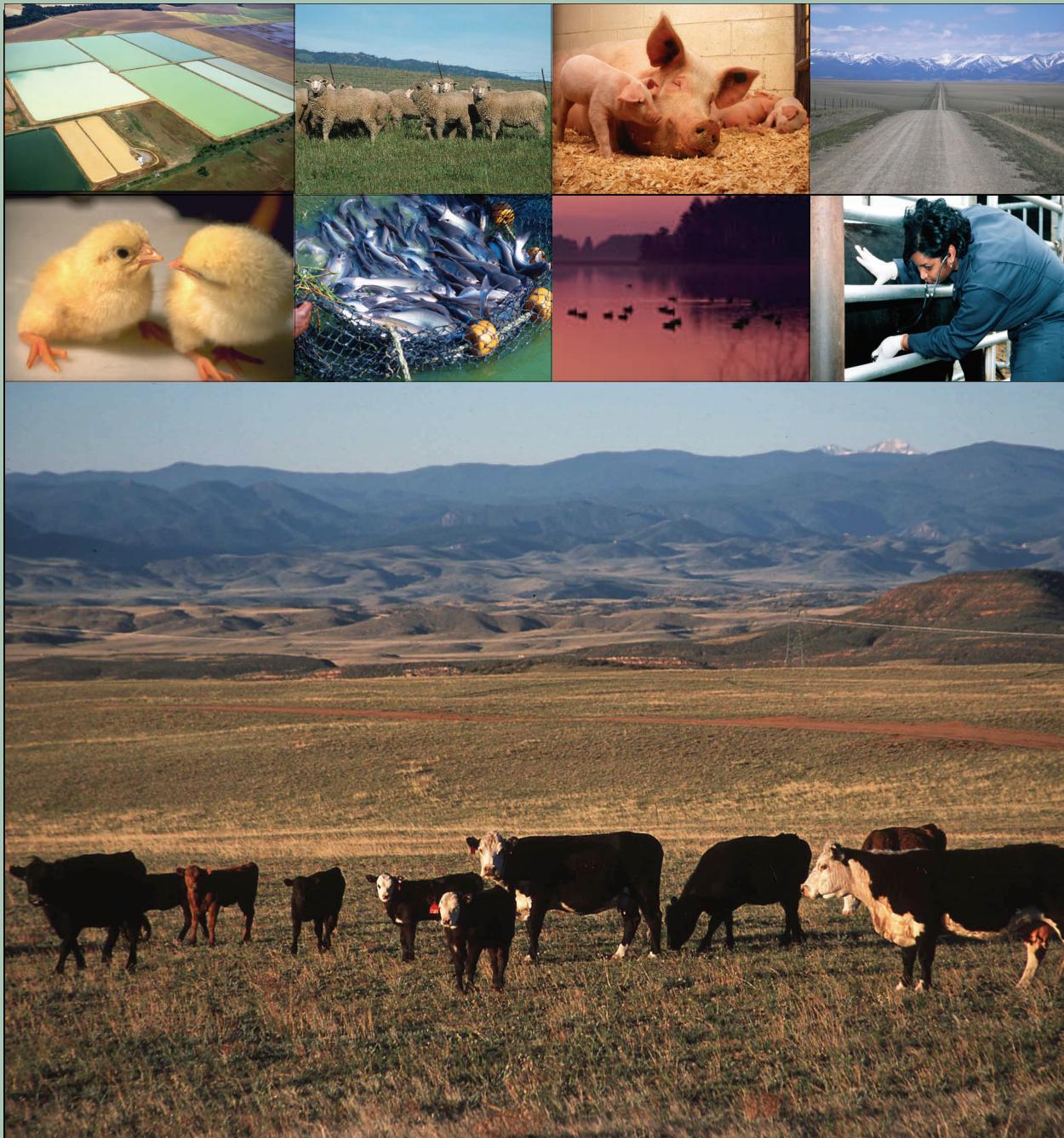
