

Standardized Antimicrobial Administration Ratio (SAAR) Table

Description

The standardized antimicrobial administration ratio (SAAR) is a metric for comparing observed to predicted days of antimicrobial therapy. It is constructed using indirect standardization where predicted antimicrobial use days are based on nationally aggregated AU data. This document explains how to calculate and interpret the SAAR. For more information, please see the AUR Module protocol: <https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf>.

For a more basic explanation of the NHSN modification screen, refer to this document:

<https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf>.

Example

You are interested in obtaining SAARs by quarter (3-month, calendar quarter-year) instead of the default display of SAARs by month. Additionally, you'd like to limit the report to show only SAARs for the antimicrobials used for hospital-onset/multi-drug resistant infections in the adult medical, surgical, and medical/surgical ICUs (SAAR Type: TAR-Adult-1) and wards (SAAR Type: TAR-Adult-2).



Modifying the Output

When you choose to modify the report, the modification screen appears showing multiple tabs containing available modifications for the given report. The “Title/Format” tab allows you to update the report title and select the format in which you want the report displayed, such as HTML or PDF. To filter the data by time period, choose the “Time Period” tab at the top of the page.

Tip: For more descriptive variable labels on your report, check the box “Show descriptive variable names” (recommended).

The “Filters” tab allows you to further filter the data that will be displayed in the report. For our example, we’re going to filter by SAAR Type to show SAARs only for hospital-onset/multi-drug resistant infections in the adult medical, surgical, and medical/surgical ICUs and wards. First, select the variable “SAAR Type” from the drop-down menu, set the operator to “in” then select the values “TAR-Adult-1 – Antimicrobials used for HO/MDR infections in adult ICUs” and “TAR-Adult-2 – Antimicrobials used for HO/MDR infections in adult wards”.

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Tip: For including just one item in each filter such as a single SAAR Type, the “equal” operator can be used instead of the “in” operator.

Modify "SAAR Report - All SAARs"

Show descriptive variable names (Print List) Analysis Data Set: AU_SAAR Type: SIR Data Set Generated On: 03/06/2017 14:44:00

Title/Format Time Period **Filters** Display Options

Additional Filters:

AND OR

AND OR

SAAR Type in

TAR-Adult-1 - Antimicrobials used for HO/MDR infections in adult ICUs

TAR-Adult-2 - Antimicrobials used for HO/MDR infections in adult wards

The “Display Options” tab allows you to view your SAARs by month, by year, by half-year, by quarter, or cumulative for the entire time period selected. In this example, we’ve selected “Summary~Yr/Qtr” to see the SAARs grouped by calendar quarter.

Modify "SAAR Report - All SAARs"

Show descriptive variable names (Print List) Analysis Data Set: AU_SAAR Type: SIR Data Set Generated On: 03/06/2017 14:44:00

Title/Format Time Period Filters **Display Options**

SIR Options:

Group by: Summary~Yr/Qtr

Final Report

For each time period, the SAAR tables display the observed antimicrobial days, predicted antimicrobial days, the total days present, and the SAAR values. The predicted days of antimicrobial use (“Predicted Antimicrobial Days”) are calculated using negative binomial regression models that adjust for predictive factors, such as bed size, teaching status, ICU status, and ward type. Five separate predictive models were developed for each of the antimicrobial groups (<http://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf>).

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At present, facilities with locations mapped as adult and pediatric medical, surgical, and medical/surgical ICUs and wards are able to generate up to 16 different SAARs. As noted by the footnotes in the SAAR tables, the SAARs will be generated for data uploaded into NHSN starting January 2014 moving forward.

National Healthcare Safety Network

SAARs Table - All Standardized Antimicrobial Administration Ratios (SAARs) High-Level Indicators and High-Value Targets

As of: March 16, 2017 at 4:58 PM

Date Range: All AU_SAAR

if (((SAARType IN ("TAR-Adult-1", "TAR-Adult-2")))

Antimicrobials used for hospital-onset/multi-drug resistant infections in adult ICUs

Facility Org ID	Summary Yr/Qtr	SAAR Type	Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
13860	2014Q1	TAR-Adult-1	931	829.179	2800	1.123	0.0005	1.052, 1.197
13860	2014Q2	TAR-Adult-1	714	431.792	1445	1.654	0.0000	1.536, 1.778
13860	2014Q3	TAR-Adult-1	926	697.668	2339	1.327	0.0000	1.244, 1.415
13860	2014Q4	TAR-Adult-1	658	430.456	1441	1.529	0.0000	1.415, 1.649

Includes data for January 2014 and forward.

Data restricted to medical, medical/surgical and surgical locations.

Source of aggregate data: 2014 NHSN AU Data

Data contained in this report were last generated on March 15, 2017 at 1:38 PM.

