



Active Bacterial Core Surveillance (ABCs) Report

Emerging Infections Program Network

Methicillin-Resistant *Staphylococcus aureus*, 2008

(Update)[†]



ABCs Areas

California (3 county San Francisco Bay area); Colorado (5 Denver area county); Connecticut; Georgia (8 county Atlanta area); Maryland (1 Baltimore area county); **Minnesota (2 metro Twin City counties)**; New York (1 Rochester county); Oregon (3 county Portland area); Tennessee (1 Nashville county). Note, the population under surveillance changed from 2007 (Bold).

ABCs Population

The surveillance areas represent **18,300,643** persons
Source: National Center for Health Statistics bridged-race vintage 2008 postcensal file.

ABCs Case Definition

Invasive methicillin-resistant *Staphylococcus aureus* (MRSA) disease: isolation of MRSA from a normally sterile site in a resident of the surveillance area in 2008. Cases of disease are classified into one of three epidemiologic classifications. A case is classified as hospital-onset (HO) if the MRSA culture was obtained on or after the fourth calendar day of hospitalization, where admission is hospital day 1; as healthcare-associated community-onset (HACO) if the culture was obtained in an outpatient setting or before the fourth calendar day of hospitalization and had one of more of the following: 1) a history of hospitalization, surgery, dialysis, or residence in a long term care facility in the previous year, or 2) the presence of a central vascular catheter within 2 days prior to MRSA culture; and as community-associated (CA) if none of the previously mentioned criteria are met.

ABCs Methodology

ABCs personnel routinely contacted all microbiology laboratories serving acute care hospitals in their area to identify cases. Standardized case report forms that include information on demographic characteristics, clinical syndrome, and outcome of illness were completed for each identified case. Convenience samples of isolates were collected and sent to CDC for routine testing, including: antimicrobial susceptibility testing, toxin testing and *SCCmec* typing. Pulsed field gel electrophoresis (PFGE) of all isolates was discontinued in 2008; an inferred PFGE algorithm was developed based on microbiologic and molecular characteristics of isolates. The algorithm has been validated for use with isolates collected though this surveillance only (<http://www.cdc.gov/HAI/settings/lab/inferred-PFGE-algorithm.html>). Regular laboratory audits were performed to ensure completeness of case ascertainment.

Rates of invasive MRSA disease among all patients were calculated using population estimates for 2008. Cases with unknown race were assigned race based on distribution of known race and gender by EIP site. Methodology to make national estimates was modified in January 2012 to adjust for receipt of dialysis, as well as age, race, and gender. Previously reported national estimates were adjusted for age and race only. Confidence intervals for nationally estimated incidence rates of disease and mortality were calculated based on the gamma distribution (Stat Med, 1997 16:791-801).

ABCs Results

ABC Racial/Ethnic Profiles

Race	No. (Rate) ^a
White	3,375(25.4)
Black	2,068(62.1)
Other	232(13.8)

Unknown race (n=776) distributed amongst known
^a Cases per 100,000 population for ABCs areas (crude rates)

Distribution of cases, deaths and PFGE type by Epidemiological Classification

MRSA Class	No. (Rate) Cases ^b	No. (Rate) Death ^c	Inferred PFGE Type (n,%) ^d			
			Tot N	USA100	USA300	USA500/Iberian
CA	948 (5.2)	92 (0.5)	229	70 (30.6)	147 (64.2)	7 (3.1)
HCA ^a	4,580 (25.0)	794 (4.3)	1,193	745 (62.5)	328 (27.5)	101 (8.5)
HO	1,298 (7.1)	308 (1.7)	338	237 (70.1)	71 (21.0)	28 (8.3)
HACO	3,282 (17.9)	486 (2.7)	855	508 (59.4)	257 (30.1)	73 (8.6)

