

A Guide to the Antimicrobial Use (AU) Option Report and the Antimicrobial Resistance & Patient Safety Portal (AR PSP)

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Objectives

At the conclusion of this session, users will be able to:

- Describe the function of the Standardized Antimicrobial Administration Ratio (SAAR)
- Summarize the components of the NHSN Antimicrobial Use (AU) Option Report
- Navigate the Antimicrobial Resistance & Patient Safety Portal (AR PSP)

Overview of the SAAR

Background on SAAR

- Standardized Antimicrobial Administration Ratio (SAAR) provides a standardized metric of antimicrobial use (AU)
- SAAR is a ratio comparing observed, or reported, AU to AU predicted by a referent, or baseline population

$$SAAR = \frac{\textit{Observed antimicrobial days}}{\textit{Predicted antimicrobial days}}$$

- Enables hospitals to track their AU over time, compare their AU data to national benchmarks, and evaluate the impact of stewardship efforts

SAAR Baseline

- “Baseline” refers to the calendar year of NHSN data used to develop the SAAR Models
- SAAR referent population is AU data aggregated from select patient care locations reporting to the AU Option during the baseline year
- NHSN uses these aggregated AU data to develop SAAR predictive models
- NHSN develops new models every few years (“re-baselining”)
 - Allows for assessment of AU risk in more settings
 - Updates antimicrobial groupings
 - Generates more recent predicted values

SAAR patient care locations: 2017 adult and pediatric baseline, 2018 neonatal baseline

Adult SAAR Locations	Pediatric SAAR Locations	Neonatal SAAR Locations
• Medical critical care units • Medical-surgical critical care units • Surgical critical care units • Medical wards • Medical-surgical wards • Surgical wards • Step down units • General hematology-oncology wards	• Medical critical care units • Medical-surgical critical care units • Medical wards • Medical-surgical wards • Surgical wards	• Level II special care nurseries • Level II/III critical care units • Level III critical care units • Level IV critical care units

- None of the SAARs contain AU data from all inpatient locations in a given facility
- Outpatient acute-care settings are currently not SAAR-eligible locations

SAAR antimicrobial agent categories: 2017 adult and pediatric baseline

Adult SAAR Antimicrobial Agent Categories	Pediatric SAAR Antimicrobial Agent Categories
• All antibacterial agents (All) • Broad spectrum antibacterial agents predominantly used for hospital-onset infections (BSHO) • Broad spectrum antibacterial agents predominantly used for community-acquired infections (BSCA) • Antibacterial agents predominantly used for resistant Gram-positive infections (e.g., MRSA) (GramPos) • Narrow spectrum beta-lactam agents (NSBL) • Antibacterial agents posing the highest risk for <i>Clostridioides difficile</i> infection (CDI) • Antifungal agents predominantly used for invasive candidiasis (Antifungal)	• All antibacterial agents (All) • Broad spectrum antibacterial agents predominantly used for hospital-onset infections (BSHO) • Broad spectrum antibacterial agents predominantly used for community-acquired infections (BSCA) • Antibacterial agents predominantly used for resistant Gram-positive infections (e.g., MRSA) (GramPos) • Narrow spectrum beta-lactam agents (NSBL) • Antibacterial agents posing the highest risk for <i>Clostridioides difficile</i> infection (CDI) • Antifungal agents predominantly used for invasive candidiasis (Antifungal) • Azithromycin (Azith)

SAAR antimicrobial agent categories: 2018 neonatal baseline

Neonatal SAAR Antimicrobial Agent Categories

- All antibacterial agents (All)
- Vancomycin predominantly used for treatment of late-onset sepsis (Vanc)
- Broad spectrum antibacterial agents predominantly used for hospital-onset infections (BSHO)
- Third generation cephalosporins (Cephs)
- Ampicillin predominantly used for treatment of early-onset sepsis (Amp)
- Aminoglycosides predominantly used for treatment of early-onset and late-onset sepsis (Amino)
- Fluconazole predominantly used for candidiasis (Fluco)

Knowledge Check

How can hospitals use the SAAR?

- A. To track their antimicrobial use over time
- B. To compare their antimicrobial use to a national benchmark
- C. To assess the impact of their stewardship interventions
- D. All of the above

Knowledge Check - Answer

How can hospitals use the SAAR?

- A. To track their antimicrobial use over time
- B. To compare their antimicrobial use to a national benchmark
- C. To assess the impact of their stewardship interventions
- D. All of the above**

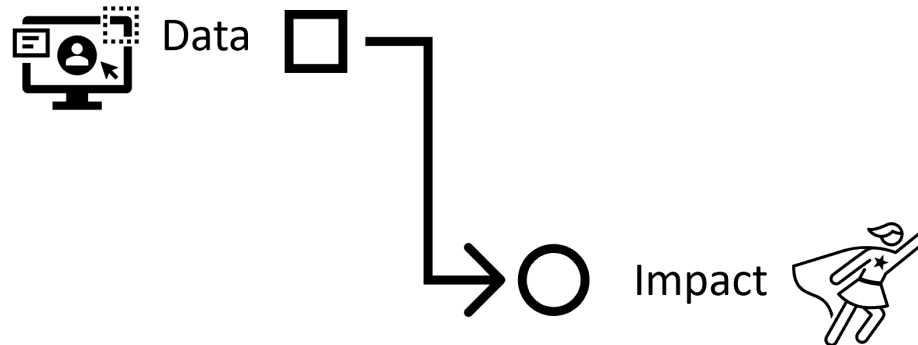
Hospitals can use the SAAR to track antimicrobial use, compare their antimicrobial use to a national benchmark, and assess the impact of interventions aimed at improving prescribing practices.

