14th Annual
Applied Animal and Public Health
Research and Extension Symposium
Sponsored by the American Association of Extension Veterinarians

Saturday, October 20, 2018
3:00 – 4:40pm
Room: Chicago C
Sheraton Crown Center Hotel, Kansas City, Missouri

Coordinators:
Anne Justice-Allen, Arizona Game and Fish Dept. (moderator)
Kimberly Woodruff, Mississippi State University
Patricia Scharko, Clemson University

Time	Title	Presenter
3:00 – 3:05	Welcome and introductions	Anne Justice-Allen, Arizona Game and Fish Department
3:05 – 3:25	Clinical Rotation in Population Medicine	D. R. Smith and K. A. Woodruff, Mississippi State University
3:25 – 3:45	Collaborative diagnostic methods to enhance capabilities of early career rural veterinary practitioners: A novel extension program	K. A. Rood, D. Vanderwall, J. Kurz, C. S. Clancy, and T. J. Baldwin, Utah State University and Utah Veterinary Diagnostic Laboratory
3:45 – 4:05	Determining Knowledge, Attitudes, and Practices Regarding Zoonotic Disease Prevention Among Operators of Animals in Public Venues	R. Jarchow, A. Alire, B. Lipton, M. Kay, Washington State University and Seattle & King County Public Health
4:05 – 4:25	Attitudes of dairy farmers and the general public towards antibiotic use and resistance in dairy cattle	M. Wemette, W. Beauvais, K. Ceres, A.K. Wolverton, A. Greiner Safi, M. Shapiro, F.L. Welcome, P. Moroni, and R. Ivanek, Cornell University
4:25 – 4:40	Why Species Matter? Dramatic Revelations in Mastitis Management with Molecular Diagnostics	A. Britten, E. Tretter, J. Britten Udder Health Systems, and Utah State University
4:40 – 6:00	Break	
6:00 – 8:00	AAEV Business meeting	Danelle Beckett-Weddle, Iowa State University

Abstracts

Clinical Rotation in Population Medicine

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Faculty at the Mississippi State University College of Veterinary Medicine recognized a need to provide veterinary students experience in population medicine. Although students were occasionally exposed to herd or population level medicine in other rotations, there was no experiential course dedicated to population medicine. Our objective was to create a new clinical rotation to encourage population level thinking. A required 3-week population medicine rotation was created for the third year of veterinary school. The problem-based clinical rotation includes onsite disease outbreak investigations and population-level consultations, taught by faculty with expertise in epidemiology, preventive medicine, internal medicine, shelter medicine, food animal medicine, poultry medicine, diagnostic medicine and food safety. There are 5 principles as learning objectives:
1. How the "system" affects animal health outcomes.
2. Critical thinking about causation.
3. Using diagnostic tests in population-based disease investigations
4. Using data (evidence) to investigate/monitor population health
5. Implementing and communicating strategies for disease control and prevention

Students and faculty, investigate outbreaks of disease of impaired productivity in farms and shelters, prepare written recommendations post-visit, and demonstrate scientific literacy by preparing a Critically Appraised Topic (CAT) on a medical question of their choice. Fifty multiple choice questions are randomly selected from a question bank for pre- and post-test evaluation of learning. The rotation has been positively received by students. On the question "the laboratories and clinical experiences enhanced my learning," 83 students rated the course a mean 3.5 (stdev =0.6) on an ordinal scale of 1-4, low to high. On the same scale, students rated the course 3.4 (stdev 0.6) on the question "the rotation provided opportunities to improve my communication skills." Students demonstrate a mean 15 percentage point pre- to post-test gain in knowledge (n=163, $p<0.0001$). These results support our conclusion that students improved knowledge and communication skills in population medicine.

