

2010 Priority Topics

Commodity groups addressed during the 2010 Animal Health Stakeholder Meeting were: [Beef](#), [Dairy](#), [Equine](#), [Goats](#), [Poultry-Breeders/Layers](#), [Poultry-Broiler/Meat](#), [Sheep](#), [Specialty Species](#), [Swine](#), and [Turkey](#).

Clicking on any commodity group above will take you to that commodity's list of priority topics.

BEEF

Bovine Respiratory Disease Complex including BVD

- Rationale: Most significant cause of beef production loss, reproductive losses secondary
- Research focus: Host-pathogen interaction/synergy, altered host response, novel preventatives & therapeutics, surveillance for pathogens and host factors for early intervention

Mycobacterial diseases (TB and Johnes)

- Rationale: Disease related to production loss, market barriers
- Research focus: Diagnostics, vaccines, herd management/control programs, wildlife/livestock interface

Vector-borne Diseases

- Rationale: Economic impact due to animal loss, market disruption, loss of consumer confidence
- Research focus: Virus-Vector Ecology & host relationship, integrated approaches to prevent importation of disease, DIVA vaccine and companion diagnostics, improved surveillance and modeling

Infectious Reproductive Disease

- Rationale: Huge economic impact on production despite limited success with diagnostic assays and preventives
- Research focus: Impact of immune status on protecting reproductive function; altered interaction of immune function and endocrine modulator; novel diagnostics, preventives and therapeutics; efficacy of current tools: diagnostics and vaccines

Minimize Impact of Emerging Infectious Diseases

- Rationale: Ensure food security, continuity of business and public health
- Research focus: Biosecurity, evidence for accurate disease transmission assessment, bio-economic decision tools for outbreak response, define & mitigate risks at livestock/wildlife interfaces

DAIRY

Lameness

- Rationale: Rising welfare issue, contributes to high removal rate, predisposes to other diseases
- Research focus: Mechanisms of disease (environment, nutrition, genetic), digital dermatitis, better management of clinical cases (extension)

Johne's

- Rationale: Prevalent, economic impact, food safety
- Research focus: Diagnostics, vaccination, management of infected animals (sub-clinical, extension), disease resistance and genes

TB

- Rationale: Re-emerging threat, potential impact on trade, economic impact
- Research focus: Diagnostics, vaccines, management (wildlife, controls, security, extension), epidemiology (movement issues, political)

Mastitis

- Rationale: Prevalent with high economic impact, reliance on antibiotics
- Research focus: Prevention (vaccines, nutrition, immunomodulation), genetic resistance, management (antimicrobial alternatives, long-term impact), diagnosis (rapid, accurate, cow-side)

Transition cow

- Rationale: Impacts numerous disease states, economic impact, impact on neonate, animal welfare focus
- Research focus: Immune function (define, predict, modulate), nutrition (immune effect, prevent metabolic disease), management (diets transition, behavior, housing, extension), metabolic balance & overall health

EQUINE

Emerging and Re-emerging Diseases

- Rationale: Threaten biological and commercial health of US horse industry, including international and interstate movement.
- Research focus: Epidemiology: identification of risk factors; immune response & vaccine development; diagnostic tests: rapid, accurate, stall-side; Pire (1st), EHV-1, EEE-WEE, CEM, VS, Lyme, EPE, EIV

Non-Infectious Diseases of Economic Importance

- Rationale: Equine health, safety, welfare & utility. Economically critical for industry and the public
- Research focus: Epidemiology to identify risk factors; foundational mechanistic pathophysiology; diagnostics, prevention & therapeutics; laminitis (1), colic (2), lameness/arthritis (3), airway disease

Reproductive and Developmental Health

- Rationale: Improved production efficiency, welfare, utility
- Research focus: Developmental musculoskeletal diseases, foal health (e.g. immunology, diarrhea, reparatory, sepsis), genital tract disease (e.g., CEM; EAV; endometritis/ placenta), infertility & embryonic development

Equine Genomics

- Rationale: Population sustainability & improvement of equine health
- Research focus: Develop novel genetic tools & resources for research, identify genetic mechanisms for diseases, characterize genotypic & environmental effects on phenotype, develop molecular diagnostic tests and pharmacogenomic approaches

Foreign Diseases and Zoonoses

- Rationale: Protect domestic population; prevent disastrous economic impacts from foreign diseases; minimize/avoid trade barriers
- Research focus: Piroplasmosis, BT, AHT; host-vector-pathogen-environment interactions; develop tools (diagnostics, etc) for surveillance, immune response & vaccine development strategies