NHSN Antimicrobial Use (AU) Option Report

AU Option Report Summary

AU Report Data Source, Key Findings & Impact

- Summary of AU data submitted from hospitals to NHSN
 - Includes 1 year of data from acute care hospitals that reported ≥ 9 months of data from SAAR eligible locations
- Summarizes SAAR distributions and AU within SAAR antimicrobial agent categories for adult, pediatric, and neonatal patient care locations
- Informs antimicrobial stewardship efforts and benchmarking



Components of the AU Option Report (PDF)



2023 National Healthcare Safety Network (NHSN) Antimicrobial Use (AU) Option Report

Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

- Executive Summary
- Background on the SAAR
- High-level comparison of SAARs over time
- Median and pooled mean SAAR values by population (adult, pediatric, and neonatal), location type, and SAAR antimicrobial agent category
- Percentages of AU by antimicrobial class and drug for each population and antimicrobial agent category
- Conclusion

Components of the AU Option Report (Excel tables)

2023 NHSN Antimicrobial Use (AU) Option Report	
Tables included in this report:	
Table 1	Characteristics of Acute Care Hospitals Reporting to NHSN AU Option in 2023 1a. Characteristics of NHSN Acute Care Hospitals reporting to NHSN from Adult SAAR Locations for ≥9 months in 2023 1b. Characteristics of NHSN Acute Care Hospitals reporting to NHSN from Pediatric SAAR Locations for ≥9 months in 2023 1c. Characteristics of NHSN Acute Care Hospitals reporting to NHSN from Neonatal SAAR Locations for ≥9 months in 2023
Table 2	2017 Baseline Adult SAARs using 2023 AU data 2a. Adult all antibacterial agents (Adult ALL) 2a1. Adult ALL SAAR distributions, by SAAR location type 2a2. Adult ALL usage by antimicrobial agent (top 10 most commonly used agents) and SAAR location type 2b. Adult broad spectrum antibacterial agents predominantly used for hospital-onset infections (Adult BSHO) 2b1. Adult BSHO SAAR distributions, by SAAR location type 2b2. Adult BSHO usage by antimicrobial agent and SAAR location type

- Characteristics of NHSN Acute Care Hospitals reporting for adult, pediatric, and neonatal SAAR Locations
- SAAR distributions for each population and SAAR agent category, by location type
- Percentage of AU by antimicrobial class and drug for each SAAR agent category and location type (if applicable)
- SAAR distributions for each population and SAAR agent category, by state

Knowledge Check ?

True or False?

The NHSN AU Option Report provides a summary of SAAR distributions and antimicrobial use within SAAR antimicrobial agent categories for adult, pediatric and neonatal patient care locations.

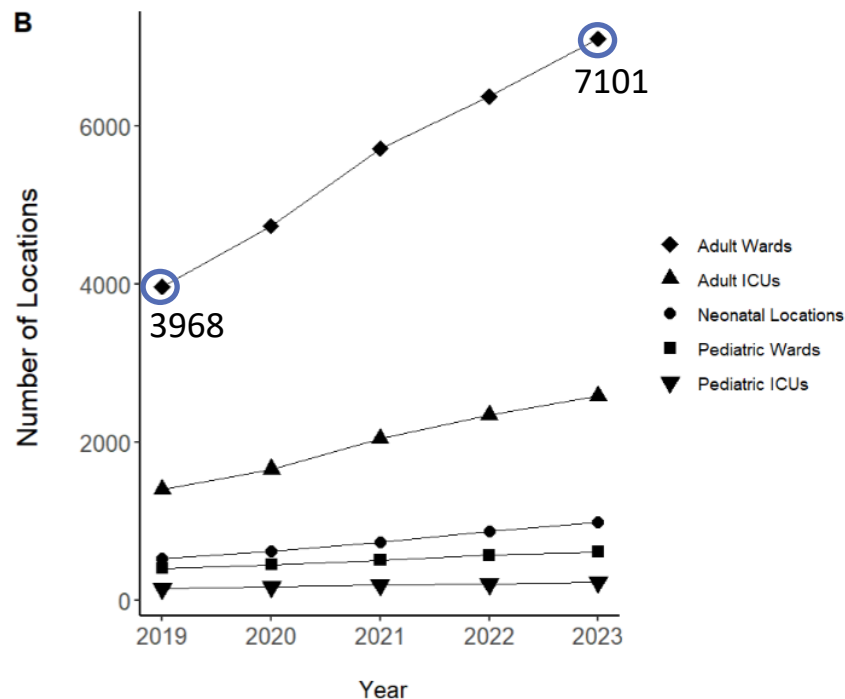
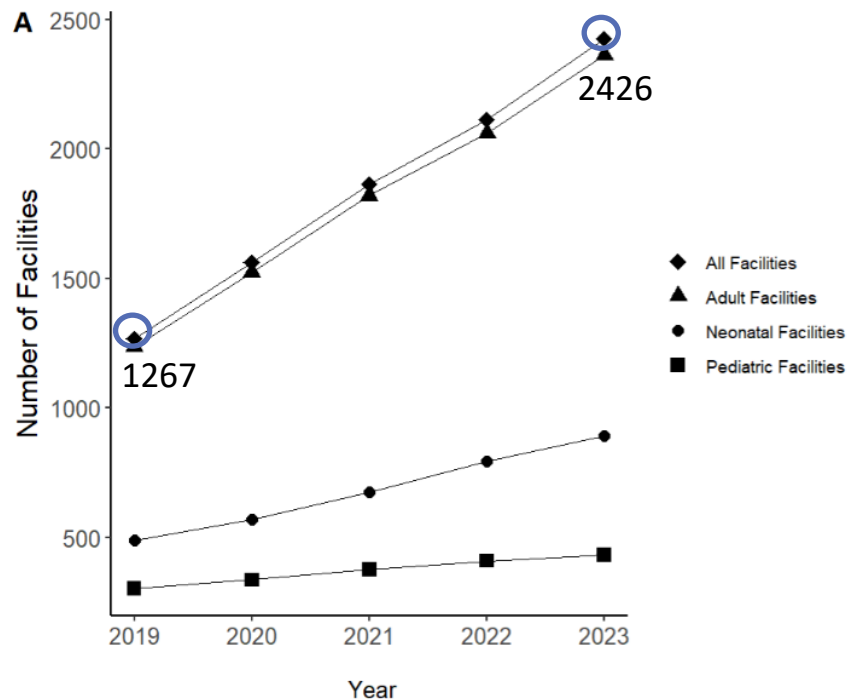
Knowledge Check – Answer

True or False?

