University of California
Agriculture and Natural Resources

Risk assessment, welfare analysis, and extension education for dairy calf respiratory disease management in California

Sharif Aly (Vet Medicine UC Davis), Terry Lehenbauer, Alson Van Eenennaam (Animal Science), Randall Anderson (CDFA), Alejandro Castillo (UCCE Merced), Carol Collar (UCCE Kings), Christiana Drake (Dept of Statistics, UC Davis), Jennifer Heguy (UCCE Stanislaus County), Lindsey Hlubert (Dept of Animal Science, UC Davis), Betsy Karle (UCCE Glenn), Frnak Mitloehner (Animal Science), Nyles Peterson (UCCE San Bernadino), Noelia Silva-del-Rio (UCCE Tulare)

Project Dates: Sep 1, 2012-Aug 31, 2016

Short summary: Bovine respiratory disease (BRD), also known as pneumonia, is the leading natural cause of death in U.S. beef and dairy cattle, causing the annual loss of more than one million animals and financial losses in excess of $700 million. This project will use surveys and interviews developed by veterinarians and extension specialists and dairy farm advisors to identify and assess the factors that are predictors of risk of BRD. This project will provide important information on how to prevent, manage, and reducing the severity of one of the most important endemic diseases in dairy cattle providing an affordable, safe, and secure milk supply to the citizens of California and other consumers in the U.S. and around the world.

Project Summary: Bovine respiratory disease (BRD), also known as pneumonia, is the leading natural cause of death in U.S. beef and dairy cattle, causing the annual loss of more than one million animals and financial losses in excess of $700 million. Control and prevention of BRD is difficult due to the disease's multiple etiologies and a complex web of interacting risk factors. In addition, there is no standardized field diagnostic method that can be used for early identification of BRD cases. Currently, classic diagnosis and treatment decisions are based on mostly subjective clinical criteria that are poor predictors of underlying respiratory system pathology. The result is a proportion of false negative and false positive diagnoses that lead to progression of disease, misuse of antimicrobials, production losses, and suboptimal animal welfare outcomes.

Risk assessment of the housing, nutrition, and management of calves and replacement animals in a dairy herd can provide valuable information for designing and implementing a herd-specific BRD control and prevention program. A risk assessment tool in the form of a survey can identify a herd's BRD risk through "scoring" of risk factors for BRD that have been validated. We propose to develop a set of survey and interview identified risk factors in collaboration with UCCE dairy farm advisors, extension specialist and veterinarians on a representative sample of California's herds. A factor analysis will then be used to identify and validate these risk factors such that the risk assessment tool is made up of the most significant predictors of risk of BRD. An example of a similar approach is currently in use nationwide for Johne's disease, an ultimately chronic disease with production losses and animal welfare concerns similar to BRD. The use of a validated sampling scheme based on the available diagnostic test options was pivotal for the Johne's disease risk assessment to identify herd prevalence and necessary disease control actions.

We have assembled a team of campus-based faculty, extension specialists, advisors and veterinarians to undertake this proposal. This project will combine the expertise and talents of key

individuals from both the UC Davis School of Veterinary Medicine, the Animal Science Department in the College of Agricultural and Environmental Sciences at Davis, Cooperative Extension Dairy advisors throughout the state and veterinarians with the California Department of Food and Agriculture. Success for this project will occur as a result of the synergistic collaboration of AES faculty and Cooperative Extension specialists and advisors working in conjunction with other scientists and researchers. This work complements genomics work being conducted in an associated USDA grant aimed at identifying DNA-based genetic markers associated with reduced BRD incidence in cattle. Anticipated outcomes from this proposal will provide important gains in preventing, managing, and reducing the severity of one of the most important endemic diseases in dairy cattle which will result in reductions in both direct and indirect costs associated with providing an affordable, safe, and secure milk supply to the citizens of California and other consumers in the U.S. and around the world.