

NAHMS Plays Key Role in Surveillance Efforts

Written by Nora Wineland, DVM MS, Center Leader NCAHS
Katherine Marshall, DVM, MSc, Analytical Epidemiologist, NAHMS

The National Animal Health Monitoring System (NAHMS) is a key component of the National Animal Health Surveillance System (NAHSS). The NAHMS unit is integral to the NAHSS goal to coordinate and collaborate on monitoring animal health and production trends and contribute to animal disease awareness education for producers and practitioners.

The NAHMS program was initiated in the early 1980s to collect, analyze, and disseminate information on animal health, animal production, animal welfare, product wholesomeness and the environment for animal health decision-makers at all levels.

NAHMS has created a niche of expertise, combining the knowledge of veterinarians, economists, and statisticians to address information needs primarily via national study development, analysis, and reporting of results. Much of the information collected relates to biosecurity, animal movement, and disease risk factors. It provides input to risk analyses for determining disease introduction probabilities and more clearly defining at-risk populations, giving some insight into how to best assess those populations for surveillance purposes. In addition, the NAHMS program identifies long-term key health indicators to monitor through various means including sentinel surveillance.

NAHMS national studies are developed by an extensive needs assessment process, which collects input from Veterinary Services, State departments of agriculture, other Federal agencies, academia, allied industry groups, and animal industry organizations at the local, State, and national levels to improve animal health and productivity. Input and discussions from these diverse perspectives are collated and distilled into what eventually becomes the study's focus and objectives.

Core attributes of NAHMS national studies include:

- Probability based sampling,
- Statistically valid estimates,
- National focus,
- Collection of animal management information and biologic samples,
- Nonregulatory programs,
- Voluntary participation, and
- Confidential data.

Surveillance questionnaires are created to examine livestock and poultry population demographics and health management practices as well as biosecurity awareness and practices. The studies have also been used to measure awareness of disease risks and determine the optimal approach for disseminating animal health information in an outreach/education campaign. The studies themselves have often become a means to disseminate livestock and poultry health information to producers. Collecting

management practice information helps ascertain the impact of disease prevention measures previously developed by industry or government agencies, provide an understanding of how an industry operates, determine how well-informed producers are on disease control and prevention, and examine animal movement patterns.

The prevalence of a particular condition in a population is determined through questions about its occurrence or via laboratory tests of on-farm samples, or both. In looking at a particular condition, the studies are often designed to evaluate potential risk factors and, in so doing, contribute to the determination of specific populations most useful for future surveillance.

NAHMS national studies generally include the collection of biologic samples and these samples, in the case of blood and fecal specimens, are banked as sera and specific bacterial isolates. These banks contribute to efficient and effective surveillance design by allowing serologic tests, for example, to evaluate when an emerging disease was introduced to the population and to examine how it may have spread over time. The banks provide the means to reexamine a particular population at a later date when better tests may have been developed for a particular condition.

Depending on the industry, field employees conducting NAHMS studies may be the only veterinarians who visit an extensive number of smaller operations, providing producer educational opportunities and observing livestock health. This not only increases producer awareness of disease and its management, it also provides a U.S. Department of Agriculture contact for the producer. Such contacts help to increase VS' familiarity with studied industry practices overall and establish individual relationships with the study participants—which enhances early detection and control of disease.

NAHMS is one member of the NAHSS alliance that brings a history of collaborations with other Federal, State and local governments, universities, and producer industries. These partnerships provide a surveillance function by developing an avenue for individuals outside of VS to interact with a government agency, creating a dialogue to improve understanding of new health events and guide research efforts.

NAHMS national studies have been conducted for swine and dairy (three studies each), poultry (two), cattle feedlot (two), beef cow/calf (two), catfish (two), equine (two) and sheep (two). In response to requests and to fill information gaps, NAHMS is also responsible for ongoing monitoring of the National Sentinel Feedlot Program. Each month NAHMS receives reports on morbidity and mortality of feedlot cattle. Feedlot consulting veterinarians provide the data and are given comparison reports.

The Collaboration in Animal Health and Food Safety Epidemiology (CAHSE) Program is a joint effort among three USDA agencies: APHIS, Agricultural Research Service, and the Food Safety and Inspection Service. The mission of this important effort is twofold: to enhance overall understanding of bacteria that pose a food-safety risk by monitoring these bacteria on-farm and in-plant over time; and to provide a means to routinely monitor critical diseases in food-animal production. This program began in 2003 and is

currently focused on the swine industry. In the future it could lead to a system of sentinel farms, as it is envisioned to cover the major livestock and poultry species.

Highlights from Recent Studies

Compared to the commercial segment of the poultry industry, information on the noncommercial segment has been limited and sparse. As a result, NAHMS Poultry 2004 focused on the noncommercial segment of the poultry industry, including backyard flocks, gamefowl breeder flocks, and live-poultry markets to obtain information about bird health, bird movement, and biosecurity practices.

The 2005 NAHMS Nonambulatory Dairy Study was initiated as part of the response to a 2002 Farm Bill request that USDA investigate the scope, causes, and handling practices of nonambulatory livestock. Animal science, industry and veterinary groups were asked to determine information needs that would identify potential risk factors involving nonambulatory cattle and calves. The questionnaire was administered in 21 of the nation's leading dairy States, and the objectives included identifying top reasons why U.S. dairy cattle and calves become nonambulatory, handling practices, and outcomes of nonambulatory dairy cattle and calves.

The NAHMS Equine 2005 study collected information regarding health practices that impact the occurrence of equine infectious diseases and estimated the occurrence of selected equine health-related events on operations with 5 or more equids in 28 States. A second part of the equine study involved a look at health requirements and biosecurity practices at equine events in six States.

Future Studies

The 2006 NAHMS Swine Study will be the fourth national study of the U.S. swine industry. This year, 17 States will participate, and the objectives include describing swine management practices used during gestation, farrowing, nursery, and grower/finisher production phases; determining the prevalence of risk factors for a variety of pathogens found in nursery and grower/finisher pigs; examining vaccination and antimicrobial-use practices; determining the prevalence of and risk factors for nonambulatory swine; identifying production practices that reduce manure nutrient content; and providing an overview of changes in U.S. swine management and health from 1990 through 2006.

In 2007, NAHMS will undertake the fourth national dairy study and planning is proceeding for this study.

For details regarding study design, data analysis, and results of all NAHMS studies, go to www.aphis.usda.gov/vs/ceah/ncahs/nahms.