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## **Methicillin-resistant *Staphylococcus aureus* (MRSA) Bloodstream Infections In Illinois Acute Care Hospitals, NHSN Surveillance Reporting January 1, 2012 – June 30, 2012**

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a type of bacteria that is resistant to certain antibiotics. MRSA usually causes infections of the skin, but also can occur in other tissues and organs of the body, or lead to a blood stream infection with serious complications. The bacteria can spread among people through direct contact with a person's infected area, sharing of towels or razors that have come in contact with an infection, or from touching surfaces that have been contaminated by an infection. The infection can be difficult to treat due to its resistance to certain antibiotics.

Gathering and analyzing surveillance data about specific infections helps us better understand the burden posed by a particular disease and helps in planning interventions to reduce infections. While it is difficult to reduce infections to zero, following specific protocols can greatly reduce the risk. Illinois hospitals are participating in programs to reduce the number of infections acquired during hospital stays.

As of January 1, 2012, all Illinois hospitals began mandated reporting of blood cultures positive for MRSA using the Center for Disease Control and Prevention's National Healthcare Safety Network (NHSN) Multidrug-Resistant Organism (MDRO) Laboratory-identified (LabID) Event module.

NHSN reporting enables a facility to rely almost exclusively on data obtained from the laboratory and allows the calculation of proxy measures of MRSA bloodstream events, exposures and healthcare acquisition. **This is the first Illinois Department of Public Health report on the incidence rate of hospital-onset MRSA positive blood cultures using data submitted by hospitals to NHSN.**

## Methods

The incidence rate of hospital-onset (HO) MRSA bloodstream laboratory identified (LabID) events is calculated in NHSN as the number of non-duplicate laboratory-identified blood cultures positive for MRSA on or after day four of admission occurring hospital-wide, divided by the total number of patient days multiplied by 10,000. ([http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO\\_CDADcurrent.pdf](http://www.cdc.gov/nhsn/PDFs/pscManual/12pscMDRO_CDADcurrent.pdf)) A MRSA LabID event includes *S. aureus* cultured from a blood culture specimen that tests oxacillin-resistant, ceftazidime-resistant, or methicillin-resistant by standard susceptibility testing methods, or by a laboratory test that is FDA-approved for MRSA detection. Test results which were performed as part of an active surveillance program and not for clinical reasons are excluded.

## Interpretation

A number of factors that can contribute to MRSA rates that are beyond the control of the hospital have not been adjusted for in this report. For example, patients with more complex medical needs may have a higher risk for acquiring a MRSA bloodstream infection. The data in this report have been grouped into categories according to type of facility. Accurate risk-adjustment of hospital-onset MRSA rates to account for differences in patient populations requires additional data that was not available at the time this report was prepared. **Therefore, the data in this report should be used as a hospital baseline and not for comparing hospitals with each other.**

## Results

For each hospital, a hospital onset (HO) MRSA rate is calculated, as well as corresponding 95% confidence interval. A pooled HO rate is calculated for each “Hospital Type” group. These pooled values serve as a comparison value against which hospital-specific rates can be compared. If a 95% confidence interval around a hospital’s rate excludes the comparison value, then a statistical test for the difference between the two values would be significant at the 0.05 level.

For example, if a hospital’s HO rate is 0.44, with a 95% confidence interval between 0.23 and 0.76 and the pooled rate is 0.19, then the difference between the two values, 0.44 and 0.19, would be significant at the 0.05 level. In other words, the hospital’s HO is significantly greater than the pooled rate. If, however, the pooled value was 0.58, which lies within the confidence interval of 0.23 and 0.76, the difference between the hospital-specific rate and the pooled rate would not be significantly different.

Inter-hospital comparisons within or between “Hospital Type” groups are not advised as adjustment for differences in patient populations that affect infection risk have not been implemented. NHSN is currently developing a statistical model to adjust for differences that will allow for comparative analyses.

## Conclusion

This is the first report of MRSA bloodstream infection rates among Illinois facilities using NHSN data. The new reporting method through NHSN ensures standard definitions of MRSA bloodstream infection cases, utilizing laboratory data. However, the data presented in this report have not been risk adjusted, and therefore comparisons between hospitals should be avoided. These data present the first six months of reporting of MRSA blood culture results to NHSN, and establishes a baseline of MRSA bloodstream infection incidence at the facility level. This information will be helpful in planning infection prevention initiatives and tracking progress at preventing infections over time. Risk adjustment of MRSA bloodstream infection rates based on facility-specific factors is forthcoming and will allow for more accurate comparison between facilities and with MRSA positive blood culture rates nationally reported through NHSN.

