

# Standardized Antimicrobial Administration Ratio (SAAR) Part Two

2019 Quick Learn Series

#### **SAAR Quick Learn Objectives**

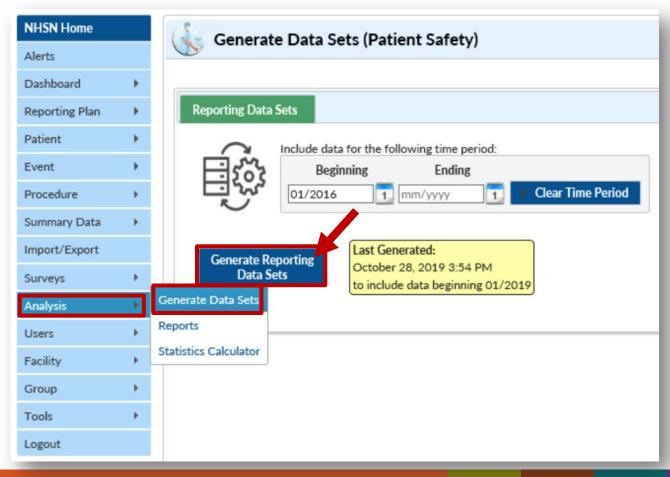
- After watching this Quick Learn, you will be able to...
  - Generate a default SAAR report
  - Modify a SAAR report
  - Interpret a SAAR report
  - Identify additional resources about the SAAR

#### **Important Note**

- Topics not covered in this Quick Learn
  - Introduction to the SAAR, 2014 and 2017 baseline SAAR differences,
     and how to use the SAAR to drive quality improvement
    - See SAAR Part One Quick Learn under training resources <a href="https://www.cdc.gov/nhsn/acute-care-hospital/aur/index.html">https://www.cdc.gov/nhsn/acute-care-hospital/aur/index.html</a>
  - SAAR methodology- see Antimicrobial Use and Resistance [AUR]
     Module Protocol:
     <a href="https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf">https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf</a>
  - In-depth statistical explanation of the SAAR- see training resources:
     <a href="https://www.cdc.gov/nhsn/acute-care-hospital/aur/index.html">https://www.cdc.gov/nhsn/acute-care-hospital/aur/index.html</a>

## **How to Generate a SAAR Report**

#### **Generate Data Sets**

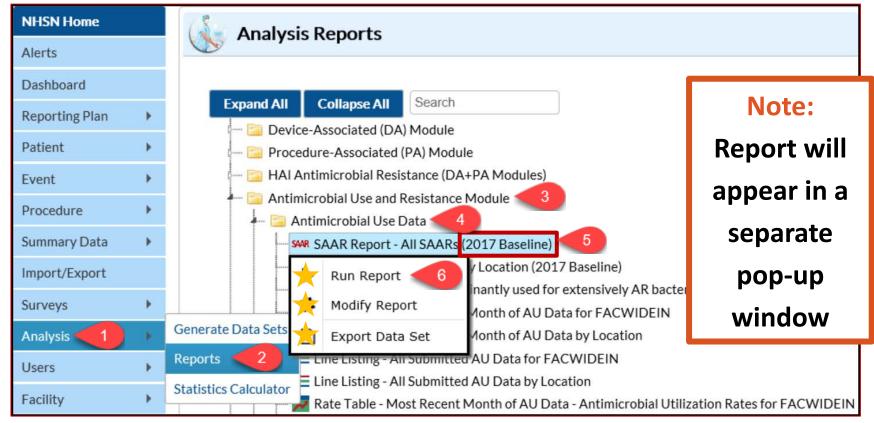


#### **After Generating New Datasets**

- Choice of two SAAR reports
  - 1. All SAARs
  - 2. All SAARs by Location
- First example run default All SAARs report
- Second example run All SAARs by Location report with modifications

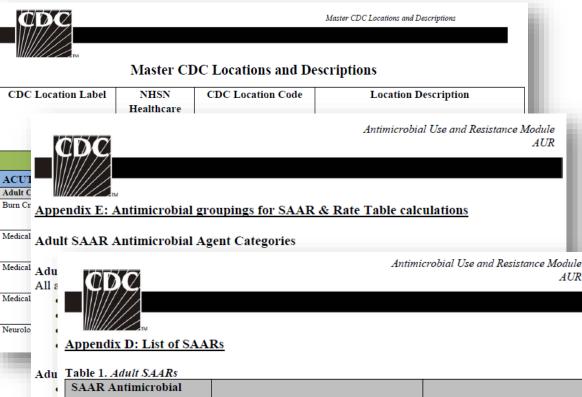
Note: We will not modify the All SAARs report for this example; all NHSN reports can be modified

