



Analyzing Device-Associated HAI Data

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Learning Objectives

- Understand the standardized infection ratio (SIR) and its use in the interpretation of Device-associated data
- Discuss the risk-adjustment methods for SIR Data
- Explain the use of the SIR data and interpretation of the analysis reports
- Review some frequently asked questions (FAQs)

Why Analyze?

- Analysis tools within NHSN help facilitate internal validation activities and help ensure accuracy
- Reports generated from NHSN can help inform prioritization and success of prevention activities
- Data entered into NHSN may be used by: CDC, CMS, your state health department, your corporation, special study groups, etc...
- Know YOUR data!!!!

A Review: The Standardized Infection Ratio (SIR)

- **SIR** – A summary statistic that compares the number of healthcare-associated infections (HAIs) that were reported to the number of HAIs that were predicted to occur, based on a calculation using data for HAI events that occurred in a given referent time period

$$\mathbf{SIR} = \frac{\# \textit{observed HAIs}}{\# \textit{predicted HAIs}}$$

A Review: The Standardized Infection Ratio (SIR)

- SIR interpretation:
 - 1 = number of infections reported as would be predicted given the US baseline data
 - Greater than 1 = more infections reported than what would be predicted given the US baseline data
 - SIR of 1.25 = 25% more infections than predicted
 - Less than 1 = fewer infections reported than what would be predicted given the US baseline data
 - SIR of 0.50 = 50% fewer infections than predicted

Basis for Using SIRs and not Rates

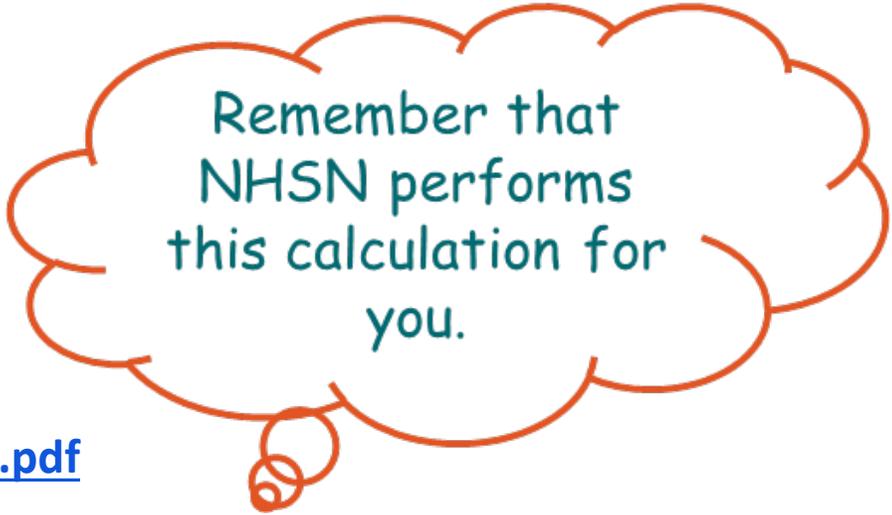
- The SIR allows users to summarize data by more than a single stratum (e.g. location or procedure category), adjusting for differences in the incidence of infection among the strata
- The SIR permits comparisons between the number of infections experienced by a facility, group, or state to the number of infections that were predicted to have occurred based on national data

Calculating the Number of Predicted Infections

- The number of predicted infections in NHSN is calculated based on the 2015 national HAI aggregate data and adjusted for each facility using variables found to be significant predictors of HAI incidence
- Negative binomial regression models are used to calculate the number of predicted events for CLABSI, MBI-LCBI, CAUTI, VAE

orgID=10000 medType=' '

orgID	ccn	summaryYM	infCount	numPred	numcldays	SIR	SIR_pval	sir95ci
10000	31C0001043	2019M01	0	0.615	769	.	.	.



Remember that
NHSN performs
this calculation for
you.

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

Using Models for Device-associated Infections

- General Negative Binomial Regression Model:

$$\log(\lambda) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i, \text{ where:}$$

α = Intercept

β_i = Parameter Estimate

X_i = Value of Risk Factor (Categorical variables= 1 if present, 0 if not.)

i = Number of Predictors

A Guide to the SIR: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>

Factors Included in the Model: Acute Care Hospitals (ACHs)

Factor	CLABSI	CLABSI (NICU)	CAUTI	Total VAE	IVAC Plus
CDC Location	✓		✓	✓	✓
Facility Type	✓		✓	✓	
Medical School Affiliation*	✓		✓	✓	✓
Birthweight		✓			
Facility Bed size*	✓		✓	✓	✓

* Variables taken from the Annual Survey

Device-associated SIR Risk Adjustment

Methods for Calculating the Predicted Number of CLABSI Infections in Acute Care Hospital (non-NICU)

Effect	Parameter Estimate
Intercept	-7.6325
CDC Location: Adult Critical Care Units, Oncology CC units	0.3257
CDC Location: Pediatric Critical Care	0.5695
CDC Location: Burn Critical Care	1.4269
CDC Location: Trauma Critical Care	0.6287
CDC Location: Specialty Care Areas	0.3766
CDC Location: Step-down Units	0.2155
CDC Location: Select Adult Wards	0.1797
CDC Location: Oncology Wards	0.3698
CDC Location Oncology Stem Cell Transplant Wards	0.6876
CDC Location: Pediatric Wards & Nurseries	0.1912
CDC Location: All Other Wards	REFERENT

Methods for Calculating the Predicted Number of CLABSI Infections in Acute Care Hospital (non-NICU)

