

barriers and facilitators to the implementation of electronic decision support (EDS) in antimicrobial stewardship. **Objective:** To examine prescriber and antimicrobial steward perceptions of EDS using an ISTA approach in the preimplementation phase of an antimicrobial stewardship intervention. **Methods:** We conducted semistructured interviews with prescribers and stewards from 4 hospitals in 2 health systems in the context of a multi-component intervention to improve the use of fluoroquinolones and extended-spectrum cephalosporins. Sites planned to implement various EDS elements including order sets, antimicrobial time outs, and audit with feedback stewardship notes in the medical record. Interviews elicited respondent perceptions about the planned intervention. Two analysts systematically coded transcripts using an ISTA framework in NVivo12 software. **Results:** Interviews with 64 respondents were conducted: 38 physicians, 7 nurses, 6 advanced practice providers, and 13 pharmacists. We identified 4 key sociotechnical interaction types likely to influence stewardship EDS implementation. First, EDS changes the communication patterns and practices of antimicrobial stewards in a way that improves efficiency but decreases vital social interaction with prescribers to facilitate behavior change. Second, there is a gap between what stewards envision for EDS and that which is possible to build in a timely manner by hospital information technology specialists. As a result, there is often a months- to years-long delay from proposal to implementation, which negatively affects intervention acceptance. Third, prescribers expressed great enthusiasm for stewardship EDS that would simplify their workload, allow them to complete important work tasks, and save time. They strongly objected to stewardship EDS that was disruptive without a compelling purpose or did not integrate smoothly with pre-existing technology infrastructure. Fourth, physician prescribers attributed social and emotional meaning to stewardship EDS, suggesting that these tools can undermine professional authority, autonomy, and confidence. **Conclusions:** Implementing stewardship EDS in a way that improves the use of antimicrobials while minimizing unintended negative consequences requires attention to the interplay between new EDS and an organization's existing workflow, culture, social interactions and technologies. Implementing EDS in stewardship will require attention to these domains to realize the full potential of these tools and to avoid negative unintended consequences.

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#### **Presentation Type:**

Poster Presentation

#### **Analyzing Healthcare Workers' Perspectives on Healthcare-Associated Infections and Infection Control Practices Using Video Reflexive Ethnography (VRE)**

Esther Paul, King Khalid University; Ibrahim Alzaydani, Abha Maternity and Children's Hospital; Ahmed Hakami, King Khalid University; Harish C. Chandramoorthy, King Khalid University

**Background:** This study explores the perspectives of healthcare workers on the healthcare-associated infection (HAI) and infection control measures in a tertiary-care unit, through a self-administered questionnaire, semi-structured interviews, and reflexive sessions based on video-recorded sterile procedures performed in respondents' work contexts. Video reflexive ethnography (VRE) is a method

that provides feedback to medical practitioners through reflection analysis, whereby practitioners identify problems and find solutions.

**Methods:** Quantitative questionnaire data were used to assess the knowledge of HAI among 50 healthcare workers and their attitude toward practice of infection control measures. Semistructured interviews based on an interview guide were used to collect qualitative data from 25 doctors and nurses. The interviews were audio recorded and transcribed verbatim immediately. Also, routine sterile procedures in the wards and intensive care unit were video recorded, and the footage was discussed by the infection control team and the personnel involved in the videos. This discussion was video recorded and transcribed. Both interview data and reflexive discussion of video-graph were analyzed using a thematic analysis. The quantitative data were analyzed using the Kruskal–Wallis test.

**Results:** The quantitative data revealed no difference in the knowledge, attitude, and practice scores used to evaluate the infection control practices among the healthcare workers. We identified 4 themes from the qualitative data: (1) knowledge of HAI and infection control, (2) infection control measures in practice, (3) the shortfall in infection control measures and HAI, and (4) required implementation. Although the qualitative data indicated that the participants had excellent compliance with hand hygiene and personal protective equipment (PPE) use, the VRE and reflexive sessions indicated otherwise. Some astounding lapses were revealed, like failure to engage in boundary maintenance between sterile and nonsterile areas, failure to observe proper hand hygiene measures, and use of traditional hijab face covers (used in an unsterile environment as well) instead of surgical masks. These findings demonstrate the advantage of combining VRE with qualitative and quantitative methodology to deduct the lapses in the practice of infection control among healthcare workers.

**Conclusions:** Introduction of training programs focused on HAI and infection control measures in the educational system will help better inform medical and nursing students. Live video demonstrations of appropriate infection control practices during sterile procedures would be highly beneficial to educate the healthcare workers on correct infection control practices. Lapses in the use of PPE can be a possible reason for the outbreak of MERS-CoV, an endemic disease, in this part of Saudi Arabia.

