Performance on Dairy Farms: Findings from NAHMS Studies

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Take Home Messages

- NAHMS is designed to describe and help meet the nation's animal-health information needs primarily through national studies. NAHMS has studied all major livestock industries (beef, dairy, equine, sheep and swine), poultry and aquaculture since its inception in the late 1980s.
- NAHMS is the only group that generates estimates of management practices and disease prevalence on a national basis in the US.
- The NAHMS Dairy 2007 study was the 4th national study of the dairy industry and the next study will be conducted in 2014.
- Results from NAHMS studies are used by extension personnel to educate producers and by animal scientists and veterinarians as a reference in conducting their own research. The information is also used by USDA to strengthen animal-health programs, promote trade, and to predict how diseases newly introduced to the United States may spread.
- NAHMS reports are free and available in hard copy or on the web http://nahms.aphis.usda.gov.
- NAHMS is collaborating with Canada to perform a national dairy study in Canada in 2014.

What is NAHMS?

NAHMS (National Animal Health Monitoring System) is a non-regulatory program of the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS). NAHMS is designed to describe and help meet the nation's animal-health information needs primarily through national studies. NAHMS has studied all major livestock industries (beef, dairy, equine, sheep and swine), poultry and aquaculture since its inception in the late 1980s.

In addition to national studies, NAHMS is involved in ongoing studies such as the bulk tank somatic cell count (BTSCC) monitoring program. A cooperative effort with USDA's Agricultural Research Service (ARS), the BTSCC program compiles and summarizes BTSCC data from four Federal Milk Marketing Orders on an annual basis. These data serve as a measure of milk quality. NAHMS also conducts targeted studies, such as the Dairy Heifer Raiser study that was conducted in 2011 to get information on management practices on these operations.

■ How are NAHMS Studies Developed?

There are 5 steps involved in the development of a NAHMS study:

- Needs assessment
- Study design
- Study implementation
- Data analysis
- Information dissemination

NAHMS studies begin with a *needs assessment* during which stakeholders are asked to identify the crucial production and health information needs of the respective industry. During the needs assessment, the focus and objectives of the study are established. *Study design* is the next step and consists of identifying participating states. States are selected based on evaluation of farm and cattle numbers. In order to make inference to the entire dairy industry, for example, NAHMS studies are designed to represent approximately 70% of US dairy operations and dairy cattle inventory. The design phase of the study includes developing questionnaires and determining which and how many samples are to be collected for testing. During the *implementation* process, questionnaires are administered, study data are collected, and biological samples are taken. Study implementation involves hundreds of personnel from USDA and its National Agricultural Statistics Service (NASS), participating states and thousands of participating producers. After the data and samples are collected they undergo an *analysis* process, whereby estimates are generated and biological samples tested. Finally, information gathered during the study is *disseminated* via multiple reports.

The study objectives drive the entire study design. The following is the list of Dairy 2007 objectives, their corresponding reports (●) and the findings (√) from the study.

1. Describe trends in dairy cattle health and management practices
   - Part II: Changes in the U.S. Dairy Cattle Industry 1991-2007, 2007,
   - Part V: Changes in Dairy Cattle Health and Management in the United States, 1991-2007, 2007
   - ✓ Vaccine use generally increased but Brucellosis use decreased
   - ✓ Incidence of mastitis, lameness, and infertility increased
   - ✓ Cow mortality increased from 3.8 to 5.7 percent
   - ✓ Percent of operations purchasing cattle unchanged with no changes in biosecurity practices

2. Evaluate management factors related to cow comfort and removal rates
   - Dairy Facilities and Cow Comfort on U.S Dairy Operations, 2007 interpretive Report
   - Associations between cow cleanliness, hock scores and stall usage on US dairy farms, manuscript published in Journal of Dairy Science.
   - ✓ Approx. 24% of cows removed each study year
     - Lameness ranked 3rd as reason for removal
   - ✓ Hock lesions linked to housing type
     - Tie stall and stanchion housing had increased hock lesions
   - ✓ Cow Comfort Index influenced by
     - Stall measures – larger stalls
     - Bedding – compost manure and sand
     - Season – higher in spring
   - ✓ Tail docking and the East region were associated with dirtier cows
   - ✓ Freestall facilities had the lowest percent of cows scored '3' or very dirty
   - ✓ Concrete and rubber mats were associated with decreased hygiene

3. Describe dairy calf health and nutrition from birth to weaning and evaluate heifer disease prevention practices
   - Part I: Reference of Dairy Cattle Health and Management Practices in the United States, 2007
   - Off-Site Heifer Raising on U.S. Dairy Operations info sheet
   - Colostrum Management info sheet
   - Part IV: Reference of Dairy Cattle Health and Management Practices in the United States, 2007
   - Calf Health and Management Practices on U.S. Dairy Operations, 2007 interpretive report
   - Calving Management on U.S. Dairy Operations info sheet
   - Prevalence of failure of passive transfer of immunity in newborn heifer calves and associated management practices on US dairy operations, manuscript published in Journal of Dairy Science