Nutrition and Metabolic Disorders

- Rationale: Enhancing health & utility, such as reducing equine obesity & associated disease, colic, parasitism, and laminitis
- Research focus: Biology of nutrition, including feed efficiency; pathophysiology of the GI tract; effect of nutrition on GI health-colic, enteritis; parasite control programs (environmental, genetic, anthelmintics)

GOATS

Gastrointestinal Parasites (worms and protozoa)

- Rationale: Reported as top industry priority as part of NAHMS needs assessment; high morbidity, high mortality, high economic impact
- Research focus: Genetics-host and parasite; diagnostics-field typing, molecular diagnostics; vaccines-Haemonchus first priority; discovery and approval of pharmaceuticals and alternatives, including phytochemicals and nutraceuticals; disease control through management-nutritional, grazing management.

Species Specific Approvals for Necessary Pharmaceuticals

- Rationale: Food safety and production issue as it relates to extra-label use due to lack of approved safe and effective medications for goats
- Research focus: Therapeutic antibiotics (for mastitis, respiratory disease, lameness); new classes of anthelmintics; pain and analgesics (for animal well-being during tattooing, dehorning, castration, etc.); biologics (toxoplasma, respiratory vaccines)

Control Measures for Caseous Lymphadenitis

- Rationale: identified as second priority in NAHMS due to production losses and food safety issues
- Research Priorities: vaccine to reduce and/or eliminate CL; improved diagnostic test; identification of host genetic factors associated with shedding; ecology of the organism (host pathogenesis, vectors, fomites, environmental persistence)

Mastitis Control and Treatment

- Rationale: Major economic losses for producers due to decreased production and inability to market milk, food safety, and lack of data on specific issues of mastitis in goats
- Research focus: Management factors (teat dipping, nutrition, housing, equipment, protocols); therapeutics-identification of effective treatments for lactating and non-lactating does; bacterial ecology and animal health (especially coagulase-negative Staph); develop vaccine (emphasis on coagulase-negative Staph)

Q fever (*Coxiella burnetti*)

- Rationale: Zoonotic (select) agent, production losses, potential for mass euthanasia, loss of public confidence in safety
- Research focus: Determine prevalence of coxiella; improved diagnostics (phase I vs. phase II); ecology of the bacteria (transmission, interaction with host genetics, wildlife and interspecies interface); management methods for controlling shedding to reduce zoonotic potential

Eradicate Scrapie

- Rationale: Lack of goat-specific data results in total herd depopulation following scrapie exposure
- Research focus: Identify routes of transmission of caprine scrapie; improved diagnostic testing, especially live animal; identify genetic factors affecting resistance and incubation time; inter-species transmission (including strain variation)

POULTRY-Breeders/Layers

Housing Systems Influence on Health/Welfare

- Rationale: Housing systems influence on health and welfare is poorly understood; economic, political, and consumer implications
- Research focus: Effects on disease incidence (mortality, morbidity, & stress), alternative disease control and treatment methods, internal and external parasite load & control, incidence of SE and overall bacteria load in eggs

Salmonella Enteritidis (SE)

- Rationale: reduction of testing costs, reduction of food-borne illness, vaccine failure on the rise
- Research focus: Evaluate immunity from different live or killed vaccine regimes, evaluate serologic methods to measure immunity, host genetic resistance, evaluate new and emerging isolates

Tumor Viruses

- Rationale: Ongoing evolution of MDV and ALV, cost to industry is ~\$200 million in the US and \$1 billion worldwide
- Research focus: Survey and pathotyping of MDV and ALV field isolates, new and improved MD vaccines, host genetic resistance, improved detection methods of ALV

Colibacillosis

- Rationale: Losses are significant and affects ~30+% flocks, it is the primary bacteriological problem in layers
- Research focus: Develop an effective mass-applied vaccine, determine risk factors for increased incidence of disease, host genetic resistance, non-traditional control and treatment measures

Mycoplasma gallisepticum (MG)

- Rationale: Present preventive measures are either not effective or are pathogenic to non-target species (e.g. turkeys, broilers)
- Research focus: Mass applied and effective vaccines safe for all poultry, surveillance and pathotyping of current MG isolates, rapid and more specific diagnostics/better surveillance, diagnostics to differentiate field strains from vaccines

POULTRY-Broiler/Meat

Functional Genomics for Disease Resistance

- Rationale: In the era of post-genomics, the information needs to be applied for practical uses
- Research focus: Identify how innate immunity influences disease resistance, identify markers of adaptive immunity leading to better immune function, apply bioinformatic tools to analyze genomics data for poultry, improved understanding of host/pathogen interaction

