

2018-2021 HAI Pathogens & Antimicrobial Resistance Report
Data Tables for Adult HAIs

These data tables accompany the 2018-2021 HAI Pathogens & Antimicrobial Resistance Report and were populated using data reported to the National Healthcare Safety Network (NHSN). More information about the methods and findings from this report are available at:
<https://www.cdc.gov/nhsn/hai-report/index.html>

Table 1. Facilities Reporting at Least 1 HAI Pathogen to NHSN, Adults¹, 2018 – 2021

Facility Type	Facilities		Pathogens	
	#	%	#	%
General	3,195	66.1	415,931	91.8
Critical Access	557	11.5	2,650	0.6
Long-term Acute Care	439	9.1	17,572	3.9
Free-standing Inpatient Rehabilitation	310	6.4	2,659	0.6
Veterans' Affairs	106	2.2	1,463	0.3
Surgical	87	1.8	1,525	0.3
Children's	40	0.8	419	0.1
Military	28	0.6	677	0.1
Oncology	20	0.4	7,603	1.7
Orthopedic	20	0.4	893	0.2
Women's and Children's	13	0.3	514	0.1
Women's	12	0.2	965	0.2
Psychiatric	9	0.2	69	0.0

Bed Size	Facilities		Pathogens	
	#	%	#	%
1-50	1,618	33.5	19,367	4.3
51-100	871	18.0	22,159	4.9
101-200	993	20.5	58,133	12.8
≥ 201	1,354	28.0	353,281	78.0
Total	4,836	100.0	452,940	100.0

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Refer to [Methods](#) for criteria used to define adult and pediatric patient populations.

Table 2. Frequency of Pathogens and HAI Events Reported to NHSN, by HAI Type, Adults, 2018-2021

HAI Type	Pathogens ¹		HAI Events ²	
	#	%	#	%
SSI	215,669	47.6	190,384	47.4
CLABSI	113,604	25.1	100,851	25.1
CAUTI	107,934	23.8	96,974	24.2
PVAP	15,733	3.5	13,114	3.3
Total	452,940	100.0	401,323	100.0

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Between 1-3 pathogens are required to be reported to NHSN for each CLABSI and CAUTI event. Between 0 -3 pathogens can be reported to NHSN for each PVAP and SSI event.
2. There were 46,099 SSIs and 403 PVAPs reported to NHSN without a pathogen from 2018 - 2021. These events are included in the event counts in Table 2.

Table 3. The Top 15 HAI Pathogens Reported to NHSN, Adults, 2018 - 2021¹

Pathogen	# Pathogens	% Pathogens	Rank
<i>Escherichia coli</i>	73,556	16.2	1
<i>Staphylococcus aureus</i>	51,131	11.3	2
<i>Enterococcus faecalis</i> ²	39,129	8.6	3
Select <i>Klebsiella</i> spp.	38,496	8.5	4
<i>Pseudomonas aeruginosa</i>	36,004	7.9	5
Coagulase-negative staphylococci	32,276	7.1	6
<i>Enterobacter</i> spp.	18,431	4.1	7
<i>Enterococcus faecium</i> ²	16,904	3.7	8
<i>Candida albicans</i> ²	16,458	3.6	9
<i>Proteus</i> spp.	13,953	3.1	10
<i>Bacteroides</i> spp.	11,602	2.6	11
Viridans group streptococci	9,962	2.2	12
Other <i>Candida</i> spp. ²	9,803	2.2	13
Other <i>Enterococcus</i> spp. ²	9,091	2.0	14
<i>Candida glabrata</i> ²	7,622	1.7	15
Other pathogen	68,522	15.1	
Total	452,940	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. [Supplemental Data Tables](#) are available for download that contain HAI pathogen distributions for each year individually.
2. When analyzed at the genus-level, *Enterococcus* spp. ranked #2 (14.4%) and *Candida* spp. ranked #6 (7.5%).

