2020 NHSN Training Webinar

Patient Safety Component Analysis Updates

February 12, 2020
Agenda

- Changes to NHSN Dataset Generation (DSG) – Maggie Dudeck
- Adjusted Ranking Metric (ARM) & the Reliability-Adjusted Rankings Dashboard – Sunny Xu
- MDRO/CDI Module Analysis Updates – Karen Jones and Sunny Xu
- 2020 CLABSI Analysis Changes and Introduction to SIR/SUR Percentile Distribution – Prachi Patel
- 2020 changes to the HAI-AR analysis reports, Recently published NHSN surveillance reports, and the Patient Safety Portal – Kathryn Haass
Changes to NHSN Dataset Generation (DSG)

Maggie Dudeck, MPH

2020 PS Analysis Updates
Changes to NHSN Dataset Generation (DSG)

- Background:
  - Generating data sets is the first step in NHSN analysis
  - Data will be frozen, for your use, at a specific point in time and copy those data into defined data sets.
  - Regenerate datasets for updates to be reflected in reports
  - Each user in NHSN who wishes to analyze data must generate data sets.

- Recent release of NHSN rolled out enhanced features for DSG
- Enhancements intended to improve DSG process, speed, and user experience
Previous Method for Data Set Generation:

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: Aug 28 2019 7:03AM
Previous Method for Data Set Generation:

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.

Previously, time parameters were not truly customizable
New: Enhanced Timeboxing!

- Original intent of previous framework was to allow custom timeframes
  - This is known as timeboxing
- In 9.4, released on December 7, 2019, facility and group users are able to specify month/year for analysis datasets, prior to generating
  - Lowers size of datasets
  - Faster generation of datasets
  - Improves system resources
  - Improves experience for users
New Data Set Generation screen

Include data for the following time period:

Beginning: 06/2018
Ending: 05/2019

Last Generated:
September 3, 2019 9:16 AM
to include data beginning 06/2018 and ending 05/2019

This information will appear in report footnotes
When clicking in the date box, the month and year drop downs will appear for selection. Once selected, click “Done”.

After date parameters are set, click “Generate Reporting Data Sets”.

New Data Set Generation screen
**New Data Set Generation screen**

- When process starts, a new progress image will appear.
- You can navigate to other areas of NHSN or log off.
  - You **cannot** run analysis reports while data sets are generating.

Your data set generation has been scheduled. You may log out or continue to work in other areas of NHSN. When you return to this screen you will see a progress bar if still processing, otherwise, you will see a time completed.
More about Specifying Dates

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<th>Will include all data within the time period (e.g., 01/01/19 thru 03/31/19)</th>
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<td>mm/yyyy</td>
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Special Rules for PS

- Survey data will **not** be limited by time period
  - All surveys completed by the facility will be included, regardless of survey year
- SSIs with event dates up to 90 days past the “ending” date will be included
  - 90 days is the max surveillance period for a number of procedure categories
- DSG process will include all LabID events
  - Once algorithms are applied, events outside the time period will be removed from final analysis data sets (ADS)
Extra Data Set Generation for PS Group Users

- In 9.4, the ParticipationAlerts analysis dataset (ADS) is separate from main DSG process
- Group Users will have two tabs on “Generate Data sets” screen
  - Reporting data sets (same as Facility option)
  - Participation Alerts data Set (optional)
- Generating this data set is optional
  - This data set is used only for the Participation Alerts reports
  - This data set should only be generated if you’re interested in reviewing unresolved alerts and is not needed for any other report in NHSN
Participation Alerts ADS

- Group Users can select a time period for Participation Alerts
  - Smaller time period, fewer alerts = quicker DSG
- Group users can select which alerts to include
  - Can also select “All Alerts”
- “Last Generated” time stamp on this tab will always be specific to Participation Alerts ADS
Participation Alerts ADS

- A new progress image appears on the Participation Alerts Data Set tab.
- You can navigate to other areas of NHSN, or log off.
  - NOTE: You cannot run the Participation Alerts reports while this data set is generating, however you can generate other reporting data sets or run other analysis reports.

