Presentation Type:
Poster Presentation - Top Poster Award
Subject Category: Surveillance/Public Health
The geography of social vulnerability and nursing home facility factors related to infectious disease transmission

Background: The impacts of health inequities on healthcare access, utilization, and outcomes have been highlighted by the COVID-19 pandemic, but these issues have been ongoing, yet understudied, in infectious disease epidemiology. Health inequities affect access to care, quality of care, and health outcomes in all healthcare settings. One healthcare setting that has yet to be fully studied in the context of health inequities is nursing homes. Nursing homes have a host of facility and population-specific issues that differ from other healthcare settings, making the impacts of health inequities likely unique and imperative to understand. The impacts of health inequities on nursing homes are unclear, and they likely have downstream effects on trends in morbidity, mortality, and transmission of multidrug-resistant organisms (MDROs) and other pathogens. **Method:** Here, we present a descriptive analysis, integrating multiple datasets relating to nursing home facility factors (data from the CMS Provider of Services and the CDC NHSN), nursing-home staffing trends (data from the CMS Payroll-Based Journal data), and social vulnerability (data from the CDC Social Vulnerability Index). We conducted a spatial analysis of nursing-home locations and the social vulnerability of the area. **Results:** Investigations of facilities and health inequities are best conducted in small spatial geographies. Analyses with less detailed spatial geographies miss high levels of heterogeneity in social vulnerability. Figure 1 provides an

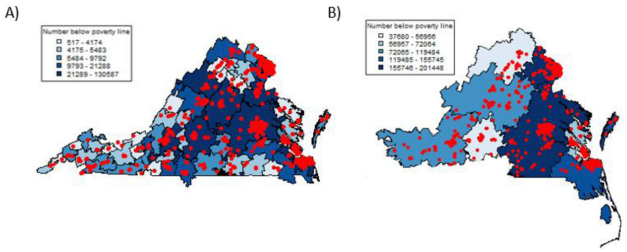

Fig. 1. Virginia nursing home distribution compared to (A) HSA-level poverty data and (B) HRR-level poverty data. Light blue indicates areas where fewer people live below the poverty line, and dark blue indicates areas where more people live below the poverty line. The red dots indicate the locations of nursing homes. HSA and HRR do not adhere to state boundaries, thus the geographical extent differs slightly between the HSA and HRR levels.

example, showing that analyzing nursing homes at a smaller spatial scale (ie, healthcare service area or HSA) shows heterogeneity in poverty levels that might be overlooked at a rough spatial scale, like Hospital Referral Regions (HRR). The poverty level associated with a nursing home will differ greatly depending on the geography of the analysis. **Conclusions:** These findings highlight that health inequities affect the quality and quantity of care of in nursing homes and that research conducted at larger geographical scales may overlook important mechanistic factors. This work will inform epidemiological models for disease transmission in nursing homes, accounting for the impacts of health inequities on transmission. Abating health inequities in all healthcare settings is a necessity to improve public health for the entire United States.
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Disclosures: None

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Presentation Type:
Poster Presentation - Top Oral Abstract
Subject Category: Antibiotic Stewardship
Antibiotic stewardship strategies and antibiotic overuse after hospital discharge: Analysis of the ROAD Home Framework
Valerie Vaughn; David Ratz; M. Todd Greene; Scott Flanders; Tejal Gandhi; Lindsay Petty; Sean Huls; Xiaomei Feng; Andrea White and Adam Hersh

