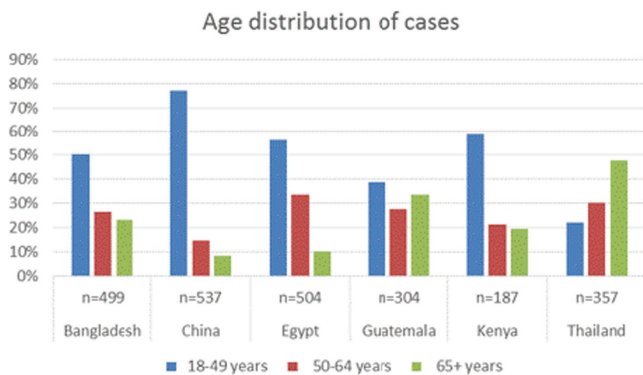


diagnostics enable simultaneous detection of multiple pathogens in respiratory specimens. Characterizing the public health threat of severe acute respiratory infection (SARI) may enhance global health security. We studied potential etiologies of SARI among adults in six countries over a 12-month period using multi-pathogen diagnostics.

Methods. We enrolled SARI cases (acute onset of fever and cough, requiring hospitalization, in an adult) from Global Disease Detection sites in Bangladesh, China, Egypt, Guatemala, Kenya, and Thailand and healthy frequency-matched controls (2 controls: 5 cases) by time (onset), age group (18–49, 50–64, 65+ years), and catchment area. Demographics, clinical data, and nasopharyngeal and oropharyngeal specimens were collected from cases and controls. Specimens were tested for 16 viruses and 14 bacteria using Taqman[®] Array Card, which uses real-time reverse transcriptase polymerase chain reaction.

Results. We enrolled 2,388 cases and 1,135 controls from Oct 2013 through Oct 2015. Age distribution (Figure) and seasonality varied by site: enrollment peaked in summer months in Bangladesh, Thailand, and China, and in winter months in Egypt, but was stable throughout the year in Guatemala and Kenya. Case fatality rate across all study locations was 2.3% (range 0–7.0%). One or more pathogens were detected in 76% of cases and in 67% of controls; ≥2 pathogens were detected in 42% of cases and 37% of controls. Pathogens more commonly detected among cases than controls included influenza A (OR 13.3, CI 7.0–25.2; 12.8% of cases vs. 1.1% of controls), influenza B (OR: 27.0, CI 8.6–84.8; 8.1% vs. 0.3%), and respiratory syncytial virus (RSV) (OR: 9.4, CI 3.4–25.8; 4.0% vs. 0.4%).

Conclusion. In this SARI study, frequent detection of multiple pathogens in the oro- and nasopharynx of both cases and controls made etiology attribution difficult. Influenza and RSV, however, were likely to be causes of SARI. Because upper respiratory tract specimens may not accurately reflect disease in the lung, better specimens are needed to determine pneumonia etiology, particularly for bacteria.



Disclosures. All authors: No reported disclosures.

890. Impact of Antivirals in the Prevention of Serious Outcomes Associated with Influenza in Hospitalized Canadian Adults: A Pooled Analysis from the Serious Outcomes Surveillance (SOS) Network of the Canadian Immunization Research Network (CIRN)

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Session: 94. Respiratory Infection Diagnosis

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Background. Antiviral treatment of influenza in outpatient settings is associated with modest improvement in outcomes but benefit in inpatient settings remains unclear. We assessed the impact of antiviral treatment on the severe outcomes death and intensive care unit (ICU) admission and/or need for mechanical ventilation (MV) in hospitalized influenza patients.

Methods. Patients admitted to hospitals of the CIRN SOS Network with an acute respiratory illness from 2011/12–2013/14 who tested polymerase chain reaction (PCR) positive for influenza were included. Demographic and medical information were obtained from patient interview or the medical chart. Main outcomes of interest were ICU admission and/or need for MV, and death. Logistic regression with backwards stepwise selection was used to estimate odds ratios (ORs) and 95% confidence limits (CIs) for the association between antiviral use and severe outcomes overall, and stratified by time from symptom onset to antiviral start (<48hours, 48hours <5 days, 5–21 days).

Results. Over 3 influenza seasons, 4,679 patients were enrolled; 59% were aged ≥65 years, 52% were female, and 89% had a comorbidity. Influenza vaccination status was available for 4,019 (86%) patients, of whom 1,796 (45%) had received current season vaccine. Of 4,679 patients, 16% of patients were admitted to ICU and/or required MV and 9% died. Overall, 54% of hospitalized influenza patients received an antiviral; mean time from the onset of symptoms to antiviral start was 4.28 days (range: 0–21 days). Treatment with antivirals was associated with a significant reduction in admission to ICU and/or need for MV (OR = 0.10; 95% CI: 0.08–0.13; *P* < 0.001), but was not significantly associated with a reduction in death (*P* = 0.454) irrespective of time between symptom onset and start of antivirals.

