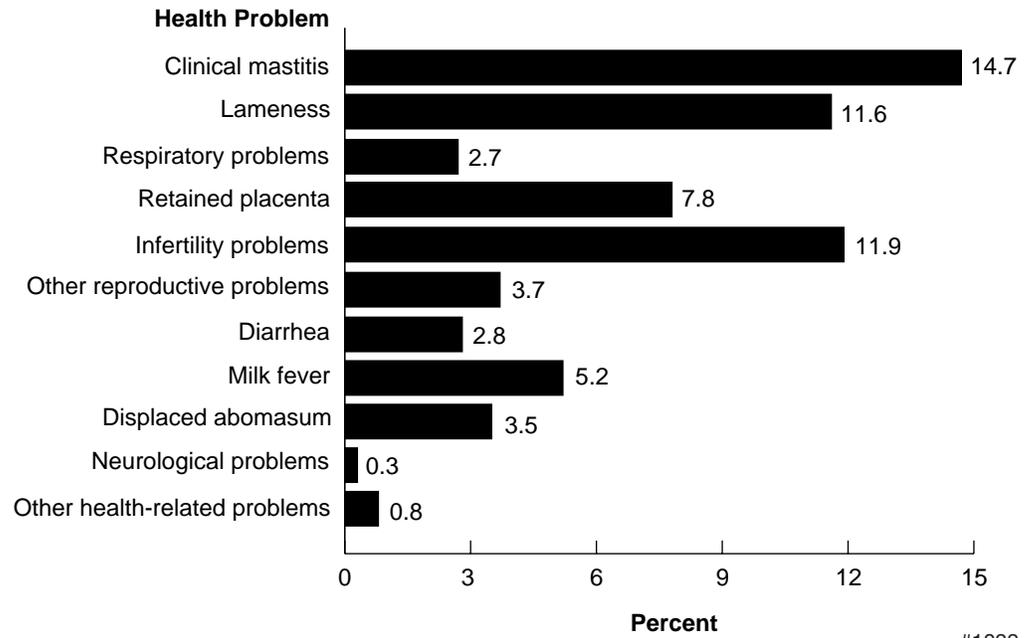
Clinical mastitis, infertility problems, and lameness were the conditions reported most commonly for all operations. Mastitis continues to be the most prevalent of all dairy cattle diseases, with all operations reporting that 14.7 percent of cows experienced mastitis during 2001. It is estimated that clinical mastitis costs \$102 to \$162 per case, with most of the cost incurred from lost milk production. Breeding/infertility problems affected 11.9 percent of dairy cows in 2001. Increased days from calving to conception (days open) costs the producer \$2 to \$4 per day after ~90 days in milk. Lameness has become the third most prevalent condition reported, with 11.6 percent of cows experiencing an episode during 2001. Lameness is estimated to cost \$327 to \$346 per case and also is a problematic disease, both physically for cows and financially for producers.

a. Percentage of dairy cows¹ that producers identified as having the following conditions during 2001, by herd size:

| Producer-identified Health Problem | Percent Dairy Cows | | | | | | | |
|--|----------------------------------|-------|---------------------|-------|------------------------|-------|----------------|-------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | | |
| Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | |
| Clinical mastitis | 15.6 | (0.4) | 13.6 | (0.5) | 14.7 | (0.7) | 14.7 | (0.3) |
| Lameness | 11.2 | (0.4) | 14.1 | (0.6) | 10.0 | (0.6) | 11.6 | (0.3) |
| Respiratory problems | 2.4 | (0.2) | 3.1 | (0.2) | 2.5 | (0.1) | 2.7 | (0.1) |
| Retained placenta (more than 24 hours) | 9.2 | (0.3) | 8.5 | (0.3) | 6.0 | (0.4) | 7.8 | (0.2) |
| Infertility problems (not pregnant 150 days after calving) | 11.7 | (0.4) | 11.3 | (0.4) | 12.5 | (0.6) | 11.9 | (0.3) |
| Other reproductive problems (dystocia, metritis) | 2.9 | (0.2) | 3.8 | (0.2) | 4.5 | (0.4) | 3.7 | (0.2) |
| Diarrhea (more than 48 hours) | 4.2 | (0.4) | 2.2 | (0.1) | 2.1 | (0.2) | 2.8 | (0.2) |
| Milk fever | 7.6 | (0.3) | 5.3 | (0.2) | 2.9 | (0.2) | 5.2 | (0.1) |
| Displaced abomasum | 3.8 | (0.2) | 4.3 | (0.2) | 2.4 | (0.1) | 3.5 | (0.1) |
| Neurological problems | 0.4 | (0.1) | 0.3 | (0.0) | 0.3 | (0.1) | 0.3 | (0.0) |
| Other health-related problems | 1.1 | (0.2) | 1.1 | (0.2) | 0.2 | (0.0) | 0.8 | (0.1) |

¹As a percentage of January 1, 2002, cow inventory

Percent of Dairy Cows that Had the Following Producer-identified Conditions During 2001



4. Mortality

Overall, 8.7 percent of dairy heifers born alive died prior to weaning. Large operations had the lowest percentage (7.7 percent) of unweaned heifer deaths. Nearly 2 percent (1.9) of weaned heifer calves died between weaning and calving. Medium operations had the highest percentage (2.1 percent) of weaned heifer deaths. For all operations, 4.8 percent (as a percentage of the January 1, 2002, inventory) of dairy cows died during 2001. Small operations had the lowest percentage (4.4 percent) of cow deaths.

a. Percentage of unweaned dairy heifer calves¹ (from birth to weaning), weaned heifers² (from weaning age to first calving), and dairy cows³ that died during 2001, by herd size:

| Type of Animal | Percent | | | | | | | |
|------------------|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Unweaned heifers | 9.1 | (0.4) | 9.4 | (0.3) | 7.7 | (0.5) | 8.7 | (0.2) |
| Weaned heifers | 1.8 | (0.1) | 2.1 | (0.1) | 1.8 | (0.1) | 1.9 | (0.1) |
| Cows | 4.4 | (0.1) | 5.0 | (0.1) | 4.9 | (0.1) | 4.8 | (0.1) |

¹As a percentage of dairy heifers born alive

²As a percentage of January 1, 2002, heifer inventory (weaning age to calving)