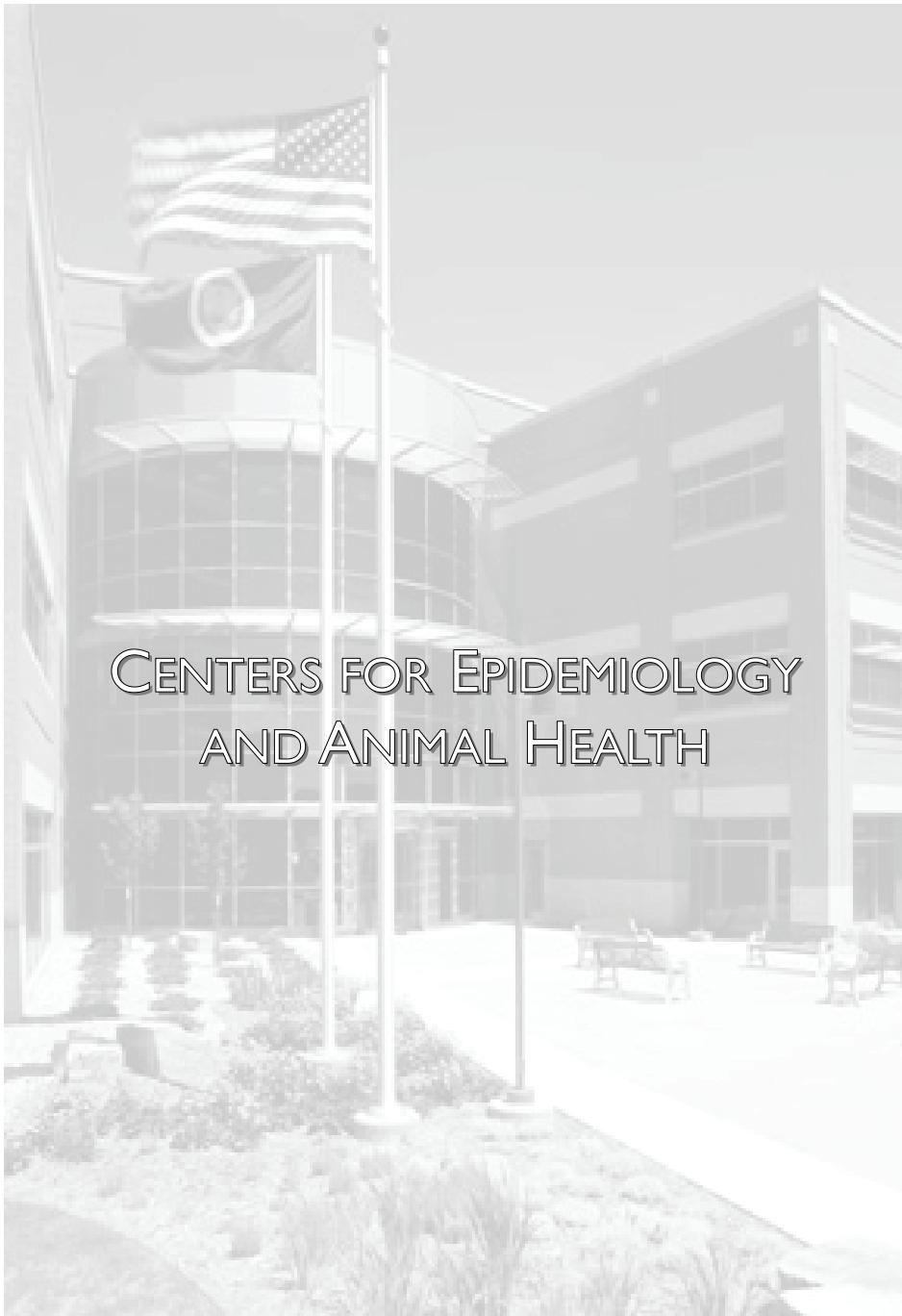


