Requests additional information on infective endocarditis study

I read the article by Sykes et al with interest, anticipating consideration of oral or periodontal infection as a portal of infection in dogs with infective endocarditis (IE). Although Sykes et al state that "periodontal disease per se was not included as a predisposing cause," they note the presence of "severe diffuse gingivitis" in one dog. Does singling out gingivitis in that dog imply that there was no gingivitis observed in the other 70 dogs?

There is increasing interest in the interaction between the oral cavity and the body as a whole in human and veterinary patients. Bacteremia is suspected to have a major role in several organ conditions that have been associated with periodontal disease in humans.

Abcessation is mentioned by Sykes et al. It should be noted that abcessation is uncommon in periodontal disease (the surface of the tooth provides a pathway for release of fluid derived from subgingival bacterial infection), even when there is a substantial volume of chronically infected tissue, which can frequently cause bacteremia.

Two challenges slow our understanding of periodontal-systemic interactions. One is limitations in microbiological techniques. Although bacteriologic results are detailed by Sykes et al, there is no mention of the methods used. The authors note that "various anaerobes" have been detected in humans with IE. Were anaerobic culture techniques used routinely in processing the blood cultures? Periodontopathogens such as Porphyromonas spp, which induce a serum antibody response and can lead to deep-seated infections, are very common in periodontal infections in dogs.

The second challenge is measurement of periodontal disease. Assessing the whole-mouth periodontal disease burden requires detailed dental scoring if the kinds of statistical analyses used by Sykes et al are to include oral disease. When a defined whole-mouth periodontal score is used, increased severity of microscopic changes in distant organs and increased serum concentration of indicators of inflammation are correlated with increasing extent of periodontal disease in dogs.

Periodontal disease is very common in dogs and deserves consideration when studying causes of infections, such as IE, presumed to result from bacteremia. The second article by Sykes et al reports that most dogs in the IE series were large-breed dogs; this does not match the reported periodontal disease prevalence pattern in dogs (small dogs are more frequently and severely affected), suggesting that there may not be a strong association between IE and periodontal disease. I would be very interested to see results of studies that examine this possibility more directly as a result of inclusion of defined oral disease data.

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The authors respond:

We would like to thank Dr. Harvey for the opportunity to report our findings with respect to oral examination and anaerobic cultures. Although we recorded the results of oral examinations for each dog in the study, the incomplete details in the medical records and the high prevalence of periodontal disease in our hospital population precluded meaningful conclusions as to whether periodontal disease predisposed to canine infective endocarditis (IE). We commented in the discussion on the results of oral examination for the dog from which a Lactobacillus-like organism was iso-

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lated because of the strong association between *Lactobacillus* infection and dental conditions or procedures in humans.

Calculus, gingivitis, or both were noted as absent (n = 3 dogs), mild (18), moderate (14), or severe (8) on examination. A history of a recent dental procedure was identified in only one dog.1 No difference was detected in the prevalence of streptococcal infection in dogs among the mild (4/18 dogs), moderate (2/14), severe (1/8), or unknown (6/26) groups (χ2 analysis; P = 0.85).

When performed, anaerobic cultures always yielded negative results. Of the 55 dogs in which bacteriologic cultures of blood had been performed, anaerobic cultures had been performed simultaneously for 33 dogs, including 21 dogs in which a causative agent had been identified. Of the 22 dogs that did not have concurrent anaerobic cultures of blood, anaerobic bacteriologic cultures of tissue or fluid samples collected either ante-mortem or at necropsy had been performed in 10 dogs, including 8 dogs in which a causative organism was identified.

Of the 16 dogs for which blood was not examined via culture, anaerobic bacteriologic cultures of tissue or fluid samples collected ante-mortem or at necropsy was performed in 6 dogs, including two dogs in which an etiologic agent was identified. Overall, anaerobic bacteriologic cultures of blood, body fluids, or tissue specimens had been performed in 49 of 71 (69%) dogs, and all results were negative. Of the 22 dogs in which no anaerobic cultures were performed, a causative agent was identified in 10 (45%), leaving 12 for which an anaerobic organism may have been an unrecognized cause. This was similar to 30 of 49 (61%) dogs in which anaerobic cultures were performed and a known cause was established (Fisher exact test; P = 0.3). Therefore, failure to perform anaerobic cultures did not appear to contribute to an inability to identify a causative agent.

