

2018 National and State HAI Data Report

Introduction:

Welcome to the 2018 National and State HAI Data Report using the 2015 baseline by comparing the number of observed device days to the number of predicted device days. This report is created by CDC staff with the National Healthcare Safety Network (NHSN).

Scope of report:

Device Days Types
Central line days (CLDs) by locations
Urinary catheter days (UCDs) by locations
Ventilator days (VDs) by locations

National and State HAI Progress Report

Standardized Utilization Ratios

Inpatient Rehabilitation Facilities

and risk adjustment calculations. Standardized utilization ratios (SURs) are used to describe device-assisted days.
(HSN).

IRF	
National	State
b	b
b	b
b	b

]

associated HAIs

Development of the NHSN Standardized Utilization Ratio (SUR): Methodology

Rationale

Traditionally, NHSN has been providing a crude measure of device utilization rate to the healthcare facilities standardized to compare with a reference baseline population as well as over time. Accordingly, CDC has

Development of SUR models

SUR models were developed for the following measures: central line days, urinary catheter days and ventilator days in intensive care units (ICU), inpatient rehabilitation facilities (IRF), long-term acute care hospitals (LTACH) (and NICU for central line catheters). Using the NHSN data (2018) in sync with rebaseline work, CDC has developed multivariable logistic regression models (see “Extra-binomial Variation in Logistic Linear Models,” Applied Statistics, 31, 144–148.). Unit of analysis in :

STEPS to compute SUR at the location level

1: First, calculate the logit scale value of p_{hat} , using parameter estimates of corresponding SUR model.

Logit p_{hat} = intercept + x_1 + X_2 + X_3 +

(Risk factors are provided in appendices for individual matrix of measure and healthcare setting)

2: Then, compute the probability of device use

$p_{hat} = [e^{\text{logit}(p_{hat})}] / [1 + e^{\text{logit}(p_{hat})}]$

3: Calculate predicted device days as follows:

Predicted Device Days = p_{hat} * In-patient days

4: Finally, derive SUR value at the location by dividing number of observed device days with number of predicted device days

$SUR = \text{Observed Device Days} / \text{Predicted Device Days}$

Note that SUR will not be calculated if Predicted Device Days is <1 due to minimum precision criteria of 1

STEPS to compute SUR at higher level above location

Do the same computation as in step 1, 2, 3 at location level.

Sum the observed device days and predicted device days up to the level of aggregation desired (e.g., facility, region, etc.).

Then, derive SUR value at the desired aggregate level by dividing number of observed device days with predicted device days

SUR Guide: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sur-guide-508.pdf>

ies. To monitor the progress of healthcare acquired infections (HAI) prevention efforts, device utilization in any h
s developed statistical models to make SUR values available for different measures (e.g., central line days, urin

tilator days. They were available for the healthcare setting of acute care hospitals (ACH), critical access hospita
days).

ession models that correct over dispersion by the Williams' method (Reference: Williams, D. A. (1982),
all the SUR models are at the location level.

redicted device days;

l.0.

ility-level).

number of predicted device days.

healthcare setting/location needs to be
ary catheter days) at various healthcare settings.

Is (CAH),

2018 Annual National and State HAI Progress Report

Inpatient Rehabilitation Facilities: Full series of tables for all national and state data

Table 1	National standardized utilization ratios (SURs) and facility-specific summary SURs: Central line days (CLDs) Urinary catheter days (UCDs) Ventilator days (VDs)
Table 2	State-specific SURs for CLDs from Inpatient rehabilitation facilities: All locations combined
Table 3	State-specific SURs for UCDs from Inpatient rehabilitation facilities: All locations combined
Table 4	State-specific SURs for VDs from Inpatient rehabilitation facilities All locations combined
Table 5	Changes in national SURs, 2018 compared to 2017: Central Line Days (CLDs) Urinary Catheter Days (UCDs) Ventilator days (VDs)
Table 6	Changes in state SURs, 2018 compared to 2017: 6a. Central Line Days (CLDs) 6b. Urinary Catheter Days (UCDs) 6c. Ventilator Days (VDs)
Appendix A	Factors used in NHSN risk-adjusted SUR calculation of the device utilization in inpatient rel

Additional Resources

Technical Appendix
HAI Progress Report Home Page
SUR Guide: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sur-guid>

habilitation facilities (IRFs)

le-508.pdf

Device and Patient Population	No. of Facilities	No. of Device days	
	Reporting ¹	Observed	Predicted
Central line days, all⁴	727	356,439	407,533.4329
ICUs⁵	119	105,582	136,247.9142
Wards⁶	608	250,857	271,285.5187
Urinary catheter days, all⁴	1,155	584,167	713,266.2128
	342	326,645	387,600.8785
Wards⁶	813	257,522	325,665.3343
Ventilator days, all⁴	29	2,952	1,538.3730
	9	1,964	688.9581
	20	988	849.4149

1. The number of reporting facilities included in the SUR calculation; SURs are not calculated when there are le
2. Percent of facilities with at least one predicted device day that had an SUR significantly greater than or less t
3. Facility-specific percentiles are only calculated if at least 20 facilities had ≥ 1.0 predicted number of device da
4. Data from all ICUs, wards (and other non-critical care locations). Data contained in this table are reported fro
5. Data from all ICUs; excludes wards (and other non-critical care locations). Data contained in this table are rej
6. Data from all wards (for this table wards also include step-down, mixed acuity, and specialty care areas [inclu

