cluster investigations, we determined that 9 investigations merited follow-up. Collectively, these 9 investigations involved 21 patients and required 115 minutes to review in ISEpi and an additional 70 minutes of review outside of ISEpi. After review, 6 investigations were deemed unlikely to represent a transmission; the other 3 had potential to represent transmission for which interventions would be performed. **Conclusions:** This study offers an important framework for adaptation of existing infection control workflow strategies to leverage the utility of rapidly integrated clinical and WGS data. This workflow can also facilitate time-sensitive decisions regarding sequencing of specific pathogens given the preponderance of available clinical data supporting investigations. In this regard, our work sets a new standard of practice: precision infection prevention (PIP). Ongoing effort is aimed at development of AI-powered capabilities for enterprise-level quality and safety improvement initiatives.
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Disclosures: Alan Doty and Juan Jose Carmona report salary from Philips Healthcare.
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Presentation Type:
Poster Presentation
Qualitative Visual Assessment of Hand Hygiene Product Effectiveness
Mary Czaplicki, GOJO Industries; Shorook Attar, GOJO Industries; Kristen Green, GOJO Industries; Rachel Leslie, GOJO Industries

Background: Effective hand hygiene (HH) is an essential preventative measure for the reduction of hospital-acquired infections (HAIs). Commonly used HH products include alcohol-based hand rubs (ABHRs), antimicrobial soaps, and nonantimicrobial soaps. In vivo clinical studies have demonstrated that levels of bacterial reduction can vary based on the HH product type, formulation, and dose. It has been reported that ABHRs provide the greatest reduction in bacteria, followed by antimicrobial soaps. **Objective:** We examined the effects of products representative of 3 HH categories on artificially soiled hands, using a hand-stamp procedure. The hand-stamp images provide a clear visualization of product effectiveness and can be used as an educational tool to promote the importance of proper hand hygiene using different product formats. **Method:** Three commercially available formulations were evaluated in this study, a mild nonantimicrobial soap, an antimicrobial soap containing chloroxylenol (PCMX), and an ABHR containing 70% v/v ethanol. Prior to the hand stamp procedure, the participant's hands were prewashed with 5 mL of a nonantimicrobial soap and dried. An inoculum of *Serratia marcescens* containing ~1 × 10^9CFU/mL was prepared as described in ASTM E2755. A 0.2-mL aliquot of the inoculum was dispensed onto the palm of the subject's hand and spread by rubbing over the entire surface of both hands. Following a 30-second dry time, one of the subject's hands was gently pressed onto the surface of a large petri dish containing tryptic soy agar to obtain a baseline image. Following the baseline sample, 1 pump of the selected test product (~0.9 mL for soap or 1.1 mL for ABHR) was applied to the participant's hands. For soap applications, hands were vigorously rubbed for 30 seconds followed by a 30-second water rinse. For ABHR, product was rubbed by the user until dry. The hand-stamp procedure was repeated following product application using the participant's other hand. **Results:** Clear qualitative reductions in bacteria were observed with each of the HH interventions. The greatest reduction was observed following the application of ABHR. Antimicrobial soap was less effective than ABHR but more effective than nonantimicrobial soap. **Conclusions:** The qualitative visual model demonstrates the effectiveness of various HH interventions and correlates with log reductions observed in traditional efficacy test methods. Future efforts should explore hand-stamp repeatability and image utilization to support HH improvement efforts in healthcare systems.
Funding: GOJO Industries provided support for this study.
Disclosures: Mary Rose Czaplicki reports salary from GOJO Industries.
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Presentation Type:
Poster Presentation
Rapid Ultrasensitive Detection of *Clostridiodes difficile* Toxins in Stool Samples Using A Single-Molecule Counting Method
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Background: *Clostridiodes difficile* infection is considered an urgent antibiotic resistance threat by the CDC, accounting for

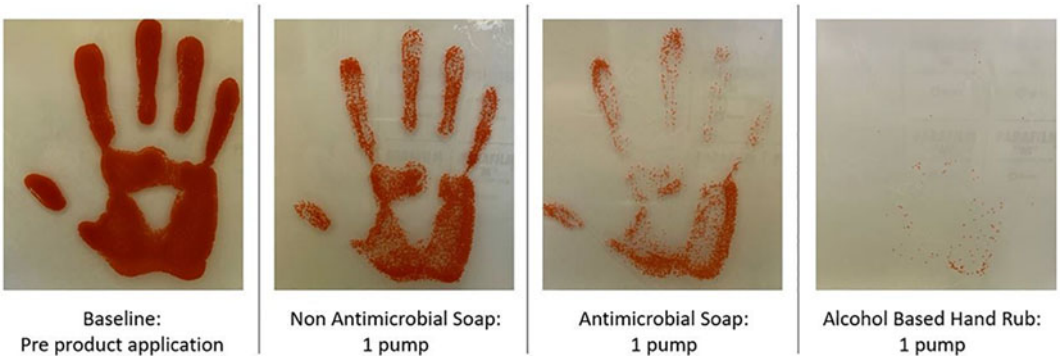

Fig. 1.

