



Active Bacterial Core Surveillance (ABCs) Report

Emerging Infections Program Network

Methicillin-Resistant *Staphylococcus aureus*, 2012



ABCs Areas

California (3 county San Francisco Bay area); Colorado (5 county Denver area); Connecticut; Georgia (8 county Atlanta area); Maryland (Baltimore City and County); Minnesota (2 metro Twin City counties); New York (1 Rochester county); Oregon (3 county Portland area); Tennessee (1 Nashville county).

ABCs Population

The surveillance areas represent **19,635,461** persons

Source: National Center for Health Statistics bridged-race vintage 2012 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 2012. 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 (CVC) 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 healthcare facilities 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, *SCCmec* typing, and *spa* typing. Pulsed field gel electrophoresis (PFGE) of all isolates was discontinued in 2008; up until 2012, PFGE was inferred based on a validated algorithm (<http://www.cdc.gov/HAI/settings/lab/inferred-PFGE-algorithm.html>). Starting in 2012, *spa* typing was added to the routine laboratory testing. Pulsed field type is currently inferred based on *spa* type, inferred MLST clonal complex and molecular characteristics of the isolates (<http://www.cdc.gov/HAI/settings/lab/CCalgorithm.html>). In 2012, isolates were only collected in five sites (California, Georgia, Minnesota, New York, and Tennessee). Regular laboratory audits were performed to ensure completeness of case detection.

Rates of invasive MRSA disease among all patients were calculated using population estimates for 2012. Cases with unknown race were assigned race based on distribution of known race and gender by EIP site. Confidence intervals for nationally estimated incidence rates of disease and mortality were calculated based on the gamma distribution (Stat Med, 1997 16:791-801).

Rates of invasive MRSA disease among patients who were undergoing chronic dialysis treatment were calculated using the December 31, 2011 point prevalent counts of patients on dialysis from the United States Renal Data System (USRDS) (<http://www.usrds.org/adr.htm>).

ABCs Results

Reported Race among 4582 Cases

Race	No. (Rate) ^a
White	2869 (20.9)
Black	1554 (40.9)
Other	159 (7.6)

Unknown race (n=391) distributed amongst known

^a Cases per 100,000 population for ABCs areas (crude rates)

Cases, Deaths & Inferred PFGE type by Epidemiological Classification

MRSA Class	No. (Rate) Cases ^b	No. (Rate) Deaths ^c	Inferred PFGE Type (%)			
			Tot N	USA100	USA300	USA500/Iberian
CA	937 (4.8)	85 (0.4)	145	30 (20.7)	100 (69.0)	5 (3.5)
HCA ^a	3565 (18.1)	475 (2.4)	535	267 (49.9)	150 (28.0)	69 (12.9)
HO	788 (4.0)	120 (0.6)	110	52 (47.3)	38 (34.6)	11 (2.7)
HACO	2777 (14.1)	355 (1.8)	425	215 (50.6)	112 (26.4)	58 (13.7)

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

^b n=80 epidemiologic category unknown

^c n=6; epidemiologic category unknown

Reported Cases on Chronic Dialysis (n=869)

Dialysis and Access Type	No. (%)
Type of dialysis	
Peritoneal	29 (3.3)
Hemodialysis	832 (95.7)
AV Fistula/Graft	361 (43.4)
CVC	440 (52.9)
Unknown	31 (3.7)
Unknown	8

Reported Clinical Syndrome by Epidemiological Class

Syndrome ^a	CA	HACO	HO
	(n=937) No. (%)	(n=2777) No. (%)	(n=788) No. (%)
Bloodstream Infection ^b			
with other syndrome	477 (50.9)	1368 (49.3)	251 (31.9)
with no other syndrome	170 (18.1)	850 (30.6)	262 (33.2)
Pneumonia	124 (13.2)	318 (11.5)	123 (15.6)
Lower Respiratory Infection ^c	34 (3.6)	87 (3.1)	45 (5.7)
Osteomyelitis	150 (16.0)	421 (15.2)	145 (18.4)
Endocarditis	67 (7.2)	135 (4.9)	25 (3.2)
Cellulitis	200 (21.3)	216 (7.8)	68 (8.6)
Wounds			
Surgical ^d	19 (2.0)	191 (6.9)	51 (6.5)
Decubitus/Pressure Ulcers	16 (1.7)	69 (2.5)	24 (3.1)
Skin Abscesses ^e	109 (11.6)	94 (3.4)	26 (3.3)
Other Wounds ^f	25 (2.7)	99 (3.6)	19 (2.4)
Traumatic	13 (1.4)	12 (0.4)	8 (1.0)

^aSome case patients had more than one syndrome.