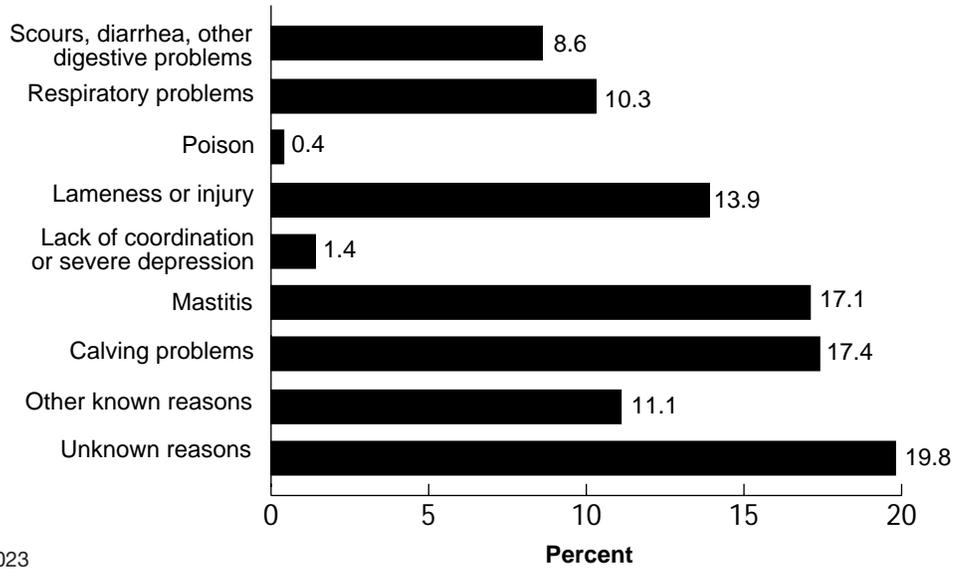
³As a percentage of January 1, 2002, dairy cow inventory

Calf scours, diarrhea, and other digestive problems accounted for 62.1 percent of all unweaned heifer deaths. Respiratory problems were the second leading cause of unweaned heifer deaths, representing 21.3 percent of all deaths. Respiratory problems accounted for 50.4 percent of weaned heifer deaths, followed by unknown reasons, which accounted for 16.0 percent of weaned heifer deaths.

Unknown reasons accounted for the largest percentage (19.8 percent) of cow deaths. Necropsies are essential in determining the cause of death so that preventive measures can be implemented. Calving problems (17.4 percent), mastitis (17.1 percent) and lameness/injury (13.9 percent) were the next three highest causes of cow deaths, respectively. Management practices that reduce both calf and cow loss during or immediately subsequent to calving should be reviewed.

b. Percentage of total unweaned dairy heifer calf deaths, weaned heifer deaths, and dairy cow deaths, by producer-attributed cause:

| Producer-attributed Cause | Percent | | | | | |
|---|------------------|------------|----------------|------------|----------------|------------|
| | Unweaned Heifers | | Weaned Heifers | | Cows | |
| | Percent Deaths | Std. Error | Percent Deaths | Std. Error | Percent Deaths | Std. Error |
| Scours, diarrhea, or other digestive problems | 62.1 | (1.1) | 12.3 | (1.0) | 8.6 | (0.5) |
| Respiratory problems | 21.3 | (0.9) | 50.4 | (1.6) | 10.3 | (0.5) |
| Poison | 0.1 | (0.0) | 1.1 | (0.4) | 0.4 | (0.1) |
| Put down due to lameness or injury | 0.5 | (0.1) | 6.4 | (0.6) | 13.9 | (0.6) |
| Lack of coordination or severe depression | 0.4 | (0.1) | 0.3 | (0.1) | 1.4 | (0.2) |
| Mastitis | NA | | NA | | 17.1 | (0.6) |
| Calving problems | 4.1 | (0.6) | NA | | 17.4 | (0.7) |
| Joint or navel problems | 1.7 | (0.2) | 1.4 | (0.3) | NA | |
| Other known reasons | 2.9 | (0.4) | 12.1 | (1.2) | 11.1 | (0.6) |
| Unknown reasons | 6.9 | (0.8) | 16.0 | (1.1) | 19.8 | (0.9) |
| Total | 100.0 | | 100.0 | | 100.0 | |

Percent of Total Dairy Cow Deaths, by Producer-attributed Cause

5. Carcass disposal

Rendering was the most common method of disposal for dead calves (43.8 percent of operations) and dead cows (62.4 percent of operations). Burial was the second most prevalent method of disposal for dead calves (35.3 percent of operations) and dead cows (22.7 percent of operations), followed by composting (10.1 percent of operations for dead calves and 6.9 percent of operations for dead cows).

Composting carcasses has become more prevalent because of the restriction on ruminant protein feeding and the increased fees charged by rendering companies to pick up animals. Composting utilizes old feedstuffs and manure to create an environment for microorganisms that accelerates the natural decomposition process. With composting, decomposition of a mature dairy cow carcass takes approximately 6 to 8 months.

a. Percentage of operations by primary method used to dispose of dead calves and cows:

| Method of Disposal | Calves | | Cows | |
|--------------------|--------------------|----------------|--------------------|----------------|
| | Percent Operations | Standard Error | Percent Operations | Standard Error |
| Buried | 35.3 | (1.3) | 22.7 | (1.1) |
| Burned/incinerated | 2.8 | (0.4) | 2.2 | (0.4) |
| Rendered | 43.8 | (1.3) | 62.4 | (1.2) |
| Composted | 10.1 | (0.8) | 6.9 | (0.7) |
| Landfill | 2.4 | (0.4) | 1.9 | (0.3) |
| Other | 5.6 | (0.6) | 3.9 | (0.5) |
| Total | 100.0 | | 100.0 | |