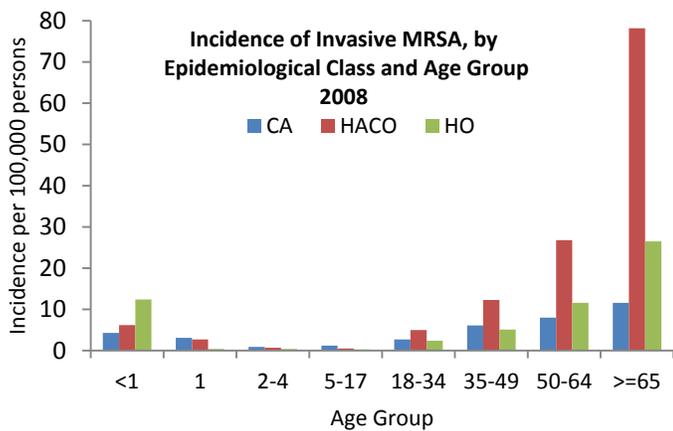
^a HCA: Healthcare-associated invasive MRSA infections; sum of patients that are classified as either HO or HACO

^b n= 88 epidemiologic category unknown

^c n=9; epidemiologic category unknown

^d isolates were eligible for testing at CDC

[†] Last Updated: January 30, 2012; See methods and discussion for update explanation.



National Estimates and Adjusted Incidence Rates of Invasive MRSA Infections

Epidemiologic Class	Estimated No.	Incidence Rate (Confidence Interval) ^a
CA	15,343	5.05 (4.72-5.4)
HCA	77,138	25.65 (24.90-26.43)
HO	21,840	7.18 (6.79-7.6)
HACO	56,298	18.52 (17.87-19.2)
Overall ^b	95,872	31.53 (30.7-32.39)

^a National Estimates and Incidence (no. per 100,000 population per year) are adjusted for age, race, gender, and receipt of dialysis treatment using 2008 US Census Data.

^b 88 cases could not be classified into an epidemiological category or category is unknown and therefore are counted in the overall estimate only.

Reported Clinical Syndrome by Epidemiological Class

Syndrome ^a	CA (n=948)	HACO (n=3,282)	HO (n=1,298)
Bloodstream infection			
with other syndrome	223	1187	597
with no other syndrome	536	1670	479
Pneumonia	155	468	234
Lower Respiratory Infection ^b	50	105	94
Osteomyelitis	120	335	109
Endocarditis	92	200	46
Cellulitis	166	284	59
Wounds			
Surgical ^c	6	174	44
Decubitus/Pressure Ulcers	18	101	40
Other wounds/skin abscesses ^d	19	39	21
Traumatic	6	27	11

^a Some case patients had more than one syndrome.

^b Lower Respiratory Infection is defined as: a patient with pneumonia documented in their discharge summary, who has a positive MRSA non-sterile respiratory specimen with accompanying chest radiology results documenting any of the following: bronchopneumonia/pneumonia, air space density/opacity, new or changed infiltrates.

^c Combines deep tissue/organ infection and infection of a surgical wound, post operatively.

^d Category includes skin abscess, necrotizing fasciitis, gangrene, non-traumatic wounds.

National Estimates and Adjusted Incidence Rates for Mortality among Cases

Epidemiologic Class	Estimated No.	Mortality Rate (Confidence Interval) ^a
CA	1,414	0.52 (0.37-0.71)
HCA	14,181	4.67 (4.35-5.02)
HO	5,416	1.78 (1.58-2.00)
HACO	8,775	2.89 (2.63-3.17)
Overall ^b	16,096	5.29 (4.95-5.66)

^a National Estimates and Mortality Rate (no. per 100,000 population per year) are adjusted for age, race, gender and receipt of dialysis treatment using 2008 US Census Data

^b 20 cases could not be classified into an epidemiological category or category is unknown and therefore are counted in the overall estimate only.

ABCs Discussion

Surveillance data from 2008 represent the fourth full year of performing population-based surveillance for invasive MRSA infections through the Emerging Infections Program/Active Bacterial Core Surveillance Activity. Several changes in operations, including addition of new variables to capture lower respiratory infections and implementation of an algorithm to infer PFGE type, resulted in some changes in the way data are presented in this 2008 Annual Summary.

National estimates and calculate incidence rates adjust for receipt of dialysis, as well as age, race, and gender. Previously reported national estimates were adjusted for age and race only.

Citation

1. Centers for Disease Control and Prevention. 2008. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Methicillin-Resistant *Staphylococcus aureus*, 2008.

Available via the Internet: <http://www.cdc.gov/abcs/reports-findings/survreports/mrsa08.html>

For more information, visit our web sites: <http://www.cdc.gov/abcs>, <http://www.cdc.gov/mrsa>

[†] Last Updated: January 30, 2012; See methods and discussion for update explanation.