GI Disease/Integrity/Host Microbial Interactions

- Rationale: Gut diseases are the most important economic factor to commercial poultry
- Research focus: Improved vaccines or other controls to prevent coccidia, improved understanding coccidia/clostridial (inc GD) interaction, understand contributions of microbioma to gut health, better understanding of GI immunity

Diseases Affecting World Trade

- Rationale: AIV, NDV, VVIBD, ILT, Salmonella and other diseases that are known to affect trade
- Research focus: Develop vaccines (tools) to prevent transmission, antigenic and genetic characterization of evolving viruses, rapid multiplex diagnostics for poultry pathogens, improved understanding of the epidemiology of the virus

Respiratory Disease Complex

- Rationale: IBV, E.coli, lentogenic NDV, ILTV, Mycoplasma are important players in the respiratory complex diseases of commercial poultry
- Research focus: Improved vaccines, mass vaccination, improved safety, cross protection; better control of E. coli and other secondary bacterial infections; better understanding of emerging viral and bacterial pathogens; role of immune competence in multi-factorial diseases

Vaccines and Their Limitations

- Rationale: Current vaccines are not meeting the needs of the industry
- Research focus: Need for improved immunomodulators for poultry vaccines, improved vaccines to more effectively block pathogen transmission, improved DIVA strategies, improved strategies to overcome maternal antibody

SHEEP

Research on Bighorn/Domestic Sheep Compatibility

- Rationale: Research gaps in the pathology behind bighorn sheep die off, which jeopardizes 80% of domestic sheep industry
- Research focus: Determine normal commensal populations of respective tract in both species; determine etiologic agents in bighorn; determine nutritional, genetic/genomic, stress factors in bighorn; determine preventive/therapeutics for both spp.

Eradicate Scrapie

- Rationale: Ongoing eradication efforts need to be expedited
- Research focus: Develop live animal/preclinical diagnostics, determine how to mitigate environmental contamination by prions, determine transmission potential of new strains, determine whether goats are transmission reservoir

Control and Prevention of Ovine Progressive Pneumonia in Sheep

- Rationale: Significant cause of trade barriers, early culling, mastitis, carcass defects, and production losses
- Research focus: Determine immunogenic markers of disease progression, develop viral molecular and pen side diagnostics, determine mechanism of disease transmission, determine method to block transmission

Prevent Malignant Catarrhal Fever in Bison and Cattle

- Rationale: Highly prevalent, asymptomatic disease in sheep; why is there high susceptibility with high mortality in bison?
- Research focus: Determine pathogenesis of MCF in bison, produce a vaccine for bison and cattle, determine viral shedding factors in sheep, determine genetic factors for disease resistance

Genetic/genomic Solutions to Economically Significant Sheep Diseases

- Rationale: Need alternatives to complement/replace current prophylactic or control measures
- Research focus: Determine markers for internal parasites, sore mouth, foot rot; develop diagnostic tests to detect markers

Improved diagnostics for ovine Johnes, Q-fever, and Brucella ovis

- Rationale: Improved diagnostics would enhance control and management of these endemic diseases
- Research focus: Develop, evaluate, validate molecular and serological diagnostics; standardization across NAHLN labs; develop early detection pen side tests

SPECIALTY SPECIES

Tuberculosis Rapid Diagnostic Tools

- Rationale: Need single application diagnostic that does not require re-handling of animals
- Research focus: Develop rapid diagnostics with high sensitivity and specificity to detect TB, develop reagents for characterization of immune responses, couple rapid diagnostics with epidemiologic tools in infected herds to develop evidence-based knowledge for controlling TB

Prevent Sheep-Associated Malignant Catarrhal Fever in Specialty Farmed Species

- Rationale: MCF causes significant economic losses in specialty farmed species and currently no vaccine and limited diagnostics. MCF can also adversely affect other domestic livestock species.
- Research focus: Develop vaccine against sheep-associated MCF, define pathogenicity and host immune responses, define mechanisms of transmission, develop appropriate diagnostic tools for specialty farmed species.

Epizootic Hemorrhage Disease/Bluetongue

- Rationale: EHD and Bluetongue serotypes are endemic in the US. EHD/BTV causes significant economic losses in specialty farmed species. EHD/BTV are infecting and causing economic losses in traditional domestic livestock
- Research focus: Develop vaccine(s) to protect against EHD and/or BT (DIVA vaccine would be long-term priority), characterize virus persistence in vectors and mechanisms of transmission, develop new diagnostics that allow differentiation of EHD or BTV serotypes, develop mechanisms for vector control that prevent transmission.