## All SAARs Report – Using the Default Report



## 2017 Baseline **SAAR Types**

- **13** SAAR locations
  - 8 adult
  - 5 pediatric
- **15** antimicrobial categories
  - 7 adult
  - 8 pediatric
- **40** unique SAARs



SAAR Antimicrobial Agent Category All antibacterial agents Broad spectrum antibacterial agents predominantly used for hospital-onset infections  Adult Medical, Medical-Surgical, Surgical ICUs Adult Medical, Medical-Surgical, Surgical ICUs Adult Medical, Medical-Surgical, Surgical Wards Adult Step Down Units Adult BSHO_Step_2017 Adult General Hematology-Oncology Adult_BSHO_ONC_2017	Table 1. Adult SAARs		
All antibacterial agents Broad spectrum antibacterial agents predominantly used for hospital-onset infections  All Adult SAAR Locations Adult All-Antibacterial 201 Adult BSHO_ICU_2017 Adult Medical, Medical-Surgical, Surgical ICUs Adult Medical, Medical-Surgical, Surgical Wards Adult Step Down Units Adult BSHO_Step_2017	SAAR Antimicrobial		
Broad spectrum antibacterial agents predominantly used for hospital-onset infections  Adult Medical, Medical-Surgical, Surgical ICUs Adult Medical, Medical-Surgical, Surgical Wards Adult Step Down Units  Adult BSHO_ICU_2017 Adult_BSHO_Ward_2017 Adult_Step_2017	Agent Category	Locations	SAAR Type in NHSN
antibacterial agents predominantly used for hospital-onset infections  Surgical ICUs  Adult Medical, Medical-Surgical, Surgical Wards  Adult Step Down Units  Adult_BSHO_Step_2017	All antibacterial agents	All Adult SAAR Locations	Adult_All-Antibacterial_2017
predominantly used for hospital-onset infections  Adult Medical, Medical-Surgical, Surgical Wards  Adult Step Down Units  Adult_BSHO_Ward_2017  Adult_BSHO_Step_2017		Adult Medical, Medical-Surgical,	Adult_BSHO_ICU_2017
hospital-onset infections Surgical Wards Adult Step Down Units Adult_BSHO_Step_2017	antibacterial agents	Surgical ICUs	
Adult Step Down Units Adult_BSHO_Step_2017		Adult Medical, Medical-Surgical,	Adult_BSHO_Ward_2017
	hospital-onset infections	Surgical Wards	
Adult General Hematology-Oncology Adult_BSHO_ONC_2017		Adult Step Down Units	Adult_BSHO_Step_2017
		Adult General Hematology-Oncology	Adult_BSHO_ONC_2017
Wards		Wards	