- ✓ About 60% of operations removed calves immediately from dam - prior to any nursing
- ✓ No association between colostrum quantity and passive transfer status
- ✓ About 50% of operations use antibiotics in weaned heifer rations
- ✓ 19% of calves had failure of passive transfer (FPT) in 2007 compared with 41% in 1991-92

4. Estimate the prevalence of herds infected with bovine viral diarrhea virus (BVD)

- Bovine Viral Diarrhea (BVD) Detection in Bulk Tank Milk and BVD Management Practices in the United States info sheet
- ✓ About 80% of producers at least knew some basics about BVD
- ✓ Bulk tank milk samples collected
- ✓ Higher percentage of operations in the West compared with East
    - West tend to be larger operations

5. Describe current milking procedures and estimate the prevalence of contagious mastitis pathogens

- Part III: Reference of Dairy Cattle Health and Management Practices in the United States, 2007
- Milking Procedure on U.S. Dairy Operations info sheet
- ✓ More than 90% of operations milk cows twice daily
- ✓ Most use iodine-based teat dips
- ✓ Almost 9 of 10 operations had BTSCC < 400,000
- ✓ *Staph. aureus* was the predominant contagious pathogen

6. Estimate the herd-level prevalence and associated costs of *Mycobacterium avium* subspecies *paratuberculosis*

- Johne's Disease on U.S. Dairy Operations info sheet
- Herd-level prevalence of *Mycobacterium avium* subsp. *Paratuberculosis* infection in United States dairy herds in 2007, manuscript published in Preventive Veterinary Medicine.
- ✓ Producer awareness has increased since 1996
- ✓ Composite fecal samples cultured
- ✓ Apparent prevalence is ~ 70% and increased with herd size
- ✓ Costs not attempted

7. Describe current biosecurity practices and determine producer motivation for implementing or not implementing biosecurity practices

- Part I: Reference of Dairy Cattle Health and Management Practices in the United States, 2007
- Part III: Reference of Dairy Cattle Health and Management Practices in the United States, 2007
- Biosecurity Practices on U.S. Dairy operations, 2007, interpretive report
- ✓ No change in quarantining animals from previous studies
- ✓ No change in vaccination requirements
- ✓ Testing new additions decreased
- ✓ "Disease is not a concern to my operation" or 'Tests already performed" reason producers didn't test

8. Determine the prevalence of specific food-safety pathogens and describe antimicrobial resistance patterns

- Antibiotic Use on U.S. Dairy Operations info sheet
- *Listeria* and *Salmonella* in Bulk Tank Milk on U.S. Dairy Operations info sheet
- *Salmonella* and *Campylobacter* on U.S. Dairy Operations info sheet
- Food Safety Pathogens Isolated from U.S. Dairy Operations, Salmonella, Listeria, and Campylobacter on U.S. Dairy Operations, 2007, Interpretive Report
- Composite Fecal Sampling and Culture for Detection of *Salmonella* on Dairy Operations and Comparison with Individual and Pooled Fecal Sampling, manuscript published in Journal of Food Protection
- Short communication: methicillin-resistant *Staphylococcus aureus* detection in US bulk tank milk, manuscript published in Journal of Dairy Science.
- ✓ The following are apparent prevalence estimates for food-safety pathogens:
- ✓ *Salmonella*
    - Individual cow samples– 41.4% of farms
    - Composite fecal samples – 49.1% of farms
    - 92.8% of isolates were susceptible
    - Bulk tank milk/filter isolation– 28.1% of farms
- ✓ *Campylobacter*
    - Individual cow – 92.6% of farms
    - 36.6% of isolates were susceptible
    - 61.2% of isolates were resistant to single antimicrobial
- ✓ *Listeria*
    - Bulk tank milk/filter isolation – 7.1% of farms
- ✓ *C. difficile*
    - Individual cow samples – 12.7% of farms

- ✓ *Coxiella burnetii*
  - Bulk tank milk samples – 76.9% of farms
- ✓ Methicillin-resistant *Staphylococcus aureus* (MRSA)
  - Bulk tank milk samples – 0% of farms

Additional informational sheets

- Dairy Cattle Identification Practices in the United States info sheet
- Reproduction Practices on U.S. Dairy Operations info sheet
- Bovine Leukosis Virus (BLV) on U.S. Dairy Operations info sheet
- Dairy Cattle Injection Practices in the United States info sheet
- Methicillin-Resistant *Staphylococcus aureus* (MRSA) Isolation from Bulk Tank Milk in the United States info sheet

All NAHMS reports are available at http://nahms.aphis.usda.gov