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#### **Analysis of National Healthcare Safety Network *Clostridioides difficile* Infection Standardized Infection Ratio by Test Type**

Qunna Li, Centers for Disease Control and Prevention; Andrea Benin, Centers for Disease Control and Prevention; Alice Guh, Centers for Disease Control and Prevention; Margaret A. Dudeck, Centers for Disease Control and Prevention; Katherine Allen-Bridson, Centers for Disease Control and Prevention; Denise Leaptrot, Centers for Disease Control and Prevention; Lawrence McDonald, Centers for Disease Control and Prevention; Daniel Pollock, Centers for Disease Control and Prevention; Jonathan Edwards, Centers for Disease Control and Prevention

**Background:** The NHSN has used positive laboratory tests for surveillance of *Clostridioides difficile* infection (CDI) LabID events since 2009. Typically, CDIs are detected using enzyme immunoassays (EIAs), nucleic acid amplification tests (NAATs), or various test combinations. The NHSN uses a risk-adjusted, standardized

Figure 1. Histograms of hospital HO incidence rates and SIRs by CDI test types for hospitals that did not switch CDI test types, 2017Q3-2018Q2

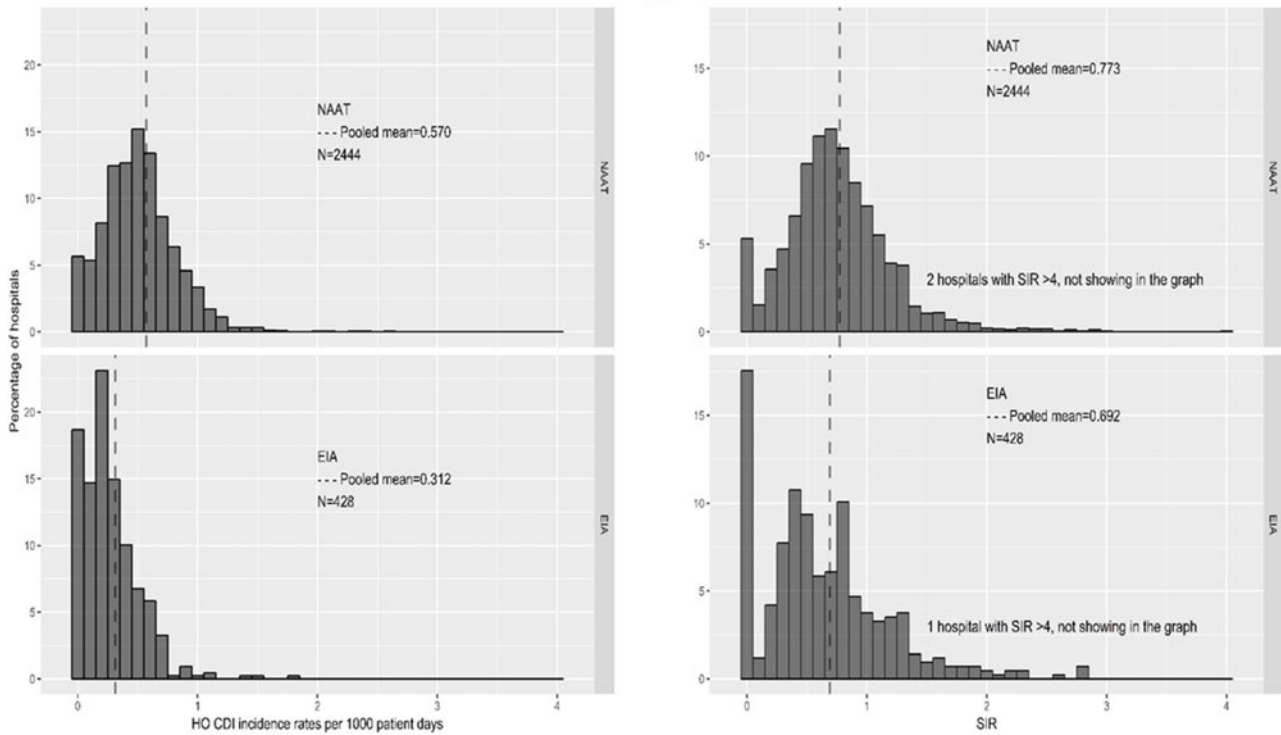


Fig. 1.

