Table 1 – Selected odds ratios (95% CI) from regression analysis

Prior Exposure Window	Prior Hospitalization	Prior ED Visit	Prior Outpatient Clinic	Prior Nursing Home / LTC	Low-Risk Antibiotics (Outpatient)	High-Risk Antibiotics (Outpatient)	Prior Family Exposure
0 Days[a]	3.83 (3.74-3.93)	1.23 (1.21-1.25)	1.03 (1.02-1.05)	1.19 (1.14-1.25)			
1-30 Days[b]	2.62 (2.58-2.67)	1.20 (1.18-1.22)	1.20 (1.17-1.23)	2.79 (2.73-2.85)	1.20 (1.18-1.23)	1.70 (1.67-1.73)	4.68 (3.73-5.88)
31-60 Days	2.18 (2.13-2.24)	1.12 (1.09-1.15)	1.23 (1.19-1.27)	1.98 (1.89-2.08)	1.09 (1.06-1.12)	1.60 (1.56-1.64)	2.75 (1.91-3.97)
61-90 Days	1.71 (1.66-1.76)	1.11 (1.08-1.15)	1.21 (1.16-1.27)	1.72 (1.62-1.82)	1.01 (0.98-1.04)	1.38 (1.34-1.42)	2.56 (1.74-3.76)

Notes: [a] 0 Days denote visits on the same day as the hospitalization (e.g., transfers); [b] for antibiotics and prior family exposure a 0-30 day window was used; [c] low-risk includes penicillins, macrolides, sulfonamides or trimethoprim; [d] high-risk include clindamycin, fluoroquinolones, cephalosporins

Fig. 1.

days. A logistic regression model was used to estimate risk associated with prior healthcare exposure. Indicators were created for prior exposure to different healthcare settings: separate indicators were used to indicate transfer, exposure to that setting in the prior 1–30 days, 31–60 days and 61–90 days. Separate indicators were created for prior hospitalization, ED, outpatient clinic, nursing home or long-term care facilities (LTCFs), psychiatric or substance-abuse facility or other outpatient facility. We also included an indicator for prior exposure to a family member with CDI and prior outpatient antibiotics. **Results:** Estimates for selected variables (odds ratios) are presented in Table 1. Prior hospitalization, ED visits, outpatient clinics, nursing home and LTCFs were all associated with increased risk of secondary diagnosed CDI. Prior hospitalization and nursing home/LTCF conveyed the greatest risk. In addition, a 'dose-–response' relationship occurred for each of these exposure settings, with exposure nearest the admission date having the largest risk. Prior exposure to psychiatric , substance abuse, or other outpatient facilities were not risk factors for CDI. Having a family member with prior CDI and both low-risk and high-risk outpatient antibiotics were associated with increased risk. These factors also exhibited a 'dose–response' pattern. **Conclusions:** Exposure to various healthcare settings significantly increased risk for secondary CDI. Prior healthcare exposures occurring nearest to the point of admission conveyed the greatest risk. These results suggest that many hospital-associated CDI cases attributed to a current hospital stay may actually be acquired from prior healthcare settings.

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Presentation Type:

Top Rated Posters

Six Years of Admission Screening for Carbapenemase-Producing Organisms at the NIH Clinical Center

Robin T. Odom, Hospital Epidemiology Service, NIH Clinical Center, NIH; Michele E. Woolbert, Hospital Epidemiology Service, NIH Clinical Center, NIH; Anna F. Lau, Sterility Testing Service, Department of Laboratory Medicine, National Institutes of Health Clinical Center; John P. Dekker, Laboratory of Clinical Immunology and Microbiology, National Institute of Allergy and Infectious Diseases, NIH; Angela V. Michelin, Hospital Epidemiology Service, NIH Clinical Center, NIH; MaryAnn Bordner, Hospital Epidemiology Service, NIH Clinical Center, NIH; David Henderson, NIH Clinical Center, NIH; Karen M. Frank, Department of Laboratory Medicine, National Institutes of Health Clinical Center; Tara Palmore, NIH