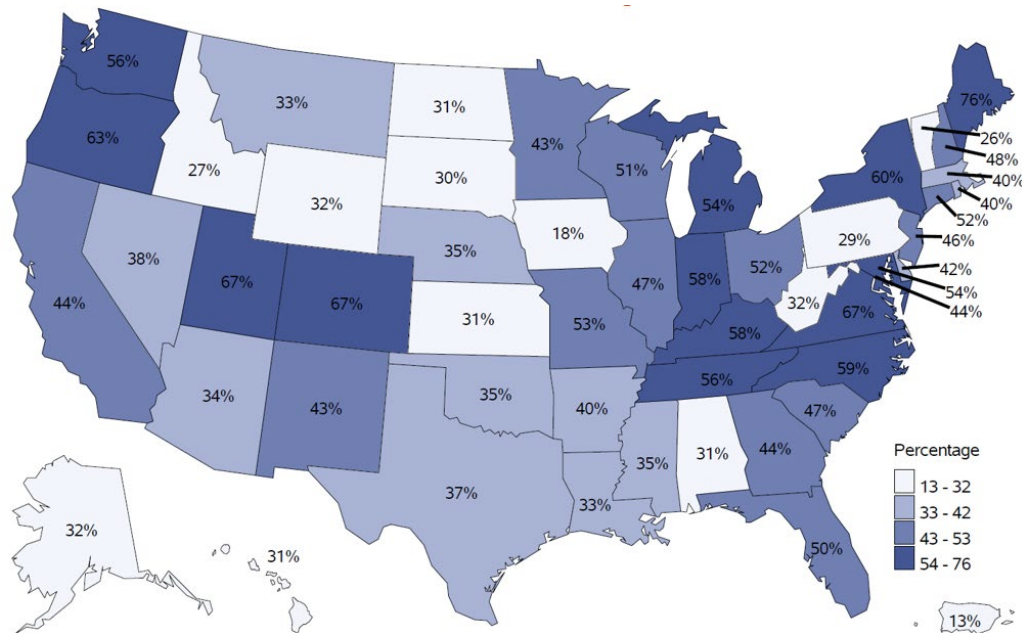
The NHSN AU Option Report provides a summary of SAAR distributions and antimicrobial use within SAAR antimicrobial agent categories for adult, pediatric and neonatal patient care locations.

2023 AU Option Report: What's New?

No. of reporting hospitals and SAAR-eligible locations over time



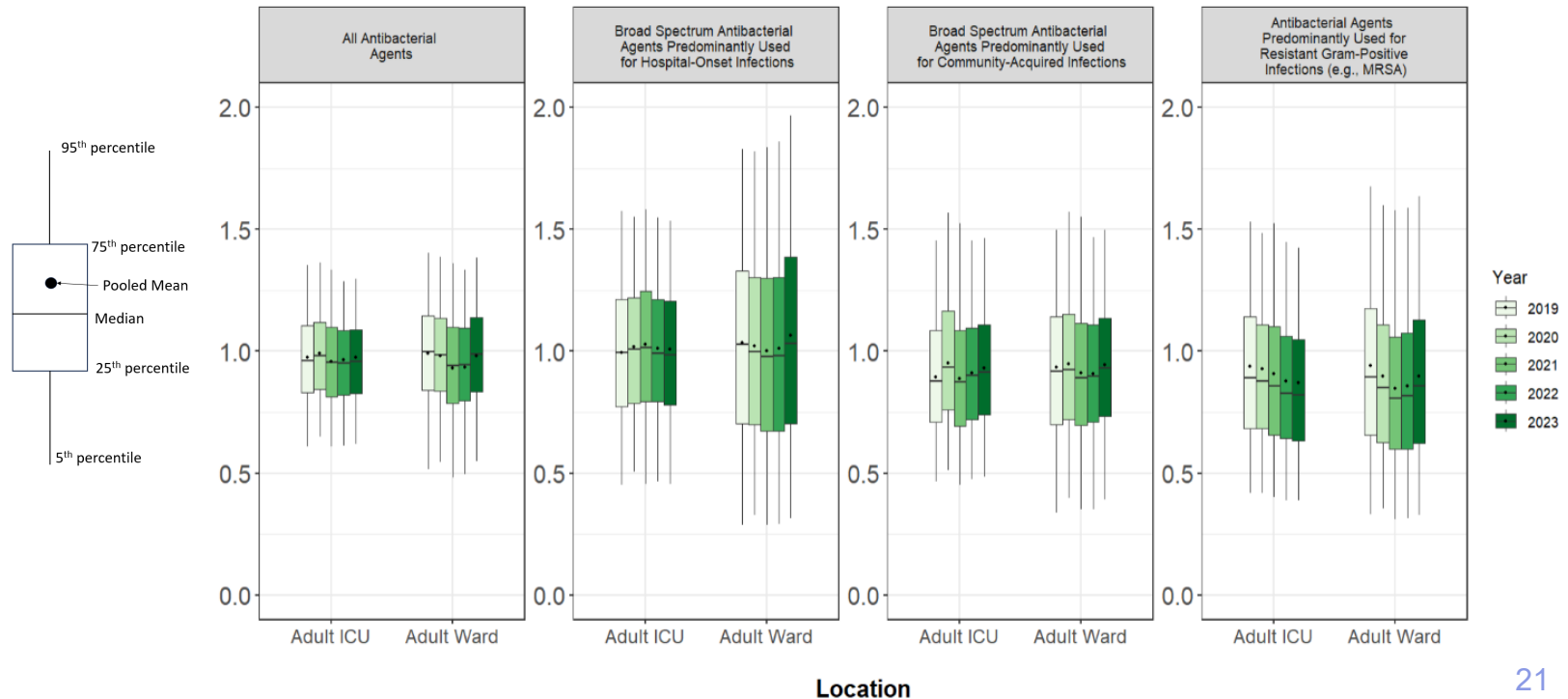
Percentage of hospitals reporting ≥ 1 month of data to the AU Option among NHSN acute care hospitals* by state/jurisdiction as of January 1, 2024



**Acute care hospitals include critical access, children's, general acute care, long-term acute care, military, oncology, orthopedic, psychiatric, inpatient rehabilitation, surgical, Veterans Affairs, women's, and women's and children's hospitals.*