Collaborative diagnostic methods to enhance capabilities of early career rural veterinary practitioners: A novel extension program

K. A. Rood[1], D. Vanderwall[1], J. Kurz[2], C. S. Clancy[2], and T. J. Baldwin[1,2]
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Utah and the intermountain region are characterized as being rural with interspersed urban areas. The majority of veterinarians within this region practice veterinary medicine in rural settings. Veterinary shortage areas have been identified enabling a number of veterinarians to participate in the Veterinary Medicine Loan Repayment Program (VMLRP). While the underlying factors associated with the recruitment and retention of veterinarians in rural practice are complex, a number of studies indicate feelings of isolation and little support with regards to clinical diagnosis as a contributor. Utah State University's School of Veterinary Medicine and the Utah Veterinary Diagnostic Laboratory provided 40 early career, rural, intermountain veterinarians with a unique pathology and diagnostic training and access program. This program included a novel clinical diagnostic telemedicine capability, access to referral pathology expertise, an opportunity to build confidence and enhance diagnostic services offered, and a diagnostic mentoring forum. Survey results one year-post event indicated that 100% felt that participation enhanced their diagnostic confidence. Our presentation will describe this novel extension program and report outcomes and impacts.

Determining Knowledge, Attitudes, and Practices Regarding Zoonotic Disease Prevention Among Operators of Animals in Public Venues

R. Jarchow[1], A. Alire[1], B. Lipton, DVM MPH[2], M. Kay, DVM MPVM[2]
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[2] Public Health – Seattle & King County, Seattle, WA

Background: Animals in public settings, such as petting farms, petting zoos, and agritourism venues, have been identified as sources of zoonotic disease infections and outbreaks. During 2010–2015, approximately 100 human infectious disease outbreaks involving animals in public settings were reported to the CDC; enteric bacteria and parasites pose the highest risk for zoonotic disease in these settings.[1] The *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2017* (Compendium) and Washington state's administrative rule, WAC 246-100-192 *Animals in public settings — Measures to prevent human disease,* provide extensive guidance to minimize disease risk from animal contact. Public Health — Seattle & King County (Public Health) interactions with a small number of petting farms and zoos, during investigations of complaints or notifiable condition cases, suggested that awareness of resources and implementation of prevention measures might be low.

Project description: Our project aimed to 1) identify venues operating in King County, Washington, that allow or encourage public contact with animals, 2) describe current operator knowledge, attitudes, and practices regarding the risk of zoonotic disease transmission and recommendations for decreasing risk, and 3) develop and distribute educational messages and materials addressing knowledge gaps. Agricultural fairs were not included as the Washington State Department of Health completed an extensive survey of fair managers in 2015.[2] Additionally, pet businesses already regulated by Public Health, including pet stores, commercial kennels, shelters, and poultry retailers, were also not included. Using online resources and licensing databases, we identified twenty-nine venues that allow or encourage public contact with animals. Interviews with venue operators were conducted via in person visits or telephone correspondence with ten facilities.

Results: While preliminary results suggest a general understanding of zoonotic disease risk with animals in public settings, operators were largely unfamiliar with specific recommendations to decrease risk. This included prohibiting strollers in animal areas and routinely disinfecting railings when possible. Most were unaware of the Compendium or WAC 246-100-192. The information obtained from interviews is being utilized to develop educational messaging and materials for operators, with the overall goal of reducing the risk of zoonotic disease transmission.

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[1] *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2017*, available at http://www.nasphv.org/documentsCompendiumAnimals.html.
[2] For more information, contact Dr. Crystal Snare, Washington State Department of Health, crystal.snare@doh.wa.gov.

Attitudes of dairy farmers and the general public towards antibiotic use and resistance in dairy cattle

