Presentation Type:
Poster Presentation

Temporal Change of Risk Factors in Hospital-Acquired *Clostridioides difficile* Infection Using Time-Trend Analysis

Jiyoun Song, Columbia University; Bevin Cohen, Columbia University School of Nursing; Philip Zachariah, Columbia University Medical Center; Jianfang Liu, Columbia University School of Nursing; Elaine Larson, Columbia University School of Nursing

Background: In the past few decades, the epidemiology of *Clostridioides difficile* infection (CDI) has evolved. Given recent changes in the incidence of CDI and prevention efforts, we investigated temporal changes over a period of 8 years (2009–2016) in the incidence of and risk factors for CDI. **Methods:** Both pediatric and adult inpatients discharged from hospitals in metropolitan New York City were included. Individual and environmental (eg, pharmacological) risk factors were identified through a matched case-control by the length of stay at a ratio of 1:4. A Cochran–Armitage test or Mann-Kendall test was used to investigate trends of incidence and risk factors. **Results:** During the study period, 6,038 of 694,849 (0.87%) patients had a positive test for *C. difficile* during their hospitalization. Of these, 2,659 of 6,038 (44.04%) were identified as hospital-acquired CDI (HA-CDI) and just over half (3,379 of 6,038, 55.96%) were identified as community-acquired CDI (CA-CDI). There were no trends in total CDI incidence rates; rather, we detected downward trends in HA-CDI and upward trends in CA-CDI (P_{trend} < .05). Younger patients and patients with lower risk of illness had HA-CDI over time (P_{trend} < .05). Antibiotics were administered to more patients over time and in longer cumulative days (+3% and +3.1% per year). We detected a reduction in the receipt of high-risk antibiotics in all cohorts (−0.12% per year) and a decrease in cumulative days of high-risk antibiotics in the cohort with HA-CDI (−1.1% per year). When stratified by the type of high-risk antibiotics, the use of carbapenem, cephalosporins, clindamycin, and monobactam increased (+0.53%, +1.8%, +0.5%, and +0.39% per year, respectively), whereas the use of broad-spectrum penicillins and glycylcycline significantly decreased over time in all cohorts (−1.8% and −0.22% per year). Among the cohorts with HA-CDI, only cephalosporins showed a significant upward trend (+ 5.7% per year) and only fluoroquinolones showed a significant downward trend (−2.2% per year). Lastly, a reduction of proton pump inhibitors and an increased use of histamine-2 blockers were detected in all cohorts (−3.8% and +7.3% per year) (all P_{trend} < .05). **Conclusions:** Although the incidence of HA-CDI decreased, more effort to decrease all antibiotics use and cumulative days should be emphasized as part of antibiotic stewardship. The downward trends of high-risk antibiotics might have been associated with the decrease in the trend of HA-CDI; however, the impact of the trends of risk factors on the trend of HA-CDI should be further investigated.

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Temporal Changes in Central-Line–Associated Bloodstream Infection Time Between Events, 2017–2018 Versus 2015–2016

Jonathan Edwards, Centers for Disease Control and Prevention; Katherine Allen-Bridson, Centers for Disease Control and Prevention; Daniel Pollock, Centers for Disease Control and Prevention

