

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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#### Presentation Type:

Poster Presentation - Poster Presentation

**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  $\geq 20$  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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#### Presentation Type:

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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

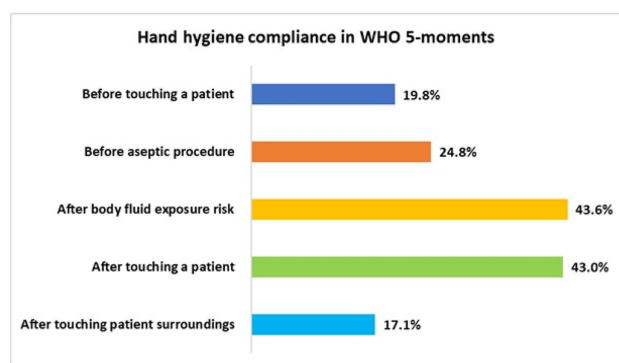


Fig. 1.

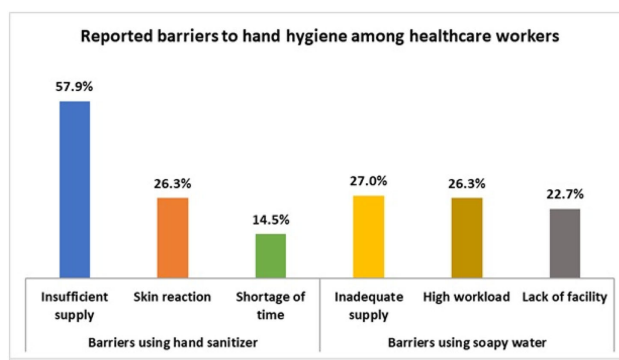


Fig. 2.

care. Inadequate HH supplies in a resource-constrained setting like Bangladesh demonstrates a lack of leadership in prioritizing, promoting, and investing in infection prevention and control. The findings of this study might help to motivate and design interventions for HH compliance, which will help reduce HAIs in the hospital setting.

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**Subject Category:** Hand Hygiene

**Electronic hand hygiene monitoring systems: Perceptions and behaviors**

Rachel Elliott; Jana Shaw; Paul Suits; Emina Fetibegovic; Telisa Stewart; Roger Wong and Julie Briggs

**Background:** Electronic hand hygiene monitoring systems (EHHMSs) are being increasingly utilized to improve hand hygiene outcomes. Following the implementation of an EHHMS at a large, academic medical center, an interdisciplinary team developed a web-based survey to gather information on employee's perceptions and behaviors surrounding the EHHMS. **Methods:** In total, 1,273 complete responses were collected. Responses were analyzed using Stata version 16 statistical software with 2-tailed tests and .05 significance level. Multivariate logistic regression models were constructed to examine factors associated with negative perceptions of the EHHMS and of wearing the EHHMS radiofrequency identification (RFID) badge. Supporting qualitative analysis was performed using Atlas.ti version 9 software. **Results:** The general sentiment toward the monitoring system was neutral (38%) to negative (37%). The same was true for respondents' sentiments toward wearing the RFID badge. Of respondents who interact with the system, 48% feel that the system does not capture hand hygiene data accurately. The EHHMS had limited influence on employee's hand hygiene habits: 27% significant influence and 54% little-to-no influence. Respondents of younger age, those employed as a registered nurse, scientist, physician, or master's level clinician, and those working at the satellite hospital were significantly more likely to have negative perceptions of the EHHMS. Negative perceptions were also significantly more likely among respondents familiar with the institution's hand hygiene policy and those who had a negative opinion of seeing the hand hygiene data of others. Negative perceptions of the EHHMS RFID badge were significantly more likely among respondents of younger age, those employed as a registered nurse, scientist, physician, or master's level clinician, those working at the satellite hospital, and those with a negative perception of seeing the hand hygiene data of others. Employment in a role providing direct patient care and those employed at the institution for >1 year were also significantly more likely to have a negative perception. **Conclusions:** Negative and neutral opinions dominate perceptions of the EHHMS considered in this analysis. Respondents expressed concerns with accuracy of the EHHMS data collection. The system's limited influence is likely a result of limited familiarity, limited performance feedback, and employee frustration and concerns. These findings provide opportunities for improvement in future implementation of EHHMS. Based on these results, implementation of EHHMS would be best supported by coordinated backing from administration and leadership, advanced planning and education, and frequent, effective communication. Additional research and evaluation are required to optimize implementation of electronic hand hygiene monitoring systems, with the goal of improving hand hygiene outcomes.