M. Wemette[1], W. Beauvais[1], K. Ceres[1], A.K. Wolverton[1], A. Greiner Safi[1,2], M. Shapiro[2], F.L. Welcome[3], P. Moroni[3], and R. Ivanek[1]
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Antibiotic use in animal agriculture has been facing increased scrutiny. Although farmers regularly make antibiotic use decisions, little research exists addressing their perceptions of such use, especially in relation to antibiotic resistance. The aims of this ongoing study are to (1) explore New York State (NYS) dairy farmers' perceptions regarding antibiotic use and resistance in dairy farming and (2) triangulate findings with those held by the United States (U.S.) general public. Dairy farmers' perceptions were assessed through thematic

analysis of semi-structured, in-person interviews. To date, 12 interviews from conventional farms with 42 to 1,500 lactating cows have been analyzed. The public's perceptions were quantitatively assessed using a 2017 telephone survey of a random sample of 1,000 U.S. adults conducted through Cornell University's Survey Research Institute. Overall, farmers perceived their antibiotic use as prudent and believed their cattle's health would suffer if antibiotic use were curtailed. Four farmers directly indicated concern about antibiotic resistance on their farm. Farmers expressed frustration over the possibility of more stringent governmental and milk cooperative requirements regulating areas such as antibiotic use, animal welfare, and hormone use. Without prompting, nine farmers expressed skepticism about organic dairy farming practices in terms of timing and use of antibiotics, impacts on animal welfare, and public misunderstanding of organic farming. All farmers described engaging in disease prevention practices. Many underscored that they prioritized disease prevention over treatment and described management changes they hoped to make and new tools, such as rumination collars, they wished to utilize in order to improve herd health. In the survey, 25.6% (n=252/983) of the general public believed antibiotic use in cows on dairy farms was a high threat to human health, and 46.1% (n=453/982) believed that cows were treated better on organic than conventional farms. These preliminary results suggest conventional NYS dairy farmers are skeptical of the need for and benefits of reduced antibiotic use on their dairy farms. Interventions for farmers emphasizing cost-effective disease prevention and financial benefits of refining antibiotic use may hold promise. For the general public, further exploration into beliefs driving antibiotic use and animal welfare concerns is needed.

Why Species Matter?
Dramatic Revelations in Mastitis Management with
Molecular Diagnostics

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Mastitis is the most economically significant disease of dairy cows. Although great improvements have been realized in lowering udder disease levels in commercial herds, progressive dairy managers continue to rely on diagnostic laboratories for identifying contagious mastitis threats to herd health and milk quality. Traditional culture has served the industry well for over 50 years but the increasing availability and use of molecular technologies, such as mass spectrometry (MALDI-TOF) and PCR, are changing the epidemiological picture of mastitis management. Control of *Mycoplasma* mastitis has been challenged by slow growth (7-10 day incubation) on culture, false positive contamination, and intermittent shedding patterns. The innovation of *Mycoplasma* specific PCR assays allows testing to be performed in only a few hours. These assays can detect and speciate these strains to differentiate the highly contagious strains such as *M. bovis* from mildly infectious strains such as *M. bovigenitalium* and non-pathogenic strains such as *Acholeplasma* are revolutionizing how this disease is managed. For this study, a total of 5209 colonies from individual cows and 986 colonies from bulk tank milks were tested for bovine mastitis-causing strains of *Mycoplasma*, as well as *Acholeplasma*. There is significant potential for false positive results from contaminant growth of non-pathogenic *Acholeplasma* in conventional *Mycoplasma* culture. Direct PCR testing of colonies showed the false positive strains in 1.3% of culture positive bulk tank milks but 34.9% of culture positive cow milk samples. Of the total *Mycoplasma* positive cow milk samples, the breakdown of species was: *M. bovis* 46.3%*, M. bovigenitalium* 16.9%, *M. californicum* 15.2%*, M. canadense* 13.9%*, M. alkalescens* 4.4%*, M. species* 2.5% and *M. arginini* 0.8%*.* Of the total *Mycoplasma* positive bulk tank milks, distribution was: *M. bovis* 56.7%, *M. bovigenitalium* 17.3%, *M. alkalescens* 9.4%, *M. species* 6.5%*, M. canadense* 5.9%, *M. californicum* 3.9% and *M. arginini* 0.4%. Accurate species detection is crucial for avoidance of unnecessary herd investigations or culling of false positive animals. Mycoplasma PCR is an early warning service which allows for rapid identification and removal of dangerous, highly infectious cows more quickly to stop further economic loss from disease spread.