**Incidence Rates of Hospital Onset<sup>a</sup> MRSA events**

**Reportable Period: January 1, 2012 – June 30, 2012**

**STATEWIDE**

**Hospital Type: Major and Graduate level<sup>b</sup> Medical School Affiliated Hospitals**

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
<b>Pooled Data</b>		<b>104</b>	<b>1346351</b>	<b>0.772</b>		
Advocate BroMenn Medical Center	Normal	0	20646	0	0.00	1.79
Advocate Christ Hospital & Medical Center	Oak Lawn	10	105022	0.95	0.46	1.75
Advocate Illinois Masonic Medical Center	Chicago	2	42030	0.48	0.06	1.72
Ann & Robert H Lurie Children's Hospital Of Chicago	Chicago	1	33566	0.297	0.01	1.66
Blessing Hospital	Quincy	3	33012	0.91	0.19	2.66
Carle Foundation Hospital	Urbana	6	49762	1.21	0.44	2.62
Decatur Memorial Hospital	Decatur	1	21814	0.46	0.01	2.55
John H Stroger Jr. Hospital Of Cook County	Chicago	1	54595	0.18	0.00	1.02
Loyola University Medical Center	Maywood	4	62063	0.64	0.18	1.65
MacNeal Hospital	Berwyn	6	40048	1.5	0.55	3.26
Memorial Medical Center	Springfield	7	65303	1.07	0.43	2.21
Mercy Hospital & Medical Center	Chicago	3	35163	0.85	0.18	2.49
Methodist Medical Center Of Illinois	Peoria	2	37769	0.53	0.06	1.91
Mount Sinai Hospital	Chicago	5	37395	1.34	0.43	3.12
NorthShore Evanston Hospital	Evanston	1	50045	0.2	0.01	1.11
NorthShore Glenbrook Hospital	Glenview	0	22670	0	0.00	1.63
NorthShore Skokie Hospital	Skokie	0	17783	0	0.00	2.07
Northwestern Memorial Hospital	Chicago	11	135697	0.81	0.40	1.45

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
OSF Saint Francis Medical Center	Peoria	8	92601	0.86	0.37	1.70
Provena Covenant Medical Center	Urbana	1	16663	0.6	0.02	3.34
Rush University Medical Center	Chicago	6	90361	0.66	0.24	1.45
Rush-Copley Medical Center	Aurora	2	27803	0.72	0.09	2.60
St Elizabeth's Hospital	Belleville	1	25132	0.4	0.01	2.22
St John's Hospital	Springfield	3	50975	0.59	0.12	1.72
Swedish Covenant Hospital	Chicago	3	41151	0.73	0.15	2.13
University Of Chicago Medical Center	Chicago	8	76102	1.05	0.45	2.07
University Of Illinois Medical Center At Chicago	Chicago	9	61180	1.47	0.67	2.79

**Hospital Type: Limited level<sup>b</sup> Medical School Affiliated Hospitals**

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
<b>Pooled Data</b>		<b>29</b>	<b>735708</b>	<b>0.394</b>		
Adventist La Grange Memorial Hospital	La Grange	0	19725	0	0.00	1.87
Advocate Condell Medical Center	Libertyville	1	35540	0.28	0.01	1.57
Advocate Lutheran General Hospital	Park Ridge	1	86233	0.12	0.00	0.65
Alton Memorial Hospital	Alton	0	11844	0	0.00	3.11
Centegra Hospital -Woodstock	Woodstock	0	15241	0	0.00	2.42
Centegra Hospital-McHenry	McHenry	0	23068	0	0.00	1.60
Franciscan St. James Health-Chicago Heights	Chicago Heights	5	46899	1.07	0.35	2.49
Franciscan St. James Health-Olympia Fields	Olympia Fields	5	46899	1.07	0.35	2.49
Graham Hospital	Canton	1	8920	1.12	0.03	6.25
Katherine Shaw Bethea (KSB) Hospital	Dixon	0	7749	0	0.00	4.76
Little Company Of Mary Hospital & Health Care Centers	Evergreen Park	1	30651	0.33	0.01	1.82
Loretto Hospital	Chicago	1	15708	0.64	0.02	3.55
Louis A Weiss Memorial Hospital	Chicago	3	26089	1.15	0.24	3.36
Loyola Gottlieb Memorial Hospital	Melrose Park	2	23709	0.84	0.10	3.05
Memorial Hospital Of Carbondale	Carbondale	0	18872	0	0.00	1.95
OSF Saint Anthony Medical Center	Rockford	1	24225	0.41	0.01	2.30
OSF Saint James Medical Center	Pontiac	0	2446	0	0.00	15.08
Resurrection Medical Center	Chicago	1	38227	0.26	0.01	1.46