Your data set generation has been scheduled. You may log out or continue to work in other areas of NHSN. When you return to this screen you will see a progress bar if still processing, otherwise, you will see a time completed.
Participation Alerts ADS

- Once generated, you’ll receive an alert that the data sets generated successfully.
- The date and time Last Generated will be updated and will appear next to the Participation Alerts reports.
Additional Information


Analysis Quick Reference Guides

General Tips

- General Tips for NHSN Analysis [PDF – 111 KB]
- New! How to Generate Data Sets [PDF – 400 KB]
- New! How to Generate Participation Alerts Data Set (Group Users) [PDF – 400 KB]
- Keys to Success with NHSN Data
- How to Modify a Report [PDF – 375 KB]
- Exporting Modified Analysis Data Sets [PDF – 574 KB]
- Reporting Height and Weight for Procedures in NHSN [PDF – 361 KB]
- How to Add and Find the Patient Safety Component Annual Survey [PDF – 574 KB]
Adjusted Ranking Metric (ARM) & the Reliability-Adjusted Rankings Dashboard

New Measure & NHSN Dashboard

Sunny Xu, MPH
What is the ARM?

- The Adjusted Ranking Metric (ARM)
- Available for Acute Care Hospitals at this time
- Accounts for differences in volume of exposure between facilities and is preferable for ranking facilities
- Individual hospitals are ranked against all other acute care hospitals for the same year
How is the ARM calculated?

- The ARM is calculated as a ratio of numerator divided by denominator, where the ARM denominator is identical to that of the SIR.
- Explicitly, the ARM is the reliability-adjusted number of events divided by the risk-adjusted predicted number of events, whereas, the SIR is the number of events divided by the risk-adjusted predicted number of events.

\[
\text{ARM} \quad \frac{\text{Reliability adjusted number of events}}{\text{Risk adjusted predicted number of events}} \quad \text{SIR} \quad \frac{\text{Number of events}}{\text{Risk adjusted predicted number of events}}
\]
Reliability-Adjusted Ranking

- Annual, facility-specific Reliability-Adjusted Rankings based on the ARM are displayed as percentiles on the Reliability-Adjusted Ranking dashboard within NHSN.
  - Where lower percentiles imply better performance
- Reliability-Adjusted Rankings are available for CLABSI, CAUTI, MRSA, CDI, SSI-COLO and SSI-HYST.
Reliability-Adjusted Ranking

Name: 
Year: 2019
Data as of: July 01, 2019

CAUTI Ranking Interpretation: A percentile of 56 out of 100 means your hospital is performing better than 44% of hospitals, after accounting for exposure.

About these data:
1. The reliability-adjusted ranking for each HAI is based on the Adjusted Ranking Metric (ARM) score.
2. This score is unique to your hospital and accounts for differences in exposure (or patient group “at risk”) between acute care hospitals.
3. Your acute care hospital is ranked against all other participating acute care hospitals and this rank is presented as a percentile, where a lower score is better. For example, a percentile of 31 out of 100 means that your hospital is performing better than 69% of hospitals, for the same HAI and year, after accounting for exposure.

For more information, please visit the NHSN website: https://www.cdc.gov/nhsn/ps-ana/analysis-resources/arm/index.html
For more information please visit the ARM webpage: https://www.cdc.gov/nhsn/ps-analysis-resources/arm/index.html
MDRO/CDI Module Analysis Updates

Sunny Xu, MPH and Karen Jones, PhD, MPSH
MDRO/CDI Module Analysis Updates 2020

- Updates to the “Incomplete Data” table located in the CDI SIR report
- Edits to the Summary Data Line List
- MRSA bacteremia de-duplication algorithm improvement
- New Combined ED/OBS CDI prevalence rate
Data Excluded from the CDI SIR Report

- CDI SIRs are only available on a quarterly-basis or longer (e.g., annual)
- CDI SIRs are not available until the quarter is complete
  - 2020 Q1 CDI SIRs are not available until March 2020 data entry is complete
  - CDI test type is necessary for the SIR, and is not entered until the March 2020 FacWideIN denominator
- If running a CDI SIR report on an *incomplete* quarter, the SIR report contains an extra data table in the results
  - Recent improvements to this table
Data Excluded from the CDI SIR Report continued

**CDI Data - Months Excluded from SIR Due to Missing CDI Test Type**

As of: October 28, 2019 at 2:50 PM  
Date Range: BS2_LABI0_RATESCDIM_CMS summaryYr After and Including 2015
if (((cdilabIDPlan = "Y" )))

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1. This table displays months that are excluded from the SIR report. These months will be included in the SIR once reporting for the entire quarter has been completed and CDI test type has been reported.

