



# Analysis in National Healthcare Safety Network (NHSN)

## Outpatient Procedure Component (OPC)

1. Same Day Outcome Measures (SDOM) Module
2. Surgical Site Infection (SSI) Module

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# Objectives

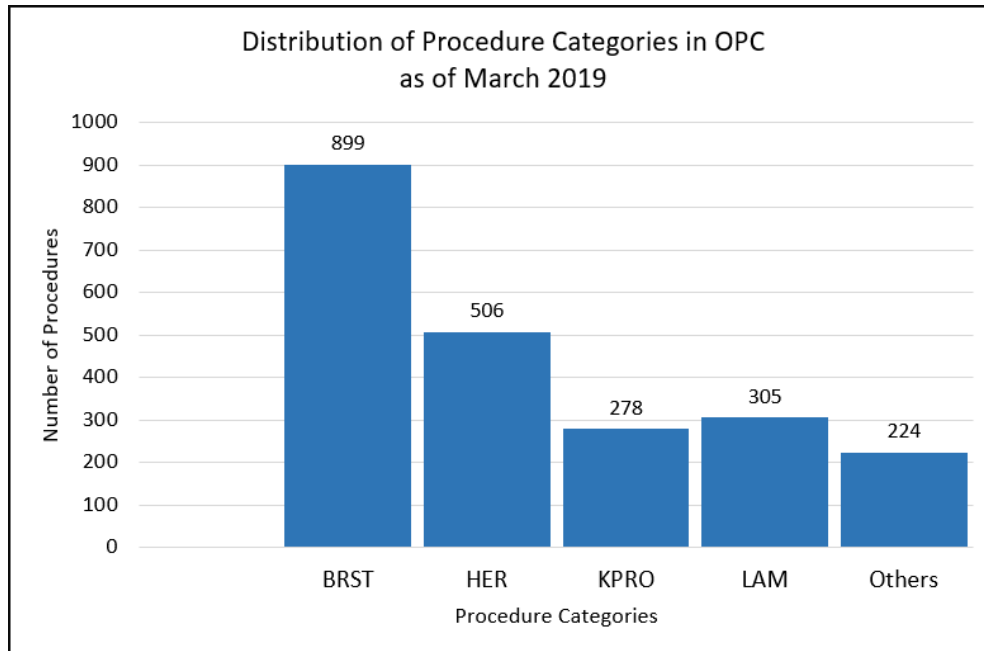
- Illustrate how to access and run the analysis reports in the Outpatient Procedure Component (OPC)
- Review the reporting structure of the SDOM and SSI modules
- Use case examples to analyze and interpret reports

# Background

- OPC ASCs that were currently enrolled in the Patient Safety Component (PSC) SSI module were migrated to OPC
  - Facilities cannot edit data prior to Nov. 1, 2018 in OPC because it will be view-only, however, it can be edited in PSC until October 2019
- OPC analysis reports are designed to accommodate outpatient procedure data from **Ambulatory Surgery Centers (ASCs)**

# Background

- As of March 2019, there are approximately 642 ASCs enrolled in OPC and 2,212 procedure records entered



# Background

- The 2015 aggregate data was used to create the SIR risk adjusted models for outpatient procedures
  - OPC includes ASC SIR data
  - Hospital Outpatient Department (HOPD) data is available in the Patient Safety Component (PSC) only includes HOPD data
  - General exclusions applied to all procedure categories

# OPC Model Exclusions

## General Exclusions

Gender= 'Other'

Inpatient and HOPD procedures and resulting SSIs

SSIs that are reported as superficial incisional secondary (SIS) or deep incisional secondary (DIS)

## Exclusions due to potential data quality issues or outliers

Age at the time of procedure is greater than 109 years

Gender is missing

Adult patients equal to or greater than 18 years: if BMI is less than 12 or greater than 60

Procedure duration less than 5 minutes

Procedure duration is greater than IQR5

# Background

- Requirements for calculating the OPC Adult All SSI SIR
  - >1000 procedures reported
  - At least 1 SSI event reported
- For a variable to be considered in the modeling, the records that included that variable must be complete
- Factors that were found to be statistically significant were included in the final model
- Intercept-only model = none the variables investigated during the analysis stage were found to be statistically significantly associated with SSI risk
- SIRs are not available for procedure categories that had insufficient data

# Summary of OPC Adult All SSI SIR Model

<u>OPC SSI SIR Module</u>	<u>Inclusion Criteria</u>	<u>Patient Population</u>
All SSI SIR Model	<ul style="list-style-type: none"><li>• Includes only ambulatory surgery centers procedures</li><li>• Includes Superficial, Deep &amp; Organ/Space SSIs</li><li>• Superficial &amp; Deep Incisional SSIs limited to primary incisional SSIs only</li><li>• Includes SSIs identified on active and passive surveillance</li></ul>	Procedures in adult patients

- Pediatric SIRs will become available in the future.



# Background

- OPC All SSI SIR models that are available for Adults  $\geq 18$  years of age:
  - Breast Procedures (BRST)
    - risk factors: age, anesthesia, BMI
  - Herniorrhaphy Procedures (HER)
    - risk factors: age, BMI, procedure duration
  - Knee Prosthesis Procedures (KPRO)
    - intercept-only model
  - Laminectomy Procedures (LAM)
    - intercept-only model

# Addendum to the NHSN Guide to SIR-Page 44

## Risk Adjustment Factors Included in the SIR Calculation: 2015 Baseline

### Hospital Outpatient Department (HOPD) Procedure/SSI SIR Model

The number of predicted SSI events is calculated using a logistic regression model (see [page 5](#) above for more information). The SSI SIR is calculated for facilities who enroll in NHSN as acute care hospitals or critical access hospitals. Under the 2015 SIR baseline, procedures and associated SSI events occurring in adult and pediatric patients are modeled separately. There is only one SSI SIR Model available for the hospital outpatient procedures (and associated SSIs). Please see *Table 1* below for a summary of the SSI SIR model. Under the 2015 SIR baseline, procedures, regardless of closure methods, are included in the SIR calculation, as long as the inclusion criteria listed below are met and none of the exclusion criteria apply.