Table 4. The Top 15 CLABSI Pathogens Reported to NHSN, by Location Type, Adults, 2018-2021

Pathogen	Acute Care Hospitals (n=2,988 hospitals)									LTACHs ³ (n=420 hospitals)		
	Hospital ICUs			Hospital Wards ¹			Hospital Oncology Units ²					
	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
Coagulase-negative staphylococci	7,553	17.0	1	4,181	10.9	2	2,380	10.6	2	886	10.7	3
<i>Enterococcus faecalis</i> ⁴	5,539	12.5	2	3,344	8.7	4	970	4.3	8	1,088	13.2	1
<i>Candida albicans</i> ⁴	5,363	12.1	3	2,574	6.7	6	260	1.2	16	451	5.5	7
Other <i>Candida</i> spp. ⁴	3,813	8.6	4	2,287	5.9	7	631	2.8	10	818	9.9	5
<i>Staphylococcus aureus</i>	3,288	7.4	5	5,914	15.4	1	1,307	5.8	6	910	11.0	2
<i>Enterococcus faecium</i> ⁴	3,200	7.2	6	1,884	4.9	8	1,974	8.8	4	487	5.9	6
<i>Candida glabrata</i> ⁴	3,126	7.0	7	1,677	4.4	9	328	1.5	14	343	4.2	9
Select <i>Klebsiella</i> spp.	2,074	4.7	8	3,519	9.1	3	1,824	8.2	5	874	10.6	4
<i>Escherichia coli</i>	1,323	3.0	9	2,601	6.8	5	3,923	17.5	1	335	4.1	10
<i>Pseudomonas aeruginosa</i>	1,316	3.0	10	1,644	4.3	10	1,011	4.5	7	414	5.0	8
<i>Enterobacter</i> spp.	1,037	2.3	11	1,374	3.6	11	741	3.3	9	277	3.4	11
<i>Serratia</i> spp.	834	1.9	12	765	2.0	12	149	0.7	21	191	2.3	13
Other <i>Enterococcus</i> spp. ⁴	735	1.7	13	496	1.3	14	426	1.9	11	91	1.1	16
Yeast, not specified	516	1.2	14	283	0.7	19	10	<0.1	79	138	1.7	15
<i>Acinetobacter</i> spp.	448	1.0	15	473	1.2	16	63	0.3	31	158	1.9	14
Other pathogen	4,321	9.7		5,483	14.2		6,371	28.5		790	9.6	
Total	44,486	100.0		38,499	100.0		22,368	100.0		8,251	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Some rankings are not shown: *Proteus* spp. (#13, 1.4%); Viridans group streptococci (#15, 1.3%).
2. Some rankings are not shown: Viridans group streptococci (#3, 10.2%); *Bacteroides* spp. (#12, 1.6%); *Rothia mucilaginosa* (#13, 1.6%); *Gemella haemolysans* (#15, 1.2%).
3. Some rankings are not shown: *Proteus* spp. (#12, 2.4%).
4. When analyzed at the genus-level, *Candida* spp. and *Enterococcus* spp. resulted in the following rankings:
 - a. *Candida* spp. - hospital ICUs (#1, 27.7%); hospital wards (#1, 17.0%); hospital oncology units (#7, 5.4%); LTACHs (#2, 19.5%).
 - b. *Enterococcus* spp. - hospital ICUs (#2, 21.3%); hospital wards (#3, 14.9%); hospital oncology units (#2, 15.1%); LTACHs (#1, 20.2%).

Table 5. The Top 15 CAUTI Pathogens Reported to NHSN, by Location Type, Adults, 2018-2021

	Acute Care Hospitals (n=3,550 hospitals)									LTACHs ³ (n=428 hospitals)			IRFs or IRF Units ⁴ (n=924 facilities)		
	Hospital ICUs			Hospital Wards ¹			Hospital Oncology Units ²								
Pathogen	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
<i>Escherichia coli</i>	14,283	33.5	1	15,678	32.5	1	799	29.6	1	2,041	22.8	1	1,881	35.3	1
Select <i>Klebsiella</i> spp.	6,159	14.5	2	7,425	15.4	2	433	16.0	2	1,669	18.6	3	919	17.2	2
<i>Pseudomonas aeruginosa</i>	5,701	13.4	3	7,283	15.1	3	424	15.7	3	2,034	22.7	2	850	15.9	3
<i>Enterococcus faecalis</i> ⁵	5,273	12.4	4	4,796	9.9	4	317	11.7	4	572	6.4	5	355	6.7	4
<i>Proteus</i> spp.	1,966	4.6	5	3,158	6.5	5	112	4.1	6	779	8.7	4	323	6.1	5
<i>Enterobacter</i>	1,930	4.5	6	2,042	4.2	6	122	4.5	5	397	4.4	7	252	4.7	6
<i>Enterococcus faecium</i> ⁵	1,303	3.1	7	1,242	2.6	7	101	3.7	7	500	5.6	6	57	1.1	12
Coagulase-negative staphylococci	1,256	2.9	8	952	2.0	11	68	2.5	8	62	0.7	15	85	1.6	9
Other <i>Enterococcus</i> spp. ⁵	980	2.3	9	989	2.0	10	48	1.8	11	87	1.0	13	77	1.4	10
<i>Citrobacter</i> spp.	780	1.8	10	1,025	2.1	8	64	2.4	9	147	1.6	8	138	2.6	7
<i>Staphylococcus aureus</i>	634	1.5	11	999	2.1	9	61	2.3	10	107	1.2	10	89	1.7	8
<i>Serratia</i> spp.	474	1.1	12	483	1.0	12	21	0.8	12	93	1.0	11	75	1.4	11
<i>Morganella</i> spp.	317	0.7	13	432	0.9	13	21	0.8	12	70	0.8	14	38	0.7	13
<i>Acinetobacter</i> spp.	156	0.4	14	234	0.5	14	13	0.5	14	120	1.3	9	27	0.5	14
Group B streptococci	131	0.3	15	108	0.2	16	9	0.3	16	3	<0.1	30	5	0.1	24
Other pathogen	1,273	3.0		1,467	3.0		90	3.3		290	3.2		160	3.0	
Total	42,616	100.0		48,313	100.0		2,703	100.0		8,971	100.0		5,331	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Some rankings are not shown: *Providencia stuartii* (#15, 0.4%).
2. Some rankings are not shown: *Staphylococcus* not specified (#15, 0.4%).
3. Some rankings are not shown: *Providencia stuartii* (#12, 1.0%).