# The Centers for Epidemiology and Animal Health



January 2011



# Letter from the Director

Dear Colleagues,

The Centers for Epidemiology and Animal Health is a center of epidemiological and economic excellence that supports the mission of APHIS Veterinary Services by providing scientifically sound and statistically valid information to decisionmakers and stakeholders. In this role, CEAH helps APHIS strengthen animal health infrastructures both nationally and internationally through surveillance, monitoring, risk analysis, spatial epidemiology, and modeling.

CEAH is uniquely positioned to provide information to help APHIS protect American agriculture. Our success depends on our increasing collaborations with stakeholders and partners, both domestic and international. We have many collaborative efforts underway in a wide variety of areas and we will strive to strengthen and enhance these efforts. These cooperative efforts help us allocate resources more appropriately and efficiently.

This publication presents an overview of CEAH, its mission, and current activities. If you would like more information, please let us know. Contact details are on page 10.



Larry Granger  
CEAH Director

# Advancing animal health around the world through epidemiology, science, and technology

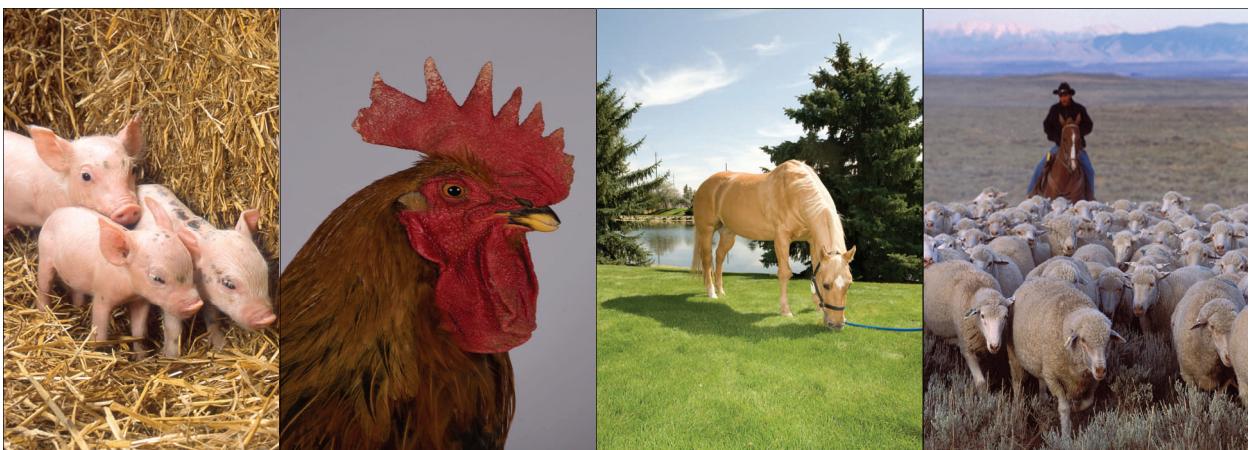
The Centers for Epidemiology and Animal Health (CEAH) is part of the USDA Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) unit. Safeguarding the health of the Nation's animals, animal products, and veterinary biologics is a key component of the VS mission, and CEAH plays a vital role in supporting that mission.

Staffed with a strong multidisciplinary team, CEAH provides scientifically sound and statistically valid information and tools to help policymakers reach critical decisions regarding animal health issues. The CEAH staff includes veterinary epidemiologists, spatial analysts, statisticians, agricultural economists, and technical writers. CEAH's experts identify emerging animal health threats, design comprehensive animal health surveillance systems, monitor health-related aspects of U.S. livestock management and production, conduct risk assessments, develop epidemiological models simulating animal disease outbreaks, and administer the National Veterinary Accreditation Program.

Collaborative partnerships with other groups are an integral part of the CEAH mission. CEAH works closely with other VS and APHIS units, as well as other USDA and Federal agencies, industry groups, universities, and many other entities involved in domestic and international animal health.

CEAH collaborates with the World Organization for Animal Health (OIE) and its member countries to improve international disease surveillance capabilities and analytic methods supporting trade decisions. CEAH helps document the status of livestock diseases within the United States and provides this information to OIE to meet U.S. obligations as a member country. CEAH is also an OIE Collaborating Center for Animal Disease Surveillance Systems, Risk Analysis, and Epidemiological Modeling. In this capacity, CEAH shares its risk analysis and disease surveillance and control expertise with OIE member countries and provides technical assistance and advice. CEAH increasingly works with OIE member countries in using epidemiological modeling to simulate the effects of diseases within their countries. This partnership promotes a harmonized approach and improves the quality of surveillance and risk assessment methodologies used by VS.