## Risk Adjustment Factors Included in the SIR Calculation: 2015 Baseline

### Outpatient Procedure Component Surgical Site Infections (OPC SSI)

The number of predicted SSI events is calculated using a logistic regression model (see [page 5](#) above for more information). The OPC SSI SIR is calculated for facilities who enroll in NHSN as Ambulatory Surgery Centers (ASC). Under the 2015 SIR baseline, procedures and associated SSI events occurring in adult outpatients are modeled separately in this new component. There is one SIR model available for outpatient adult procedures (and associated SSIs). Please see *Table 1* below for a summary of the OPC SSI SIR model.

NHSN Guide to the SIR:

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

# Knowledge Check 1

All outpatient procedure data records are included in the new Outpatient Procedure Component. True or False?

## ANSWER:

FALSE: only outpatient procedures from the Ambulatory Surgery Center is included in the OPC.

- All other outpatient data is available in Patient Safety under the HOPD reports in the Procedure-Associated Module

# Background: Outpatient Data in OPC versus PSC

## ■ OPC

- Reporting of outpatient data limited to **Ambulatory Surgery Centers (ASCs)** only
- 2015 aggregate data from **ASC** used for risk modeling
- Two distinct reporting modules: SSI and SDOM
- Standardized Infection Ratio (SIR) calculated for Adults: BRST, HER, KPRO, LAM
- As of November 1, 2018, OPC-SSI replaces the use of the PSC SSI event module for ASCs

## ■ PSC

- Reporting of outpatient data for **Hospital Outpatient Departments (HOPDs)** only
- 2015 aggregate data from **HOPD** used for risk modeling
- Reports are located under the Procedure Associated module
- SIR models for certain procedure categories are available for adults and pediatrics
- Outpatient data from ASC previously entered in PSC will be available for editing in PSC until October 2019

## Knowledge Check 2

You can view data for ASC outpatient procedures that were previously entered into PSC in OPC. True or False?

### ANSWER:

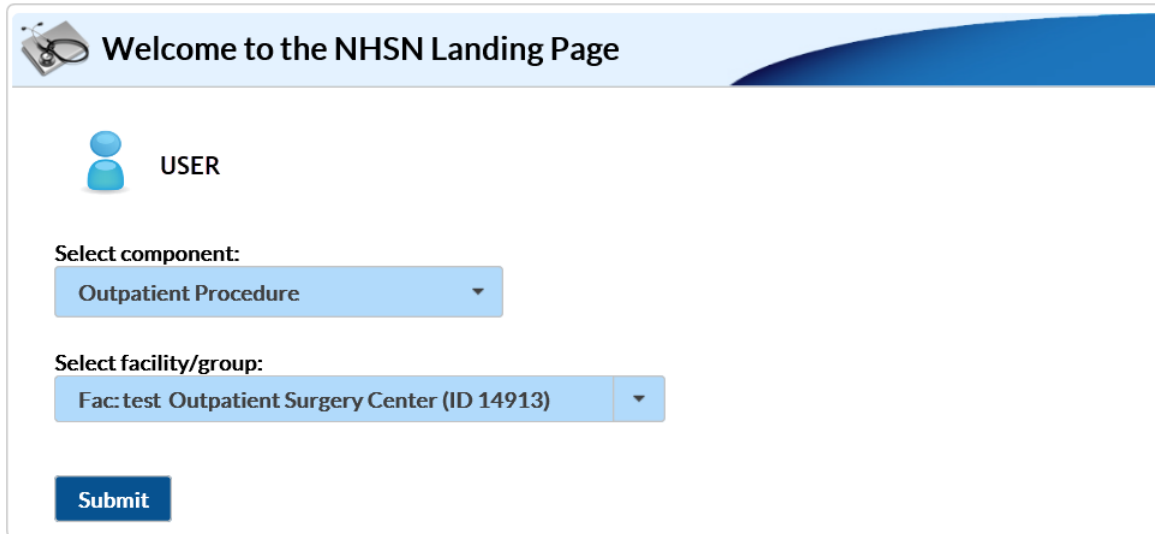
TRUE: OPC ASCs that were currently enrolled in the Patient Safety SSI module were migrated to OPC – the SSI data will be available for analysis

- Facilities cannot edit data prior to Nov. 1 in OPC because it will be view only


# How to Access and Run Analysis Reports in OPC

# Accessing OPC Analysis reports in NHSN

The landing page allows you to select the NHSN component as well as the facility enrolled in each component.



