



Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Center for Epidemiology and Animal Health **Impact Report** FY 2022



MISSION

The Center for Epidemiology and Animal Health (CEAH) provides applied and innovative analyses to generate science-based information and solutions for decision making around complex national animal health issues.

CEAH is made up of the following units:



National Animal Health Monitoring System (NAHMS)

NAHMS is the statistical unit within Veterinary Services (VS) responsible for population estimates related to animal health management and productivity. NAHMS conducts national studies on the health and health management of livestock, equine, aquaculture, and poultry populations within the United States (U.S.) at regular intervals.



Program Coordination and Implementation (PCI)

PCI strengthens CEAH's mission by supporting staff with communications and editing support, project management, operations and logistics support, and compliance.



Geospatial Analytics, Products, and Services (GAPS)

GAPS provides map-centric products and solutions, as well as geospatial analyses that support emergency planning and response, disease risk analyses, epidemiology investigations, disease monitoring and reporting, and the overall mitigation and prevention of animal disease introduction and spread in the U.S.



Surveillance Design and Analysis (SDA)

Through collaborative surveillance design, analysis, evaluation, and communication, SDA develops and enhances animal disease surveillance. SDA provides practical and timely surveillance solutions to meet customer needs, from single-premises sampling plans to robust national-level surveillance systems, including the proposed National List of Reportable Animal Diseases. SDA also serves as the World Organisation for Animal Health (WOAH) Focal Point for U.S. animal disease reporting.



Transboundary Disease Analytics (TDA)

TDA identifies and characterizes global animal health hazards, assesses hazards and strategies to prevent the entry of transboundary diseases into the United States, conducts pathways assessments, and contributes to animal disease preparedness and response planning, implementation, and evaluations.



Domestic Animal Health Analytics (DAHA)

DAHA supports domestic disease programs through risk analysis, epidemiologic evaluations, and providing indemnity and compensation analyses and tools.

CEAH PORTFOLIOS



**Monitoring
and Trends**



**Domestic Animal
Disease Mitigation**



**Foreign Animal Disease
(FAD) Prevention/
Mitigation**



**Foreign Animal Disease
(FAD) Response
Planning and
Implementation**

GOALS FOR CEAH PORTFOLIOS



Provide focus for
CEAH's strategic
planning efforts



Coordinate and
prioritize workloads
and projects within and
across CEAH units



Improve CEAH's ability
to manage a complex
array of projects and
services

Monitoring & Trends

Activities produce data and products characterizing:

- Distributions of Disease, Host, or Vector Data
- Animal Health Management and Biosecurity
- Industry Trends
- Antimicrobial Use and Stewardship

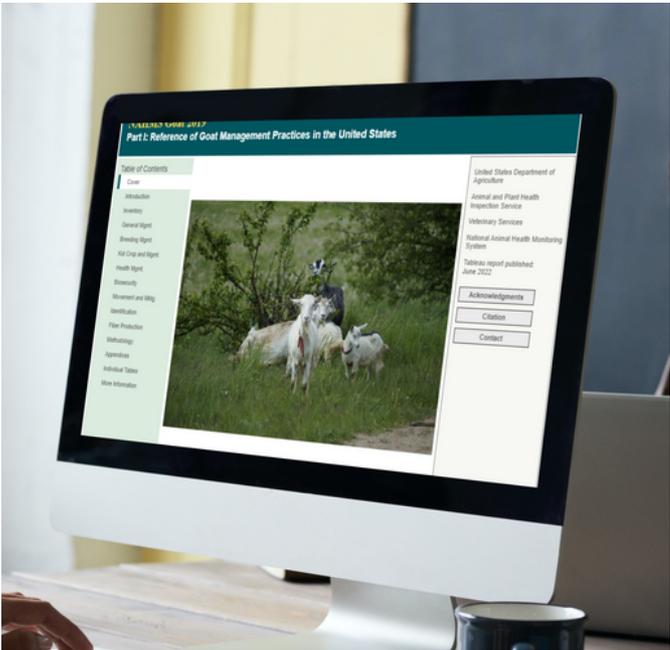


Created tools to enhance the accessibility of Avian Influenza Virus (AIV) information for stakeholders. In collaboration with Wildlife Services (WS), CEAH designed and published the Wild Bird Avian Influenza Surveillance Dashboard, displaying AIV results from samples collected through the USDA WS National Wildlife Disease Program.