VS is examining its future as the lead agency promoting animal health and has developed a strategic vision—VS 2015—to guide the organization. CEAH's work aligns with that vision. To meet the evolving domestic and international animal health challenges, CEAH is focusing its expertise on disease prevention, preparedness, response, and recovery across agricultural sectors and animal species.



# Providing information and analysis to inform decisionmakers on animal health issues

The increasing risk of foreign animal and emerging diseases—many of them zoonotic diseases—illustrates the need for precise monitoring, surveillance, and risk analysis. The challenges posed by new or emerging animal diseases require timely, factual information to prepare for and respond to these threats. CEAH plays a key role in APHIS-VS' preparation and response efforts.

CEAH experts specializing in animal health monitoring, surveillance, spatial analysis, disease simulation and spread modeling, and risk analysis, provide relevant products and information to help policymakers reach timely, cost-effective decisions. CEAH also provides epidemiological expertise, analytical support, and personnel during animal health emergencies. In its role administering the National Veterinary Accreditation Program, CEAH strengthens the education and involvement of accredited veterinarians in safeguarding animal health in the United States.

The centers at CEAH include the National Surveillance Unit (NSU); the Center for Animal Health Information and Analysis (CAHIA), which houses the National Center for Risk Analysis (NCRA); the National Animal Health Monitoring System (NAHMS); and the Office for International Collaboration and Coordination (OICC).

## CEAH at a Glance

- ◊ Provides timely, factual information about commercial livestock, poultry, and aquaculture
- ◊ Identifies and analyzes risks to animal health and agricultural markets
- ◊ Provides epidemiological and analytical support focusing on preparedness and business continuity for animal health emergencies
- ◊ Serves as an OIE Collaborating Center for Animal Disease Surveillance Systems, Risk Analysis, and Epidemiological Modeling
- ◊ Designs and evaluates surveillance systems
- ◊ Conducts benefit-cost analyses of animal disease intervention options
- ◊ Identifies and monitors global policy, environmental, and social changes that could impact animal health
- ◊ Facilitates informed decisionmaking for government and industry animal-health management
- ◊ Administers the National Veterinary Accreditation Program



# Animal Health Surveillance

## National Surveillance Unit (NSU)

NSU coordinates the development of U.S. animal health surveillance and the National Animal Health Surveillance System (NAHSS). The NAHSS is a network of partners and programs working to protect animal health through more efficient and effective surveillance systems. As new surveillance initiatives are integrated into the NAHSS, NSU has an increased role to analyze surveillance data and provide information to stakeholders including USDA, APHIS, and VS decisionmakers.

NSU's work focuses on surveillance planning, design, and evaluation; coordination, integration, analysis, and dissemination of surveillance information; and development of surveillance methodology and analytical tools. One component of integrated, comprehensive surveillance is the National Animal Health Reporting System (NAHRS). Under NAHRS, which is coordinated by NSU, participating State animal health officials report monthly on the occurrence of confirmed OIE-listed diseases in U.S. livestock, poultry, and aquaculture species.

NSU develops animal disease case definitions for use in surveillance and reporting. NSU also lends expertise to national disease response planning and in designing



and evaluating surveillance methods for outbreak zones.

### Surveillance plans and evaluations

- ◊ Avian influenza (AI)
- ◊ Bovine spongiform encephalopathy (BSE)
- ◊ Bovine tuberculosis (TB)
- ◊ Brucellosis
- ◊ Classical swine fever (CSF)
- ◊ Comprehensive swine surveillance
- ◊ Disease outbreaks
- ◊ Pseudorabies virus
- ◊ Scrapie
- ◊ Swine influenza virus
- ◊ Vesicular disease
- ◊ Viral hemorrhagic septicemia

### Surveillance communications

- ◊ OIE annual, semi-annual, and immediate reports
- ◊ NAHRS annual report
- ◊ AI, BSE, CSF, equine arbovirus, and scrapie reporting

### Surveillance methods and tools

- ◊ Predictive models for managing TB-affected herds and determining disease freedom
- ◊ Disease outbreak surveillance toolbox
- ◊ Methodology to quantify expert opinion