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**Subject Category:** Hand Hygiene

**Local production of alcohol-based hand rub to optimize hand hygiene facility in healthcare settings during COVID-19**

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**Background:** Hand hygiene (HH) remains arguably the most effective way to prevent healthcare-associated infections (HAIs) and ultimately improve the prospect of patient safety. Studies have shown that as many as 50%–70% of infections are transmitted through hands due to poor HH practices. HH with use of alcohol-based hand rub (ABHR) is preferred over handwashing with soap and water because of its wide microbial efficacy, time efficiency, and improved skin tolerance. It is also well known that ABHR can be used as an effective prevention measure during disease outbreaks. Before and during the COVID-19 pandemic, health facilities in Sierra Leone have been challenged with HH infrastructural problems such as lack of sinks with constant running water. Before Sierra Leone recorded its first case of COVID-19 in March 2020, the consumption of ABHR in the health facilities was estimated to be 24,000 L per year, which doubled during the COVID-19 pandemic. The demand for commercially available ABHR increased, leading to acute shortages. The estimated cost of the locally produced ABHR ~\$2–3 per 500 mL, although it may cost up to \$10 for 500 mL when buying imported ABHR products from the local market. **Methods:** All ingredients were procured locally, and ABHR production was based on WHO formula 1. The production was set for 12 months to cover the estimated annual consumption of ABHR, with periodic monitoring to ensure effective distribution and availability at the point of care. Analysis of assessment results in 12 hospitals from the pre-

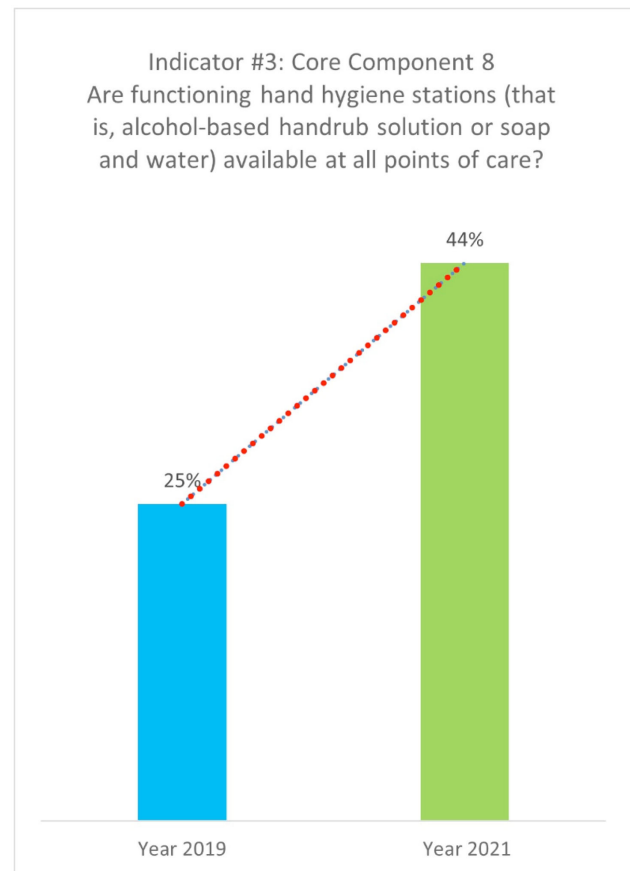


Fig. 1.