AUR

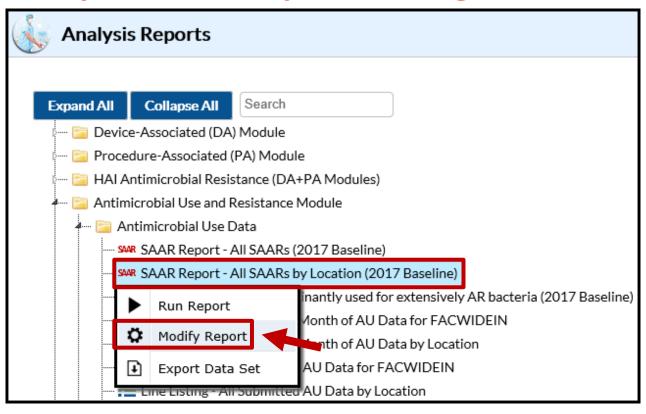
AUR

## **Example of Default All SAARs Report Output Table**

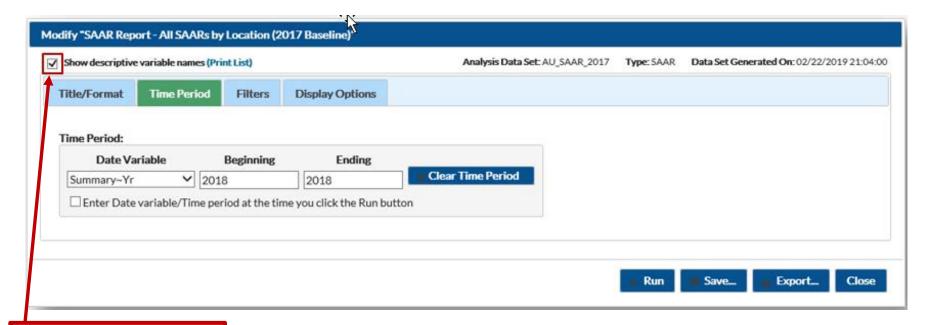
#### National Healthcare Safety Network SAARs Table - All Standardized Antimicrobial Administration Ratios (SAARs) High-Level Indicators and High-Value Targets (2017 Baseline) As of May 7, 2019 at 2:22 PM Date Range: All AU SAAR 2017 All Antibacterial Agents used in adult SAAR ICUs, wards, step down units and oncology units SAARType 2017 antimicrobialDays numAUDays Predicted numDays Present SAAR SAAR pval SAAR95CI orgID summaryYM 13860 2017M01 Adult All-1001 443.794 703 Antibacterial 2017 13860 2017M02 Adult All-40230 5.356 Antibacterial 2017 13860 2017M03 Adult All-20115 2.648 National Healthcare Safety Network SAARs Table - All Standardized Antimicrobial Administration Ratios (SAARs) High-Level Indicators and High-Value Targets (2017 Baseline) As of May 7, 2019 at 2:22 PM Date Range: All AU\_SAAR\_2017 Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR **ICUs** orgID summaryYM SAARType\_2017 antimicrobialDays numAUDays Predicted numDays Present SAAR SAAR pval SAAR95CI 2017M01 Adult BSHO ICU 2017 2017M02 Adult\_BSHO\_ICU\_2017 Note: Data for example only

