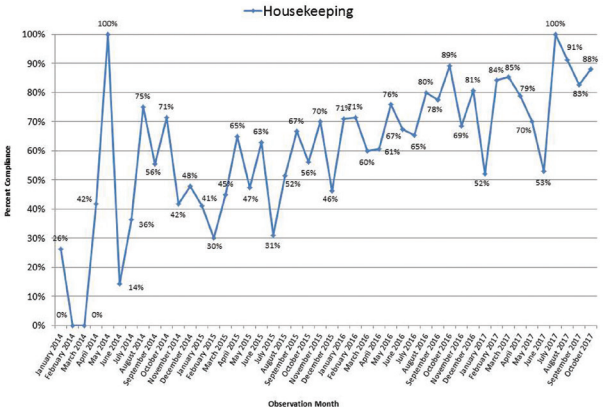
protect themselves and our patients, and reduce HAIs. Increasing EVS leadership commitment was key to further engage EVS staff and encourage better HH amongst EVS staff. Review of HH metrics was hard wired into the daily functions of the EVS department.

Results. Figure 1 shows EVS HH compliance from January 2014 through October 2017. This highlights the substantial progressive, albeit slow, improvement in EVS HH practices from a baseline of 40% to 60% to 80% over the course of nearly 4 years.

Conclusion. EVS HH rates remained suboptimal for prolonged periods. Initially the lack of leadership commitment and high staff turnover made training and engagement difficult. Continued interventions and use of just-in-time coaching proved to be effective to help improve compliance and better understand barriers to best practices. Connecting with EVS staff in small group huddles and the engagement of EVS leadership was key to success.

Figure 1 – Hand Hygiene Compliance by Healthcare Worker Type



Disclosures. **J. P. Parada**, Merck: Speaker's Bureau, Speaker honorarium.

461. Electronic Hand Hygiene Compliance Monitoring Systems: Not All Are Created Equal

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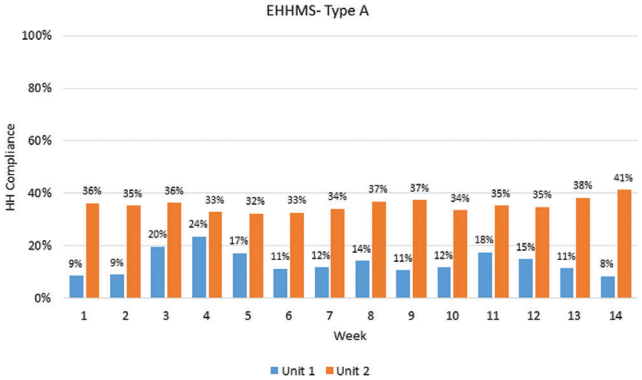
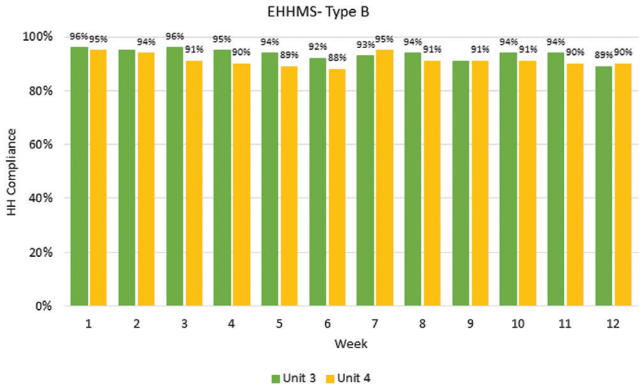
Background. While direct observation is considered the gold standard for hand hygiene (HH) surveillance, there is a growing interest in the implementation of electronic monitoring systems, which claim to accurately capture individual-level HH performance.

Methods. Two types of electronic hand hygiene monitoring systems (EHHMS) were trialed at an 865-bed, academic medical center over an 18-month period. Each type of EHHMS was piloted in two inpatient units, and hospital employees who had contact with patients and/or the patient environment were eligible to participate. In each trial, participants received standard training and were then asked to wear EHHMS badges while continuing their normal workflow. Methods of assessment included regular review of EHHMS reports, an inter-rater reliability analysis to compare EHHMS to direct observation by trained HH observer, and a qualitative electronic survey to assess the acceptability of EHHMS. HH compliance goal was set at 90%.

