



Using NHSN Analysis Features for Prevention: Practice

Use of Targeted Assessment for Prevention (TAP) Reports and Statistical Calculator

Part 1: Creating a facility specific TAP Report.

This practice workbook is a guide to creating reports to assist in viewing your data from different statistical perspectives. TAP reports characterize your facility's HAI data through ranking locations by priority and by CAD (cumulative attributable difference, the number of infections that a facility or location must prevent in order to meet an HAI reduction goal.) Although TAP Reports are available for both Facility and Group users, this workbook will focus only on TAP Report use by a facility user.

Exercise 1: Create a CLABSI TAP Report for your Facility

1. Always begin by generating a data set prior to using the Analysis feature to be sure all data are current.
2. In the NHSN Portal click Analysis → Output Options → TAP Reports → Acute Care Hospitals (ACHs) → CDC Defined Output → TAP Report - CLAB Data for ACHs → Modify.

Patient Safety Component
Analysis Output Options

Expand All Collapse All

- Device-Associated (DA) Module
- Procedure-Associated (PA) Module
- HAI Antimicrobial Resistance (DA+PA Modules)
- MDRO/CDI Module - Infection Surveillance
- MDRO/CDI Module - LABID Event Reporting
- MDRO/CDI Module - Process Measures
- MDRO/CDI Module - Outcome Measures
- Antimicrobial Use and Resistance Module
- CMS Reports
- TAP Reports
- Acute Care Hospitals (ACHs)
 - CDC Defined Output
 - TAP Report - CLAB Data for ACHs
 - TAP Report - CAU Data for ACHs
 - TAP Report - FACWIDEIN CDI LabID data for ACHs
- Inpatient Rehabilitation Facilities (IRFs)
- Long Term Acute Care Hospitals (LTACHs)
- Advanced

Run creates a TAP Report with all data from January 2012 to present

Click in order:

1. Analysis
2. Output Options
3. TAP Reports
4. Acute Care Hospitals (ACHs)
5. CDC Defined Output
6. TAP Report - CLAB Data for ACHs
7. Modify

3. From the Analysis SIR screen, modify Output Name and Date Variable , then press "Run".

Analysis SIR

Analysis Data Set: **CLAB_TAP** Export Analysis Data Set

Modify Attributes of the Output:

Last Modified On: **05/27/2015**

Output Type: **SIR**

Output Name: TAP Report - California Hospital CLABSI Data ①

Output Title: TAP Report - California Hospital CLABSI Data 2013

Select output format:

Output Format: HTML ②

③ Use Variable Labels

Select a time period or Leave Blank for Cumulative Time Period: [HELP](#)

④ Date Variable: summaryYr ④ Beginning: 2013 Ending: 2013 Clear Time Period

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

Specify Other Selection Criteria: [HELP](#)

[Show Criteria](#) [Column +](#) [Row +](#) [Clear Criteria](#)

⑤ ⑤	 	 	

1. Name your report if you wish to save it for future use.
2. For Output Format, use HTML (or CSV if you plan to export to Excel)
3. Always check "Use Variable Labels".
4. Select a Date Variable. We are choosing year (2013).
5. To include only specific data variables in your report (e.g. a certain location, age group, gender, organism type, etc.), you can add instructions to the Selection Criteria table. In this example, we are going to leave it blank.
6. Leave "Group by" option blank.
7. Click "Run"

Other Options:

[Print Variable Reference List](#)