This column is ‘blank’ because CDI Test Type is missing for the quarter.
Updates to the Summary Data Line List

- Analysis Reports > Advanced > “Line Listing- All Summary Data”
- Shortened list of “Selected Variables” on the Modify screen
MRSA bacteremia de-duplication algorithm

- An improvement has been made to the de-duplication algorithms used for the MRSA bacteremia SIR numerator.
- This improvement adjusts the de-duplication that occurs in rare scenarios when a single patient has multiple positive MRSA bacteremia events that cross multiple units within the facility and multiple calendar months.
A positive MRSA bacteremia will not be counted in the SIR if the patient had a prior positive MRSA bacteremia in the previous 14 days (where the first specimen date is considered Day 1).

Updates and additional examples can be found in the LabID SIR Troubleshooting Guide: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf
New CDI prevalence rate

- Combined Outpatient Prevalence Rate for ED and 24 hour Observation Locations:

\[
\text{Total number of unique CO CDI LabID Events} \times \frac{\text{Total patient encounters in ED and 24 hour Observation location(s)}}{\text{ID events}} \times 100
\]

Note: This rate has been added for informational purposes only and is not used in the risk adjustment calculations for the SIR.
Notable mentions

- The MRSA bacteremia SIR reports that are located in the “CMS Reports” analysis folder for Inpatient Rehabilitation Facilities (IRFs) and Long-term Acute Care Hospitals (LTACHs) will not contain data beyond 2018 Q3.
- Additional guidance and examples have been provided to assist users in accurate reporting of primary CDI test type method. This clarification will assist facilities that use a single-step or conditional multi-step testing algorithm.
2020 CLABSI Analysis Changes and Introduction to SIR/SUR
Percentile Distribution

Prachi Patel, MPH

Surveillance Branch, DHQP, NCEZID
Centers for Disease Control and Prevention
CLABSI Numerator exclusions

- 2015: MBI-LCBI events
  - 2019: Extracorporeal life support (ECMO) and Ventricular Assist Device (VAD) BSI events
  - 2020: Munchausen Syndrome by Proxy (MSBP), Epidermolysis bullosa (EB), Patient self-injection, and Pus at vascular access site
Analysis Options Impacted

- CLABSI SIR and Rate tables
  - Excludes: MBI-LCBI, ECMO, VAD, MSBP, EB, Patient self injection, Pus at vascular site

- MBI-LCBI SIR and Rate tables
  - Excludes: ECMO, VAD, MSBP, EB, Patient self injection, Pus at vascular site
New Analysis Options

- BSI Events Excluded from the CLABSI Numerator line list
  - Will include all events that will not be included in the CLABSI numerator/event count
  - New analysis variable called clab_exclude
    - If any of the previously mentioned risk factors are met, this variable will show as “Yes”
## Line List Example

### National Healthcare Safety Network

**Line Listing for BSI Events Excluded from the CLABSI Numerator**  
As of January 2, 2020 at 9:06 AM  
**Date Range: CLABEVENTS evntDateYr: 2019 to 2019**

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The New SIR/SUR Percentile Distribution

- Percentile distribution of facility-specific SIRs/SURs are now included on SIR and SUR reports
  - Based on the national SIR and SUR distribution published in the annual HAI Progress Report
    - [https://www.cdc.gov/hai/data/portal/progress-report.html](https://www.cdc.gov/hai/data/portal/progress-report.html)

- The percentile distribution of facility-specific SIRs/SURs are available for
  - Device-associated HAIs (CLABSI, CAUTI and VAE)
    - By orgID overall
    - By Location Type
      - ICU, WARD and NICU (CLABSI only)
  - Surgical Site Infections: Complex Admission/Readmission SIR Model only
  - MDRO: CDI and MRSA at facility-wide
The Percentile Distribution and How to Interpret Them: CLABSI SIR Example

- The SIR/SUR percentiles are available for the CLABSI reports listed in above
- Using the output table above as example
  - This can be interpreted as 99% of facilities in the nation (with at least 1 predicted infection) had a overall CLABSI SIR equal to or lower than 2.717
How to Interpret the SIR/SUR Percentile Distribution: CLABSI Example

- On the Location Type table of our report output,
- Only the ICU location type, highlighted, has an SIR therefore the SIR percentile is calculated
- The other location types had less than 1 predicted infections and no SIR calculated
  - Therefore the SIR percentile is not calculated
2020 Analysis Update Webinar