4. Some rankings are not shown: *Klebsiella variicola* (#15, 0.3%).
5. When analyzed at the genus-level, *Enterococcus* spp. resulted in the following rankings: hospital ICUs (#2, 17.7%); hospital wards (#4, 14.5%); hospital oncology units (#2, 17.2%); LTACHs (#4, 12.9%); IRFs (#4, 9.2%).

Table 6. The Top 15 PVAP Pathogens Reported to NHSN, by Facility Type, Adults, 2018-2021

	Acute Care Hospitals (n=1,155 hospitals)			LTACHs ^{1,2} (n=110 hospitals)		
Pathogen	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
<i>Staphylococcus aureus</i>	4,556	29.6	1	65	18.7	2
<i>Pseudomonas aeruginosa</i>	2,062	13.4	2	105	30.2	1
Select <i>Klebsiella</i> spp.	1,869	12.1	3	38	10.9	3
<i>Enterobacter</i> spp.	932	6.1	4	14	4.0	7
<i>Escherichia coli</i>	802	5.2	5	16	4.6	6
<i>Serratia</i> spp.	783	5.1	6	25	7.2	4
<i>Stenotrophomonas maltophilia</i>	699	4.5	7	11	3.2	8
<i>Haemophilus influenzae</i>	628	4.1	8	0	0.0	.
<i>Streptococcus</i> spp.	582	3.8	9	3	0.9	14
<i>Acinetobacter</i> spp.	443	2.9	10	23	6.6	5
<i>Proteus</i> spp.	243	1.6	11	9	2.6	9
<i>Citrobacter</i> spp.	212	1.4	12	2	0.6	15
Coronavirus ³	169	1.1	13	0	0.0	.
<i>Moraxella catarrhalis</i>	86	0.6	14	0	0.0	.
Virus, not specified	75	0.5	15	0	0.0	.
Other pathogen	1,244	8.1		37	10.6	
Total	15,385	100.0		348	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Some rankings are not shown: *Providencia stuartii* (#10, 1.7%); *Pseudomonas* not specified and *Corynebacterium striatum* (#11, 1.4%); Non-fermentative gram-negative bacillus (#13, 1.1%).
2. *Citrobacter* spp., *Klebsiella* not specified, and *Pseudomonas putida* are tied for ranking #15.
3. Consists of pathogens reported as "human coronavirus" and SARS-CoV-2. Among those pathogens reported in this category, 167 (99%) were reported in 2020-2021.

Table 7. Frequency of SSI Pathogens, by Surgical Category and SSI Type, Adults, 2018-2021

	All SSIs (n=3,433 hospitals)		Superficial Incisional		Deep Incisional		Organ/Space	
Surgical Category	# Pathogens	% Pathogens	# Pathogens	% Pathogens	# Pathogens	% Pathogens	# Pathogens	% Pathogens
Abdominal	112,285	52.1	28,873	45.1	7,449	20.6	75,963	65.8
Orthopedic	55,613	25.8	13,596	21.2	20,789	57.5	21,228	18.4
Ob/Gyn	26,181	12.1	13,546	21.2	2,154	6.0	10,481	9.1
Cardiac	10,506	4.9	4,642	7.3	2,483	6.9	3,381	2.9
Neurosurgical	3,921	1.8	462	0.7	665	1.8	2,794	2.4
Vascular	2,801	1.3	1,290	2.0	1,142	3.2	369	0.3
Breast	2,325	1.1	913	1.4	932	2.6	480	0.4
Kidney	978	0.5	341	0.5	61	0.2	576	0.5
Neck	786	0.4	253	0.4	495	1.4	38	<0.1
Prostate	273	0.1	72	0.1	16	<0.1	185	0.2
Total	215,669	100.0	63,988	100.0	36,186	100.0	115,495	100.0

