1.15a Denominator Details

1. Calculate the monthly number of inpatient days by summing the daily count of patients occupying beds, per inpatient location in the facility.
2. Calculate the monthly number of inpatient admissions, per inpatient location.
3. The number of predicted events in NHSN is calculated based on the 2022 national hospital onset MRSA LabID event aggregate data and is adjusted for each facility using variables found to be significant predictors of MRSA incidence. The number of predicted MRSA LabID Bacteremia Events is calculated using a negative binomial regression model.
    1. The general formula for the negative binomial regression model is
    log (λ) = α + $\beta\beta 1XX1$ + $\beta\beta 2XX2$ + ⋯ + $\beta\beta iXXi$, where:
        α = Intercept
        βi = Parameter estimate
        Xi = Value of risk factor (categorical variables: 1 if present, 0 if not present)
        i = Number of predictors

    The tables below represent the variables found to be statistically significant predictors of MRSA bacteremia LabID events and are used in the negative binomial regression model to calculate the number of predicted healthcare facility-onset MRSA bacteremia LabID events in inpatient hospitals under the 2022 baseline data.

Acute Care Hospitals

Parameter		Estimate	Standard Error	Pvalue
Intercept		-11.6685	0.1598	<.0001
Outpatient Community Onset prevalence rate	2. 0.013 <= EDRate < 0.040	0.2471	0.0437	<.0001
	3. 0.040 <= EDRate < 0.064	0.3537	0.0448	<.0001
	4. 0.064 <= EDRate < 0.085	0.4703	0.0492	<.0001
	5. 0.085 <= EDRate	0.6112	0.0483	<.0001
	1. No ED/Obs or EDRate < 0.013	0	0	.
Inpatient Community Onset prevalence rate	2. 0 < InpCOPrevRate < 0.042	0.1259	0.0336	0.0002
	3. 0.042 <= InpCOPrevRate < 0.071	0.2238	0.0374	<.0001
	4. 0.071 <= InpCOPrevRate	0.3538	0.0343	<.0001
	1. Zero InpCOPrevRate	0	0	.
Average length of stay	2. 2.6 <= avgLOS < 4.8	0.5149	0.121	<.0001
	3. 4.8 <= avgLOS < 5.2	0.6104	0.1238	<.0001
	4. 5.2 <= avgLOS	0.765	0.1211	<.0001

	1. 1 <= avgLOS < 2.6	0	0	.
Proportion of total beds that are ICU	2. 0.061 <= ICUbedPropn < 0.161	0.1856	0.0667	0.0054
	3. 0.161 <= ICUbedPropn < 0.232	0.2758	0.0685	<.0001
	4. 0.232 <= ICUbedPropn	0.4254	0.0714	<.0001
	1. 0 <= ICUbedPropn < 0.061	0	0	.
Total number of beds	2. 67 <= numbeds	0.2204	0.0783	0.0049
	1. 1 <= numbeds < 67	0	0	.
Medical school affiliation	M	0.1188	0.0264	<.0001
	U,G,N	0	0	.
Facility type (based on NHSN enrollment):	GEN,ONC	0.2477	0.0799	0.0019
	CHLD,WOMCHILD,MIL,ORTHO, SURG,WOM	0	0	.

Critical Access Hospitals

Parameter		Estimate	Standard Error	Pvalue
Intercept	Intercept	-11.3451	0.2029	<.0001
Outpatient Community Onset prevalence rate	EDrate_GRP 1:EDrate>0	0.9991	0.2773	0.0003
	EDrate_GRP 0:EDrate 0 or missing	0	.	.
Inpatient Community Onset prevalence rate	COrate_GRP 1:COrate>0	0.8824	0.3418	0.0098
	COrate_GRP 0:Corate=0	0	.	.

4.1b Implementation Costs and Burden*

Per the Paperwork Reduction Act (PRA) of 1995, federal agencies cannot conduct or sponsor the collection of information unless the Office of Management and Budget (OMB) has reviewed and approved the proposed data collection. Federal agencies must submit a set of documents known as an Information Collection Request (ICR), to request OMB approval of an information collection. The ICR documents describe what information is needed; why it is needed; how it will be collected; and how much time, money, and effort it will cost the respondents to collect the information.

Multiple data collection forms are utilized to provide surveillance data on MRSA Bacteremia LabID Events. Below are the OMB-approved estimated total annual burden hours and annual cost for all facilities that complete this data collection.

