

Presentation Type:

Poster Presentation - Poster Presentation

Subject Category: Disinfection/Sterilization

Measuring the impact of an enhanced strategy for daily disinfection in acute-care hospital rooms

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Background: Enhanced strategies for daily disinfection in acute-care hospital rooms are needed but are poorly understood. **Methods:** We conducted a randomized control trial pilot study in acute-care hospital rooms at Duke University Health System in Durham, North Carolina, comparing the efficacy of a novel EPA-registered quaternary ammonium disinfectant with 24-hour activity, Sani24, to routine daily disinfection. Rooms housing patients on contact precautions were enrolled. In each study room, the bedrails, overbed table, and sink were divided into 2 equal halves, or sides, labeled left and right, with sample areas of 2,000 cm², 1,750 cm², and 400 cm², respectively. Each sample area side was then randomized 1:1 to intervention or control by a coin toss. Sani24 was applied to the surface of each intervention sample side and allowed to air dry. Control sides were left alone. Environmental services (EVS) staff were not involved in the study and were blinded to randomization status. Glogerm dots were applied to all 6 sample-area sides after application of the intervention to measure compliance of daily disinfection by EVS and the removal of the intervention agent. Microbiological samples were taken with sponges premoistened with neutralizing buffer from each sample area side for 6 total samples (3 intervention and 3 control) immediately before and 24 hours following application of the intervention agent. Clinically important pathogens (CIP) were defined as MRSA, VRE, and CRE. The primary outcome was room CFU on study day 1, which was compared using a Wilcoxon rank-sum test. **Results:** In total, 20 patient rooms were enrolled in the study, and 240 samples were obtained from 120 sites (60 intervention and 60 control) from November 2021 to January 2022. Enrolled patients were all on contact isolation and had an active infection; 15 (75%) were bedridden and 8 (40%) were female. On day 0, baseline contamination was similar between study arms: 7,460 (IQR,4,204–16,482) room CFU and 18 samples (30%) harboring CIP in the intervention arm versus 7,273 (IQR, 3,142–21,117) and 15 samples (25%) in the control arm ($P = .49$ and $.47$, respectively). On day 1, intervention areas had significantly lower CFU at 4,016 (IQR, 2,339–7,358) compared to controls at 6,112 CFU (IQR, 3,484–11,356; $P = .01$). No significant differences were detected between study arms regarding CIP recovery. Glogerm was minimally removed from sample areas ($n = 7$, 3%), and the result was similar between study arms. **Conclusions:** The use of the quaternary ammonium disinfectant with 24-hour activity on high-touch healthcare surfaces led to reduced contamination over a 24-hour period. Routine daily disinfection compliance by EVS was low since minimal sample areas had Glogerm removed

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Table 2.

	Both days		Day 0		p-value	Day 1		p-value
	Total	Intervention	Intervention	Control		Intervention	Control	
Median Room CFU (IQR)	6,954 (1,263-17,248)	7,460 (4,204-16,482)	7,273 (1,142-21,117)		4,016 (2,339-7,358)	6,112 (3,484-11,356)	0.01	
Median Bedrail CFU (IQR)	1,243 (258-3,768)	2,052 (156-6,700)	1,566 (216-2,744)		1,197 (357-3,648)	885 (220-5,208)	0.29	
Median Overbed Table CFU (IQR)	1,752 (197-4,060)	1,634 (425-4,590)	1,556 (418-4,335)		1,152 (368-2,948)	2,216 (741-3,820)	0.5	
Median Sink CFU (IQR)	1,101 (426-3,234)	1,710 (193-4,411)	2,190 (687-5,549)		490 (98-1,007)	1,351 (473-2,948)	0.003	
Total CIP, n(%)	58 (24)	18 (30)	15 (25)	0.56	12 (20)	13 (22)	0.83	
Bedrail CIP, n(%)	21 (26)	6 (30)	4 (20)	0.47	6 (30)	5 (25)	0.73	
Overbed Table CIP, n(%)	20 (25)	6 (30)	5 (25)	0.73	4 (20)	5 (25)	0.7	
Sink CIP, n(%)	17 (21)	6 (30)	6 (30)	1	2 (10)	3 (15)	0.63	
Total Glogerm removed, n(%)	7 (6)				3 (5)	4 (7)	0.67	
Bedrail Glogerm removed, n(%)	1 (1)				0 (0)	1 (5)	0.11	
Overbed Table Glogerm removed, n(%)	4 (5)				2 (10)	2 (10)	1	
Sink Glogerm removed, n(%)	2 (3)				1 (5)	1 (5)	1	

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Subject Category: Disinfection/Sterilization

