

We identified distinct groups of CO-MRSA and MSSA infection rate trajectories by grouping census tracts of the 20 county Atlanta Metropolitan Statistical Area (MSA) between 2002 to 2016 with similar temporal trajectories.

**Methods.** This is a retrospective study from 2002-2016, using electronic health records of children living in Atlanta, Georgia with *S. aureus* infections and relevant US census data (at the census tract level). A group based trajectory model was applied to generate community onset *S. aureus* trajectory infection groups (low, high, very high) by census tract and were mapped using ArcGIS.

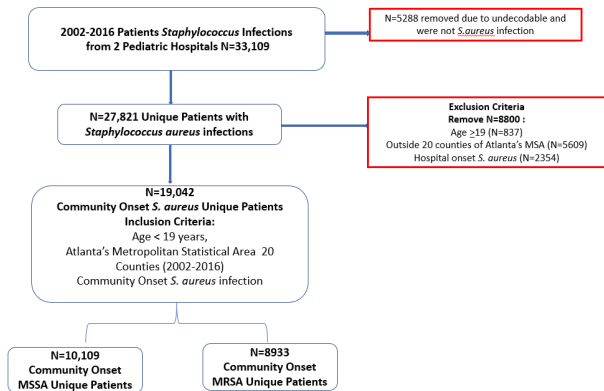
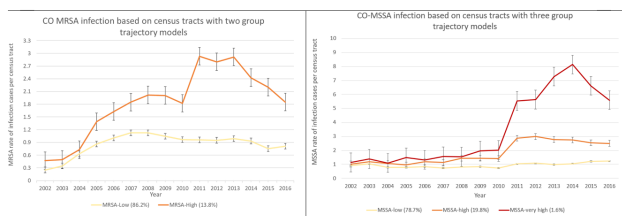


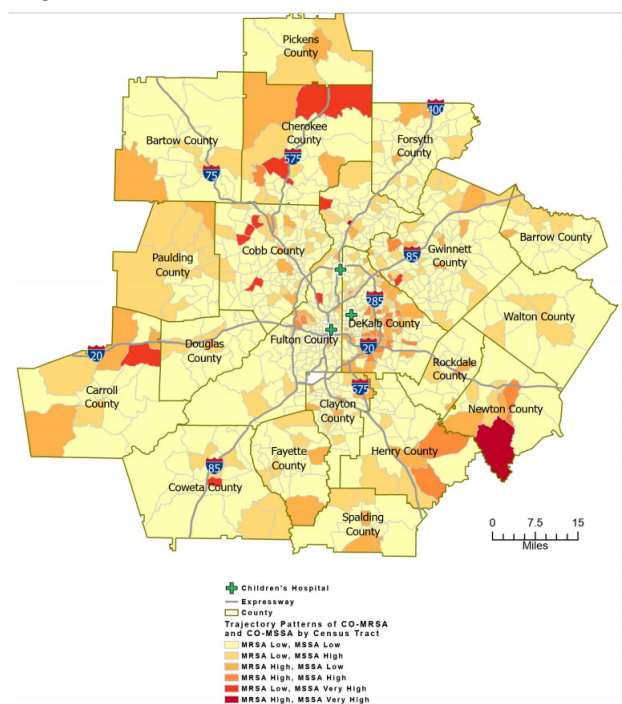
Figure 1. Enrollment Scheme –Unique Patients with CO-MRSA and MSSA Infections

**Results.** Three CO-MSSA infection groups (low, high, very high) and two CO-MRSA infection groups (low, high) were detected among 909 census tracts in the 20 counties. We found ~74% of all the census tracts with *S. aureus* occurrence during this time period belonged to low infection rate groups for both MRSA and MSSA, with a higher proportion occurring in the less densely populated counties. Census tracts in DeKalb County, one of Atlanta's most densely populated areas, had the highest proportion of the worst infection trend patterns (CO-MRSA high or very high, CO-MSSA high or very high).