- 2020 changes to the HAI-AR analysis reports
- Recently published NHSN surveillance reports
- Patient Safety Portal

Kathryn Haass, MPH, CPH, M(ASCP)BB
Changes to HAI Antibiotic Resistance Analysis Reports

- Line list, frequency table, and rate table are available to show antibiotic-resistant pathogens reported for an HAI
  - CLABSIs, CAUTIs, SSIs, VAEs, pedVAEs

- CRE definition change in analysis reports for 2020:
  - CRE-E.coli, CRE-Klebsiella, CRE-Enterobacter
  - In 2020, NHSN adopted the new SNOMED classification for *Enterobacter aerogenes*
    - Starting in 2020, *Enterobacter aerogenes* will be known as *Klebsiella aerogenes*
    - Carbapenem-resistant *Klebsiella aerogenes* will be counted as CRE-Klebsiella
  - If reported as *Enterobacter aerogenes*, NHSN will re-classify as Klebsiella
  - No other changes to CRE definitions
### Line List for CRE Klebsiella

**National Healthcare Safety Network**  
**Line Listing - Antimicrobial Resistant Organisms**

**CREklebsiella_HAI** - *Carbapenem-resistant Klebsiella pneumoniae/oxytoca/aerogenes*

As of: January 2, 2020 at 10:41 AM  
Date Range: ANTIBIOGRAM_HAI eVarDateYQ 2020Q1 to 2020Q1

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- Updated titles to reflect pathogen change
- New footnotes beneath the report
- Guidance documents are available on the use of these reports, resistance definitions, etc.:  
New Publications: Common Pathogens and Resistance Patterns among HAIs in the U.S.

- CDC released two surveillance reports highlighting common pathogens and antibiotic resistance in U.S. healthcare facilities, 2015-2017

1. Adult HAI Report:
   - Frequent pathogens for CLABSIs, CAUTIs, SSIs, & VAEs
     - SSI pathogens available for each NHSN operative procedure code
     - Data shown separately for ICUs, Wards, Oncology Units, LTACHs, IRFs
   - Resistance data stratified by infection type, location, and surgical category
   - [https://doi.org/10.1017/ice.2019.296](https://doi.org/10.1017/ice.2019.296)

2. Pediatric HAI Report: [https://doi.org/10.1017/ice.2019.297](https://doi.org/10.1017/ice.2019.297)

- CLABSIs, CAUTIs, SSIs, & pediatric VAPs
- Pathogen and resistance data are stratified by infection type, location type, and surgical category
  - Data shown separately for NICUs, pediatric ICUs, pediatric wards, pediatric oncology units

Both reports, as well as supplemental data tables, are available at: [https://www.cdc.gov/nhsn/datastat/index.html](https://www.cdc.gov/nhsn/datastat/index.html)

### Table 5. Distribution and Rank Order\(^a\) of the 15 Most Commonly Reported Pediatric Central Line-Associated Bloodstream Infection (CLABSI) Pathogens, by Location Type,\(^b\) 2015–2017

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>NICUs(^b) No. (%) Pathogens</th>
<th>Rank</th>
<th>Pediatric ICUs(^a) No. (%) Pathogens</th>
<th>Rank</th>
<th>Pediatric Oncology Units(^a) No. (%) Pathogens</th>
<th>Rank</th>
<th>Pediatric Wards(^a,(^b) No. (%) Pathogens</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>1,381 (25.2)</td>
<td>1</td>
<td>420 (12.6)</td>
<td>2</td>
<td>266 (7.7)</td>
<td>5</td>
<td>313 (12.4)</td>
<td>2</td>
</tr>
<tr>
<td>Coagulate-negative staphylococci</td>
<td>1,145 (20.9)</td>
<td>2</td>
<td>345 (10.4)</td>
<td>4</td>
<td>316 (9.1)</td>
<td>4</td>
<td>289 (11.4)</td>
<td>3</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>596 (10.9)</td>
<td>3</td>
<td>151 (4.5)</td>
<td>9</td>
<td>429 (12.4)</td>
<td>2</td>
<td>205 (8.1)</td>
<td>5</td>
</tr>
</tbody>
</table>

Antibiotic Resistance & Patient Safety Portal

- A re-designed web-based platform that allows users to explore HAI and antibiotic resistance data in their state, region, and across the country
- Replaces the Patient Safety Atlas

https://arpssp.cdc.gov
The 2018 HAI Progress Report, which summarizes national and state-level progress in the prevention of HAIs, was released late last year.