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
Rockford Memorial Hospital	Rockford	1	32353	0.31	0.01	1.72
Roseland Community Hospital	Chicago	0	11917	0	0.00	3.10
Saint Joseph Hospital	Chicago	0	33310	0	0.00	1.11
Saints Mary And Elizabeth Medical Center	Chicago	0	62803	0	0.00	0.59
Shriners Hospital For Children	Chicago	0	1060	0	0.00	34.80
St Alexius Medical Center	Hoffman Estates	0	38968	0	0.00	0.95
St Mary's Hospital	Decatur	2	22783	0.88	0.11	3.17
Swedish American Hospital	Rockford	2	36729	0.54	0.07	1.97
VHS West Suburban Medical Center	Oak Park	2	13740	1.46	0.18	5.26

**Hospital Type: Community Hospitals<sup>b</sup>**

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
<b>Pooled Data</b>		<b>56</b>	<b>1366057</b>	<b>0.411</b>		
Adventist Bolingbrook Hospital	Bolingbrook	0	10416	0.000	0.000	3.542
Adventist GlenOaks Hospital	Glendale Heights	1	15502	0.650	0.016	3.594
Adventist Hinsdale Hospital	Hinsdale	1	30201	0.330	0.008	1.845
Advocate Good Samaritan Hospital	Downers Grove	0	40777	0.000	0.000	0.905
Advocate Good Shepherd Hospital	Barrington	1	24134	0.410	0.010	2.309
Advocate South Suburban Hospital	Hazel Crest	2	27067	0.740	0.089	2.669
Advocate Trinity Hospital	Chicago	1	23428	0.430	0.011	2.378
Alexian Brothers Medical Center	Elk Grove Village	3	54523	0.550	0.141	1.997
Anderson Hospital	Maryville	1	15953	0.630	0.016	3.493
Central DuPage Hospital	Winfield	1	50541	0.200	0.005	1.102
CGH Medical Center	Sterling	0	9426	0.000	0.000	3.914
Community Memorial Hospital	Staunton	0	503	0.000	0.000	73.338
Crossroads Community Hospital	Mount Vernon	0	2575	0.000	0.000	14.326
Delnor Hospital	Geneva	0	16078	0.000	0.000	2.294
Edward Hospital	Naperville	0	48164	0.000	0.000	0.766
Elmhurst Memorial Hospital	Elmhurst	0	31498	0.000	0.000	1.171
FHN Memorial Hospital	Freeport	0	8544	0.000	0.000	4.318
Galesburg Cottage Hospital	Galesburg	0	9841	0.000	0.000	3.748
Gateway Regional Medical Center	Granite City	1	20331	0.490	0.012	2.740
Genesis Medical Center-Illini Campus	Silvis	0	7708	0.000	0.000	4.786
Good Samaritan Regional Health Center	Mount Vernon	0	13840	0.000	0.000	2.665
Harrisburg Medical Center	Harrisburg	0	5202	0.000	0.000	7.091
Heartland Regional Medical Center	Marion	2	8790	2.280	0.276	8.219
Herrin Hospital	Herrin	2	13692	1.460	0.177	5.277
Holy Cross Hospital	Chicago	1	26543	0.380	0.010	2.099
Illinois Valley Community Hospital	Peru	0	5192	0.000	0.000	7.105
Ingalls Hospital	Harvey	1	43358	0.230	0.006	1.285
Jersey Community Hospital	Jerseyville	0	1915	0.000	0.000	19.263
Kishwaukee Community Hospital	De Kalb	0	10779	0.000	0.000	3.422