Effect	Parameter Estimate
Intercept	-7.6325
Medical School Affiliation*: Major	0.2627
Medical School Affiliation*: Graduate	0.1494
Medical School Affiliation*: Undergraduate/Non-teaching	REFERENT
Facility Type: Children's, Military, Veteran's Affairs, Women's, Women's and Children's	0.1429
Facility Type: General Acute Care, Oncology, Orthopedic, Psychiatric, Surgical	REFERENT
Facility Bed Size*: ≥ 224 Beds	0.2571
Facility Bed Size*: 94 – 223 Beds	0.1160
Facility Bed Size*: ≤ 93 Beds	REFERENT

Example: Applying Risk Model for CLABSI, NHSN 2015

$$\begin{aligned}
 &= \exp(-7.6325 + \\
 &0.3257 * (\text{Adult Critical Care and Oncology CC}^*) + \\
 &0.5695 * (\text{Pediatric Critical Care}^*) + \\
 &1.4269 * (\text{Burn Critical Care}^*) + \\
 &0.6287 * (\text{Trauma Critical Care}^*) + \\
 &0.3766 * (\text{Specialty Care Areas}^*) + \\
 &0.2155 * (\text{Step-down Units}^*) + \\
 &0.1797 * (\text{Select Adult Wards}^*) + \\
 &0.3798 * (\text{Oncology Wards}^*) + \\
 &0.6876 * (\text{Oncology Stem Cell Transplant}^*) + \\
 &0.1912 * (\text{Pediatric Wards \& Nurseries}^*) + \\
 &0.2627 * (\text{Med School Aff: Major}^*) + \\
 &0.1494 * (\text{Med School Aff: Graduate}^*) + \\
 &0.1429 * (\text{Facility Type: Children's, Military, VA, Women's} \\
 &\text{and Women's and Children's}^*) + \\
 &0.2571 * (\text{Facility Bed Size} \geq 224 \text{ Beds}^*) + \\
 &0.1160 * (\text{Facility Bed Size } 94\text{-}223 \text{ Beds}^*) * \text{numCLDays}
 \end{aligned}$$

* For these risk factors, if present = 1; if not = 0

Effect	Parameter Estimate
Intercept	-7.6325
CDC Location: Adult Critical Care Units, Oncology CC units	0.3257
CDC Location: Pediatric Critical Care	0.5695
CDC Location: Burn Critical Care	1.4269
CDC Location: Trauma Critical Care	0.6287
CDC Location: Specialty Care Areas	0.3766
CDC Location: Step-down Units	0.2155
CDC Location: Select Adult Wards	0.1797
CDC Location: Oncology Wards	0.3698
CDC Location Oncology Stem Cell Transplant Wards	0.6876
CDC Location: Pediatric Wards & Nurseries	0.1912
CDC Location: All Other Wards	REFERENT
Medical School Affiliation*: Major	0.2627
Medical School Affiliation*: Graduate	0.1494
Medical School Affiliation*: Undergraduate/Non-teaching	REFERENT
Facility Type: Children's, Military, Veteran's Affairs, Women's, Women's and Children's	0.1429
Facility Type: General Acute Care, Oncology, Orthopedic, Psychiatric, Surgical	REFERENT
Facility Bed Size*: ≥ 224 Beds	0.2571
Facility Bed Size*: 94 – 223 Beds	0.1160
Facility Bed Size*: ≤ 93 Beds	REFERENT

Example: Applying Risk Model for CLABSI, NHSN 2015

- Facility Profile:
 - 215-beds
 - General Acute Care Hospital
 - Graduate Teaching Facility
 - Reporting for:
 - Medical Cardiac Critical Care
 - With 565 central line days for January 2019



Example: Applying Risk Model for CLABSI, NHSN 2015

= exp(-7.6325 +

0.3257*(1) +

0.5695*(0) +

1.4269*(0)+

0.6287*(0) +

0.3766*(0) +

0.2155*(0)+

0.1797*(0)+

0.3698*(0)+

0.6876*(0)+

0.1912*(0)+

0.2627*(0)+

0.1494*(1)+

0.1429*(0)*+

0.2571*(0)*+

0.1160*(1)) * 565 Central line days

0.494 = predicted CLABSI events for the month of January

* For these risk factors, if present = 1; if not = 0

Table 1. CLABSI in Acute Care Hospitals (non-NICU locations)

Parameter	Parameter Estimate	Standard Error	P-value
<i>Intercept</i>	-7.6325	0.0606	<0.0001
<u>CDC Location Code: Adult Critical Care Units, Oncology Critical Care Units</u>			
<i>Medical Cardiac Critical Care</i>			
<i>Surgical Cardiothoracic Critical Care</i>			
<i>Medical Critical Care</i>			
<i>Medical/Surgical Critical Care</i>			
<i>Neurologic Critical Care</i>			
<i>Neurosurgical Critical Care</i>	0.3257	0.0435	<0.0001
<i>Medical Oncology Critical Care</i>			
<i>Medical/Surgical Oncology Critical Care</i>			
<i>Pediatric Oncology Critical Care</i>			
<i>Surgical Oncology Critical Care</i>			
<i>Prenatal Critical Care</i>			
<i>Respiratory Critical Care</i>			
<i>Surgical Critical Care</i>			
<u>CDC Location Code: Pediatric Critical Care</u>			
<i>Pediatric Burn Critical Care</i>			
<i>Pediatric Cardiothoracic Critical Care</i>			
<i>Pediatric Medical/Surgical Critical Care</i>			
<i>Pediatric Medical Critical Care</i>			
<i>Pediatric Neurosurgical Critical Care</i>			
<i>Pediatric Surgical Critical Care</i>	0.5695	0.0699	<0.0001
<i>Pediatric Trauma Critical Care</i>			
CDC Location Code: Burn Critical Care (Adult)	1.4269	0.1125	<0.0001
CDC Location Code: Trauma Critical Care (Adult)	0.6287	0.0835	<0.0001