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Table 8. The Top 15 SSI Pathogens Reported to NHSN, by SSI Type, Adults, 2018-2021

	All SSIs			Superficial Incisional			Deep Incisional ¹			Organ/Space ²		
Pathogen	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
<i>Staphylococcus aureus</i>	33,201	15.4	1	11,789	18.4	1	9,563	26.4	1	11,849	10.3	2
<i>Escherichia coli</i>	29,874	13.9	2	7,452	11.6	2	3,216	8.9	3	19,206	16.6	1
<i>Enterococcus faecalis</i> ³	16,871	7.8	3	5,082	7.9	5	2,299	6.4	5	9,490	8.2	3
Coagulase-negative staphylococci	14,844	6.9	4	5,552	8.7	3	3,595	9.9	2	5,697	4.9	7
<i>Pseudomonas aeruginosa</i>	13,160	6.1	5	5,360	8.4	4	2,414	6.7	4	5,386	4.7	8
Select <i>Klebsiella</i> spp.	11,693	5.4	6	3,703	5.8	6	1,673	4.6	7	6,317	5.5	5
<i>Bacteroides</i> spp.	10,316	4.8	7	1,781	2.8	9	717	2.0	11	7,818	6.8	4
<i>Enterobacter</i> spp.	9,313	4.3	8	3,148	4.9	7	1,884	5.2	6	4,281	3.7	11
<i>Candida albicans</i> ³	7,782	3.6	9	1,383	2.2	10	510	1.4	13	5,889	5.1	6
Viridans group streptococci	6,594	3.1	10	1,358	2.1	12	723	2.0	10	4,513	3.9	9
<i>Proteus</i> spp.	6,229	2.9	11	2,707	4.2	8	1,438	4.0	8	2,084	1.8	13
<i>Enterococcus faecium</i> ³	6,150	2.9	12	1,153	1.8	14	593	1.6	12	4,404	3.8	10
Other <i>Enterococcus</i> spp. ³	5,162	2.4	13	1,363	2.1	11	474	1.3	16	3,325	2.9	12
<i>Citrobacter</i> spp.	3,057	1.4	14	912	1.4	15	409	1.1	17	1,736	1.5	15
<i>Serratia</i> spp.	3,036	1.4	15	1,185	1.9	13	763	2.1	9	1,088	0.9	17
Other pathogen	38,387	17.8		10,060	15.7		5,915	16.3		22,412	19.4	
Total	215,669	100.0		63,988	100.0		36,186	100.0		115,495	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Some rankings are not shown: Group B streptococci (#14, 1.4%); *Cutibacterium acnes* (#15, 1.3%).
2. Some rankings are not shown: *Candida glabrata* (#14, 1.6%).
3. When analyzed at the genus-level, *Candida* spp. and *Enterococcus* spp. resulted in the following rankings:
 - a. *Candida* spp. - All SSIs (#6, 5.6%); superficial incision (#9, 3.0%); deep incisional (#9, 2.3%); organ/space (#4, 8.2%).

- b. *Enterococcus* spp. - All SSIs (#3, 13.1%); superficial incision (#2, 11.9%); deep incisional (#3, 9.3%); organ/space (#2, 14.9%).

Table 9. The Top 15 SSI Pathogens Reported to NHSN Following Surgery Types¹ with High Pathogen Volume, Adults, 2018-2021