Welcome to the NHSN Landing Page

 USER

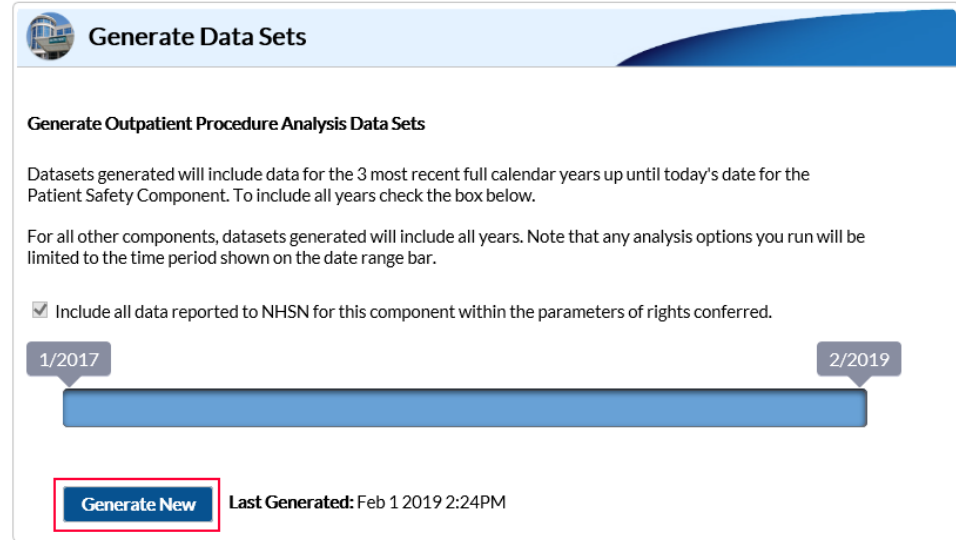
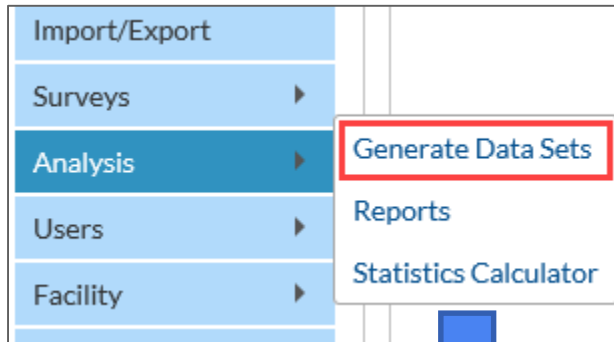
Select component:  
Outpatient Procedure

Select facility/group:  
Fac: test Outpatient Surgery Center (ID 14913)

Submit

# Running Analysis Reports in OPC

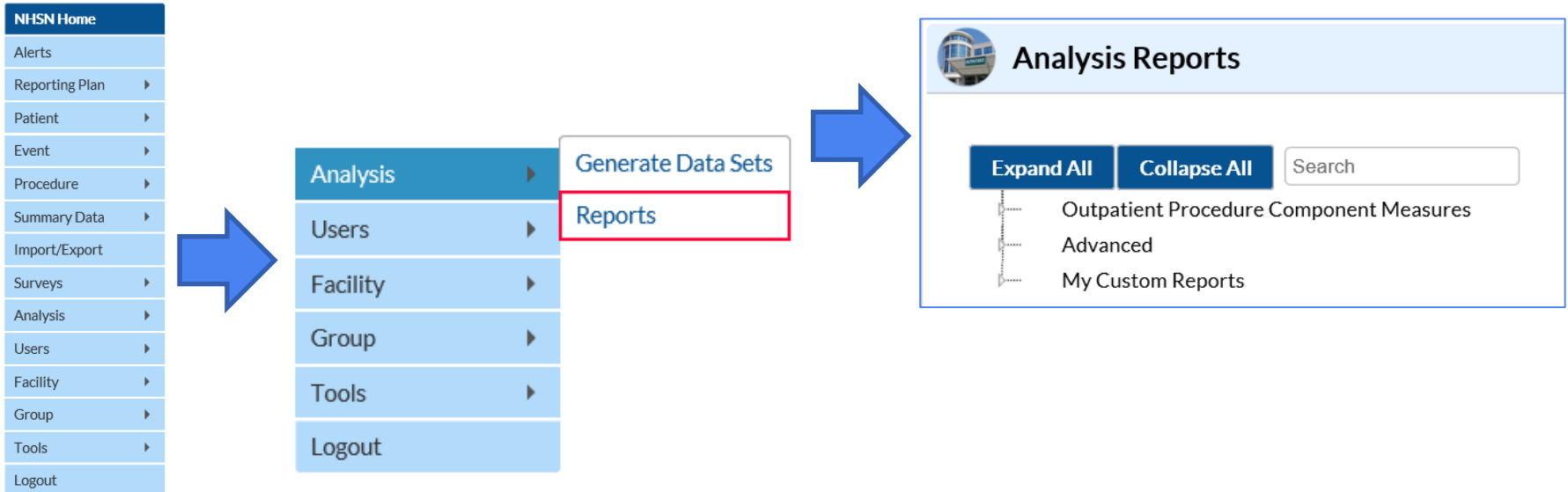
Before running analysis reports for any NHSN Component, it is important to generate a new data set.