Conclusion. In this study, treatment with antivirals in hospitalized patients with influenza was associated with a significant reduction in ICU admission and MV, even when initiated a mean of 4.28 days from symptom onset. Reduction in death was not demonstrated. These findings support current recommendations for antiviral use in hospitalized adults and suggest increased compliance with these guidelines may reduce morbidity and cost.

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891. Antibiotic Consumption and Antibiotic Resistance Across Organisms, Drugs, and Consumer Groups

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Session: 95. Use 'em and Lose 'em: Preventing Antibiotic Overuse

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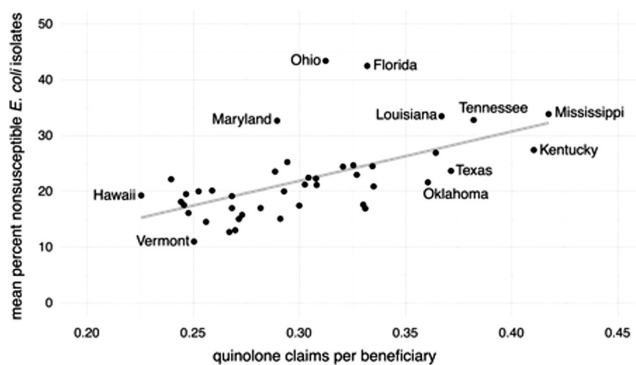
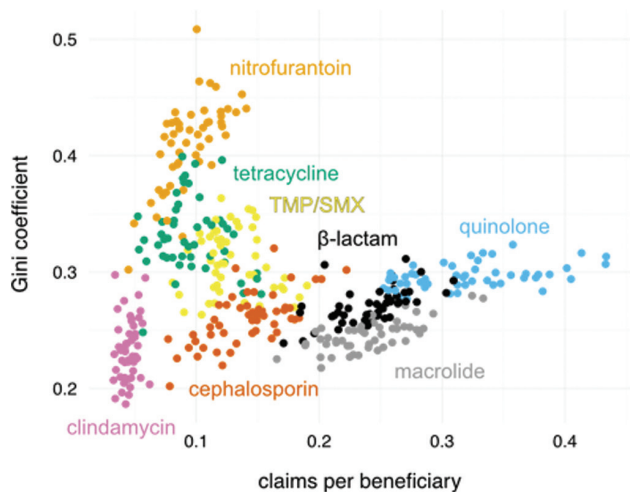
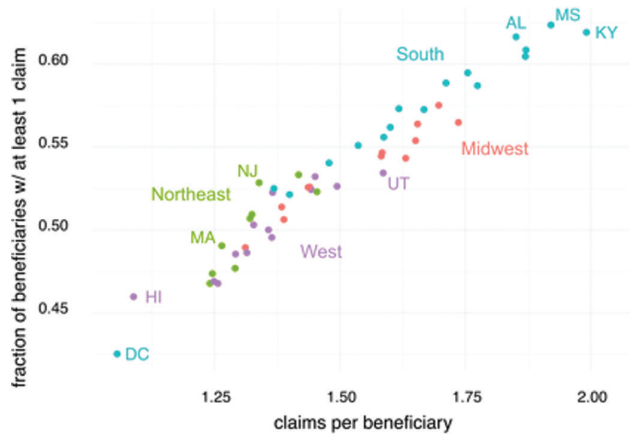
Background. Antibiotic consumption is considered a major driver of antibiotic resistance, but it remains unclear whether the consumption–resistance relationship is apparent for many organisms and drugs, and whether aggregate consumption is the best predictor of resistance.

Methods. We conducted a landscape assessment of the consumption–resistance relationship by comparing a 20% sample of Medicare Part D outpatient antibiotic pharmacy

claims with a nationwide survey of hospital antibiotic susceptibility reports. Antibiotic consumption was summarized in individual states and hospital-referral regions (HRRs) using traditional, aggregate consumption or by metrics that account for the concentration of consumption in a few individuals (Gini coefficient). The consumption-resistance relationships for 17 organism-drug combinations were simultaneously evaluated (Spearman's rho; linear models predicting resistance from aggregate consumption and Gini coefficient) and corrected for multiple-hypothesis testing (Benjamini-Hochberg).