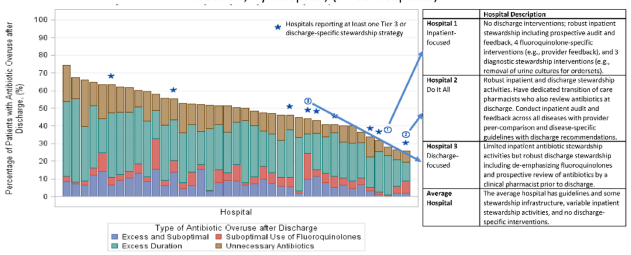
Background: Antibiotics are frequently prescribed—and overprescribed—at hospital discharge, leading to adverse-events and patient harm. Our understanding of how to optimize prescribing at discharge is limited. Recently, we published the ROAD (Reducing Overuse of Antibiotics at Discharge) Home Framework, which identified potential strategies to improve antibiotic prescribing at discharge across 3 tiers: Tier 1—Critical infrastructure, Tier 2—Broad inpatient interventions, Tier 3—Discharge-specific strategies. Here, we used the ROAD Home Framework to assess the association of stewardship strategies with antibiotic overuse at discharge and to describe pathways toward improved discharge prescribing. **Methods:** In fall 2019, we surveyed 39 Michigan hospitals on their antibiotic stewardship strategies. For patients hospitalized at participating hospitals July 1, 2017, through July 30, 2019, and treated for community-acquired pneumonia (CAP) and urinary tract infection (UTI), we assessed the association of reported strategies with days

Figure 1. Self-reported Stewardship Characteristics and Interventions, N= 39 hospitals

	Hospitals Responding "Yes"
Tier 1: Critical Infrastructure	
Has an antibiotic stewardship team	39 (100%)
Stewardship resources increased since the Joint Commission standard	12 (31%)
Hospital policy requiring documentation of intended antibiotic duration	6 (15%)
Tier 1: UTI-specific Critical Infrastructure	
Institutional treatment guideline for UTI	27 (69%)
Institutional treatment guideline for UTI, updated within the last year	20 (51%)
Indications of obtaining urine culture	18/20 (90%)
Recommendations for not treating ASB	17/20 (85%)
Antibiotic regimens that are concordant with national guidelines	20/20 (100%)
Recommend against fluoroquinolone as first line agent for cystitis	19/20 (95%)
Clinicians educated on UTI and ASB	34 (87%)
Tier 1: Pneumonia-Specific Critical Infrastructure	
Institutional treatment guideline for pneumonia	36 (92%)
Institutional treatment guideline for pneumonia, updated within the last year	23 (59%)
Antibiotic regimens consistent with national guidelines	23/23 (100%)
Recommends 5-day antibiotic treatment for most pneumonia	21/23 (91%)
Recommends fluoroquinolone as first line agent for CAP w/o penicillin allergy	2/23 (9%)
PNA guideline oral step-down recommendations	21/23 (91%)
Provides recommendation for de-escalation	20/23 (87%)
Clinicians educated on pneumonia	37 (95%)
Tier 2: Broad Interventions (Inpatient Focused)	
Antibiotic timeout at 48-72 hours	12 (31%)
All fluoroquinolones restricted	12 (31%)
Had a fluoroquinolone-directed intervention in last year	39 (100%)
Median number of interventions (5 potential)	3 (2-4)
Tracked fluoroquinolone prescribing rates	31 (80%)
Included fluoroquinolones in antibiotic timeout	14 (36%)
Provided clinician-level feedback on fluoroquinolone prescribing	11 (28%)
Educated clinicians on alternatives to fluoroquinolones	32 (82%)
Incorporated alternatives to fluoroquinolones in local guidelines	30 (77%)
Tier 2: UTI-Specific Broad Interventions	
Had any diagnostic stewardship intervention targeting ASB	26 (67%)
Median number of interventions (11 potential)	1 (0-2)
Removal/change in urine culture testing from preoperative order sets	3 (8%)
Removal/change of urine culture testing from ED order sets	12 (31%)
Removal/change of urine culture testing from admission order sets	7 (18%)
Removal of urine culture testing from other order sets	6 (15%)
Added reflex testing (urinalysis cutoff to urine cultures)	7 (18%)
Removed reflex testing	7 (18%)
Hiding urine culture results in some settings	1 (3%)
Requiring physician order to run urine cultures in ED	6 (15%)
Two-step urine culture initiative to reduce urine cultures in ED	3 (8%)
Framing urine culture results in test results	3 (8%)
Audit and feedback for UTI	26 (67%)
Audit and feedback for ASB	23 (59%)
CPOE for UTI	26 (67%)
CPOE for ASB	10 (26%)
Tier 2: Pneumonia-Specific Broad Interventions	
Preset duration of antibiotics (in CPOE) for patients with pneumonia	22 (56%)
Audit and feedback for pneumonia	31 (80%)
CPOE for pneumonia	39 (100%)
Tier 3: Discharge-specific Interventions	
Intervention de-emphasizing fluoroquinolones at discharge	6 (15%)
Have data on institutional antibiotic use at discharge	3 (8%)
Outpatient antibiotics are reviewed prior to discharge	3 (8%)
Clinical pharmacist reviews	3/3 (100%)
Pharmacists notified about discharges via face-to-face rounds	1/3 (33%)
Pharmacists notified about discharges via automatic page and face-to-face rounds	2/3 (67%)