F. Housing

1. Housing facilities

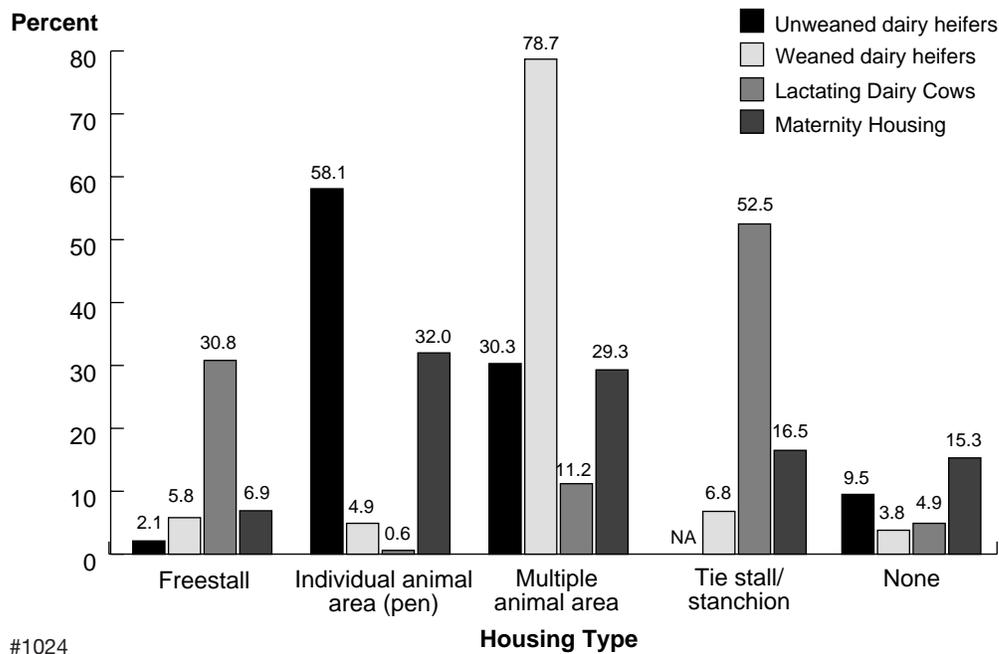
The most common *inside* housing type used for unweaned dairy heifers was individual animal areas (58.1 percent of operations), followed by multiple animal areas (30.3 percent of the operations). “None” was reported as the primary type of inside housing on 9.5 percent of operations, indicating that these unweaned heifers typically lived outside or were sent off-site to be raised. The primary inside housing type for weaned dairy heifers was multiple animal areas (78.7 percent of the operations). Tie stall or stanchion barns were the most common inside housing type for lactating dairy cows on 52.5 percent of operations, followed by freestall (30.8 percent) and multiple animal areas (11.2 percent). For housing maternity cows inside, 32.0 percent of operations reported using individual animal areas; multiple animal areas were used for inside maternity housing¹ on 29.3 percent of operations.

a. Percentage of operations by primary type of housing facility used during 2001:

| Housing Type | Percent Operations | | | | | | | |
|------------------------------|------------------------|------------|----------------------|------------|----------------------|------------|-------------------|------------|
| | Unweaned Dairy Heifers | | Weaned Dairy Heifers | | Lactating Dairy Cows | | Maternity Housing | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Freestall | 2.1 | (0.4) | 5.8 | (0.6) | 30.8 | (1.0) | 6.9 | (0.7) |
| Individual animal area (pen) | 58.1 | (1.4) | 4.9 | (0.6) | 0.6 | (0.2) | 32.0 | (1.3) |
| Multiple animal area | 30.3 | (1.3) | 78.7 | (1.1) | 11.2 | (0.8) | 29.3 | (1.1) |
| Tie stall or stanchion | NA | NA | 6.8 | (0.7) | 52.5 | (1.1) | 16.5 | (1.1) |
| None | 9.5 | (0.8) | 3.8 | (0.4) | 4.9 | (0.4) | 15.3 | (1.0) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

¹Maternity housing refers to facilities or outside areas used for dairy cows about to calve that are separate from facilities used by lactating cows.

Percent of Operations by Primary Type of Housing Facility Used During 2001



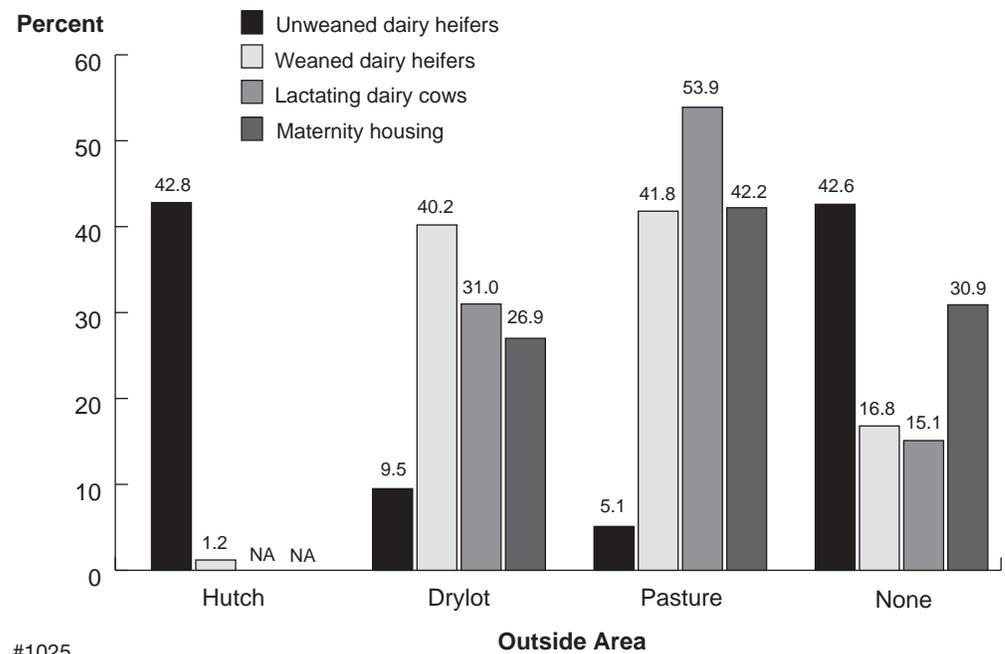
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A hutch was the primary area used to house unweaned heifers (42.8 percent of operations). Only 9.5 percent and 5.1 percent of operations used a drylot or pasture, respectively, as their primary outside housing area for unweaned heifers. The remaining 42.6 percent of operations had either no outside housing or raised unweaned heifers off-site. Pasture was the primary outside housing area for weaned heifers on 41.8 percent of operations, followed closely by drylot (40.2 percent of operations). Very few (1.2 percent) operations housed weaned heifers in hutches. Pasture was the most common outside housing area used for lactating cows (53.9 percent of operations). Drylot was the second most common outside housing area for lactating cows (31.0 percent of operations). On 42.2 percent of operations, pasture was the primary outside housing for maternity cows, followed by drylot (26.9 percent of operations). For operations reporting “none,” no outside maternity housing was available on 30.9 percent of operations.

b. Percentage of operations by primary outside area used during 2001:

| Percent Operations | | | | | | | | |
|--------------------|------------------------|------------|----------------------|------------|----------------------|------------|-------------------|------------|
| Housing Type | Unweaned Dairy Heifers | | Weaned Dairy Heifers | | Lactating Dairy Cows | | Maternity Housing | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Hutch | 42.8 | (1.3) | 1.2 | (0.3) | NA | NA | NA | NA |
| Drylot | 9.5 | (0.8) | 40.2 | (1.3) | 31.0 | (1.2) | 26.9 | (1.1) |
| Pasture | 5.1 | (0.7) | 41.8 | (1.3) | 53.9 | (1.2) | 42.2 | (1.3) |
| None | 42.6 | (1.4) | 16.8 | (1.0) | 15.1 | (0.8) | 30.9 | (1.2) |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

