Evaluation of Hygiene Protocols on the Reduction of Bacterial Load on the Hands of Equine Veterinary Staff Performing Routine Physical Examinations

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Based on this study, alcohol-based hand sanitizers reduce the bacterial load on the hands of equine staff after a physical examination more than routine hand washing with an antibacterial soap. Further work needs to be carried out to determine if the type of bacteria that remain on the examiners hands are of importance to animal or human health.

1. Introduction
Hand hygiene is one of the most important methods used to control the spread of infectious diseases [1,2]. Most hand hygiene products are evaluated using in vitro or experimental contamination protocols [1,2]. The results of these experiments do not necessarily translate into real-life situations of patient care, especially for the equine practitioner’s needs. There are many factors involved in hand hygiene, and hand contamination in veterinary medicine differs from human medicine. The availability and use of gloves for patient care in human hospitals is now routine. It is the authors’ impression that, in general, veterinary health care providers do not usually wear gloves when providing medical care to routine patients as do human health care workers. For example, it is not routine for a veterinarian to put on examination gloves to do a venipuncture or to do a routine physical examination of the typical hospitalized patients.

To our knowledge, no study has quantified the number of bacteria on the skin of domestic animals (however, these studies have been done with humans) nor has anyone reported the typical log increase in bacteria on the hands of health care personnel after performing a common procedure such as a physical examination in a horse. In addition, data have not been published on the effectiveness of various hand hygiene protocols in reducing the bacterial load on the hands of equine hospital staff after performing a routine physical examination. We performed a pilot study to evaluate hand contamination and explore the effectiveness of three different hand hygiene protocols in reducing the number of bacteria on the hands of veterinary students after performance of a routine equine physical examination.

2. Materials and Methods
Physical examinations were performed by veterinary students on horses owned by the veterinary teaching hospital at the Ontario Veterinary College (OVC) or Colorado State University (CSU; Fig. 1). A comparison of the bacterial load pre-physical examination, post-physical examination, and post-hand hygiene was made. The three hand hygiene protocols evaluated were (1) hand washing for 15 s with an antibacterial soap [a], (2) application of a 67% alcohol-based hand sanitizer [b] (Fig. 2), and (3) application of an alcohol-chlorhexidine lotion [c] (Fig. 2). Hand rinse samples were obtained before the physical examination, after the physical examination, and after the hand hygiene protocol. The hand to be sampled was put in 100 ml of phosphate-buffered saline for 30 s for each of the sampling time points (Fig. 3). For analysis, the log bacterial counts were truncated at the lower limit of detection (3 x 10⁴). The difference in the truncated log bacterial counts were calculated between the pre-physical exam counts and the post-physical exam counts (effect of physical) and the post-physical exam counts and the post-hygiene procedure counts (effect of protocol). The mean values (counts or differences) were compared by hand hygiene protocol and study site (CSU and OVC) using analysis of variance. The distribution of the model residuals were evaluated graphically to determine if the model assumptions were appropriate. Scheffe’s method was used to account for multiple comparisons when each hand hygiene protocol was compared against the others.
3. Results
Based on the reduction factor, the alcohol-based hand sanitizer and the chlorhexidine-alcohol lotion reduced the bacterial load on hands after a physical examination more than washing hands for 15 s with antibacterial soap containing 0.3% triclosan.

4. Discussion
Compliance with hand hygiene protocols by medical care professionals is as important as the efficacy of the product [2-5]. Reasons cited by health care workers in human medicine for a lack of compliance are inadequate time to perform the procedure and do other patient care tasks and the adverse impact of frequent hand washing on their skin [2-5]. The use of procedures other than routine hand washing such as alcohol-based hand sanitizers with emollients have been implemented in many human health care facilities [2]. In this study, we explored the reduction of bacterial counts on the hands of veterinary students after performing a routine physical examination on horses after three different hand hygiene protocols. Two main types of bacteria inhabit the surface of a health professional’s hands - the resident flora and the transient flora. The transient flora are those bacteria that are acquired during the performance of hospital duties and are traditionally thought of as those most likely to be associated with nosocomial infections. In this pilot study, we did not fully evaluate the type of bacteria on hands after implementation of hand hygiene protocols. Although resistance to some of the antibacterial agents in soaps have been shown, resistance by specific bacteria to hand hygiene products that would be a problem in a veterinary practice has not been evaluated. Further work is needed to explore the type of bacteria left on examiner’s hands. This would entail subculture and definitive identification of all colony types on all post-treatment samples. Another limitation of this study is that we did not evaluate the efficacy of the various hand hygiene protocols in inactivating viruses. Based on the results of this study, as an alternative to hand washing, the alcohol-based hand sanitizers could be used if hand washing is not an option or if hands are not grossly soiled. These products are clearly labeled as not for use on grossly contaminated hands. If the practitioner had minimal visible contamination after examination of an equine patient, the alcohol-based products could be a feasible substitute for hand washing.

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Footnotes
b. Purell, GoJo Industries Inc., Alton OH 44309.
c. Avagard 3M Health Care, St. Paul, MN, 55144.
References

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