Active Bacterial Core Surveillance (ABCs) Report
Emerging Infections Program Network
Methicillin-Resistant *Staphylococcus aureus*, 2014

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 20,080,401 persons
Source: National Center for Health Statistics bridged-race vintage 2014 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 2014. 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 or 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 (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 (www.cdc.gov/HAI/settings/lab/CCalgorithm.html). In 2014, isolates were only collected in three sites (Georgia, Minnesota, and Tennessee). Regular laboratory audits were performed to ensure completeness of case detection.

In 2014, some sites collected limited data from most hospital-onset cases, with full case report form data collected only for a random sample of 10–20% of hospital-onset cases. Data not collected because of sampling were estimated based on the distribution of collected data to calculate incidence. Detailed case data below only reflect data from full case report forms unless otherwise specified. Rates of invasive MRSA disease among all patients were calculated using population estimates for 2014. Cases with unknown race were assigned race based on distribution of known age, 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, 2013 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 4450 Cases

Race	No. (Rate [a])
White	2842(20.4)
Black	1466(37.4)
Other	142(6.3)

Unknown race (n=305) distributed amongst known
[a] Cases per 100,000 population for ABCs areas (crude rates)

Reported Cases on Chronic Dialysis (n=653)

Dialysis and Access Type	No. (%)
Type of dialysis	
Peritoneal	37(5.7)
Hemodialysis	611(93.6)
AV Fistula/Graft	293(44.9)
CVC	299(45.8)
Unknown	19(2.9)
Unknown	5(0.8)

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	1014 (5.1)	81 (0.4)	112	25 (22.3)	57 (50.9)	11 (9.8)
HCA [a]	3389 (16.9)	457 (2.3)	378	175 (46.3)	94 (24.9)	66 (17.5)
HO	680 (3.4)	126 (0.6)	55	27 (49.1)	12 (21.8)	9 (16.4)
HACO	2709 (13.5)	331 (1.7)	323	148 (45.8)	82 (25.4)	57 (17.6)

[a] HCA: Healthcare-associated invasive MRSA infection; sum of patients that are classified as either the HO or HACO classes
[b] n= 47 epidemiologic category unknown
[c] n=8; epidemiologic category unknown.   HO rate imputed from a sample of cases.

Reported Clinical Syndrome by Epidemiological Class

| Syndrome [a]	CA (n=1014) No. (%)	HACO (n=2709) No. (%)	HO (n=209) No. (%)
Bloodstream Infection [b]			
with other syndrome	537 (52.9)	1444 (53.3)	65 (31.1)
with no other syndrome	214 (21.1)	172 (16.9)	66 (31.6)
Pneumonia	144 (14.2)	312 (11.5)	27 (12.9)
Osteomyelitis	172 (16.9)	438 (16.1)	38 (18.2)
Endocarditis	55 (5.4)	140 (5.2)	10 (4.8)
Cellulitis	182 (18.0)	236 (8.7)	21 (10.1)
Wounds			
Surgical [c]	10 (1.0)	172 (6.4)	12 (5.7)
Decubitus/Pressure Ulcers	23 (2.3)	91 (3.4)	0 (0.0)
Skin Abscesses [d]	99 (9.8)	107 (4.0)	5 (2.4)
Other Wounds[e]	35 (3.5)	118 (4.4)	10 (4.8)
Traumatic	4 (0.4)	4 (0.2)	1 (0.5)

[a] Some case patients had more than one syndrome.
[b] Catheter site infection or AV fistula infection only are included in BSI with other syndrome.
[c] Combines deep tissue/organ infection and infection of a surgical wound, post operatively.
[d] Category includes skin abscess, necrotizing fasciitis, gangrene.
[e] Category includes non-traumatic and other chronic wound infections.