Background: The CDC NHSN surveillance coverage includes central-line–associated bloodstream infections (CLABSIs) in acute-care hospital intensive care units (ICUs) and select patient-care wards across all 50 states. This surveillance enables the use of CLABSI data to measure time between events (TBE) as a potential metric to complement traditional incidence measures such as the standardized infection ratio and prevention progress. **Methods:** The TBEs were calculated using 37,705 CLABSI events reported to the NHSN during 2015–2018 from medical, medical-surgical, and surgical ICUs as well as patient-care wards. The CLABSI TBE data were combined into 2 separate pairs of consecutive years of data for comparison, namely, 2015–2016 (period 1) and 2017–2018 (period 2). To reduce the length bias, CLABSI TBEs were truncated for period 2 at the maximum for period 1; thereby, 1,292 CLABSI events were excluded. The medians of the CLABSI TBE distributions were compared over the 2 periods for each patient care location. Quantile regression models stratified by location were used to account for factors independently associated with CLABSI TBE, such as hospital bed size and average length of stay, and were used to measure the adjusted shift in median CLABSI TBE. **Results:** The unadjusted median CLABSI TBE shifted significantly from period 1 to period 2 for the patient care locations studied. The shift ranged from 20 to 75.5 days, all with 95% CIs ranging from 10.2 to 32.8, respectively, and P < .0001 (Fig. 1). Accounting for independent associations of CLABSI TBE with hospital bed size and average length of stay, the adjusted shift in median CLABSI TBE remained significant for each patient care location that was reduced by ~15% (Table 1). **Conclusions:** Differences in the unadjusted median CLABSI TBE between period 1 and period 2 for all patient care locations demonstrate the feasibility of using TBE for setting benchmarks and tracking prevention progress. Furthermore, after adjusting for hospital bed size and average length of stay, a significant shift in the median CLABSI TBE persisted among all patient care locations, indicating that differences in patient populations alone likely do not account for differences in TBE. These findings regarding CLABSI TBEs warrant further exploration of potential

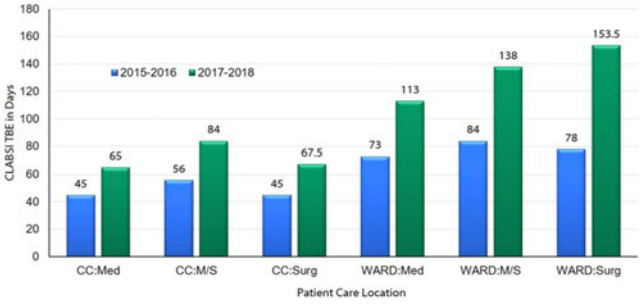

Fig. 1.

Patient Care Location	Number of CLABSIs	CLABSI TBE Shift of Median	95% Confidence Limits		P-value
CC:Medical	5027	17.0	12.1	21.9	<0.0001
CC:Med-surg	10475	25.0	20.3	29.7	<0.0001
CC:Surgical	2774	21.0	14.2	27.8	<0.0001
WARD:Medical	7494	42.0	34.2	49.8	<0.0001
WARD:Med-surg	7619	49.0	41.3	56.7	<0.0001
WARD:Surgical	3024	65.0	52.2	77.8	<0.0001

*Adjusted for hospital bed size and average length of stay

Fig. 2.

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shifts at additional quantiles, which would provide additional evidence that TBE is a metric that can be used for setting benchmarks and can serve as a signal of CLABSI prevention progress.
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The Burden of Gastroenteritis Outbreaks in Long-Term Care Settings in Philadelphia, 2009–2018
Hansol Kang, University of Florida College of Medicine; Susan Coffin, Childrens Hospital of Philadelphia; Tiina Peritz, Philadelphia Department of Public Health

Background: Gastroenteritis causes significant morbidity and mortality in long-term care facility (LTCF) residents, a growing population within the United States. **Methods:** We conducted a retrospective cross-sectional study in LTCFs in Philadelphia County from 2009 to 2018. Outbreak characteristics and interventions were extracted from Philadelphia Department of Public Health's (PDPH) database, and quality data on all LTCFs was extracted from the CMS Nursing Home Compare database. **Results:** We identified 121 gastroenteritis outbreaks in 49 facilities. Numbers of affected patients ranged from 2 to 211 patients (median patient attack rate, 17%). Staff were reported ill in 94 outbreaks (median staff attack rate, 5%). Outbreak facilities were associated with higher occupancy rates (91% vs 88%; $P = .033$) and total bed numbers (176 vs 122; $P = .071$) when compared to nonoutbreak facilities. Higher rates of staff illness were associated with prolonged outbreaks (13% vs 4%; $P < .001$) and higher patient illness rates (9% vs 4%; $P = .012$). Prolonged outbreaks were associated with lower frequency of cohorting for outbreak management (13% vs 41%; $P = .046$). **Conclusions:** This study is the largest published analysis of gastroenteritis outbreaks in LTCFs. Facility characteristics and staff disease 20 activity were associated with more severe outbreaks. Heightened surveillance for gastrointestinal symptoms among staff and increased 21 use of cohorting might reduce the risk of prolonged gastroenteritis outbreaks in LTCF.
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The Daily Direct Costs of Isolating Patients Identified With Highly Resistant Microorganisms
Manon van Dijk, Department of Medical Microbiology and Infectious Diseases, Erasmus MC, University Medical Center, Rotterdam, The Netherlands; Anne F. Voor in 't holt, Medical Microbiology and Infectious Diseases, Erasmus University Medical Centre; Juliëtte Severin, Erasmus MC University Medical Center Rotterdam; Suzanne Polinder, Department of Public Health, Erasmus University Medical Center Rotterdam, The Netherlands; M. Vos, ErasmusMC