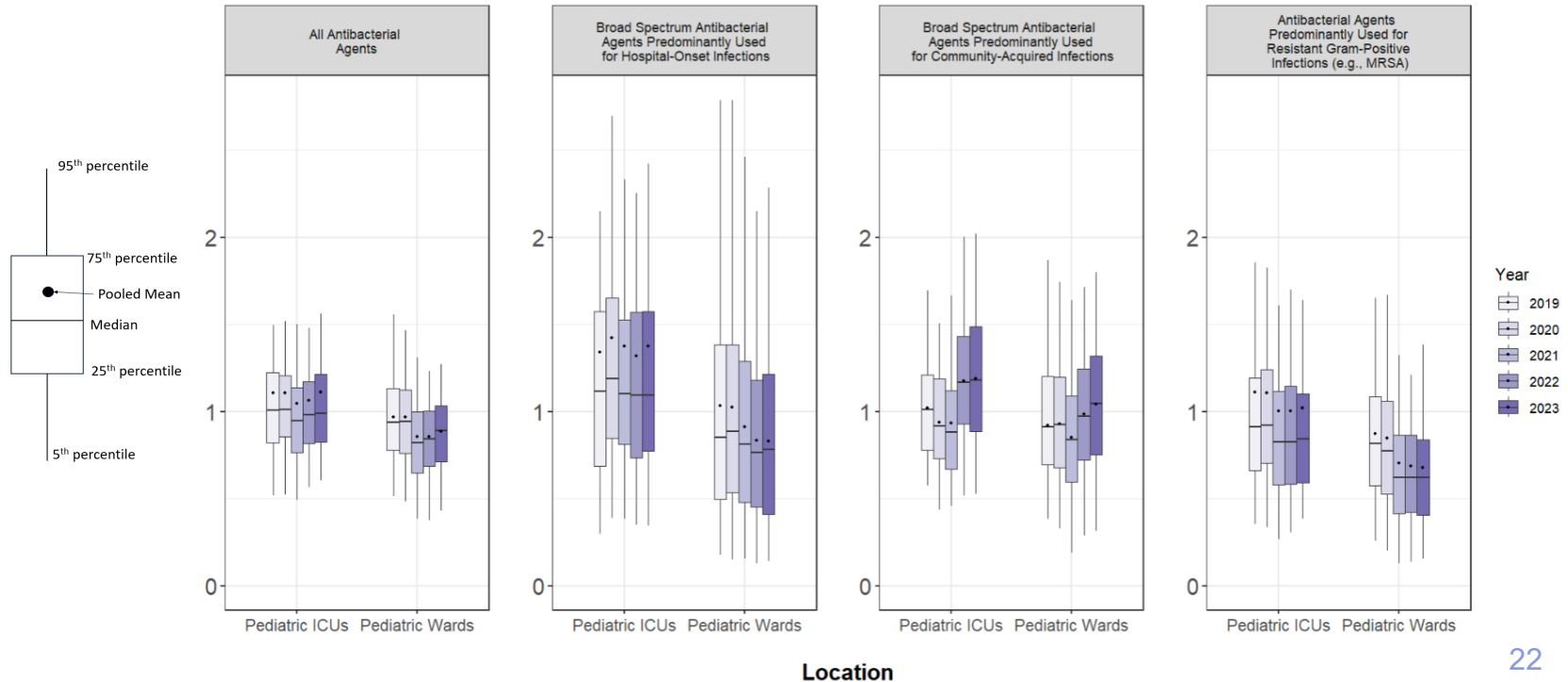
High-level SAAR comparison – Adult

- SAAR distributions among reporting locations, by select antimicrobial agent category, for adult SAAR-eligible intensive care units and wards, 2019–2023



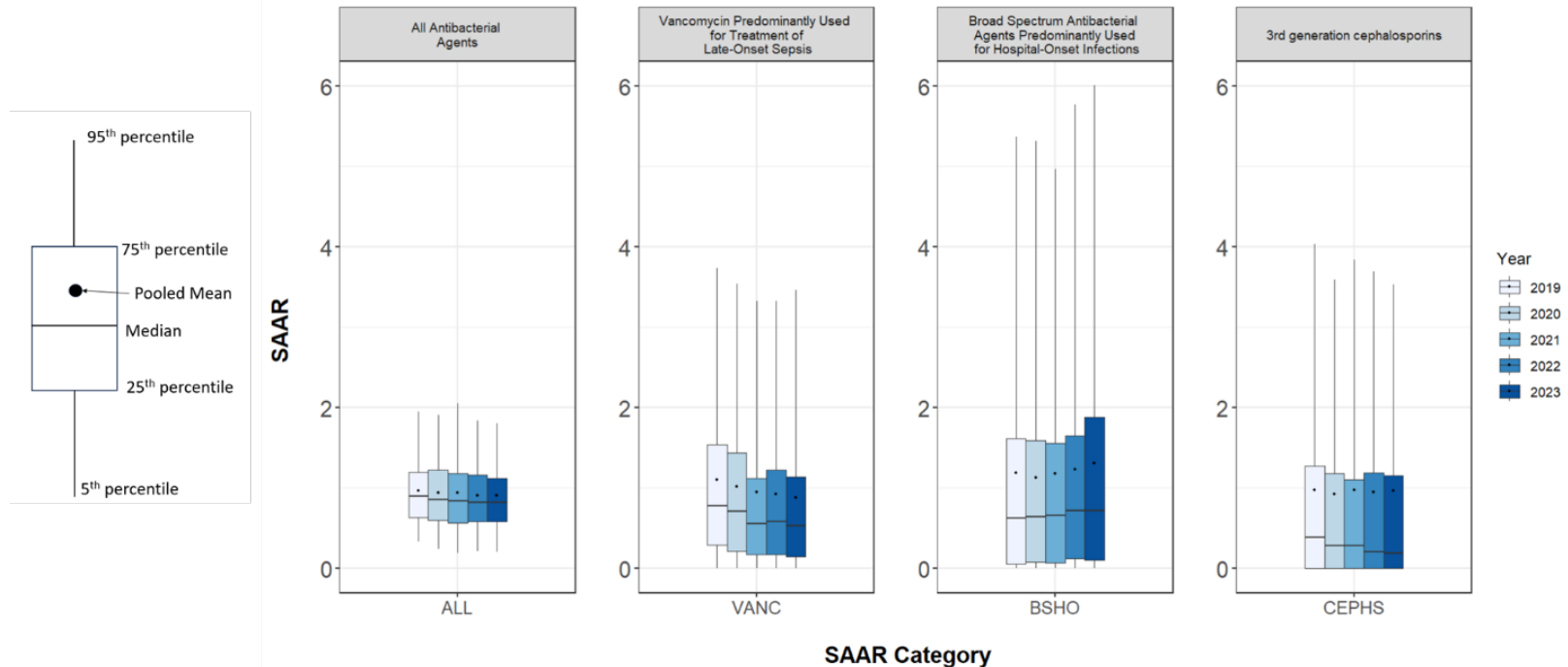
High-level SAAR comparison – Pediatric

- SAAR distributions among reporting locations, by select antimicrobial agent category, for pediatric SAAR-eligible intensive care units and wards, 2019–2023