Estimated Annualized Burden Hours and Cost			
Form Number & Name	**No. of Respondents**	**Avg. Burden per Response (Min./Hour 60)**	**Total Respondent Cost**
57.127 MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring	5,500	15	$879
57.128 Laboratory-identified MDRO or CDI Event	4800	23	$1,348

5.1.3 Characteristics of Measured Entities*

Reliability Testing:

Facilities that met reporting criteria within the National Healthcare Safety Network (NHSN) for 2024 were included in the analysis. The final sample included 1,907 ACHs with data on MRSA bacteremia LabID outcome and relevant risk factors that were eligible for the metric. Facilities varied in key characteristics relevant to the risk model, including bed size and teaching status. The diverse sample used for risk-adjusted modeling reflects variation across U.S. hospitals and supports comparisons in MRSA bacteremia LabID performance measure in each care setting. The final sample did not include CAHs that were eligible for the metric.

	ACH			CAH		
Medical Type	**Frequency**	**Percent**	**Cumulative**	**Frequency**	**Percent**	**Cumulative**
Major	1210	63.5	1210	NA	NA	NA
Non-Major	697	36.5	1907	NA	NA	NA
Midwest	380	19.93	380	NA	NA	NA
Non Mainland	7	0.37	387	NA	NA	NA
Northeast	353	18.51	740	NA	NA	NA
South	783	41.06	1523	NA	NA	NA
West	384	20.14	1907	NA	NA	NA
Bed Size						
Median (IQR)	254 (172, 384)			NA		

Risk Adjustment:

The risk adjustment models are based on data from Acute Care Hospitals (ACHs) and Critical Access Hospitals (CAHs) and are modeled separately based on risk factors significantly associated with that setting. Facilities that met reporting criteria within the National Healthcare Safety Network (NHSN) for 2022 were included in the analysis. The final sample included 1,963 ACHs with data on MRSA bacteremia LabID outcome and relevant risk factors that were eligible for the metric. Facilities varied in key characteristics relevant to the risk model, including bed size and teaching status. The diverse sample used for risk-adjusted modeling reflects variation across U.S.

hospitals and supports comparisons in MRSA bacteremia LabID performance measure in each care setting. The final sample did not include CAHs.

	ACH			CAH		
Medical Type	**Frequency**	**Percent**	**Cumulative**	**Frequency**	**Percent**	**Cumulative**
Major	1102	56.1	11102	NA	NA	NA
Non-Major	861	43.9	1963	NA	NA	NA
Midwest	416	21.19	416	NA	NA	NA
Non Mainland	7	0.36	423	NA	NA	NA
Northeast	360	18.34	783	NA	NA	NA
South	794	40.45	1577	NA	NA	NA
West	386	19.66	1963	NA	NA	NA
Bed Size						
Median (IQR)	251 (172, 378)			NA		

Validity Testing:

Any acute care hospital that reported 2024 data to NHSN for both MRSA and CDI events, or MRSA and CLABSI events, and had at least one predicted event for each HAI, respectively, was included in the analysis. Bed size, medical type, and census region of included facilities are broken down below. Critical access hospitals were not included in the analysis due to small sample size resulting in zero facilities having at least one predicted MRSA event.

	Facilities with MRSA and CLABSI SIRs			Facilities with MRSA and CDI SIRs		
	Frequency	**Percent**	**Cumulative**	**Frequency**	**Percent**	**Cumulative**
Medical Type						
Major	1195	63.94	1195	1210	63.48	1210
Non-Major	674	36.06	1869	696	36.52	1906

Census Region						
Midwest	371	19.85	371	380	19.94	380
Non Mainland	7	0.37	378	7	0.37	387
Northeast	340	18.19	718	353	18.52	740
South	770	41.2	1488	782	41.03	1522
West	381	20.39	1869	384	20.15	1906
Bed Size						
Median (IQR)		258 (176, 385)			254 (172, 384)	

Validation Studies:

Prascius S, Wells A, Collier AM, Renard A, Hooper D, Stein T. Reduction of hospital-onset methicillin-resistant Staphylococcus aureus (MRSA) bacteremia with the use of twice daily alcohol-based nasal antiseptic in intensive care units. Am J Infect Control. 2025 Aug 19:S0196-6553(25)00504-8. doi: 10.1016/j.ajic.2025.08.006.

The study took place in a 191-bed hospital within a Midwest health care system.

Pakyz AL, Wang H, Ozcan YA, Edmond MB, Vogus TJ. Leapfrog Hospital Safety Score, Magnet Designation, and Healthcare-Associated Infections in United States Hospitals. J Patient Saf. 2021 Sep 1;17(6):445-450.

The study included hospitals that participate in the CMS Hospital Inpatient Quality Reporting Program who are required to report HAIs using criterion developed by the Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN).

