Standardized Antimicrobial Administration Ratio (SAAR) Bar Chart All SAARs (2017 Baseline) by Location

Description

The Standardized Antimicrobial Administration Ratio (SAAR) is a metric for comparing observed to predicted days of antimicrobial therapy. This document explains how to visualize data contained in the All SAARs (2017 Baseline) report for multiple locations over a given time period. For more information on how to calculate and interpret the SAAR please see: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/AU-QRG-SAARTables-Location.pdf.

Example

You are interested in displaying SAARs for all locations in your facility for quarter three of calendar year 2017. You can get this information in table form by running the SAAR report- ALL SAARs (2017) in NHSN. To visually display these data, select the standard SAAR report within NHSN and export the dataset to Excel. The following example was created using Microsoft Excel for Office 365. Displays may vary in other versions of Excel.

Export Data

After generating datasets, choose "Reports" from the "Analysis" drop-down option on the left-hand navigation bar. Once on the Analysis Reports page expand the "Antimicrobial Use Data" folder from within "Antimicrobial Use and Resistance Module". Select "SAAR Report-All SAARs (2017 baseline) then click "Export Data Set". This selection will open a display window allowing you to select a file format. Select "Excel spreadsheet" and click "Export". An Excel (XLS) file will download to the location you've selected on your computer. For more information on exporting data, view How to Export Data from NHSN.

Creating a PivotTable

The next step is to create a PivotTable. The PivotTable is a useful tool to filter, sort, and summarize data within a spreadsheet. Your exported XLS file will look like figure 1.

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1. Select "Insert" then "PivotChart". Choose "PivotChart & PivotTable" in the drop-down box. The "Create PivotTable" window will appear.
2. Under "Choose the data that you want to analyze", click the option to select a table or range then use the arrow in the "Table/Range" box to select the entire data table.
3. Under "Choose where you want the PivotTable report to be placed", select "New Worksheet". Then click "Okay".

After selecting your dataset, you'll choose which variables you want to include in your PivotChart as shown in Figure 2.

4. In the PivotChart Fields window under "Choose fields to add to report", select the variables of interest by checking the box to the left of the variable.
5. Drag and drop the variables of interest to the appropriate columns. Notice that as you drag variables into the PivotTable fields, the PivotTable on the left updates automatically.
   a. Place the variable "locSAAR" in the "Values" field.
      Note: The "Values" field should display "Sum of LocSAAR". If it shows another summary measure (e.g., "count") click the drop-down arrow next to the variable name and choose "Value Field Settings" then "sum" as the option under "Summarize Value Field By"
   b. Place the variable "SAARType_2017" in the "Filters" field.
   c. Place "Location" in the "Axis (categories)" field.
      Note: "Axis (Categories)" may also be called "Rows"
      Note: Group users should use "orgLoc" instead of "Location"
   d. Place "SummaryYQ" in the "Legend (series)" field.
      Note: "Legend (series)" may also be called "Columns"
6. Update the table's filters. Select the dropdown menu next to "SAARType_2017" in the PivotTable and choose, "Adult_All-Antibacterial 2017". Select the dropdown menu next to "Column Labels" and select the time period of interest. For this example, set "SummaryYQ" to "2017Q3".
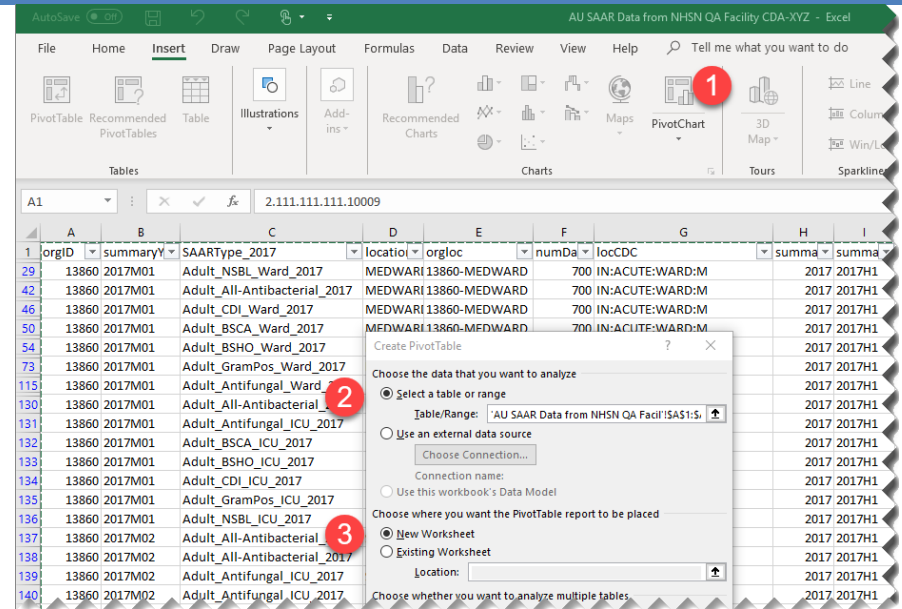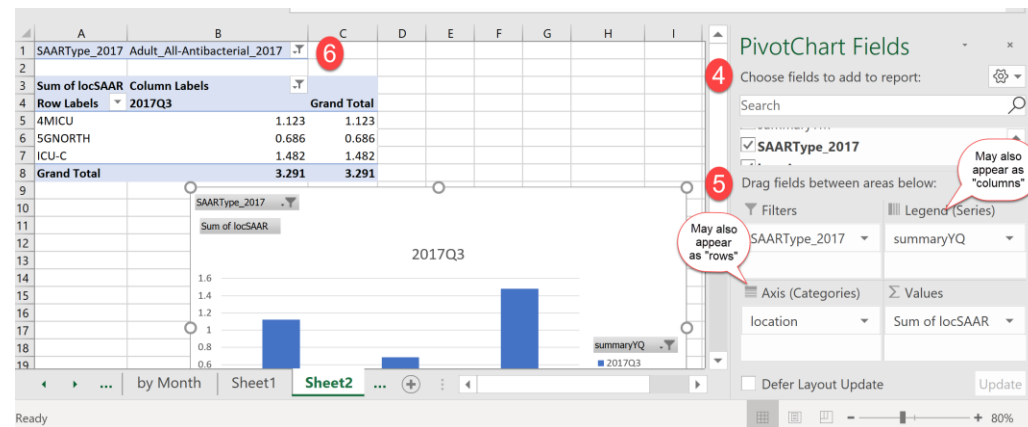