Percent of Operations by Primary Outside Area Used During 2001



#1025

2. Separate maternity housing

Housing for maternity cows (“close-up” pens) was separate from housing used for lactating dairy cows on 53.1 percent of all operations. Separate maternity housing was most common among large operations (91.9 percent), followed by the medium operations (81.6 percent). Small operations were least likely to use separate maternity housing (43.5 percent of operations). Separate housing for cows within 2 to 3 weeks of calving is a useful management strategy for accommodating the nutritional and environmental adjustments needed to prevent post-calving diseases.

a. Percentage of operations where maternity housing was separate from housing used for lactating dairy cows, by herd size:

| Percent Operations | | | | | | | |
|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| Herd Size (Number of Dairy Cows) | | | | | | | |
| Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | All Operations | |
| Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error |
| 43.5 | (1.6) | 81.6 | (1.7) | 91.9 | (1.5) | 53.1 | (1.3) |

3. Milking facilities

The majority (70.0 percent) of cows were milked in a parlor. However, only 37.1 percent of operations used a parlor as their primary milking facility. A tie stall or stanchion barn was used as the primary milking facility on 61.9 percent of operations, but only 28.9 percent of cows were milked in this type of facility.

a. Percentage of operations (and percentage of cows on these operations) by primary milking facility used in 2001:

| Facility Type | Percent Operations | Standard Error | Percent Cows | Standard Error |
|------------------------|--------------------|----------------|--------------|----------------|
| Parlor | 37.1 | (1.0) | 70.0 | (0.8) |
| Tie stall or stanchion | 61.9 | (1.0) | 28.9 | (0.8) |
| Other | 1.0 | (0.2) | 1.1 | (0.2) |
| Total | 100.0 | | 100.0 | |

G. Biosecurity**1. Physical contact with unweaned calves**

Isolating unweaned calves from other age classes of cattle on dairy operations is an important management practice that helps reduce disease in unweaned calves. Unweaned calves had contact with weaned calves not yet of breeding age on 22.8 percent of operations. In addition, unweaned calves had contact with bred heifers and adult cattle on 13.3 percent and 15.4 percent of operations, respectively.

a. Percentage of operations (and percentage of dairy heifer calves born on these operations) where after separation from the mother, unweaned heifer calves had physical contact¹ with the following:

| Age Group | Percent Operations | Standard Error | Percent Calves | Standard Error |
|---------------------------------------|---------------------------|-----------------------|-----------------------|-----------------------|
| Weaned calves not yet of breeding age | 22.8 | (1.2) | 15.5 | (0.9) |
| Bred heifers not yet calved | 13.3 | (0.9) | 11.1 | (0.8) |
| Adult cattle | 15.4 | (1.0) | 11.8 | (0.9) |

¹Physical contact is defined as nose-to-nose contact or sniffing/touching/licking each other, including through a fence.

2. Physical contact with other animals

Physical contact between dairy cattle and/or their feed and other animal species occurs on U.S. dairy operations. With the exception of dogs, cats, and deer, a small percentage of operations reported that this contact was occurring. Overall, 70.6 percent, 87.8 percent, and 53.1 percent of operations reported contact between female dairy cattle or their feed with dogs, cats, and deer respectively. There were some regional differences in the percentages of cat and deer contact. There were only minor differences in the percentages between regions for contact with other species.

a. Percentage of operations where the following animals had physical contact with female dairy cattle and/or contact with their feed, by region:

| Animal Type | Percent Operations | | | | | | | | | |
|---|--------------------|------------|---------|------------|-----------|------------|-----------|------------|----------------|------------|
| | Region | | | | | | | | | |
| | West | | Midwest | | Northeast | | Southeast | | All Operations | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Chickens or other poultry | 6.2 | (1.9) | 6.5 | (0.9) | 7.2 | (1.4) | 9.8 | (3.2) | 6.8 | (0.7) |
| Horses or other equine | 7.0 | (1.5) | 12.1 | (1.2) | 15.9 | (2.0) | 13.6 | (2.9) | 12.8 | (0.9) |
| Pigs | 1.7 | (0.8) | 2.8 | (0.6) | 0.9 | (0.6) | 5.0 | (2.0) | 2.3 | (0.4) |
| Sheep | 0.2 | (0.1) | 1.5 | (0.5) | 1.5 | (0.5) | 0.7 | (0.7) | 1.3 | (0.3) |
| Goats | 1.6 | (0.7) | 2.4 | (0.6) | 4.2 | (1.1) | 2.1 | (0.9) | 2.8 | (0.5) |
| Beef cattle | 9.6 | (2.2) | 10.5 | (1.1) | 9.9 | (1.5) | 14.0 | (3.2) | 10.5 | (0.8) |
| Exotic species (e.g., llamas, alpacas, emus, etc.) | 0.8 | (0.7) | 0.4 | (0.2) | 1.0 | (0.6) | 0.1 | (0.1) | 0.6 | (0.2) |
| Dogs | 67.3 | (2.8) | 72.0 | (1.7) | 69.2 | (2.3) | 66.0 | (3.8) | 70.6 | (1.2) |
| Cats | 65.5 | (3.0) | 91.0 | (1.1) | 91.8 | (1.3) | 66.9 | (4.3) | 87.8 | (0.8) |
| Deer or other members of the deer family (e.g., elk, moose, etc.) | 21.6 | (2.9) | 51.4 | (1.9) | 62.8 | (2.4) | 68.7 | (3.7) | 53.1 | (1.3) |

3. Frequency of physical contact with deer

Contact of dairy cattle, their feed, or their water sources with deer is of particular concern and should be avoided. Deer may be infected with pathogens transmissible to cattle (e.g., tuberculosis). Deer contact with cattle pasture, hay, or water sources during winter was reported either sometimes or most of the time on 78.1 percent, 55.1 percent, and 39.7 percent of operations, respectively.

a. For operations that reported that deer had physical contact with dairy cows, dairy heifers, or their feed, percentage of operations by frequency of deer access to the following during *winter*:

| Areas Accessed by Deer | Percent Operations | | | | | | Total |
|------------------------------|--------------------|------------|--------------------|------------|---------------------------|------------|-------|
| | No Access | | Accessed Sometimes | | Accessed Most of the Time | | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | |
| Pasture | 21.9 | (1.5) | 21.4 | (1.6) | 56.7 | (1.9) | 100.0 |
| Hay | 44.9 | (1.9) | 16.9 | (1.4) | 38.2 | (1.8) | 100.0 |
| Water sources used by cattle | 60.3 | (1.8) | 13.8 | (1.2) | 25.9 | (1.6) | 100.0 |

