

decreased to 40% during the last quarter. The nurses' adherence to the daily checklist remained stable (>75%). **Conclusions:** This CAUTI prevention project was the first use of quality improvement methodology to implement change at NHTD. A trend decrease in CAUTI was observed, though a greater decrease occurred at the beginning of the intervention. Limited compliance of daily reminders is likely reflected in no statistically significant decrease in DUR. Possibly, this quality improvement project raised awareness among clinicians to improve general CAUTI prevention practices in the ICU without decreasing DUR. Given limited compliance with reminder and checklists, the intervention will be revised during the next PDSA cycle to improve adherence.

¹Meddings J, Rogers MA, Krein SL, Fakhri MG, Olmsted RN, Saint S. Reducing unnecessary urinary catheter use and other strategies to prevent catheter-associated urinary tract infection: an integrative review. *BMJ Qual Saf* 2014;23:277–289.

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Poster Presentation

Pitfalls of a Staged Implementation of an Automated Hand Hygiene System: Lessons Learned

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Background: Hand hygiene is the first defense against healthcare-associated infections, yet studies show that adherence to hand hygiene still remains low. An academic medical center selected a beacon-based automated hand hygiene reminder system to improve hand hygiene adherence. Accountability is challenging to enforce without a reliable means to measure hand hygiene adherence. The hospital used secret shoppers to observe hand hygiene adherence. This method captures an estimated 0.5%–1.7% of opportunities and may be influenced by the Hawthorne effect. **Methods:** In November 2018, a phased trial of an electronic hand hygiene reminder system began in 4 intensive care units (ICUs). The system selected used a badge and beacon technology. The badge identifies each care provider and displays colored lights to show adherence status. Beacons are present on the patient's bed, soap, and hand sanitizer dispenser. These beacons establish a "patient zone" that captures opportunities for hand hygiene. The specialty beds in the ICUs were supposed to remain on the units. A patient transferring to a lower level of care would be placed on another bed or gurney when leaving the ICU. ICU staff were badged for the system. **Results:** The phased implementation strategy had challenges with beds, badges, and the system. Despite planning, education, and communication, the beds left the ICU area, so the beacons were outside the ICU, and staff did not always wear their assigned badge. There were issues with the system router as well. Unit leadership and the infection control team worked on processes to get beds back into the units. The implementation team decided to provide badges to staff who regularly worked in the ICU to differentiate from consultation groups that came to the ICU (and were not badged). The system routers were plugged in at various places on the units and had become unplugged so information was not sent for reports. Despite these issues, over the year of implementation, the units did achieve an increase in hand hygiene adherence from 48% to 85%. Collectively, the units achieved a 53% reduction in central-line-associated blood stream infection (CLABSI), reducing infections from 13 to 7 and a 35% reduction in methicillin-resistant *Staphylococcus aureus*

(MRSA), reducing infections from 8 to 3 as defined by the NHSN. **Conclusions:** When implementing a beacon-based, automated hand hygiene system, staged implementation can be challenging. To avoid these challenges, facility-wide implementation is preferable.

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Point-Prevalence Surveys of Antibiotic Use at Three Large Public Hospitals in Kenya

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Background: Antibiotics are the most prescribed medicines worldwide, accounting for 20%–30% of total drug expenditures in most settings. Antimicrobial stewardship activities can provide guidance for the most appropriate antibiotic use. **Objective:** In an effort to generate baseline data to guide antimicrobial stewardship recommendations, we conducted point-prevalence surveys at 3 hospitals in Kenya. **Methods:** Sites included referral hospitals located in Nairobi (2,000 beds), Eldoret (900 beds) and Mombasa (700 beds). [Results are presented in this order.] Hospital administrators, heads of infection prevention and control units, and laboratory department heads were interviewed about ongoing antimicrobial stewardship activities, existing infection prevention and control programs, and microbiology diagnostic capacities. Patient-level data were collected by a clinical or medical officer and a pharmacist. A subset of randomly selected, consenting hospital patients was enrolled, and data were abstracted from their medical records, treatment sheets, and nursing notes using a modified WHO point-prevalence survey form. **Results:** Overall, 1,071 consenting patients were surveyed from the 3 hospitals (n = 579, n = 263, and n = 229, respectively) of whom >60% were aged >18 years and 53% were female. Overall, 489 of 1,071 of patients (46%) received ≥1 antibiotic, of whom 254 of 489 (52%) received 1 antibiotic, 201 of 489 (41%) received 2 antibiotics, 31 of 489 (6%) received 3 antibiotics, and 3 of 489 (1%) received 4 antibiotics. Antibiotic use was higher among those aged <5 years: 150 of 244 (62%) compared with older individuals (337 of 822, 41%). Amoxicillin/clavulanate was the most commonly used antibiotic (66 of 387, 17%) at the largest hospital (in Nairobi) whereas ceftriaxone was the most common at the other 2 facilities: 57 of

184 (31%) in Eldoret and 55 of 190 (29%) in Mombasa. Metronidazole was the next most commonly prescribed antibiotic (15%–19%). Meropenem was the only carbapenem reported: 22 of 387 patients (6%) in Nairobi, 2 of 190 patients (1%) in Eldoret, and 8 of 184 patients (4%) in Mombasa. Stop dates or review dates were not indicated for 106 of 390 patients (27%) in Nairobi, 75 of 190 patients (40%) in Eldoret, and 113 of 184 patients (72%) in Mombasa receiving antibiotics. Of 761 antibiotic prescriptions, 45% had a least 1 missed dose. Culture and antibiotic susceptibility tests were limited to 50 of 246 patients (20%) in Nairobi, 17 of 124 patients (14%) in Eldoret, and 23 of 119 patients (19%) in Mombasa who received antibiotics. The largest hospital had an administratively recognized antimicrobial stewardship committee.