**Table 1. National standardized utilization ratios (SURs) and facility-specific summary
Table 1a. Central line days (CLDs), urinary**

SUR	95% CI for SUR		Facility-specific SURs			
	Lower	Upper	No. Facilities with ≥ 1 Predicted Device Days	No. Facilities with SUR Significantly > National SUR N	No. Facilities Significantly < National SUR % ²	No. Facilities Significantly < National SUR N
0.8746	0.8718	0.8775	727	255	35%	330
0.7749	0.7702	0.7796	119	49	41%	55
0.9247	0.9211	0.9283	608	196	32%	291
0.8190	0.8169	0.8211	1,154	405	35%	531
0.8427	0.8398	0.8456	342	119	35%	165
0.7908	0.7877	0.7938	812	292	36%	343
1.9189	1.8506	1.9890	29	4	14%	23
2.8507	2.7267	2.9789	9	.	.	.
1.1632	1.0923	1.2374	20	4	20%	15

less than 5 reporting facilities. This may be different from those reported in the SIR tables due to exclusion of facilities with a predicted number of device days less than the nominal value of the national SUR. This is only calculated if at least 10 facilities had ≥ 1.0 predicted device days in 2018. If a facility's predicted number of device days was < 1.0 , a facility-specific SUR was neither calculated nor reported from inpatient rehabilitation facilities; as such, data from ACHs, CAHs and LTACHs are excluded from inpatient rehabilitation facilities; as such, data from ACHs, CAHs and LTACHs are excluded from inpatient rehabilitation facilities (excluding hematology/oncology, bone marrow transplant). Data contained in this table are reported from inpatient rehabilitation facilities.

Facility-specific SURs using device days data reported to NHSN during 2018 for inpatient rehabilitation facilities (IRF), urinary catheter days (UCDs), and ventilator days (VDs).

Facility with SUR	Percentile							
	5%	10%	15%	20%	25%	30%	35%	40%
National SUR								
45%	0.1559	0.2946	0.3847	0.4723	0.5323	0.6038	0.6563	0.7107
46%	0.2936	0.3680	0.4066	0.4259	0.5167	0.5599	0.6175	0.6369
48%	0.1452	0.2526	0.3697	0.4749	0.5498	0.6072	0.6660	0.7219
46%	0.2580	0.3417	0.4115	0.4733	0.5423	0.5877	0.6358	0.6836
48%	0.3224	0.4128	0.5174	0.5746	0.6135	0.6467	0.6912	0.7189
42%	0.2251	0.3260	0.3771	0.4330	0.5141	0.5596	0.6071	0.6630
79%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
75%	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

on and inclusion criteria. Refer to the technical appendix for details.
 dicted device days in 2018.
 calculated nor included in the distribution of facility-specific SURs.

d.
 patient rehabilitation facilities.

ns), by device type and patient population:

ile Distribution of Facility-specific SURs³

Median									
45%	50%	55%	60%	65%	70%	75%	80%	85%	90%
0.7692	0.8187	0.8685	0.9269	0.9740	1.0299	1.1238	1.2624	1.3671	1.6043
0.6868	0.7501	0.8019	0.8483	0.9077	0.9550	1.0010	1.0323	1.1933	1.3595
0.7868	0.8386	0.8803	0.9389	0.9946	1.0675	1.1832	1.2865	1.4026	1.6226
0.7200	0.7652	0.8100	0.8599	0.9071	0.9613	1.0551	1.1323	1.2222	1.3886
0.7561	0.7900	0.8182	0.8745	0.9071	0.9488	1.0107	1.0854	1.1597	1.3352
0.7045	0.7508	0.8012	0.8414	0.9051	0.9716	1.0695	1.1555	1.2455	1.4126
0.0000	0.0000	0.0000	0.0000	0.0692	0.3489	0.3819	2.0303	2.1453	3.3423
0.0000	0.0000	0.0346	0.1761	0.3159	0.3654	0.8505	1.6747	2.0878	2.6343

95%

1.9001

1.6750

1.9183

1.5776

1.5157

1.6067

6.4087

.

3.2328

Table 2. State-specific standardized utilization ratios (SURs) and facility-specific summary SUI
Table 2. Central line days (CLI)

