NHSN Data Quality - An Introduction to the Patient Safety Component Data Quality Activities

Data Quality Webinar

Vaishnavi Pattabiraman MSc MS MPH

Rebecca Konnor MPH

Prachi Patel MPH

Data Quality Committee, NHSN Acute Care Analytics Team

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Learning Objectives

1. Introduction to Data Quality Webinar – **Vaishnavi Pattabiraman**
2. NHSN Data Quality Activities – **Rebecca Konnor**
3. Data Quality Outreach – **Prachi Patel**

Data Quality Webinar Series – An Introduction

- A **Bi-annual webinar by the Patient Safety Component (PSC) SMEs** for NHSN users with a focus on **Data Quality (DQ) related items** inclusive of but not limited to the following,
  - Updates about **DQ resources for the NHSN users** – **example:** new DQ related tools in the NHSN application, guidance documents, etc.
  - Updates about any new **DQ checks** for consideration by NHSN users

Why is Data Quality Critical?

1. **High quality data is critical** because,
   a) It is the foundation upon which accurate data analysis, interpretation and results are derived.
   b) HAI Prevention efforts and public health policies are proposed based on the data analysis results using statistical measures such as SIR, SUR, rates, etc.

Why is Data Quality Critical? – Continued

c) Benchmark facility performance against risk-adjusted national data.

d) Fulfill state-mandated reporting requirements, and/or to comply with the Centers for Medicare and Medicaid Services (CMS) HIQR, PCHQR Program requirements.

Data Quality Webinar - Goals

- Habituate routine DQ checks by the NHSN users which will in turn promote data accuracy.
- Gentle reminders prior to deadline related DQ checks such as – deadlines related to annual surveys, CMS reporting, etc.
- Overarching goal of reducing DQ outreaches done by the PSC SMEs.
- To be in tune with the NHSN users about DQ updates and resources.

NHSN Data Quality Activities: DQ Checks and Supporting Resources

Rebecca

NHSN Patient Safety Component: Data Quality Manual

- Lists the various data quality issues that have been identified as impacting NHSN data analysis
- Defines each data quality issue
  - By HAI/module
- Provides step by step guide on how to address the data quality issue
  - Uses examples that NHSN users can understand and apply to their own facility data

https://www.cdc.gov/nhsn/pdfs/pscmanual/Instructions_DQ.pdf

NHSN Patient Safety Component: Data Quality Manual

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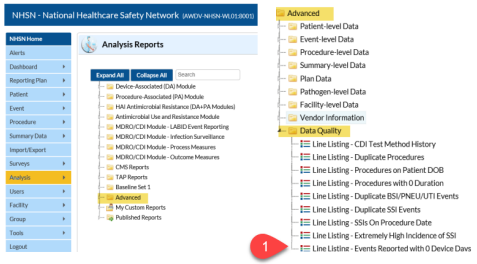
CHAPTER 2: NHSN DATA QUALITY OUTPUT OPTIONS

DATA QUALITY IS A SUB-FOLDER UNDER **ADVANCED FOLDER** IN **ANALYSIS REPORTS** IN NHSN APPLICATION AS HIGHLIGHTED IN THE TABLES AND EXPLAINED IN THE TEXT BELOW.



Data shown in the report output below is fictitious and for education purposes only

2.1. DEVICE-ASSOCIATED EVENTS REPORTED WITH 0 OR MISSING DEVICE DAYS (OUTPUT OPTION: LINE LISTING – EVENTS REPORTED WITH 0 DEVICE DAYS)

This line list includes those months where at least one DA event (i.e., CLABSI, VAE, or CAUTI) was reported with either 0 corresponding device days or a missing summary record.

Instructions:

This line list is sorted by summary month, summary type, and location. Review the line list and enter the appropriate denominator data. Remember – without device days, DA rates for CLABSI, CAUTI, Ventilator-Associated Pneumonia (VAP), Ventilator associated events (VAE), Pediatric Ventilator-Associated Events (PedVAE) and SIRs for CLABSI, CAUTI, VAE cannot be calculated. Facilities have the option of removing the location from their monthly reporting plan(s) for those months and locations where the data may be unavailable, although consideration should be given to state mandates and CMS IPPS CLABSI reporting requirements.

Example 2.1-1: In the example below, 3 event types were entered without the summary data that needs to be corrected in NHSN.

I. 1 CAUTI and 1 CLABSI were reported for location 3E, January 2019, yet summary data have not been entered (indicated by the "missing" (.) patient days (numpatdays) and device days (numddays).

II. 4 CLABSIs were reported for location INSURGCC, January 2019, and the device day count (numddays) was reported as 0.

National Healthcare Safety Network

Line Listing of Events Reported with 0 Device Days

As of April 20, 2019 at 12:59 PM

Date Range: MISSINGDAYS

Carefully review this list, which includes those months where at least one DA event was reported with no corresponding device days. Enter the appropriate summary data or remove the event from your plan. Sorted by orgID summaryYM.

