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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Session: 58. Healthcare Epidemiology: Advances in Hand Hygiene
Thursday, October 4, 2018: 12:30 PM

Background. The CDC Hand Hygiene Guidelines recommend washing hands with soap when hands are visibly soiled. Pending changes to the United States healthcare antimicrobial 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 for 30s and rinsed 10s (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 standard 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 (α = 0.05).

Results. In all three studies nonantimicrobial soap achieved 100% removal of S. marcescens. In study 1, the novel soap achieved a 1.6 log reduction compared with a 1.0 log reduction for the control soap (P < 0.0001). In studies 2 and 3, the nonantimicrobial soap achieved log 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 hygiene setting such as healthcare settings.

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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 HAIP 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 diagnoses (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
clearly responsible for the reversal, we did observe a statistically significant increase in the proportion of HA CDI cases. The proportion of cases visiting ambulatory healthcare settings during the year previous to the outbreak were tracked using an epidemic curve and institutional case mapping. A multipronged intervention was implemented that included molecular typing of isolates, quarterly terminal cleaning of the ED, improved CDI screening and testing, intensified antimicrobial stewardship (AS) with mandatory education for key clinicians, and rigorously enhanced enforcement of hand hygiene with secret observers and directed feedback. Pre-, mid-, and fully-implemented intervention HA and CA CDI rates were observed.

Methods. Hospital acquired (HA) and community-acquired (CA) CDI cases were tracked using an epidemic curve and institutional case mapping. A multipronged intervention was implemented that included molecular typing of isolates, quarterly terminal cleaning of the ED, improved CDI screening and testing, intensified antimicrobial stewardship (AS) with mandatory education for key clinicians, and rigorously enhanced enforcement of hand hygiene with secret observers and directed feedback. Pre-, mid-, and fully-implemented intervention HA and CA CDI rates were observed.

Results. Ninety-five percent of CA CDI and 98% of all patients who developed CDI were admitted through the ED. Cases of CDI were distributed throughout the hospital. The genotyping did not identify a single strain outbreak. Sixteen percent of all CDI samples (23% of CA and 9% of HA cases) sent to the DOH tested positive for B5NAP1. Preintervention rates of HA CDI were found to be lower than mid-intervention rates (2.4, 95% CI= 1.5–3.1 vs. 4.3, 95% CI= 1.13–7.37). HA CDI rates after full-intervention in fourth quarter 2017 and first quarter 2018 trended toward baseline (2.1, 95% CI= 0–5.93) but had not achieved statistical improvement (Figure 1). A significant correlation between HA CDI rates and CA CDI rates was not found ($r = 0.241, P < 0.5$), suggesting that HA CDI rates were not driven by CA CDI rates. Hospital and ED hand hygiene improved significantly; hospital preintervention $= 0.91$, ED hand hygiene improved significantly; hospital preintervention $= 0.84$ vs. intervention $= 0.91$, P < 0.01; ED hand hygiene preintervention $= 0.72$ vs. intervention $= 0.86$, P < 0.05. No statistically significant changes in antimicrobial use were noted.

Conclusion. A rapid, aggressive team-based approach for a CDI outbreak successfully reversed a rising rate and SIR. Although no specific intervention was clearly responsible for the reversal, we did observe a statistically significant increase in hand hygiene. This outbreak and its management illustrate the importance of active surveillance and a rapid team-based response to CDI outbreaks.

Disclosures. All authors: No reported disclosures.

468. Diagnosis of Clinical Clostridium difficile Infection: An Unmet Challenge in New York, USA

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Session: 59. Healthcare Epidemiology: Updates in C. difficile

Background. Diagnosis of Clostridium difficile infection (CDI) is challenging. The reason is two-fold: (a) lack of unique symptoms and (b) lack of a gold standard test for CDI. We studied variation in CDI rates when different diagnostic algorithms were utilized. In addition, we compared patients who met the clinical definition of CDI with different diagnostic assays.

Methods. This is a retrospective study at an academic medical center (401-bed) conducted over 12 months (January 2017–December 2017). A stool sample that tested positive by polymerase chain reaction (PCR) for C. difficile ($n = 81$) was then tested for glutamate dehydrogenase (GDH) and toxin enzyme immunoassay (EIA). Additionally, all PCR-positive cases were also tested for toxin production by cytotoxic neutralization assay (CCNA). Clinical C. difficile was defined as three or more loose stools within 24-hour time period. Clinical data were obtained from review of charts. This definition was applied to all community-onset and hospital-onset cases.