Figure 1

Figure 2

2

Note: While this example focuses on a multiple locations, you can also use PivotTables to view SAARs for a single location across time. To do so using the data downloaded for the example above:

- *Place the variable "locSAAR" in the "Values" field*
- *Place the variable "SAARType_2017" in the "Filters" field*
- *Place "Location" and the time variable (e.g. SummaryYM) in the "Axis (categories)" field*
- *In the "Row Labels" within the PivotTable, select the location of interest (ICU-C, for instance). Select the time period and SAAR Type values of interest.*

Next format your chart to best fit these data (Figure 3). First, make necessary adjustments to your axes:

7. Right-click the Y axis and open the "Format Axis" window.
8. Axis Options
   a. Set the minimum bound to 0.0 (Calculated SAAR values are always greater than or equal to zero).
   b. Set the major unit based on your data. For this example, it's set to 0.2.
9. Under "Horizontal Axis Crosses" select the "Axis Value" button and enter 1.0 to make the axis cross at one instead of zero. Any bar below this axis (less than one) indicates a location with less antibiotic use than predicted while a bar above the axis (greater than one) indicates a location with more antibiotic use than predicted.

Note: If you want to display your graph with zero as the baseline, leave the "Horizontal Axis Crosses" set to default or set "Axis Value" to zero.

Adjust the labels location on the chart to improve readability (Figure 4).

