

posttest scores, the Project ECHO experience of virtual case-based learning and collaborative problem solving has encouraged critical thinking, peer-to-peer learning, networking among participants, and has provided microbiologists with the resources for improved bacterial isolation, identification, and antibiotic susceptibility testing. The lessons learned could be applied as this project is expanded to additional laboratories in the AMR Surveillance Network.

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Disclosures: None

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Presentation Type:

Oral Presentation

Longitudinal Characterization and Transmission Dynamics of Antibiotic-Resistant Organisms in an ICU (LOCATE AROs)

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Background: Healthcare-associated infections caused by antibiotic-resistant organisms (AROs) are a major cause of significant morbidity and mortality. To create and optimize infection prevention strategies, it is crucial to delineate the role of the environment and clinical infections. **Methods:** Over a 14-month period, we collected environmental samples, patient feces, and patient bloodstream infection (BSI) isolates in a newly built bone marrow transplant (BMT) intensive care unit (ICU). Samples were collected from 13 high-touch areas in the patient room and 4

communal areas. Samples were collected from the old BMT ICU, in the new BMT ICU before patients moved in, and for 1 year after patients moved in. Selective microbiologic culture was used to isolate AROs, and whole-genome sequencing (WGS) was used to determine clonality. Antibiotic susceptibility testing was performed using Kirby-Bauer disk diffusion assays. Using linear mixed modeling, we compared ARO recovery across time and sample area. **Results:** AROs were collected and cultured from environmental samples, patient feces, and BSI isolates (Fig. 1a). AROs were found both before and after a patient entered the ICU (Fig. 1b). Sink drains had significantly more AROs recovered per sample than any other surface area ($P < .001$) (Fig. 1c). The most common ARO isolates were *Pseudomonas aeruginosa* and *Stenotrophomonas maltophilia* (Fig. 1d). The new BMT ICU had fewer AROs recovered per sample than the old BMT ICU ($P < .001$) and no increase in AROs recovered over the first year of opening ($P > .05$). Furthermore, there was no difference before versus after patients moved into the hospital ($P > .05$). Antibiotic susceptibility testing reveal that *P. aeruginosa* isolates recovered from the old ICU were resistant to more antibiotics than isolates recovered from the new ICU (Fig. 2a). ANI and clonal analyses of *P. aeruginosa* revealed a large cluster of clonal isolates (34 of 76) (Fig. 2b). This clonal group included isolates found before patients moved into the BMT ICU and patient blood isolates. Furthermore, this clonal group was initially found in only 1 room in the BMT ICU, and over 26 weeks, it was found in sink drains in all 6 rooms sampled (Fig. 2b). **Conclusions:** AROs are present before patients move into a new BMT ICU, and sink drains act as a reservoir for AROs over time. Furthermore, sink-drain *P. aeruginosa* isolates are clonally related to isolates found in patient BSIs. Overall, these results provide insight into ARO transmission dynamics in the hospital environment.

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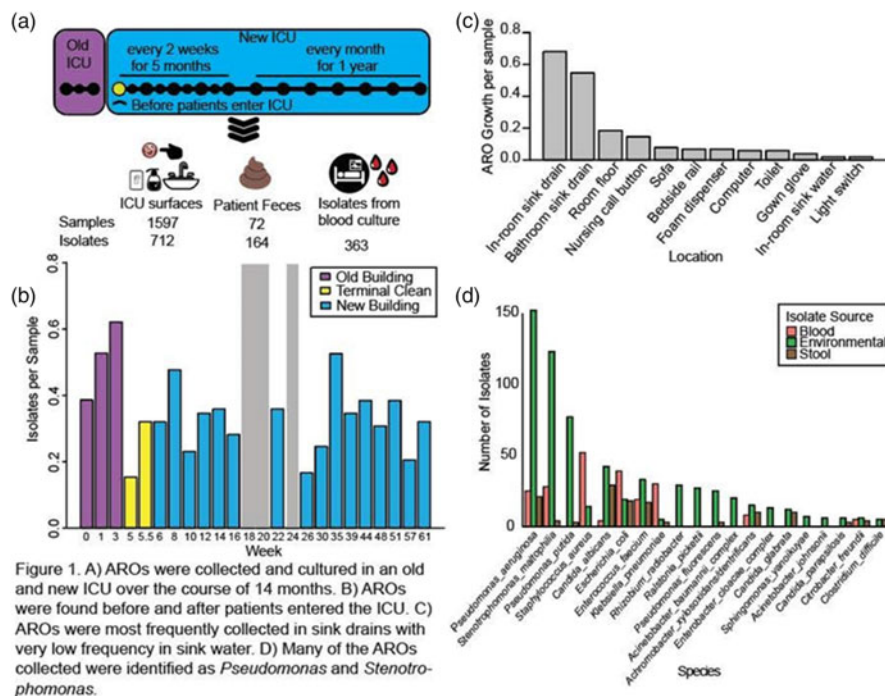


Fig. 1.