Results. C. difficile was detected in 81 symptomatic patients by PCR test. Of these, 41.9% met the clinical definition of diarrhea. Of the 81 patients, toxin EIA and GDH were positive in 28.6% (24/81) and 4% met the clinical definition. CCNA was positive in 66.7% (54/81) and only 8% met the clinical definition. The CDI rate (per 10,000 patient days) was 10.2 in the PCR positive group; 3.02 in toxin EIA and GDH group and 6.81 in CCNA group. Duration of diarrhea was longer when functional assays (toxin EIA and/or CCNA) were positive, i.e., 48 hours after diagnosis, 22.7% (18/79) of patients with a positive CCNA and EIA had diarrhea while 4.3% (4/94) of the patients with GDH and PCR positive tests (nonfunctional assays) had diarrhea ($P = 0.013$). The difference was statistically significant. All 81 patients were started on CDI treatment within 24 hours of diagnosis. Of note, there was no laxative use contributing symptoms in these cases.

Conclusion. C. difficile rates differ with various diagnostic algorithms. Duration of diarrhea was significantly longer when functional assays (CCNA or toxin EIA) were positive. Inclusion of both a functional assay (EIA and/or CCNA) and a clinical definition of CDI can improve the test characteristics. A combination of clinical judgment and functional assays is required for an accurate diagnosis of CDI.

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469. Validation and Characterization of Community-Acquired Clostridium difficile Infections from the Quebec C. difficile Infection Surveillance Program (QCISP)

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Session: 59. Healthcare Epidemiology: Updates in C. difficile

Background. Community-acquired Clostridium difficile infections (CA-CDI) are under a mandatory reporting program starting in August 2004 across 95 healthcare institutions from the QCISP. There has been a slow and continuous increase in the incidence rate of hospitalized CA-CDI since 2007 without any known obvious explanation. The objectives of this study were to characterize cases of CA-CDI and investigate the potential causes of this increase.

Methods. A retrospective study was carried out using a survey sent to eligible healthcare institutions. Hospitals participating in QCISP that reported ≥3 cases of CA-CDI in 2016–2017 were invited to participate. To identify potential causes of the apparent increase in CA-CDI incidence, they were asked to provide clinical information regarding up to three cases of CA-CDI for two distinct surveillance years (2011–2012 and 2016–2017). To characterize each CA-CDI cases, a broad range of demographic, clinical, and laboratory variables were collected, including medical history, contact of patients with primary and secondary healthcare institutions, previous antibiotics use as well as laboratory diagnostic test. A χ² test have been used to test year differences in indicator distributions.

Results. A total of 49 healthcare institutions provided data on 172 cases of CA-CDI. Overall, 92% ($n = 159$) of them meet the QCISP CA-CDI criteria definition. Among them, 60% patients were 65 years old, 74% were female, and average age was 66±20.5 year old. Seventy-four percent had received antibiotic in the previous year. Between the two years, there was no significant change in the socio-demographic and clinical variables of CA-CDI cases. The proportion of patients receiving immunosuppressive drugs and proton pump inhibitors at the time of diagnosis was 11% and 45%, respectively. The proportion of cases visiting ambulatory healthcare settings during the year previous to patient admission increased from 61% (2011–2012) to 69% (2016–2017) ($P = 0.18$). Moreover, there was a significant increase in the proportion of CA-CDI diagnosed by laboratory PCR test (from 8% to 55%; $P < 0.0001$).

Conclusion. This study provided important data to characterize CA-CDI using the QCISP. The increase in the use of PCR is associated with the incidence of CA-CDI but may not be the cause of it.

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470. Concomitant Antibiotic Use and Death Among a National Cohort of Veterans With Clostridium difficile Infection (CDI)

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Session: 59. Healthcare Epidemiology: Updates in C. difficile

Background. Antibiotic use is a well-known risk factor for development of CDI, and there is preliminary evidence suggesting concomitant antibiotic use may result in poor outcomes, including death. This work investigated the effect of concomitant antibiotic exposure during CDI treatment on mortality among patients with CDI.