Contributed to scientific research literature to advance animal health practices. CEAH authors published manuscripts to improve understanding of giardia infections in preweaned dairy calves and improve the characterization of Salmonella species on goat operations, leveraging samples collected in the NAHMS Dairy 2014 and Goat 2019 studies.



Increased availability of NAHMS study data for industry stakeholders. CEAH provided producers, industry, extension, and other stakeholders easier access to NAHMS study data through user-friendly, dynamic dashboards, such as the NAHMS Goat 2019 Management Practices. CEAH also employed targeted infographics for data distribution, creating products on U.S. goat identification practices, agritourism, sheep predator and nonpredator death losses, and *Enterococcus* on U.S. beef operations.



Transformed aquaculture tools to support evolving stakeholder needs. CEAH revised the Comprehensive Aquaculture Health Program Standards decision trees and inspection guidance, a risk-based assessment tool to support premises disease freedom surveillance evaluations, and pilot tested a tool supporting the trade of shrimp production facilities.

Provided national and international partners with timely animal and zoonotic disease threat analysis. CEAH performed weekly evaluations and updates of global emerging and reemerging animal and zoonotic diseases of consequence to the U.S. animal industry. CEAH delivered pertinent data to Wildlife Services, International Services, and National Veterinary Services Laboratories (NVSL), as well as to related international agencies, including WOA and the Food and Agriculture Organization (FAO) of the United Nations.

Supported Highly Pathogenic Avian Influenza (HPAI) mitigation efforts through data analysis and pattern identification for response operations.

CEAH provided epidemiologic and modeling support to the Veterinary Services Incident Management Teams, National Incident Coordinator, and State, and local HPAI outbreak responses. By delivering data visualizations and epidemiological support to local outbreaks and potential phylogenetic clusters, CEAH provided leadership personnel with time-critical decision-making tools allowing for the optimal use of assets to maximize response and minimize economic impacts.



Sustained antimicrobial use and resistance study partnership to boost commercial swine population health.

CEAH continued a collaborative effort to study antimicrobial use and resistance on commercial swine operations in the Midwest through a public-private partnership. A year-one findings report from this cooperative agreement was accepted for publication in the WOAQ Quarterly Scientific and Technical Review.



Initiated NAHMS Bison 2022 study in conjunction with industry partners.

CEAH initiated a national study focusing on ranched bison health and management in the U.S. This study will provide stakeholders with valuable information on bison industry production practices and challenges, including animal management and welfare, nutrition and range management, and environmental stewardship. Additionally, the study will look at: health management and biosecurity practices; producer-reported occurrence of select health problems, associated management practices or actions, and causes of bison mortality; and prevalence of select economically important pathogens for bison and quality of pasture forage.

Advanced awareness of animal health management through data collection and analysis.

By fulfilling its responsibilities to collect promised information on U.S. bison, swine, and feedlot operations, CEAH - in conjunction with field animal health technicians and veterinarians - provided materials to increase the understanding of health, management, and antimicrobial stewardship in these livestock sectors.

Domestic Animal Disease Mitigation

Activities include:

- Epidemiologic and Ecologic Analysis
- Surveillance Design and Evaluation
- Economic Analysis
- Evaluation of Domestic Animal Health Strategies



Responded to the 2022 HPAI threat with the swift development of risk models and surveillance tools. In collaboration with United States Geological Survey (USGS) and University of Maryland partners, CEAH provided the preliminary HPAI spillover risk model showing spillover risk by county within the United States (U.S.). Through evaluation of model accuracy using 2022 HPAI outbreak data, CEAH showed the risk model performs well at the county scale. CEAH also provided surveillance design and implementation and WOH disease reporting across various domesticated and wild species, supporting domestic producers, State partners, wildlife organizations, and international trade activities for 94 avian and non-avian HPAI-affected species.