High-level SAAR comparison – Neonatal

- SAAR distributions among reporting locations, by select antimicrobial agent category, for SAAR-eligible neonatal location types, 2019–2023



Reasons for Variation in SAARs between years

COVID-19 pandemic

- Led to shifting characteristics of inpatients¹

Changes to prescribing practices due to antimicrobial stewardship efforts

Changes to the composition of hospitals submitting data to NHSN AU Option

Availability of antimicrobial agents

Activities of diseases that could impact AU

Example: Pediatric BSCA SAAR category

- BSCA SAARs were higher among pediatric ICUs and wards in 2023 compared to 2022
- Use of β -lactam/ β -lactamase inhibitor agents increased among these hospitals
 - amoxicillin/clavulanate acid
 - ampicillin/sulbactam
- Coincides with surge in respiratory illness² and national amoxicillin shortage³

State-Specific SAAR Distributions: ≥ 20 facilities in 2023

Table 5a: Adult all antibacterial agents SAAR distributions, by State¹

		Antimicrobial days		limits (CL) of Median SAAR		Percentile distribution of state-specific SAARs					
State Abbreviation	No. of facilities	Observed	Predicted	Lower CL	Upper CL	No. of facilities with ≥ 1 predicted antimicrobial day ²	10th	25th	50th	75th	90th
AZ	22	475,020	456,892.30	0.814	1.139	22	0.511	0.811	0.997	1.139	1.202
CT	22	760,753	821,976.12	0.904	0.980	22	0.838	0.882	0.919	0.980	1.024
KS	28	275,692	300,376.91	0.891	1.082	28	0.827	0.881	0.969	1.110	1.207
NM	21	291,124	282,021.76	0.981	1.181	21	0.897	0.981	1.089	1.181	1.328
NV	20	803,711	785,996.35	0.946	1.122	20	0.884	0.940	1.023	1.123	1.153

Table 7a: Neonatal all antibacterial agents SAAR distributions, by State¹

		Antimicrobial days		95% confidence limits (CL) of Median SAAR		Percentile distribution of state-specific SAARs					
State Abbreviation	No. of facilities	Observed	Predicted	Lower CL	Upper CL	No. of facilities with ≥ 1 predicted antimicrobial day ²	10th	25th	50th	75th	90th
PA	26	32,155	34,552.15	0.624	0.968	26	0.580	0.619	0.753	1.014	1.418

Antimicrobial Resistance & Patient Safety Portal (AR PSP)

AR PSP Homepage



<https://arpsp.cdc.gov/>

Antibiotic Use & Stewardship

The screenshot shows the CDC Antimicrobial Resistance & Patient Safety Portal. At the top left is the CDC logo and text: "Centers for Disease Control and Prevention" and "CDC 24/7: Saving Lives, Protecting People™". At the top right is a search bar labeled "Search AR&PSP". Below the header is a blue banner with a notification icon and text: "New additions to AR&PSP include: Outpatient Antibiotic Use data update for 2023 data and Inpatient Antibiotic Use data update for 2023 data." Below this is a dark blue bar with the text "Antimicrobial Resistance & Patient Safety Portal". Underneath is a breadcrumb trail: "Home > Antibiotic Use & Stewardship". The main content area has a large blue header with the text "Antibiotic Use & Stewardship". Below this, there are two columns. The left column is titled "Antibiotic Use" and contains the text: "Tracking and reporting antibiotic use is critical to identify opportunities for improvement, and to inform and assess antibiotic stewardship interventions." and "Inpatient Antibiotic Use: All SAAR Agent Categories: These data reflect antibiotic use from inpatient facilities enrolled in the National Healthcare Safety Network's (NHSN) Patient Safety Component Antimicrobial Use and Resistance (AUR) Antimicrobial Use (AU) Option. Standardized Antimicrobial Administration Ratios (SAARs) are used to describe antimicrobial use by comparing the number of observed antimicrobial days to the number of predicted antimicrobial days." The right column is titled "Antibiotic Stewardship Core Elements". At the bottom left, a yellow arrow points to a yellow button with the text "→ Inpatient Antibiotic Use: All SAAR Agent Categories".

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Search AR&PSP

1 New additions to AR&PSP include: [Outpatient Antibiotic Use data update for 2023 data](#) and [Inpatient Antibiotic Use data update for 2023 data](#).

Antimicrobial Resistance & Patient Safety Portal

Home > Antibiotic Use & Stewardship

Antibiotic Use & Stewardship

Antibiotic Use

Tracking and reporting antibiotic use is critical to identify opportunities for improvement, and to inform and assess antibiotic stewardship interventions.

Inpatient Antibiotic Use: All SAAR Agent Categories: These data reflect antibiotic use from inpatient facilities enrolled in the National Healthcare Safety Network's (NHSN) Patient Safety Component Antimicrobial Use and Resistance (AUR) Antimicrobial Use (AU) Option. Standardized Antimicrobial Administration Ratios (SAARs) are used to describe antimicrobial use by comparing the number of observed antimicrobial days to the number of predicted antimicrobial days.

→ [Inpatient Antibiotic Use: All SAAR Agent Categories](#)

Inpatient Antibiotic Use Homepage

The screenshot shows the CDC Antimicrobial Resistance & Patient Safety Portal. At the top left is the CDC logo and the text "Centers for Disease Control and Prevention CDC 24/7: Saving Lives. Protecting People™". At the top right is a search bar labeled "Search AR&PSP". Below the header is a blue banner with a white exclamation mark icon and the text: "New additions to AR&PSP include: [Outpatient Antibiotic Use data update for 2023 data](#) and [Inpatient Antibiotic Use data update for 2023 data](#)." Below this is a dark blue bar with the text "Antimicrobial Resistance & Patient Safety Portal". Underneath is a breadcrumb trail: "Home > Antibiotic Use & Stewardship > Inpatient Antibiotic Use". The main content area has a blue background with the title "Inpatient Antibiotic Use" and a "Print as PDF" button. Below the title are three white boxes, each containing information about facilities with an all-antibacterial SAAR statistically significantly greater than 1.0. The first box is for Adult facilities (985 / 2302, 42.8%), the second for Pediatric facilities (106 / 404, 26.2%), and the third for Neonatal facilities (216 / 800, 27.0%). Each box also includes a small icon of a person.

