

Monitoring *Staphylococcus* Infection Trends with Biosurveillance Data

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OBJECTIVE

We used our biosurveillance system to describe trends in emergency department (ED) visits for skin and soft tissue infections (SSTI) as well as *staphylococcus* pneumonia hospitalization trends.

BACKGROUND

Methicillin resistant *staphylococcus aureus* (MRSA) is a leading cause of SSTI. Until recently, *S. aureus* pneumonia has been considered primarily a nosocomial infection, and was reported infrequently as a cause of severe community-acquired pneumonia. In recent years, there have been several reports of MRSA community-acquired pneumonia cases associated with influenza among healthy individuals resulting in hospitalization or death [1]. During the 2007-08 influenza season, the WA DOH received reports of necrotizing *staphylococcus* pneumonia associated with flu-like illness and confirmed flu; these included severe cases of pneumonia caused by MRSA [2]. We examined data from our biosurveillance system to describe trends in *staphylococcus* infection among ED patients and patients hospitalized with pneumonia or influenza (PI) in King County, WA.

METHODS

In addition to our ED-based syndromic surveillance, we collect hospital data on patients admitted with a diagnosis of PI (ICD codes 480-487). The data elements include hospital name, date/time of visit, age, sex, zip code, chief complaint, disposition, diagnoses, and a patient and visit key. The PI hospitalization data also include whether or not the patient was in the ICU or was intubated. We examined codes for *S. aureus* (482.0, 482.1, 482.4, and 482.9); *staphylococcus* (041.1); MRSA (V09.0); SSTI (680-682 and 704.8); and influenza (487). For the PI data, we searched both admission and discharge diagnoses. We classified chief complaints associated with SSTI by searching for the terms MRSA, cellulitis, boil, skin infection, wound, ulcer, pustule, lesion, furuncles, carbuncles, and abscess, while excluding unrelated terms. We restricted the emergency department analysis to 12 of 19 King County EDs that had complete diagnostic data between 2000 and 2006, and the PI analysis to 10 of 16 hospitals that provided admissions data between 2001 and 2006; visits with missing diagnoses were excluded.

RESULTS

During 2000-06, there was an increasing annual trend in the proportion of SSTI diagnoses in EDs ($p < 0.001$); the majority of SSTI diagnoses were among males (57.6%). The proportion of ED visits with an SSTI diagnosis was highest among 45-64 year-olds. Among ED patients, 20.3% had at least one repeat visit for an SSTI; 55.2% of repeat visits were among 18-44 year-olds. During 2001-06, 4.3% of 82,446 hospitalizations for PI included a diagnosis of *S. aureus*; there was no significant annual trend in the proportion of PI admissions due to *S. aureus*. Almost half (47.8%) of patients hospitalized with *S. aureus* pneumonia were also diagnosed with MRSA, and a smaller percentage were diagnosed with an SSTI or influenza (6.4% and 0.4%, respectively). Among patients hospitalized with PI with a diagnosis of *S. aureus*, there were more males (64.5%) than females ($p < 0.0001$); 41.5% were ≥ 65 years old. Among patients hospitalized with *S. aureus* pneumonia was the most common (18.1%) chief complaint; a small percentage of patients presented with a chief complaint of “staph” (<1%), MRSA (2.3%), and “flu” (<1%).

CONCLUSIONS

Consistent with national trends of increasing community-acquired MRSA SSTI, we found an increasing annual trend in the proportion of SSTI diagnoses at EDs. However, we did not find an increasing annual trend in *S. aureus* diagnoses among patients hospitalized with PI. Based on the available data, it was not possible to ascertain what fraction of *S. aureus* hospitalizations were MRSA; the proportion of nosocomial vs. community-acquired illness; or what risk factors were most prevalent among cases. Biosurveillance systems may prove useful in monitoring trends in MRSA pneumonia. We are currently expanding our system in order to establish a population-based surveillance system for monitoring PI admissions associated with *S. aureus*.

REFERENCES

- [1] Severe Methicillin-Resistant *Staphylococcus aureus* Community-Acquired Pneumonia Associated with Influenza --- Louisiana and Georgia, December 2006--January 2007. *MMWR* 2007;56:325-329. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5614a1.htm>. Accessed June 9, 2008
- [2] Severe MRSA Pneumonia Associated with Influenza. *epiTRENDS* 2008;13(3). <http://www.doh.wa.gov/ehsphl/epitrends/08-epitrends/08-03-epitrends.htm>. Accessed June 10, 2008.

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