Results. In the first pilot, 279 employees volunteered to trial Type A EHHMS for 14 weeks, with an overall HH compliance of 30% (87,688 opportunities). In the second pilot, 169 employees volunteered to trial Type B EHHMS for 12 weeks, with an overall HH compliance of 93% (363,272 opportunities). Voluntary survey response rate for Type A was 32% (90/279) and for Type B was 40% (67/169). The majority of respondents consistently used EHHMS in daily workflow (Type A: 82%, 68/83) (Type B: 82%, 55/67) and most did not felt apprehensive about using the EHHMS (Type A: 19%, 16/83) (Type B: 22%, 15/67).





Inter-rater reliability assessment of piloted EHHMS

Type of Technology	Unit	Number of beds	Technology Compliance	HH Observer Compliance	Kappa Statistic	Technology Accuracy
Type A	Unit 1	20	15% (*N* = 86)	90.8% (*N* = 308)	0.039	11%
	Unit 2	30	42% (*N* = 98)	89% (*N* = 470)	0.180	54%
Type B	Unit 3	30	93% (*N* = 116)	90% (*N* = 48)	0.81	97%
	Unit 4	30	87% (*N* = 141)	92% (*N* = 60)	0.74	95%

Conclusion. Type B EHHMS captured our healthcare workers' HH performance during clinical workflow with a greater accuracy and more HH events than Type A. EHHMS may provide an alternative method to capture HH compliance in the healthcare setting. Hospitals considering the use of an EHHMS should assess the technology's ability to accurately capture HH performance in the clinical workflow prior full housewide implementation.

Disclosures. **All authors:** No reported disclosures.

462. *"All Eyes on You"*: A Covert Observational Study on Contact Precaution Compliance in Six Hospitals at the Detroit Medical Center

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Background. The Center for Disease Control and Prevention recommends strict contact isolation precautions (CP) that include hand hygiene (HH) and barrier (gloves and gown) precautions upon entering and leaving the rooms of patients diagnosed with multidrug-resistant organism or *Clostridium difficile* infections. Although this policy has been in place for several years, compliance rate among HCW is rarely studied. The aim of our study was to covertly monitor, analyze, and compare the overall bundle compliance (OBC) and individual (HH, glove and gown) component compliance (ICC) among HCWs during routine patient care.

Methods. A prospective observational study was done in six Detroit Medical Centers (July 2017 to February 2018). Trained observers audited both inpatient and intensive care units on random days and time. Components audited (1) HH before donning and after doffing (2) gowning and gloving techniques before entering and after existing the patient room. A mobile application (speedy audit) was used to record all data. A pilot targeted education program (TEP) was also conducted in one of the hospitals where education was focused only on strict HH practice before donning.

Results. A total of 6,274 observations were collected. The OBC was 38%. Common HCWs observed included nurses (registered nurse and nursing student)

47%; physicians (attending's, residents, fellows) 28%; service workers including Environmental Service, Food service, Patient transporter, Social worker, Pastoral care-14%; Allied Health Professions including Dietician, Blood Collection, Physiotherapist, Radiology Tech, Respiratory Therapist 4%; The OBC among all HCW were below 50%. For the ICC, HH (49%) was way below the gloving (80%,) and gowning (62%) compliance. HH compliance before donning was strikingly lower (40%) than the compliance after doffing (62%). This trend was similar in all HCW. Within a month of TEP, a drastic increase in both HH [↑ to 75% from 26% ($P < 0.001$)] and OBC [↑ to 68% from 16% ($P < 0.001$)] was seen.

Conclusion. Common misconception that gloves are substitute to HH could explain the low HH rates before donning. Recognition of this gap and focused education on HH before donning has led to improved compliance in all HCW.

Disclosures. **All authors:** No reported disclosures.