~225,000 hospitalizations, 12,800 deaths, and ~$1 billion in healthcare costs in the United States in 2017. The presence of the secreted toxins that cause the devastating symptoms of this gastrointestinal infection are diagnostic of *C. difficile* infection (CDI). However, the rapid testing methods currently used to detect CDI lack accuracy. Enzyme immunoassays are specific but lack sensitivity because they do not detect CDI patients that have low levels of the toxins. Nucleic acid amplification tests (NAATs) are sensitive, but they lack specificity because they detect patients colonized with *C. difficile* in the dormant spore form that does not produce the toxins. This insufficiency has resulted in the adoption of complex multitest algorithms for *C. difficile* diagnosis. We present results for a new toxin test that demonstrates both high clinical sensitivity and clinical specificity for *C. difficile* toxin B on a fully automated benchtop platform. **Methods:** The detection technology uses nonmagnified digital imaging to count single toxin molecules that tether together target-specific magnetic and fluorescent particles. The 30-minute method includes the use of a dye cushion to eliminate wash steps and the need for time-consuming specimen preparation steps. We determined analytical performance characteristics of the test using negative clinical stool samples spiked with purified toxin. To assess clinical performance, we tested 785 stool samples from 5 clinical sites and compared the results with the cellular cytotoxicity neutralization assay (CCNA). **Results:** The test's limit of detection for toxin B was 60 pg/mL. A comparison of the new test to the CCNA reference method gave 98% positive percentage agreement (83 of 85 samples) and 95% negative percentage agreement (667 of 700 samples). **Conclusions:** The new method demonstrated 96% accuracy compared to the gold standard for *C. difficile* toxin tests. The results also demonstrate an analytical sensitivity (limit of detection, 60 pg/mL). Thus, the test has the potential to detect CDI patients missed by enzyme immunoassay (EIA) tests due to their low analytical sensitivity. Because the test detects toxins directly, it is expected to have a lower false-positive rate than NAAT methods, which detect patients colonized with the non–toxin-producing spore form. A single accurate test for toxin-producing *C. difficile* could eliminate the need for multitest algorithms.

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Disclosures: Donald Straus reports that he is the founder and chief scientific officer of First Light Diagnostics (FLDx) with salary and ownership interest in the form of stocks, stock options, and warrants. Adam Williams reports salary from First Light Diagnostics.
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Presentation Type:
Poster Presentation

The Effect of Automated Hand Hygiene Monitoring Systems and Other Complementary Behavior-Change Strategies on Performance

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Background: Technology and interest for use of automated hand hygiene monitoring systems (AHHMS) as a tool to help improve healthcare personnel hand hygiene has been advancing for the last decade. Emerging evidence indicates that the use of AHHMS plus complementary strategies improves hand hygiene (HH) performance rates and outcomes (eg, healthcare-associated infections). The WHO HH guideline "Multimodal Strategy" teaches the importance of multiple components as necessary to build and sustain HH compliance. Few published data compare the impact of different complementary behavioral strategies in combination with AHHMS on results. **Methods:** We utilized data from 1 AHHMS that records alcohol-based hand rub and soap dispensing and room entries and exits to provide group HH performance rates. Data were collected from 58 units in 10 hospitals in North America from July 2014 through August 2019. Hospitals were stratified into 4 categories based on their approach to hospital-initiated unit-level interventions and AHHMS vendor support (Table 1). Baseline data were defined for each unit as the initial 1–2 months of execution, before complementary strategies

Table 1.

Table 1: ***Summary of the Categories of Complementary Behavior Change Strategies in Addition to Automated Hand Hygiene Monitoring System (AHHMS)***

Complimentary Behavior Change Strategies	Category Coding
Vendor-provided clinician support + hospital-initiated unit-level interventions	Vendor + Hospital
Vendor-provided clinician support with No hospital-initiated unit-level interventions	Vendor Only
Hospital-initiated unit-level interventions with No vendor support	Hospital Only
No vendor support + No hospital or unit-level interventions	AHHMS Only

Table 2.

Table 2: ***Hand Hygiene (HH)/Performance Data Sum by Complimentary Strategy***

Hand Hygiene Behavioral Intervention Categories	# Unit Months	# of Units	# of HH Events	#of HH Opportunities	Median HH Performance Rate [95% CI]	HH % Change vs. AHHMS Only [95% CI]
Vendor + Hospital	1,469	43	76,033,317	148,768,145	41.4% [37.0%, 46.4%]	+20.8% [20.5%, 30.0%]
Vendor Only	72	6	2,320,736	8,786,285	33.3% [29.7%, 37.3%]	-2.9% [-3.4%, -2.5%]
Hospital Only	384	8	11,755,028	37,485,325	32.3% [28.9%, 36.2%]	-5.8% [-6.2%, -5.4%]
AHHMS Only	159	57	9,079,929	27,613,157	34.3% [30.6%, 38.4%]	**Not Applicable**