Abbreviations: UTI, urinary tract infection; ASB, asymptomatic bacteriuria; CAP, community-acquired pneumonia; ED, emergency department; CPOE, computerized provider order entry

Figure 2. Antibiotic Overuse after Discharge in Patients Treated for Pneumonia or Urinary Tract Infection, by Hospital, (N=39 hospitals)



of antibiotic overuse at discharge. Days of antibiotic overuse at discharge were defined based on national guidelines and included unnecessary therapy, excess duration, and suboptimal fluoroquinolone use. We evaluated the association of stewardship strategies with days of discharge antibiotic overuse 2 ways: (1) all stewardship strategies were assumed to have equal weight, and (2) strategies weighted using the ROAD Home Framework with tier 3 (discharge-specific) strategies had the highest weight. **Results:** Overall, 39 hospitals with 20,444 patients (56.5% CAP; 43.5% UTI) were included. The survey response rate was 100% (39 of 39). Hospitals reported a median of 12 (IQR, 9–14) of 33 possible stewardship strategies (Fig. 1). On bivariable analyses, review of antibiotics prior to discharge was the only strategy consistently associated with lower antibiotic overuse at discharge (aIRR, 0.543; 95% CI, 0.335–0.878). On multivariable analysis, weighting by ROAD Home tier predicted antibiotic overuse at discharge for both CAP and UTI. For diseases combined, having more weighted strategies was associated with lower antibiotic overuse at discharge (aIRR per weighted intervention, 0.957; 95% CI, 0.927–0.987). Discharge-specific stewardship strategies were associated with a 12.4% relative decrease in antibiotic overuse days at discharge. Based on these findings, 3 pathways emerged to improve antibiotic use at discharge (Fig. 2): inpatient-focused strategies, "doing it all," and discharge-focused strategies. **Conclusions:** The more stewardship strategies reported, the lower a hospitals' antibiotic overuse at discharge. However, different pathways to improve discharge antibiotic use exist. Thus, discharge stewardship strategies should be tailored. Specifically, hospitals with limited stewardship resources and infrastructure should consider implementing a discharge-specific strategy straightaway. In contrast, hospitals that already have substantial inpatient infrastructure may benefit from proactively incorporating discharge into their existing strategies.

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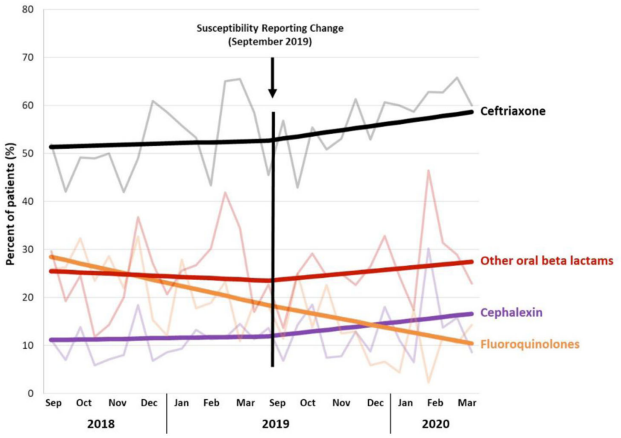
Presentation Type:
Poster Presentation - Top Oral Abstract
Subject Category: Surveillance/Public Health