	Abdominal			Orthopedic ²			Ob/Gyn ³			Cardiac ⁴		
Pathogen	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
<i>Escherichia coli</i>	22,250	19.8	1	2,883	5.2	5	3,555	13.6	1	571	5.4	5
<i>Enterococcus faecalis</i>	10,722	9.5	2	2,851	5.1	6	2,485	9.5	3	322	3.1	9
<i>Bacteroides</i> spp.	8,246	7.3	3	293	0.5	24	1,594	6.1	5	56	0.5	18
Select <i>Klebsiella</i> spp.	7,004	6.2	4	2,083	3.7	8	1,269	4.8	6	709	6.7	4
<i>Candida albicans</i>	6,565	5.8	5	500	0.9	15	275	1.1	18	236	2.2	11
<i>Pseudomonas aeruginosa</i>	6,541	5.8	6	3,702	6.7	3	1,079	4.1	8	913	8.7	3
<i>Staphylococcus aureus</i>	6,407	5.7	7	18,744	33.7	1	3,025	11.6	2	2,574	24.5	1
<i>Enterococcus faecium</i>	5,273	4.7	8	519	0.9	14	165	0.6	24	90	0.9	16
Viridans group streptococci	4,617	4.1	9	611	1.1	12	936	3.6	9	165	1.6	12
<i>Enterobacter</i> spp.	4,433	3.9	10	2,922	5.3	4	824	3.1	10	523	5.0	7
Other <i>Enterococcus</i> spp.	4,115	3.7	11	464	0.8	16	408	1.6	13	49	0.5	22
Coagulase-negative staphylococci	3,318	3.0	12	6,939	12.5	2	1,860	7.1	4	1,389	13.2	2
<i>Citrobacter</i> spp.	2,016	1.8	13	456	0.8	17	334	1.3	14	113	1.1	14
<i>Proteus</i> spp.	1,980	1.8	14	2,350	4.2	7	1,163	4.4	7	434	4.1	8
<i>Candida glabrata</i>	1,893	1.7	15	72	0.1	41	78	0.3	36	55	0.5	19
Other pathogen	16,905	15.1		10,224	18.4		7,131	27.2		2,307	22.0	
Total	112,285	100.0		55,613	100.0		26,181	100.0		10,506	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. The top 4 surgical categories by pathogen volume are shown in this table.
2. Some rankings are not shown: *Serratia* spp. (#9, 2.3%); Group B streptococci (#10, 1.9%); *Cutibacterium acnes* (#11, 1.2%); *Morganella* spp. (#13, 1.0%).
3. Some rankings are not shown: Group B streptococci (#11, 3.0%); *Prevotella bivia* (#12, 2.0%); *Morganella* spp. (#15, 1.2%).
4. Some rankings are not shown: *Serratia* spp. (#6, 5.4%); *Cutibacterium acnes* (#10, 2.7%); *Morganella* spp. (#13, 1.6%); Other *Candida* spp. (#15, 1.0%).

Table 10. The Top 15 SSI Pathogens Reported to NHSN Following Select Surgery Types with Low Pathogen Volume, Adults, 2018-2021

	Neurosurgical			Vascular ¹			Breast ²		
Pathogen	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank	# Pathogens	% Pathogens	Rank
<i>Staphylococcus aureus</i>	846	21.6	1	611	21.8	1	769	33.1	1
Coagulase-negative staphylococci	765	19.5	2	183	6.5	5	215	9.2	3
<i>Cutibacterium acnes</i>	479	12.2	3	4	0.1	40	18	0.8	17
Select <i>Klebsiella</i> spp.	275	7.0	4	159	5.7	7	81	3.5	8
<i>Enterobacter</i> spp.	212	5.4	5	165	5.9	6	137	5.9	4
<i>Pseudomonas aeruginosa</i>	205	5.2	6	278	9.9	2	275	11.8	2
<i>Serratia</i> spp.	142	3.6	7	89	3.2	9	104	4.5	6
<i>Escherichia coli</i>	107	2.7	8	211	7.5	3	106	4.6	5
<i>Candida albicans</i>	65	1.7	9	46	1.6	13	9	0.4	24
<i>Enterococcus faecalis</i>	61	1.6	10	187	6.7	4	96	4.1	7
<i>Proteus</i> spp.	60	1.5	11	137	4.9	8	74	3.2	9
Viridans group streptococci	60	1.5	12	41	1.5	15	28	1.2	11
<i>Citrobacter</i> spp.	45	1.1	13	49	1.7	12	19	0.8	15
<i>Propionibacterium</i> not specified	44	1.1	14	4	0.1	40	7	0.3	27
<i>Acinetobacter</i> spp.	34	0.9	15	24	0.9	19	37	1.6	10
Other pathogen	521	13.3		613	21.9		350	15.1	
Total	3,921	100.0		2,801	100.0		2,325	100.0	

Note: Refer to [Technical Resources](#) for more information about the acronyms and terms used in this table.

Footnotes:

1. Some rankings are not shown: Other *Enterococcus* spp. (#10, 2.3%); *Bacteroides* spp. (#11, 2.1%); Group B streptococci (#14, 1.5%).
2. Some rankings are not shown: Group B streptococci (#12, 1.1%); *Staphylococcus* not specified (#13, 1.0%); *Morganella* spp. (#14, 0.9%).