Example: Applying Risk Model for CLABSI, NHSN 2015

$$\begin{aligned}
 &= \exp(-7.6325 + \\
 &0.3257*(1) + \\
 &0.5695*(0) + \\
 &1.4269*(0) + \\
 &0.6287*(0) + \\
 &0.3766*(0) + \\
 &0.2155*(0) + \\
 &0.1797*(0) + \\
 &0.3698*(0) + \\
 &0.6876*(0) + \\
 &0.1912*(0) + \\
 &0.2627*(0) + \\
 &0.1494*(1) + \\
 &0.1429*(0)* + \\
 &0.2571*(0)* + \\
 &0.1160*(1)) * 565 \text{ Central line days}
 \end{aligned}$$

Facility bed size*: ≥ 224 beds	0.2571	0.0471	<0.0001
Facility bed size*: 94 - 223 beds	0.1160	0.0493	0.0187
Facility bed size*: ≤ 93 beds	REFERENT	-	-
Medical school affiliation*: Major	0.2627	0.0211	<0.0001
Medical school affiliation*: Graduate	0.1494	0.0244	<0.0001
Medical school affiliation*: Undergraduate/Non-teaching	REFERENT	-	-
<u>Facility type: (based on NHSN enrollment)</u>	0.1429	0.0526	0.0066
<i>Children's</i> <i>Military</i> <i>Veterans' Affairs</i> <i>Women's</i> <i>Women's and Children's</i>			
<u>Facility type: (based on NHSN enrollment)</u>	REFERENT	-	-
<i>General Acute Care</i> <i>Oncology</i> <i>Orthopedic</i> <i>Psychiatric</i> <i>Surgical</i>			

0.494 = predicted CLABSI events for the month of January

* For these risk factors, if present = 1; if not = 0

Your hospital has been measuring CLABSI using SIRs and you have noticed a difference of your number predicted from month to month. Primarily, what factor would largely contribute to variations in the number predicted from month to month?

CDC Location

Number of Beds

Number of
Central lines

Medical School
Affiliation

Knowledge Check: Your hospital has been measuring CLABSI using SIRs and you have noticed a difference of your number predicted from month to month. Primarily, what factor would largely contribute to variations in the number predicted from month to month?

- Central line days
- The parameter estimates for CLABSI model:
 - CDC Location – rarely changes
 - Facility bed size – changes, if any, per year
 - Facility Type – rarely changes
 - Medical school affiliation – changes, if any, per year
 - Central line days – multiplier that changes every month

SIR Tables in NHSN

Generate Data sets

- Always generate your datasets before analyzing your data

Generate Patient Safety Analysis Data Sets

Datasets generated will include data for the 3 most recent full calendar years up until today's date for the Patient Safety Component. To include all years check the box below.

For all other components, datasets generated will include all years. Note that any analysis options you run will be limited to the time period shown on the date range bar.

Include all data reported to NHSN for this component within the parameters of rights conferred.



Generate New

Last Generated: Feb 26 2019 12:28PM

Device Associated Reports in NHSN

- Device-Associated (DA) Module 
 - Central Line-Associated BSI
 - Mucosal Barrier Injury CLABSI
 - Ventilator-Associated PNEU
 - Ventilator-Associated Events
 - Pediatric Ventilator-Associated Events
 - Urinary Catheter-Associated UTI
 - Central Line Insertion Practices
- Procedure-Associated (PA) Module
- HAI Antimicrobial Resistance (DA+PA Modules)
- Antimicrobial Use and Resistance Module
- MDRO/CDI Module - LABID Event Reporting
- MDRO/CDI Module - Infection Surveillance
- MDRO/CDI Module - Process Measures
- MDRO/CDI Module - Outcome Measures
- CMS Reports 
 - Acute Care Hospitals (Hospital IQR)
 - Critical Access Hospitals (Hospital IQR)
 - Inpatient Rehabilitation Facilities (IRFQR)
 - Long Term Acute Care Hospitals (LTCHQR)
 - PPS-Exempt Cancer Hospitals (PCHQR)

- Baseline Set 1
 - DA - Central Line Associated BSI 
 - DA - Ventilator-Associated VAE 
 - DA - Urinary Catheter-Associated UTI 
 - PA - SSI
 - MDRO/CDI - LabID Events
 - CMS - Acute Care Hospitals (Hospital IQR)
 - CMS - Inpatient Rehabilitation Facilities (IRFQR)
 - CMS - Long Term Acute Care Hospitals (LTCHQR)
 - CMS - PPS-Exempt Cancer Hospitals (PCHQR)
 - TAP - Acute Care Hospitals (ACHs)
 - TAP - Inpatient Rehabilitation Facilities (IRFs)
 - TAP - Long Term Acute Care Hospitals (LTACHs)
 - Advanced - Procedure-level Data