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™

Search AR&PSP

! New additions to AR&PSP include: [Outpatient Antibiotic Use data update for 2023 data](#) and [Inpatient Antibiotic Use data update for 2023 data](#).

Antimicrobial Resistance & Patient Safety Portal

Home > Antibiotic Use & Stewardship > Inpatient Antibiotic Use

Inpatient Antibiotic Use [Print as PDF](#)

Category	Number of Facilities	Percentage	Year
ADULT: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0	985 / 2302	42.8%	Facilities in 2023
PEDIATRIC: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0	106 / 404	26.2%	Facilities in 2023
NEONATAL: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0	216 / 800	27.0%	Facilities in 2023

<https://arpsp.cdc.gov/profile/inpatient-antibiotic-use/all>

Demo - 1

 Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People™

Search AR&PSP 

! New additions to AR&PSP include: [Outpatient Antibiotic Use data update for 2023 data](#) and [Inpatient Antibiotic Use data update for 2023 data](#).

Antimicrobial Resistance & Patient Safety Portal

Explore and Visualize Data on Antimicrobial Resistance and Patient Safety


ANTIMICROBIAL
RESISTANCE


ANTIBIOTIC USE AND
STEWARDSHIP


HEALTHCARE PERSONNEL
VACCINATION


HEALTHCARE- AND
COMMUNITY-ASSOCIATED
INFECTIONS


GEOGRAPHIC LOCATION

FEATURED ITEMS →



Facilities Reporting SAAR by State

PERCENTAGE OF ELIGIBLE FACILITIES REPORTING SAAR DATA BY STATE

YEAR

2023 2022 2021

POPULATION

Adult Pediatric Neonatal

This map displays the percentage of eligible facilities reporting SAAR data, by state, for the select SAAR population, in 2023.

To view State Profile data, hover and click on desired State.

For additional detail on eligible facility definitions, please see footnotes.

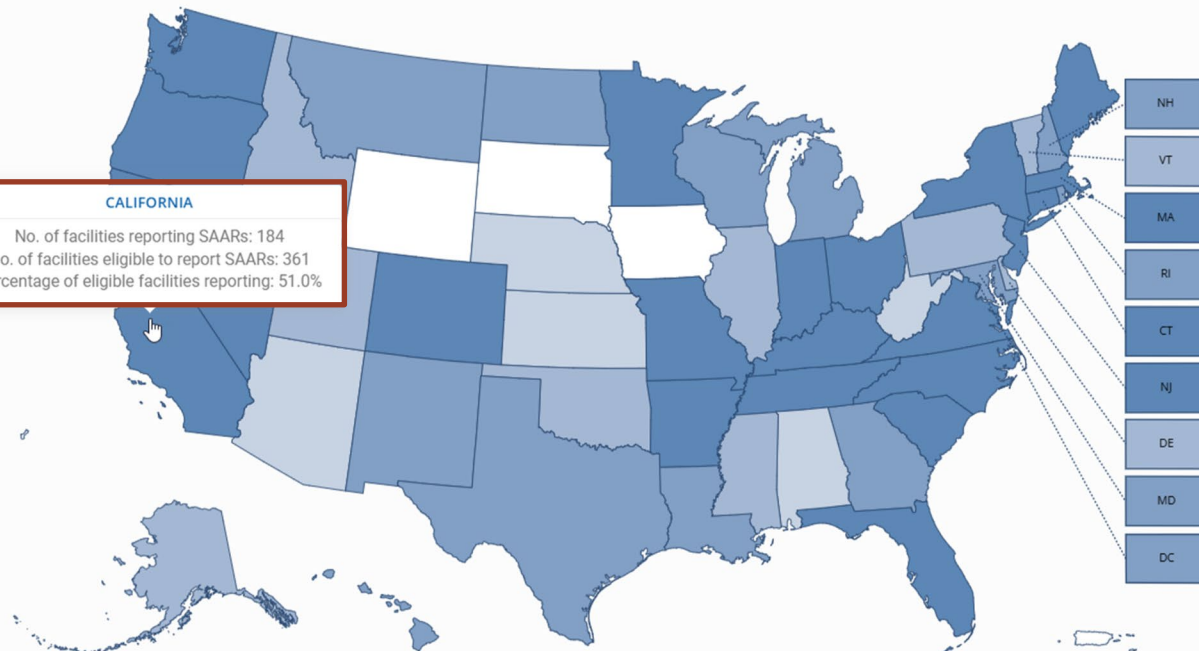
PERCENTAGE OF ELIGIBLE FACILITIES REPORTING ADULT SAAR DATA BY STATE IN 2023

[VIEW DATA](#) [SAVE IM](#)



CALIFORNIA

No. of facilities reporting SAARs: 184
No. of facilities eligible to report SAARs: 361
Percentage of eligible facilities reporting: 51.0%



Percentage of Eligible Facilities Reporting SAAR Data

Percentage Range	Color
0.0% - 21.0%	Lightest Blue
21.1% - 31.3%	Light Blue
31.4% - 38.0%	Medium Blue
38.1% - 50.4%	Dark Blue
50.5% - 100%	Darkest Blue

Demo - 2

 Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Search AR&PSP 

 New additions to AR&PSP include: [Outpatient Antibiotic Use data update for 2023 data](#) and [Inpatient Antibiotic Use data update for 2023 data](#).

Antimicrobial Resistance & Patient Safety Portal

Home > Antibiotic Use & Stewardship > Inpatient Antibiotic Use

Inpatient Antibiotic Use

[Print as PDF](#)

ADULT: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0 

985 / 2302 (42.8%) Facilities in 2023

PEDIATRIC: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0 

106 / 404 (26.2%) Facilities in 2023

NEONATAL: NUMBER OF FACILITIES WITH THE ALL ANTIBACTERIAL SAAR STATISTICALLY SIGNIFICANTLY > 1.0 

216 / 800 (27.0%) Facilities in 2023




Inpatient Antibiotic Use

The Standardized Antimicrobial Administration Ratio (SAAR) is a risk-adjusted summary measure of antimicrobial use available to acute care hospitals participating in the National Healthcare Safety Network (NHSN) Antimicrobial Use (AU) Option. Hospitals can use the SAAR to track AU, compare their AU to a national benchmark, and assess the impact of interventions aimed at improving prescribing practices.