Conclusions: The prevalence of antibiotic use found by our study was 46%, generally lower than the rates reported in 3 similar studies from other African countries, which ranged from 56% to 65%. However, these survey findings indicate that ample opportunities exist for improving antimicrobial stewardship efforts in Kenya considering the high usage of empiric therapy and low microbiologic diagnostic utilization.

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Postintra-vitreal Injection Endophthalmitis: An Infection Control Investigation and Case–Control Analysis of Risk Factors

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Background: Intravitreal injection of vascular endothelial growth factor inhibitors with or without steroids is a well-established, effective therapy for several ocular disorders. The expected rate of complications from these injections is low, with meta-analyses reporting 5–6 occurrences of infectious endophthalmitis per 10,000 injections. Through October 2019, our health system observed 8 cases of endophthalmitis among 7,693 injections (10.4 per 10,000 injections), compared to 1 case in 2018. This unusually high rate prompted an infection control investigation and a case control study to examine risk factors for the development of postintra-vitreal injection endophthalmitis. **Methods:** Infection control providers performed direct observation of several ophthalmologists performing intra-vitreal injections on 3 separate occasions to determine points of intervention to prevent infection. To define risk factors for postintra-vitreal injection endophthalmitis, we conducted a retrospective case-control study of the 8 affected patients. Four control patients were selected per case, matched by clinic location, drug injected, and date of injection (total subjects, $N = 40$). We extracted patient-level risk factors from medical records; documentation was not sufficient to compare procedure-level factors. We conducted unadjusted univariate Poisson regression and Mantel–Cox method rate ratios to identify significant risk predictors of endophthalmitis. **Results:** Direct observation yielded variable practice in use of masks, gloves, sterile lid speculum, and the duration of povidone-iodine contact on the ocular surface prior to injection. The

location of alcohol hand gel relative to the procedure field was sub-optimal. Due to patient volume, there were significant delays between procedure and patient prep and injection time. The mean age was 76 years among cases and 74.1 years among controls; 35% of patients were men. Age-related macular degeneration was the most common indication for injection (55%). Only 10% of injections were bilateral. Although not statistically significant, patients with coronary artery disease had a higher rate of infection than those without coronary artery disease (165.3 vs 16.3 per 10,000 person years; IRR = 3.0; 95% CI, 0.60–14.8; $P = .18$); current smokers were also at higher risk (86.9 per 10,000; IRR, 3.2; 95% CI, 0.33–30.4; $P = .32$). **Conclusions:** Coronary artery disease and smoking were risk factors for the development of postintra-vitreal injection endophthalmitis in a 2019 cluster of cases in our organization. We are continuing to work with our ophthalmologists to optimize infection prevention in the injection environment, including strict use of gloves, appropriate use of povidone-iodine, and routinely wearing a mask and encouraging a no-talking policy during injections.

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Practice Variation in Validation of Device Denominator Data for National Healthcare Safety Network Reporting

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Background: The NHSN is a widely used CDC program for tracking healthcare-associated infections (HAIs). The goal of the NHSN is to help healthcare organizations to identify and track the incidence of HAI and to prevent adverse events as well as to simplify mandatory quality reporting to the CMS. Healthcare organizations provide both event data for HAIs and information about the population at risk. For device-related infections, device denominator data (eg, data related to urinary or intravascular catheters, and ventilators) must be collected and reported. NHSN guidelines require that electronic reporting of device denominator numbers be validated to be within 5% of manually collected counts over a period of 3 consecutive months. Little is known about current practical application of validation practices. **Methods:** We surveyed members of the SHEA Research Network (SRN) to assess awareness of and compliance with the current NHSN requirements for device denominator data validation. **Results:** The survey was sent to 89 member institutions of the SRN from November 20, 2018, to December 12, 2018. The response rate was 35.7%, and 90% of respondents are currently using an electronic system for device denominator count reporting. All except 1 institution manually validated the data. Of the facilities that had completed validation, 31% used <90 days of manual data. Moreover, 82% of these facilities found a difference of <5% between the electronic data and manual data without a statistically significant difference between those with at least 90 days of validation data and those with <90 days. Also, 21% of facilities validated data based on a subset of units. **Conclusions:** Although most respondents to the survey validate electronically collected device denominator data in accordance with NHSN’s requirements, nearly one-third reported using shorter validation periods than NHSN requires.