

Characteristics	Count (N=35)	%
Countries		
United States	20	57
Italy	4	11
United Kingdom	3	9
Japan	2	6
Others	6	17
Years		
2020 and after	4	11
2010-2019	23	66
2000-2009	5	14
1999 and before	3	9
Study topics		
Effectiveness of OR cleaning in reducing environmental contamination	10	29
Compliance of OR cleaning practices	1	3
Interventions for improving OR cleaning effectiveness and/or compliance	24	68
Study designs		
(Non-)randomized controlled trial	8	23
Quasi-experimental	20	57
Observational	5	14
Qualitative and mixed-methods design	2	6
Funding		
Commercial	9	26
Non-commercial	5	14
Not reported	21	60

environmental contamination (Fig. 2), 1 examined the compliance of OR cleaning practices (Fig. 3), and 24 examined interventions for improving OR cleaning effectiveness and/or compliance (Fig. 4). Figure 5 summarizes the characteristics of the included studies. **Conclusions:** In this review, OR cleaning was inconsistently performed in practice, and mixed findings were reported regarding the effectiveness of OR cleaning in reducing environmental contamination. No study has systematically examined work-system factors influencing OR cleaning. Efforts to improve OR cleaning focused on cleaning tools and technologies (eg, ultraviolet light) and staff monitoring and training. Interventions targeting the broader work system influencing the cleaning processes are lacking. The scientific rigor of the included studies was modest. Most studies were either commercially funded or did not reveal their funding sources, which might introduce a desirability bias.

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**Disclosures:** None

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Presentation Type:

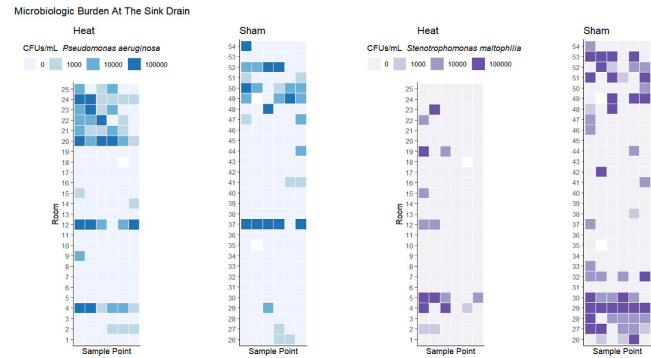
Poster Presentation - Poster Presentation

Subject Category: Environmental Cleaning

Some like it hot: Variable impact of a tailpiece heating device on different gram-negative bacteria

Stacy Park; Shireen Kotay; Katie Barry; Joanne Carroll; April Attai; William Guilford and Amy Mathers

**Background:** Transmission of multidrug-resistant bacteria to patients from colonized hospital sink drains has prompted attempts to interrupt transmission through a variety of interventions directed at the wastewater environment. We previously found that use of a heating device designed to disrupt biofilm formation between the P trap and the sink drain, which is the major point of dispersal of bacteria to the patient-care environment, was associated with reduced risk of detectable gram-negative organisms on hospital sink drains. However, there was no observed effect on some important pathogens, including *Pseudomonas aeruginosa* and *Stenotrophomonas maltophilia*. We hypothesized that heating to a higher temperature would provide additional efficacy in preventing drain colonization. **Methods:** As part of a previous randomized study, 54 tailpiece heaters were installed in 3 intensive care units in an academic hospital and 2 acute-care units in an associated regional hospital; half of these devices were shams (ie, no heat). The devices were programmed to heat for 1 hour every fourth hour. Prior to this study, a device update increased the heating temperature (during the previous study the median heated temperature was 65.9°C). Sink drains and P traps were sampled monthly. Samples were assessed for semiquantitative growth of gram-negative bacteria on MacConkey agar, looking



