


Does environmental microbiological surveillance support infection control in veterinary hospitals? A PRO/CON debate

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Healthcare-associated infections (HAIs) are a known risk of hospitalization. In human healthcare, they are ranked among the top 10 causes of death,¹ resulting in increased hospitalization duration, morbidity and mortality, and cost of care.² While we lack similar data in veterinary medicine, historically, HAIs have been reported among 82% of veterinary teaching hospitals (VTHs) in a 5-year period,³ and among critical care patients (up to 20% of horses hospitalized for gastrointestinal disease;⁴ and up to 16% of dogs and 12% of cats hospitalized in a critical care unit⁵). Additionally, outbreaks of HAIs often result in facility closures (32% of VTHs) and restrictions of patient admissions (58% of VTHs),³ affecting the ability of these facilities to provide patient care.

Reports of HAIs among veterinary patients are associated with multiple different agents (e.g. *Salmonella*, *Staphylococcus* species), and of particular concern are the so called ESKAPE organisms (*Enterococcus faecium*, *Staphylococcus aureus* and *S. pseudintermedius*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Enterobacter* spp.).⁶ Many of these organisms are antimicrobial resistant, may be multi-drug resistant (e.g. *Salmonella*) or tend to 'escape' many antimicrobial agents (e.g. ESKAPE organisms).⁶

The source of these AMR- or MDR-infections among veterinary patients is not well understood, however, it is prudent to consider whether patient population management and, relevantly, the environment may play a role. It has been shown that the occurrence of AMR among non-type specific *E. coli* from hospitalized horses is associated with antimicrobial use and, more importantly, the hospital environment.⁷ Additionally, among feedlot cattle, transitioning to a new environment had the greatest influence on the resistome and microbiome, not treatment with antimicrobials on feedlot entry.⁸ Together, this suggests that the environment may play a key role in not only AMR-infections but, more importantly, may serve as a reservoir for HAIs.

In human health care, the Study on the Efficacy of Nosocomial Infection Control (conducted from 1970 to 1976) found that HAIs could be reduced by an estimated 32% with the implementation of a comprehensive program that included organized surveillance

and control activities, among other components.⁹ While this study was conducted in human hospitals, one has to wonder whether the same reduction would be true in veterinary hospitals. With this in mind, in this PRO/CON debate, we consider the question: *Does environmental microbiological surveillance support infection control in veterinary hospitals?*

Generally speaking, surveillance is the systematic collection and analysis of events or outcomes of interest. In practice, we do this through a monitoring system with a predetermined plan of action, based on a critical limit, to mitigate risk.¹⁰ Surveillance efforts can be broadly classified as active or passive. Active surveillance is conducted for a specific purpose, formally collecting data on an outcome or indicator of interest. This type of surveillance generally yields high quality primary data that is complete and is typically representative of the group or region of interest. While this type of surveillance can yield better quality data, it is often time and resource intensive. On the other hand, passive surveillance relies on data that are being collected for another purpose (e.g. laboratory, pharmacy or financial data). This type of surveillance generally results in lower quality secondary data that are often incomplete and may not be representative of the group or region of interest. That being said, this type of surveillance is generally less time and resource intensive. Additional consideration should be given to the expansiveness of a surveillance program. Active targeted or risk-based surveillance focuses efforts on a specific group, area or region of concern. This type of surveillance selectively screens for a specific purpose, resulting in accurate data on a very specific group, area or region. It is generally more time and resource intensive than passive surveillance, but often less so when compared to comprehensive active surveillance.

Microbiological environmental surveillance (i.e. screening of environmental surfaces for bacteria of concern) among human hospitals has been on the decline since 1970.^{11,12} At that time, the Centers for Disease Control and Prevention (CDC) recommended discontinuation of the practice of 'undirected environmental sampling' as there was no demonstrable link between environmental contamination and rates of HAIs.¹¹ They suggested that directed or

targeted sampling based on defined protocols and processes may be warranted for the investigation and management of epidemic disease (i.e. an outbreak), in the conduction of research on the spread of HAIs, to monitor the environment for, and abatement of, a potentially hazardous biological agent, or to evaluate efficacy of changes in infection prevention and control practices.¹¹ Further, the CDC highlighted that at that time, there was no established permissible level of contamination on hospital surfaces.¹¹ Since that time, a quantitative standard for human hospital surface cleanliness has been established for aerobic colony counts as <2.5 cfu/cm², and for specific pathogens as <1 cfu/cm².¹³ To date, there are no standards established for surface contamination in veterinary hospitals. Despite this, many VTHs report conducting regular, active environmental surveillance (up to 74% of VTHs), with approximately half (55%) doing so using a predetermined temporal pattern³, which may include on-going surveillance or intermittent, periodic surveillance.

In this issue of *JAC*, Timofte and Jepson argue the PRO position, that 'proactive targeted routine environmental surveillance that focusses on specific pathogens (e.g. ESKAPE organisms) is of benefit to clinicians and veterinary hospitals for guiding infection prevention and control practices.'

Allerton and Weese argue the CON position, that 'routine environmental microbiological surveillance offers no value as a measure of cleanliness and, provides no actionable information by determining the presence or absence of pathogens in the hospital environment.'

Readers should carefully consider these viewpoints when evaluating the use of environmental microbiological surveillance in their facilities (targeted or otherwise), reviewing the evidence provided by each, and reflect on balancing the obligation to reduce the risk of HAIs among patients, the allocation of limited resources and their commitment to implementing evidence-based infection prevention practices.

Transparency declarations

None to declare.

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