Trends of Community-Onset MRSA and MSSA Infection Rates Based on Group-based Trajectory Models



Spatial patterns for CO-MRSA and CO-MSSA Trajectory Trends in the Atlanta Metropolitan Area Between 2002 to 2016



**Conclusion.** Trends of *S. aureus* infection patterns, stratified by antibiotic resistance over geographic areas and time, identify communities with higher risks for MRSA infection compared to MSSA infection. Further investigation of the determinants of the trajectory groupings and the geographic outliers identified by this study may be a way to target prevention strategies aimed to prevent *S. aureus* infections.

**Disclosures.** All Authors: No reported disclosures

### 3. Stopping Hospital Infections with Environmental Services (SHINE): A Cluster-Randomized Trial of Intensive Monitoring Methods for Terminal Room Cleaning on Rates of Multidrug-Resistant Organisms (MDROs) in the Intensive Care Unit (ICU)

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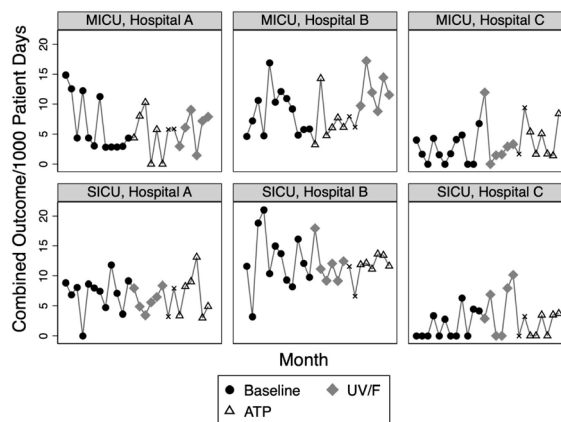
**Session:** O-01. Addressing MDRO Colonization and Infection

**Background.** MDROs frequently contaminate hospital environments. We performed a multicenter cluster-randomized, crossover trial of two methods for intensive monitoring of terminal cleaning effectiveness at reducing infection and colonization with MDROs within ICUs.

**Methods.** Six medical and surgical ICUs at three medical centers received both intensive monitoring interventions sequentially, in a randomized order. The intervention included surveying a minimum of 10 surfaces each in 5 rooms weekly, after terminal cleaning, with adenosine triphosphate (ATP) monitoring or an ultraviolet fluorescent marker (UV/F). Results were delivered to environmental services (EVS) staff in real-time, with failing surfaces re-cleaned. The primary study outcome was the monthly rate of infection or colonization with MDROs, including methicillin-resistant *Staphylococcus aureus*, *Clostridioides difficile*, vancomycin-resistant Enterococcus, and multidrug-resistant gram-negative bacilli (MDR-GNB), assessed during a 12-month baseline comparison period and sequential 6-month intervention periods, separated by a 2-month washout. Outcomes during each intervention period were compared to the combined baseline period plus the alternative intervention period using mixed-effects Poisson regression, with study hospital as a random effect.

**Results.** The primary outcome rate varied by hospital and ICU (Figure 1). The ATP method was associated with a relative reduction in the incidence rate of infection or colonization with MDROs (incidence rate ratio (IRR) 0.887, 95% confidence-interval (CI) 0.811–0.969, P=0.008) (Table 1), infection with MDROs (IRR 0.924, 95% CI 0.855–0.998, P=0.04), and infection or colonization limited to multidrug-resistant MDR-GNB (IRR 0.856, 95% CI 0.825–0.887, P< 0.001). The UV/F intervention was not associated with a statistically significant impact on these outcomes. Room turn-around time was increased by a median of one minute with the ATP intervention and 4.5 minutes with the UV/F intervention compared to baseline.

Figure 1. MDRO infection or colonization per 1000 patient days by study month



NOTE. MDRO, multi-drug resistant organism; MICU, medical intensive care unit; SICU, surgical intensive care unit; UV/F, ultraviolet fluorescent marker; ATP, adenosine triphosphate