## **How to Modify a SAAR Report**

## All SAARs by Location Report – Using Modifications

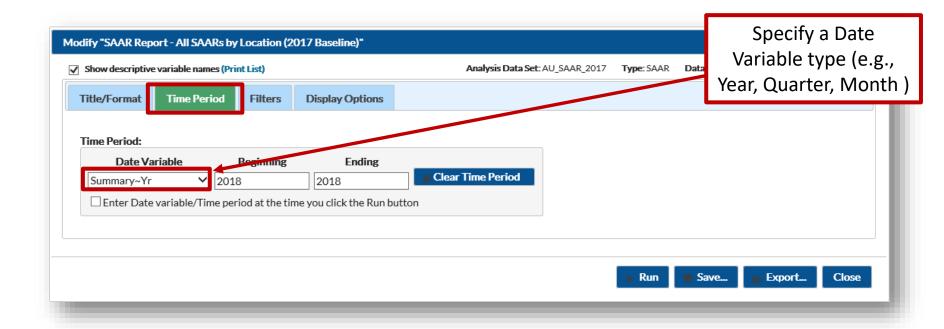


## All SAARs by Location Report – Variable Names

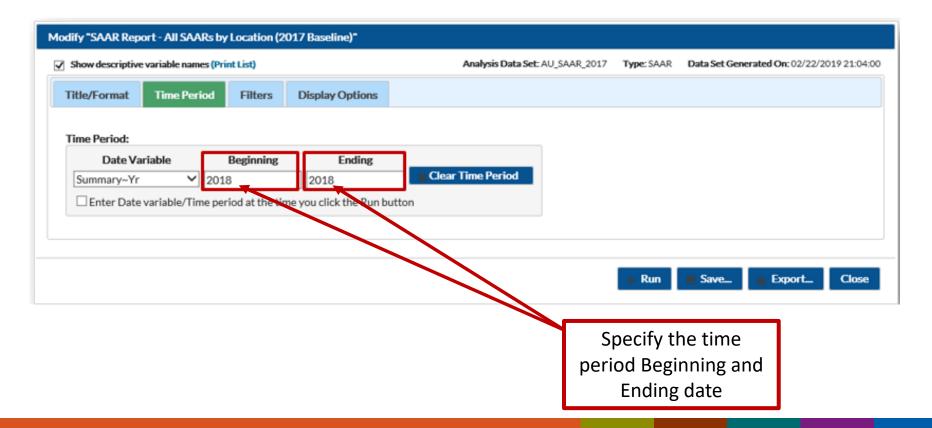


Show descriptive variable names

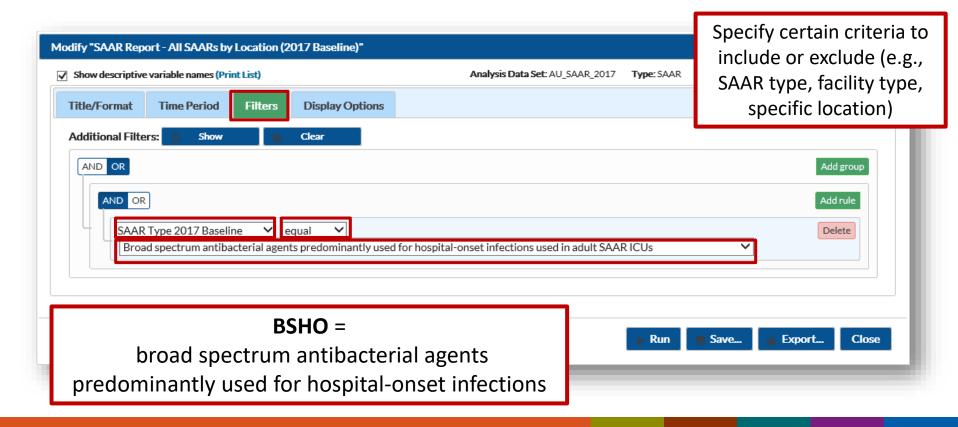
## All SAARs by Location Report – Time Period Tab



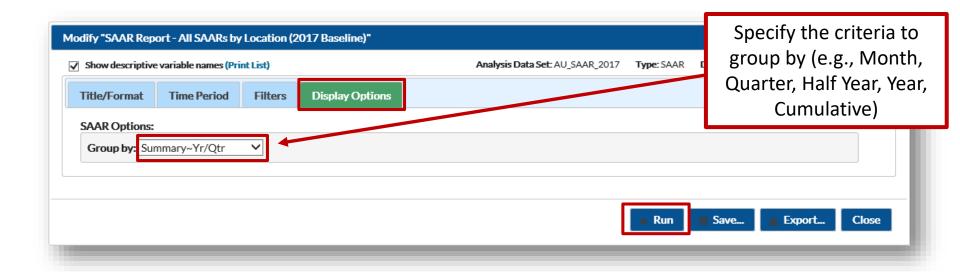
## All SAARs by Location Report – Time Period Tab



## All SAARs by Location Report – Filters Tab



#### All SAARs by Location Report – Display Options Tab



## Modified All SAARs by Location Report – Output Table

#### National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018

if (II SAARType 2017 = "Adult BSHO ICU 2017" ) II

#### Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

Facility Org ID	SAAR Type 2017 Baseline	Location	Summary Yr/Qtr	CDC Location	Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q2	N:ACUTE:CC:S	30	0.701	3	1		
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q3	N:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q4	N:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
13860	Adult_BSHO_ICU_2017	MICU	2018Q3	N:ACUTE:CC:M	160	78.762	297	2.031	0.0000	1.734, 2.365
13860	Adult_BSHO_ICU_2017	MSICU	2018Q1	N:ACUTE:CC:MS	24	142.163	608	0.169	0.0000	0.111, 0.247
13860	Adult_BSHO_ICU_2017	MSICU	2018Q3	N:ACUTE:CC:MS	140	72.952	312	1.919	0.0000	1.620, 2.257
13860	Adult_BSHO_ICU_2017	SICU	2018Q3	N:ACUTE:CC:S	131	58.689	251	2.232	0.0000	1.874, 2.640

Includes data for January 2017 and forward.

The SAAR is only calculated if the number of predicted antimicrobial days (numAUDaysPredicted) is >=1.

If antimicrobial days exceed days present for a specific SAAR category, a SAAR will not be calculated and data should be validated for accuracy.

Data restricted to medical, medical-surgical, surgical, step down and oncology locations.

Source of aggregate data: 2017 NHSN AU Data

Data contained in this report were last generated on February 22, 2019 at 9:04 PM.

**How to Interpret a SAAR Report** 

#### **SAAR Type Column**

#### National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018

if III SAARType 2017 = "Adult BSHO ICU 2017" ) II

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13860	Adult_BSHO_ICU_2017	ICU-C	2018Q2	IN:ACUTE:CC:S	30	0.701	3	- 1	2	
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q3	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q4	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
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#### **Location and CDC Location Columns**

#### National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018 if (((SAARType\_2017 = "Adult\_BSHO\_ICU\_2017")))

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

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#### **Antimicrobial Days**

Any amount of a specific antimicrobial agent administered in a calendar day to a particular patient as reported in eMAR or BCMA

National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018

if III SAARType 2017 = "Adult BSHO ICU 2017" ) II

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Data restricted to medical, medical-surgical, surgical, step down and oncology locations.