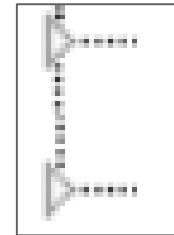
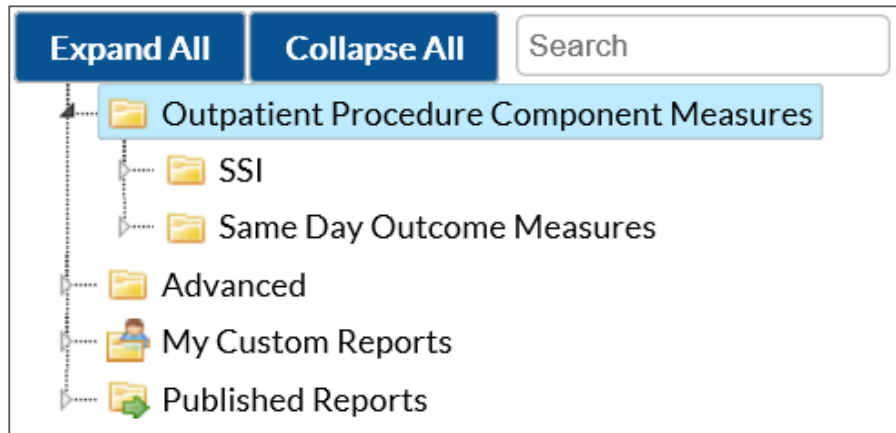
# Accessing OPC Analysis reports in NHSN

- Left navigation pane gives you the option to select “Analysis” and then the “Reports”.
- Each “Report” will have drop down menu for selection of specific reports



# Running Analysis Reports in OPC

- From each of the drop down headings, you can select the reports you want to run



These arrows indicates there are additional menu options within the reports that can be expanded

# Reporting Structure of SSI and SDOM Modules

# OPC Reporting Structure

- Instructions for Data Collection
- Annual Facility Survey
- Monthly Reporting Plan
- SSI Event form
- SDOM Event form
- Denominator of Procedures form

**ASC Surveillance:** <https://www.cdc.gov/nhsn/ambulatory-surgery/index.html>

# SSI Module

Expand All Collapse All Search

Outpatient Procedure Component Measures

- SSI
- Line Listing - All SSI Events
- Frequency Table - All SSI Events
- Bar Chart - All SSI Events
- Pie Chart - All SSI Events
- SIR SIR - Adult All Outpatient SSI Data by Procedure
- SIR SIR - Adult All Outpatient SSI Data by Surgeon
- Line Listing - Outpatient Procedures Excluded from SIR
- Custom Reports



SSI

Line Listing - All SSI Events

- Run Report
- Modify Report
- Export Data Set

# SDOM Module

Expand All Collapse All Search

- Outpatient Procedure Component Measures
  - SSI
    - Same Day Outcome Measures**
    - Line Listing - SDOM Events
    - Frequency Table - SDOM Events
    - Bar Chart - SDOM Events
    - Pie Chart - SDOM Events

Same Day Outcome Measures

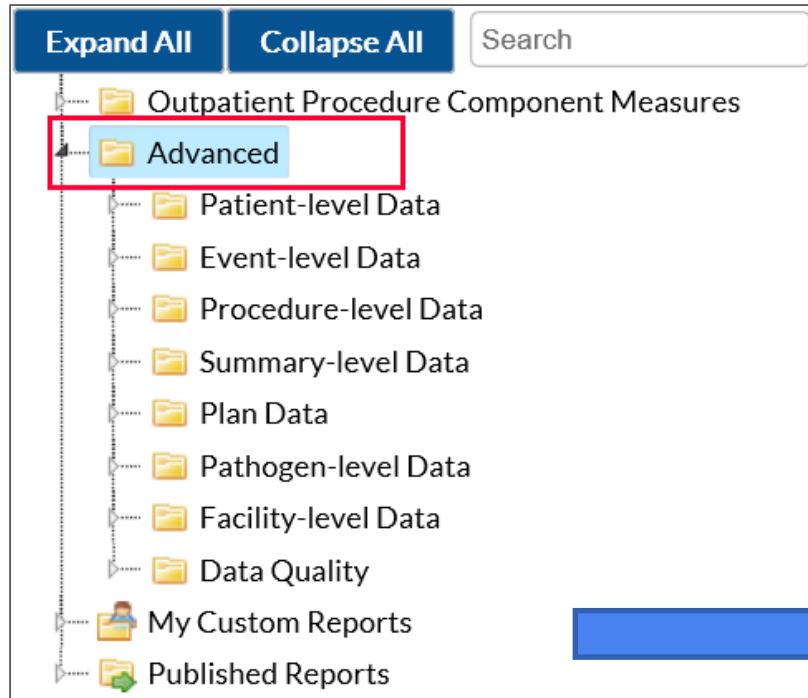
Line Listing - SDOM Events

- ▶ Run Report
- ⚙ Modify Report
- Export Data Set

Adv

My Custom Reports

# Additional Analysis Reports



Various reports can allow you to create line listings, frequency tables, and graphs based on report type.

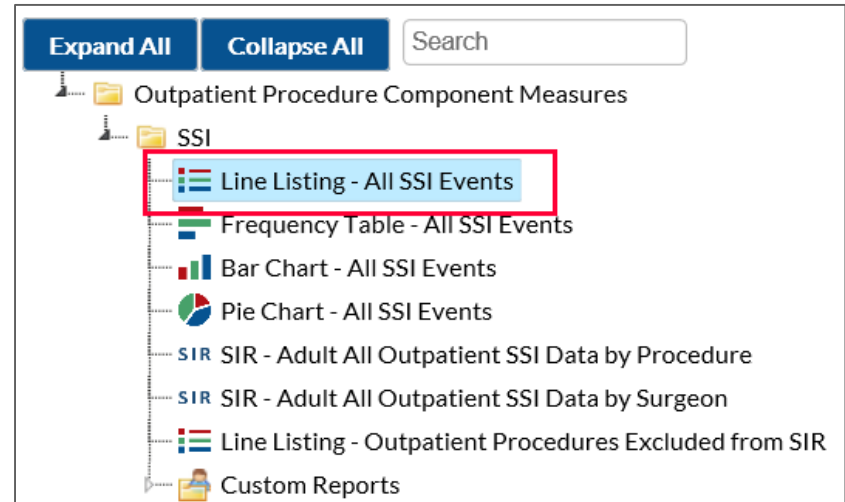
You can also create custom reports to save as a template for future use

