A pilot study to determine the prevalence of methicillin-resistant *Staphylococcus aureus* in showers at pork production facilities, gymnasiums, and private residences in Indiana

Sandra F. Amass, DVM, MS, PhD, Diplomate ABVP; Rika Jolie, DVM, MsC, PhD; Jessica L. Schneider, BS, RVT; Phillip Morgan

**Summary**

Swab samples of the floor and water-control handles of showers at 10 pork production facilities, 10 public gymnasiums, and 10 private residences were culture-negative for methicillin-resistant *Staphylococcus aureus*. This organism appears not to be a human health risk for those utilizing showers at these 10 Indiana pork production facilities.

**Keywords:** swine, shower, communal shower, methicillin-resistant *Staphylococcus aureus*

**Received:** January 12, 2005

**Accepted:** March 10, 2005

**Resumen – Un estudio piloto para determinar la prevalencia del *Staphylococcus aureus* resistente a la meticilina en las regaderas de las granjas porcinas, gimnasios y residencias en Indiana**

Los hisopos que se tomaron del piso y llaves de control de agua de las regaderas de 10 granjas porcinas, 10 gimnasios públicos y 10 residencias fueron negativos al cultivo de *Staphylococcus aureus* resistente a la meticilina. Este organismo parece no ser un riesgo para la salud humana para aquellos que utilizan las regaderas en estas 10 granjas porcinas en Indiana.

**Resumé – Une étude pilote pour déterminer la prévalence du *Staphylococ- coccus aureus* résistant à la méthicilline dans les douches aux installations des fermes porcines, les gymnases, et les résidences dans Indiana**

Écouvillons du sol et des poignées de contrôle de l'eau de douches des 10 fermes porcinas, 10 gymnases publics, et 10 résidences ont été négatifs à la culture du *Staphylococcus aureus* résistant à la méthicilline. Cet organisme paraît ne pas être un risque pour la santé humaine pour ceux qui utilisent des douches à ces 10 fermes porcinas dans Indiana.

**Materials and methods**

Swab samples from the floor and water-control handles of a single shower at each of 10 pork production facilities, 10 public gymnasiums, and 10 private residences were collected in October. Additionally, two positive and two negative control samples were submitted on the 21st of October. Visits to potential sampling sites were unannounced. Permission to sample sites was given at arrival. The shower was not sampled if the owner volunteered that the shower had been disinfected prior to the investigators’ arrival at the site on the day of sampling.
Samples were cultured according to hospital standard operating procedures for isolation of *S. aureus*. Briefly, swabs were plated onto mannitol salt agar and aerobically incubated with 5% to 10% CO₂ at 35 ± 2°C for 48 hours. Plates were examined daily. A coagulase test was performed on mannitol-positive colonies that resembled *Staphylococcus* spp. Antimicrobial sensitivity testing was performed on all coagulase-positive colonies.

**Results**

*Staphylococcus aureus* was isolated from both positive control samples. The two negative control samples and all other samples were culture-negative for *S. aureus*.

**Discussion**

Although, the primary means of contracting MRSA is by direct contact with a colonized person, recent evidence suggests that environmental reservoirs of MRSA may pose a human health concern. Under the conditions of this study, MRSA was not detected in samples collected from floors and water-control handles of showers in pork production facilities, public gymnasiums, or private residences. Thus, MRSA was not found to be a risk for those utilizing shower facilities at the pork production units sampled. However, the study had several limitations, including small sample size, geographical area, season, and limited scope of bacterial species.

First, sample sizes were limited by the number of public gymnasiums in the geographical area sampled. A sample size of 10 would only allow us to detect MRSA in one sample with 95% confidence, assuming a 30% prevalence of MRSA in our shower population. Thus, the experimental design provided limited capability of isolating MRSA at prevalences of less than 30%.

Second, all samples were collected in a limited geographical area. Our results might have been different had sampling occurred in an expanded geographical area incorporating multiple states and diverse climates. Third, sampling occurred during the fall of the year. Sampling during other seasons might have been more conducive to maintenance of environmental bacterial reservoirs. Lastly, the focus of this study was on MRSA alone, which is only one of several potential pathogens of concern in communal showers.

Future studies in the area of human health concerns pertaining to the use of communal showers should address these study limitations and should be expanded to include other infectious agents, including fungi.

**Acknowledgements**

We thank the American Association of Swine Veterinarians’ Foundation for funding this project. We also thank the staff at Greater Lafayette Health Services, Inc, Lafayette, Indiana, for providing laboratory support and Dr Jennifer Greiner for her assistance with the study. Finally, we thank the volunteers who made this project possible by allowing us to sample their facilities and their homes.

**References**


*Non-refereed references.*