Abstract # 1212

Environmental Contamination Characterization of Two Outpatient Clinics

bobby.warren@duke.edu
DUMC Box 103259
Durham, NC 27710
Phone: (919) 681-7957

Duke Center for Antimicrobial Stewardship and Infection Prevention

Bobby Warren[1,2], Nick Turner[1,2], Becky Smith[1,2], Rachel Addison[1,2], Samantha Marden[1,2], David Weber[3], William A. Rutala[3], Deverick J. Anderson[1,2] and the CDC Prevention Epicenters Program

1- Duke Center for Antimicrobial Stewardship and Infection Prevention, Durham, NC, USA; 2- Division Of Infectious Diseases, Duke University Medical Center, Durham, NC, USA; 3- Division of Infectious Diseases, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Duke University School of Medicine

Abstract (*revised*)

Background
Environmental contamination in outpatient clinics is poorly understood.

Methods
We performed a microbiological analysis of surfaces in wound and pulmonary outpatient clinics at a tertiary care center. Cultures were obtained with pre-moistened cellulose sponges from three locations (Exam bed/chair, patient chair, physician area/chair) before and after clinic days. Sponges were combined with 1% Tween20-PBS and mixed in the Seward Stomacher. The homogenate was centrifuged and all but ~5 mL of the supernatant was discarded. Samples were plated on Sheep's blood agar and selective medias for *S. aureus, Enterococcus spp.* and Gram-negative bacteria. CFU was determined by counting the number of colonies on each plate and using dilution calculations to calculate the CFU of the original ~5 mL homogenate. The total sample areas in the wound and pulmonary clinic were 12,735 cm^2 and 16,400 cm^2, respectively.

Results
A total of 300 samples were obtained over 90-days. Median total room CFU was 7,918 (IQR 2,939-18,855) (Figure 2). Median CFU for the exam area, patient area and physician areas were 2,090 (537-10,508), 1524 (573-4,605) and 960 (371-2183), respectively (Figure 4). The proportions of samples positive for *S. aureus, Enterococcus spp.* and Gram-negative bacteria were 5, 3 and 6%, respectively (Figure 7). In general, median total CFU increased during the clinic day (median CFU before the clinic day 6883 (2937-14983) versus median after clinic day=10351 (3484-21263) (Figure 3). Environmental bioburden was higher in the wound clinic than the pulmonary clinic (median 18206 CFU [IQR 10048-25037] vs. 3764 [IQR 1452-6671], p<0.001) (Figure 2). The average number of patients seen in the wound clinic per clinic day was greater than the pulmonary clinic (3 vs 2).

Discussion
Outpatient clinic rooms were contaminated with clinically important pathogens. Contamination varied by environmental location and increased as the clinic day progressed. Higher contamination was seen in the wound clinic possibly due to higher patient volume versus increased environmental contamination that occurs while providing wound care. Wound care clinics may need to focus on more detailed cleaning to reduce environmental contamination and the risk of pathogen transmission in at-risk patients.

Methods

- Environmental cultures were taken before and after clinic days for 25 study days of exam, patient and physician areas in both clinics using a sponge pre-moistened with DE neutralizing agar.
- Samples were processed using the sponge and stomacher technique.
- Gram positive species were identified using selective media (mannitol salt, bile esculin agar and 6.5% NaCl solution.) Gram negative species were identified via MacConkey agar and MALDI-TOF
- The total sample area in the wound and pulmonary clinic were 12,735 cm2 and 16,400 cm2, respectively.

Figure 1: Sample areas

Figure 2: Room bioburden by clinic

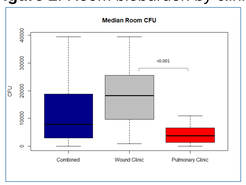


Figure 3: Room bioburden before and after clinic days

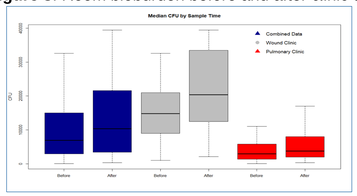
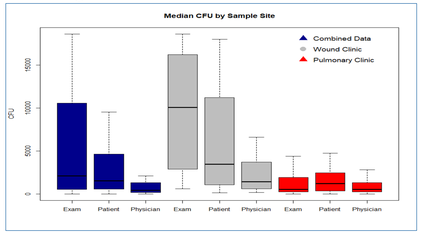


Figure 4: Sample site bioburden by clinic



Results

- Environmental bioburden was higher in the wound clinic than the pulmonary clinic (median 18206 CFU [IQR 10048-25037] vs. 3764 [IQR 1452-6671], p<0.001). (Figure 2)
- Median total CFU increased during the clinic day (median CFU before the clinic day 6883 [IQR 2937-14983] versus median after clinic day=10351 [3484-21263]. (Figure 4)
- Samples positive for *S. aureus, Enterococcus spp*. and Gram-negative bacteria were 5, 3 and 6%, respectively, and more species of interest were found in the wound clinic. (Figures 6, 7)

Figure 5: Room bioburden over time

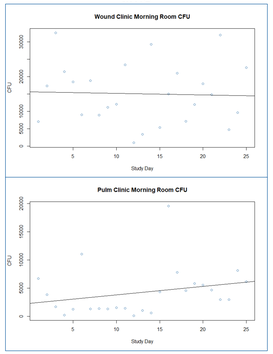


Figure 6: Species by clinic sample area

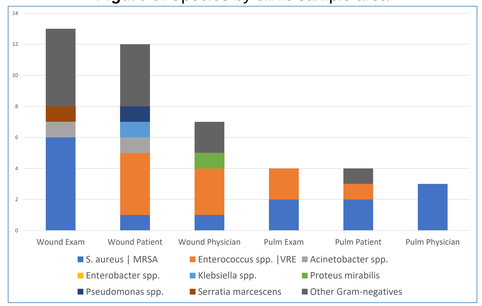
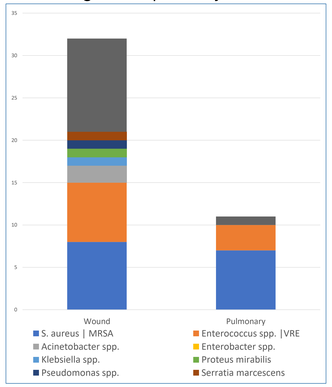


Figure 7: Species by clinic



Conclusions

- Outpatient clinics were contaminated with clinically relevant pathogens.
- Contamination varied by sample location and increased over the course of the clinic day.
- Higher contamination was seen in the wound clinic.
- Higher contamination was seen in the "Exam" areas, particularly in the wound clinic.
- Environmental contamination is sporadic and heterogenous.
- Further work is needed to understand the level of contamination in outpatient clinic settings.