2016 Applied Animal and Public Health Research and Extension Symposium

15 October 3-6 pm

Room Pebble Beach

3:00 – 3:10p Welcome

3:10 – 3:30 p R. Wohrle

Disease Outbreaks Related to Animals in Public Settings: Why are they still occurring; what must be done to stop them?

3:30 – 3:55 p D. Wolfgang

Screening for Influenza in Swine: A Pilot Study to Reduce Zoonotic Exposure in 4-H Youth Showman

3:55 – 4:20 p A. Justice-Allen

***Escherichia coli* O26 and *Salmonella enterica* in javelina (*Pecari tajacu*) at the urban interface, a concern for public and wildlife health**

4:20 – 4:25 p Break

4:25 – 4:50 p J. Britten

The development of Casein Hydrolysate as a use for local involution of a single quarter in dairy cows

4:50 – 5:15 p L. Jones

Surveillance of Bovine Viral Diarrhea virus antigen in Florida & Georgia Dairy Herds using bulk tank milk samples

5:15 p – 5:40 p S. Collins

Seroprevalence of Bovine Anaplasmosis in the Southeastern United States

5:40 – 6:00 p A. Canon

National Veterinary Accreditation Program APHIS-Approved Supplemental Training for the Veterinary Feed Directive

Disease Outbreaks Related to Animals in Public Settings:

Why are they still occurring; what must be done to stop them?

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Zoonotic and Vector-borne Diseases Program

Abstract

As a result of a 2015, *E. coli* outbreak at the Whatcom County fairgrounds that resulted in 25 confirmed cases, 34 probable cases, 10 hospitalizations, 6 cases of HUS, and 0 deaths, the Washington State Department of Health initiated a review of the state rule addressing Animals in Public Settings to determine if the rule should be amended. Although Washington State has this rule {WAC 246-100-192} addressing animals in public settings, and despite educational campaigns on the subject, disease outbreaks related to animals in public settings continue to occur. The vulnerability of the populations often impacted – (children, elderly, immune compromised, pregnant women) are of great concern. Environmental Public Health Sciences Zoonotic Disease Program surveyed nearly 80 fair managers in Washington State to determine their knowledge and practices associated with preventing transmission of zoonotic agents during animal exhibit events. A primary objective of this project was to evaluate the current rule for adequacy in effecting risk mitigation efforts by venue operators. An additional emphasis was to collect information on the perceived needs for helpful resources by fair managers. One of the outcomes from the survey was the development of a resource toolkit for fair and event managers. This toolkit introduces a consumer protection plan approach to the control of disease hazards associated with animals in the fair environment. It is intended as a supplement to compliance with the Washington state rule, WAC 246-100-192 Animals in Public Settings.

Screening for Influenza in Swine: A Pilot Study to Reduce Zoonotic Exposure in 4-H Youth Showman

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Between 2011 and 2014 it was documented that 319 youth acquired influenza, strain H_3N_2, after close contact with swine. In nearly all cases this contact was associated with the exhibition of swine at youth fairs. A cross-sectional study to determine three principle factors associated with risk for influenza in exhibition settings was conducted. One, could major behavioral risk factors for influenza infection in youth showman be identified. Two, could sterilized cotton chew ropes hung in a pen for a short time serve as an effective surveillance tool for influenza in swine in this setting. Three, what were the actual biosecurity practices enforced compared to the practices promoted or described. 4-H members (n=38) in two clubs in Pennsylvania completed a 55 item questionnaire and were followed through their annual fair season. Youth showmen were systematically observed for behavior associated with risk of infection while they worked with their animals at the fair. In addition, their show animals (n=78) were sampled for influenza as they entered the fair at weigh in. Animals were sampled individually with a sterile swab on muzzle and orally. A chew rope for oral samples was suspended in animal pens on days 1, 3 and 5 of the fair (Pens often contained multiple animals, but only associated with one youth showman. These samples were considered pooled.). All samples for influenza type A were tested by real time polymerase chain reaction (RT-PCR). Participants demonstrated a range of knowledge regarding zoonotic diseases and the application of biosecurity procedures through the risk factor questionnaire. Behavior for risk of infection was different between new (younger) club members compared to more experienced (older) youth. A number of swine were identified as positive for influenza type A with RT-PCR (n=12). No H_3N_2 or other zoonotic strains were indentified. Individual animal compared to the chew rope samples gave statistically similar results. Risk of acquiring influenza at fairs by youth showing swine could be reduced with increased knowledge and implementation of prevention techniques for zoonotic disease. Better surveillance at exhibitions of swine for influenza can be achieved by utilizing pooled animal samples, such as chew ropes, with molecular tests.