Group by: ⑥

⑦ Run Save As Reset Back Export Output Data Set

4. Your facility TAP Report will look like the table below:

FACILITY			LOCATION									
Facility Org ID	Facility Name	Facility CAD	Location Rank	Location	CDC Location	Events	Central Line Days	DUR %	CAD	SIR	SIR Test	No. Pathogens CNS,YS,SA,ES,KS,EC)
15633	California General Hospital	5.82	1	1 MICU	IN:ACUTE:CC:M	4	823	91	3.22	2.56	.	4 (0, 0, 0, 1, 0, 0)
			2	1 SICU	IN:ACUTE:CC:S	2	370	77	1.57	.	.	2 (0, 1, 0, 1, 0, 0)
			3	DLB	IN:ACUTE:CC:MS	1	169	10	0.87	.	.	1 (0, 1, 0, 0, 0, 0)
			4	BMT	IN:ACUTE:WARD:ONC_HSCT	1	80	17	0.85	.	.	1 (0, 0, 0, 0, 0, 0)
			5	.A7W.W	IN:ACUTE:CC:MS	0	5	5	0.00	.	.	.
			6	8586 NICU	IN:ACUTE:CC_STEP:NURS	0	15	20	-0.01	.	.	.
			7	DLB96	IN:ACUTE:CC_STEP:NURS	0	100	7	-0.12	.	.	.
			8	ONC	IN:ACUTE:CC:S	0	134	61	-0.15	.	.	.
			9	ICU WEST	IN:ACUTE:CC:MS	0	212	49	-0.16	.	.	.
			10	DLB95	IN:ACUTE:CC:NURS	0	223	12	-0.26	.	.	.

TAP Report Results and Discussion:

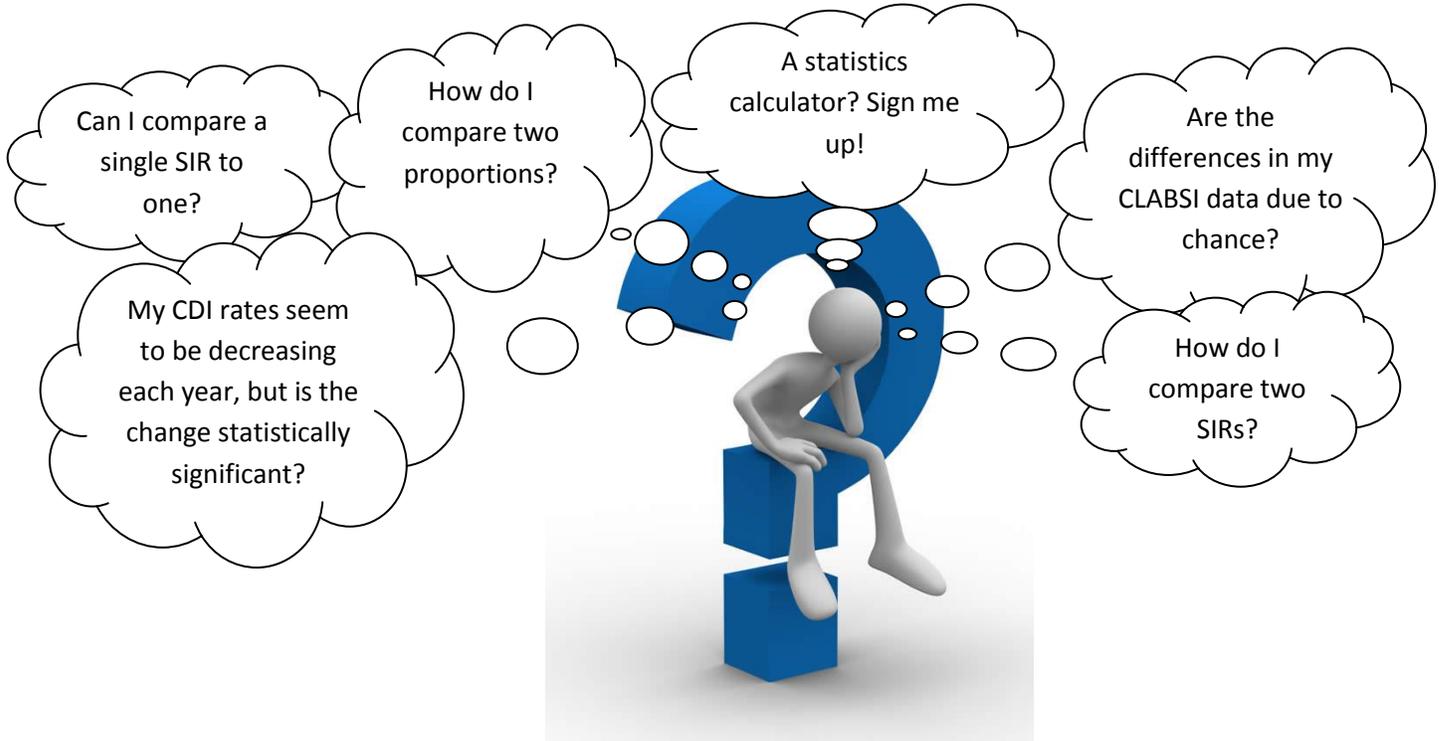
- TAP Results:
 - In the example above, California General Hospital (our fictitious test hospital) needs to prevent 6 infections overall to reach its target SIR. The 1MICU is listed at the most problematic location (ranking #1) which will require the prevention of 3 infections in order to reach the SIR goal.
- Cumulative Attributable Difference (CAD):
 - CAD is the number of HAI that must be prevented to meet reduction goals
 - Location CAD = observed infections - (predicted infections) x SIR_{Target} (national CLABSI target 0.5)
 - Note the “predicted” number of infections can be found in the SIR output option analysis
 - SIR target can be chosen based on corporate/group goals, or state/national targets – our national target for CLABSI is currently 0.5 (meaning a reduction goal of 50%)
 - Lower target SIRs result in larger excess numbers of infections
 - Positive CAD = more infections than predicted
 - Negative CAD = fewer infections than predicted
 - If location level CADs are the same in a given facility, their ranks are tied.
 - Each locations CAD is calculated using the locations observed and expected rates:
- No. Pathogens refers to number of pathogens detected from 6 common pathogen groups:
 - CNS (Coag. Negative Staphylococcus)
 - Yeast (both candida and non-candida species)
 - K.pneumoniae/K. oxytoca
 - Staphylococcus aureus
 - Enterococcus species
 - E. Coli