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
McDonough District Hospital	Macomb	0	3834	0.000	0.000	9.621
Memorial Hospital	Belleville	3	36470	0.820	0.170	2.404
MetroSouth Medical Center	Blue Island	0	15893	0.000	0.000	2.321
Midwestern Regional Medical Center	Zion	0	7393	0.000	0.000	4.990
Morris Hospital & Healthcare Centers	Morris	2	8903	2.250	0.272	8.115
NorthShore Highland Park Hospital	Highland Park	0	21643	0.000	0.000	1.704
Northwest Community Hospital	Arlington Heights	4	49493	0.810	0.220	2.069
Northwestern Lake Forest Hospital	Lake Forest	1	15576	0.640	0.016	3.577
Norwegian-American Hospital	Chicago	0	17238	0.000	0.000	2.140
OSF St Joseph Medical Center	Bloomington	0	13422	0.000	0.000	2.748
OSF St Mary Medical Center	Galesburg	0	8103	0.000	0.000	4.552
Ottawa Regional Hospital & Healthcare Center	Ottawa	0	6981	0.000	0.000	5.284
Our Lady Of The Resurrection Medical Center	Chicago	1	24419	0.410	0.010	2.282
Palos Community Hospital	Palos Heights	2	40719	0.490	0.059	1.774
Passavant Area Hospital	Jacksonville	1	6914	1.450	0.037	8.058
Pekin Hospital	Pekin	0	7757	0.000	0.000	4.756
Proctor Hospital	Peoria	0	15175	0.000	0.000	2.431
Provena Mercy Medical Center	Aurora	1	25248	0.400	0.010	2.207
Provena Saint Joseph Hospital	Elgin	1	22178	0.450	0.011	2.512
Provena Saint Joseph Medical Center	Joliet	5	59481	0.840	0.273	1.962
Provena St Mary's Hospital	Kankakee	0	14661	0.000	0.000	2.516
Provena United Samaritans Logan	Danville	1	12554	0.800	0.020	4.438
Provident Hospital Of Cook County	Chicago	1	3029	3.300	0.084	18.394
Richland Memorial Hospital	Olney	1	9563	1.050	0.026	5.826
Riverside Medical Center	Kankakee	0	30912	0.000	0.000	1.193
Rush Oak Park Hospital	Oak Park	0	13299	0.000	0.000	2.774
Saint Anthony Hospital	Chicago	0	17446	0.000	0.000	2.114
Saint Anthony's Health Center	Alton	0	7268	0.000	0.000	5.076
Sarah Bush Lincoln Health Center	Mattoon	2	14443	1.380	0.168	5.002
Sherman Hospital	Elgin	0	31386	0.000	0.000	1.175
Silver Cross Hospital	Joliet	2	33585	0.600	0.072	2.151

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
South Shore Hospital	Chicago	0	12735	0.000	0.000	2.897
St Anthony's Memorial Hospital	Effingham	0	13244	0.000	0.000	2.785
St Bernard Hospital & Health Care Center	Chicago	1	21561	0.460	0.012	2.584
St Francis Hospital	Evanston	3	20529	1.460	0.301	4.271
St Joseph's Hospital	Breese	0	2067	0.000	0.000	17.847
St Margaret's Health	Spring Valley	0	4808	0.000	0.000	7.672
St Mary's Hospital	Streator	0	4186	0.000	0.000	8.812
St Mary's Hospital	Centralia	0	13100	0.000	0.000	2.816
Thorek Hospital & Medical Center	Chicago	0	13363	0.000	0.000	2.761
Touchette Regional Hospital	Centreville	0	5698	0.000	0.000	6.474
Trinity Medical Center-Rock Island	Rock Island	1	40876	0.240	0.006	1.363
VHS Westlake Hospital	Melrose Park	3	20034	1.500	0.309	4.376
Vista Medical Center East	Waukegan	2	22552	0.890	0.107	3.204
Vista Medical Center West	Waukegan	0	7410	0.000	0.000	4.978