Standardized Infection Ratio (SIR) Table

Device-Associated (DA) Module

- Central Line-Associated BSI
 - Line Listing - All CLAB Events
 - Frequency Table - All CLAB Events
 - Bar Chart - All CLAB Events
 - Pie Chart - All CLAB Events
 - Rate Table - CLAB Data for ICU-Other
 - Run Chart - CLAB Data for ICU-Other
 - Rate Table - CLAB Data for NICU
 - Run Chart - CLAB Data for NICU
 - Rate Table - CLAB Data for SCA/ONC
 - Run Chart - CLAB Data for SCA/ONC
 - SIR SIR - Acute Care Hospital CLAB Data**
 - SUR SUR - Acute Care Hospital Central Line Device Use
 - SIR SIR - Critical Access Hospitals CLAB Data
 - SUR SUR - Critical Access Hospitals Central Line Device Use
 - SIR SIR - Long Term Acute Care CLAB Data
 - SUR SUR - Long Term Acute Care Central Line Device Use
 - SIR SIR - Inpatient Rehab Facilities CLAB Data
 - SUR SUR - Inpatient Rehab Facilities Central Line Device Use

Device-Associated (DA) Module

- Central Line-Associated BSI
 - Line Listing - All CLAB Events
 - Frequency Table - All CLAB Events
 - Bar Chart - All CLAB Events
 - Pie Chart - All CLAB Events
 - Rate Table - CLAB Data for ICU-Other
 - Run Chart - CLAB Data for ICU-Other
 - Rate Table - CLAB Data for NICU
 - Run Chart - CLAB Data for NICU
 - Rate Table - CLAB Data for SCA/ONC
 - Run Chart - CLAB Data for SCA/ONC
 - SIR SIR - Acute Care Hospital CLAB Data
 - Run Report
 - Modify Report**
 - Export Data Set
 - SUR SUR - Acute Care Hospital Central Line Device Use
 - SIR SIR - Critical Access Hospitals CLAB Data
 - SUR SUR - Critical Access Hospitals Central Line Device Use
 - SIR SIR - Long Term Acute Care CLAB Data
 - SUR SUR - Long Term Acute Care Central Line Device Use
 - SIR SIR - Inpatient Rehab Facilities CLAB Data
 - SUR SUR - Inpatient Rehab Facilities Central Line Device Use

Standardized Infection Ratio (SIR) Table

- **Report Modification:** For the purpose of this example, the modifications that have been made are: **summaryYr was set to 2018**, filtered by Critical Care (CC) locationType, and the report grouped by summaryYH.

The screenshot shows a web interface for modifying a report. The title bar reads "Modify 'SIR - Acute Care Hospital CLAB Data'". Below the title bar, there is a checkbox labeled "Show descriptive variable names (Print List)" and the text "Analysis Data Set: bs2_CLAB_Rates". A navigation bar contains four tabs: "Title/Format", "Time Period" (highlighted with a red border), "Filters", and "Display Options". Under the "Time Period" tab, the "Time Period:" section is highlighted with a red border. It contains a table with three columns: "Date Variable", "Beginning", and "Ending". The "Date Variable" column has a dropdown menu with "summaryYr" selected. The "Beginning" column has a text input field containing "2018". The "Ending" column has a text input field containing "2018". To the right of the table is a blue button with a white 'X' icon and the text "Clear Time Period". Below the table is a checkbox labeled "Enter Date variable/Time period at the time you click the Run button".

Date Variable	Beginning	Ending
summaryYr ▼	2018	2018

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

Standardized Infection Ratio (SIR) Table

- **Report Modification:** For the purpose of this example, the modifications that have been made are: summaryYr was set to 2018, **filtered by Critical Care (CC) locationType**, and the report grouped by summaryYH.

The screenshot shows a web interface for modifying a report titled "SIR - Acute Care Hospital CLAB Data". The interface includes a header bar with the title and a sub-header with a checkbox for "Show descriptive variable names (Print List)" and the text "Analysis Data Set: bs2_CLAB_RatesICU". Below this is a navigation bar with four tabs: "Title/Format", "Time Period", "Filters", and "Display Options". The "Filters" tab is highlighted with a red border. Underneath the navigation bar, there are "Additional Filters:" buttons for "Show" and "Clear". A filter rule is displayed below, consisting of a logical operator "AND" (highlighted in blue), a variable dropdown menu set to "locationType", a comparison operator dropdown menu set to "equal", and a value dropdown menu set to "CC - CC". The entire filter rule is enclosed in a red rectangular box.

Standardized Infection Ratio (SIR) Table

- **Report Modification:** *For the purpose of this example, the modifications that have been made are: summaryYr was set to 2018, filtered by Critical Care (CC) locationType, and **the report grouped by summaryYH.***

Show descriptive variable names ([Print List](#)) Analysis Data Set: bs2_CLAB_RatesICU

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

SIR Options:

Group by: summaryYH ▼

Standardized Infection Ratio (SIR) Table

■ Output/Results

National Healthcare Safety Network

SIR for Central Line-Associated BSI Data for Acute Care Hospitals (2015 baseline) - By OrgID

As of: February 26, 2019 at 2:20 PM

Date Range: BS2 CLAB RATESALL summaryYr 2018 to 2018

if(((locationType = "CC")))

orgID=10000 medType=' '

orgID	ccn	summaryYH	infCount	numPred	numclays	SIR	SIR_pval	sir95ci
10000	31C0001043	2018H1	6	1.715	2038	3.498	0.0103	1.418, 7.276
10000	31C0001043	2018H2	5	1.432	2077	3.492	0.0191	1.279, 7.740

1. This report includes CLABSI data from acute care hospitals for 2015 and forward excluding MBI events. For 2019 and forward, this report also excludes ECMO and VAD events.
2. The SIR is only calculated if the number predicted (numPred) is ≥ 1 . Lower bound of 95% Confidence Interval only calculated when number of observed events > 0 .
3. The number of predicted events is calculated based on national aggregate NHSN data from 2015. It is risk adjusted for CDC location, hospital beds, medical school affiliation type and facility Type.
4. If the risk factor data are missing, the record will be excluded from the SIR.