Table 11. Percent of HAI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹, by HAI Type, Adults, 2018-2021

Pathogen, Antimicrobial Phenotype	Device-associated HAIs			Surgical Site Infections		
	# Reported	% Tested	%R	# Reported	% Tested	%R
<u><i>Urgent Threats</i></u>						
<i>Acinetobacter</i> spp.	2,158			802		
Carbapenem-NS		80.8	44.6		77.8	28.0
Select Enterobacterales²	79,603			50,880		
Carbapenem-resistant (CRE)		75.5	3.3		74.2	1.6
<u><i>Serious Threats</i></u>						
Select Enterobacterales³	68,558			40,538		
Extended-spectrum cephalosporin-NS		85.5	25.8		84.3	18.1
<i>Enterobacter</i> spp.	9,118			9,313		
Cefepime-NS		77.7	13.6		77.4	7.8
<i>Enterococcus faecalis</i>	22,258			16,871		
Vancomycin-resistant (VRE)		89.1	5.5		89.0	2.4
<i>Enterococcus faecium</i>	10,754			6,150		
Vancomycin-resistant (VRE)		91.5	77.0		91.8	48.8
<i>Pseudomonas aeruginosa</i>	22,844			13,160		
Multidrug-resistant (MDR)		94.5	11.9		94.5	3.9
<i>Staphylococcus aureus</i>	17,930			33,201		
Meth/ox/cefox - resistant (MRSA)		88.4	45.5		90.7	39.2

Note: Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
3. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 12. Percent of CLABSI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹, by Location Type, Adults, 2018-2021

	Hospital ICUs			Hospital Wards			Hospital Oncology Units			LTACHs		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>												
<i>Acinetobacter</i> spp.	448			473			63			158		
Carbapenem-NS		79.9	41.1		77.8	34.2		81.0	15.7		89.9	70.4
Select Enterobacterales²	4,434			7,494			6,488			1,486		
Carbapenem-resistant (CRE)		73.8	6.4		72.9	5.0		74.4	3.4		87.7	16.5
<i>Serious Threats</i>												
Select Enterobacterales³	3,164			5,929			5,699			1,173		
Extended-spectrum cephalosporin-NS		82.5	33.2		80.5	28.9		81.9	30.5		92.2	49.7
<i>Enterobacter</i> spp.	1,037			1,374			741			277		
Cefepime-NS		74.9	14.5		76.6	12.6		76.4	11.0		80.5	22.4
<i>Enterococcus faecalis</i>	5,539			3,344			970			1,088		
Vancomycin-resistant (VRE)		88.3	3.8		88.1	6.7		87.7	4.6		94.7	12.9
<i>Enterococcus faecium</i>	3,200			1,884			1,974			487		
Vancomycin-resistant (VRE)		90.5	79.1		90.3	74.9		89.6	70.4		96.3	80.0
<i>Pseudomonas aeruginosa</i>	1,316			1,644			1,011			414		
Multidrug-resistant (MDR)		87.2	14.2		88.8	11.9		88.1	8.5		98.3	25.3
<i>Staphylococcus aureus</i>	3,288			5,914			1,307			910		
Meth/ox/cefex - resistant (MRSA)		85.5	44.9		86.4	48.0		86.2	43.0		92.5	70.0

Note: Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
3. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 13. Percent of CLABSI Pathogens Reported From Oncology Units That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Threats¹, by Mucosal Barrier Injury (MBI) Status, Adults, 2018-2021

Pathogen, Antimicrobial Phenotype ²	MBI-LCBIs			Non-MBI LCBIs		
	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>						
Select Enterobacterales³	5,182			1,306		
Carbapenem-resistant (CRE)		74.6	3.6		73.4	2.7
<i>Serious Threats</i>						
Select Enterobacterales⁴	4,605			1,094		
Extended-spectrum cephalosporin-NS		81.5	32.5		83.7	22.4
<i>Enterobacter</i> spp.	546			195		
Cefepime-NS		77.1	13.5		74.4	3.4
<i>Enterococcus faecalis</i>	609			361		
Vancomycin-resistant (VRE)		86.5	5.9		89.8	2.5
<i>Enterococcus faecium</i>	1,535			439		
Vancomycin-resistant (VRE)		88.8	72.0		92.3	64.7

