Trends in Invasive Infection with Methicillin-Resistant Staphylococcus aureus (MRSA) in Three San Francisco Bay Area Counties, 2005-2011

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Background

• In 2004, the California Emerging Infections Program (CEIP), at the request of the Centers for Disease Control and Prevention, initiated population-based laboratory surveillance for invasive Methicillin-resistant Staphylococcus aureus (MRSA). MRSA had long been among the most important nosocomial pathogens and had recently emerged as an important pathogen in the community (1).

• Data collected are used to describe the changing MRSA epidemiology.

In January 2008, select severe community-onset Staphylococcus aureus infections became reportable in California. Case defining criteria include patients without documented hospital-associated risk factors, indwelling devices, and/or nursing home exposures.

Methods

• Cases are identified through laboratory-based surveillance and are defined as MRSA cultured from a normally sterile body site from a resident of the CEIP catchment area (Alameda, San Francisco, and Contra Costa counties) per Active Bacterial Core Surveillance protocol (2).

• Medical record review was conducted to collect demographic and risk factor information. Cases were assigned one of three mutually exclusive epidemiologic classifications: healthcare-associated community-onset (HACO; previous healthcare exposures measured, compared to HO and CA categories), hospital onset (HO; culture collected >3 days after hospital admission), or community associated (CA, no documented previous healthcare exposures, neither HO nor HACO).

• Healthcare exposures were compared using chi square tests and significance was defined as p ≤ 0.05.

• Analyses were performed using SAS version 9.3.

• Annual and age-adjusted incidence rates were calculated using California Department of Finance estimates (3).

Results

• Between 2005 and 2011, 6383 cases of iMRSA were detected: 22% HO, 55% HACO and 12% CA. iMRSA cases classified as HACO remain the largest proportion over all years.

• Between 2005 and 2011, there was an overall decrease in iMRSA incidence, from 31.9 cases/100,000 persons in 2005 to 20.4 cases/100,000 persons in 2011.

• The largest incidence decrease (54%) was seen among HO, from 8.3/100,000 persons in 2005 to 3.8/100,000 persons in 2011.

• HACO incidence decreased by 34% from 17.2/100,000 persons in 2005 to 11.3/100,000 persons in 2011.

• CA incidence remained steady over the seven-year period, 5.4/100,000 persons in 2005 to 4.9/100,000 persons in 2011.

• Race and sex distribution is similar across all epidemiologic classifications (Table 1).

• The greatest proportion of cases under 35 years old was classified as CA, 2% were <12 and 12% were 18-34 (Table 1).

• A higher proportion of HACO cases had all five of the healthcare exposures measured, compared to HO and CA cases (Table 2).

• The highest fatality proportion was seen in HO (29%), followed by HACO (17%), and CA (6%) cases.

• The highest average age-adjusted incidence of 60.3/100,000 persons was found among HACO iMRSA who were >65 years old (Figure 2).

Conclusions

Since 2005, incidence of iMRSA in the San Francisco Bay Area has decreased, most notably among HO iMRSA, consistent with previous findings (4). Healthcare based iMRSA intervention practices such as hand hygiene, MRSA infection control methods including bundles, isolation practices, and creation of antimicrobial stewardships may have been responsible for the decrease in hospital-associated iMRSA.

Continued examination of iMRSA trends and monitoring effectiveness of prevention strategies is recommended.

References


Limitations

• CEIP’s MRSA surveillance does not include health interviews. Therefore, some HACO cases may have been misclassified as CA due to data collected by medical record review of only the iMRSA admission.

• Data only represents invasive MRSA infections.

Tables and Figures

Figure 1. Incidence of Invasive iMRSA of San Francisco Bay Area by Epidemiologic Classification and Total by Year, 2005-2011.

Table 1. Demographics of Invasive Methicillin-Resistant Staphylococcus aureus (MRSA) Infections in the San Francisco Bay Area by Epidemiologic Classification, 2005-2011.

Table 2. Healthcare Exposures of Invasive Methicillin-Resistant Staphylococcus aureus (MRSA) Infections in the San Francisco Bay Area by Epidemiologic Classification, 2005-2011.

Table 3. Outcome of Invasive Methicillin-Resistant Staphylococcus aureus (MRSA) Infections in the San Francisco Bay Area by Epidemiologic Classification, 2005-2011.

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