State	No. of Facilities	No. of Device days			95% CI	
		Observed	Predicted	SUR	Lower	Upper
Alaska	2	.	.	.	.	.
Alabama	6	5,224	4,112.2743	1.2703	1.2363	
Arkansas	13	5,629	6,010.4929	0.9365	0.9123	
Arizona	14	5,825	5,846.3993	0.9963	0.9710	
California	77	37,240	47,666.4804	0.7813	0.7733	
Colorado	20	8,534	9,989.6049	0.8543	0.8363	
Connecticut	4	.	.	.	.	.
D.C.	2	.	.	.	.	.
Delaware	3	.	.	.	.	.
Florida	26	21,507	21,252.2540	1.0120	0.9985	
Georgia	21	10,462	9,511.1404	1.1000	1.0790	
Guam	.	.	.	.	.	.
Hawaii	.	.	.	.	.	.
Iowa	13	3,613	3,719.3800	0.9714	0.9401	
Idaho	2	.	.	.	.	.
Illinois	33	18,366	20,315.9413	0.9040	0.8910	
Indiana	24	12,319	9,232.8168	1.3343	1.3108	
Kansas	10	3,728	2,876.1932	1.2962	1.2550	
Kentucky	7	2,071	1,954.9304	1.0594	1.0145	
Louisiana	22	7,222	8,031.0795	0.8993	0.8787	
Massachusetts	3	.	.	.	.	.
Maryland	2	.	.	.	.	.
Maine	4	.	.	.	.	.
Michigan	21	9,518	11,415.0485	0.8338	0.8172	
Minnesota	6	2,659	2,958.5433	0.8988	0.8651	
Missouri	16	6,129	6,977.6426	0.8784	0.8566	
Mississippi	8	2,479	2,662.6064	0.9310	0.8949	
Montana	5	303	823.8357	0.3678	0.3281	
North Carolina	13	11,636	14,785.3803	0.7870	0.7728	
North Dakota	2	.	.	.	.	.
Nebraska	6	2,369	2,437.2808	0.9720	0.9335	
New Hampshire	2	.	.	.	.	.
New Jersey	6	4,864	7,312.2212	0.6652	0.6467	
New Mexico	5	1,345	2,482.3416	0.5418	0.5134	
Nevada	12	10,056	9,382.2021	1.0718	1.0510	
New York	44	19,684	24,264.8270	0.8112	0.7999	
Ohio	26	11,883	12,894.0240	0.9216	0.9051	
Oklahoma	11	4,568	3,991.4928	1.1444	1.1116	
Oregon	6	1,245	2,056.3389	0.6054	0.5725	
Pennsylvania	76	45,673	60,199.4902	0.7587	0.7518	
Puerto Rico	1	.	.	.	.	.
Rhode Island	4	.	.	.	.	.
South Carolina	21	9,137	15,258.5381	0.5988	0.5866	

South Dakota	3	.	.	.	.
Tennessee	16	6,947	8,494.5521	0.8178	0.7988
Texas	57	25,487	27,847.7199	0.9152	0.9040
Utah	4	.	.	.	.
Virginia	12	8,534	7,549.8551	1.1304	1.1066
Virgin Islands	.	.	.	.	.
Vermont	2	.	.	.	.
Washington	14	5,931	6,235.1218	0.9512	0.9272
Wisconsin	18	6,356	5,024.1517	1.2651	1.2343
West Virginia	2	.	.	.	.
Wyoming	.	.	.	.	.
All US	727	356,439	407,533.4329	0.8746	0.8718

1. The number of reporting facilities included in the SUR calculation; SURs are not calculated when th
2. Percent of facilities with at least one predicted device day that had an SUR significantly greater than
3. Facility-specific percentiles are only calculated if at least 20 facilities had ≥ 1.0 predicted number of
4. Data from all ICUs and wards (and other non-critical care locations). Data contained in this table are

Rs using device days data reported to NHSN during 2018 for inpatient rehabilitation facilities (IRFs Ds), all locations⁴

for SUR	Facility-specific SURs					10%
	No. Facilities with ≥1 Predicted Device Days	No. Facilities with SUR Significantly > National SUR N	No. Facilities with SUR Significantly < National SUR	No. Facilities with SUR	No. Facilities with SUR	

1.3051	6	.	.	.	.	.
0.9612	13	5	38%	4	31%	.
1.0222	14	7	50%	5	36%	.
0.7892	77	19	25%	43	56%	0.3598
0.8725	20	7	35%	9	45%	0.4340
.
.
1.0256	26	11	42%	10	38%	0.4977
1.1212	21	12	57%	6	29%	0.4678
.
.
1.0035	13	6	46%	7	54%	.
.
0.9172	33	13	39%	14	42%	0.4096
1.3580	24	15	63%	8	33%	0.2494
1.3383	10	5	50%	4	40%	.
1.1057	7	.	.	.	.	.
0.9202	22	8	36%	10	45%	0.1472
.
.
.
0.8507	21	3	14%	10	48%	0.3880
0.9334	6	.	.	.	.	.
0.9006	16	5	31%	7	44%	.
0.9683	8	.	.	.	.	.
0.4110	5	.	.	.	.	.
0.8014	13	4	31%	7	54%	.
.
1.0117	6	.	.	.	.	.
.
0.6841	6	.	.	.	.	.
0.5714	5	.	.	.	.	.
1.0929	12	5	42%	2	17%	.
0.8226	44	12	27%	27	61%	0.1240
0.9383	26	8	31%	12	46%	0.4375
1.1780	11	6	55%	4	36%	.
0.6398	6	.	.	.	.	.
0.7657	76	23	30%	43	57%	0.1741
.
.
0.6112	21	5	24%	11	52%	0.2936

0.8372	16	6	38%	7	44%	
0.9265	57	24	42%	24	42%	0.3249
1.1545	12	7	58%	4	33%	
0.9756	14	3	21%	5	36%	
1.2964	18	8	44%	5	28%	
0.8775	727	255	35%	330	45%	0.2946

There are less than 5 reporting facilities. This may be different from those reported in the SIR tables due to n or less than the nominal value of the national SUR. This is only calculated if at least 10 facilities had ≥ device days in 2018. If a facility's predicted number of device days was <1.0, a facility-specific SUR was reported from inpatient rehabilitation facilities.