# Risk Analysis

## Center for Animal Health Information and Analysis (CAHIA)

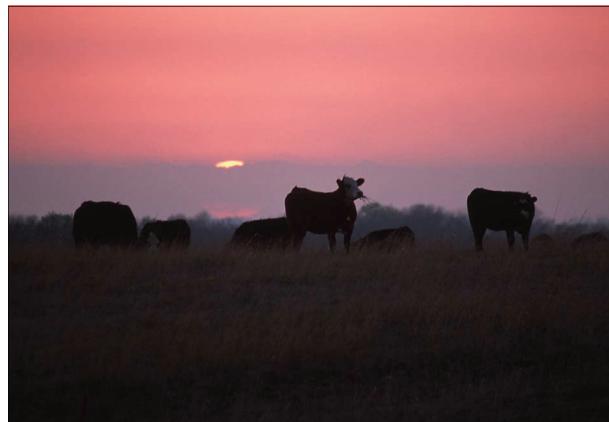
### National Center for Risk Analysis (NCRA)

NCRA supports VS operations and informs regulatory decisions by conducting time-critical risk, epidemiologic, and economic analyses. NCRA provides comprehensive analyses of threats and risks through an interdisciplinary approach that includes expertise in animal health, veterinary medicine, ecology, epidemiology, economics, biostatistics, spatial analyses, and entomology. NCRA also provides training in risk analysis domestically and internationally. The scope of NCRA's work includes:

- ◊ Developing and applying epidemiologic and economic methods for comprehensive analysis of emerging threats, animal disease outbreaks, and disease control programs in the U.S., including risk and pathways analyses that support regulatory functions such as regionalization, compartmentalization, consequence assessment, compensation, and indemnity
- ◊ Building and applying epidemiological and economic models and other analytical decision support tools to inform risk analyses and VS program development and enhance emergency preparedness and response
- ◊ Developing science-based methods to further understand the ecology of disease, vectors, and hosts and the interactions between animal health and human health and identify risk factors and determinants of disease introduction and spread
- ◊ Standardizing and communicating processes and methods through presentations, training, and publications
- ◊ Contributing to international standard-setting for risk analysis

#### **Recent analyses and methods development**

- ◊ Risk factors associated with domestic equine piroplasmosis outbreaks



- ◊ Pathways assessments, including pathways of introduction and risk factors for transmission of bovine tuberculosis and highly pathogenic avian influenza (HPAI)
- ◊ Domestic regionalization for bovine tuberculosis
- ◊ Risk factors associated with the introduction and movement of HPAI by wild migratory waterfowl and identification of areas at risk for transmission to poultry
- ◊ Risk of introduction of New World screwworm into the United States as a result of increasing trade with Cuba and other screwworm-infested areas of the Caribbean
- ◊ Evaluation of risks associated with movement of eggs and egg products into, within, and outside of a control area during an HPAI outbreak
- ◊ Evaluation of the risk of introduction of classical swine fever to inform surveillance planning efforts
- ◊ Development of a livestock and wildlife herd health analysis tool that allows identification of areas at risk for brucellosis transmission
- ◊ Empirical modeling of livestock movement and disease spread to identify risk factors associated with disease transmission and enhance program development and implementation
- ◊ Assessment of risk to U.S. animal agriculture related to movement of military bases to Guam and Micronesia from Japan

# Animal Health Monitoring

## National Animal Health Monitoring System (NAHMS)

NAHMS' work focuses on national animal health monitoring, study design, animal health information, VS program support, and data analysis. NAHMS collects, analyzes, and disseminates data on animal health, management, and productivity across the United States. NAHMS provides timely information on animal health, production and management practices, and pathogen prevalence to producers, industry representatives, policymakers, academicians, and other interested stakeholders.

NAHMS periodically conducts scheduled national studies on the health and health management of U.S. domestic livestock, poultry, and aquaculture populations. Each animal group is studied at regular intervals, providing the up-to-date and trend information needed to monitor animal health, support trade decisions, assess research and development needs, answer questions from consumers,



and set policy. NAHMS provides stakeholders with valuable information on disease occurrence and exposure to disease agents, management practices, productivity, producer awareness and knowledge, and other topics. NAHMS prepares a wide variety of publications based on study findings. These reports are distributed to the general public and animal health professionals and are placed on the USDA-APHIS Web site. NAHMS also provides expertise in study design, implementation, and data analysis to obtain information needed for other agency purposes and external programs.