10. Right-click the location names under the bars and select "Format Axis".
11. Select "Labels" under "Axis Options".
12. Choose "Low" from the "Label Position" dropdown list to move the position of the location labels.
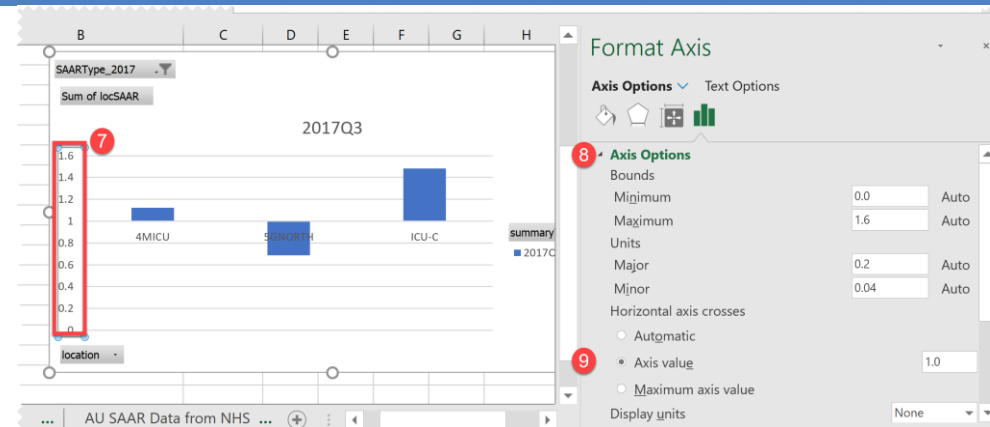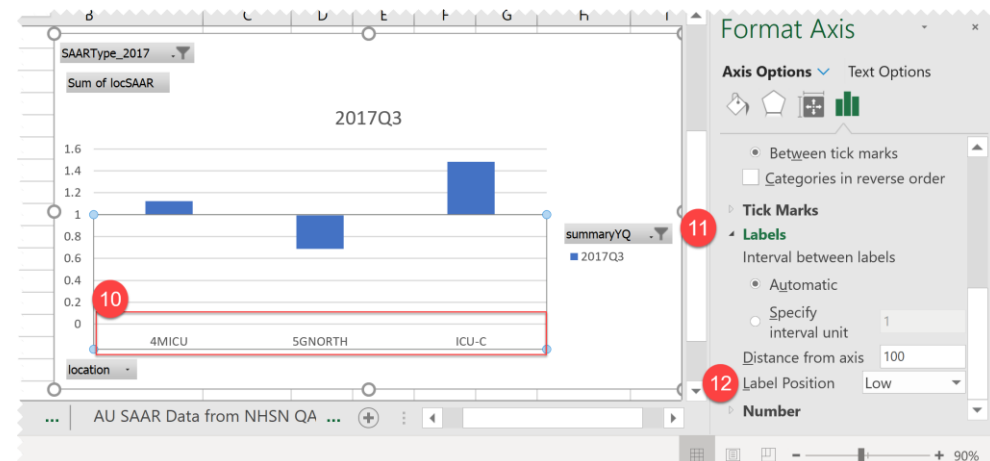

Figure 3

Figure 4

Add all necessary titles to make your graph a standalone image (Figure 5).

13. To add axis titles, select "Design" then "Add Chart Element" and "Axis Titles". Choose "Primary Vertical" to add the Y axis title "SAAR value".

14. Title your graph and axes so your audience can easily interpret the graph. Your title should describe data presented including the location and time period. For example, give your graph the title, "Adult All Antibacterial Standardized Antimicrobial Administration Ratio (SAAR), by location, [insert time period here]". Edit the text size as needed.
    Note: You may also want to include labels on the bars to show the specific SAAR values. To do so, select "Data Labels" from the "Add Chart Element" drop down box.

Before presenting your chart, hide the field buttons for a cleaner presentation (Figure 6).

15. Select "Analyze Data".
16. Click on the "Field Buttons" drop down box.
17. To hide field buttons on your final output de-select "Show Value Filter Field Buttons", "Show Axis Filter Field Buttons", and "Show Value Field Buttons".

Add a bolded line at the Y axis value of one. This makes it easier to interpret your findings.

18. Select "Insert".
19. Choose "Shapes" and select a straight line.
    Insert this line so it runs perpendicular to the Y axis at a value of one. Edit the weight and color of this line to make it stand out. For example, choose the color orange and a 3 point weight.

Note: To change the spacing between bars, right click on one of the bars and select "Format Data Series". Change "Gap Width" to adjust the spacing. In this example, Gap Width is set to 20%. You can also adjust the font size of the various components of your chart of as needed.
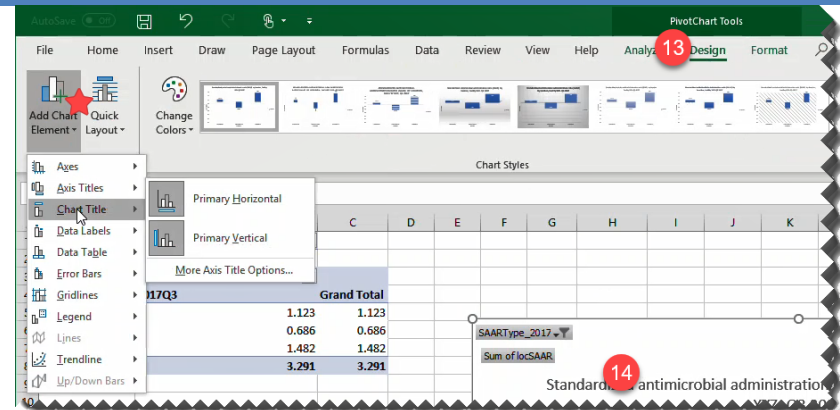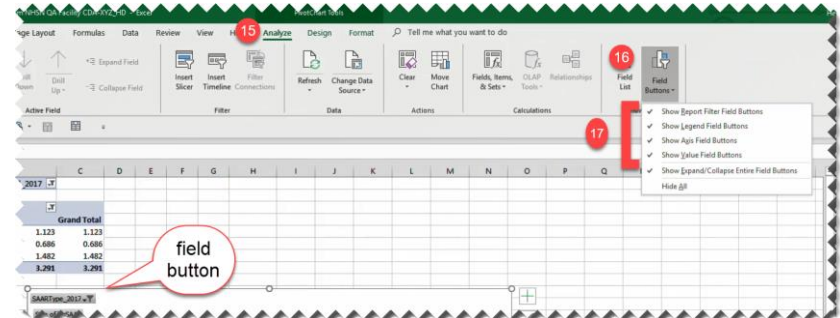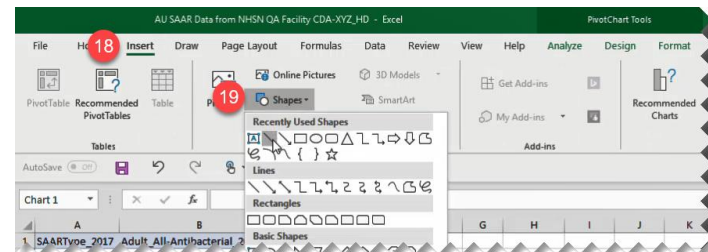