DATA SOURCE

[NATIONAL HEALTHCARE SAFETY NETWORK \(NHSN\)](#)

YEARS INCLUDED

RESOURCES

[→ NHSN Antimicrobial Use Report](#)
[→ AUR Module Protocol](#)

Median SAAR by Year, Population, SAAR Agent & State

SAAR DATA BY STATE MAP

YEAR

2023 2022 2021

POPULATION

Adult Pediatric Neonatal

SAAR AGENT

All Antibacterial Agents

This map displays 2022 median SAAR values for all SAAR agent categories and SAAR populations, by state and select territories.

To view State Profile data, hover and click on desired State.

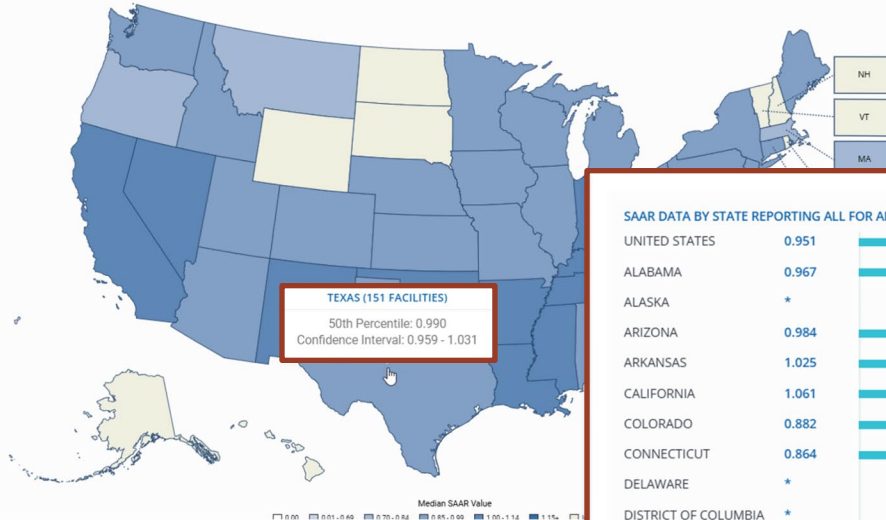
For specific SAAR agent category names, please see footnotes below.

For additional SAAR distribution data, please see "View Data" tab.

For more information on insufficient data, please see footnotes below.

SAAR DATA BY STATE REPORTING ALL FOR ADULTS IN 2022

VIEW DATA



SAAR DATA BY STATE REPORTING ALL FOR ADULTS IN 2022

UNITED STATES	0.951	
ALABAMA	0.967	
ALASKA	*	
ARIZONA	0.984	
ARKANSAS	1.025	
CALIFORNIA	1.061	
COLORADO	0.882	
CONNECTICUT	0.864	
DELAWARE	*	
DISTRICT OF COLUMBIA	*	
FLORIDA	0.975	
GEORGIA	0.929	
HAWAII	*	
IDAHO	0.860	
ILLINOIS	0.977	
INDIANA	1.028	
IOWA	0.953	

SAAR Comparison to National Median

SAAR AGENT CATEGORY COMPARISON TO NATIONAL MEDIAN

Adult	Pediatric	Neonatal
2023	2022	2021

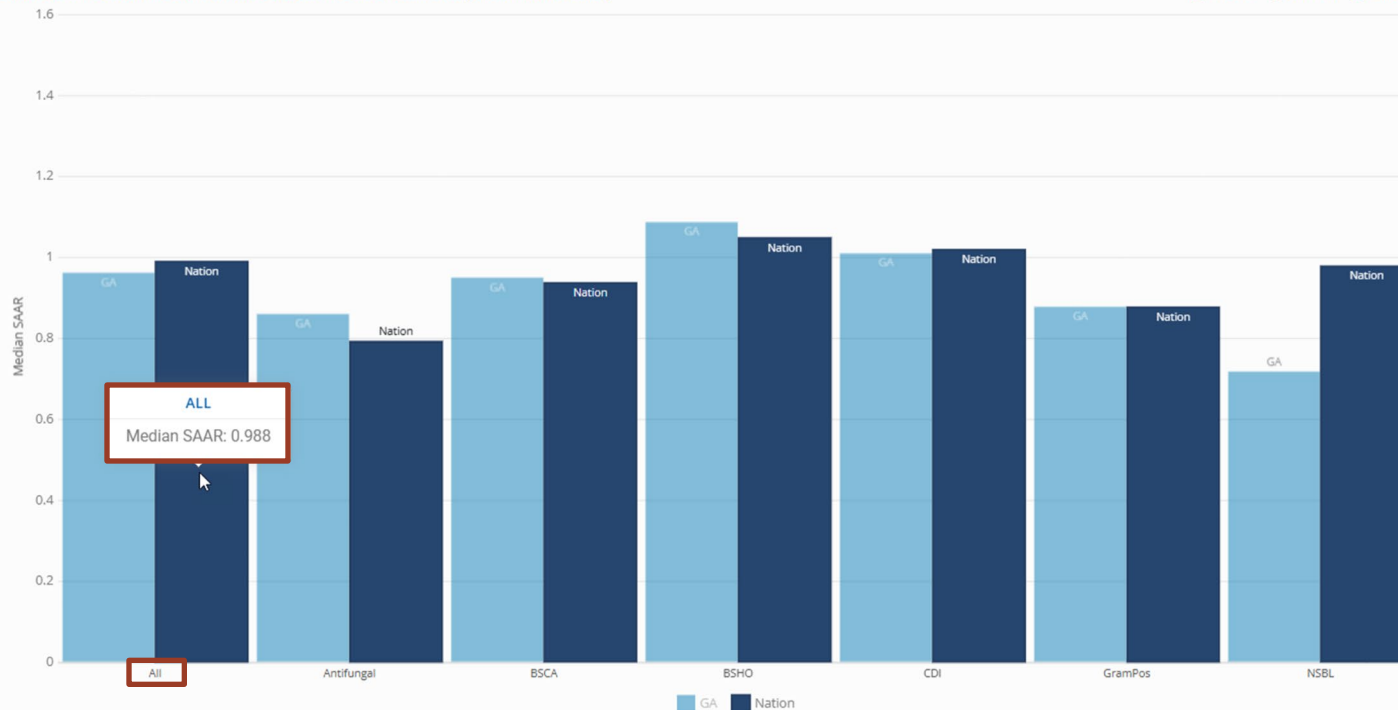
This graphic shows the Georgia median SAAR value comparison of each SAAR agent category under the specified filter type of 'Adult', 'Pediatric', and 'Neonatal' in comparison to the National median, for 2023.