- This example shows the first SAAR table that was generated based on the modifications: “Antimicrobials used for hospital-onset/multi-drug resistant infections in adult ICUs”. The report shows which modifications were made in the line above the table title: if(((SAARType IN (“TAR-Adult-1”, “TAR-Adult-2”))))).
- These SAAR tables include the observed and predicted antimicrobial days for the 17 antibacterial agents that are included in the “Antimicrobials used for hospital-onset/multi-drug resistant infections” SAARs. For a complete list of antimicrobials in each SAAR grouping, please see the NHSN AUR Module Protocol: <http://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf>.
- As shown in the blue box, there were 658 antimicrobial days reported for this facility’s adult medical, surgical and medical/surgical ICUs during the last quarter of 2014. This is the observed number of antimicrobial days. The SAAR is the number of observed antimicrobial days (numerator) divided by the number of predicted antimicrobial days (denominator); in this example, the 2014 Quarter 4 SAAR is $658/430.456 = 1.529$.
- The SAAR p-value is a statistical measure that tells you if the observed usage is significantly different from what was expected. A p-value less than 0.05 (an arbitrary and conveniently used cut point) indicates that the number of observed antimicrobial days is statistically significantly different (higher or lower) than the number of antimicrobial days expected. Due to the large number of antimicrobial days recorded and included in the predictive models, most SAAR p-values are less than 0.05 and should be interpreted with caution as statistical significance does not necessarily translate into clinical significance.
- The 95% Confidence Interval (CI) is a range of values in which the true SAAR is thought to lie; however, the SAAR reported under the SAAR column is the most likely value. If the confidence interval includes the value of 1, then the SAAR is not statistically significant (the observed usage is not statistically significantly different from predicted usage, using the same convenient cut point). In this example, the



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2014 Quarter 4 SAAR 95% CI does not contain 1, which can be interpreted as sufficient statistical evidence to conclude that the 2014 Quarter 1 SAAR is different than 1.

National Healthcare Safety Network SAARs Table - All Standardized Antimicrobial Administration Ratios (SAARs) High-Level Indicators and High-Value Targets

As of: March 16, 2017 at 4:58 PM

Date Range: All AU_SAAAR

if (((SAARType IN ("TAR-Adult-1", "TAR-Adult-2")))

Antimicrobials used for hospital-onset/multi-drug resistant infections in adult wards

Facility Org ID	Summary Yr/Qtr	SAAR Type	Antimicrobial Days	Predicted Antimicrobial Days	Days Present	SAAR	SAAR p-value	95% Confidence Interval
13860	2014Q1	TAR-Adult-2	151	381.047	3526	0.396	0.0000	0.337, 0.463
13860	2014Q2	TAR-Adult-2	112	246.610	2282	0.454	0.0000	0.376, 0.544
13860	2014Q3	TAR-Adult-2	131	370.239	3426	0.354	0.0000	0.297, 0.418
13860	2014Q4	TAR-Adult-2	580	518.920	4751	1.118	0.0089	1.029, 1.212

Includes data for January 2014 and forward.

Data restricted to medical, medical/surgical and surgical locations.

Source of aggregate data: 2014 NHSN AU Data

Data contained in this report were last generated on March 15, 2017 at 1:38 PM.

- This example shows the second SAAR table that was generated based on the modifications: “Antimicrobials used for hospital-onset/multi-drug resistant infections in adult wards”.
- As shown in the red box, there were 580 antimicrobial days reported for this facility’s adult medical, surgical and medical/surgical wards during the last quarter of 2014. This is the observed number of antimicrobial days. The SAAR is the number of observed antimicrobial days (numerator) divided by the number of predicted antimicrobial days (denominator); in this example, the 2014 Quarter 4 SAAR is $580/518.920 = 1.118$. Additionally, because the 2014 quarter 4 SAAR p-value is less than 0.05 (0.0089) and the 95% confidence interval does not include 1 (1.029, 1.212), this SAAR is considered statistically different from 1.

Additional Resources

Strategies to Assess Antibiotic Use to Drive Improvements in Hospitals:

<https://www.cdc.gov/getsmart/healthcare/pdfs/strategies-to-assess-antibiotic-use-in-hospitals-508.pdf>

Introduction to NHSN Analysis: <https://www.cdc.gov/nhsn/pdfs/training/2016/analysis-data-quality-parikh.pdf>

How to Export Data from NHSN: <http://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/exportdata.pdf>

AUR Module Protocol: <http://www.cdc.gov/nhsn/pdfs/pscmanual/11pscacrurrent.pdf>

Surveillance for Antimicrobial Use Option: <http://www.cdc.gov/nhsn/acute-care-hospital/aur/>

