"Are veterinarians and veterinary technicians at increased risk of carriage of enteric pathogens or antimicrobial resistant flora?"

ISSUE/PURPOSE

Scientific studies examining antimicrobial resistance (AMR) have identified carriage of numerous AMR bacteria in a variety of animals. Transfer of AMR bacteria from animals to agricultural workers has been demonstrated in several studies of farmers and slaughterhouse workers. Large-animal veterinarians might also be expected to have regular exposure, although much less is known about their risk. Current literature
identifies methicillin-resistant Staphylococcus aureus (MRSA) transfer from swine to swine veterinarians, but there appears to be limited investigation of AMR bacterial colonization in large-animal veterinarians. Additional information specifically investigating the risks of AMR bacterial carriage in large-animal veterinarians practicing in the upper Midwest is needed, and to our knowledge broad-spectrum evaluation of
AMR bacterial carriage in this population has not been examined.

APPROACH OR PROJECT MILESTONES

Recruitment of veterinarians and veterinary technicians for this project took place between August 2020 and June 2021, and used a variety of modalities including: an advertisement in the North Dakota Veterinary Medical Association newsletter, advertising in the NDSU Veterinary Diagnostic Laboratory newsletter, advertisements on social media, text/social media messaging, and emails and phone calls to veterinary clinics in the upper Midwest region (targeting specifically ND, MN, SD). A total of 110 sample kits were sent to recruits who requested a sample kit, and 59 kits were returned with a response rate of 53.6%. Both a nasal and rectal swab were requested. Four of the 59 submissions were returned with only a nasal swab. The other 55 submissions contained both a nasal and rectal swab. 59.3% of the participants were veterinarians, 39% were technicians, and 1.7% did not identify a profession. 30.5% of the participants were men, 67.8% were women, and 1.7% did not indicate a sex.
Nasal swab samples were evaluated for the presence of Staphylococcus aureus (MRSA) and Staphylococcus pseudintermedius (MRSP) using standard microbiological techniques and culture media. Identification was performed using MALDI-TOF, and resistance identified using PBP2 testing. Standard fecal selective culturing techniques were used, and identification methods included chromogenic medium evaluation, MALDI-TOF and PCR. Susceptibility testing was performed by disk diffusion.

KEY FINDINGS/RESULTS

The results of this study are as follows. The nasal carriage rate of MRSA was 10.2%. Of the MRSA positive participants, 16.6% of the participants were in small animal predominant practice, 33.3% were in a 50/50 mixed animal practice, 33.3% were in predominantly large animal practice, and 16.6% were in diagnostic medicine. Of the primary species contacted professionally, 33.3% indicated cats and dogs, while 66.7% indicated primary contact with beef cattle. Of the species last contacted, 66.6% had contacted beef cattle, while 33.3% had contacted cats and dogs. 33.3% of the MRSA positive participants indicated they were regularly wearing face masks as part of professional PPE at work. The nasal carriage rate of MRSP was 6.8%. Of the MRSP positive participants, 25% were in small animal exclusive practice, 25% were in small animal predominant practice, 25% were in regulatory practice, and 25% were in 50/50 mixed animal practice. Of the primary species contacted professionally, 100% indicated cats and dogs, with 25% also indicating contact with beef cattle. Of the species last contacted, 75% had contacted dogs and cats, while 25% had contacted beef cattle, swine and horses. None of the MRSP positive participants indicated wearing a face mask as part of professional PPE. The enteric carriage rates identified by this study are as follows: Salmonella 0%, Campylobacter 0%, Shiga toxin producing E. Coli (STEC) 0%, extended-spectrum B-lactamase (ESBL) producing E. coli 0%, the enteric carriage rate of vancomycin resistant Enterococci (VRE) was 1.8%, and the enteric carriage rate of Carbapenem-resistant Enterobacteriaceae (CRE) was 0%.]

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THE BOTTOMLINE

In summary, this study identified a high prevalence of both MRSA and MRSP carriage among veterinary professionals. Community carriage of MRSA in the United States is estimated to be 1.5%1, while MRSA carriage in human healthcare workers (HCW) in the United States and Europe is estimated to be 4.5%2,3. This study identified MRSA carriage among veterinary professionals to be more than twice that of HCW at 10.2%. Very few studies have examined MRSP carriage in veterinarians. Two publications estimate the prevalence to be approximately 3.5%4,5. The current study identified MRSP carriage to be almost twice this, at 6.8%. Data analysis is on-going and a manuscript is being prepared for publication.]

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