especially for *P. aeruginosa* and *S. maltophilia*. Frontline personnel were blinded to device assignment. **Results:** The mean heated temperature reached was 74.4°C. Based on proportional odds logistic regression (wherein the odds ratio reflects the likelihood of a given sample falling in a lower microbiologic burden level versus the levels above it), the heating device was associated with increased likelihood of lower microbiologic burden at the drain level for general growth on MacConkey agar (OR, 2.47; 95% CI, 1.11–5.51) and for growth of *S. maltophilia* (OR, 5.39; 95% CI, 2.20–13.18). The device did not have an effect on burden of Enterobacterales (OR, 1.38; 95% CI, 0.58–3.24). For *P. aeruginosa*, there was a trend toward decreased likelihood of lower microbiologic burden (OR, 0.41; 95% CI, 0.18–1.07) that did not reach statistical significance at the drain level, and the heating device was associated with decreased likelihood of lower microbiologic burden of *P. aeruginosa* at the P-trap level (OR, 0.20; 95% CI, 0.10–0.39). **Conclusions:** Heat disruption of biofilm between the P trap and sink may be a promising strategy for prevention of hospital sink drain colonization; however, the impact is variable across different bacterial species. Further understanding of the dynamics of the microbiome within wastewater is needed.

**Disclosures:** None

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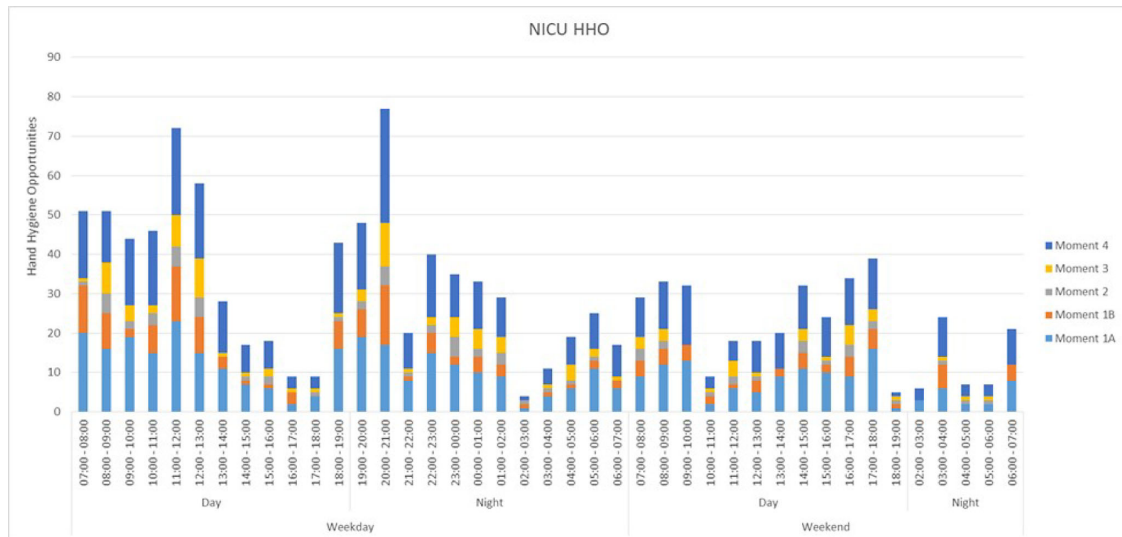
Poster Presentation - Poster Presentation

Subject Category: Hand Hygiene

Measuring hand hygiene opportunities per hour across two neonatal intensive care units

Eugene Lee; Souad Al-Muthree; Paige Reason; Meghan Donohue; Michael Dunn; Meghan Statchuk; Sarah Khan; Shikha Gupta-Bhatnagar; Salhab El-Helou; Jerome Leis and Dominik Mertz

**Background:** To estimate hand hygiene compliance using electronic hand hygiene monitoring, the number of hand hygiene opportunities (HHOs) per period must be known in a given setting. Data on the number of HHOs in a neonatal ICU (NICU) are limited. We measured HHOs per hour and identified factors that may influence the number of HHOs per hour to calibrate compliance estimates for electronic hand hygiene monitoring. **Methods:** The study was conducted in 2 large NICUs in Ontario, Canada (72 and 42 beds, respectively). We centrally trained observers to identify HHOs using the Ontario-based “Four Moments of Hand Hygiene,” which is similar to combining moments 4 and 5 of the WHO “Five Moments of Hand Hygiene.” To apply the moments of hand hygiene to the NICU setting, the following modifications were made: moment 1 was entering the incubator or contact with anything within the ‘baby space’ directly around the incubator, and moment 4 was when hands exited the incubator and, as such, the ‘baby space.’ Using a standardized tool, the investigators conducted direct observation of HHOs during randomized observation periods from July 1, 2022, to January 9, 2023. In addition to HHOs, data on covariables potentially associated with the frequency of HHOs were collected: time and day of the week, acuity, additional precautions, corrected gestational age, and private