Background: Isolation precautions are recommended when caring for patients identified with highly resistant microorganisms (HRMOs). However, the direct costs of isolating patients are largely unknown. Therefore, we aimed to obtain detailed information on the daily direct costs associated with isolating patients identified with HRMO. **Methods:** This study was performed from November until December 2017 on a 12-bed surgical ward. This ward contained solely isolation rooms with an anteroom. The daily direct costs of isolation were based on three cost items: (1) additional personal protective equipment (PPE); measured by counting the consumption of empty packaging materials, (2) cleaning and disinfection of the isolation room; based on the costs of an outsourced cleaning company, and (3) additional workload for healthcare workers; based on literature and multiplied by the average gross hourly salary of nurses. A distinction was made between the costs for strict isolation, contact-plus isolation, and contact isolation. **Results:** During the study period, 26 patients were nursed in isolation because of HRMO carriage, resulting in a total of 304 isolation days (median 7 isolation days; range 1-44). Gloves were consumed the most and hair caps the least. The average daily direct costs of isolation were the least expensive for contact isolation, €28/$31, and the most expensive for strict isolation, €41/$47. **Conclusions:** By using a novel, easy method to estimate consumption of PPE, we conclude that the daily direct costs of isolating a patient, differs per type of isolation. Insight into the direct costs of isolation is of utmost importance when developing or revising policies.
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The Development of an Environmental Surveillance Protocol to Detect *Candida auris* and Measure the Adequacy of Discharge Room Cleaning Performed by Different Methods
Sadie Solomon, NYU Langone Health System; Michael Phillips, NYU Langone Medical Center; Anne Kelly, NYU Langone Health System; Akwasi Darko, NYU Langone Health System; Frank Palmeri, NYU Langone Health System; Peter Aguilar, NYU Langone Health System; Julia Gardner, NYU Langone Health System; Judith Medefindt, NYU Langone Health System; Stephanie Sterling, NYU Langone Health System; Maria Aguero-Rosenfeld, NYU Langone Health System; Anna Stachel, NYU Langone Health

Background: Contaminated surfaces within patient rooms and on shared equipment is a major driver of healthcare-acquired infections (HAIs). The emergence of *Candida auris* in the New York City metropolitan area, a multidrug-resistant fungus with extended environmental viability, has made a standardized assessment of cleaning protocols even more urgent for our multihospital academic health system. We therefore sought to create an environmental surveillance protocol to detect *C. auris* and to assess patient room contamination after discharge cleaning by different chemicals and methods, including touch-free application using an electrostatic sprayer. Surfaces disinfected using touch-free methods may not appear disinfected when assessed by fluorescent tracer dye or ATP bioluminescent assay. **Methods:** We focused on surfaces within the patient zone which are touched by the patient or healthcare personnel prior to contact with the patient. Our protocol sampled the over-bed table, call button, oxygen meter, privacy curtain, and bed frame using nylon-flocked swabs dipped in nonbacteriostatic sterile saline. We swabbed a 36-cm^2 surface area on each sample location shortly after the room was disinfected, immediately inoculated the swab on a blood agar 5% TSA plate, and then incubated the plate for 24 hours at 36°C. The contamination with common environmental bacteria