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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Presentation Type:
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Subject Category: Hand Hygiene

Electronic hand hygiene monitoring systems: Perceptions and behaviors

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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 be 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

Bobson Fofanah; Sia Tengbe; Ibrahim Kamara and Musa M. Korjie

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-

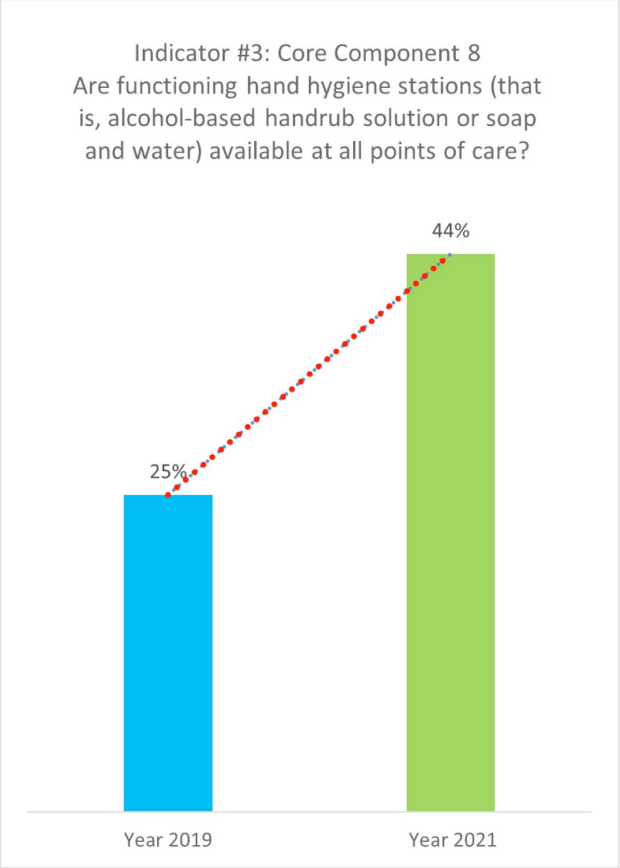

Fig. 1.

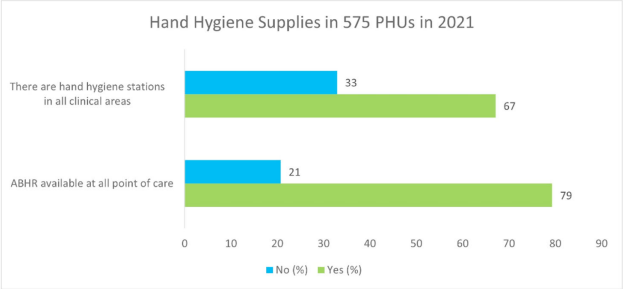

Fig. 2.

COVID-19 era (2019) to the COVID-19 era (2021) was performed based on the WHO IPC Assessment Framework (IPCAF) indicator. **Results:** With an average monthly production of 3,482 L, a total of 41,780 L ABHR was produced and packaged in branded 500-mL containers for distribution to healthcare facilities. This quantity exceeded the estimated demand for ABHR during the COVID-19 pandemic. The data show a considerable increase (from 25% to 44%) in the number of available and functioning HH stations with mainly locally produced ABHR. Results from the monitoring of 575 peripheral health units (PHUs) in 2021 also showed that >67% of PHUs had HH facilities in all clinical areas and that the locally produced ABHR was used in 79% of these HH stations. **Conclusions:** Locally produced ABHR has shown to be a cost-effective and evidence-based intervention to optimize HH at the point of care. Therefore, localities are encouraged to undertake this realistic and sustainable approach to address issues of acute shortage of ABHR, especially during a global pandemic.

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A pilot study of using thermal imaging to assess hand hygiene technique