Source of aggregate data: 2015 NHSN CLABSI Data

Data contained in this report were last generated on February 26, 2019 at 12:28 PM.

Standardized Infection Ratio (SIR) Table-Interpretation

orgID	summaryYH	infCount	numPred	numcldays	SIR	SIR_pval	sir95ci
10000	2018H1	6	1.715	2038	3.498	0.0103	1.418, 7.276
10000	2018H2	5	1.432	2077	3.492	0.0191	1.279, 7.740

- This facility reported 6 central line-associated BSI (infCount) for CC or critical care units during the first half of 2018. This is the observed number of CLABSIs.
- The overall SIR for this facility during this time period is 3.498, indicating that this facility observed more infections than predicted. The number of CLABSIs predicted to occur for the first half of 2018 is 1.715 and 1.432 for the second half.
- An SIR will only be calculated if the number of predicted infections is ≥ 1 .

Interpreting your SIR Report : SIR p-value

orgID	summaryYH	infCount	numPred	numclays	SIR	SIR_pval	sir95ci
10000	2018H1	6	1.715	2038	3.498	0.0103	1.418, 7.276
10000	2018H2	5	1.432	2077	3.492	0.0191	1.279, 7.740

- SIR p-value is a statistical measure that tells you if the observed number of infections is significantly different from what was predicted
- P-value less than 0.05 indicates that the number of observed CLABSIs is [statistically] significantly different (higher or lower) from the number predicted
- In this example, the p-value for the 2018H1 SIR is less than 0.05 and thus there is significant difference between the number of infections observed and the number of infections predicted

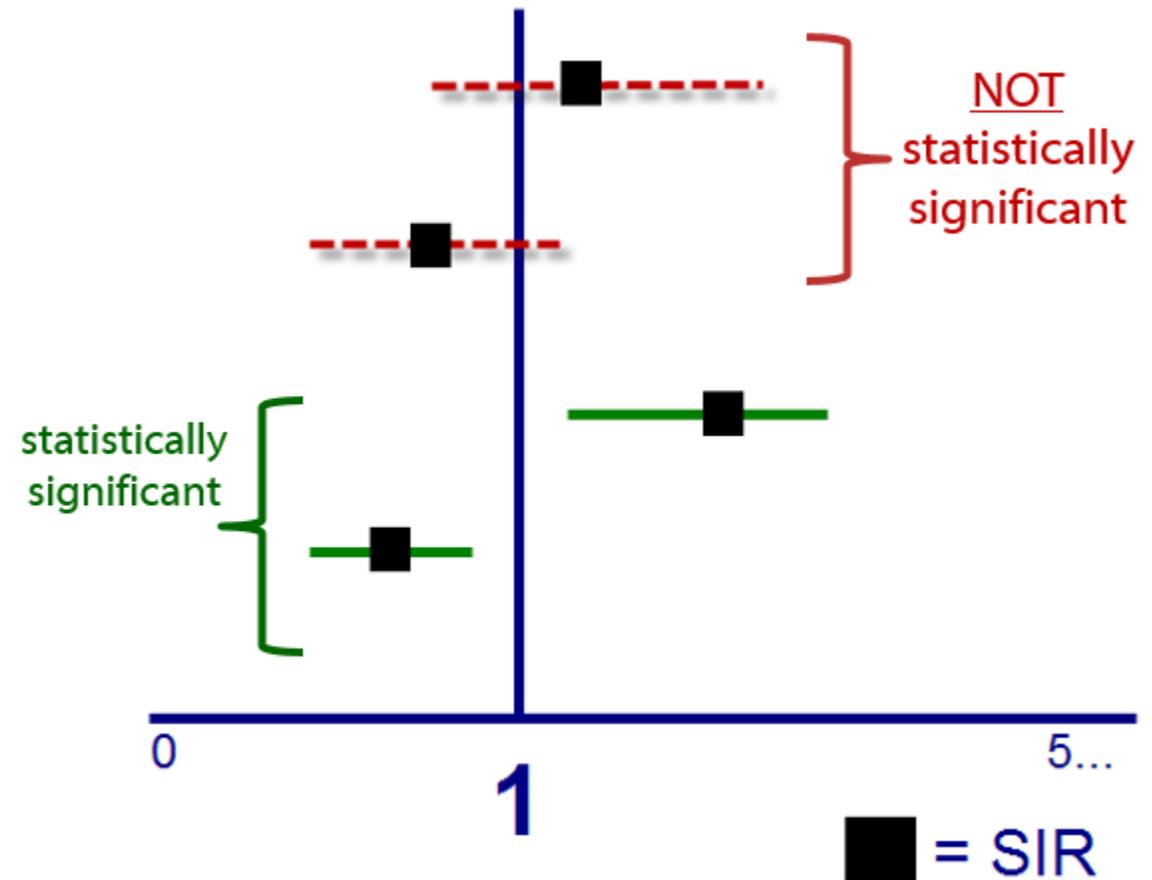
Interpreting your SIR Report : SIR Confidence Interval

orgID	summaryYH	infCount	numPred	numcldays	SIR	SIR_pval	sir95ci
10000	2018H1	6	1.715	2038	3.498	0.0103	1.418, 7.276
10000	2018H2	5	1.432	2077	3.492	0.0191	1.279, 7.740

- The 95% Confidence interval is a range of values in which the true SIR is thought to lie
- If the confidence interval includes the value of 1, then the SIR is not significant (the number of observed infections is not significantly different from the number predicted, using the same convenient cut point)

Interpreting your SIR Report : SIR Confidence Interval

- If the confidence interval includes the value of 1, then the SIR is not significant
 - i.e., if the lower bound is ≤ 1 and the upper bound is ≥ 1 , then the SIR is not significant



An SIR will be calculated as long as the number of predicted infections is $>.05$.