Deer contact with cattle pasture, hay, or water sources during summer was reported as occurring either sometimes or most of the time by 93.5 percent, 69.7 percent, and 58.9 percent of operations, respectively.

b. For operations that reported that deer had physical contact with dairy cows, dairy heifers, or their feed, percentage of operations by frequency of deer access to the following during *summer*:

| Areas Accessed by Deer | Percent Operations | | | | | | Total |
|------------------------------|--------------------|------------|--------------------|------------|---------------------------|------------|-------|
| | No Access | | Accessed Sometimes | | Accessed Most of the Time | | |
| | Percent | Std. Error | Percent | Std. Error | Percent | Std. Error | |
| Pasture | 6.5 | (0.8) | 24.2 | (1.6) | 69.3 | (1.7) | 100.0 |
| Hay | 30.3 | (1.8) | 21.0 | (1.5) | 48.7 | (1.9) | 100.0 |
| Water sources used by cattle | 41.1 | (1.9) | 19.7 | (1.4) | 39.2 | (1.8) | 100.0 |

4. Biosecurity for new arrivals:

New additions to dairy operations can introduce new diseases to the herd. Careful scrutiny of the source of new additions and brief isolation or quarantine once the animals are on the dairy are good management practices. Not surprisingly, bred heifers and lactating cows were the classes of cattle that were brought onto the most operations, with 15.8 percent of all operations reporting that bred heifers were added and 16.4 percent of operations reporting that lactating cows were added. Large operations (54.4 percent) were more likely to add bred heifers than medium (28.9 percent) and small (10.4 percent) operations. Beef or dairy cattle were brought onto 45.7 percent of all operations.

a. Percentage of operations that brought the following classes of cattle onto the operation during 2001, by herd size:

| Class of Cattle | Percent Operations | | | | | | | |
|-------------------------------------|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Pct. | Std. Error |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Unweaned calves (dairy or beef) | 4.9 | (0.9) | 6.0 | (1.1) | 3.2 | (1.1) | 5.1 | (0.7) |
| Dairy heifers (weaned but not bred) | 5.8 | (0.8) | 9.0 | (1.2) | 13.2 | (1.9) | 6.7 | (0.7) |
| Bred dairy heifers | 10.4 | (1.0) | 28.9 | (1.9) | 54.4 | (2.7) | 15.8 | (0.9) |
| Lactating dairy cows | 14.4 | (1.2) | 22.7 | (1.8) | 21.7 | (2.3) | 16.4 | (1.0) |
| Dry dairy cows | 5.7 | (0.8) | 6.9 | (1.1) | 6.3 | (1.0) | 5.9 | (0.6) |
| Beef heifers and cows | 1.5 | (0.4) | 1.6 | (0.4) | 1.1 | (0.3) | 1.5 | (0.3) |
| Dairy bulls (weaned) | 11.9 | (1.1) | 17.7 | (1.5) | 28.4 | (2.4) | 13.7 | (0.9) |
| Beef bulls (weaned) | 2.1 | (0.5) | 2.9 | (0.6) | 2.7 | (0.9) | 2.3 | (0.4) |
| Steers (weaned) | 1.0 | (0.3) | 1.6 | (0.5) | 0.1 | (0.1) | 1.1 | (0.3) |
| Any beef or dairy cattle | 40.1 | (1.7) | 61.2 | (2.0) | 75.3 | (2.3) | 45.7 | (1.4) |

Operations in the West region, which are typically large in size, reported the highest percentage of operations that brought-on bred dairy heifers (39.6 percent) and dairy bulls (24.8 percent). The Northeast region had the highest percentage (18.6 percent) of operations where lactating dairy cows were added.

i. Percentage of operations that brought the following classes of cattle onto the operation during 2001, by region:

| Class of Cattle | Percent Operations | | | | | | | |
|---|--------------------|---------------|-------------------|---------------|-----------|---------------|-----------|---------------|
| | West | | Region Midwest | | Northeast | | Southeast | |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Unweaned calves (dairy or beef) | 4.8 | (1.5) | 5.7 | (1.0) | 4.8 | (1.2) | 0.6 | (0.5) |
| Dairy heifers (weaned but not bred) | 11.2 | (1.6) | 6.1 | (0.9) | 7.4 | (1.4) | 4.0 | (1.7) |
| Bred dairy heifers | 39.6 | (2.9) | 13.5 | (1.2) | 13.0 | (1.6) | 19.2 | (3.9) |
| Lactating dairy cows | 15.2 | (1.8) | 15.7 | (1.3) | 18.6 | (1.9) | 15.7 | (2.9) |
| Dry dairy cows | 3.8 | (0.9) | 5.9 | (0.9) | 6.8 | (1.2) | 5.0 | (1.5) |
| Beef heifers and cows | 2.4 | (0.8) | 1.6 | (0.5) | 0.5 | (0.3) | 3.2 | (1.6) |
| Dairy bulls (weaned) | 24.8 | (2.2) | 13.1 | (1.3) | 11.1 | (1.5) | 15.7 | (2.9) |
| Beef bulls (weaned) | 5.6 | (1.3) | 1.8 | (0.5) | 2.0 | (0.7) | 4.1 | (1.7) |
| Steers (weaned) | 1.3 | (0.5) | 1.4 | (0.4) | 0.3 | (0.2) | 1.7 | (1.4) |
| Any beef or dairy cattle | 67.3 | (3.1) | 44.4 | (1.9) | 41.9 | (2.5) | 47.9 | (4.2) |

b. For operations that brought dairy cows (lactating or dry) and bred dairy heifers onto the operation during 2001, number of **dairy cows** and **bred dairy heifers** brought onto the operation as a percentage of the January 1, 2002, dairy cow inventory, by herd size:

| Percent Cows/Bred Dairy Heifers | | | | | | | | |
|--|---|-------------------|----------------------------|-------------------|-------------------------------|-------------------|-----------------------|-------------------|
| Animal Type | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Pct. | Std. Error |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Dairy cows | 15.5 | (1.4) | 14.5 | (1.4) | 13.8 | (1.6) | 14.5 | (0.9) |
| Bred dairy heifers | 14.6 | (2.2) | 14.3 | (2.4) | 19.7 | (1.4) | 17.5 | (1.1) |

