subsequently washed twice in phosphate-buffered saline and re-immersed in fresh BHI, sonicated, incubated for 24 hours and quantitatively measured at OD590nm for regrowth. Both assays were performed in triplicate. MIC and MBEC values were determined as the lowest concentration of disinfectant that inhibited growth of the bacteria.

Results: Each strain exhibited different susceptibility profiles to the disinfectants tested. B. subtilis was the most resistant, while the clinical isolates were most susceptible. In addition, biofilms were more resistant to the disinfectants compared to planktonic cultures.

Conclusions: Since biofilms are the primary mode of growth for most bacteria, it is important to recognize their role in the vast majority of medically relevant infections. The results of this study support the use of the MBEC method to test the efficacy of disinfectants, as it presents the most relevant results of antimicrobial activity. This will allow for further development of standardized test methods that more accurately reflect conditions found in the field, thus leading to more effective strategies for controlling the spread of infection.

Presentation Number 2-021

Cleaning Practices for Hospital Mattresses in Top US Adult Hospitals

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Background/Objectives: Manufacturers of hospital beds and mattresses recommend cleaning the mattress first with soap and water, disinfecting the surface, and then rinsing the surface. It is also recommended to only use disinfectants with a pH of 5-9. Chemical manufacturers have tested disinfectants on hard non-porous surfaces and not on soft surfaces. Any claim of efficacy of disinfectants against bacterial pathogens only applies to the use of the product on hard, non-porous surfaces. Mattresses are soft surfaces, and the use of quaternary ammonia compounds on these soft surfaces should be considered "off-label." The current study is intended to define how top hospitals in the United States (U.S.) are cleaning hospital mattresses.

Methods: The top 113 hospitals for 2011-2012, as listed in the US News & World Report, were contacted by phone and asked about their cleaning procedures for hospital mattresses. Each respondent from environmental services was asked five questions: What chemical do you clean your beds and mattresses with? How do you mix or dilute the chemical? How long do you leave the chemical on the bed or do you just let it dry on the bed? Do you use anything other than that chemical first, like soap and water? Do you rinse off the cleaner after you clean the bed?

Results: Of the top hospitals, 69 (61%; 95% CI, 52-70%) agreed to answer the survey questions. Six (5%; 95% CI, 3-11%) refused to participate and 38 (34%; 95% CI, 26-43%) could not be reached after multiple attempts. Chemicals used to clean the beds included: quaternary ammonia compounds (58/69; 84%; 95% CI 74-91%), bleach compounds (7/69; 10%; 95% CI 5-19%), phenolic cleaners (3/69; 4%; 95% CI 1-12%), and hydrogen peroxide (1/69; 1%; 95%CI 0-8%). Only two hospitals were using disinfectants with a pH between 5 and 9, as recommended by the manufacturers. The pH of all of these compounds is not within the recommended range of 5-9. Only 16 (23%; 95% CI, 15-34%) of the hospitals reported cleaning the mattress prior to disinfection, and only 6 (9%; 95% CI, 4-18%) reported rinsing off the disinfectant after use.

Conclusions: Most top adult hospitals in the U.S. do not follow manufacturer's recommendations on appropriate cleaning and disinfection of hospital mattresses. This failure may result in inadequate cleaning and may damage the surface of the mattresses.

Presentation Number 2-022

The Influence of ABHR Product Format on In Vivo Efficacy: A Meta-Analysis

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Background/Objectives: Alcohol-based hand rubs (ABHR) are the primary form of hand hygiene in healthcare settings. ABHR are available in a number of different formats including rinse, spray, gel, and foam. In U.S. healthcare facilities the most common formats are gel and foam. Currently, there are conflicting data regarding the relative efficacy of gel versus foam ABHR. The objective of this study was to determine whether product format influences ABHR efficacy through a meta-analysis of multiple studies comparing both gel and foam products.

Methods: The test products were commercial ABHR formulations based on 70% ethanol and differing only by the addition of "gelling" ingredients (Gel A) or "foaming" ingredients (Foam B). Data from a total of 18 studies which were executed at different times of the year, by different laboratories, where the efficacy of Gel A and Foam B were evaluated were included in the analysis. Standard in vivo test methodologies were used in each study and included the U.S. Food and Drug Administration Health Care Personnel Handwash (HCPHW) method, ASTM E1174-06, ASTM E2755-10, and ASTM E2784-10. All methods measure test product efficacy after both a single use and after 10 consecutive uses. Two meta-analyses were conducted, one based on single use data and one based on data after 10 consecutive product uses. The Hedges' g value was calculated based on the log reduction from baseline for each product for each study. The model used was a complete random effects model with subgroups (Gel A and Foam B) evaluated.

Results: After a single test product use mean log reductions ranged from 2.32-4.48 and 2.43-4.57, for Gel A and Foam B, respectively. After 10 product uses, log reductions ranged from 3.11-5.24 and 2.61-5.19, for Gel A and Foam B, respectively. Based on the meta-analysis both products were highly effective after a single use (Hedges' g = 11.746 and 12.174 for Gel A and Foam B, respectively) and after ten product uses (Hedges' g = 11.164 and 10.844 for Gel A and Foam B, respectively). Because the Hedges' g 95% confidence intervals for Gel A and Foam B overlapped, there was no difference in efficacy between Gel A and Foam B after a single use or after ten consecutive uses.

Conclusions: This was the first example of applying meta-analysis to compare the in vivo efficacy of different ABHR products or product formats (gel vs. foam). The results of this meta-analysis indicate that ABHR format does not significantly influence efficacy. Previously published results suggest that other attributes, including product formulation and product application volume, are more predictive of ABHR efficacy.