Bacterial Pneumonia-Pasturella/Fusobacteria

- Rationale: Fusobacteria and Pasturella are causing significant economic losses (mortality and morbidity) in farmed species
- Research focus: Characterize etiology and pathogenesis of pneumonia, develop vaccine(s) to prevent bacterial pneumonia, comparative genomics to define species differences in susceptibility.

Parasite Control

- Rationale: All specialty farmed species have issues with parasites, lack of approved anthelmintic, effective dosages and regimes, food withdrawal times, and parasite resistance to anthelmintic treatment
- Research focus: Develop anthelmintics and/or treatment regimes that are effective in specialty farmed species to prevent abdominal parasites, characterize residue issues and withdrawal time for for anthelmintic regime, develop new anthelmintics that are effective in specialty farmed species, characterize mechanisms of parasite resistance to anthelmintics.

Tools and Resources

- Rationale: There is a lack of species-specific reagents, genomics, physiology, etc to address disease issues in specialty farmed species
- Research focus: Development and characterization of reagents (cross-reactive or species specific) to allow characterization of immune responses, acquirement of genomic data on species or species-specific pathogens to allow bioinformatics approach to problems, characterization of physiologic responses to drugs, drug metabolism and excretion, and effective dosages related to route delivery.

SWINE

PRRS Elimination

- Rationale: Significant economic losses to pig industry
- Research focus: Vaccine platforms, viral host-cell pathogenesis, immunology; diagnostics, surveillance; ecology, epidemiology; genetics of PRRS resistance/susceptibility

Emerging and Zoonotic Diseases

- Rationale: \$1.6B loss from H1N1 in 2009
- Research focus:: Swine influence, MRSA, etc.; diagnostics, pathogenesis, transmission; microbial genomic, bioinformatics; vaccine platforms, intervention strategies

Optimize Health of Growing Pig

- Rationale: Area of greatest opportunity for improving economics of production efficiency, prevention wastage and animal well-being
- Research focus: Polymicrobial infections; microbial genomics and bioinformatics; vaccine platforms, therapeutics, delivery platforms; diagnostics, surveillance

Periparturient Production Efficiency

- Rationale: High wastage; mortality, morbidity, growth efficiency; carbon footprint
- Research focus: Polymicrobial infection, Immune modulators, Lactation performance, microbiome

Healthy Pig Production with Restricted Antimicrobial Access

- Rationale: Strategies to avoid negative consequence on animal health and well-being as demonstrated in other countries
- Research focus: Microbiome, metagenomics; alternatives to antibiotics/antimicrobials; nutrient utilization and feed efficiency; alternative management strategies

TURKEY

Clostridial dermatitis (Turkey cellulitis)

- Rationale: Consistently, year-to-year several industry surveys indicate that this is the top priority affecting turkey health.
- Research focus: Risk factors for introduction, pathogenesis of infection; prevention; vaccines for breeders and meat birds; other control strategies, probiotics, antibiotic alternatives

Pre-harvest Food Safety

- Rationale: Pre-harvest control of Salmonella and Campylobacter is critical to assuring a safe product for consumers.
- Research focus: Identification of risk factors, control: vaccine development and other mitigation strategies

Influenza in Turkey Breeders

- Rationale: Turkeys are uniquely susceptible to infection with influenza A viruses, particularly breeders.
- Research focus: Identification of risk factors; pathogenesis including immunopathogenesis; within and between flock transmission, interspecies introductions; prevention strategies: vaccination, biosecurity addressing risks

Enhanced Gut Health

- Rationale: Understanding and improving the gut microbiome is critical to health and production.
- Research focus: Develop approaches to microbial community analysis, understanding host/pathogen interactions in the gut, create strategies to manage gut health, developing diagnostics for gut pathogens

Histomoniasis

- Rationale: Blackhead has re-emerged as a significant disease for the turkey industry negatively impacting production and welfare.
- Research focus: Identify risk factors for the disease, develop new therapeutics for treatment, develop prevention strategies and prophylactics

Understanding the Adaptability of Pathogens to Current Treatments

- Rationale: The continuing development of pathogen resistance has resulted in the need for novel strategies to keep animals healthy.
- Research focus: Identifying mechanisms of bacterial resistance to treatment, develop novel antimicrobials , develop strategies for preserving the efficacy of treatments