463. Healthcare Workers Perceptions Regarding the Use of an Electronic Hand Hygiene Monitoring System at a VA Hospital

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Background. A cornerstone of healthcare-associated infection prevention is hand hygiene which has resulted in regulatory requirements to monitor hand hygiene compliance. Direct observation is the gold standard for hand hygiene compliance monitoring, but has several drawbacks. Electronic monitoring systems have begun to replace direct observation with several potential advantages, including larger sample size and more timely feedback. End user acceptance and adoption is a critical step to evidence-based practice implementation. To evaluate potential barriers and facilitators to adoption, we conducted a qualitative evaluation of nursing perceptions following a trial of an electronic hand hygiene compliance monitoring system.

Methods. We conducted four focus groups of 21 nursing staff on a medical/surgical inpatient unit at a tertiary care VA hospital. Nursing staff consisted of Registered Nurses, Nursing Assistants, and Health Technicians; of which there were 19 females and 2 males. Groups were audio recorded and tapes transcribed. Content analysis of transcriptions was undertaken to identify codes, categories, and themes.

Results. Themes identified as facilitators included: (1) unit champion; (2) electronic observation (vs. human observation); and (3) timely feedback. Themes identified as barriers included: (1) concern with data accuracy; (2) feasibility of frequent (daily) goal setting; and (3) staff knowledge of how system works.

Conclusion. Nursing staff perceived electronic monitoring improved hand hygiene compliance. Staff verbalized negative perceptions with hand hygiene compliance monitoring but preferred electronic monitoring vs. human monitoring. Most barriers discussed revolved around the need to understanding how the electronic monitoring system works and need to believe the data are accurate. Implementation of this innovative technology will require extensive planning to address staff knowledge and understanding to ensure staff acceptance and adoption.

Disclosures. **All authors:** No reported disclosures.

464. The Efficacy of Alcohol Based Wipes, Gel, Foam, and Spray Compared With Liquid Soap in Eliminating Transient Hand Bacteria

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Background. Hand hygiene is a proven method of preventing the spread of pathogens and reducing healthcare-associated infections. Studies have shown that up to 50% of healthcare professionals' (HCPs) hands were contaminated with the same pathogen as a patient with a confirmed multidrug-resistant organism, such as MRSA or VRE, after exiting the room. This suggests that these bacteria were obtained through contact with the environment and/or patient. The objective of this study was to compare the efficacy of alcohol based hand rubs and liquid soap at the removal of transient hand bacteria.

Methods. Seventy-five healthy adults were randomly chosen to participate in one of the five hand hygiene tests. Before implementing hand hygiene, moistened sterile swabs were used to rub the fingers, thumbs, and palms of both hands. The volunteers then performed one of the hand hygiene methods following WHO recommendations for hand washing and hand rubs. Wipes were used by applying a pulling motion on fingers and thumbs followed by rubbing the palms. The swabs were agitated for 15 seconds in a peptone broth and poured onto Petrifilms for incubation of 48 hours at 37°C.

Results. The percent reduction in transient hand bacteria using aerobic colony counts were enumerated and calculated as follows: 90% for wipes, 82% for liquid soap, 80% for gel, 72% for foam, and 71% for spray. The wipes eliminated hand bacteria significantly better then the liquid soap ($P = 0.0247$) while the gel ($P = 0.7239$) and foam ($P = 0.0661$) showed no significance. Lastly, the soap preformed significantly better than the spray ($P = 0.0182$).

Conclusion. This study demonstrated that alcohol-based wipes performed better at removing transient bacteria from the hands than liquid soap and water. This result potentially provides another method for HCPs in reducing the risk of infection for their next patient and decreasing the likelihood of transmitting an infectious agent via hands.

Disclosures. **All authors:** No reported disclosures.

465. Microbial Removal Efficacy of a Novel Nonantimicrobial Hand Soap

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Background. The CDC Hand Hygiene Guidelines recommend washing hands with soap when hands are visibly soiled. Pending changes to the United States healthcare antiseptic regulations are decreasing the availability of antimicrobial soap active ingredients making it important to understand key performance differences across soap types. The purpose of this study was to investigate the germ removal properties of a novel, nonantimicrobial soap exhibiting improved interfacial tension properties, a measure of the interaction of the soap with skin.