Source of aggregate data: 2017 NHSN AU Data

Data contained in this report were last generated on February 22, 2019 at 9:04

Antimicrobial Days are the SAAR numerator

## **Predicted Antimicrobial Days**

Predicted Antimicrobial Days are calculated using predictive models developed by CDC

#### National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018 if (((SAARType\_2017 = "Adult\_BSHO\_ICU\_2017")))

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

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If antimicrobial days exceed days present for a specific SAAR category, a SAAR will not be calculated and data should be validated for accuracy.

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Source of aggregate data: 2017 NHSN AU Data

Data contained in this report were last generated on February 22, 2019 at 9:04 PM.

Predicted Antimicrobial Days are the SAAR denominator

#### **Days Present**

 Aggregate number of patients housed in a patient care location or facility anytime throughout the day during a calendar month

National Healthcare Safety Network

SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018

if (((SAARType\_2017 = "Adult\_BSHO\_ICU\_2017")))

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

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13860	Adult_BSHO_ICU_2017	ICU-C	2018Q3	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
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13860	Adult_BSHO_ICU_2017	SICU	2018Q3	IN:ACUTE:CC:S	131	58.689	251	2.232	0.0000	1.874, 2.640

Include The SA If antir Data re Source

**Note:** Days present are used to calculate predicted values, it is important to verify their accuracy

#### **SAAR**

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

National Healthcare Safety Network SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM
Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018
if (((SAARType\_2017 = "Adult\_BSHO\_ICU\_2017" ) ))

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

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13860	Adult_BSHO_ICU_2017	ICU-C	2018Q2	IN:ACUTE:CC:S	30	0.701	3	-		
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13860	Adult_BSHO_ICU_2017	ICU-C	2018Q4	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
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13860	Adult_BSHO_ICU_2017	MSICU	2018Q1	IN:ACUTE:CC:MS	24	142.163	608	0.169	0.0000	0.111, 0.247
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13860	Adult_BSHO_ICU_2017	SICU	2018Q3	IN:ACUTE:CC:S	131	58.689	251	2.232	0.0000	1.874, 2.640

Include The SAA If antim Data re

Source of Data cor

## The SAAR provides a standardized metric of antimicrobial use

#### Interpreting a SAAR value

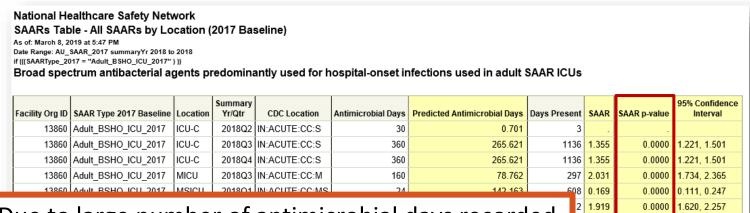
#### A SAAR value:

- <1 May indicate antimicrobial under use</p>
- =1 The same antimicrobial use as predicted
- >1 May indicate antimicrobial over use

**Note:** A SAAR is not a definitive measure of appropriateness or judiciousness of antimicrobial use and any SAAR value may warrant additional investigation

#### SAAR p-value

- Statistical measure, indicates if observed antimicrobial use is significantly different from predicted antimicrobial use based on 2017 referent population
  - A p-value less than 0.05 indicates SAAR is significantly different than one



**Note:** Due to large number of antimicrobial days recorded and included in predictive models, most SAAR p-values are less than 0.05 and should be interpreted with caution

curacy.

1 2.232

0.0000 1.874, 2.640

#### 95% Confidence Interval

- Range of values in which the true SAAR is likely to lie
  - If confidence interval includes value of 1, then the SAAR is not statistically significant
  - If confidence interval does not include value of 1, then the SAAR is statistically significantly different from the value of 1, and observed days of therapy are different from predicted days of therapy

**Note:** The SAAR p-value and 95 Percent Confidence Interval will always indicate the same statistical significance and can be interpreted interchangeably.

#### Safety Network

ARs by Location (2017 Baseline)

mmaryYr 2018 to 2018 SHO\_ICU\_2017" ) ))

bacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

2017 Baseline	Location	Summary Yr/Qtr		Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
D_ICU_2017	ICU-C	2018Q2	IN:ACUTE:CC:S	30	0.701	3			
D_ICU_2017	ICU-C	2018Q3	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
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#### 2017 and forward.