versus multibed room or open pod. **Results:** We audited HHOs for 146 hours including 26 at site A and 120 at site B. Overall, 804 HHOs (69.2%) occurred during weekdays and 739 (63.6%) occurred during day shifts from 7:00 A.M. to 7:00 P.M. The most frequent moments of hand hygiene were moment 1 (47.8%, before contact) and moment 4 (36.8%, after contact). The average numbers of HHOs were 7.8 per hour overall, 7.6 per hour on weekdays, 7.7 per hour on weekends, 8.8 per hour on day shifts, and 6.8 per hour on night shifts. The breakdown of HHOs by profession was 92.8% nurses, 0.6% physicians, 4.5% allied health, and 2.1% for others. **Discussion:** The rate of HHOs in NICU varied over a 24-hour period and was similar between 2 different NICUs. Evenings and weekends had considerably fewer average HHOs, and peaks were observed following nursing shift changes. The rate of HHOs may be influenced by other factors including unit design, patient acuity, and use of transmission-based precautions. Further analysis using a Poisson regression model will help to explore these factors and to calibrate electronic monitoring for this population.

**Disclosures:** None

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### Presentation Type:

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### Subject Category:

**Functional dependence as a contributing factor for patient hand contamination by multidrug-resistant organisms in acute care**

Trenton Behunin; Julia Mantey; Marco Cassone and Lona Mody

**Background and objectives:** Patients with functional disabilities are at higher risk of adverse outcomes, including infections. Although healthcare worker hand contamination has long been recognized as an important source of pathogen acquisition, the role of patient hands has been less clearly defined. We sought to determine whether the presence of functional disabilities is correlated with patient hand contamination by multidrug-resistant organisms (MDROs) and thus a potential target for patient hand hygiene (PHH) interventions. **Methods:** Case-control study of hand contamination with methicillin-resistant *S. aureus*, vancomycin-resistant enterococci, and gram-negative bacilli resistant to cephalosporins, fluoroquinolones, and/or carbapenems in 2 acute-care hospitals in southeastern Michigan. Cases ( $n = 40$ ) and controls ( $n = 359$ ) were defined as patients with or without hand contamination by MDROs, respectively. We assigned 3 exposure categories based on Katz activities of daily living scores: no functional disabilities (independent, reference group), 1-3 functional disabilities (partially dependent), and 4+ functional disabilities (dependent).

We used stepwise logistic regression to identify confounding variables. Logistic regression was then used to establish the relationship between a patient's functional dependence level and their hand contamination by MDROs. **Results:** The distribution of hand contamination of each target MDRO by level of patient dependence is shown in the Table. Overall, methicillin-resistant *Staphylococcus aureus* (MRSA) was the most represented, followed by resistant gram-negatives and vancomycin-resistant enterococci (VRE). Hospital site, sex, and history of MDROs were included in the model based on stepwise regression. The odds ratio (OR) of MRSA hand contamination in the dependent category was 3.19 (95% CI, 1.18-5.54) compared to the independent category, and for any MDRO the

**Table. Distribution of Hand Contamination with MDROs by Level of Independence**

	Independent ( $n = 298$ )	Partially Dependent ( $n = 45$ )	Dependent ( $n = 56$ )
Any MDRO	26 (8.7)	3 (6.7)	11 (19.6)
MRSA	11 (3.7)	2 (4.4)	7 (12.5)
RGNB	13 (4.4)	0 (0.0)	1 (1.8)
VRE	4 (1.3)	1 (2.2)	3 (5.4)

Data is presented as no. (%).

Abbreviations: MDRO, multi-drug resistant organism; MRSA, methicillin-resistant *Staphylococcus aureus*; RGNB, resistant gram-negative bacteria; VRE, vancomycin-resistant *Enterococci*.

**Figure 1. Odds Ratios of Dependency vs. Hand Contamination by Organism**