); by device type and patient population:

Median			
25%	50%	75%	90%
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
0.5098	0.7675	0.9904	1.3163
0.5730	0.8545	1.1252	2.2851
.	.	.	.
.	.	.	.
.	.	.	.
0.6539	0.8734	1.0218	2.0980
0.7136	1.1921	1.4280	1.8993
.	.	.	.
.	.	.	.
.	.	.	.
0.5218	0.8549	1.0028	1.6010
0.6265	1.1755	1.6734	1.9871
.	.	.	.
.	.	.	.
0.5840	0.8169	1.2461	1.8787
.	.	.	.
.	.	.	.
0.5704	0.7991	0.8803	1.0299
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
0.3410	0.5684	1.0597	1.8316
0.6178	0.8181	1.0675	1.4072
.	.	.	.
.	.	.	.
0.3935	0.7131	1.0272	1.3508
.	.	.	.
.	.	.	.
0.4107	0.7466	0.9509	1.1933

.	.	.	.
0.6038	0.8706	1.1893	1.7042
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
0.5323	0.8187	1.1238	1.6043

exclusion and inclusion criteria. Refer to the technical appendix for details.
1.0 predicted device days in 2018.
neither calculated nor included in the distribution of facility-specific SURs.

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Table 3. State-specific standardized utilization ratios (SURs) and facility-specific summary SUR
Table 3. Urinary catheter days (L

State	No. of Facilities	No. of Device days			95% CI
		Observed	Predicted	SUR	Lower
Alaska	2				
Alabama	18	15,055	16,466.2737	0.9143	0.8998
Arkansas	24	13,128	13,920.4684	0.9431	0.9270
Arizona	26	15,898	18,237.7351	0.8717	0.8582
California	77	29,533	42,210.8386	0.6997	0.6917
Colorado	20	7,024	8,582.9985	0.8184	0.7994
Connecticut	7	1,724	2,887.0390	0.5972	0.5695
D.C.	2				
Delaware	3				
Florida	53	46,851	53,219.1613	0.8803	0.8724
Georgia	29	12,686	15,392.6701	0.8242	0.8099
Guam					
Hawaii	1				
Iowa	16	4,077	3,970.2810	1.0269	0.9957
Idaho	6	2,255	2,419.2612	0.9321	0.8942
Illinois	43	23,299	29,621.4148	0.7866	0.7765
Indiana	38	15,592	17,263.3147	0.9032	0.8891
Kansas	20	7,231	9,713.2670	0.7444	0.7275
Kentucky	16	10,537	13,247.3286	0.7954	0.7803
Louisiana	49	15,201	17,580.3744	0.8647	0.8510
Massachusetts	10	13,539	15,349.1415	0.8821	0.8673
Maryland	3				
Maine	5	2,229	3,142.7699	0.7092	0.6803
Michigan	38	14,641	21,181.9054	0.6912	0.6801
Minnesota	13	4,389	4,915.8636	0.8928	0.8667
Missouri	31	14,245	18,314.7652	0.7778	0.7651
Mississippi	11	3,680	5,628.5678	0.6538	0.6330
Montana	5	752	1,028.2871	0.7313	0.6804
North Carolina	26	8,263	16,921.3815	0.4883	0.4779
North Dakota	3				
Nebraska	10	5,974	5,279.3280	1.1316	1.1032
New Hampshire	8	3,627	5,490.3643	0.6606	0.6394
New Jersey	19	19,786	23,710.9211	0.8345	0.8229
New Mexico	8	4,862	4,921.7711	0.9879	0.9604
Nevada	13	11,401	10,658.6165	1.0697	1.0502
New York	52	17,075	31,197.0749	0.5473	0.5392
Ohio	47	24,474	28,653.9124	0.8541	0.8435
Oklahoma	22	8,060	9,927.6457	0.8119	0.7943
Oregon	8	1,635	2,597.4956	0.6295	0.5995
Pennsylvania	76	43,251	50,803.3202	0.8513	0.8434
Puerto Rico	7	1,508	3,673.0424	0.4106	0.3902
Rhode Island	5	1,323	1,562.5238	0.8467	0.8020
South Carolina	21	7,006	13,426.0293	0.5218	0.5097

South Dakota	3	.	.	.	.
Tennessee	32	14,959	19,720.9745	0.7585	0.7464
Texas	142	91,285	92,307.2843	0.9889	0.9825
Utah	11	3,369	4,511.3579	0.7468	0.7219
Virginia	27	12,126	17,465.8785	0.6943	0.6820
Virgin Islands	.	.	.	.	.
Vermont	2	.	.	.	.
Washington	15	8,837	6,815.4236	1.2966	1.2698
Wisconsin	22	6,111	6,904.8906	0.8850	0.8631
West Virginia	8	5,858	6,552.8525	0.8940	0.8713
Wyoming	2	.	.	.	.
All US	1,155	584,167	713,266.2128	0.8190	0.8169

1. The number of reporting facilities included in the SUR calculation; SURs are not calculated when there are no reported device days.
2. Percent of facilities with at least one predicted device day that had an SUR significantly greater than or less than the expected value.
3. Facility-specific percentiles are only calculated if at least 20 facilities had ≥ 1.0 predicted number of device days.
4. Data from all ICUs and wards (and other non-critical care locations). Data contained in this table are reported as of 12/31/2019.

