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Background: A quantitative understanding of the impact of delays to concordant antibiotic treatment on patient mortality is important for designing hospital antibiotic policies. *Acinetobacter* spp are among the most prevalent pathogens causing multidrug-resistant hospital-acquired infections in developing countries. We aimed to determine the causal effect of delays in concordant antibiotic treatment on 30-day survival of patients with hospital-acquired *Acinetobacter* spp bacteremia in a resource-limited setting. **Methods:** We included patients with *Acinetobacter* spp–related hospital-acquired bacteremia (HAB) in a hospital in Thailand over a 13-year period. We classified patients into 4 groups: those with no delays to concordant antibiotic treatment; those with a 1-day delay; those with 2-day delays; and those with >2 days of delay. We adopted an analytical approach that aimed to emulate a randomized controlled trial and compared the expected potential outcomes of patients between the exposure groups using a marginal structural model with inverse-probability weightings to adjust for confounders and immortal time bias. **Results:** Between January 2003 and December 2015, 1,203 patients had HAB with *Acinetobacter* spp., of which 682 patients (56.7%) had ≥1 days of delay in concordant antibiotic treatment. These delays were associated with an absolute increase in 30-day mortality of 6.6% (95% CI 0.2%-13.0%), from 33.8% to 40.4%. Among the 1,203 patients, 521 had no delays to concordant antibiotic treatment (i.e. concordant therapy on the day of blood collection), 224 patients had a 1-day delay, 119 had a 2-day delay, and 339 had a delay of ≥3 days. The crude 30-day mortality was substantially lower in patients with ≥3 days of delay in concordant treatment compared to those with 1 to 2-days of delays. After adjusting for measured confounders and immortal time bias, the expected probability of dying in the hospital within 30-days of blood collection if patient had no delays in concordant therapy was 39.7% (95% CI: 32.3-47.2%), for a 1-day delay it was 42.7% (95% CI: 29.8-55.7%), for a 2-day delay it was 51.0% (95% CI: 38.9-63.2%), and for a ≥3 days was 40.9% (36.0-45.7%).

Conclusions: Delays to concordant antibiotic therapy are linked to increased mortality among patients with HAB due to *Acinetobacter* spp. Accounting for confounders and immortal time bias is necessary when attempting to estimate causal effects of delayed concordant treatment and, in this case, it helped resolve paradoxical results in crude data.

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Poster Presentation

Determinants of Protection Against Measles Infection in a Vaccinated Healthcare Worker

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Background: In 2019, a measles community outbreak resulted in a secondary case in a health care worker (HCW) working in a pediatric hospital in Montréal, Canada. Following the event, HCWs were screened to identify individuals susceptible to measles infection based on serology results. **Objective**: Our aim was to assess measles seroprotection rates and to evaluate vaccine responses of susceptible HCWs using commercial enzyme immunoassay (EIA) or enzyme linked immunosorbent assay (ELISA). **Methods:** Emergency department (ED) employees, including doctors, were screened for measles susceptibility as part of a postoutbreak measure by the hospital occupational health service. Demographic information was collected. Measles history and vaccination information were collected using a personal vaccination booklet, employee vaccination profile, or the Québec vaccination registry. According to the Quebec Immunization Protocol (PIQ), individuals born before 1970, or who have received 2 doses of a measles-containing vaccines are considered protected. Individuals with undetectable or equivocal antibody levels were considered at risk of measles infection. These individuals were offered vaccination and were tested for vaccine response 4 weeks after vaccination. **Results:** Anti-IgG measles antibody results, demographic information, and vaccination information were obtained for 257 employees. The results are currently available for 233 HCWs: 224 HCWs (96%) were seropositive, 7 (3%) were seronegative, and 2 were equivocal. Among seronegative individuals, 6 (85.7%) were born after 1980 and 3 (42.9%) had received 2 doses of a measles-containing vaccine. Of those with an equivocal result, 1 (50%) had received 2 doses and 1 (50%), born after 1970, did not confirm vaccination status. Finally, 9 (4%) of seropositive individuals were not vaccinated; of whom 8 (88.9%) were born before 1970. **Conclusions:** Our preliminary results suggest that the 95% immunity threshold that is usually required to prevent secondary transmission of measles has been reached in our ED HCW cohort. Even years after the second MMR dose, HCWs remain well protected. Relying on documented vaccination status is thus acceptable.