Figure 5

Figure 6

Figure 7

Results

Looking at the output produced in this example (Figure 8), you can see that 4MICU had a SAAR value slightly higher than 1, while 5GNorth had a SAAR value lower than 1, indicating antimicrobial use reported for 5GNorth in Q3 of 2017 was less than what the 2017 baseline predicts. ICU-C's SAAR value in Q3 indicates antimicrobial use was approximately 1.5 times greater than what is predicted by the 2017 baseline and may benefit from targeted stewardship interventions. We recommend reviewing the created pivot chart in tandem with a results table, paying special attention to the 95% confidence intervals to view statistical significance of comparisons between observed and predicted antimicrobial days of therapy. To make a table like Table 1 just copy the variables of interest from your original exported spreadsheet or refer to https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/aur/AU-QRG-SAARTables-Location.pdf to learn how to modify the SAAR table report within the NHSN application.

Note: If you update data in your original table you can update your chart as well! After updating data in your table, select the"Data" tab from the main menu and choose "Refesh All" to update the chart (Figure 9).

Additional Resources

Strategies to Assess Antibiotic Use to Drive Improvements in Hospitals: https://www.cdc.gov/antibiotic-use/healthcare/pdfs/Strategies-to-assess-antibiotic-use-in-hospitals-508.pdf

Introduction to NHSN Analysis: https://www.cdc.gov/nhsn/pdfs/training/2018/intro-to-analysis-508.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/11pscaurcurrent.pdf

Surveillance for Antimicrobial Use Option: http://www.cdc.gov/nhsn/acute-care-hospital/aur/
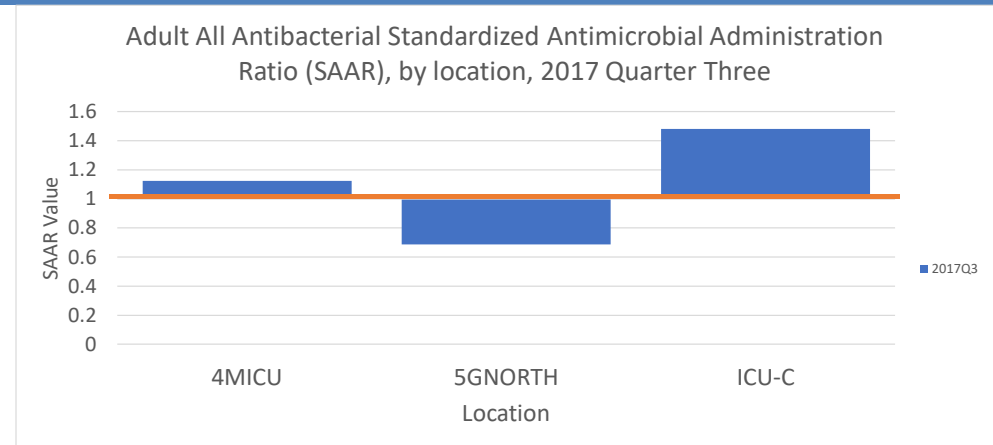
Figure 8

Table 1

All Antibacterial SAAR (2017 Baseline) by Location, Facility XYZ - Q3 2017				
location	Antimicrobial Days	AU Days Predicted	SAAR	SAAR 95% CI
4MICU	522	465.23	1.122	1.076, 1.172
5GNORTH	493	718.65	0.686	0.622, 0.742
ICU-C	400	270.12	1.482	1.185, 1.783

Figure 9