Assessment of cleaning stethoscopes using UV-C sanitation

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Background: It is well established that stethoscopes harbor pathogenic bacteria species. Within hospital settings, these pathogens can be rapidly transmitted from room to room and can cause harm in vulnerable populations. The current literature demonstrates that disinfecting stethoscopes with isopropanol kills 99% of all bacteria. However, in practice this rarely occurs and disinfection is subject to user error. We assessed the efficacy of ultraviolet germicidal irradiation (UV-C) at decontaminating stethoscopes used at our rural healthcare system along with the cleaning habits of their users. **Methods:** Stethoscopes were randomly selected from the clinical staff of our hospital's largest nursing unit. The stethoscopes were each swabbed for culture then exposed to UV-C for 20 seconds and sampled again. Users were asked to complete a survey during this process. Samples were then cultivated on tryptone soya broth (TSB) agar, and all growth was sent for identification via matrix-assisted laser desorption/ionization (MALDI-TOF). Later, the protocol was repeated to assess cleaning efficacy of the isopropanol wipes commonly used in our hospital. We collected pre- and post-intervention samples after cleaning vigorously for 3 minutes according to the manufacturer's guidelines. The samples were classified as follows: "cleaner" if the number of colonies decreased after sanitation, "sterilized" if the number of colonies decreased to zero, "no change" if the number of colonies stayed the same, and "no assessment" if there was no

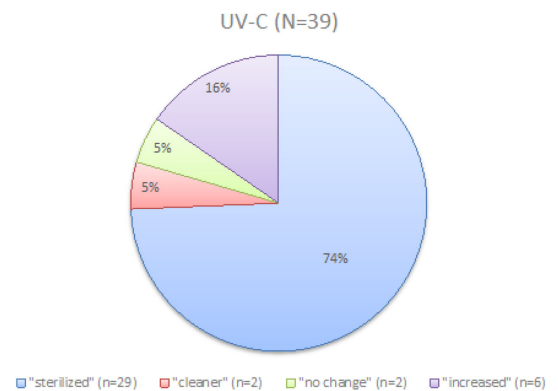


Figure 1. Effectiveness of UV-C at cleaning stethoscopes.

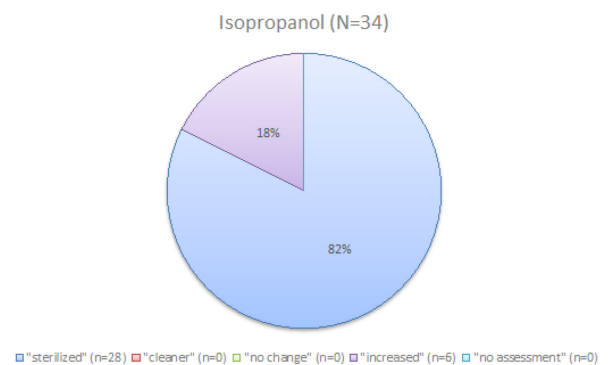


Figure 2. Effectiveness of isopropanol at cleaning stethoscopes.

preintervention growth. Several samples “increased” in CFU count after the intervention, likely due to incomplete sampling, contamination, or incomplete penetration of UV-C. The Fisher exact test was used to analyze the effectiveness of the stethoscope sanitation techniques. **Results:** In total, 60 samples (33 used for analysis) were obtained from stethoscopes cleaned with UV-C (Fig. 1). Moreover, 34 samples (28 used for analysis) were obtained from stethoscopes cleaned with isopropanol (Fig. 2). Both UV-C (93.9% vs 6.1%; $P < .01$) and isopropanol (100% vs 0%; $P < .01$) resulted in a significant decrease in bacterial colonization on stethoscopes. UV-C was not more effective at sanitizing stethoscopes than isopropanol (93.9% vs 100%; $P = .50$). **Conclusions:** Both UV-C and isopropanol were effective at cleaning hospital stethoscopes. Given that UV-C is not subject to user error and that it takes less time to clean a stethoscope than isopropanol, it may be the superior option in a clinical setting.

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Subject Category: Hand Hygiene

Hand hygiene adherence at entrances and exits of healthcare facilities in two rural districts of Uganda

Background: During the COVID-19 pandemic, the World Health Organization (WHO) has recommended hand hygiene (HH) stations (ie, with soap and water for handwashing or alcohol-based hand rub or ABHR) at entrances and exits of every public or private commercial building, including healthcare facilities (HCFs). **Methods:** Enumerators observed the HH materials present at the entrances and exits of 37 public HCFs in the Moroto and Kotido districts and patient and visitor use of those HH materials. When handwashing stations were nonfunctional or out of water, no HH observations were made. **Results:** Of the 37 HCF entrances and exits assessed, 4 (11%) met the recommended guidance for HH materials: 3 (8%) had water and soap, and 1 (3%) had ABHR and water and soap. In other HCFs, 12 (32%) had no HH station present, 13 (35%) handwashing stations had no water, and 8 (22%) had water but not soap. Of 180 persons observed, 52 (29%) attempted HH and only 10 (6%) used appropriate HH technologies (4 with ABHR and 6 with water and soap). Of 52 people who attempted HH, 42 (81%) used only water without soap. All HH observed occurred when entering facilities; no HH occurred when exiting (0 of 68). Of those 52 who performed HH, 48 (92%) performed HH for the recommended time of >20 seconds. However, only 9 (5%) of 180 adhered to suggested HH technologies and length of time (used water and soap scrubbing for ≥ 20 seconds or used ABHR). **Conclusions:** We detected poor HH practice by patrons at entrances and exits of HCFs, which may be due to lack of appropriate HH materials, particularly lack of soap. Optimal strategies for adherence to WHO-recommended HH practices at entrances and exits of public and private commercial buildings, including HCFs, should be explored.