### National commodity studies and reports

- ◊ Beef cow-calf: 1992–93, 1997, and 2007–08
- ◊ Beef feedlot: 1994 and 1999
- ◊ Catfish: 1997, 2003, and 2010
- ◊ Dairy: 1991–92, 1996, 2002, and 2007
- ◊ Goats: 2009
- ◊ Horses and other equids: 1998, 2005
- ◊ Poultry: 1999, 2004, and 2010
- ◊ Sheep: 1996, 2001
- ◊ Swine: 1990, 1995, 2000, and 2006
- ◊ Annual U.S. Animal Health Report (2004, 2005, 2006, 2007, 2008)



# Domestic and International Collaboration

## Office for International Collaboration and Coordination (OICC)

The OICC is responsible for coordinating CEAH's collaboration on animal health issues and projects, both domestically and internationally. This includes collaboration with other agencies, supporting existing and new relationships with universities and accredited veterinarians, and handling marketing and public relations for CEAH products and expertise.

The OICC helps to facilitate CEAH's involvement in international activities that contribute to the APHIS mission. These activities include collaborative efforts to safeguard animal health, contribute to development of international standards with OIE and other organizations, and contribute to broader U.S. foreign policy initiatives.

Many international visitors attend training sessions at CEAH to share information and learn about methods for surveillance, risk analysis, veterinary epidemiology, modeling, and geospatial analysis. Through partnerships involving OIE, the United Nations Food and Agriculture Organization (FAO), the World Health Organization (WHO), and other agencies and organizations, CEAH assists with early warning of and response to major animal diseases, including zoonoses.

CEAH also assists other countries in assessing their veterinary infrastructures and capacity-building.



## Key international and domestic collaborative efforts

- ◊ Participating in OIE ad hoc groups on disease categorization, epidemiology, surveillance guidelines and epidemiological modeling
- ◊ Assisting OIE and member countries on veterinary services infrastructure assessment
- ◊ Participating in the OIE-FAO Network on Animal Influenza and providing recommendations for the OIE-FAO-WHO Global Early Warning and Response System for major animal diseases
- ◊ Collaborating with FAO for spatial analysis of highly pathogenic avian influenza infections
- ◊ Collaborating to harmonize standards for aquatic animal disease surveillance and control
- ◊ Sharing risk assessment methodologies and approaches with the European Food Safety Authority
- ◊ Serving as an integral partner in the Offshore Pest Information Program
- ◊ Providing training, mentoring, and consultation to the CaribVet Working Group
- ◊ Providing specialized training both internation-



- ally and domestically on risk assessment and geospatial methods
- ◊ Developing and applying the North American Animal Disease Spread Model (NAADSM) to address questions on disease prevention, preparedness, and control domestically and internationally in collaboration with Colorado State University; the Ontario Ministry of Agriculture, Food and Rural Affairs; the University of Guelph; and the Canadian Food Inspection Agency.

#### National Veterinary Accreditation Program

The National Veterinary Accreditation Program is a key area of collaboration for VS and State animal health officials. The United States depends increasingly on accredited veterinarians to carry out many of its animal health programs and services, including animal inspections, testing, and certifications.



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[http://www.aphis.usda.gov/about\\_aphis/programs\\_offices/veterinary\\_services/ceah.shtml](http://www.aphis.usda.gov/about_aphis/programs_offices/veterinary_services/ceah.shtml)

**CAHIA-NCRA Web site**

[http://www.aphis.usda.gov/animal\\_health/emergingissues/index.shtml](http://www.aphis.usda.gov/animal_health/emergingissues/index.shtml)

**National Animal Health Monitoring System**

<http://nahms.aphis.usda.gov>

**National Animal Health Surveillance System**

<http://www.aphis.usda.gov/vs/nahss>

**National Animal Health Reporting System**

[http://www.aphis.usda.gov/animal\\_health/nahrs/](http://www.aphis.usda.gov/animal_health/nahrs/)

**National Veterinary Accreditation Program**

[www.aphis.usda.gov/animal\\_health/vet\\_accreditation/](http://www.aphis.usda.gov/animal_health/vet_accreditation/)