



Using NHSN Data and Analysis Features for Prevention:

Risk Adjustment Models for SSI

The Standardized infection ratio (SIR) improves SSI surveillance risk adjustment by incorporating the contribution of surgery-specific risk factors combined with individual patient risk factors. Development of procedure-specific logistic regression models allows NHSN analysis to calculate the probability of SSI for each of your surgical patients. In contrast, previous adjustment for SSI surveillance used the same three standard risk factors (duration of procedure, wound class, and ASA score) for each procedure type, creating risk strata for each procedure type. Using NHSN's Analysis features, the IP is empowered to explore each patient's risk for surgical site infection and how the surgical patient population plays into the facilities' overall SSI SIR. New analytical tools can be used to further reduce and prevent infections as the significance of individual risks are understood and focused infection prevention strategies can be implemented.

Exploring SSI Risk using NHSN Analysis

- 1) Generate a data set prior to running reports in Analysis to be sure all data are up to date
- 2) Run a line list of your SSI Procedures (in this example, we will use 2013 data): Click Analysis → Output Options → Advanced

The screenshot shows the NHSN web application interface. At the top, it displays the CDC logo and the text "Department of Health and Human Services Centers for Disease Control and Prevention". Below this is the "NHSN - National Healthcare Safety Network" header. A navigation menu on the left includes options like "NHSN Home", "Alerts", "Reporting Plan", "Patient", "Event", "Procedure", "Summary Data", "Import/Export", "Analysis", "Surveys", "Users", "Facility", "Group", and "Log Out". The "Analysis" menu item is circled with a red 1. Under "Analysis", "Generate Data Sets" and "Output Options" are circled with red 2s. The main content area shows the "Patient Safety Component" with "Analysis Output Options" and a "HELP" button. Below this are "Expand All" and "Collapse All" buttons, followed by a list of analysis modules. The "Advanced" module is circled with a red 3. A callout box on the right states "Click in order: 1. Analysis, 2. Output Options, 3. Advanced".

3) Run a line list of your SSI Procedures (continued): Click Advanced → Procedure-level Data → CDC Defined Output → Line Listing-All Procedures → Modify

Click in order (continued):

4. Advanced
5. Procedure-level data
6. CDC Defined Output
7. Line Listing – All Procedures
8. Modify

Line Listing - All Procedures	Run	Modify
Frequency Table - All Procedures	Run	Modify
Bar Chart - All Procedures	Run	Modify
Pie Chart - All Procedures	Run	Modify
SIR - Complex 30-Day SSI Data by Surgeon	Run	Modify
Rate Table - SSI Data by Procedure and Risk Index	Run	Modify
Run Chart - SSI Data by Procedure and Risk Index	Run	Modify
Rate Table - Specific Event SSI Rates by Procedure	Run	Modify
Run Chart - Specific Event SSI Data by Procedure	Run	Modify
Rate Table - SSI Data by Surgeon, Procedure, and...more	Run	Modify
Run Chart - SSI Data by Surgeon, Procedure, and...more	Run	Modify

4) When you click Modify, the Line Listing screen will appear

NHSN Home

Alerts

Reporting Plan

Patient

Event

Procedure

Summary Data

Import/Export

Analysis

- Generate Data Sets
- Output Options
- Statistics Calculator

Surveys

Users

Facility

Group

Log Out

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

Line Listing

[HELP](#)

Analysis Data Set: Procedures Export Analysis Data Set

Modify Attributes of the Output:

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

Output Type: **Line Listing**

Output Name: ①

Output Title:

Select output format:

Output Format: ②

③ Use Variable Labels

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

④ Beginning 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 <input type="text" value=""/>	<input type="text" value=""/>	<input type="text" value=""/>

Other Options: [HELP](#) [Print Variable Reference List](#)