Quarantining¹ new additions helps prevent the introduction of new diseases. Only unweaned dairy or beef calves (37.0 percent) and weaned steers (40.0 percent) were quarantined on more than one-quarter of operations. For the most common classes of cattle brought onto dairy operations, bred heifers and lactating cows, only a small percentage of operations quarantined these new additions, 19.6 percent and 9.5 percent, respectively.

c. For operations that brought the following classes of cattle onto the operation during 2001, percentage of operations that quarantined any animals upon arrival at the operation:

| Class of Cattle | Percent Operations | Standard Error |
|-------------------------------------|---------------------------|-----------------------|
| Unweaned calves (dairy or beef) | 37.0 | (7.3) |
| Dairy heifers (weaned but not bred) | 23.9 | (3.9) |
| Bred dairy heifers | 19.6 | (2.3) |
| Lactating dairy cows | 9.5 | (1.6) |
| Dry dairy cows | 7.1 | (2.2) |
| Beef heifers and cows | 24.0 | (8.5) |
| Dairy bulls (weaned) | 15.9 | (2.4) |
| Beef bulls (weaned) | 23.6 | (6.5) |
| Steers (weaned) | 40.0 | (11.4) |
| Any beef or dairy cattle | 20.6 | (1.6) |

¹Quarantine refers to the physical separation of new additions from animals in the existing herd.

d. For operations that brought the following classes of cattle onto the operation during 2001, operation average percentage of animals quarantined and, if quarantined, operation average number of days quarantined:

| Class of Cattle | Percent Cattle Quarantined | | Days Quarantined | |
|-------------------------------------|----------------------------|----------------|-------------------|----------------|
| | Operation Average | Standard Error | Operation Average | Standard Error |
| Unweaned calves (dairy or beef) | 78.6 | (1.2) | 49.2 | (9.3) |
| Dairy heifers (weaned but not bred) | 36.1 | (1.0) | 28.2 | (6.0) |
| Bred dairy heifers | 26.9 | (3.3) | 23.7 | (4.0) |
| Lactating dairy cows | 20.2 | (3.8) | 20.1 | (4.1) |
| Dry dairy cows | 6.5 | (1.9) | 21.4 | (4.3) |
| Beef heifers and cows | 31.1 | (11.5) | 31.1 | (6.6) |
| Dairy bulls (weaned) | 20.2 | (3.3) | 19.0 | (2.5) |
| Beef bulls (weaned) | 50.0 | (14.6) | 32.0 | (12.9) |
| Steers (weaned) | 48.2 | (14.6) | 41.3 | (14.0) |

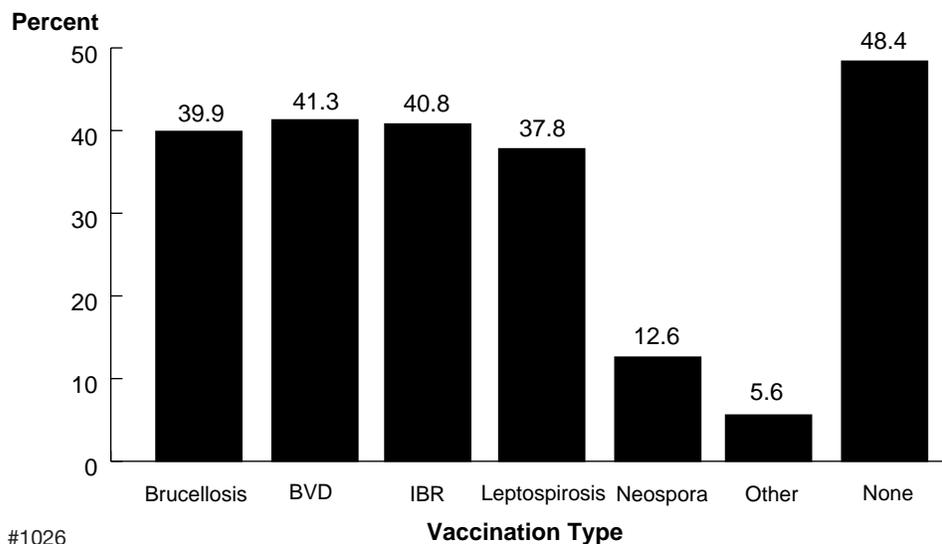
In general, a higher percentage of large and medium operations required vaccinations of all types before bringing new animals onto the farm, compared to small operations. Overall, 48.4 percent of operations reported requiring no vaccinations before bringing new animals onto the farm.

e. For operations that brought beef or dairy cattle onto the operation during 2001, percentage of operations using the following methods of disease control before bringing animals on farm:

i. Vaccination normally required by operation, by herd size:

| Vaccination Type | Percent Operations | | | | | | | |
|---|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Pct. | Std. Error |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Brucellosis | 33.4 | (2.5) | 51.3 | (2.7) | 60.0 | (3.1) | 39.9 | (1.9) |
| Bovine viral diarrhea (BVD) | 36.2 | (2.5) | 51.2 | (2.7) | 53.9 | (3.2) | 41.3 | (1.9) |
| Infectious bovine rhinotracheitis (IBR) | 35.8 | (2.6) | 50.5 | (2.7) | 51.2 | (3.2) | 40.8 | (1.9) |
| Leptospirosis | 32.5 | (2.5) | 48.5 | (2.7) | 47.5 | (3.2) | 37.8 | (1.8) |
| Neospora | 11.1 | (1.6) | 15.5 | (1.8) | 16.1 | (2.3) | 12.6 | (1.2) |
| Other | 4.3 | (0.8) | 8.4 | (1.4) | 7.7 | (1.5) | 5.6 | (0.7) |
| None | 55.4 | (2.7) | 36.0 | (2.7) | 28.1 | (3.0) | 48.4 | (2.0) |

Percent of Operations by Vaccination Required Before Bringing New Animals On Farm