Methods. The novel nonantimicrobial soap was compared with a control nonantimicrobial soap. In study 1, the soaps were tested according to ASTM E2755 to determine reduction of *Serratia marcescens* after one use where 5 mL of soap was applied to dry hands, lathered 30s and rinsed 30s ($N = 12$). Studies 2 and 3 compared the products under more realistic test conditions, including a more relevant healthcare pathogen, more realistic product application and in study three skin condition representative of healthcare worker skin. The second study compared the novel soap and the control soap for *Staphylococcus aureus* removal using ASTM E2755 with 1.8 mL of soap applied to dry hands, lathered for 30s and rinsed for 10s ($N = 12$). The third study used an *ex vivo* skin model of dry, irritated human skin to evaluate *S. aureus* removal. Statistical comparisons between soaps were made using a paired t-test ($\alpha = 0.05$).

Results. In all three studies, the novel nonantimicrobial soap was superior to the control soap for bacteria removal. In study 1, the novel soap achieved a 2.26 $\log_{10}$ reduction compared with a 1.70 $\log_{10}$ reduction for the control soap ($P < 0.0001$). In studies 2 and 3, the nonantimicrobial soap achieved $\log_{10}$ reductions that were 0.34 ($P = 0.0236$) and 0.53 ($P = 0.005$) greater than the control soap, respectively.

Conclusion. This study indicates that a nonantimicrobial soap can achieve a high level of microbe removal (>99%) on skin. Additionally, product formulation appears to impact the microbial removal properties of nonantimicrobial soap on both healthy human subjects, and on dry irritated human skin. Therefore, this novel soap may be a good option in a high-frequency hand hygiene environment such as healthcare.

Disclosures. **S. Edmonds-Wilson**, GOJO Industries: Employee, Salary. **K. Tian**, GOJO Industries: Employee, Salary. **J. Bingham**, GOJO Industries: Employee, Salary.

466. Use of Administrative Data to Characterize *Clostridium difficile* Infections (CDI) Reported by California Hospitals to the California Department of Public Health (CDPH) via the National Healthcare Safety Network (NHSN): 2014–2015

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Background. In 2014–2015, CDI accounted for more than half of all healthcare-associated infections (HAI) reported by California hospitals. The CDPH HAI Program used an administrative dataset from the California Office of Statewide Health Planning and Development (OSHPD) to identify admission source (e.g., home, skilled nursing facility), length of stay, payer category, and outcome (e.g., death) of patients with CDI reported by California hospitals via NHSN.

Methods. We merged NHSN CDI events with OSHPD hospital discharge data for the period January 1, 2014, to December 31, 2015. NHSN classifies CDI cases as community onset (CO) if the CDI test specimen was collected during the first three hospital days and hospital onset (HO) if collected on day 4 or later. We used OSHPD discharge records that listed CDI as a diagnosis (ICD-9-CM: 00845 and ICD-10-CM: A047 codes). We matched NHSN CDI records with OSHPD hospital discharge records by hospital, admission date, and date of birth.

Results. Hospitals reported 58,841 NHSN inpatient incident and recurrent CDI events in 2014–2015. We matched 42,172 (71.7%) NHSN CDI records with an OSHPD hospital discharge record; 60.5% of matched cases were CO-CDI and 39.5% were HO-CDI. Sources of admission included home (78.2%; CO: 81.0% and HO: 74.0%), skilled nursing/intermediate care facility (10.7%; CO: 10.9% and HO: 10.4%), acute care hospital (6.0%; CO: 3.2% and HO: 10.4%), and residential care facility (1.7%; CO: 2.0% and HO: 1.4%). Payers included Medicare (61.8%), Medi-Cal (18.7%), and private insurance (16.8%). The median length of stay for CO cases was 5 days (interquartile range [IQR]: 3–9), and for HO cases, 15 days (IQR: 9–25); 8.7% (CO: 7.1% and HO: 11.2%) of patients with CDI died during hospitalization.

Conclusion. Our analysis demonstrates use of an administrative dataset to supplement NHSN HAI data. Patients with CDI were predominantly admitted from home and had prolonged hospitalizations and substantial in-hospital mortality. We are evaluating use of these data to identify hospital admissions at various time intervals before