Bovine tuberculosis (TB) and paratuberculosis (Johne’s disease) Symposium: What we know and what we need to know

254 A three-year study of bovine tuberculosis in an enzootic area, the Nile Delta. Adel M. Talata*,1, Hazem A. Abdelaal1, and Essam A. Nasr2, 1University of Wisconsin-Madison, Madison, WI, 2Veterinary Serum and Vaccine Research Institute, Cairo, Egypt.

Bovine tuberculosis (BTB) is a chronic infectious disease characterized by the formation of granulomatous lesions in organs, mainly lungs and lymph nodes. BTB is caused by slowly growing bacilli, mainly M. bovis. In developed countries, BTB in animals is significantly in decline with rates that reached down to <0.001% in cattle herds in the United States. In developing countries, BTB represent a major problem with a prevalence that could reach up to 10 to 15% of cattle herds in some parts of Africa. In Egypt, BTB transmission among animals and from animals to humans represents a major problem because of the complexity of animal husbandry and animal trade. In this study, our teams in both the United States and Egypt used the single intradermal comparative skin test (SICST) to examine the herd level prevalence of BTB in 5 different regions within the Nile Delta of Egypt. During the years of 2012–2015, several farms were visited where SICST was conducted on all animals in the herd alongside collecting all of the historical background of disease prevalence in these farms. As expected, farms with a known history of risky management behavior (e.g., introduction of new animals without testing, or not testing at all for BTB) were associated with high levels of BTB prevalence that reached up to 45% in some herds. Interestingly, clinical health condition of animals and milk yield were not associated with the BTB herd-level prevalence. However, where BTB was enzootic, the highest percentage of SICST-positive animals (average 14%) were among the 6–12 mo of age while newly testing farms identified the highest percentage of SICST positive (60%) in animals above 24 mo of age. This result highlights the importance of periodical testing and intervention to control BTB in dairy herds. Overall, the prevalence of BTB among total number of 2799 examined animals was 7.3% during the 3 years screening project. Recommendation to reduce the BTB in these herds included the frequent testing of animals using SICST, especially before restocking of a dairy herd.

Key Words: bovine tuberculosis, prevalence, enzoolgy

255 Host genomics—What have we learned? Holly L. Neibergs*, Washington State University, Pullman, WA.

The study of the genomic variation in cattle has been undertaken to identify loci that allow the prediction of cattle susceptible to Mycobacte-rium avium ssp. paratuberculosis (MAP) infection. The application of this information is to assist in disease prevention through selective breeding of cattle that are less likely to become infected should MAP exposure occur. A genetic predisposition to MAP infection in cattle was established through differences in prevalence of MAP infection found across breeds and across sires. Heritability estimates for susceptibility to MAP infection have been computed from family and genomic studies and typically range from 0.01 to 0.18, although higher estimates have been reported. Candidate gene and genome wide association studies have both been used to identify the loci associated with MAP infection. Phenotypes of susceptible and non-susceptible cattle have been based on serum ELISA, milk ELISA, fecal culture, tissue culture, PCR of tissue or feces or a combination of these diagnostic methods. The disparity in the sensitivity of the diagnostic methods affects the reliability of the controls, and the stage of MAP infection at which the animal is diag-
and coordinating actions for infectious diseases to understand the vulnerability of livestock trade networks to infectious diseases.

Key Words: bovine tuberculosis, cattle, movement

257 MDA outreach: Communicating for a change. Julia M. Smith*, University of Vermont, Burlington, VT.

If a veterinary practitioner has tried to persuade a client to take action and nothing happens, is the problem that the client did not listen well or that the practitioner did not communicate well? An understanding of a few communication and behavior change models can enhance one’s ability to make change a reality. Key principles of risk communication and social marketing of behavior will be discussed in the context of controlling mycobacterial diseases of animals (MDA). Risk communication can be understood as the process of sharing information and opinion about something hazardous, where uncertainty is a characteristic feature of the risk. When addressing Johne’s disease or bovine tuberculosis, the disease is the hazard and uncertainty is associated with disease progression, detection, and success of control strategies. An approach known as message mapping can be a useful tool when developing risk communication messages. According to Prochaska’s stages of change model, the process of converting a decision-maker into a change-maker takes time and involves distinct changes in attitude toward doing something new or different. To have the most effective conversations, it is important to identify at what stage of change the decision maker is and to tailor one’s key points accordingly. Selling someone on behavior change to prevent or control a disease is a lot like selling someone on buying the latest gadget. The Academy for Educational Development has developed a process for marketing behavior change using the BEHAVE framework. This framework involves asking a few more questions before developing a strategy designed to achieve a behavior change. The strategy guides the development of a marketing plan. An essential element of a BEHAVE-based marketing plan is prototyping and pre-testing messages and aspects of the plan. When practicing risk communication and social marketing of behavior, it is essential to actively listen to the client or potential change-maker. Converting a decision-maker into a change-maker makes all the difference in controlling diseases such as Mycobacterium avium ssp. paratuberculosis and Mycobacterium bovis.

Key Words: risk communication, stages of change, social marketing of behavior

258 Zoonotic potential of bTB and MAP—Nothing to worry about...right? Tim Bull*, Institute of Infection and Immunity, St George’s University of London, London, UK.

The threat of mycobacterial zoonotic transmission (particularly bTB) has driven expensive eradication efforts and large culling projects. In the absence of reliable vaccines however, the cost and complexity of programs needed to secure eradication from domestic herds and wildlife maintenance reservoirs has had limited progress. Few have succeeded in eradication and some arguably increased transmission rates. As a result bTB and MAP remain prevalent in domestic animals and wildlife reservoirs. Given the opportunity and a favorable host susceptibility these mycobacteria can cause disease in humans. Acute bTB infection is a potentially life threatening disease clinically indistinguishable from tuberculosis. Pasteurization remains an effective defense reflected by the fact that most human bTB cases are either a result of direct animal contact or re-activation from an older latent infection. For MAP, the issue is less clear cut. Despite significant indications that MAP invades, is present and persistent in many humans and has the capacity in susceptible individuals to trigger inflammatory bowel conditions such as Crohn’s disease, the role of MAP as a direct human pathogen is still not widely accepted. Worryingly MAP survives pasteurization and prevalence is such that viable MAP is now significantly present in retail and dried infant formula milk. If MAP is truly a human pathogen, current ineffective MAP control methods are permitting an extensive, unchecked, worldwide, chronic exposure to humans, some of whom are susceptible to developing disease. Latency and persistence are important characteristics of mycobacterial disease evoking long term immunological influences promoting disease. These states have been difficult to quantitate due to dormant unculturable phenotypes. Better tests are needed but the likelihood is that the extent of bTB and MAP disease burden in humans is not yet fully evident. The threat from bTB and MAP to human health thus remains tangible. Only vigilance currently prevents many potential animal reservoirs becoming re-seeded. Failure to improve screening and eradication tools will continue to allow global spread, increase the risk of human exposure and ensure more trouble is in store.

Key Words: bovine tuberculosis, paratuberculosis, zoonotic potential