Rs using device days data reported to NHSN during 2018 inpatient rehabilitation facilities (IRFs), by JCDs), all locations⁴

for SUR	Facility-specific SURs						10%
	Upper	No. Facilities with ≥1 Predicted Device Days	No. Facilities with SUR		No. Facilities with SUR	No. Facilities with SUR	
			Significantly > National SUR	Significantly < National SUR			
		N	N				

0.9290	18	6	33%	4	22%	.	
0.9593	24	13	54%	8	33%	0.5940	
0.8854	26	13	50%	9	35%	0.2955	
0.7077	77	18	23%	47	61%	0.2251	
0.8377	20	7	35%	10	50%	0.3925	
0.6259	7	.	.	.	.	.
.	
.	
0.8883	53	25	47%	17	32%	0.2821	
0.8386	29	11	38%	13	45%	0.3544	
.	
.	
1.0587	16	8	50%	8	50%	.	
0.9712	6	.	.	.	.	.
0.7967	43	16	37%	19	44%	0.3260	
0.9174	38	18	47%	14	37%	0.4834	
0.7618	20	3	15%	10	50%	0.4085	
0.8107	16	3	19%	10	63%	.	
0.8785	49	18	37%	19	39%	0.4128	
0.8970	10	4	40%	4	40%	.	
.	
0.7392	5	.	.	.	.	.
0.7025	38	12	32%	18	47%	0.3356	
0.9196	13	5	38%	5	38%	.	
0.7906	31	9	29%	18	58%	0.2580	
0.6752	11	3	27%	8	73%	.	
0.7850	5	.	.	.	.	.
0.4989	26	4	15%	18	69%	0.1972	
.	
1.1606	10	2	20%	7	70%	.	
0.6824	8	.	.	.	.	.
0.8462	19	7	37%	9	47%	.	
1.0159	8	.	.	.	.	.
1.0894	13	6	46%	4	31%	.	
0.5556	52	9	17%	33	63%	0.2328	
0.8649	47	16	34%	21	45%	0.3904	
0.8297	22	9	41%	9	41%	0.4191	
0.6605	8	.	.	.	.	.
0.8594	76	26	34%	36	47%	0.3821	
0.4317	7	.	.	.	.	.
0.8933	5	.	.	.	.	.
0.5342	21	0	0%	15	71%	0.3372	

0.7707	32	12	38%	14	44%	0.5535
0.9954	142	70	49%	43	30%	0.5315
0.7723	11	4	36%	6	55%	.
0.7067	26	7	27%	17	65%	0.2736
.
1.3238	15	7	47%	6	40%	.
0.9074	22	11	50%	4	18%	0.3450
0.9171	8	.	.	.	.	.
.
0.8211	1,154	405	35%	531	46%	0.3417

less than 5 reporting facilities. This may be different from those reported in the SIR tables due to exclusions less than the nominal value of the national SUR. This is only calculated if at least 10 facilities had ≥ 1.0 predicted days in 2018. If a facility's predicted number of device days was < 1.0 , a facility-specific SUR was neither reported from inpatient rehabilitation facilities.

device type and patient population:

Median			
25%	50%	75%	90%
.	.	.	.
.	.	.	.
0.6970	0.9810	1.2617	2.2598
0.6409	0.8989	1.2439	1.4476
0.5204	0.6792	0.8316	1.0654
0.5499	0.7448	1.0496	1.2650
.	.	.	.
.	.	.	.
.	.	.	.
0.6793	0.8466	1.1265	1.4665
0.6278	0.8086	1.1651	1.2613
.	.	.	.
.	.	.	.
.	.	.	.
0.5016	0.8005	1.0364	1.2003
0.5749	0.8137	1.3482	1.6067
0.6546	0.7413	0.8959	0.9701
.	.	.	.
0.6055	0.7561	1.0469	1.5486
.	.	.	.
.	.	.	.
.	.	.	.
0.5746	0.7455	0.9523	1.1102
.	.	.	.
0.3780	0.6626	0.9411	1.1597
.	.	.	.
.	.	.	.
0.3617	0.5468	0.7639	1.0430
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
0.3351	0.5427	0.8336	1.0605
0.5596	0.7602	1.0272	1.5033
0.5427	0.7719	1.2312	1.4295
.	.	.	.
0.5372	0.7647	1.0604	1.3407
.	.	.	.
.	.	.	.
0.4391	0.5202	0.6789	0.7616

0.6070	0.8672	1.0845	1.4451
0.7046	0.8911	1.1491	1.4766
0.5231	0.6660	1.0461	1.1888
0.7663	1.0409	1.1913	1.4545
0.5423	0.7652	1.0551	1.3886

on and inclusion criteria. Refer to the technical appendix for details.
dicted device days in 2018.
calculated nor included in the distribution of facility-specific SURs.

|

Table 3. State-specific standardized utilization ratios (SURs) and facility-specific summary SUR

Table 4. Ventilator days (VDs)