Hospital Type: Critical Access<sup>b</sup> Hospitals

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
<b>Pooled Data</b>		<b>5</b>	<b>70521</b>	<b>0.766</b>		
Abraham Lincoln Memorial Hospital	Lincoln	2	2528	7.91	1.0	28.6
Advocate Eureka Hospital	Eureka	0	1008	0	0.0	36.6
Carlinville Area Hospital	Carlinville	0	1864	0	0.0	19.8
Crawford Memorial Hospital	Robinson	0	2090	0	0.0	17.7
Dr John Warner Hospital	Clinton	0	693	0	0.0	53.2
Fairfield Memorial Hospital	Fairfield	0	2094	0	0.0	17.6
Fayette County Hospital	Vandalia	0	1428	0	0.0	25.8
Ferrell Hospital	Eldorado	0	1679	0	0.0	22.0
Franklin Hospital	Benton	0	553	0	0.0	66.7
Gibson Area Hospital & Health Services	Gibson City	0	1374	0	0.0	26.8
Greenville Regional Hospital	Greenville	0	2818	0	0.0	13.1
Hamilton Memorial Hospital District	McLeansboro	0	1446	0	0.0	25.5
Hammond-Henry Hospital	Geneseo	0	1479	0	0.0	24.9
Hillsboro Area Hospital	Hillsboro	0	1277	0	0.0	28.9
Hoopeston Community Memorial Hospital	Hoopeston	0	611	0	0.0	60.4
Hopedale Medical Complex	Hopedale	1	1155	8.66	0.2	48.2
Illini Community Hospital	Pittsfield	0	1093	0	0.0	33.8
Kewanee Hospital	Kewanee	0	1294	0	0.0	28.5
Lawrence County Memorial Hospital	Lawrenceville	0	1482	0	0.0	24.9
Marshall Browning Hospital	Du Quoin	0	826	0	0.0	44.7
Massac Memorial Hospital	Metropolis	0	2023	0	0.0	18.2
Memorial Hospital	Carthage	0	1481	0	0.0	24.9
Mendota Community Hospital	Mendota	1	2047	4.89	0.1	27.2

					95% Confidence Interval <sup>c</sup>	
HOSPITAL	CITY	Events Hospital Onset <sup>a</sup>	Patient Days	Hospital Onset Rate <sup>d</sup>	Lower Bound	Upper Bound
Mercer County Hospital	Aledo	0	712	0	0.0	51.8
Mercy Harvard Hospital	Harvard	0	761	0	0.0	48.5
Midwest Medical Center	Galena	0	964	0	0.0	38.3
Morrison Community Hospital	Morrison	0	1681	0	0.0	21.9
OSF Holy Family Medical Center	Monmouth	0	716	0	0.0	51.5
Pana Community Hospital	Pana	0	496	0	0.0	74.4
Paris Community Hospital	Paris	0	1030	0	0.0	35.8
Perry Memorial Hospital	Princeton	1	2054	4.87	0.1	27.1
Pinckneyville Community Hospital	Pinckneyville	0	786	0	0.0	46.9
Red Bud Regional Hospital	Red Bud	0	3075	0	0.0	12.0
Rochelle Community Hospital	Rochelle	0	864	0	0.0	42.7
Salem Township Hospital	Salem	0	1555	0	0.0	23.7
Sarah D Culbertson Memorial Hospital	Rushville	0	954	0	0.0	38.7
Shelby Memorial Hospital	Shelbyville	0	1520	0	0.0	24.3
Sparta Community Hospital	Sparta	0	1875	0	0.0	19.7
St Francis Hospital	Litchfield	0	2856	0	0.0	12.9
St Joseph Memorial Hospital	Murphysboro	0	1759	0	0.0	21.0
St Joseph's Hospital	Highland	0	2456	0	0.0	15.0
Taylorville Memorial Hospital	Taylorville	0	2813	0	0.0	13.1
Thomas H Boyd Memorial Hospital	Carrollton	0	1280	0	0.0	28.8
Union County Hospital	Anna	0	1632	0	0.0	22.6
Valley West Community Hospital	Sandwich	0	1753	0	0.0	21.0
Wabash General Hospital	Mount Carmel	0	1495	0	0.0	24.7
Washington County Hospital	Nashville	0	1091	0	0.0	33.8

<sup>a</sup> Hospital Onset(HO) : LabID event that occurred more than three days after admission to the facility (i.e., on or after day four)

<sup>b</sup> Hospital Type

Hospitals Affiliated with a Medical School

Major: an important part of the teaching program of the medical school and the majority of medical students rotate through multiple clinical services.

Graduate: used by the medical school for graduate training programs only; i.e., residency and/or fellowships.

Limited: used in the medical school's teaching program only to a limited extent.

Community hospital: General acute care hospital with no academic affiliation.

Critical Access hospital: 25 beds or less and is located and serves primarily rural populations throughout the state.

<sup>c</sup> 95% Confidence Interval calculated based on exact Poisson distribution

<sup>d</sup> Hospital Onset (HO) Rate:  $\text{Number of HO LabID events} / \text{Total Inpatient Days} \times 10,000$  rate expressed as "per 10,000 patient days"