# Case Examples



# Case Example 1

- The NHSN Outpatient Surgery Center had a record number of outpatient procedures performed between June and December 2018. There were a total of 3,000 procedures performed. We want to see a line listing of all events that were identified for that time period.
- How would we do this?
  - Line Listing –All SSI Events



# Case Example 1: Modification of SSI Event Line Listing

- Time Period: June through December 2018

Show descriptive variable names ([Print List](#))

Title/Format	Time Period	Filters	Display Variables	Sort Variables	Display Options
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**Time Period:**

Date Variable	Beginning	Ending	
procDateYM ▾	06/2018	12/2018	<a href="#">✕ Clear Time Period</a>

Enter Date variable/Time period at the time you click the Run button

- Show descriptive variable names = variable labels on the report
  - procDateYm =procedure date year month
- Date Variable: search by procedure date because procedure carries the risk of infection

# Case Example 1: Modification of SSI Event Line Listing

**Title/Format** | **Time Period** | **Filters** | **Display Variables** | **Sort Variables** | **Display Options**

**Display Variables:**

**Available Variables:**

- component
- eventDate
- eventID
- evntDateYH
- evntDateYM
- evntDateYQ
- evntDateYr
- opeventType
- opeventTypeDesc
- opspcEvent
- opspcEventDesc
- pathIdentified
- pathogen1
- pathogen2

**Selected Variables:**

- orgID
- patID
- procDate
- procCode
- dob
- ageAtProc
- gender
- procDurationHr
- procDurationMin
- outpatient
- whenDetected
- allAdultExcl

**Buttons:** Up, Down, Undo

# Case Example 1: Modification of SSI Event Line Listing

The screenshot displays the 'Sort Variables' tab of a software interface. At the top, there are six tabs: 'Title/Format', 'Time Period', 'Filters', 'Display Variables', 'Sort Variables' (which is highlighted in green), and 'Display Options'. Below the tabs, the 'Sort Variables:' section is active. It contains two main areas: 'Available Variables:' and 'Selected Variables:'. The 'Available Variables:' list includes: admDateYH, admDateYM, admDateYQ, admDateYr, admToDisDays, admToEvntDays, ageAtEvent, ageAtProc, and allAdultExcl. The 'Selected Variables:' list contains 'procCode'. Between the two lists are four buttons: 'All' (with a right arrow), 'Selected' (with a right arrow), '< Selected' (with a left arrow), and '<< All' (with a left arrow). To the right of the 'Selected Variables:' list are three buttons: 'Up' (with a left arrow), 'Down' (with a right arrow), and 'Undo' (with a curved arrow).

**NOTE:** the variable must be in your line list in order to sort on that variable

# Case Example: Report Output

## National Healthcare Safety Network Line Listing of All Surgical Site Infection Events

As of February 12, 2019 at 3:29 PM

Date Range: All OP\_SSI\_EVENTS procDateYM 2018M06 to 2018M12

patID	procDate	procCode	ageAtProc	gender	whenDetected	allAdultExcl	component	eventDate	
OPC1015	06/01/2018	AMP	77	F	ACTIVE	0	PS	07/01/2018	DIP
OPC1515	06/01/2018	AVSD	26	F	ACTIVE	0	PS	07/04/2018	DIP
OPC1336	07/01/2018	BRST	26	F	ACTIVE	0	PS	08/04/2018	OS-BRST
OPC1129	07/15/2018	BRST	127	F	ACTIVE	1	PS	08/30/2018	BRST-DIP
OPC1396	06/02/2018	BRST	49	F	PASSIVE	1	PS	07/01/2018	DIS-BRST
OPC1029	07/06/2018	BRST	45	F	PASSIVE	1	OP	08/02/2018	OS-BRST
OPC1162	08/08/2018	BRST	68	M	ACTIVE	0	OP	09/03/2018	SIP-BRST
OPC1156	09/20/2018	BRST	76	F	ACTIVE	0	OP	10/04/2018	DIS-BRST
OPC1396	07/01/2018	BRST	27	F	ACTIVE	1	PS	07/15/2018	DIS-BRST
OPC1022	06/11/2018	BRST	61	M	ACTIVE	0	OP	06/15/2018	DIP-BRST
OPC1020	08/28/2018	HER	66	M	PASSIVE	1	OP	09/05/2018	SIP
OPC1415	08/03/2018	HER	41	F	PASSIVE	1	OP	08/29/2018	DIP
OPC1024	09/09/2018	HER	59	M	PASSIVE	1	OP	09/14/2018	OS
OPC1200	07/05/2018	KPRO	43	F	PASSIVE	0	OP	07/28/2018	SIS
OPC1202	07/05/2018	KPRO	42	M	ACTIVE	1	OP	09/10/2018	SIS
OPC1205	07/24/2018	KPRO	44	M	ACTIVE	1	OP	08/12/2018	DIP