- Things to consider when reviewing the TAP Reports:
 - the time period being included in the report
 - which locations were included in the analysis
 - any other factors which could limit the analysis

- ★ New with NHSN summer 2015 release users will be allowed to specify a value for the multiplier used to calculate the CAD!
 - The current version of NHSN uses only HHS Action Plan Goal Target SIR as a multiplier. New version will allow users to customize using any desired goals (e.g. State SIR, National SIR, Collaborative/group Goal, etc.

Part 2: Using the Statistics Calculator

This practice workbook will guide you through use of the statistics calculators; each of the calculators are tools which can help you determine if there are relative changes in your data and whether these changes are significant.



Department of Health and Human Services
Centers for Disease Control and Prevention

NHSN - National Healthcare Safety Network

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Analysis

- [Generate Data Sets](#)
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- [Statistics Calculator](#)

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Group

Log Out

The statistics calculator is located under Analysis on the left blue navigation bar. Use the various calculators with the data you obtained in "Output Options" to learn more about relationships between your facility's data.

Statistics Calculator

HELP

- [Compare Two Proportions](#)
- [Compare Single SIR to 1](#)
- [Compare Two Standardized Infection Ratios](#)
- [Compare Two Incidence Density Rates](#)

Logged into California General Hospital (ID 15633) as TRACYLANIER.
Facility California General Hospital (ID 15633) is following the PS component.

Which calculator do I use?

- ▣ Compare Two Proportions
- ▣ Compare Single SIR to 1
- ▣ Compare Two Standardized Infection Ratios
- ▣ Compare Two Incidence Density Rates

1. Compare Two Proportions: Use this calculator to compare proportions such as device utilization ratios or SSI rates.

1. Use NHSN Analysis to obtain information about the data you want to compare. Refer to CDPH HAI Program Using Analysis Series Lessons 1-4 for instructions on creating line lists or tables with the data you wish to compare.
2. Open the Compare Two Proportions calculator and fill in the data boxes per instructions:

Compare Two Proportions

[HELP](#)

When comparing two proportions (e.g. SSI Rates, Device Utilization ratios etc.), the hypothesis is that the rates are not different from each other. To perform a statistical test and calculate a p-value, enter the number of events as the numerator and the number of trials as the denominator (e.g. procedures, patient days) for two data sources. Press calculate.