True

False

Knowledge Check: An SIR will be calculated as long as the number of predicted infections is $>.05$.

- False: The SIR will only be calculated if the number of predicted infections is ≥ 1
- This rule was instituted to avoid the calculation and interpretation of statistically imprecise SIRs, which typically have extreme values

CAUTI (and CLABSI) SIR Reports in NHSN

- SIR Outputs will include 5 tables:
 1. Overall SIR for the facility
 2. SIR by location type
 3. SIR by CDC location
 4. SIR by individual locations
 5. Data Not Included in the SIR

CAUTI (and CLABSI) SIR Output- Table 1

- This table will include all the units for which your hospital reported data during that time period.
- For this example we used the Display Option by 'Cumulative'

National Healthcare Safety Network

SIR for Catheter-Associated UTI Data for Acute Care Hospitals (2015 baseline) - By OrgID

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA summaryYr 2018 to 2018

if(((CCN = "12345")))

orgID=10018 medType=M

orgID	ccn	summaryYr	infCount	numPred	numcathdays	SIR	SIR_pval	sir95ci
10018	12345	2018	1	4.097	3086	0.244	0.1013	0.012, 1.204

CAUTI (and CLABSI) SIR Output- Table 2

- This table produces an SIR for each Location Type (e.g. ICUs, WARDS)

National Healthcare Safety Network

SIR for Catheter-Associated UTI Data for Acute Care Hospitals (2015 baseline) - By OrgID/Location Type

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA.summaryYr 2018 to 2018

if (((CCN = "12345")))

orgID=10018 medType=M

orgID	ccn	locationType	summaryYr	infCount	numPred	numcathdays	SIR	SIR_pval	sir95ci
10018	12345	CC	2018	0	3.648	2780	0.000	0.0261	, 0.821
10018	12345	CC_ONC	2018	0	0.045	40	.	.	
10018	12345	OTHER	2018	0	0.049	25	.	.	
10018	12345	WARD	2018	1	0.354	240	.	.	
10018	12345	WARD_ONC	2018	0	0.002	1	.	.	

CAUTI (and CLABSI) SIR Output- Table 3

- This table produces an SIR for each CDC location type that has CAUTI data entered in the facility.

National Healthcare Safety Network

SIR for Catheter-Associated UTI Data for Acute Care Hospitals (2015 baseline) - By OrgID/CDC Location Code

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA summaryYr 2018 to 2018

if (((CCN = "12345")))

orgID=10018 medType=M

orgID	ccn	loccdc	summaryYr	infCount	numPred	numcathdays	SIR	SIR_pval	sir95ci
10018	12345	IN:ACUTE:CC:C	2018	0	0.200	125	.	.	
10018	12345	IN:ACUTE:CC:CT	2018	0	0.130	100	.	.	
10018	12345	IN:ACUTE:CC:CT_PED	2018	0	0.199	200	.	.	
10018	12345	IN:ACUTE:CC:M	2018	0	2.982	2250	0.000	0.0507	, 1.005
10018	12345	IN:ACUTE:CC:MS	2018	0	0.137	105	.	.	
10018	12345	IN:ACUTE:CC:ONC_M	2018	0	0.045	40	.	.	
10018	12345	IN:ACUTE:WARD:STRK	2018	0	0.021	10	.	.	
10018	12345	IN:NONACUTE:LTC	2018	0	0.049	25	.	.	

CAUTI (and CLABSI) SIR Output- Table 4

- This table produces an SIR for each individual location that has CAUTI data entered in the facility.

National Healthcare Safety Network

SIR for Catheter-Associated UTI Data for Acute Care Hospitals (2015 baseline) - By OrgID/Location

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA_summaryYr 2018 to 2018

if (((CCN = "12345")))

orgid=10018 medType=M

orgid	ccn	location	summaryYr	months	infcount	numPred	numcathdays	SIR	SIR_pval	SIR95CI
10018	12345	1152BHV	2018	1	0	0.095	30	.	.	
10018	12345	3- WEST	2018	1	0	0.199	200	.	.	
10018	12345	3E	2018	1	0	0.175	150	.	.	
10018	12345	MD WARD	2018	1	1	0.065	50	.	.	
10018	12345	MICU	2018	1	0	2.982	2250	0.000	0.0507	, 1.005
10018	12345	ONC M	2018	1	0	0.045	40	.	.	
10018	12345	P_HSCT	2018	1	0	0.002	1	.	.	