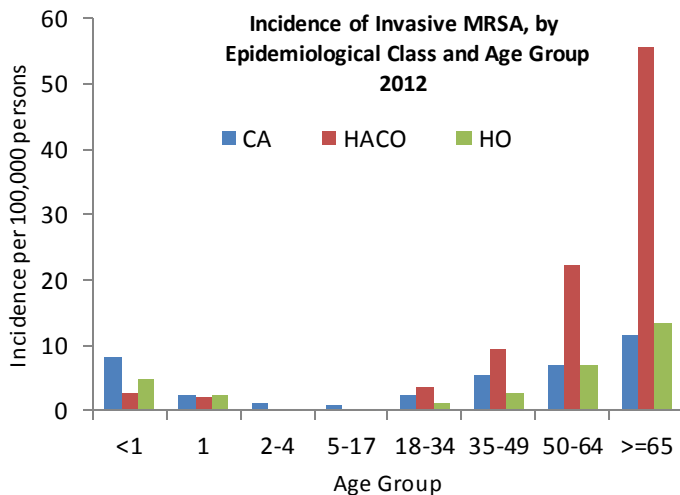
^bCatheter site infection or AV fistula infection only are included in BSI with other syndrome.

^cLower 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.

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

^eCategory includes skin abscess, necrotizing fasciitis, gangrene. Number of cases considered as skin abscess was expanded for the 2012 annual summary.

^fCategory includes non-traumatic and other chronic wound infections.



National Estimates and Adjusted Incidence Rates of Invasive MRSA Infections

Epidemiologic Category	Estimated Cases of Infection					
	Non-Dialysis Patients		Dialysis Patients		Total	
	Estimated No.	Incidence Rate (Confidence Interval) ^a	Estimated No.	Incidence Rate (Confidence Interval) ^b	Estimated No.	Incidence Rate (Confidence Interval) ^d
CA	15,138	4.82 (3.69-6.42)	NA	NA	15,138	4.82 (3.69-6.42)
HCA	44,771	14.29 (12.40-16.62)	14,041	3262.39 (2496.82-4247.12)	58,812	18.74 (15.81-22.42)
HO	11,493	3.67 (2.73-5.02)	1,408	327.24 (131.31-739.07)	12,901	4.11 (2.90-6.02)
HACO	33,278	10.62 (9.06-12.55)	12,633	2936.08 (2216.06-3876.65)	45,911	14.63 (12.09-17.85)
Overall ^c	61,268	19.54 (17.24-22.31)	14,041	3263.31 (2496.12-4248.98)	75,309	23.99 (20.64-28.10)

^aNational Estimates and Incidence (no. per 100,000 population per year) are adjusted for age, race, gender and receipt of chronic dialysis using 2012 US Census Data.

^bNational Estimates and Incidence (no. per 100,000 dialysis patients per year) for dialysis patients are adjusted for age, race and gender using 2011 USRDS point prevalence data.

^c80 cases could not be classified into an epidemiological category or category is unknown and therefore are counted in the overall estimate only.

^dStarting in 2011, confidence intervals on national estimates were determined for each of the 72 age/race/gender/dialysis specific strata and summarized for an overall national estimate, accounting for variance across all strata producing a more conservative estimate (with wider confidence intervals) compared to estimates prior to 2011.

National Estimates and Adjusted Incidence Rates for Mortality among Cases

Epidemiologic Class	Estimated No.	Mortality Rate (Confidence Interval) ^a
CA	1,444	0.46 (0.22-0.93)
HCA	8,128	2.59 (1.74-3.88)
HO	2,045	0.65 (0.31-1.35)
HACO	6,083	1.94 (1.23-3.10)
Overall ^b	9,670	3.08 (2.15-4.48)

^a National Estimates and Mortality Rate (no. per 100,000 population per year) are adjusted for age, race, gender and receipt of chronic dialysis using 2012 US Census Data

^b 80 cases could not be classified into an epidemiological category or category is unknown and therefore are counted in the overall estimate **only**.

National Metric for Healthy People 2020 and the Department of Health and Human Services Action Plan to Prevent Healthcare-Associated Infections

	Disease Rate			Estimate of Cases in United States. ^a		
	Baseline (07-08)	2012	% Change	Baseline (07-08)	2012	Difference
HCA	27.08	18.74	-30.80	82,000	59,000	23,000

^a Disease Rate (no. per 100,000 population per year) and National Estimates are adjusted for age, race, gender and receipt of chronic dialysis using 2011 US Census Data

ABCs Discussion

Surveillance data from 2012 represent the eighth full year of performing population-based surveillance for invasive MRSA infections through the Emerging Infections Program/Active Bacterial Core Surveillance Activity.

Overall, compared to the baseline incidence (2007-2008 calendar years) identified in the HHS Action Plan, there was a decrease of 30.80%.

Citation

1. Centers for Disease Control and Prevention. 2012. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Methicillin-Resistant *Staphylococcus aureus*, 2012.

Available via the Internet: <http://www.cdc.gov/abcs/reports-findings/survreports/mrsa12.pdf>

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