Escherichia coli O26 and *Salmonella enterica* in javelina (*Pecari tajacu*) at the urban interface, a concern for public and wildlife health

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Interactions between wildlife and domestic animals at the urban-wildland interface can facilitate the transmission of diseases to humans. The prevalence of enteric pathogens in wild ungulates has generally been found to be less than that of most livestock species. However, some species, such as javelina (collared peccary, *Pecari tajacu*) have been identified as probable carriers of enteric pathogens such as *Salmonella* sp. Because of the occurrence of urban washes and other natural landscape features within and surrounding urban areas of Arizona, javelina are common inhabitants of urban and the urban-wildland interface areas. From early May to early June the Arizona Game and Fish Department (AGFD) received several calls regarding dead and sick javelina near the Catalina Ridge Estates neighborhood of Tucson. Signs observed by residents and investigating AGFD personnel were diarrhea, lethargy, poor body condition, and weakness. Five of 10 javelina were recovered for necropsy and diagnostic testing. Abnormal gross necropsy findings consisted of fluid intestinal contents in all animals examined (hemorrhagic in two individuals). Histologically necrohemorrhagic inflammation with intralesional bacteria was identified in 3/3 distal small intestinal samples and 2/2 colon samples. The zoonotic pathogens, *Salmonella enterica* serotypes Give or Munchen (4/5 samples) and *Escherichia coli* O26 (3/5 samples), which commonly cause necrohemorrhagic enterocolitis were cultured. Other *Salmonella* species were isolated, *Salmonella enterica* serotype 4,5,12-e,n,z15 and *Salmonella enterica* spp*. arizonae* (1/5 samples for each) Because more than one bacterial pathogen was isolated, a viral pathogen as a predisposing factor cannot completely be ruled out. It is also possible that the disease was introduced to the javelina population through contact with human or domestic animal waste. When we identified the presence of shedding infected animals in the urban interface as a potential source of disease for domestic dogs, public information materials were distributed to homeowner associations, the media, Pima County Animal Care and Control, and Pima County Public Health with recommendations for minimizing risk of exposure.

The development of Casein Hydrolysate as a use for local involution of a single quarter in dairy cows

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Treatment options for dairy cows that have one persistently inflamed mammary quarter are limited. Cessation of milk production in only one quarter, without permanent damage, is difficult and unpredictable. This project investigates the efficacy of infusing one mastitic quarter in eligible cows, using casein hydrolysate, to cease milk production in that quarter. Cows were screened and enrolled based on case definition parameters for total cow and quarter-level somatic cell count, stage of lactation, milk production data and milk culture results. There was a total of three treatment groups: active casein hydrolysate, a placebo and a no infusion "negative" control. Using a completely randomized block design, cows were blocked by lactation number and culture results into one of 4 blocks. Assessments were focused on pre- and post-treatment milk production, somatic cell count (at the cow and individual quarter level) and percentage of total-cow milk production from the infused quarter. Comparisons were done in GraphPad Prism using ANOVA, with $\alpha=0.05$. The data supporting the model of therapeutic cessation of lactation to benefit milk quality, irrespective of treatment group, was found to be highly significant both at the cow and quarter level. Additionally, the amount of milk lost, within treatment groups, was not found to be significant nor was there any evidence of significantly decreased quarter contribution in the subsequent lactation. Infusing inflamed mammary quarters with casein hydrolysate may be a promising alternative to current protocols on dairy operations.

Surveillance of Bovine Viral Diarrhea virus antigen in Florida & Georgia Dairy Herds using bulk tank milk samples.