Results. We identified a significant correlation between aggregate consumption of an antibiotic and an organism's reported resistance to that antibiotic in only a few cases: quinolones and *E. coli* (Spearman's rho = 0.65, adjusted $P < 10^{-4}$) and *E. cloacae* (rho = 0.50, adjusted $P = 0.006$). In other cases, notably *E. coli* with trimethoprim-sulfamethoxazole, the distribution of antibiotic consumption among consumers has a marginal relationship with antibiotic resistance (-1.0 p.p. resistance per p.p. Gini coefficient of consumption among consumers, unadjusted $P < 0.001$).

Conclusion. There is a clear correlation between aggregate consumption of an antibiotic and resistance of an organism to that antibiotic in only a few cases, suggesting that antibiotic steward efforts might maximize their effectiveness by focusing on particular organisms, drugs, and consumer groups rather than overall, aggregate consumption.



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892. Improvement of Gram-negative Susceptibility to Fluoroquinolones After Implementation of a Pre-authorization Policy for Fluoroquinolone Use: A Decade-Long Experience

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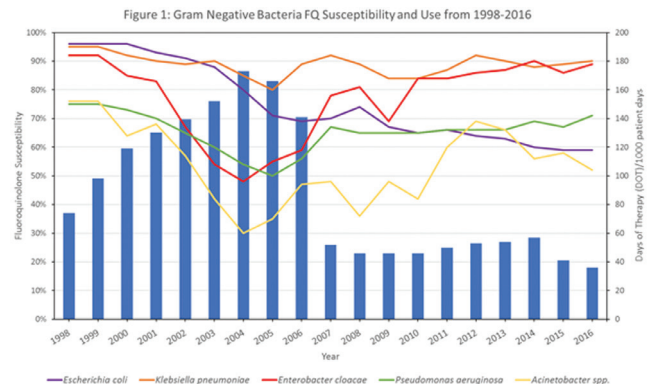
Session: 95. Use 'em and Lose 'em: Preventing Antibiotic Overuse
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Background. Antibiotic use is a well-known risk factor for acquisition of drug-resistant bacteria and community antibiotic prescribing can drive high rates of resistance within the hospital setting. Owing to concerns over increasing fluoroquinolone (FQ) resistance among Gram-negative organisms at UAB Hospital, our stewardship program implemented a pre-authorization policy. The goal of this study was to assess the relationship between hospital fluoroquinolone use and antibiotic resistance.

Methods. In 2006, the inpatient formulary was consolidated to only ciprofloxacin and moxifloxacin with implementation of guidelines for use to limit inpatient prescribing. Any use outside of these guidelines required approval from an infectious diseases physician. Organism-specific data were obtained from the clinical microbiology database and FQ use was obtained from the hospital database. Correlations were calculated using Pearson's coefficient.

Results. From 1998 to 2004, FQ use peaked at 173 days of therapy (DOT)/1,000 patient-days, but has remained below 60 DOT/1,000 patient-days since restriction implementation (Figure 1). FQ susceptibility was documented for five common Gram-negative isolates, *P. aeruginosa*, *Acinetobacter* spp., *Enterobacter cloacae*, *E. coli*, and *K. pneumoniae*, over an 18-year period (1998-2016). Common hospital acquired pathogens, including *Pseudomonas aeruginosa*, *Acinetobacter* spp. and *Enterobacter cloacae* improved in their susceptibilities to fluoroquinolones. *Acinetobacter* went from 35% to over 50% susceptible in the preceding 10 years after the policy. *Pseudomonas* improved from 50% susceptible to over 70% and *Enterobacter* improved from less than 50% to over 90% susceptible. Interestingly this improvement was not seen for *E. coli* which continued to show a decline in susceptibility from over 90% to near 60% in 2016.

Conclusion. In a large academic hospital setting, FQ susceptibility for common hospital-acquired GNRS improved significantly with the introduction of a restricted use program. A continued decline in *E. coli* FQ susceptibility suggests resistance rates may be driven by outpatient and community antibiotic use and thus, outpatient stewardship programs are necessary to prevent further spread of FQ resistance.



Disclosures. All authors: No reported disclosures.

893. Inpatient plus Post-discharge Durations of Therapy to Identify Antimicrobial Stewardship Opportunities at Transitions of Care

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Background. In-hospital antimicrobial durations capture only a portion of total antimicrobial exposures attributable to that inpatient stay. Review of electronic discharge prescriptions could allow stewards to identify excessive prescribing durations.