Susceptibility reporting and antibiotic prescribing for UTIs in the inpatient setting: A nudge toward improved stewardship

Madison Ponder; Alan Kinlaw; Lindsay Daniels; Ashlyn Norris and Kevin Alby

Background: Urinary tract infections (UTIs) are common in the inpatient, observation, and emergency department settings. Although many UTI-causing pathogens are susceptible to oral β-lactams, these agents are not tested directly, and susceptibility is extrapolated from other agents. To improve the use of these agents, the University of North Carolina Medical Center (UNCMC) added cephalexin to the susceptibility profile generated with urine culture results in the electronic health record (EHR). We evaluated prescribing trends of cephalexin, other oral β-lactams, fluoroquinolones, and other antibiotics for UTIs in the inpatient setting, before and after the susceptibility reporting change. **Methods:** An interrupted time-series analysis was conducted. Among 1,491 patients who had positive urine cultures with susceptibilities and received at least

Figure 1. Segmented trends (bold lines) and raw data (faded) for percent of patients receiving antibiotic class before and after the September 2019 EHR-based intervention, for cephalexin (purple), other oral beta lactams (red), ceftriaxone (black), fluoroquinolones (orange).



1 antibiotic with a listed UTI indication during their inpatient stay at UNCMC, we measured the weekly prevalence (%) of patients who received each antibiotic group: cephalexin, other oral β-lactams (amoxicillin-clavulanate, cefdinir, cefuroxime), fluoroquinolones (levofloxacin, ciprofloxacin), and ceftriaxone. The study comprised a preintervention period (September 2018–March 2019) and a postintervention period (September 2019–March 2020). The prevalence of each antibiotic or group was plotted over time, and segmented linear regression was used to estimate the impact of the intervention on each antibiotic groups' time trend. **Results:** At study baseline in September 2018, the weekly prevalence of antibiotic use was 11% for cephalexin, 26% for other oral β-lactams, 51% for ceftriaxone, and 29% for fluoroquinolones. Fluoroquinolone use decreased steadily throughout the study period, by 11% during the 7-month preintervention period (95% CI, −17% to −5%) and by 8% (95% CI, −13% to −3%) after the intervention (*P* for trend deflection, .70). In contrast, during the preintervention period, trends were flat for cephalexin, ceftriaxone, and other oral β-lactams (all *P* for nonzero preintervention slope were >.40). During the postintervention period, use increased for ceftriaxone (6%; 95% CI, 3%–9%). Post-intervention use also increased for cephalexin (5%; 95% CI, −3% to 12%) and other oral β-lactams (4%; 95% CI, −8%, 15%), but these trends were imprecise and not statistically significant at α = .05. Fig. 1 displays trends and raw data for each antibiotic group. **Conclusions:** The urine culture susceptibility reporting change was associated with small increases in cephalexin and ceftriaxone use, coincident with continued decreasing use of fluoroquinolones, for hospitalized patients with positive urine cultures and a listed UTI indication. Low-resource EHR-based interventions may confer considerable benefit for antimicrobial stewardship efforts in this clinical setting, and larger real-world studies are needed to replicate and contextualize these findings.

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Presentation Type:
Poster Presentation - Top Oral Abstract
Subject Category: *C. difficile*

Impact of exposure to potentially contaminated hospital beds on risk of hospital-onset *C. difficile* infection

Lucy Witt; Jessica Howard-Anderson; Elizabeth Overton and Jesse Jacob

Background: Environmental contamination increases risk for *Clostridioides difficile* infection (CDI) given that spores can remain on a hospital bed, floor, sink, and light switch despite appropriate cleaning