	Data Source #1	Data Source #2
Group Labels:	<input type="text"/>	<input type="text"/>
Numerator (Number of Events):	<input type="text"/>	<input type="text"/>
Denominator (Number of Trials):	<input type="text"/>	<input type="text"/>
Title:	<input type="text"/>	

④

1. Label to identify data source
2. Data for comparison
3. Title of Report
4. Calculate

Exercise 2: Use Compare Two Proportions Calculator to compare 2013 and 2014 COLO SSI rates:

- In 2013, California General Hospital performed 985 COLO procedures with 18 SSI. Prompted by the higher SIR, your department worked on an SSI PI Project to implement new strategies to decrease SSI.
- Following the PI project, in 2014 California General Hospital performed 1048 COLO procedures with 8 SSI. Although the SSI number is lower, you want to compare these results to see if they are statistically significant.
 - **Use the NHSN Compare Two Proportions Calculator to see if there is a significant difference between these two proportions.**

Compare Two Proportions



When comparing two proportions (e.g. SSI Rates, Device Utilization ratios etc.), the hypothesis is that the rates are not different from each other. To perform a statistical test and calculate a p-value, enter the number of events as the numerator and the number of trials as the denominator (e.g. procedures, patient days) for two data sources. Press calculate.

	Data Source #1	Data Source #2
Group Labels:	2013 COLO Data	2014 COLO Data
Numerator (Number of Events):	18	8
Denominator (Number of Trials):	985	1048

Title: Comparison of 2013 to 2014 COLO SSI

National Healthcare Safety Network Comparison of 2013 to 2014 COLO SSI

As of: May 31, 2015 at 5:51 PM

	2013 COLO Data	2014 COLO Data
Numerator	18	8
Denominator	985	1048
Proportion	1.827%	0.763%
Proportion p-value	0.0373	

Calculator Results and Discussion

For this example, the p-value of 0.0373 indicates that the 2013 COLO SSI data is significantly different (higher) than the 2014 COLO SSI data.

- The proportion 1.827%(2013) is higher than the 0.763% (2014) proportion
- A p-value less than 0.05 is considered significant

2. Compare Single SIR to 1 : Use this calculator to calculate an SIR and it's p-value.

1. Use NHSN or your surveillance data to determine the number of HAI infections that occurred in your location, within your desired time frame.
2. Use NHSN published data or State published data to obtain the number of expected CDI infections for the location.

National Healthcare Safety Network (NHSN) report: Data summary for 2006 through 2008, issued December 2009

Jonathan R. Edwards, MStat, Kelly D. Peterson, BBA, Yi Mu, PhD, Shailendra Banerjee, PhD, Katherine Allen-Bridson, RN, BSN, CIC, Gloria Morrell, RN, MS, MSN, CIC, Margaret A. Dudeck, MPH, Daniel A. Pollock, MD, and Teresa C. Horan, MPH
Atlanta, Georgia

<http://www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.pdf>

3. Open the Compare Single SIR to 1 calculator and fill in the data boxes per instructions:

Compare Single SIR to 1

[HELP](#)

When comparing a standardized infection ratio, the hypothesis is that the SIR is not different from one. To perform a hypothesis test and calculate a p-value, enter the number of observed events and the number of expected events. The SIR will be displayed automatically. Press calculate.

Data Source #1

Group Labels: ①

Number observed: ②

Number expected: ③

Standardized Infection Ratio: ③

④ **Title:**

⑤

1. Label to identify data source
2. Data for SIR Calculation
3. SIR (will auto-populate when above data entered)
4. Title of Report
5. Calculate

Exercise 3: Use Compare Single SIR to 1 Calculator to find SIR and p-value:

- Your facility reports CDI data for a fiscal year beginning in July. You need to create a SIR for 12 months of CDI data for your Medical Unit, beginning July 2013.
- You had 16 CDI infections on your Medical Unit in Fiscal Year 2013.
- NHSN data indicates the expected number of CDI infections for your Medical unit was 14.345 for Fiscal Year 2013.

➤ **Use the NHSN Compare Single SIR to 1 calculator to find the SIR and p-value.**

Compare Single SIR to 1



When comparing a standardized infection ratio, the hypothesis is that the SIR is not different from one. To perform a hypothesis test and calculate a p-value, enter the number of observed events and the number of expected events. The SIR will be displayed automatically. Press calculate.