Presently, there is a lack of evidence supporting an association between IE and periodontal disease or dental procedures in dogs. As noted by Dr. Harvey, most dogs with IE are large-breed dogs. Even in humans, IE is most commonly caused by a dental procedure, not periodontal disease. Any association between periodontal disease and cardiovascular disease in humans has been reported to be preliminary, and it has been suggested that large studies would be needed to identify whether any associations were causal.2 We also look forward to prospective studies of IE in dogs that include more defined oral disease data.

**Comments on the future of food supply veterinary medicine**

In the 1920s and 1930s, folks would harvest jackrabbits in the area that I now practice in. They would take them over to a buying station in a little town on the Frisco Railroad, and from there, they would be sent south to be used as feed on mink farms. As recently as 1995, I could hear prairie chickens booming during their mating dances when I went out for my morning paper in the spring. There haven’t been jackrabbits here for 50 years, nor do I hear the prairie chickens booming anymore.

I mention these things in regards to the recent publication of material regarding the perceived shortage of food animal veterinarians,1,4 about which I have commented before in this journal. There are no longer any jackrabbits or prairie chickens here because the uninterrupted, healthy tallgrass prairie necessary for their survival has been nearly wiped out.

There is no longer a need for food animal veterinarians because the type of client we work for has nearly been wiped out. No matter how many jackrabbits or prairie chickens are released into my neighborhood, these animals will merely end up on the menu of our local predators because of the altered habitat. Likewise, no matter how many veterinary school curriculum or admission revisions, expert brainstorming sessions, or financial incentive programs are put forth, the food animal veterinarian situation will not change until the progression of non-passionate, non-veterinarian-involved industrialization of our food animal production reverses course. Until that day, we too will be the hot meal of market economic forces in the real world.

**The authors respond:**

Dr. Wilson presents an interesting challenge: can the food supply veterinary profession be more adaptive than the Kansas jackrabbits and prairie chickens have proved to be? We all face a changing world, and professions are no exception. Our studies,1,3 which are noted by Dr. Wilson, clearly point out internal changes (eg, changing student demographics and career expectations) and external changes, including industrialization of food animal production, that must be addressed.
with strategic action. Change is never an easy process. We see it not just in the veterinary medical profession, but also in the businesses that are a part of the food animal industrialization process that Dr. Wilson mentions. They, like the veterinary profession, are facing substantial changes in their business environment. Globalization and costs have forced them to pursue every available opportunity for greater efficiency. Unfortunately, traditional animal care by well-trained veterinarians has been a casualty of the changing processes in the agribusiness industry. These changes will continue to occur.

Can the veterinary food supply profession adapt and be present to face the next shift in its working environment? We are optimistic that the profession will prove more adaptive than the jackrabbits and prairie chickens. However, strategic change requires a solid basis upon which to make informed decisions. The studies referenced here provide a substantial basis for change. This does not mean the course is easy. Strategic change also requires personally difficult changes. Waiting for the external world—including the businesses that are central to the increasingly integrated food supply system—to change is not a realistic strategy. Food supply veterinarians will go the way of the prairie chicken unless they pursue a proactive path that includes changing and adapting veterinary skill sets to match the needs of the evolving food supply environment. This requires leadership, vision, and tough decisions. We strongly believe that making internal changes to the profession will empower the food supply veterinary medicine profession and open up opportunities to counter and improve what Dr. Wilson notes as “the progression of noncompassionate, non–veterinarian-involved industrialization of our food animal production” system.

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Dr. Wilson’s insightful letter is quite reflective of the diversity of opinion among the expert panelists surveyed in the fourth Food Supply Veterinary Medicine article¹ in the July 1, 2006, JAVMA. His comments reflect the inevitable reality of the industry that we serve, and it is a fact that there has always been, and will continue to be, change within it. We may like and agree with some changes and loathe others. The real question is, however, as a profession, are we making good faith efforts at forecasting and addressing societal and stakeholder needs in the food animal arena? To that end, these articles are an attempt to identify the factors and forces impacting this aspect of our profession.

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