John Boyce and Richard Martinello

Background: Although substantial efforts have been made to improve hand hygiene (HH) compliance among healthcare personnel (HCP), much less attention has been devoted to improving HH technique. To date, no standard method for assessing HH technique has been widely adopted by hospitals. Because applying an alcohol-based hand sanitizer (ABHS) transiently reduces adjacent skin temperature, we explored the feasibility of using thermal imaging to determine whether ABHS has been applied to fingertips and thumbs, areas often missed by HCP. **Methods:** A convenience sample of 12 Quality and Safety staff volunteered for the study. A FLIR One Pro thermal camera attached to an iPhone was used to obtain thermal images of the palmar aspect of each volunteer's dominant hand before applying ~1.8 mL ABHS gel, immediately after hands felt dry, and at 1 minute and 2 minutes later. Spot temperature readings of the mid-palm area and middle finger were recorded at each time point. The sex and estimated hand surface area (HSA in cm^2) of each volunteer were recorded. **Results:** In 11 of 12 volunteers, thermal imaging showed a significant decrease in mid-palm and middle finger skin temperatures after performing HH (paired t test $P < .01$ for both), especially for the fingers and thumb, indicating that ABHS was applied to these areas (Fig. 1). When HH was performed with ABHS and the thumb was purposefully excluded, the lack of colorimetric change in the thumb was visible (Fig. 2). The palmar area showed the least drop in temperature and reverted to normal temperature more quickly. Immediate post-HH mid-palm temperature change ranged from +0.5 to −2.7°C, with a significantly greater mean temperature drop with small or medium hands than with large hands (Mann-Whitney

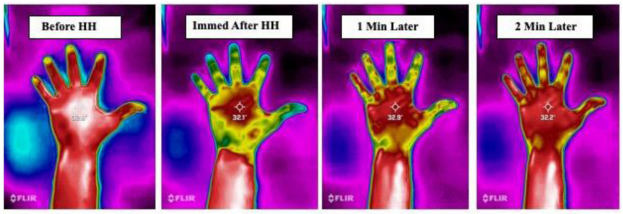

Figure 1. Thermal images of a volunteer's hand before, immediately after HH, and 1 and 2 minutes later

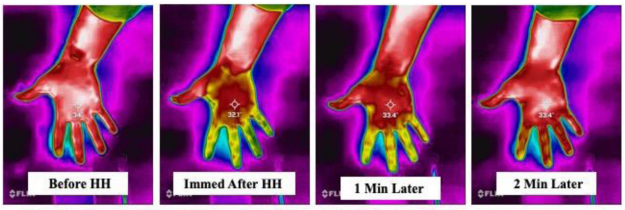

Figure 2. Thermal images illustrating HH using ABHS where the thumb was purposefully excluded

U test $P = .048$). With some volunteers, the color changes lasted 1 minute or longer. However, for persons with "cold" fingers at baseline, it was more difficult to draw conclusions from the gross assessment for colorimetric change. **Conclusions:** Thermal imaging of HH performance shows promise as an HH assessment technique and may be useful to determine whether HCP have applied ABHS to their fingertips and thumbs. Additional studies involving a much larger number of HCP under varying conditions are needed to determine whether thermal imaging can be a practical modality for teaching HH technique, for routinely monitoring HH technique, or as a research tool for studying the dynamics of HH using ABHS.

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Subject Category: Infection Control in Low and Middle-Income Countries

Prescribing of common outpatient antibiotics for respiratory infections in adults amid the COVID-19 pandemic in Brazil

Dipesh Solanky; Olivia McGovern; Fernanda Lessa; Lauri Hicks; Sharon Tsay and Payal Patel

Background: Inappropriate antibiotic use for SARS-CoV-2 infection has the potential to increase the burden of antibiotic resistance. Brazil experienced spread of a new SARS-CoV-2 variant in the fourth quarter (Q4) of 2020, resulting in the highest case counts in Latin America, raising concerns of antibiotic overuse. To better understand antibiotic use during the COVID-19 pandemic, we evaluated prescribing changes in antibiotics commonly used for outpatient respiratory infections (amoxicillin-clavulanate, azithromycin, and levofloxacin or moxifloxacin [AALM]) among adults aged ≥20 years in Brazil in 2020 versus 2019. **Methods:** We analyzed the IQVIA MIDAS medical data set for AALM prescribing by age group (20–39, 40–59, 60–64, 65–74, ≥75 years), comparing Q4 2020 rates to those in Q4 2019. We estimated crude rate ratios and 95% CIs using prescription number as the numerator (assuming Poisson counts) and age-adjusted population as the denominator. We also determined the most common prescribing specialties for each antibiotic across both time points. **Results:** Compared to Q4 2019, Q4 2020 azithromycin prescribing increased among all ages, ranging from 90.7% (95% CI, 90.0%–91.4%) in those aged 20–39 years to 927.2% (95% CI, 912.9%–941.7%) in those aged 65–74 years (Fig. 1). Amoxicillin-clavulanate prescribing decreased for most ages, ranging from −78.4% (95% CI, −78.7% to −78.1%) in those aged 60–64 years to −25.8% (95% CI, −26.6% to −25.0%) in those