State	No. of Facilities	No. of Device days			95% CI
		Observed	Predicted	SUR	Lower
Alaska	.	.	.	.	.
Alabama	.	.	.	.	.
Arkansas	.	.	.	.	.
Arizona	.	.	.	.	.
California	3	.	.	.	.
Colorado	.	.	.	.	.
Connecticut	.	.	.	.	.
D.C.	.	.	.	.	.
Delaware	.	.	.	.	.
Florida	.	.	.	.	.
Georgia	1	.	.	.	.
Guam	.	.	.	.	.
Hawaii	.	.	.	.	.
Iowa	.	.	.	.	.
Idaho	.	.	.	.	.
Illinois	2	.	.	.	.
Indiana	1	.	.	.	.
Kansas	.	.	.	.	.
Kentucky	.	.	.	.	.
Louisiana	2	.	.	.	.
Massachusetts	.	.	.	.	.
Maryland	.	.	.	.	.
Maine	.	.	.	.	.
Michigan	.	.	.	.	.
Minnesota	.	.	.	.	.
Missouri	.	.	.	.	.
Mississippi	.	.	.	.	.
Montana	.	.	.	.	.
North Carolina	.	.	.	.	.
North Dakota	.	.	.	.	.
Nebraska	.	.	.	.	.
New Hampshire	.	.	.	.	.
New Jersey	.	.	.	.	.
New Mexico	1	.	.	.	.
Nevada	2	.	.	.	.
New York	6	545	312.7623	1.7425	1.6008
Ohio	3	.	.	.	.
Oklahoma	.	.	.	.	.
Oregon	.	.	.	.	.
Pennsylvania	5	1,967	390.3476	5.0391	4.8200
Puerto Rico	.	.	.	.	.

Rhode Island	.	.	.	.	.
South Carolina	1	.	.	.	.
South Dakota	.	.	.	.	.
Tennessee	1	.	.	.	.
Texas	.	.	.	.	.
Utah	.	.	.	.	.
Virginia	.	.	.	.	.
Virgin Islands	.	.	.	.	.
Vermont	.	.	.	.	.
Washington	1	.	.	.	.
Wisconsin	.	.	.	.	.
West Virginia	.	.	.	.	.
Wyoming	.	.	.	.	.
All US	29	2,952	1,538.3730	1.9189	1.8506

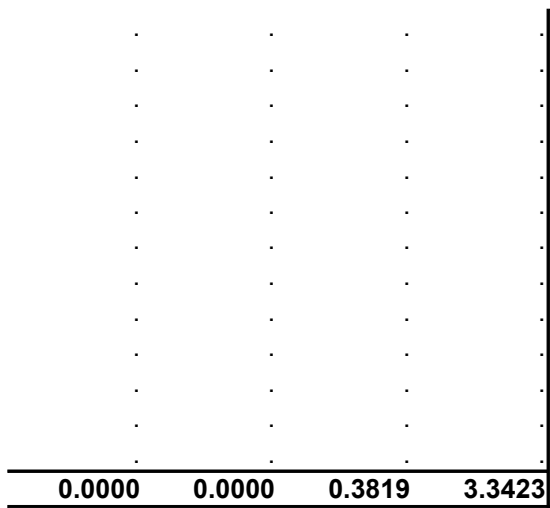
1. The number of reporting facilities included in the SUR calculation; SURs are not calculated when there are
2. Percent of facilities with at least one predicted device day that had an SUR significantly greater than or less
3. Facility-specific percentiles are only calculated if at least 20 facilities had ≥ 1.0 predicted number of device (
4. Data from all ICUs and wards (and other non-critical care locations). Data contained in this table are repor

's using device days data reported to NHSN during 2018 inpatient rehabilitation facilities (IRFs), by s), all locations⁴

for SUR	Facility-specific SURs			10%
	Upper	No. Facilities with ≥ 1 Predicted Device Days	No. Facilities with SUR Significantly > National SUR N	
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1.8935	6	.	.	.
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5.2655	5	.	.	.
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1.9890	29	4	14%	23	79%	0.0000

less than 5 reporting facilities. This may be different from those reported in the SIR tables due to exclusions less than the nominal value of the national SUR. This is only calculated if at least 10 facilities had ≥ 1.0 predicted days in 2018. If a facility's predicted number of device days was < 1.0 , a facility-specific SUR was neither calculated from inpatient rehabilitation facilities.



in and inclusion criteria. Refer to the technical appendix for details.
 icted device days in 2018.
 alculated nor included in the distribution of facility-specific SURs.

|

Table 5. Changes in national standardized utilization ratios (SURs) using HAI data reported from all NHSN inpatient rehabilitation facilities reporting during 2018 by HAI and patient population: Central line days (CLDs), urinary catheter days (UCDs), and ventilator days (VDs), 2018 compared to 2017

	2017 SUR	2018 SUR	Percent Change	Direction of Change, Based on Statistical Significance	p-value
Central line days, all locations¹	0.8973	0.8746	-3%	DECREASE	0.0000
ICU ²	0.8120	0.7749	-5%	DECREASE	0.0000
Ward ³	0.9364	0.9247	-1%	DECREASE	0.0000
UCDs, all locations¹	0.9100	0.8190	-10%	DECREASE	0.0000
	0.9057	0.8427	-7%	DECREASE	0.0000
	0.9150	0.7908	-14%	DECREASE	0.0000
Ventilator days, all locations¹	2.2367	1.9189	-14%	DECREASE	0.0000
ICUs ²	3.2317	2.8507	-12%	DECREASE	0.0001
Wards ³	1.5151	1.1632	-23%	DECREASE	0.0000

* Statistically significant, $p < 0.0500$

1. Data from all ICUs, wards (and other non-critical care locations).

2. Data from all ICUs; excludes wards (and other non-critical care locations).

3. Data from all wards (for this table wards also include step-down and specialty care areas [including hematology/oncology, bone marrow transplan

ur].