The component shows you if the records were entered in OPC or PSC

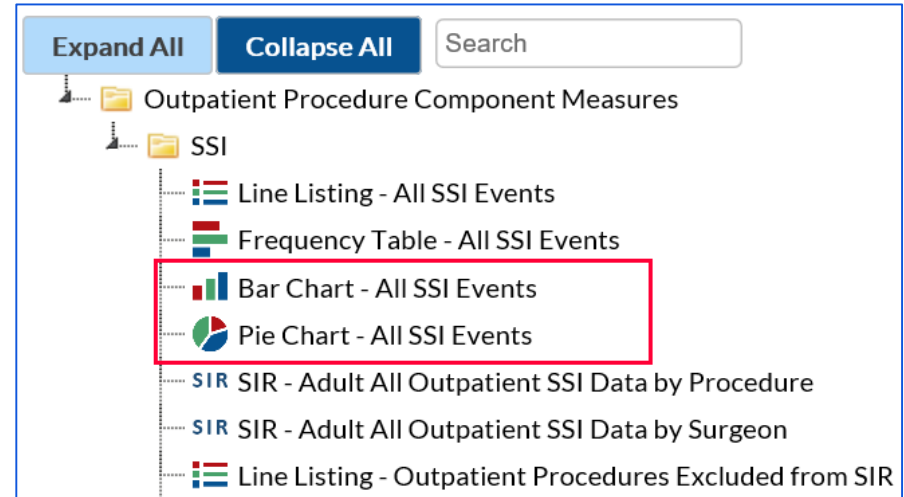
8 BRST SSI Events

## Case Example 2

- You are asked to provide a graphical representation of the data to understand the (1) distribution of the specific event types that were identified for BRST SSIs and (2) when these SSIs were detected.
- How can you show that information?

### Pie Charts and Bar Charts

1. Use Pie chart to show distribution of event type
2. Use Bar Chart to show distribution of detection type



# Case Example 2: Modifications for Pie Chart

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

Additional Filters:  Show  Clear

AND OR Add group

AND OR Add rule

procCode equal BRST Delete

Adding a filter to only show BRST procedures

Note: opspcEvent=Outpatient Specific Event

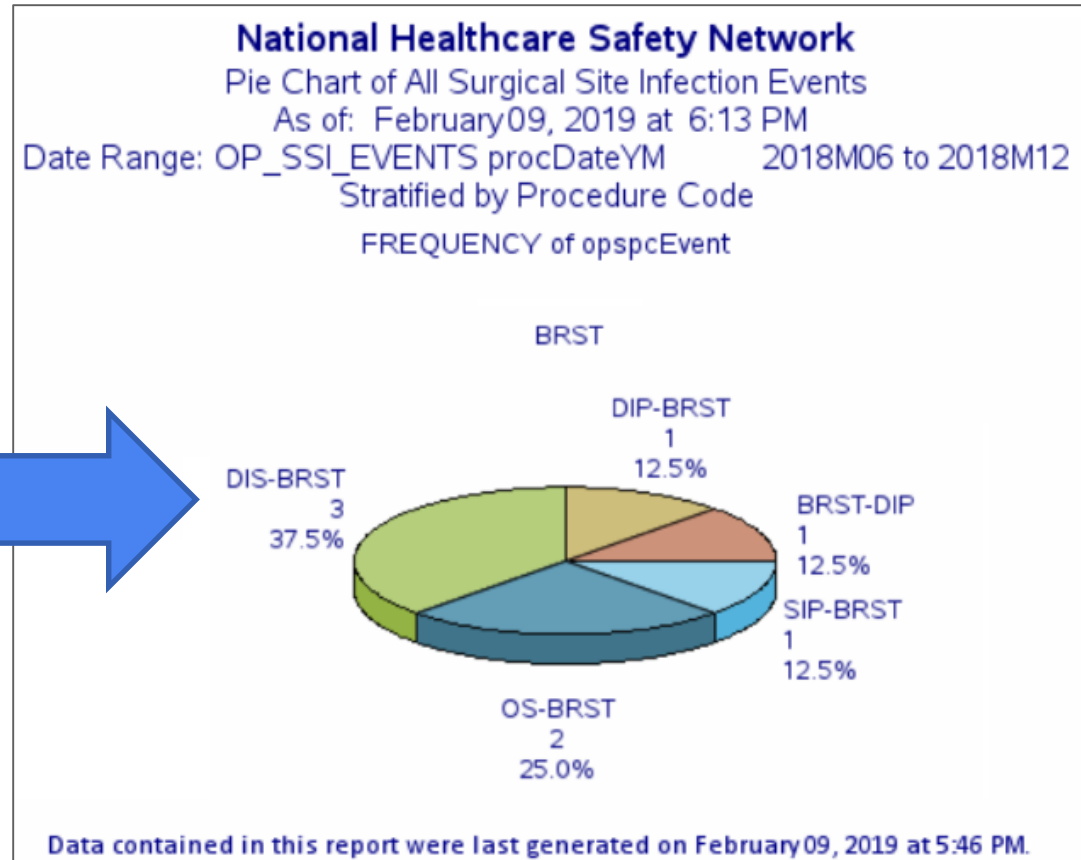
Title/Format Time Period Filters **Display Options**

Pie Chart Options:

Chart Variable	Stratification Variable	Page by
opspcEvent	procCode	
Number of pies across a page:	2	
Number of pies down a page:	1	
Placement of the Percent:	Outside	
Placement of the Slice Label:	Outside	
Placement of the Value:	Outside	
Placement of Legend:	None	

## Case Example 2: Pie Chart Report

- The pie chart is showing you that more DIS-BRST events were identified in that time period than other infection type
- Allows further investigation into the record level details
- Note: DIS-BRST=Deep incisional Breast SSI Events