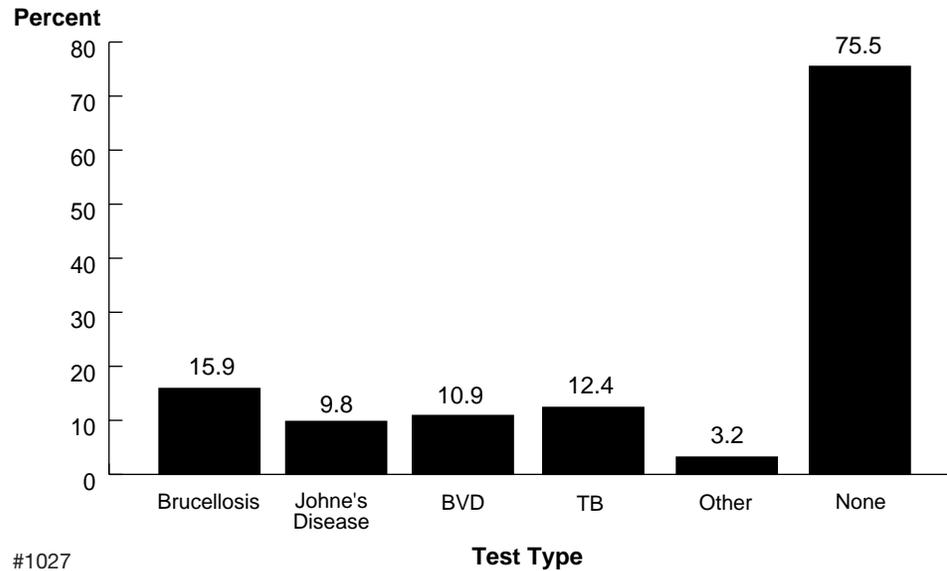


#1026

Testing cattle for certain diseases prior to bringing them onto a farm may help identify infected cattle. Test-positive cattle may be rejected or quarantined once brought onto the operation. Overall, 75.5 percent of operations required no testing of incoming cattle, with small, medium, and large operations having 78.8 percent, 70.6 percent, and 61.2 percent, respectively, of operations requiring no testing. Data from the Dairy '96 study indicated that 9.1 percent of all operations required testing for Johne's disease prior to bringing animals onto the operation. This stayed approximately the same in 2002, with 9.8 percent of operations requiring Johne's testing.

ii. Testing normally required by operation, by herd size:

| Test Type | Percent Operations | | | | | | | |
|--|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Pct. | Std. Error |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Brucellosis | 13.1 | (1.8) | 19.5 | (2.1) | 29.9 | (2.7) | 15.9 | (1.3) |
| Mycobacterium paratuberculosis (Johne's disease) | 8.3 | (1.4) | 12.7 | (1.9) | 12.2 | (1.9) | 9.8 | (1.1) |
| Bovine viral diarrhea (BVD) | 8.6 | (1.4) | 15.6 | (2.1) | 15.0 | (2.1) | 10.9 | (1.1) |
| Bovine tuberculosis (TB) | 10.8 | (1.5) | 14.3 | (1.7) | 20.7 | (2.3) | 12.4 | (1.1) |
| Other | 2.8 | (0.8) | 4.3 | (1.3) | 3.5 | (1.1) | 3.2 | (0.6) |
| None | 78.8 | (2.2) | 70.6 | (2.5) | 61.2 | (2.9) | 75.5 | (1.6) |

Percent of Operations by Testing Normally Required Before Bringing Animals On Farm

Testing of individual cow milk samples and/or bulk tank milk samples are suggested biosecurity practices for preventing introduction of contagious mastitis organisms. Overall, 26.8 percent of operations required individual cow's milk somatic cell counts; 16.6 percent required a somatic cell count of the bulk tank; 11.0 percent required individual cow's milk culture; and 10.6 percent required a bulk tank culture. Compared to the Dairy '96 study, slight increases occurred in the percentage of operations that required testing for all four test procedures. In general, the percentage of operations that required testing increased as the size of operation increased.

f. For operations bringing on dairy cows during 2001, percentage of operations that normally required testing or proof of udder health, by herd size:

| Type of Test | Percent Operations | | | | | | | |
|--|----------------------------------|------------|---------------------|------------|------------------------|------------|----------------|------------|
| | Herd Size (Number of Dairy Cows) | | | | | | All Operations | |
| | Small (Less than 100) | | Medium (100-499) | | Large (500 or More) | | Pct. | Std. Error |
| | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error | Pct. | Std. Error |
| Individual cow milk somatic cell count | 26.7 | (3.7) | 26.7 | (4.0) | 29.5 | (5.2) | 26.8 | (2.8) |
| Herd bulk tank milk somatic cell count | 14.3 | (2.9) | 19.2 | (3.4) | 34.1 | (5.9) | 16.6 | (2.2) |
| Individual cow milk culture | 10.7 | (2.5) | 10.6 | (2.6) | 18.8 | (4.8) | 11.0 | (1.8) |
| Herd bulk tank milk culture | 9.5 | (2.4) | 10.0 | (2.6) | 31.0 | (6.0) | 10.6 | (1.8) |

Section II: Methods

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. The objective of the needs assessment for the NAHMS Dairy 2002 study was to conduct a national survey to collect information from U.S. dairy producers and others associated with the dairy industry about what they perceived to be the most important dairy health and productivity issues. A driving force of the needs assessment was to receive as much input as possible from a variety of producers, as well as from industry experts and representatives, veterinarians, extension specialists, universities, and dairy organizations.

Focus group meetings were held at various locations across the United States to help determine the focus of the study.

Birmingham, AL October 21, 2000
United States Animal Health Association (USAHA)

Kansas City, MO October 31, 2000
American Feed Industry Association (AFIA)
Dairy Nutrition Committee

Teleconference December 15, 2000
Bovine Alliance on Management and Nutrition (BAMN)

San Antonio, TX February 4, 2001
American Farm Bureau Federation
Dairy Advisory Committee

Riverdale, MD February 16, 2001
Government Perspective Meeting
APHIS, FSIS, FDA, and ARS

In addition, a short form asking for rankings of major dairy issues was provided via multiple data collection modes. There were 155 responses completed via the Web, 90 by hard copy, and 1 completed via telephone.

The focus group meeting input was merged with other responses to determine Dairy 2002 study objectives.

B. Sampling and Estimation

1. State selection

The preliminary selection of States to be included in the study was done in January 2001, using the National Agricultural Statistics Service (NASS), USDA January 28, 2000, Cattle Report. A goal for NAHMS national studies is to include States that account for at least 70 percent of the animals and producer population in the United States. The initial review of States identified 20 major States with 84 percent of the milk cow inventory and 81 percent of the operations with milk cows (dairy herds). The States were: CA, FL, ID, IL, IN, IA, KY, MI, MN, MO, NM, NY, OH, PA, TN, TX, VT, VA, WA, and WI.

A memo identifying these 20 States was provided in February 2001 to the USDA:APHIS:VS CEAH Director and, in turn, the VS Regional Directors. Each Regional Director sought input from their respective States about being included or excluded from the study. By midyear, Colorado was included, based on the State's interest.