CAUTI (and CLABSI) SIR Output- Table 5

- This table produces a list of the locations that are not included in the SIR (eg. missing data or outpatient locations)

National Healthcare Safety Network

CAUTI Data Not Included in SIR

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA summaryYr 2018 to 2018

if(((CCN = "12345")))

orgID=10018 medType=M

orgID	ccn	locationType	loccdc	location	infcount	numucathdays
10018	12345	SCA	IN:ACUTE:SCA:DIAL_PED	3U	0	2
10018	12345	OTHER	OUT:ACUTE:ED	454	0	1
10018	12345	OTHER	OUT:ACUTE:ED	454	0	175

National Healthcare Safety Network

CAUTI Data – Months with Missing or 0 Device Days

As of: March 12, 2019 at 1:12 PM

Date Range: BS2_CAU_RATESICU_SCA summaryYr 2018 to 2018

if(((CCN = "12345")))

orgID=10018 medType=M

orgID	ccn	locationType	location	summaryYM	numucathdays
10018	12345	SCA	3U	2018M08	0
10018	12345	WARD	3E	2018M05	0
10018	12345	OTHER	454	2018M02	0

Rate Tables

- Pooled means will no longer appear in the default device-associated rate tables for 2015 data and forward

National Healthcare Safety Network

Rate Table for Catheter-Associated UTI Data for ICU-Other/SCA/ONC

As of: February 7, 2018 at 8:07 AM

Date Range: BS2_CAU_RATESICU_SCA summaryYr 2017 to 2017

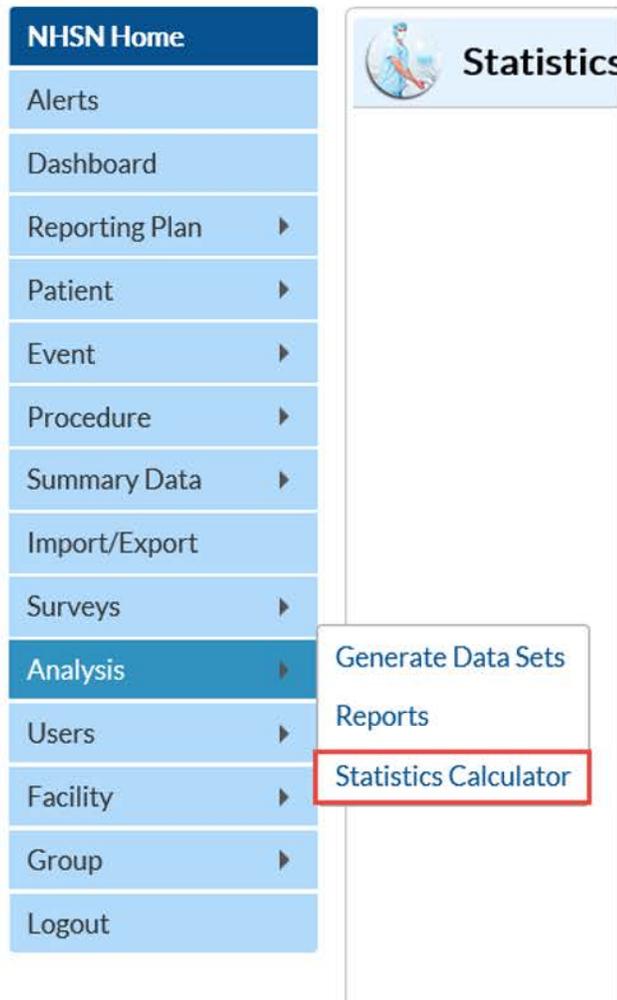
orgID=10000 loccdc=IN:ACUTE:WARD:M

location	summaryYM	CAUCount	numucathdays	CAURate	numpatdays	CathDU
3 CENTRAL	2017M02	0	55	0.000	345	0.159
3 CENTRAL	2017M04	2	85	23.529	800	0.106
3 CENTRAL	2017M05	1	90	11.111	900	0.100
3 CENTRAL	2017M06	3	90	33.333	700	0.129

Data contained in this report were last generated on February 6, 2018 at 8:19 AM.

Beginning January 2015, the CAUTI definition excludes all non-bacterial pathogens and therefore, the number of CAUTIs reported in 2015 and forward may be lower than in previous years.

Statistics Calculator



The screenshot shows the NHSN Home navigation menu. The 'Analysis' menu item is expanded, and the 'Statistics Calculator' option is highlighted with a red border. Other menu items include Alerts, Dashboard, Reporting Plan, Patient, Event, Procedure, Summary Data, Import/Export, Surveys, Users, Facility, Group, and Logout.

- NHSN Home
- Alerts
- Dashboard
- Reporting Plan
- Patient
- Event
- Procedure
- Summary Data
- Import/Export
- Surveys
- Analysis
 - Generate Data Sets
 - Reports
 - Statistics Calculator
- Users
- Facility
- Group
- Logout

- [Compare Two Proportions](#)
- [Compare Single SIR to 1](#)
- [Compare Two Standardized Infection Ratios](#)
- [Compare Two Incidence Density Rates](#)
- [Compare Single Proportion to a Benchmark](#)
- [Compare Single SIR to Nominal Value](#)

National Healthcare Safety Network Medical Ward SIR compared to 1

As of: March 7, 2019 at 9:07 AM

Med Ward Number Observed	Med Ward Number Expected	SIR	SIR p-value	SIR95CI
2	1.278	1.565	0.5032	0.262, 5.170

FAQs

FAQs

- NHSN, when running my DA SIR reports, I am unable to find a CLABSIs that was entered in February 2019.
 - I have generated my datasets. It should be present!
 - Missing a CLABSIs from my Medical Ward (NSICU) that appear in our line list but not in any of the SIR reports.

Can you tell me what is going on?