SIR and SUR data for:
- Device-Associated HAIs: CLABSI, CAUTI, & VAE
- SSIs for All NHSN Operative Procedures
- MRSA and CDI LabID Event

SIR and SUR data are separated by four healthcare settings:
- Acute care hospitals (ACHs)
- Critical access hospitals (CAHs)
- Inpatient rehabilitation facilities (IRFs)
- Long-term acute care hospitals (LTACHs)

Nationally, among ACHs, the highlights in this report include:
- Overall, about 9% decrease in CLABSI between 2017 and 2018
  - Largest decrease in ICU (11%)
- Overall, about 8% decrease in CAUTI between 2017 and 2018
  - Largest decrease in ICU (10%)
- Overall there was no significant change in VAE between 2017 and 2018
- Overall, there was no significant change in SSI related to the 10 select procedures tracked in the report between 2017 and 2018.
  - The 10 select procedures are Surgical Care Improvement Project (SCIP) procedures. For a list of the SCIP procedures, please see: [https://health.gov/hcahps/pdfs/ssi2012.pdf](https://health.gov/hcahps/pdfs/ssi2012.pdf)  [PDF - 2 pages]
  - No significant changes in abdominal hysterectomy SSIs
  - No significant changes in colon surgery SSIs
- No significant changes in hospital onset MRSA bacteremia between 2017 and 2018
- About 12% decrease in hospital onset *C. difficile* infections between 2017 and 2018
2018 National and State HAI Progress Report

- Includes state-level reporting mandates and data validation activities performed by states
- The full report consists of
  - Executive Summary
  - National and State-level Data Highlights
  - Technical Appendix which describes the analytic methodology used in the report
  - Data Tables (by healthcare setting)
- The report is located on the HAI Data Page:
  - https://www.cdc.gov/hai/data/portal/progress-report.html
- Also available on the newly redesigned Antibiotic Resistance & Patient Safety Portal (AR & PSP)
  - https://arpsp.cdc.gov

Current HAI Progress Report

2018 National and State Healthcare-Associated Infections Progress Report

Executive Summary

The Centers for Disease Control and Prevention (CDC) is committed to protecting patients and healthcare personnel from adverse healthcare events and promoting safety, quality, and value in healthcare delivery. Preventing healthcare-associated infections (HAIs) is a top priority for CDC and its partners in public health and healthcare. The 2018 National and State Healthcare-Associated Infections (HAI) Progress Report provides a summary of select HAIs across four healthcare settings: acute care hospitals (ACHs), critical access hospitals (CAHs), inpatient rehabilitation facilities (IRFs), and long-term acute care hospitals (LTACHs). Data from CAHs are provided in the detailed technical tables but not in the report itself. The designation of CAH is assigned by the Centers for Medicare and Medicaid Services (CMS) to hospitals that have 25 or fewer acute care inpatient beds and that maintain an annual average length of stay of 96 hours or less for acute care patients. IRFs include hospitals, or part of a hospital, that provide intensive rehabilitation services using an interdisciplinary team approach. LTACHs provide treatment for patients who are generally very sick and stay, on average, more than 25 days. To view HAI data from individual hospitals, LTACHs, and IRFs, please see: CMS Hospital Compare, LTACH Compare, and IRF Compare.

DATA TABLES

- 2018 SIR Data
  - 2018 National and State HAI Progress Report SIR Data - Acute Care Hospitals [XLS - 557 KB]
  - 2018 National and State HAI Progress Report SIR Data - Critical Access Hospitals [XLS - 364 KB]
  - 2018 National and State HAI Progress Report SIR Data - Inpatient Rehabilitation Facilities [XLS - 125 KB]
  - 2018 National and State HAI Progress Report SIR Data - Long-Term Acute Care Hospital [XLS - 147 KB]

- 2018 SUR Data
  - 2018 National and State HAI Progress Report SUR Data - Acute Care Hospitals [XLS - 273 KB]
  - 2018 National and State HAI Progress Report SUR Data - Critical Access Hospital [XLS - 159 KB]
  - 2018 National and State HAI Progress Report SUR Data - Inpatient Rehabilitation Facilities [XLS - 90 KB]
  - 2018 National and State HAI Progress Report SUR Data - Long-Term Acute Care Hospitals [XLS - 94 KB]