## Case Example 2: Modifications for Bar Chart

Title/Format Time Period Filters Display Options

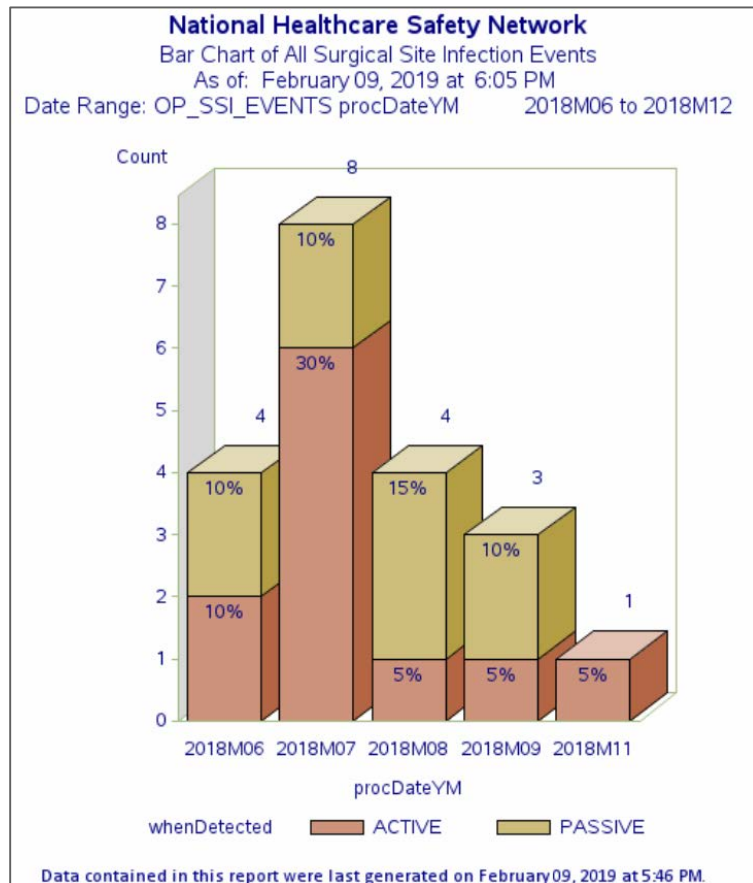
  

**Bar Chart Options**

<b>Chart Variable</b>	<b>Stratification Variable</b>	<b>Page by</b>
procDateYM	whenDetected	
Orientation of Bars:		
3D Vertical		
Placement of the Percent:		
Inside		
Placement of the Value:		
Outside		

- View the distribution of SSI detection type by month

# Case Example 2: Bar Chart Report Output

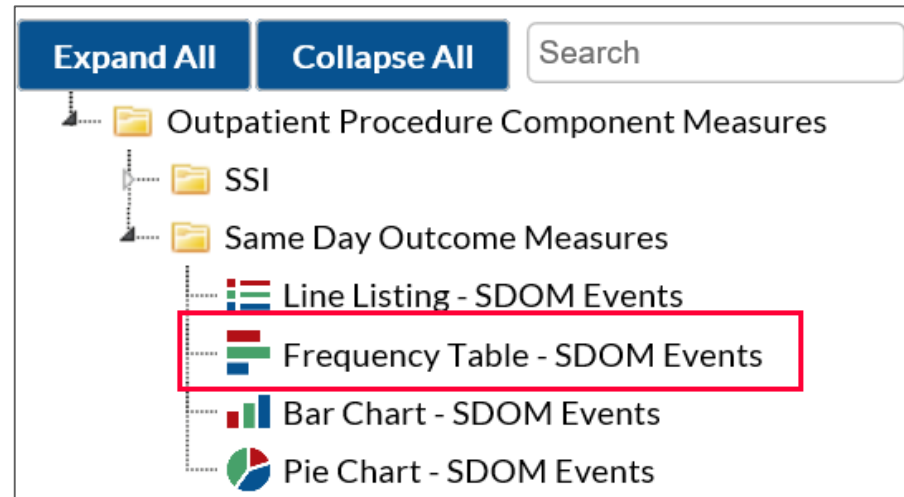


*\*Fictitious data for illustrative purposes only*

- This graph is showing the overall distribution of SSI event detection methods
- More SSI Events in July 2018 were identified via active surveillance than passive surveillance
- Facilities can use this to identify which detection method is better at capturing SSI events

## Case Example 3

- The NHSN Outpatient Surgery Center monitors same day outcome measures and implemented a new “No Patient Fall” prevention initiative in 2018. The team is interested to know how it is working. How many patient falls were reported in 2018 vs 2019?
- How can we accomplish this?
  - Frequency Table



# Case Example 3: Modification

Title/Format Time Period Filters Display Options

**Frequency Table Options:**

**Selected Variables to include in report:**

<b>Row</b>	<b>Column</b>	<b>Page by</b>
evntDateYr	patientFall	orgID

**Frequency Table Options:**

- Table percent - Display cell frequency divided by table total
- Missing - Include observations with missing values
- Print the table in list form

**Two-Way Table Options:**

- Row Percent - Display cell frequency divided by row total
- Column Percent - Display cell frequency divided by column total
- Expected - Expected cell frequencies
- Chi-square - Test for independence

# Case Example 3: Frequency Table Report Output

National Healthcare Safety Network  
Frequency Table of Same Day Outcome Measure Events  
As of: February 12, 2019 at 6:53 PM  
Date Range: All OP\_SDOM\_EVENTS

orgID=14913

Frequency  
Percent  
Row Pct  
Col Pct

evntDateYr	patientFall		
	patientFall		
	N	Y	Total
2018	4	2	6
	57.14	28.57	85.71
	66.67	33.33	
	80.00	100.00	
2019	1	0	1
	14.29	0.00	14.29
	100.00	0.00	
	20.00	0.00	
<b>Total</b>	5	2	7
	71.43	28.57	100.00

Data contained in this report were last generated on February 12, 2019 at 5:46 PM.