infection ratio (SIR) to assess healthcare facility-onset (HO) CDI. Despite including test type in the risk adjustment, some hospital personnel and other stakeholders are concerned that NAAT use is associated with higher SIRs than are EIAs. To investigate this issue, we analyzed NHSN data from acute-care hospitals for July 1, 2017 through June 30, 2018. **Methods:** Calendar quarters for

which CDI test type was reported as NAAT (includes NAAT, glutamate dehydrogenase (GDH)+NAAT and GDH+EIA followed by NAAT if discrepant) or EIA (includes EIA and GDH+EIA) were selected. HO CDI SIRs were calculated for facility-wide inpatient locations. We conducted the following analyses: (1) Among hospitals that did not switch their test type, we compared

Figure 2. Scatter plots of pooled semiannual SIRs for NAAT and EIA for hospitals with CDI test type switch pattern EIA-to-NAAT and NAAT-to-EIA, 2017Q3-2018Q2

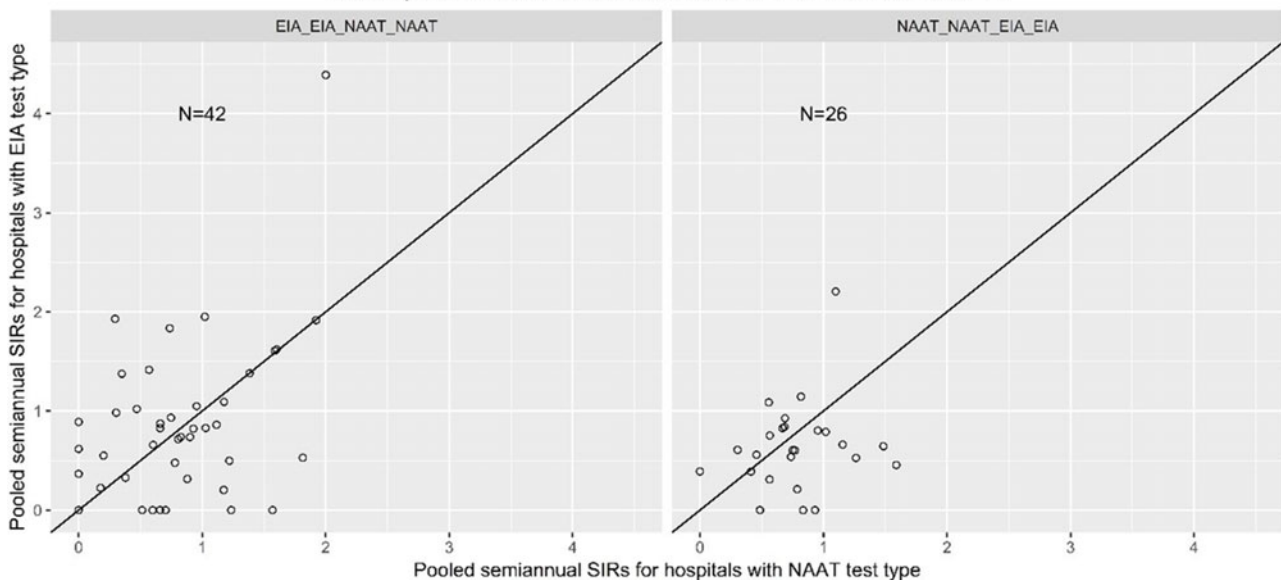


Fig. 2.

the distribution of HO incident rates and SIRs by those reporting NAAT vs EIA. (2) Among hospitals that switched their test type, we selected quarters with a stable switch pattern of 2 consecutive quarters of each of EIA and NAAT (categorized as pattern EIA-to-NAAT or NAAT-to-EIA). Pooled semiannual SIRs for EIA and NAAT were calculated, and a paired *t* test was used to evaluate the difference of SIRs by switch pattern. **Results:** Most hospitals did not switch test types (3,242, 89%), and 2,872 (89%) reported sufficient data to calculate SIRs, with 2,444 (85%) using NAAT. The crude pooled HO CDI incidence rates for hospitals using EIA clustered at the lower end of the histogram versus rates for NAAT (Fig. 1). The SIR distributions of both NAAT and EIA overlapped substantially and covered a similar range of SIR values (Fig. 1). Among hospitals with a switch pattern, hospitals were equally likely to have an increase or decrease in their SIR (Fig. 2). The mean SIR difference for the 42 hospitals switching from EIA to NAAT was 0.048 (95% CI, -0.189 to 0.284; *P* = .688). The mean SIR difference for the 26 hospitals switching from NAAT to EIA was 0.162 (95% CI, -0.048 to 0.371; *P* = .124). **Conclusions:** The pattern of SIR distributions of both NAAT and EIA substantiate the soundness of NHSN risk adjustment for CDI test types. Switching test type did not produce a consistent directional pattern in SIR that was statistically significant.