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17 NHSN AU Data

t were last generated on February 22, 2019 at 9:04 PM.

#### Interpretation

National Healthcare Safety Network SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018
if (((SAARType\_2017 = "Adult\_BSHO\_ICU\_2017")))

Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

Reported antimicrobial use significantly different from predicted use for MSICU during first quarter of 2018, with less antimicrobial use than predicted by 2017 baseline SAAR

Facility Org ID	SAAR Type 2017 Baseline	Location	Summary Yr/Qtr	CDC Location	Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q2	IN:ACUTE:CC:S	30	0.701	3		¥.	
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13860	Adult_BSHO_ICU_2017	SICU	2018Q3	IN:ACUTE:CC:S	131	58.689	251	2.232	0.0000	1.874, 2.640

Includes data for January 2017 and forward.

The SAAR is only calculated if the number of predicted antimicrobial days (numAUDaysPredicted) is >=1.

If antimicrobial days exceed days present for a specific SAAR category, a SAAR will not be calculated and data should be validated for accuracy.

Data restricted to medical, medical-surgical, surgical, step down and oncology locations.

Source of aggregate data: 2017 NHSN AU Data

Data contained in this report were last generated on February 22, 2019 at 9:04 PM

#### **SAAR Data Requirements**

#### National Healthcare Safety Network SAARs Table - All SAARs by Location (2017 Baseline)

As of: March 8, 2019 at 5:47 PM

Date Range: AU\_SAAR\_2017 summaryYr 2018 to 2018 if (((SAARType 2017 = "Adult BSHO ICU 2017")))

#### Broad spectrum antibacterial agents predominantly used for hospital-onset infections used in adult SAAR ICUs

Facility Org ID	SAAR Type 2017 Baseline	Location	Summary Yr/Qtr	CDC Location	Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q2	IN:ACUTE:CC:S	30	0.701	3			
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q3	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
13860	Adult_BSHO_ICU_2017	ICU-C	2018Q4	IN:ACUTE:CC:S	360	265.621	1136	1.355	0.0000	1.221, 1.501
13860	Adult_BSHO_ICU_2017	MICU	2018Q3	IN:ACUTE:CC:M	160	78.762	297	2.031	0.0000	1.734, 2.365
13860	Adult_BSHO_ICU_2017	MSICU	2018Q1	IN:ACUTE:CC:MS	24	142.163	608	0.169	0.0000	0.111, 0.247
13860	Adult_BSHO_ICU_2017	MSICU	2018Q3	IN:ACUTE:CC:MS	140	72.952	312	1.919	0.0000	1.620, 2.257
13860	Adult_BSHO_ICU_2017	SICU	2018Q3	IN:ACUTE:CC:S	131	58.689	251	2.232	0.0000	1.874, 2.640



#### Includes data for January 2017 and forward.

The SAAR is only calculated if the number of predicted antimicrobial days (numAUDaysPredicted) is >=1.

If antimicrobial days exceed days present for a specific SAAR category, a SAAR will not be calculated and data should be validated for accuracy.

Data restricted to medical, medical-surgical, surgical, step down and oncology locations.

Source of aggregate data: 2017 NHSN AU Data

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## Resources

#### **NHSN** Resources

- NHSN AUR Module webpage: <a href="http://www.cdc.gov/nhsn/acute-care-hospital/aur/">http://www.cdc.gov/nhsn/acute-care-hospital/aur/</a>
  - AUR Module Protocol
  - FAQs
  - SAAR Quick Reference Guides
  - Standardized Antimicrobial Administration Ratio 2019
- NHSN Locations Chapter: <u>https://www.cdc.gov/nhsn/pdfs/pscmanual/15locationsdescriptions\_current.pdf</u>
- How to modify an NHSN Report: <a href="https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf">https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf</a>
- Strategies to Assess Antibiotic Use to Drive Improvements in Hospitals:
   <a href="https://www.cdc.gov/antibiotic-use/healthcare/pdfs/Strategies-to-assess-antibiotic-use-in-hospitals-508.pdf">https://www.cdc.gov/antibiotic-use/healthcare/pdfs/Strategies-to-assess-antibiotic-use-in-hospitals-508.pdf</a>

# Thank you! For any questions or concerns, contact the NHSN Helpdesk at <a href="mailto:nhsn@cdc.gov">nhsn@cdc.gov</a>

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.