Background: Transmission of carbapenemase-producing organisms (CPO) threatens patient safety in healthcare facilities. As a result of a 2011 outbreak of *bla*KPC+ *Klebsiella pneumoniae*, the NIH Clinical Center (NIHCC) has prioritized early detection and isolation of CPO carriers, using point-prevalence surveys and targeted high-risk ward surveillance since 2011 and admission surveillance since 2013. We describe our experience over 6 years of admission surveillance. **Methods:** The NIHCC is a 200-bed research hospital that provides care for a highly immunocompromised patient population. From September 2013 to September 2019, perirectal swabs were ordered automatically for all patients on admission to nonbehavioral health wards. Swabs were ordered twice weekly for ICU patients, weekly in other high-risk wards, and monthly for hospital-wide point prevalence (excluding behavioral health). Patients hospitalized in the United States in the previous week or abroad in the previous 6 months were considered high risk for carriage and isolated pending results from 2 swabs. Most swabs (n = 37,526) were cultured onto HardyCHROM CRE. If gram-negative bacilli (GNB) were present, a molecular screen for carbapenemases was performed on a sweep of cultured material (day 1) pending organism isolation. GNB were identified by MALDI-TOF MS. Prior to June 2019, isolates were screened by *bla*KPC/*bla*NDM PCR. Starting in June 2019, Enterobacteriaceae and *Pseudomonas aeruginosa* were screened using the phenotypic modified carbapenem inactivation method (mCIM), reflexing to the GeneXpert CARBA-R molecular assay if positive; other GNB were tested directly with CARBA-R. Selected GNB underwent susceptibility testing (Sensititre). Whole-genome sequencing was used to assess relatedness among CPO isolates. Swabs from high-risk patients were tested directly by *bla*KPC PCR (n = 699) until August 2019 (most in parallel with culture) and thereafter by CARBA-R (n = 13). **Results:** Among 54,188 orders for perirectal swabs, 38,238 were collected from 14,497 patients (compliance 71%). Among 33 CPO-colonized patients identified from September 2013 through September 2019, 15 were identified on admission, 6 were identified in point-prevalence surveys, 8 were identified from high-risk ward surveillance, and 4 were identified from clinical cultures. Sequencing demonstrated no relatedness among CPO isolates. Although only 1.4% of patients sampled on admission were colonized with CPO, those meeting high-risk criteria were 21 times as likely to be colonized. **Conclusion:** Admission surveillance for CPO identified a low rate of colonization, but it detected

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nearly half of known CPO-colonized NIHCC patients over the past 6 years. Modest compliance with swab collection leaves room for improvement and likely results in missed instances of colonization. Although we cannot determine its effectiveness, we view our strategy as one of several key safety measures for our highly vulnerable patient population.

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Presentation Type:
Top Rated Posters

SPARC-ing Change—The Maryland Statewide Prevention and Reduction of *Clostridioides difficile* (SPARC) Collaborative

Clare Rock, Johns Hopkins University School of Medicine; Rebecca Perlmutter; David Blythe, MDH; Jacqueline Bork, University of Maryland; Kimberly Christine Claeys, University of Maryland, Baltimore; Sara Cosgrove, Johns Hopkins University School of Medicine; Kathryn Dzintars, The Johns Hopkins Hospital; Valeria Fabre, Johns Hopkins University; Anthony Harris, University of Maryland School of Medicine; Emily Heil, University of Maryland School of Pharmacy; Yea-Jen Hsu; Sara Keller, Johns Hopkins University; Lisa Maragakis, Johns Hopkins University School of Medicine; Aaron Michael Milstone, Johns Hopkins University; Daniel Morgan, University of Maryland School of Medicine; Richard Brooks, Centers for Disease Control and Prevention; Surbhi Leekha, University of Maryland Baltimore