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#### Antibiotic Stewardship for Nursing: Can E-learning Be a First Step?

Mary T. Catanzaro, HAP

**Background:** The CDC and The Joint Commission have called for an interdisciplinary approach to antibiotic stewardship implementation. The healthcare team should consist of infectious disease physicians, pharmacists, infectious disease pharmacists, infection preventionists, microbiologists, and nurses. The scant literature to date has looked at nurses' attitudes and beliefs toward participating in antibiotic stewardship and have identified several factors that contribute to the lack of uptake by nurses: lack of education around stewardship, poor communication among healthcare providers, and hospital or unit culture, among others. Additionally, nurses' lack of interest in what would be more work or not within their scope of work was put forth as an additional factor by infection preventionists and pharmacists as a barrier to implementation. **Method:** An investigator-developed online survey was used to assess the usefulness of 3 investigator-developed educational e-learning modules that encompassed the role of nurses in antibiotic stewardship, pharmacy and laboratory topics related to antimicrobial stewardship, as well as the nurses' attitudes toward their participation in such activities. **Results:** Participants took the survey after review of the 3 e-learning modules. The results indicate that, contrary to what pharmacists and infection preventionists thought, 82% of nurses felt they should contribute to and be part of the antimicrobial stewardship team. Additionally, after completing the modules, 73% felt more empowered to participate in stewardship discussions with an additional 23% wanting more education. 100% felt that they learned information that they could utilize in their everyday work. Barriers to implementation of stewardship activities on their unit included lack of education (41%), hospital or unit culture (27%), with only 4% citing they did not feel it was their job or that they had anything to contribute to

a discussion. Also, 24% felt that there were no obstacles to participation. **Conclusions:** Surprisingly, most nurses who took this educational series and survey felt that they should be part of the antibiotic stewardship team. As cited previously from the literature, education and culture need to be addressed to overcome the nurses' barriers to stewardship involvement. E-learning can provide an easy first step to educating nurses when time permits and can provide a good springboard for discussion on the units and with physicians and pharmacists. For a copy of the modules, please contact the author.

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#### Antibiotic Susceptibility of Common Organisms Isolated from Urine Cultures of Nursing Home Residents

Austin R. Penna MPH, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention. Atlanta, GA; Taniece R. Eure MPH, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention. Atlanta, GA; Nimalie D. Stone MD, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention. Atlanta, GA; Grant Barney BS, New York Emerging Infections Program. Rochester, NY; Devra Barter MS, Colorado Department of Public Health and Environment. Denver, CO; Paula Clogher MPH, Connecticut Emerging Infections Program and the Yale School of Public Health. New Haven, CT; Ghinwa Dumyati MD, New York Emerging Infections Program and University of Rochester Medical Center. Rochester, NY; Erin Epon MD, California Department of Health. Richmond, CA; Christina B. Felsen MPH, New York Emerging Infections Program and University of Rochester Medical Center. Rochester, NY; Linda Frank RN, BSN, PHN, California Emerging Infections Program. Oakland, CA; Deborah Godine RN, California Emerging Infections Program. Oakland, CA; Lourdes Irizarry MD, New Mexico Department of Health. Santa Fe, NM; Helen Johnston MPH, Colorado Department of Public Health and Environment. Denver, CO; Marion A. Kainer MBBS, MPH, Tennessee Department of Health. Nashville, TN; Linda Li MPH, Maryland Department of Health. Baltimore, MD; Ruth Lynfield MD, Minnesota Department of Health. St. Paul, MN; JP Mahoehney RN, MPH, Minnesota Department of Health. St. Paul, MN; Joelle Nadle MPH, California Emerging Infections Program. Oakland, CA; Susan M. Ray MD, Georgia Emerging Infections Program and Emory University. Atlanta, GA; Sarah Shrum Davis MPH, New Mexico Department of Health. Santa Fe, NM; Marla Sievers MPH, New Mexico Department of Health. Santa Fe, NM; Krithika Srinivasan MD, MPH, Connecticut Emerging Infections Program and the Yale School of Public Health. New Haven, CT; Lucy E. Wilson MD, ScM, Maryland Department of Health. Baltimore, MD; Alexia Y. Zhang MPH, CIC, Oregon Health Authority. Portland, OR; Shelley S. Magill MD, PhD, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention. Atlanta, GA; Nicola D. Thompson MS, PhD, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention. Atlanta, GA

**Background:** With the emergence of antibiotic resistant threats and the need for appropriate antibiotic use, laboratory microbiology information is important to guide clinical decision making in nursing homes, where access to such data can be limited.