Geographic Cluster of Community-Acquired methicillin resistant Staphylococcus aureus infections among Pediatric Patients from Brooklyn, New York

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Abstract

To understand the potential reservoirs of CA-MRSA in the identified high risk community and perform an epidemiological study to determine comparative S. aureus colonization burden between children admitted from high risk and non-high risk ZIP codes, and assess the microbiological profile of clinical MRSA isolates from high risk ZIP codes.

Objectives

- Beginning in July 1, 2015 we performed active surveillance S. aureus nasal and throat cultures on all non-oncology treated children admitted (within 48 hours) to General Pediatric and PICU units.
- We performed whole genome sequencing on CA-MRSA isolates from children in high-risk ZIP codes who were admitted to the hospital.
- To identify potential reservoirs and risk factors for transmission of CA-MRSA in high risk ZIP codes, we developed a questionnaire with family engagement specialists to be voluntarily completed by families of patients admitted to the General Pediatric and PICU units.

Methods

- Whole genome sequencing identified a significant cluster in the high risk ZIP codes.
- Clinical Pediatric CA-MRSA infections since July 1, 2015
- Only significant risk factor identified thus far: household members with known prior MRSA infection (OR=17 (CI 2.4–114), p<0.007)

Results

Whole genome sequencing identified a significant cluster in the high risk ZIP codes in children with clinical CA-MRSA infection.

Conclusions

- We identified a CA-MRSA cluster in select neighborhoods in Brooklyn.
- The high prevalence of MRSA colonization and infection rate is likely related to transmission of a clonally expanded USA300 clone.
- Transmissions are likely occurring at home and given elementary-school-aged children had the highest number of infections, households and schools may be CA-MRSA reservoirs.

Background

- CA-MRSA infections tend to occur in previously healthy young patients. They have been associated predominately with SSTIs but have also been linked to several severe clinical syndromes such as necrotizing pneumonia and severe sepsis.
- The Epidemiology of CA-MRSA in NYC, a region of high MRSA prevalence, is not completely understood.
- Astute clinicians at NYU Langone Medical Center have observed a cohort of pediatric patients residing in specific zip codes in Brooklyn present with CA-MRSA.
- CA-MRSA colonization in general population 0.5-2%.
- Among patients with CA-MRSA infection, only 20% are colonized with CA-MRSA [Uhlmann et al. PLoS One, 2011].