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Funding to support this research was provided through the Florida Milk Checkoff program, May 1, 2015

Disease caused by bovine viral diarrhea virus (BVD) produces significant economic loss to the dairy industry. Diseases observed in infected herds include: reproductive failure (failure to conceive, embryonic loss, abortion, congenital defects and stillborn or weak, unthrifty calves) and respiratory disease and diarrhea in young calves. Some cattle infected with BVD virus do not show any signs of disease. However, the virus suppresses the immune system which can make them susceptible to other diseases or they can be a source of infection for other animals. Calves can be infected with the virus during gestation and the effect of BVD infection on the developing fetus varies depending on the stage of pregnancy. Infection early in the pregnancy will usually result in embryonic loss or abortion. Exposure of the fetus to the non-cytopathic BVD biotype prior to 125 days of gestation can result in the development of a permanently infected (PI) calf. Though most PI calves die within the first 6 months of life, some go on to become seemingly healthy adults. PI's shed large numbers of the virus throughout their lifetime and continually expose other cattle to the virus. Transmission from PIs to susceptible members of the herd can be by direct contact, through contaminated feed and water troughs, veterinary and farm equipment or facilities. Management practices to control the disease include vaccination of all members of the herd, biosecurity procedures to prevent introduction, bio-containment to interrupt the spread of the virus and laboratory testing of samples for the presence of the virus in a herd, with the final goal of identifying and removing PI animals from the herd.

The economic impact of BVD is not easy to measure. Direct costs of clinical disease including abortion, increased days open and inseminations per conception, clinical disease and cost of treatment, death loss and culling are easily observed and measured. However, BVD also causes sub-clinical problems such as decreased milk production, increased somatic cell count and subfertility of cows and bulls in herds using natural service. Studies have shown a BVD outbreak in a lactating herd can cost $35 to $410 per lactating cow depending on the severity of the disease.

A PCR assay has been developed for use in bulk milk samples. This test has been shown to be highly sensitive and can consistently detect a single PI cow in a group of up to 400 lactating dairy cows. Sample collection is simple and a large number of adult cattle can be screened simultaneously relatively inexpensively reducing the need for individual blood testing of the lactating cows.

In order to determine the presence of BVD virus in Southeast US dairies bulk milk tank samples for BVD antigen testing were collected from Southeastern Milk, Inc members in Florida and Georgia (40 each). Bulk milk samples were collected by lab personnel at SMI at their Belleview and Okeechobee, FL locations from every truckload of milk in a 24 hour period 5 times over 7 months from each dairy. SMI member's names were not disclosed to UGA researchers. Two dairies dropped out of the testing during the study.

Results for FL and GA dairy herds tested for BVDV in bulk milk samples

	Positive by Herd Size				
Month	<200	200-500	500-1000	>1000	Total
October 2015	3/23	2/12	2/16	9/28	16/79 (20%)
November 2015	0/23	5/12	1/16	5/28	11/79 (14%)
December 2015	2/23	2/12	2/16	5/28	11/79 (14%)
February 2016	2/23	2/12	3/16	5/28	12/79 (15%)
April 2016	1/23	4/11	2/16	3/28	10/78 (13%)
Total*	5/23	7/12	5/16	13/28	30/78 (38.4%)

*Dairies with multiple positive test results were only counted once

These results indicate a whole herd BVD testing plan may be warranted in some herds. BVD is likely causing health and reproductive problems.

SEROPREVALENCE OF BOVINE ANAPLASMOSIS IN THE SOUTHERNEASTERN UNITED STATES

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Bovine anaplasmosis, also known as gall sickness or autumn anemia, is an extremely economically important tick-borne disease among cattle and other ruminants in the United States and worldwide. In the United States, it has been estimated that anaplasmosis costs about $400 per infected head[1]. The same study also suggests that bovine anaplasmosis costs the cattle industry in the US about $300 million per year[1].

Bovine anaplasmosis is readily transmitted by several tick species as well as iatrogenically via contaminated equipment and needles[2]. Once introduced to a naïve herd, mortality rates can reach up to 50% contributing to the overall cost of the disease[3]. In addition to death, other clinical signs are noted to decrease production such as anemia, icterus, decreased milk production, lethargy, and abortion.