Incidence of Invasive MRSA, by Epidemiological Class and Age Group 2014
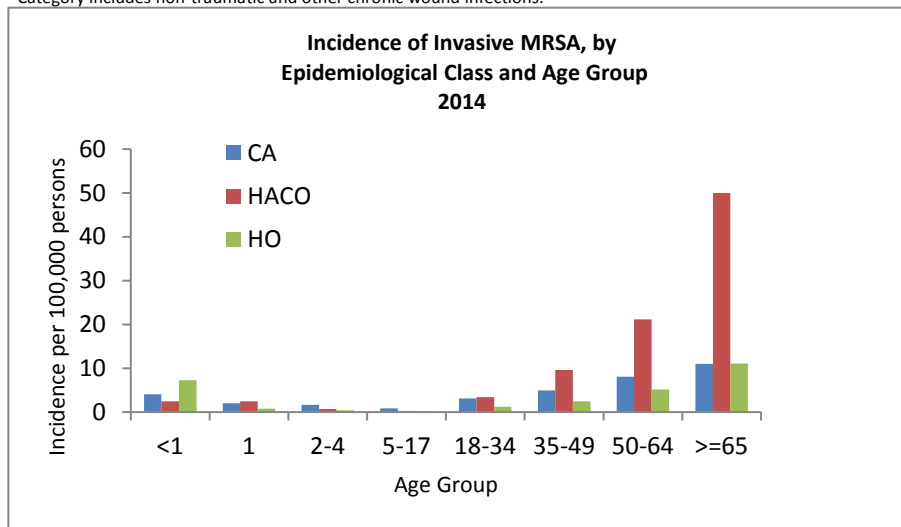
National Estimates and Adjusted Incidence Rates of Invasive MRSA Infections

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) [c]
CA	16,522	5.18 (4.03- 6.79)	0	0	16,522	5.18 (4.03-6.79)
HCA	44,627	14.01 (12.17-16.29)	10,517	2332.86 (1713.77-3152.92)	55,144	17.30 (14.57-20.72)
HO [d]	10,130	3.18 (2.33-4.40)	803	178.12 (55.45-462.27)	10,933	3.43 (2.41-5.05)
HACO	34,497	10.83 (9.26-12.81)	9,714	2154.74 (1563.82-2935.10)	44,211	13.87 (11.46-16.95)
Overall [e]	61,927	19.45 (17.16-22.18)	10,517	2332.86 (1713.77-3152.92)	72,444	22.72 (19.56-26.61)

[a] National Estimates and Incidence (no. per 100,000 population per year) are adjusted for age, race, gender and receipt of chronic dialysis using 2014 US Census Data.
[b] National Estimates and Incidence (no. per 100,000 dialysis patients per year) for dialysis patients are adjusted for age, race and gender using 2013 USRDS point prevalence data.
[c] Starting in 2011, confidence intervals on national estimates were calculated based on 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.
[d] Non-dialysis and dialysis estimated number and incidence based on data from a sample of HO cases.
[e] 47 cases could not be classified into an epidemiological category or category is unknown and therefore are counted in the overall estimate **only**.

National Estimates and Adjusted Incidence Rates for Mortality among Cases

Epidemiologic Class	Estimated No.	Mortality Rate (Confidence Interval) [a]
CA	1,316	0.41 (0.18-0.87)
HCA	7,743	2.43 (1.62-3.76)
HO [b]	2,106	0.66 (0.32-1.34)
HACO	5,637	1.77 (1.10-2.93)
Overall [b]	9,194	2.88 (1.99-4.30)

[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 2014 US Census Data

[b] HO estimated number and rate based on mortality data from a sample of HO cases.

[c] 47 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)	2014	% Change	Baseline (07-08)	2014	Difference
HCA	27.08	17.30	-36.11	82,000	55,000	27,000

[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 2014 US Census Data

ABCs Discussion

Surveillance data from 2014 represent the tenth full year of performing population-based surveillance for invasive MRSA infections through the Emerging Infections Program/Active Bacterial Core Surveillance Activity.

Compared to 2005 (the first full year of ABCs MRSA surveillance) estimated healthcare-associated MRSA incidence has decreased 44.87% and estimated overall incidence has decreased 39.51%. Compared to the baseline incidence (2007–2008 calendar years) identified in the HHS Action Plan, there was a decrease of 36.11% for healthcare-associated MRSA. Compared to 2013, incidence of healthcare-associated MRSA decreased by 5.36% while incidence of community-associated MRSA increased by 1.57%.

Citation

1. Centers for Disease Control and Prevention. 2014. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Methicillin-Resistant *Staphylococcus aureus*, 2014.
Available via the Internet: www.cdc.gov/abcs/reports-findings/survreports/mrsa14.html
For more information, visit our web sites: www.cdc.gov/abcs/index.html, http://www.cdc.gov/mrsa