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Subject Category: Hand Hygiene

Compliance and constraints of hand hygiene among healthcare workers in Bangladesh

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Background: Hand hygiene (HH) is a core element of patient safety and the single most essential strategy for preventing healthcare-associated

infections (HAIs). Adherence to HH among healthcare workers (HCWs) varies greatly depending on a range of factors, including risk perceptions, institutional culture, auditing mechanisms, and availability of HH supplies. We observed HH compliance among HCWs to determine the factors influencing practices in tertiary healthcare facilities in Bangladesh. **Methods:** During September 2020–February 2021, we conducted nonparticipatory observations at 11 tertiary-care hospitals in Bangladesh using the WHO “Five Moments for Hand Hygiene” tool to record compliance among physicians, nurses, and cleaning staff. We also performed semistructured interviews to determine the key barriers to complying with hand hygiene. Furthermore, we noted the presence, location, and functionality of existing HH stations within each hospital ward. **Results:** We observed 14,668 HH opportunities among HCWs. The overall HH compliance was 25.3%, and compliance differed significantly by professional category ($P < .001$). Physicians had the highest HH compliance at 28.5% (2,264 of 7,930), followed by nurses at 25.4% (1,272 of 5,008). Cleaning staff had the lowest rates of HH at 9.9% (171 of 3,221). HCWs of public hospitals had significantly higher odds of complying with HH practices than those in private hospitals (27.4% vs 17.9%; aOR, 1.73; 95% CI, 1.55–1.93; $P < .001$). HH compliance also varied by WHO Five Moments indicators. HCWs were 3 times more likely to perform HH ‘after touching a patient’ than ‘before touching patient’ (aOR, 3.36; 95% CI, 2.90–3.90; $P < .001$). Common barriers to using hand sanitizer were insufficient supply (57.9%), skin reaction (26.3%), shortage of time (14.5%), and lack of awareness (11.9%). Regarding handwashing with soap, inadequate supplies (27.0%), high workload (26.3%), and lack of facilities (22.7%) were the key factors for low adherence. The HH infrastructure observation in 82 wards showed that running water and soap were available in 168 (86.2%) of 195 HCW-designated basins, compared to 51 (35.9%) of 142 for the patient- and attendant-assigned basins. Handwashing posters were found in only 44 (13.1%) of 337 basin surroundings, and no hand drying supplies were observed for patients or attendants. **Conclusions:** Hand hygiene compliance among HCWs fall significantly short of the standard for safe patient

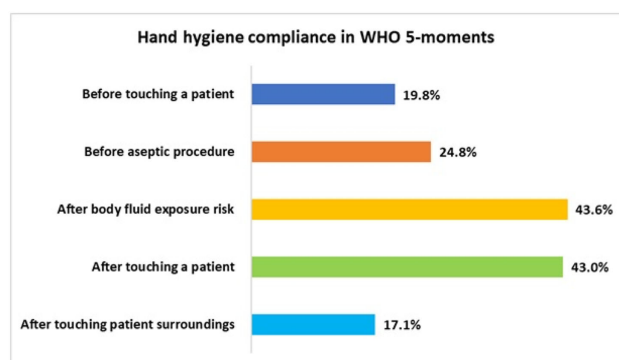


Fig. 1.

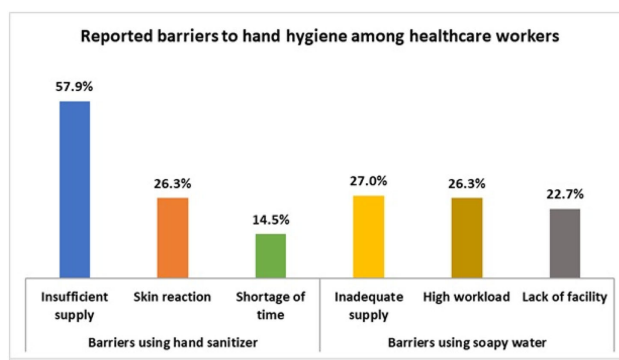


Fig. 2.