After review of the literature, the authors found that the prevalence of anaplasmosis in the southeastern United States has not been documented since the 1970's[4]. As a result, the authors sought to provide a more accurate picture of the seroprevalence of anaplasmosis in the southeastern United States from 2002-2012 by evaluating data provided by laboratories accredited by the American Association of Veterinary Laboratory Diagnosticians. In addition, the authors gathered data regarding the 2013 seroprevalence by collecting blood from cull cattle presented to 2 abattoirs in the southeastern United States. Seroprevalence was assessed by performing polymerase chain reaction (PCR) and/or enzyme-linked immunosorbent assay (ELISA).

The overall seroprevalence for the data collected (including 65,328 samples) from AAVLD accredited labs ranged from 5.1%-56.1% for the 8 states with the most thorough data (including Alabama, Arkansas, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, and Texas). The average seroprevalence for these states during the time frame from 2002-2012 was 18.8%. Data collected from the abattoir setting resulted in 2,680 samples. The seroprevalence ranged from 2.44%-35.18% with an average of 13.0% for the entire southeast. Results were presented in map form using ArcGIS software for the production of the maps. Maps were presented state by state per year as well as in summary of all years observed. Maps were created using the data collected from each state's respective laboratory, data collected from the abattoir samples, and data from the United States Department of Agriculture's Census of Agriculture 2012.

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National Veterinary Accreditation Program APHIS-Approved Supplemental Training for the Veterinary Feed Directive

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The enhanced National Veterinary Accreditation Program (NVAP) that began in 2011 requires approximately 66,000 U.S. accredited veterinarians to complete either three or six APHIS-Approved Supplemental Training (AAST) modules every 3 years. USDA has provided funding to the Center for Food Security and Public Health (CFSPH) at the Iowa State University College of Veterinary Medicine to develop web-based, PDF, and PowerPoint modules for the NVAP since the fall of 2003. To date, there are 29 modules either complete or in development. General topics include an overview of the NVAP; foreign animal, reportable, and program diseases; vesicular diseases; exotic avian diseases such as Newcastle disease and avian influenza; animal welfare; and health certificates for companion animals, equines, sheep, and goats. Specific interest groups (poultry, aquaculture, and lab animal) have also commissioned development of topics for accredited veterinarians.

Modules are frequently presented at national meetings (e.g., the American Veterinary Medical Association) and state veterinary meetings. All modules are available online at https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/nvap or can be purchased on USB drives at the same website.

Although AAST is required for U.S. accredited veterinarians, online modules are free and available to anyone with internet access and do not require a username or password. During 2013–2015, a total of 273,527 module completion certificates were issued. Data from Google Analytics suggest a far broader audience than strictly accredited veterinarians seeking certificates. Furthermore, the Student Veterinary Medical Association recommends completing NVAP AAST in preparation for the North American Veterinary Licensing Examination.

On June 3, 2015, a final rule was published revising the Veterinary Feed Directive regulations in response to growing concerns associated with antimicrobial resistance. The NVAP and CFSPH saw a significant need for educational materials on this timely topic. The NVAP AAST reaches a wide number of veterinarians, is available to veterinarians and the public free of charge, and is available in multiple formats to reach a broad audience. NVAP AAST Module 23, Use of Antibiotics in Animals, was recognized at the G7 Summit by the Federal Ministry of Health, Germany, as an example of best practices to combat antimicrobial resistance. As such, the Veterinary Feed Directive Module supports efforts to educate veterinarians about preventing antimicrobial resistance.

The primary purpose of the Veterinary Feed Directive Module is to discuss recent changes in the Veterinary Feed Directive, assure accredited veterinarians have up-to-date information on current regulatory changes, and provide resources for additional information and guidance on this topic.

The Veterinary Feed Directive Module is an example of the many educational topics the NVAP and CFSPH make available to veterinarians. Extension veterinarians can use these modules to fulfill their AAST requirements, learn about timely regulatory and disease topics, and educate other stakeholders about accredited veterinarian duties and animal and public health. Extension veterinarians can also encourage others, even veterinarians who are not accredited, to use tools such as the NVAP AAST for their educational needs. The NVAP AAST modules serve as a freely accessible source of high quality education on a wide variety of public and animal health topics.