Table 6. Changes in state-specific standardized infection ratios (SURs) between 2017 and 2018 from NHSN Inpatient Rehabilitation Facilities
6a. Central line days (CLDs), all locations¹

State ²	All Inpatient Rehabilitation Facilities Reporting to NHSN				
	2017 SUR	2018 SUR	Percent Change	Direction of Change, Based on Statistical Significance	p-value
Alaska	.	.	.	.	.
Alabama	1.1700	1.2703	9%	INCREASE	0.0001
Arkansas	0.7741	0.9365	21%	INCREASE	0.0000
Arizona	0.8954	0.9963	11%	INCREASE	0.0000
California	0.7835	0.7813	0%	NO CHANGE	0.6983
Colorado	0.9937	0.8543	-14%	DECREASE	0.0000
Connecticut	.	.	.	.	.
D.C.	.	.	.	.	.
Delaware	.	.	.	.	.
Florida	1.2569	1.0120	-19%	DECREASE	0.0000
Georgia	1.1109	1.1000	1%	NO CHANGE	0.4821
Guam	.	.	.	.	.
Hawaii	.	.	.	.	.
Iowa	0.8320	0.9714	17%	INCREASE	0.0000
Idaho	.	.	.	.	.
Illinois	0.8638	0.9040	5%	INCREASE	0.0000
Indiana	1.1782	1.3343	13%	INCREASE	0.0000
Kansas	1.1138	1.2962	16%	INCREASE	0.0000
Kentucky	0.8802	1.0594	20%	INCREASE	0.0000
Louisiana	1.0192	0.8993	-12%	DECREASE	0.0000
Massachusetts	.	.	.	.	.
Maryland	.	.	.	.	.
Maine	.	.	.	.	.
Michigan	0.8779	0.8338	-5%	DECREASE	0.0005
Minnesota	1.0041	0.8988	-10%	DECREASE	0.0001
Missouri	0.7780	0.8784	13%	INCREASE	0.0000
Mississippi	0.7537	0.9310	24%	INCREASE	0.0000
Montana	.	0.3678	22%	INCREASE	0.0194
North Carolina	0.7851	0.7870	0%	NO CHANGE	0.8582
North Dakota	.	.	.	.	.
Nebraska	0.8960	0.9720	8%	INCREASE	0.0059
New Hampshire	.	.	.	.	.
New Jersey	0.7080	0.6652	-6%	DECREASE	0.0040
New Mexico	0.5495	0.5418	1%	NO CHANGE	0.7198
Nevada	1.1381	1.0718	-6%	DECREASE	0.0000
New York	0.8601	0.8112	-6%	DECREASE	0.0000
Ohio	1.0944	0.9216	-16%	DECREASE	0.0000
Oklahoma	1.3224	1.1444	-13%	DECREASE	0.0000
Oregon	0.4707	0.6054	29%	INCREASE	0.0000
Pennsylvania	0.7755	0.7587	-2%	DECREASE	0.0009
Puerto Rico	.	.	.	.	.
Rhode Island	1.1561	.	.	.	.
South Carolina	0.6138	0.5988	2%	NO CHANGE	0.0896
South Dakota	.	.	.	.	.
Tennessee	0.9640	0.8178	-15%	DECREASE	0.0000
Texas	0.9944	0.9152	-8%	DECREASE	0.0000
Utah	.	.	.	.	.
Virginia	1.1527	1.1304	2%	NO CHANGE	0.2029
Virgin Islands	.	.	.	.	.
Vermont	.	.	.	.	.
Washington	1.0171	0.9512	-6%	DECREASE	0.0003
Wisconsin	1.4164	1.2651	-11%	DECREASE	0.0000
West Virginia	.	.	.	.	.
Wyoming	.	.	.	.	.
All US	0.8973	0.8746	-3%	DECREASE	0.0000

* Statistically significant, p < 0.0500

1. Data from all ICUs, wards (and other non-critical care locations).
2. States without SUR either in 2017 and/or 2018 and therefore subsequent data not calculated

Table 6. Changes in state-specific standardized utilization ratios (SURs) between 2017 and 2018 from NHSN Inpatient Rehabilitation Facilities
6b. Urinary Catheter Days (UCDs), all locations¹