Background: In 2018, the Maryland Department of Health, in collaboration with the University of Maryland and Johns Hopkins University, created the Statewide Prevention and Reduction of *Clostridioides difficile* (SPARC) collaborative to reduce *C. difficile* as specified in Healthy People 2020. **Methods:** The SPARC collaborative recruited hospitals contributing most cases to statewide *C. difficile* standardized infection ratio (SIR), according to data reported to the National Healthcare Safety Network (NHSN). SPARC developed intervention bundles around 4 domains: infection prevention, environmental cleaning, and diagnostic and antimicrobial stewardship. Each facility completed a self-assessment followed by an on-site, day-long, peer-to-peer (P2P) evaluation with 8–12 SPARC subject matter experts (SMEs) representing each domain. The SMEs met with hospital executive leadership and then led 4 domain-based group discussions with relevant hospital team leaders. To identify policy and practice gaps, SMEs visited hospital inpatient units for informal interviews with frontline staff. In a closing session, SPARC SMEs, hospital executives, and team leaders reconvened to discuss preliminary findings. This included review of covert observation data (hand hygiene, personal protective equipment compliance, environmental cleaning) obtained by SPARC team 1–2 weeks prior. Final SPARC P2P written recommendations guided development of customized interventions at each hospital. SPARC provided continuous support (follow up phone calls, educational webinars, technical support, didactic training for antimicrobial stewardship pharmacists) to enhance facility-specific implementation. For every quarter, we categorized *C. difficile* NHSN data for each Maryland hospital into "SPARC" or "non-SPARC" based on participation status. Using negative binomial mixed models, we analyzed difference-in-difference of pre- and postincidence rate ratios (IRRs) for SPARC and non-SPARC hospitals, which allowed estimation of change attributable to SPARC participation independent of other time-varying factors. **Results:** Overall, 13 of 48 (27%) hospitals in Maryland participated in the intervention. The baseline SIR for all Maryland hospitals was 0.92, and the post-SPARC SIR was 0.67. The SPARC hospitals had a greater reduction in hospital-onset *C. difficile* incidence; 8.6 and 4.3 events per 10,000 patient days for baseline and most recent quarter, respectively. For non-SPARC hospitals, these hospital-onset *C. difficile* incidences were 5.1 preintervention and 4.3 postintervention. We found a statistically significant difference-in-difference between SPARC and non-SPARC hospital *C. difficile* reduction rates (ratio of IRR, 0.63; 95% CI, 0.44–0.89; $P = .01$). **Conclusions:** The Maryland SPARC collaborative, a public health-academic partnership, was associated with a 25% reduction in the Maryland *C. difficile* SIR. Hospitals participating in SPARC demonstrated significantly reduced *C. difficile* incidences to match that of high-performing hospitals in Maryland.

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Presentation Type:
Top Rated Posters

The Burden of Infection in Transfers from Nursing Homes to Hospitals

Andrew Dick, The RAND Corporation; Mark Sorbero, The RAND Corporation; E. Yoko Furuya, Columbia University Irving Medical Center; Tadeja Gracner; Mansi Agarwal, Columbia University; Patricia Stone, Columbia School of Nursing

Background: The focus on infection prevention in nursing homes is growing, but little is known about the role infections play in transfers from nursing home to hospital. Our goals were (1) to identify rates of infection-related transfers to the hospital and (2) to identify trends in these rates from 2011 to 2014. **Methods:** Using a nationally representative sample of 2,501 nursing homes (2011–2014), elderly resident data from the Minimum Data Set 3.0 were combined with CMS inpatient data (MedPAR). We classified transfers from nursing home to hospital as caused by infection (1) if infection was the primary diagnosis and present on admission (POA) or (2) if infection was indicated as the MedPAR admitting diagnosis code and POA.

Table 1.

Table 1: Percent of all-cause transfers caused by, or made with, infection

Infection Type	Transfer Classification	Year 2011	2012	2013	2014
Respiratory:	Caused By	10.4%	9.9%	9.9%	8.6%
	With	28.8%	30.1%	31.0%	29.5%
Sepsis:	Caused By	12.1%	13.8%	15.0%	16.6%
	With	14.6%	16.3%	17.6%	19.4%
UTI:	Caused By	7.7%	7.9%	7.6%	7.6%
	With	28.1%	29.3%	28.8%	28.9%
All Infections:	Caused By	31.1%	32.4%	33.0%	33.4%
	With	50.5%	52.1%	52.6%	52.6%
NH Residents (Millions)		3.75	3.80	3.86	3.92
Hospital Transfers / Patient		0.479	0.428	0.407	0.396

Note: Transfers classified as with infection include all those with an infection diagnosis present on admission and therefore include transfers that were caused by infection.

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