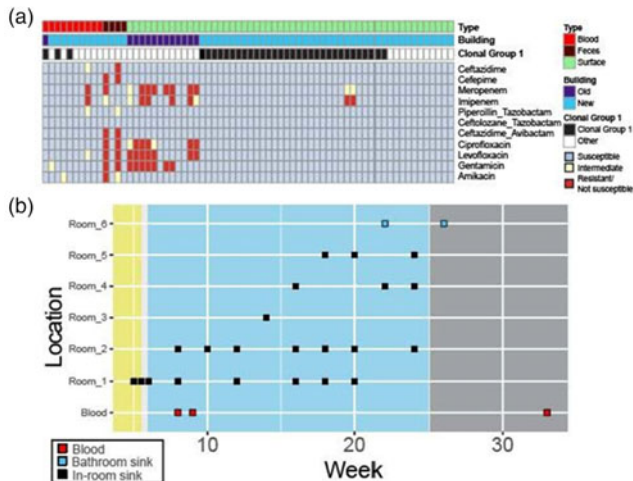


Figure 2. Preliminary data characterized 75 *P. aeruginosa* isolates using AST and WGS. A) Old BMT ICU had a higher proportion of MDROs than new BMT ICU. B) 34 *P. aeruginosa* isolates were classified as clonal group 1 (squares) in the new BMT ICU. Clonal group 1 was identified before (yellow) and after (blue) patients moved into new ICU. More sequencing is necessary for isolates in grey area.

Fig. 2.

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Oral Presentation

Mitigating Hospital-Onset *Clostridioides difficile*: Evaluation of a Standardized Environmental Hygiene Program in Eight Hospitals

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Background: Despite ongoing efforts over the past 3 decades, hospital-onset *Clostridioides difficile* infection (HO-CDI) continues to challenge interventions aimed at its prevention and control. We describe the impact of a model environmental services (EVS) program on the incidence of HO-CDI across 8 hospitals that are part of a nationwide integrated health system. **Methods:** Eight acute-care hospitals with 44–532 beds (mean, 263 beds) in 6 states with stable endemic HO-CDI incidence densities independently implemented identical sporicidal environmental hygiene interventions in 2017. The program combined the use of a hydrogen peroxide/peroxyacetic acid surface disinfectant for all patient-zone hygienic cleaning combined with a structured model EVS cleaning program that included optimized cleaning and disinfection technique, staff training, and auditing with objective performance feedback, which aligned with 2008 HICPAC/CDC categories I and II as well as 2010 CDC Guidance Level II monitoring program recommendations. After a 3-month phase-in, we compared NHSN-reported LabID HO-CDI SIRs for 18 months before and 12 months after implementation of the program. Results were not shared between sites and data were not collated by the authors until a year after the

postintervention results were initially available. Multiple possible confounding factors were evaluated and determined not to have identifiably affected the outcome. **Results:** Mean preintervention HO-CDI SIRs over the 18 months measured ranged from 0.5 to 1.4 (mean, 1.0 for the group). Following the wash-in period, SIRs decreased precipitously in all sites to a mean of 0.42 for the group by the end of 12 months of the intervention. ($P < .0001$) (Fig. 1). Individual site improvement ranged from 20% to 92% (mean, 57%) (Fig. 2.) **Conclusions:** Overall, HO-CDI SIRs decreased almost 60% in the study hospitals following daily sporicidal disinfection cleaning of all patient-zone surfaces in association with ongoing programmatic optimization of cleaning practice. As predicted by earlier single-site studies reporting a favorable impact of sporicidal disinfectant cleaning in outbreak settings, this multisite quasi-experimental study has illustrated the substantial potential impact of hospital-wide sporicidal disinfection integrated with objectively sustained optimized thoroughness of cleaning to decrease the incidence of HO-CDI.

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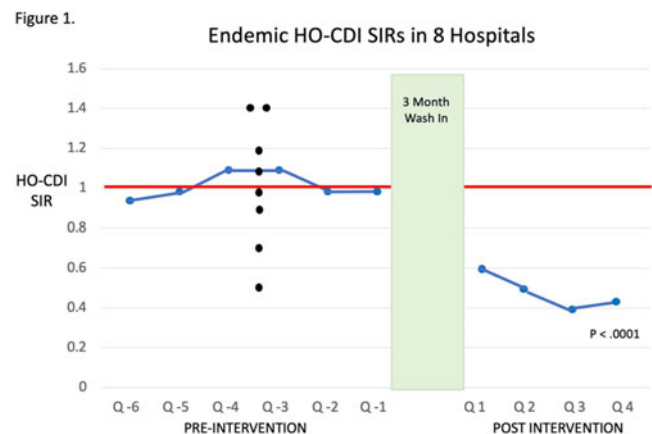


Fig. 1.

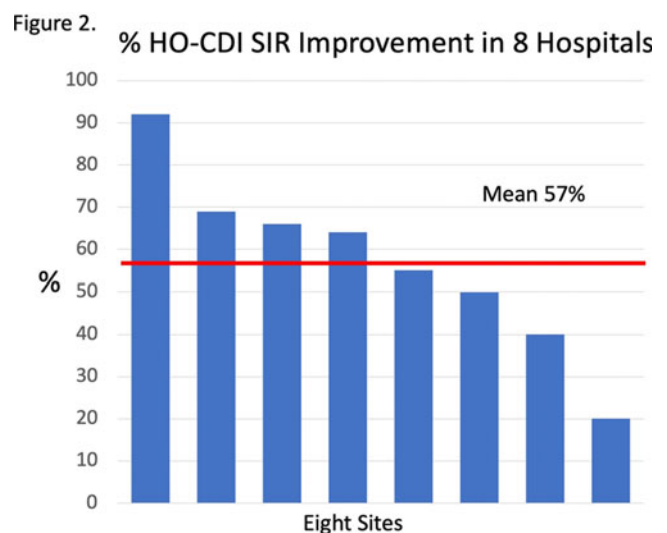


Fig. 2.