Data Source #1

Group Labels:

Number observed:

Number expected:

Standardized Infection Ratio:

Title: x

Number Observed	Number Expected	SIR	SIR p-value	SIR95CI
16	14.345	1.115	0.6398	0.660, 1.773

Calculator Results and Discussion

- Our Medical Unit CDI SIR for Fiscal year 2013 is 1.115. This means that our CDI is over 10% higher than that of a similar medical unit.
- In this example, the p-value and Confidence Interval (CI) indicate that the SIR is not statistically different from 1 (p-value >0.05; CI crosses 1).
- This calculator is recommended for SIRs that are calculated using aggregate data from a source other than NHSN (e.g. State aggregate).

3. Compare Two Standardized Infection Ratios: Use this calculator to compare two SIRs to each other

1. Use NHSN Analysis to obtain two SIRs you would like to compare. Refer to CDPH HAI Program Using Analysis Series Lessons 1-4 for instructions on tables with this information.
2. Open the Compare Two Standardized Infection Ratios calculator and fill in the data boxes per instructions:

Compare Two Standardized Infection Ratios



When comparing two standardized infection ratios, the hypothesis is that the two ratios are not different from each other. To perform a hypothesis test and calculate a p-value, enter the number of observed events and the number of expected events. The standardized infection ratio (SIR) for each data source will be displayed automatically. Press calculate.

1. Label to identify data source
2. Data for SIR Calculation
3. SIR (will auto-populate when above data entered)
4. Title of Report
5. Calculate

	Data Source #1	Data Source #2
Group Labels:	<input type="text"/>	<input type="text"/>
Number observed:	<input type="text"/>	<input type="text"/>
Number expected:	<input type="text"/>	<input type="text"/>
Standardized Infection Ratio:	<input type="text"/>	<input type="text"/>
④ Title: <input style="width: 90%;" type="text"/>		
⑤ <input type="button" value="Calculate"/> <input type="button" value="Back"/>		

Exercise 4: Use Compare Two Standardized Infection Ratios Calculator to compare 2013 and 2014 MRSA BSI SIRs

- In 2013, California General Hospital had 12 HO cases of MRSA BSI; NHSN indicated an expected rate of 13.576.
 - In 2014, California General Hospital had 16 HO cases of MRSA BSI; NHSN indicated an expected rate of 14.268.
- **Use the NHSN Compare Two Standardized Infection Ratios calculator to see if there is a significant difference between these two SIRs.**

Compare Two Standardized Infection Ratios



When comparing two standardized infection ratios, the hypothesis is that the two ratios are not different from each other. To perform a hypothesis test and calculate a p-value, enter the number of observed events and the number of expected events. The standardized infection ratio (SIR) for each data source will be displayed automatically. Press calculate.

	Data Source #1	Data Source #2
Group Labels:	2013 SIR	2014 SIR <input type="text" value="x"/>
Number observed:	12	16
Number expected:	13.576	14.268
Standardized Infection Ratio:	0.884	1.121

Title:

National Healthcare Safety Network Comparison of 2013

As of: May 31, 2015 at 6:02 PM

	2013 MRSA BSI	2014 MRSA BSI
Observed	12	16
Expected	13.576	14.268
SIR	0.884	1.121

Relative change in SIR (data column 2 / data column 1): $1.121/0.884=1.268$
Two-tailed p-value: 0.5408
95% Conf. Interval: 0.597, 2.753
Percent change: $1.268*100 = 126.8\%$

Calculator Results and Discussion

- Although there was an increased number of MRSA BSI from 2013 to 2014, it was not statistically significant. This can be noted by the p-value >0.05 and the CI that includes 1.
- Since the 2014 SIR is 12% over the expected rate of HO MRSA BSI, this facility should review practices that would lead to elevated rates of MRSA transmission (e.g. isolation practice compliance, MRSA screening, etc.)
- When the 2013 and 2014 SIR values are compared, the 2014 SIR shows an increase by 126.8%.

4. Compare Two Incidence Density Rates : Use this calculator to compare two incidence density rates from different time periods or groups.