FAQs

- Review CLABSI protocol for changes to reporting measures
- Modify CLABSI line list to incorporate additional variables

Modify "Line Listing - All CLAB Events"

Show descriptive variable names ([Print List](#)) Analysis Data Set: CLAB_Events Type: Line Listing Data Set Generated On: 02/26/2

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

Display Variables:

Available Variables:		Selected Variables:	
procDate	All	orgID	Up
procDateYH	Selected	patID	Down
procDateYM	Selected	dob	
procDateYQ		gender	
procDateYr		admitDate	
procICD10Code	All	eventID	Undo
procICD10Supp		eventDate	
procICD9Code		eventType	
siteBldMatch		spcEvent	
spcEventDesc		location	
ssn		ecmo	
tempCentralLine		mbi_lcbi	
umbCatheter			
vad			
vre			

Identifying excluded events

- CLABSI events that are identified as MBI-LCBI, ECMO, and VAD will be excluded from CLABSI numerator
- MBI-LCBI reports used for analyzing MBI-LCBI events

National Healthcare Safety Network

Line Listing for All Central Line-Associated BSI Events

As of: March 5, 2019 at 11:18 AM

Date Range: CLAB_EVENTS evntDateYr 2019 to 2019

orgID	eventID	eventType	eventDate	location	ecmo	mbi_lcbi	vad
10000	35395774	BSI	02/15/2019	3 CENTRAL	N	N	N
10000	34939026	BSI	01/21/2019	CMICU_N	N	N	Y
10000	35002183	BSI	01/16/2019	CC_ONC	Y	N	N
10000	35043655	BSI	01/04/2019	CMICU_N	Y	N	N
10000	35043672	BSI	01/11/2019	CMICU_N	N	N	N
10000	35172159	BSI	01/28/2019	CMICU_N	N	Y	Y
10000	35298896	BSI	02/04/2019	NSICU	N	Y	N
10000	35134732	BSI	01/05/2019	9 SOUTH	Y	N	Y
10000	35397483	BSI	01/19/2019	CARDCRIT	Y	N	Y
10000	35459808	BSI	02/21/2019	6A	N	N	N
10000	35150350	BSI	01/15/2019	NICU 3	Y	N	N

Running the MBI-LCBI reports

- Mucosal Barrier Injury CLABSI
 - Line Listing - All MBI CLABSI Events
 - Frequency Table - All MBI CLABSI Events
 - Bar Chart - All MBI CLABSI Events
 - Pie Chart - All MBI CLABSI Events
 - Rate Table - MBI-CLABSI Data (ICU/Other)
 - Run Chart - MBI-CLABSI Data (ICU/Other)
 - Rate Table - MBI-CLABSI Data (NICU)
 - Run Chart - MBI-CLABSI Data (NICU)
 - Rate Table - MBI-CLABSI Data (SCA/ONC)
 - Run Chart - MBI-CLABSI (SCA/ONC)
 - SIR - Acute Care MBI-CLABSI Data

National Healthcare Safety Network

SIR for MBI-CLABSI Data (2015 Data) - By OrgID

As of: March 5, 2019 at 11:47 AM

Date Range: All BS2 CLAB MBI RATESALL

orgID=10000 medType=' '

orgID	ccn	summaryYQ	infCount	numPred	numclays	SIR	SIR_pval	sir95ci
10000	31C0001043	2019M1	1	0.250	150	.	.	
10000	31C0001043	2019M2	1	0.320	360	.	.	

FAQs

- NHSN, when running my CMS IQR SIR reports, I am unable to find a CAUTI that was entered in January 2019.
 - Datasets have been generated.
 - Missing a CAUTI that appears in our Device-associated CAUTI SIR report but not in the CAUTI IQR SIR report.

Can you tell me why this CAUTI is not appearing in my reports?

Identifying excluded event/location

National Healthcare Safety Network

Line Listing for All Catheter-Associated UTI Events

As of: March 6, 2019 at 8:18 AM

Date Range: All CAU EVENTS

orgID	patID	dob	gender	admitDate	eventID	eventDate	eventType	spcEvent	location	locCDC
10000	1122333	07/09/1971	F	01/03/2019	27777176	01/09/2019	UTI	SUTI	5WEST	IN:ACUTE:WARD:TEL

- Identify the excluded event and determine location of event
- Event occurred in the Telemetry ward, which is not a location that will be included in the CMS IQR report for CAUTI

Hospital IQR reports for CLABSI and CAUTI

CLABSI

Start Q1 2011 - adult, pediatric, and neonatal ICUs

Start Q1 2015 - adult and pediatric medical, surgical, and medical/surgical wards

CAUTI

Start Q1 2012 - adult and pediatric ICUs

Start Q1 2015 - adult and pediatric medical, surgical, and medical/surgical wards

What changes can potentially impact my SIRs?

- Entry or deletion of events
- Changes to number of patient days, device days, admissions
- Removal or addition to monthly reporting plans
- Changes to relevant factors in the annual survey (e.g., medical school affiliation, facility bedsize)
- Resolution of “Report No Events” alerts

Summary

- These are YOUR data –know what your data says about your facility
- Understand the data that derive your analytic results
- Understand how you can customize the reports in NHSN to give you the data you need
- Data from your facility can help drive prevention measures and reduce HAI burden

Device Associated Analysis Resources

- A Guide to the SIR: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>
- Analysis Output Quick Reference Guides: <http://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html>
- Analysis Resources: <https://www.cdc.gov/nhsn/ps-analysis-resources/index.html>
- CMS Requirements: <https://www.cdc.gov/nhsn/cms/index.html>
- NHSN Analysis Training: <https://www.cdc.gov/nhsn/training/analysis/index.html>

Help with any analysis outputs: email NHSN@cdc.gov

Thank you!

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.