5.4.6. Interpretation of Risk/Case-mix Factor Findings

The final risk adjustment models demonstrated that differences in facility-level factors were adequately accounted for. Variables were retained based on both statistical significance ($p < 0.05$) and validation through forward stagewise and backward elimination techniques. For the Acute Care model all but 1 variable that was sent forward for testing was retained in the final model. This is an indication of both, each variables independent association with MRSA events and the number of events we had to model. The Critical Access Hospitals are known to have a much smaller number of events which limit the final risk model. During derivation there were 53 total events in the CAH hospitals leading to 2 variables being retained in the final model with little degree of freedom room for additional covariates. The models were validated using bootstrap sampling, which helped identify and remove any variables with unstable beta estimates, ensuring that the model-maintained generalizability. Overall, the modeling approach demonstrated that the retained risk factors sufficiently captured variation in patient case-mix across facility types. The use of model diagnostics such pseudo-R-squared confirmed good model fit and predictive utility. This indicates that outcome comparisons using the risk-adjusted results are fair and not confounded by underlying differences in population or facility. The retained variables meaningfully explain differences in outcome risk, and the exclusion of non-significant variables and variables that were limited in the model helps to avoid unnecessary model complexity.

Acute Care Hospitals

Parameter		Estimate	Standard Error	Pvalue
Intercept		-11.6685	0.1598	<.0001
Outpatient CO prevalence rate	2. 0.013 <= EDRate < 0.040	0.2471	0.0437	<.0001
	3. 0.040 <= EDRate < 0.064	0.3537	0.0448	<.0001
	4. 0.064 <= EDRate < 0.085	0.4703	0.0492	<.0001
	5. 0.085 <= EDRate	0.6112	0.0483	<.0001
	1. No ED/Obs or EDRate < 0.013	0	0	.
Inpatient CO prevalence rate	2. 0 < InpCOPrevRate < 0.042	0.1259	0.0336	0.0002
	3. 0.042 <= InpCOPrevRate < 0.071	0.2238	0.0374	<.0001
	4. 0.071 <= InpCOPrevRate	0.3538	0.0343	<.0001
	1. Zero InpCOPrevRate	0	0	.
Average length of stay	2. 2.6 <= avgLOS < 4.8	0.5149	0.121	<.0001
	3. 4.8 <= avgLOS < 5.2	0.6104	0.1238	<.0001
	4. 5.2 <= avgLOS	0.765	0.1211	<.0001
	1. 1 <= avgLOS < 2.6	0	0	.
Proportion of total beds that are ICU	2. 0.061 <= ICUbedPropn < 0.161	0.1856	0.0667	0.0054
	3. 0.161 <= ICUbedPropn < 0.232	0.2758	0.0685	<.0001
	4. 0.232 <= ICUbedPropn	0.4254	0.0714	<.0001

	1. 0 <= ICUbedPropn < 0.061	0	0	.
Total number of beds	2. 67 <= numbeds	0.2204	0.0783	0.0049
	1. 1 <= numbeds < 67	0	0	.
Medical school affiliation	M	0.1188	0.0264	<.0001
	U,G,N	0	0	.
Facility type (based on NHSN enrollment):	GEN,ONC	0.2477	0.0799	0.0019
	CHLD,WOMCHILD,MIL,ORTHO, SURG,WOM	0	0	.

Critical Access Hospitals

Parameter		Estimate	Standard Error	Pvalue
Intercept	Intercept	-11.3451	0.2029	<.0001
Outpatient CO prevalence rate	EDrate_GRP 1:EDrate>0	0.9991	0.2773	0.0003
	EDrate_GRP 0:EDrate 0 or missing	0	.	.
Inpatient CO prevalence rate	COrate_GRP 1:COrate>0	0.8824	0.3418	0.0098
	COrate_GRP 0:Corate=0	0	.	.