3. Use NHSN Analysis to obtain information about the data you want to compare. Refer to CDPH HAI Program Using Analysis Series Lessons 1-4 for instructions on creating line lists or tables with the data you wish to compare.
4. Open the Compare Two Incidence Density Rates calculator and fill in the data boxes per instructions:

Compare Two Incidence Density Rates

[HELP](#)

When comparing two incidence density rates (i.e. person-time), the hypothesis is that the rates are not different from each other. To perform a statistical test and calculate a p-value, enter the number of events as the numerator, the number of person-time units (i.e. exposure) as the denominator, and choose the multiplier you wish for the rate calculation. Press calculate. (See examples below)

Data Source #1 **Data Source #2**

Group Labels: ①

Numerator(Number of events): ②

Denominator(Number of person-time units): ②

Multiplier: 10 ▾ ③

Title: ④

⑤

1. Label to identify data source
2. Data for comparison
3. Choose multiplier for your density rate (see examples if unsure which to choose)
4. Title of Report
5. Calculate

Example 1
To compare 2 C.difficile LabID incidence rates:

- Enter the # of CDI HO Incident LabID events
- Enter the # of patient days
- Choose the desired multiplier(i.e., 10,000)
- Press calculate
- Output will provide the CDI HO Incident LabID Event rates per 10,000 patient days and the p-value to indicate the level of statistical significance

Example 2
To compare 2 Dialysis Event bloodstream infection rates:

- Enter the # of Dialysis Event positive blood cultures
- Enter the # of patient months
- Choose the desired multiplier(i.e., 100)
- Press calculate
- Output will provide the DE positive blood culture rates per 100 patient months and the p-value to indicate the level of statistical significance

Example 3
To compare 2 central-line associated bloodstream infection rates:

- Enter the number of CLABSI events
- Enter the # of central line days
- Choose the desired multiplier (1000)
- Press calculate
- Output will provide the CLABSI rates per central line and the p-value to indicate level of statistical significance

Exercise 5: Use Compare 2013 and 2014 CDI Incidence Density Rates:

- In 2013 California General Hospital had 133 HO CDI cases for 134,845 patient days.
 - In 2014 California General Hospital had 105 HO CDI cases for 141,722 patient days.
- **Use the NHSN Compare Two Incidence Density Rates calculator to determine if the rates are statistically different from one another.**

Compare Two Incidence Density Rates



When comparing two incidence density rates (i.e. person-time), the hypothesis is that the rates are not different from each other. To perform a statistical test and calculate a p-value, enter the number of events as the numerator, the number of person-time units (i.e. exposure) as the denominator, and choose the multiplier you wish for the rate calculation. Press calculate. (See examples below)

	Data Source #1	Data Source #2
Group Labels:	2013	2014 <input type="button" value="x"/>
Numerator(Number of events):	133	105
Denominator(Number of person-time units):	134845	141722
Multiplier:	10000 <input type="button" value="v"/>	

Title:

Example 1

To compare 2 C.difficile LabID incidence rates:

- Enter the # of CDI HO Incident LabID events
- Enter the # of patient days
- Choose the desired multiplier(i.e., 10,000)
- Press calculate
- Output will provide the CDI HO Incident LabID Event rates per 10,000 patient days and the p-value to indicate the level of statistical significance

Example 2

To compare 2 Dialysis Event bloodstream infection rates:

- Enter the # of Dialysis Event positive blood cultures
- Enter the # of patient months
- Choose the desired multiplier(i.e., 100)
- Press calculate
- Output will provide the DE positive blood culture rates per 100 patient months and the p-value to indicate the level of statistical significance

Example 3

To compare 2 central-line associated bloodstream infection rates:

- Enter the number of CLABSIs
- Enter the # of central line days
- Choose the desired multiplier(i.e., 1000)
- Press calculate
- Output will provide the CLABSI rates per central line and the p-value to indicate level of statistical significance

National Healthcare Safety Network Comparison 2013

As of: June 11, 2015 at 12:35 PM

	2013	2014
Numerator	133	105
Denominator	134845	141722
Incidence Density Rate	9.863	7.409
IDR p-value	0.0281	

Calculator Results and Discussion

- For this example the p-value is 0.0281, indicating that the 2012 CDI Incidence density rate is significantly higher than the 2013 CDI incidence density rate.
- The multiplier allows you to view rates as they are normally displayed.
 - If you are unsure which multiplier to use
 - refer to NHSN calculations, CDPH Public Report(Key Findings) or calculator examples.