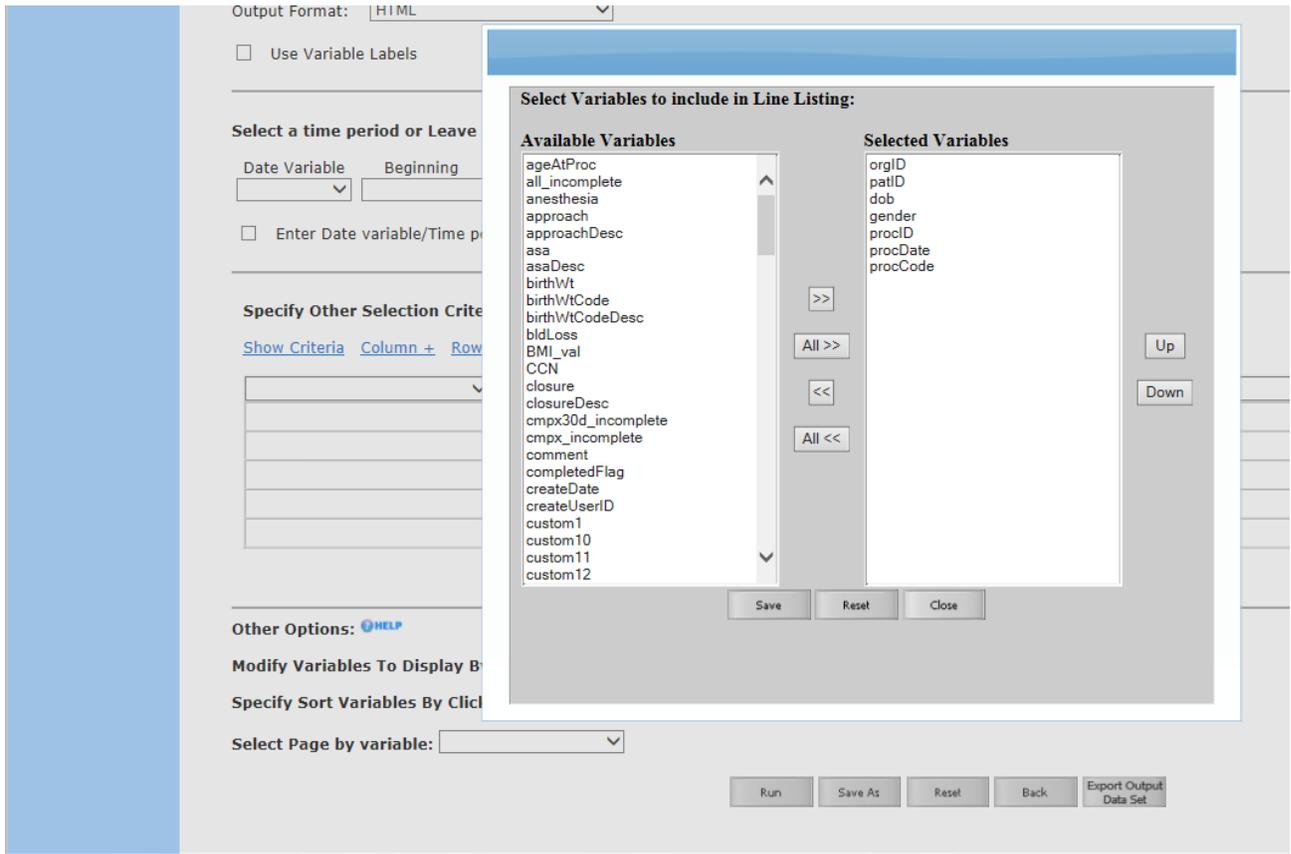
Modify Variables To Display By Clicking: [Modify List](#) ⑥

Specify Sort Variables By Clicking: [Modify List](#)

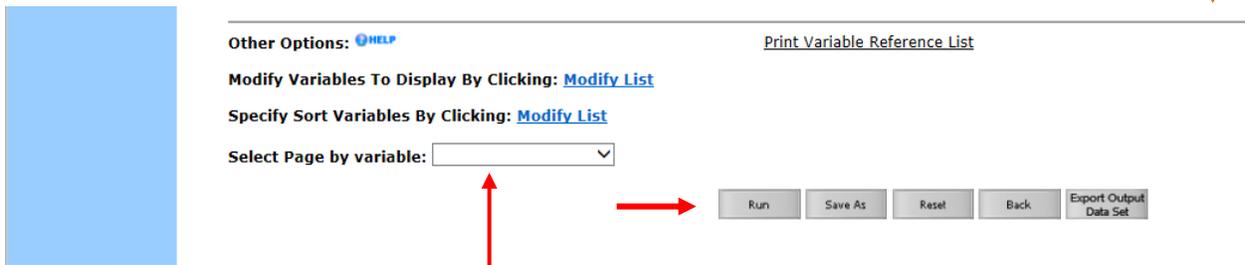
Select Page by variable:

Run Save As Reset Back Export Output Data Set

1. Name your report if you wish to save it for the future (you may want run the same report or a similar report again). Not necessary for a quick look.
2. For Output Format, keep in HTML -OR- If you wish to export to Excel, change to CSV using the drop down
3. Always check the box, "Use Variable Labels"
4. Select a Date Variable
5. If you want to filter your data to include a subset of your data (i.e. surgery type), indicate your selection in the "Specify Other Selection Criteria" table
6. Other Options: click on the blue "modify list" for Modify Variables to Display



Add "modelRiskAll" and "modelRiskComplex" by clicking twice on these items in the Available Variable list. The selections will populate in the Selected Variables Column. Save the selections by clicking "Save" at the bottom of the grey box.



Choose "procCode" in the Select Page by Variable Option to create a report sorted by your procedure types. Press "Run" to create a report!

Line Listing for All Procedures
 As of: May 28, 2015 at 8:15 PM
 Date Range: PROCEDURES procDateYM 2013M03 to 2013M05

Procedure Code=AAA

Facility Org ID	Patient ID	Date of Birth	Gender	Procedure ID	Procedure Date	Procedure Code	Risk using All SSI Model	Risk using Complex AR Model
15633	TEST1002	01/21/1935	F	14725274	03/01/2013	AAA	0.0248	0.0100
15633	TEST1003	01/30/1935	F	14725275	04/01/2013	AAA	0.0248	0.0100
15633	TEST1004	02/08/1935	F	14725276	05/01/2013	AAA	0.0987	0.0454
15633	TEST2564	12/08/1976	F	14743279	04/01/2013	AAA	0.0248	0.0100
15633	TEST2565	11/29/1976	F	14743280	03/02/2013	AAA	0.0248	0.0100

Sorted by procCode
 Data contained in this report were last generated on May 27, 2015 at 4:33 PM.

National Healthcare Safety Network
Line Listing for All Procedures
 As of: May 28, 2015 at 8:15 PM
 Date Range: PROCEDURES procDateYM 2013M03 to 2013M05

Procedure Code=APPY

Facility Org ID	Patient ID	Date of Birth	Gender	Procedure ID	Procedure Date	Procedure Code	Risk using All SSI Model	Risk using Complex AR Model
15633	TEST1014	05/17/1935	F	14725286	03/13/2013	APPY	0.0074	0.0038
15633	TEST1015	05/28/1935	M	14725287	03/27/2013	APPY	.	.
15633	TEST1016	06/06/1935	F	14725288	04/10/2013	APPY	0.0135	0.0061

Our report is categorized by procedure type.

Risk using all SSI Model calculates SSI risk* for each surgical patient for all SSI types (Superficial, Deep incisional, and Organ/space)

Risk using Complex AR Model calculates SSI risk* for only Deep incisional and Organ/space SSI identified in patients during the same surgical Admission or on Readmission to a hospital

* Based on national referent data (NHSN, 2006-2008).

For more information on methods of SSI risk adjustment in NHSN, please refer to Risk Model paper on the NHSN website that was published in ICHE:

http://www.cdc.gov/nhsn/PDFs/pscManual/SSI_ModelPaper.pdf .

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2011, VOL. 32, NO. 10

ORIGINAL ARTICLE

Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network

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(See the commentary by Moehring et al. on pages 987–989.)

BACKGROUND. The National Healthcare Safety Network (NHSN) has provided simple risk adjustment of surgical site infection (SSI) rates to participating hospitals to facilitate quality improvement activities; improved risk models were developed and evaluated.