6.2.4 Progress on Improvement

MRSA Bacteremia LabID 2015 Baseline Data 2015-2023, by facility type

Facility Type	Year	Number of Reporting Facilities[1]	Number of Patient Days	Number of MRSA LabID Events	Number of Predicted Infections	SIR[2]	95% CI Lower Bound	95% CI Upper Bound	Number of facilities with ≥ 1 Predicted Event	No. Facilities with SIR Significantly > National SIR n (%)[3]	No. Facilities with SIR Significantly < National SIR n (%)[3]	Percentile Distribution of Facility-specific SIRs[4]				
												10%	25%	Median 50%	75%	90%
ACH	2015	3,616	NR	8,887	8,906.430	0.998	0.977	1.019	1,839	144 (8%)	75 (4%)	0.000	0.443	0.827	1.364	2.084
	2016	3,602	155,107,407	8,546	9,142.247	**0.935**	0.915	0.955	1,859	124 (7%)	67 (4%)	0.000	0.419	0.796	1.324	1.956
	2017	3,662	156,084,260	8,102	9,398.025	**0.862**	0.843	0.881	1,881	122 (6%)	57 (3%)	0.000	0.380	0.751	1.172	1.793
	2018	3,670	157,277,965	8,222	9,783.465	**0.840**	0.822	0.859	1,905	115 (6%)	62 (3%)	0.000	0.362	0.741	1.189	1.696
	2019	3,698	159,884,986	8,131	9,952.621	**0.817**	0.799	0.835	1,934	112 (6%)	47 (2%)	0.000	0.378	0.718	1.122	1.691
	2020	3,658	142,407,357	8,775	9,328.825	**0.941**	0.921	0.96	1,862	125 (7%)	82 (4%)	0.000	0.458	0.811	1.337	1.984
	2021	3,681	165,896,703	11,605	10,850.791	**1.070**	1.050	1.089	1,979	158 (8%)	112 (6%)	0.000	0.542	0.950	1.520	2.209
	2022	3,723	165,729,704	9,830	10,878.368	**0.904**	0.886	0.922	1,999	129 (6%)	82 (4%)	0.000	0.435	0.793	1.265	1.863
	2023	3,728	165,958,989	8,107	10,738.480	**0.755**	0.739	0.772	1,947	94 (5%)	50 (3%)	0.000	0.335	0.658	1.046	1.559
CAH	2015	434	NR	28	28.204	0.994	0.673	1.416	0	.	.	.	.	.	.	.
	2016	537	1,556,759	21	32.415	**0.648**	0.412	0.973	0	.	.	.	.	.	.	.
	2017	644	1,825,147	25	37.559	**0.666**	0.440	0.968	0	.	.	.	.	.	.	.
	2018	694	2,005,833	23	41.739	**0.551**	0.358	0.814	0	.	.	.	.	.	.	.
	2019	717	2,129,107	26	44.291	**0.587**	0.392	0.848	0	.	.	.	.	.	.	.
	2020	718	1,979,223	28	41.181	**0.680**	0.461	0.970	0	.	.	.	.	.	.	.
	2021	889	2,557,083	43	53.229	0.808	0.592	1.078	0	.	.	.	.	.	.	.
	2022	980	2,770,042	61	57.660	1.058	0.816	1.350	0	.	.	.	.	.	.	.
	2023	1,017	2,776,776	39	57.800	**0.675**	0.486	0.913	0	.	.	.	.	.	.	.

1. Number of facilities included in SIR calculation.
2. Bolded SIR value indicates statistical significance at the alpha = 0.05 level (e.g., the SIR is statistically significantly different than 1.0)
3. Percent of facilities with at least one predicted event that had an SIR significantly greater than or less than the nominal value of the national SIR by facility type and year.
4. If a facility's predicted number of MRSA events was < 1.0, a facility-specific SIR was neither calculated nor included in the distribution of facility-specific SIRs.

ACH: Acute Care Hospital; CAH: Critical Access Hospital
NR: Data for this table was taken from the HAI Progress Report for that year's data. In the 2015 HAI Progress Report, NHSN did not publish the number of patient days.

Acute Care Hospitals (ACH):

From 2015 to 2023, using the 2015 baseline model, the MRSA Standardized Infection Ratio (SIR) for Acute Care Hospitals (ACHs) decreased significantly. There was a statistically significant 24.3% (p <0.0001) decrease in the 2023 SIR (0.755) as compared to the 2015 SIR (0.998), suggesting improvements in infection prevention and control across facilities. Notably, the steady decrease in the SIR from

2015 until 2019 was interrupted by the COVID-19 pandemic; this is consistent with published literature. There were significant increases observed in the SIR during 2020 and 2021. The largest increase occurred between 2019 (0.817) and 2020 (0.941) with a 15.2% ($p < 0.0001$) increase in the SIR. The SIR has since recovered from the COVID-19 impact as significant decreases were observed in 2022 and 2023. The largest improvement in the SIR occurred between 2022 (0.904) and 2023 (0.755) with a 16.5% ($p < 0.0001$) decrease in the SIR. Overall, while there is evidence of improvement in the SIR for ACH facilities from 2015 to 2023, the data suggests that ongoing efforts are critical to maintain and further enhance infection control practices, especially in light of the challenges posed by the COVID-19 pandemic.

Critical Access Hospitals (CAH):

From 2015 to 2023, using the 2015 baseline model, the MRSA Standardized Infection Ratio (SIR) for Critical Access Hospitals (CAHs) decreased. There was a 32.0% ($p = 0.1238$) decrease in the 2023 SIR (0.675) as compared to the 2015 SIR (0.994), suggesting improvements in infection prevention and control across facilities. Similarly to ACHs, consistent improvement in the SIR was interrupted by the COVID-19 pandemic. There were notable increases observed in the SIR during 2020, 2021, and 2022; although none of these year-to-year comparisons were statistically significant. The SIR has since recovered from the COVID-19 impact as a significant improvement occurred between 2022 (1.508) and 2023 (0.675), with a 36.2% ($p = 0.0272$) decrease in the SIR. Overall, while there is evidence of improvement in the SIR for CAH facilities from 2015 to 2023, the data suggests that ongoing efforts are critical to maintain and further enhance infection control practices.