For specific SAAR agent category names, please see footnotes below.

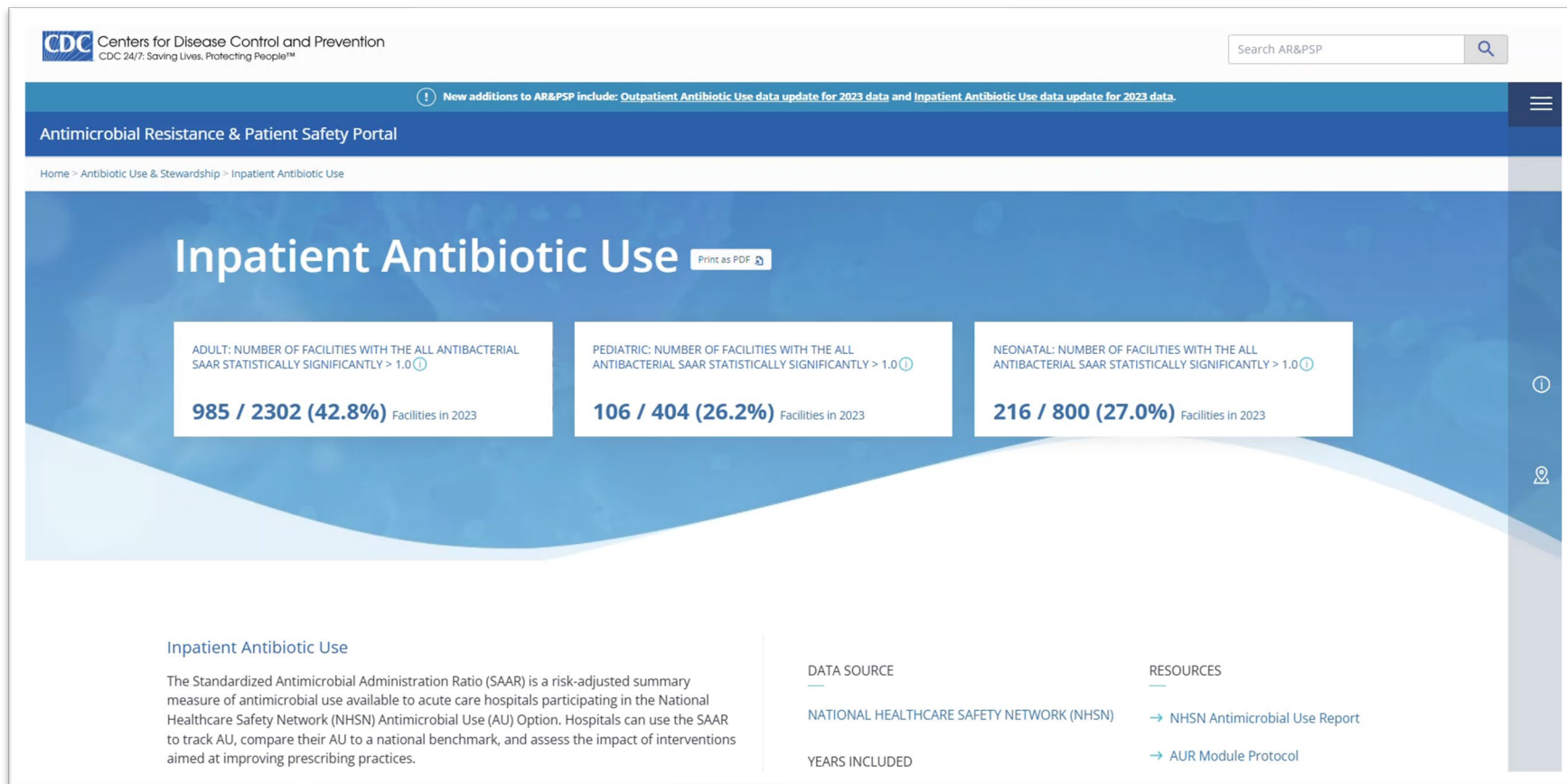
If insufficient data is provided for a given geographic area or SAAR agent category, the visualization will appear blank for relevant categories.

SAAR AGENT CATEGORY COMPARISON TO NATIONAL MEDIAN IN 2023 (ADULT POPULATION)

[VIEW DATA](#) [SAVE IMAGE](#) [SHARE](#)



Demo - 3



Knowledge Check - Question

True or False?

The Antimicrobial Resistance & Patient Safety Portal (AR PSP) provides national and state-specific SAARs.

Knowledge Check - Answer

True or False?

The Antimicrobial Resistance & Patient Safety Portal (AR PSP) provides national and state-specific SAARs.

Resources and References

Resources

- NHSN's Guide to the SAAR
 - <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/au-saar-guide-508.pdf>
- Antimicrobial Use and Resistance (AUR) Module Reports
 - <https://www.cdc.gov/nhsn/datastat/aur-reports.html>
- Antimicrobial Resistance & Patient Safety Portal (AR PSP)
 - <https://arpsp.cdc.gov/profile/inpatient-antibiotic-use/all>

References

1. O'Leary EN, Neuhauser MM, Srinivasan A, et al. Impact of the COVID-19 Pandemic on Inpatient Antibiotic Use in the United States, January 2019 Through July 2022. *Clin Infect Dis*. Jan 25 2024;78(1):24-26. doi:10.1093/cid/ciad453
2. Barnes M, Youngkin E, Zipprich J, et al. Notes from the Field: Increase in Pediatric Invasive Group A Streptococcus Infections - Colorado and Minnesota, October-December 2022. *MMWR Morb Mortal Wkly Rep*. Mar 10 2023;72(10):265-267.
3. Amoxicillin Shortage: Antibiotic Options for Common Pediatric Conditions. American Academy of Pediatrics. Accessed January 23, 2025.
<https://publications.aap.org/redbook/resources/22761/Amoxicillin-Shortage-Antibiotic-Options-for-Common?autologincheck=redirected>

For NHSN questions or concerns, contact the NHSN Helpdesk

- **NHSN-ServiceNow** to submit questions to the NHSN Help Desk.
- Access new portal at <https://servicedesk.cdc.gov/nhsncsp> .
- If you do not have a SAMS login, or are unable to access ServiceNow, you can still email the NHSN Help Desk at nhsn@cdc.gov.

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