Maintained a leading role in monitoring current and emerging viral vulnerabilities in animal operations. CEAH facilitated the development of updated case definitions for SARS-CoV-2 and Mpox for animals. These case definitions are used by local, State, and federal animal health and public health officials to determine when cases are detected, impacting disease surveillance and reporting efforts.

Performed continuous improvement updates to the national bovine brucellosis surveillance plan. Through support for USDA brucellosis surveillance program design, CEAH continues to provide the foundation for market confidence in the health of U.S. cattle.



Improved accessibility of goat scrapie information for stakeholders. CEAH provided data on the genetic variability of codons related to scrapie susceptibility in U.S. goats through the analysis of genetic samples collected from 6,029 goats on 654 farms during the Goat 2019 study. CEAH also published an infographic about scrapie and genotyping on the NAHMS website derived from the 2021 published manuscript, allowing easier access to selected information.

Created Cattle Fever Tick (CFT) modeling framework to support transparent, data-driven program decisions. CEAH proposed and developed a novel modeling framework to assist in the CFT program's assessment of surveillance, development of surveillance guidance, generation of program metrics, identification of areas of concern for infestations, and evaluation of mitigations.

Provided expertise for USDA indemnity appeal panel reviews facilitating the decision process. CEAH participated in indemnity appeal panel reviews for poultry, quail, cattle, and cervid appeals. The panels generated timely recommendations for USDA, providing a consistent mechanism for payment decisions when a producer appeals the standard indemnity valuation. These efforts help ensure continued producer participation in disease reporting and control activities.



Led VS response on *Mycoplasma bovis* (*M. bovis*) affected bison herds by closely working with impacted Tribes. CEAH addressed concerns from the USDA Office of Tribal Relations regarding the high mortality and spread of *M. bovis* on bison herds. Through active outreach to Tribes on this topic, CEAH expanded USDA Tribal relations and improved understanding of *M. bovis* in bison herds.

Accomplished bovine tuberculosis (bTB) Test and Remove modeling for four herds across the Nation. Through bTB test and remove modeling, CEAH provided direction on the most effective and cost-efficient path for control of bTB outbreaks for affected herds.



Provided animal health officials with a valuable digital dashboard for equine disease tracking. CEAH designed and published the Equine Arboviral Disease Surveillance Dashboard for State animal health officials that displays eastern equine encephalitis (EEE) and West Nile Virus (WNV) cases utilizing Centers for Disease Control and Prevention (CDC) Arbonet data. The dashboard dramatically reduces time spent sharing and verifying equine arboviral case data while offering users added visualization of the information through customizable tables and maps.

Improved midge modeling data to enhance animal health decision making processes. CEAH developed the best predictors for modeling habitat suitability and site occupancy based on weather conditions during data collection. This modeling allows for informed decision-making on animal diseases spread by midges, such as bluetongue and African horse sickness.

Foreign Animal Disease Prevention / Mitigation

Activities include:

- Surveillance Design & Evaluation
- Global Monitoring and Situational Awareness
- Risk Analyses
- Evaluation of FAD Mitigation/Control Options



Provided reported U.S. animal disease data to national and international partners. U.S. disease reporting supports our national and international responsibilities to preserve safe trade, public health, food security, and sustainable socio-economic growth. CEAH submitted immediate, follow-up, and semesterly reports in the new World Animal Health Information System (WAHIS).



Constructed the ASF Global Status Story Map providing an effective data tool for stakeholders. CEAH developed and published the ASF Global Status Story Map to provide ease of access to monthly disease map updates, notable changes in disease risk, epidemiology and other surveillance data, susceptible population maps, and additional information and documents of interest.



Improved African Swine Fever (ASF) response efforts through surveillance and sampling. CEAH developed sampling guidance when using pooled specimens during ASF response, leading to incorporation into future response plans. CEAH used visual communication techniques, such as posters and abstracts, at multiple international conferences to summarize VS surveillance activities in Puerto Rico and the U.S. Virgin Islands. These efforts assist in protecting the U.S. pork industry from the devastating impact of an ASF incursion. Current estimates project ASF could lead to \$15 billion to \$50 billion in losses to the industry.