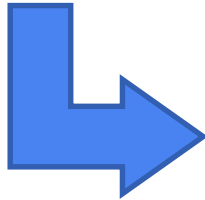
*\*Fictitious data for illustrative purposes only*

- Out of 6 SDOM encounters reported for 2018, two events were patient falls
- There were zero falls reported for 2019
- Given this information, the “No Patient Fall” initiative is working and so far there has been a reduction in falls reported in 2019

## Case Example 4:

- The NHSN Outpatient Surgery Center's executive team is interested in knowing overall how the facility is performing in regards to breast procedures that were performed in 2018.

Use the SIR Report!



Expand All Collapse All Search

- Outpatient Procedure Component Measures
  - SSI
    - Line Listing - All SSI Events
    - Frequency Table - All SSI Events
    - Bar Chart - All SSI Events
    - Pie Chart - All SSI Events
    - SIR SIR - Adult All Outpatient SSI Data by Procedure**
    - SIR SIR - Adult All Outpatient SSI Data by Surgeon
    - Line Listing - Outpatient Procedures Excluded from SIR

# Case Example 4: Modifications

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

**Time Period:**

Date Variable	Beginning	Ending	
summaryYr ▼	2018	2018	<b>Clear Time Period</b>
<input type="checkbox"/> Enter Date variable/Time Period			

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

**Additional Filters:** **Show** **Clear**

AND OR **Add group**

AND OR **Add rule**

procCode ▼ equal ▼ BRST **Delete**

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

**SIR Options:**

**Group by:** summaryYr ▼

## Case Example 4: ASC BRST SIR

- Predictive Risk Factors from the All Outpatient BRST SSI SIR model includes:
  - anesthesia
  - age
  - BMI



# Case Example 4: SIR Report

## National Healthcare Safety Network

### SIR for Adult All Outpatient SSI Data by Procedure (2015 Baseline) - By OrgID

As of: February 4, 2019 at 12:27 PM

Date Range: All OP SIR ADULTALLSSIPROC s summaryYM 2018M01 to 2018M12

if (((procCode = "BRST" ) ) )

orgid=14913

orgid	ccn	procCount	infCountAdultAll	numPredAdultAll	SIRAll	SIRAll_pval	SIRAll95CI
14913	868768	18	1	1.132	0.883	1.0000	0.044, 4.356

1. Includes outpatient NHSN operative procedures performed in ambulatory surgery centers (AMB-SURG) in patients  $\geq 18$  years of age.
2. The SIR is only calculated if numPred is  $\geq 1$ . Lower bound of 95% Confidence Interval only calculated if infCount  $> 0$ .
3. The number of predicted events is calculated based on national aggregate NHSN data from 2015.
4. Excludes all Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs.
5. Includes procedures and associated SSIs that are reported with either primary or other than primary closure technique.

Source of aggregate data: 2015 NHSN SSI Data

Data contained in this report were last generated on February 4, 2019 at 10:32 AM.

*\*Fictitious data for illustrative purposes only*

## Case Example 4: SIR Report Interpretation

orgid	ccn	procCount	infCountAdultAll	numPredAdultAll	SIRAll	SIRAll_pval	SIRAll95CI
14913	868768	18	1	1.132	0.883	1.0000	0.044, 4.356

- In 2018, there was 1 breast SSI event identified in facility 14913 (infCountAdultAll), and there was a total of 18 outpatient breast surgeries performed (procCount).
- Based on the NHSN 2015 baseline data, 1.132 breast SSIs were predicted (“numPredAdultAll”) in this facility under the Adult All Outpatient SSI SIR risk adjusted model.
- This results in an SIR of 0.883 (1/1.132), signifying that during this time period, the facility identified less breast SSIs than were predicted.
- Because the p-value (“SIRAll\_pval”) is above the significance level of 0.05 and the 95% confidence interval (“SIRAll95CI”) includes the value of 1, we can conclude that this facility’s SIR is not statistically significant; in other words, this facility did not observe a statistically significantly different number of breast SSIs than predicted.

## Knowledge Check 3

What is the best way to represent your facility's data?

- a. Line List
- b. Frequency Table
- c. SIR
- d. All of the above

**ANSWER:** ALL OF THE ABOVE - You can utilize line lists, frequency tables, bar charts, pie charts and SIR reports based on what kind of reporting you need.

# Summary of OPC Analysis Reports

## In Summary

- There are two modules within OPC: SDOM and SSI
- Facilities that were enrolled in PSC and entering outpatient data have been transferred into OPC and that data is viewable
- Reports, such as line listings, frequency tables and graphical charts can be found in all report modules
- OPC data is outpatient data from ASCs using the 2015 baseline data for the risk adjusted model:
  - Adult All Outpatient SSI SIR reports are available for BRST, HER, KPRO, and LAM
- You can utilize the analysis reports to provide insight into trends for prevention initiatives

# Analysis Resources

- OPC Analysis Resource Guides: **Coming Soon!**
- ASC Surveillance Guides: <https://www.cdc.gov/nhsn/ambulatory-surgery/index.html>
- NHSN Guide to the SIR: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>
- General Analysis Resources: <https://www.cdc.gov/nhsn/ps-analysis-resources/index.html>

Thank You!  
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For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://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.