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Determining Antibiotic Use in Long-Term Care Facilities Across Tennessee

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Background: Antibiotic stewardship is an area of great concern in long-term care facilities nationwide. The CDC promotes 7 core

elements of antimicrobial stewardship. Based on information obtained from the Infection Control Assessment and Response (ICAR) Program, the 2 core elements most infrequently achieved by LTCFs are tracking and reporting. Currently, minimal data are available on antibiotic use (AU) in LTCFs in Tennessee. To address both issues, the Tennessee Department of Health (TDH) developed a monthly antibiotic use (AU) point-prevalence (PP) survey to provide LTCFs with a free tool to both track and report their AU and to gather data on how LTCFs are using antibiotics. **Methods:** We used REDCap to create a questionnaire to collect information on selected antibiotics administered in Tennessee LTCFs. This self-administered survey was promoted through the TDH monthly antimicrobial stewardship and infection control (ASIC) call as well as at various conferences and speaking engagements across the state. Antimicrobial stewardship leads for each facility were targeted. Antibiotics were grouped into 4 classes according to their indications: *C. difficile* infections, urinary tract infections, skin and soft-tissue infections (SSTIs) and respiratory infections. We determined AU percentage by dividing the number of days of therapy for a drug by a facility's average census. Individualized reports are provided to each participating facility on a quarterly basis. **Results:** Currently, 16 facilities have participated in the survey. Overall, 40.7% of antibiotics prescribed were in the common for SSTI category and 39.3% were common for respiratory infections. The top 33 most commonly prescribed antibiotics were amoxicillin (156 days of therapy [DOT]), nitrofurantoin (92 DOT), and levofloxacin (88 DOT). The average percentage of residents on antimicrobials on the day of survey was 12.3%; within this group, 57% of antibiotics were initiated in the LTCF, whereas 43% were present upon admission. **Conclusions:** Early results from the TDH AU PP survey revealed that drugs commonly used for SSTIs and respiratory infection were the most common antibiotic prescriptions and a potential area of focus for TDH's antimicrobial stewardship efforts. None of the 3 most frequently prescribed antibiotics, however, fall under the SSTI indication, despite SSTI being the most commonly prescribed indication based on the survey's evaluation metrics. This finding could be related to the larger number of antibiotics that fall under the SSTI indication. Preliminary data are being used to guide the direction of TDH's future ASIC calls to better suit disease states, which have room for improvement.

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Developing a Clinically Informed Compartmental Mathematical Model of Pediatric Norovirus Transmission—A Feasibility Study

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Background: Norovirus causes a significant disease burden of 20 million cases per year in the United States. Hospitals and long-term care facilities constitute the most commonly reported settings for noroviral outbreaks and clusters and thus represent a critically important site for prevention. Our institutional surveillance and response system identified 10–14 clusters or outbreaks of gastrointestinal viral disease per year, predominantly affecting staff. We sought to develop a compartmental mathematical model to examine the potential efficacy of various infection control practices in the management of noroviral clusters. **Methods:** We developed a set of parallel compartments representing both patient and staff categories (nursing, nurse assistants, etc) involved in a prototypical outbreak, using a 38-bed mixed medium- and high-acuity medical unit as the model basis. A susceptible–exposed–infected–recovered/immune (SEIR) model structure was used (Fig. 1). We conducted interviews with infection preventionists and nursing management to parameterize the model with data on (1) staff-to-patient ratios, (2) staff-patient contact time, (3) staff-staff contact time, (4) spatial distribution of patient assignments, and (5) baseline and intraoutbreak infection prevention practices. With these data, we proceeded to develop submodels, building on the primary model, that examined the effects of additional parallel compartmentalization of granular groups of staff, including resident physicians, environmental services, and clinical nursing assistants. Model parameters for these subanalyses were informed by interviews with clinical experts and review of internal data. **Results and Conclusions:** An SEIR model was developed that allowed for examination of a modeled outbreak of norovirus and comparison with a known prior outbreak on the same modeled unit for fidelity. Submodeling was performed with more staffing detail, allowing for the addition of further parallel SEIR tracks that delineated more granular staffing patterns. Staff interviews proved critical in the parameterization of these submodels, allowing for a more faithful representation of real-world dynamics. This work, through modification of model parameterization, can be used to assess the efficacy of hypothetical infection control interventions (eg, earlier unit closure, longer staff furlough) in altering transmission dynamics during an outbreak.

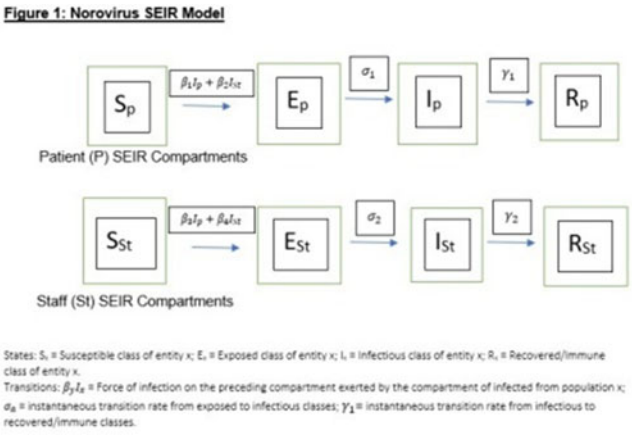

Fig. 1.

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