Reviewed and revised animal health surveillance plans to meet current situational requirements. CEAH updated the national surveillance plan for swine hemorrhagic fevers and published the updated plan on the APHIS website. These updates included enhancements to support the WOAHP protection zone established for Puerto Rico and the U.S. Virgin Islands. USDA surveillance programs continue to be the foundation for market confidence in the health of U.S. swine.

Foreign Animal Disease Response Planning & Implementation

Activities include:

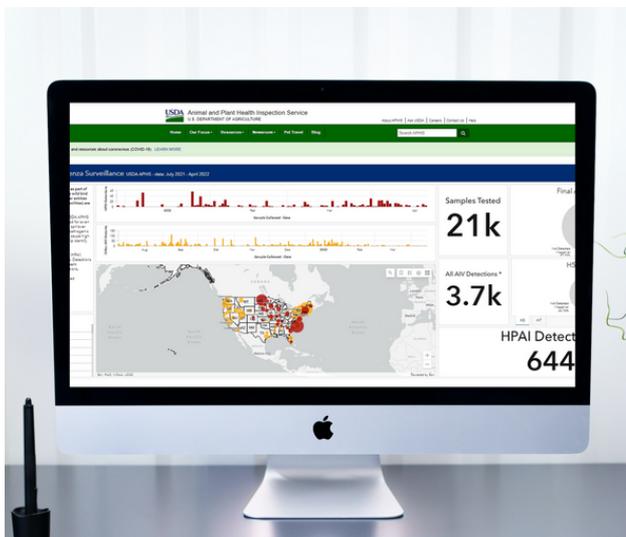
- Improving FAD Response Plans
- Assisting in Response Efforts
- Geospatial Map Applications
- Supporting Training Exercises



Published critical HPAI map products for enhanced situational awareness of virus impacts. Between February and September 2022, CEAH GAPS provided daily HPAI situational report map products and trade zone maps for 41 states, totaling over 800 situation reporting maps and more than 2,400 trade zone maps. The timely and accurate delivery of such a large volume of maps required innovative and automated solutions to develop and deliver these quality products for situational awareness and trade partner communications.



Collaborated with aquaculture stakeholders to assess the current viral risk to the industry. CEAH worked with the Aquaculture Commodity Health Group to protect and improve the health, quality, and marketability of the U.S. aquaculture industry by publishing the Decapod Iridescent Virus (DIV1) and Infectious Hypodermal and Hematopoietic Necrosis Virus (IHHNV) Rapid Risk Assessments, contributing to the safeguarding of the U.S. aquaculture industry.



Provided epidemiologic and modeling support for the HPAI 2022 outbreak. CEAH used national disease spread models for resource and budgetary planning, in addition to providing senior leadership weekly updates on descriptive and geospatial epidemiology of the outbreak. CEAH facilitated time of introduction modeling to inform farm-level response planning, and supported in depth evaluation of phylogenetically-linked clusters of cases.

Provided expertise for USDA indemnity appeal panel reviews. CEAH participated in indemnity appeal panel reviews for poultry, quail, cattle, and cervids.

Other Activities

- FY 2022 Accomplishments that are not categorized into a portfolio



Released over 35 peer-reviewed publications. CEAH subject matters experts developed and contributed to various publications featured in journals, manuscripts, and academic research papers.



Served as World Organisation for Animal Health (WOAH) Collaborating Centre. CEAH is a WOA Collaborating Centre for Modeling, Surveillance, and Risk Analysis. Centres are designated for a specific specialty within a focus area and work together with other WOA Member Countries to safeguard animal health globally. CEAH's Collaborating Centre Annual report is available online through the WOA website.



Assisted with HPAI outbreak Federal deployment efforts. CEAH deployed 30 staff members to 11 different locations to help with HPAI outbreak response.

Participated in APHIS Website Modernization efforts to better organize NAHMS Study materials. NAHMS collaborated with the APHIS Web Team to create a functional, 508 compliant data table to better organize documents. The data table currently stores over 750 NAHMS documents in a searchable table that can be sorted by commodity, study year, and document type.

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