All Inpatient Rehabilitation Facilities Reporting to NHSN					
	2017 SUR	2018 SUR	Percent Change	Direction of Change, Based on Statistical Significance	p-value
Alaska	.	.	.	.	.
Alabama	0.9171	0.9143	0%	NO CHANGE	0.7949
Arkansas	1.0196	0.9431	-8%	DECREASE	0.0000
Arizona	0.8691	0.8717	0%	NO CHANGE	0.7880
California	0.8137	0.6997	-14%	DECREASE	0.0000
Colorado	0.9599	0.8184	-15%	DECREASE	0.0000
Connecticut	0.6895	0.5972	-13%	DECREASE	0.0000
D.C.	.	.	.	.	.
Delaware	.	.	.	.	.
Florida	0.9103	0.8803	-3%	DECREASE	0.0000
Georgia	0.9381	0.8242	-12%	DECREASE	0.0000
Guam	.	.	.	.	.
Hawaii	.	.	.	.	.
Iowa	0.9922	1.0269	3%	NO CHANGE	0.1429
Idaho	1.1305	0.9321	-18%	DECREASE	0.0000
Illinois	0.9295	0.7866	-15%	DECREASE	0.0000
Indiana	0.9720	0.9032	-7%	DECREASE	0.0000
Kansas	0.8026	0.7444	-7%	DECREASE	0.0000
Kentucky	0.8394	0.7954	-5%	DECREASE	0.0001
Louisiana	1.0636	0.8647	-19%	DECREASE	0.0000
Massachusetts	0.9999	0.8821	-12%	DECREASE	0.0000
Maryland	.	.	.	.	.
Maine	0.7789	0.7092	-9%	DECREASE	0.0014
Michigan	0.7922	0.6912	-13%	DECREASE	0.0000
Minnesota	0.9694	0.8928	-8%	DECREASE	0.0001
Missouri	0.9477	0.7778	-18%	DECREASE	0.0000
Mississippi	0.6495	0.6538	1%	NO CHANGE	0.7848
Montana	.	0.7313	.	.	.
North Carolina	0.5926	0.4883	-18%	DECREASE	0.0000
North Dakota	1.3294	.	.	.	.
Nebraska	1.2459	1.1316	-9%	DECREASE	0.0000
New Hampshire	0.7067	0.6606	-7%	DECREASE	0.0036
New Jersey	1.1040	0.8345	-24%	DECREASE	0.0000
New Mexico	1.1184	0.9879	-12%	DECREASE	0.0000
Nevada	1.1831	1.0697	-10%	DECREASE	0.0000
New York	0.6635	0.5473	-18%	DECREASE	0.0000
Ohio	0.9393	0.8541	-9%	DECREASE	0.0000
Oklahoma	0.9456	0.8119	-14%	DECREASE	0.0000
Oregon	0.7080	0.6295	-11%	DECREASE	0.0009
Pennsylvania	0.8883	0.8513	-4%	DECREASE	0.0000
Puerto Rico	0.5637	0.4106	-27%	DECREASE	0.0000
Rhode Island	0.7932	0.8467	7%	NO CHANGE	0.0965
South Carolina	0.6105	0.5218	-15%	DECREASE	0.0000
South Dakota	.	.	.	.	.
Tennessee	0.8039	0.7585	-6%	DECREASE	0.0000
Texas	1.0363	0.9889	-5%	DECREASE	0.0000
Utah	0.8246	0.7468	-9%	DECREASE	0.0001
Virginia	0.9327	0.6943	-26%	DECREASE	0.0000
Virgin Islands	.	.	.	.	.
Vermont	.	.	.	.	.
Washington	1.7115	1.2966	-24%	DECREASE	0.0000
Wisconsin	1.0139	0.8850	-13%	DECREASE	0.0000
West Virginia	0.8785	0.8940	2%	NO CHANGE	0.3527
Wyoming	.	.	.	.	.
All US	0.9100	0.8190	-10%	DECREASE	0.0000

* Statistically significant, p < 0.0500

1. Data from all ICUs, wards (and other non-critical care locations).
2. States without SUR either in 2017 and/or 2018 and therefore subsequent data not calculated

Table 6. Changes in state-specific standardized utilization ratios (SURs) between 2017 and 2018 from NHSN Inpatient Rehabilitation Facilities
6c. Ventilator days (VDs), all locations¹

	All Inpatient Rehabilitation Facilities Reporting to NHSN				
	2017 SUR	2018 SUR	Percent Change	Direction of Change, Based on Statistical Significance	p-value
Alaska
Alabama
Arkansas
Arizona
California
Colorado
Connecticut
D.C.
Delaware
Florida
Georgia
Guam
Hawaii
Iowa
Idaho
Illinois
Indiana
Kansas
Kentucky
Louisiana
Massachusetts
Maryland
Maine
Michigan
Minnesota
Missouri
Mississippi
Montana
North Carolina
North Dakota
Nebraska
New Hampshire
New Jersey
New Mexico
Nevada
New York	2.5460	1.7425	-32%	DECREASE	0.0000
Ohio
Oklahoma
Oregon
Pennsylvania	5.3062	5.0391	5%	NO CHANGE	0.1065
Puerto Rico
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Virginia
Virgin Islands
Vermont
Washington
Wisconsin
West Virginia
Wyoming
All US	2.2367	1.9189	-14%	DECREASE	0.0000

* Statistically significant, p < 0.0500

1. Data from all ICUs, wards (and other non-critical care locations).

2. States without SUR either in 2017 and/or 2018 and therefore subsequent data not calculated

Appendix A. Factors used in NHSN risk adjusted standard utilization ratios (SUR) calculation of the device utilization in inpatient rehabilitation facilities (IRFs).

Device Type	Validated Parameters for Risk Model
CLDs (non-NICU)	Intercept Facility bed size* Primary diagnosis of stroke admission (in percentile) Primary diagnosis of ortho admission (in percentile)
UCDs	Intercept Proportion of stroke admission (in percentile)
VAE	Intercept only

* Facility bed size, facility type and medical school type are taken from the Annual Hospital Survey

Additional Resources

Technical Appendix: <http://www.cdc.gov/hai/pdfs/progress-report/tech-appendix.pdf>

Explains the methodology used to procedure the HAI Progress Report.

HAI Progress Report Home Page: <http://www.cdc.gov/hai/progress-report/index.html>

The complete HAI Progress Report, including state-specific fact sheets and the Executive Summary, can be fo

The new SUR Guide: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sur-guide-508.pdf>

und at the above website.