2. Operation selection

The list sampling frame was provided by the NASS. Within each State a stratified random sample was selected. The size indicator was the number of milk cows for each operation. The NASS selected a sample of dairy producers in each State for making the NASS January 1 cattle estimates. The list sample from the January 2001 survey was used as the screening sample. Those producers reporting one or more milk cows on January 1, 2001, were included in the sample for contact in January 2002. Due to the predicted large workload, the sample was reduced in two States (KY and PA), for a final screening sample of 3,876 operations.

3. Population inferences

Inferences cover the population of dairy producers with at least one milk cow in the 21 States. As of January 1, 2002, these States accounted for 85.5 percent (7,790,000 head) of milk cows in the United States and 82.8 percent (80,810) of operations with milk cows in the United States. (See appendix II for respective data on individual States.) All respondent data were statistically weighted to reflect the population from which they were selected. The inverse of the probability of selection for each operation was the initial selection weight. This selection weight was adjusted for nonresponse within each State and size group to allow for inferences back to the original population from which the sample was selected.

C. Data Collection**1. Phase I:**

General Dairy Management Report, December 31, 2001– February 12, 2002. NASS enumerators administered the General Dairy Management Report. The interview took slightly over 1 hour.

D. Data Analysis**1. Validation and estimation****a. General Dairy Management Report**

Initial data entry and validation for the General Dairy Management Report were performed in individual NASS State offices. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all States were combined.

2. Response rates**a. General Dairy Management Report – Screening Questionnaire**

Of the 3,876 operations in the screening sample, 410 operations had no milk cows on January 1, 2001, and were therefore ineligible for the NAHMS Dairy 2002 study. Of these 3,466 dairy operations, 2,461 participated in the initial phase of the study. This phase occurred from December 31, 2001, to February 12, 2002, and included the administration of a questionnaire by NASS enumerators.

| Response Category | Number Operations | Percent Operations |
|--|--------------------------|---------------------------|
| No milk cows on January 1, 2002 | 227 | 5.9 |
| Out of business | 183 | 4.7 |
| Refusal | 821 | 21.2 |
| Survey complete and VMO consent | 1,438 | 37.1 |
| Survey complete, refused VMO consent | 905 | 23.3 |
| Survey complete, ineligible for VMO | 118 | 3.0 |
| Out of scope (prison, research farm, etc.) | 45 | 1.2 |
| Unknown (code 8) | 2 | 0.1 |
| Inaccessible | 137 | 3.5 |
| Total | 3,876 | 100.0 |

Appendix I: Sample Profile

A. Responding Sites

1a. Total inventory, by herd size

| Herd Size (Total Inventory) | Number of Responding Sites |
|-----------------------------|----------------------------|
| Less than 100 | 1,131 |
| 100 to 499 | 820 |
| 500 or more | 510 |
| Total | 2,461 |

1b. Number of responding sites, by region

| Region | Number of Responding Sites |
|-----------|----------------------------|
| West | 525 |
| Midwest | 1,085 |
| Northeast | 596 |
| Southeast | 255 |
| Total | 2,461 |

Appendix II: U.S. Milk Cow Population and Operations

| Region | State | Number of milk cows on January 1, 2002 ¹ (Thousand Head) | | Number of Operations 2001 | |
|------------------------|--------------|--|---|--------------------------------------|---------------------------------------|
| | | Milk cows on operations with 1 or more head | Milk cows on operations with 30 or more head | Operations with 1 or more head | Operations with 30 or more head |
| West | California | 1,620 | 1,618.4 | 2,500 | 2,200 |
| | Colorado | 91 | 90.0 | 800 | 220 |
| | Idaho | 377 | 375.5 | 1,000 | 770 |
| | New Mexico | 290 | 289.4 | 500 | 165 |
| | Texas | 310 | 306.9 | 2,100 | 1,150 |
| | Washington | 247 | 246.3 | 1,000 | 700 |
| | Total | 2,935 | 2,926.5 | 7,900 | 5,205 |
| Midwest | Illinois | 115 | 111.6 | 1,900 | 1,420 |
| | Indiana | 154 | 140.1 | 2,900 | 1,400 |
| | Iowa | 205 | 194.8 | 3,500 | 2,680 |
| | Michigan | 297 | 282.2 | 3,300 | 2,250 |
| | Minnesota | 500 | 480.0 | 7,800 | 6,700 |
| | Missouri | 140 | 133.0 | 3,700 | 2,100 |
| | Ohio | 260 | 236.6 | 5,200 | 2,800 |
| | Wisconsin | 1,280 | 1,232.6 | 19,100 | 15,950 |
| Total | 2,951 | 2,810.8 | 47,400 | 35,300 | |
| Northeast | New York | 675 | 661.5 | 7,200 | 5,900 |
| | Pennsylvania | 588 | 564.5 | 10,300 | 8,500 |
| | Vermont | 154 | 152.5 | 1,600 | 1,470 |
| | Total | 1,417 | 1,378.4 | 19,100 | 15,870 |
| Southeast | Florida | 152 | 151.4 | 510 | 220 |
| | Kentucky | 125 | 115.0 | 2,900 | 1,600 |
| | Tennessee | 90 | 87.8 | 1,500 | 870 |
| | Virginia | 120 | 116.4 | 1,500 | 1,010 |
| | Total | 487 | 470.6 | 6,410 | 3,700 |
| Total (21 States) | | 7,790 (85.5% of U.S.) | 7,586.3 (85.5% of U.S.) | 80,810 (82.8% of U.S.) | 60,075 (86.6% of U.S.) |
| Total U.S. (50 States) | | 9,109.6 | 8,872.8 | 97,560 | 69,405 |

¹Source: NASS Cattle, February 1, 2002. An operation is any place having one or more head of milk cows, excluding cows used to nurse calves, on hand at any time during the year.

Dairy 2002 Study Objectives and Related Outputs

1. Describe baseline dairy cattle health and management practices and trends in dairy farm health management.
 - **Part I: Reference of Dairy Health and Management in the United States, 2002, December 2002**
 - Part II: Changes in the United States Dairy Industry, 1991-2002, expected winter 2003
 - Part III: Reference of Dairy Health and Health Management in the United States, 2002, expected spring 2003
 - Colostrum, bST info sheets and interpretive reports, expected winter 2002
2. Describe strategies to prevent and reduce Johne's disease.
 - Johne's Disease on United States Dairy Operations, 2002, expected spring 2003
3. Evaluate management factors associated with the presence of certain food safety pathogens.
 - Info sheets, expected spring 2003
4. Describe the preparedness of producers to respond to foreign animal diseases, such as foot and mouth disease.
 - Info sheets, expected winter 2003
5. Describe waste handling systems.
 - Part III: Reference of Dairy Health and Management in the United States, 2002, expected spring 2003
 - Interpretive report, expected spring 2003