Note: Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. MBI-LCBIs cannot be reported with *Acinetobacter* spp., *Pseudomonas aeruginosa*, or *Staphylococcus aureus* pathogens. Therefore, antimicrobial resistance phenotypes for these pathogens are not shown.
3. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
4. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 14. Percent of CAUTI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹, by Location Type, Adults, 2018-2021

	Hospital ICUs			Hospital Wards			Oncology Units			LTACHs			IRFs		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>															
Acinetobacter spp.	156			234			13			120			27		
Carbapenem-NS		74.4	44.8		78.6	51.1		.	.		89.2	83.2		.	.
Select Enterobacterales²	22,372			25,145			1,354			4,107			3,052		
Carbapenem-resistant (CRE)		74.7	1.8		75.4	2.2		76.5	2.0		84.0	8.4		75.8	1.4
<i>Serious Threats</i>															
Select Enterobacterales³	19,955			22,725			1,211			3,631			2,728		
Extended-spectrum cephalosporin-NS		85.8	21.5		85.9	24.4		86.5	25.7		92.2	41.6		87.7	15.6
Enterobacter spp.	1,930			2,042			122			397			252		
Cefepime-NS		80.0	13.3		75.3	13.0		81.1	13.1		85.1	27.2		78.6	11.1
Enterococcus faecalis	5,273			4,796			317			572			355		
Vancomycin-resistant (VRE)		89.3	2.8		89.2	5.5		91.8	5.8		89.3	24.5		93.2	5.1
Enterococcus faecium	1,303			1,242			101			500			57		
Vancomycin-resistant (VRE)		92.7	76.5		92.4	79.2		94.1	83.2		97.6	88.9		94.7	72.2
Pseudomonas aeruginosa	5,701			7,283			424			2,034			850		
Multidrug-resistant (MDR)		95.7	8.7		95.2	10.6		93.2	9.9		99.1	20.8		95.9	6.7
Staphylococcus aureus	634			999			61			107			89		
Meth/ox/cefox - resistant (MRSA)		91.5	39.8		91.4	53.2		93.4	52.6		89.7	81.3		93.3	63.9

Note: Percent resistance is not calculated when the number of tested isolates is < 20. Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
3. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 15. Percent of PVAP Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹, by Facility Type, Adults, 2018-2021

	Acute Care Hospitals			LTACHs		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>						
<i>Acinetobacter</i> spp.	443			23		
Carbapenem-NS		82.6	36.1		91.3	85.7
Select Enterobacterales²	3,603			68		
Carbapenem-resistant (CRE)		74.8	2.8		85.3	17.2
<i>Serious Threats</i>						
Select Enterobacterales³	2,292			51		
Extended-spectrum cephalosporin-NS		88.7	19.6		92.2	53.2
<i>Enterobacter</i> spp.	932			14		
Cefepime-NS		79.7	9.2		.	.
<i>Pseudomonas aeruginosa</i>	2,062			105		
Multidrug-resistant (MDR)		95.4	15.4		97.1	34.3
<i>Staphylococcus aureus</i>	4,556			65		
Meth/ox/cefox - resistant (MRSA)		91.6	35.6		95.4	59.7

Note: Percent resistance is not calculated when the number of tested isolates is < 20. Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
3. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 16. Percent of SSI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹ for Surgical Categories with High Pathogen Volume,² Adults, 2018-2021

	Abdominal			Orthopedic			Ob/Gyn			Cardiac		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>												
<i>Acinetobacter</i> spp.	185			376			89			46		
Carbapenem-NS		81.1	39.3		78.5	26.4		70.8	3.2		80.4	48.6
Select Enterobacterales³	33,687			7,888			5,648			1,803		
Carbapenem-resistant (CRE)		74.9	1.9		72.3	1.2		71.8	0.5		76.1	1.2
<i>Serious Threats</i>												
Select Enterobacterales⁴	28,755			4,760			4,696			1,185		
Extended-spectrum cephalosporin-NS		84.3	18.4		83.9	18.8		83.2	14.8		85.2	19.7
<i>Enterobacter</i> spp.	4,433			2,922			824			523		
Cefepime-NS		77.9	11.0		75.8	5.1		75.4	2.1		78.8	5.8
<i>Enterococcus faecalis</i>	10,722			2,851			2,485			322		
Vancomycin-resistant (VRE)		89.2	2.3		88.5	3.4		88.5	0.7		89.1	3.8
<i>Enterococcus faecium</i>	5,273			519			165			90		
Vancomycin-resistant (VRE)		91.8	45.9		92.1	75.5		90.9	32.7		94.4	77.6
<i>Pseudomonas aeruginosa</i>	6,541			3,702			1,079			913		
Multidrug-resistant (MDR)		94.8	5.0		93.6	2.8		93.4	1.0		96.5	4.0
<i>Staphylococcus aureus</i>	6,407			18,744			3,025			2,574		
Meth/ox/cefox - resistant (MRSA)		91.4	52.6		90.2	36.4		91.6	38.7		91.2	33.5

Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. The top 4 surgical categories by pathogen volume are shown in this table. Refer to CDC's [Antibiotic Resistance & Patient Safety Portal](#) for antimicrobial resistance data for each NHSN procedure code.
3. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
4. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 17. Percent of SSI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹ for Select Surgical Categories with Low Pathogen Volume², Adults, 2018-2021

	Neurologic			Breast			Vascular		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>									
<i>Acinetobacter</i> spp.	34			37			24		
Carbapenem-NS		67.6	21.7		75.7	3.6		87.5	57.1
Select Enterobacterales³	594			324			535		
Carbapenem-resistant (CRE)		66.2	1.5		71.3	.		80.4	2.3
<i>Serious Threats</i>									
Select Enterobacterales⁴	308			176			363		
Extended-spectrum cephalosporin-NS		85.7	20.5		91.5	9.9		87.9	16.6
<i>Enterobacter</i> spp.	212			137			165		
Cefepime-NS		80.2	2.4		80.3	1.8		85.5	9.2
<i>Enterococcus faecalis</i>	61			96			187		
Vancomycin-resistant (VRE)		90.2	3.6		84.4	3.7		87.7	6.7
<i>Enterococcus faecium</i>	15			0			40		
Vancomycin-resistant (VRE)			90.0	72.2
<i>Pseudomonas aeruginosa</i>	205			275			278		
Multidrug-resistant (MDR)		94.6	3.1		95.3	2.3		96.4	3.4
<i>Staphylococcus aureus</i>	846			769			611		
Meth/ox/cefox - resistant (MRSA)		90.2	29.1		86.5	21.7		93.5	42.2

Note: Percent resistance is not calculated when the number of tested isolates is < 20. Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes (Table 17):

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Select surgical categories with low pathogen volume are shown in this table. Refer to CDC's [Antibiotic Resistance & Patient Safety Portal](#) for antimicrobial resistance data for each NHSN procedure code.
3. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
4. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.

Table 18. Percent of SSI Pathogens That Were Resistant to Selected Antimicrobials and Classified as "Urgent" or "Serious" Antimicrobial Resistant Threats¹, by SSI Type, Adults, 2018-2021

	Superficial Incisional SSI			Deep Incisional SSI			Organ/Space SSI		
Pathogen, Antimicrobial Phenotype	# Reported	% Tested	%R	# Reported	% Tested	%R	# Reported	% Tested	%R
<i>Urgent Threats</i>									
<i>Acinetobacter</i> spp.	330			207			265		
Carbapenem-NS		74.8	20.6		77.3	28.8		81.9	35.9
Select Enterobacterales²	14,303			6,773			29,804		
Carbapenem-resistant (CRE)		74.2	1.2		72.9	1.6		74.4	1.8
<i>Serious Threats</i>									
Select Enterobacterales³	10,783			4,748			25,007		
Extended-spectrum cephalosporin-NS		84.0	19.3		84.6	18.7		84.3	17.5
<i>Enterobacter</i> spp.	3,148			1,884			4,281		
Cefepime-NS		76.2	5.0		77.3	6.9		78.2	10.1
<i>Enterococcus faecalis</i>	5,082			2,299			9,490		
Vancomycin-resistant (VRE)		88.3	2.0		89.5	3.6		89.2	2.2
<i>Enterococcus faecium</i>	1,153			593			4,404		
Vancomycin-resistant (VRE)		91.1	51.2		92.6	61.4		91.9	46.5
<i>Pseudomonas aeruginosa</i>	5,360			2,414			5,386		
Multidrug-resistant (MDR)		94.9	2.9		95.6	3.9		93.7	4.9
<i>Staphylococcus aureus</i>	11,789			9,563			11,849		
Meth/ox/cefox - resistant (MRSA)		92.0	41.4		90.9	38.5		89.1	37.4

Note: Refer to [Technical Resources](#) for more information about phenotype definitions, acronyms, and terms used in this table.

Footnotes:

1. As classified by [CDC's 2022 Special Report: COVID-19 U.S. Impact on Antimicrobial Resistance](#)
2. Consists of *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Klebsiella aerogenes*, and *Enterobacter* spp.
3. Consists of *E.coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*.