1

orgID	summaryYM	summarytype	location	eventType	eventCount	birthWtCode	numpatdays	numddays	plan
10018	2019M01		3E	CAU	1	.	.	.	Y
10018	2019M01		3E	CLAB	1	.	.	.	Y
10018	2019M01		INSURGCC	CLAB	4	.	100	0	Y

https://www.cdc.gov/nhsn/pdfs/pscmanual/Instructions_DQ.pdf

DQ Manual and Toolkit:

DQ Checklists

NHSN
NATIONAL HEALTHCARE SAFETY NETWORK

Toolkit for Data Quality Checks for Reporting Facilities

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https://www.cdc.gov/nhsn/pdfs/validation/2021/2021_-nhsn-iv-for-facilities-508.pdf

Monthly Data Quality Activities

- Validate Monthly Reporting Plan
- Conduct data quality checks routinely
  - Missing data (zero patient days, “no events”)
  - Implausible data (device days > patient days, BMI > 200)
  - Outliers (procedure duration < 5 minutes)
  - Incomplete data (SSI event not linked to procedure)
  - Inaccurate data (incorrect date of event)
  - Outstanding NHSN alerts (incomplete event, missing events)
- Review data prior to state or CMS program submission using NHSN Data Quality Checklists

Monthly Data Quality Checklist-CMS Reporting

❑ CCN: _____ ❑ Month/Year: _____/_____

1 STEP 1: Create Monthly Reporting Plans

CAUTI	CLABSI	MRSA bacteremia and CDI LabID	SSI
❑ ICUs* ❑ Wards†	❑ ICUs* ❑ NICUs ❑ Wards†	❑ FacWideIN- MRSA (blood specimens only) ❑ FacWideIN- CDI (all specimens) ❑ ED/OBS locations (*will be added to plan automatically if FacWideIN is selected and ED/OBS location(s) mapped in NHSN)*	❑ COLO inpatient procedures ❑ HYST inpatient procedures

The following tables refer to Influenza and COVID-19 Vaccination quality reporting. For a checklist for *HCP Reporting to CMS Hospital, IRF and LTCH Quality Reporting Programs* please click the following link; NHSN Checklist for HCP Reporting.

Influenza Vaccination (Healthcare Personnel Safety Component)
❑ Quarter 4 (October – December) through Quarter 1 (January – March)

COVID-19 Vaccination (Healthcare Personnel Safety Component)
❑ Quarter 4 (October – December) through Quarter 1 (January – March) 1 week of data for each month

2 STEP 2: Enter Events/Procedures

CAUTI	CLABSI	MRSA bacteremia and CDI LabID‡	SSI
❑ ICUs* ❑ Wards†	❑ ICUs* ❑ NICUs ❑ Wards†	❑ FacWideIN- MRSA (blood specimens only) ❑ FacWideIN- CDI (all specimens) ❑ ED/OBS locations	❑ COLO inpatient procedures ❑ HYST inpatient procedures

https://www.cdc.gov/nhsn/pdfs/cms/ach-monthly-checklist-cms-iqr.pdf

Monthly Data Quality Checklist-CMS Reporting

STEP 3: Enter Summary (Denominator) Data 3

- ❑ "Device-Associated – Intensive Care Unit / Other Locations" form
  - ❑ Summary record for each inpatient location
    - ❑ Total Patient Days
    - ❑ Central Line Days
    - ❑ Urinary Catheter Days
  - ❑ Select "Report No Events", for each event type, only if no events were identified that met the NHSN surveillance definition
- ❑ "MDRO and CDI Monthly Denominator – all Locations" form
  - ❑ One summary record per month for FacWideIN
    - ❑ Line 1: Total Facility Patient Days & Admissions
    - ❑ Line 2: Patient Days & Admissions
    - ❑ Line 3: Patient Days & Admissions
    - ❑ Indicate CDI test type (3rd month of each qtr)
      - March, June, September, December
    - ❑ Select "Report No Events", for each organism, only if no events were identified that met the NHSN surveillance definition
  - ❑ Summary record for each ED/OBS location
    - ❑ Total Encounters
    - ❑ Select "Report No Events", for each organism, only if no events were identified that met the NHSN surveillance definition

STEP 4: Resolve Alerts 4

- ❑ Incomplete Events
- ❑ Missing Events *(select "Report No Events" box, if applicable)*
- ❑ Incomplete Summary Data
- ❑ Missing Summary Data
- ❑ Incomplete Procedures
- ❑ Missing Procedures *(select "No Procedures Performed" box, if applicable)*
- ❑ Missing Procedure-associated Events *(select "Report No Events", if applicable)*
- ❑ Unusual Susceptibility Profile
- ❑ Confirm CDI Test Type

https://www.cdc.gov/nhsn/pdfs/cms/ach-monthly-checklist-cms-iqr.pdf

Monthly Data Quality Checklist-CMS Reporting

5 STEP 5: Generate Datasets

- ❑ Generate new data sets before verifying data in CMS reports in **STEP 6**

6 STEP 6: Print/Save Copies of Quarterly CMS Reports

- ❑ "SIR - CLAB Data for Hospital IQR"
- ❑ "SIR - CAU Data for Hospital IQR"
- ❑ "SIR - Complex 30-Day SSI Data for Hospital IQR"
- ❑ "SIR - MRSA Blood FacWideIN LabID Data for Hospital IQR"
- ❑ "SIR - CDI FacWideIN LabID Data for Hospital IQR"

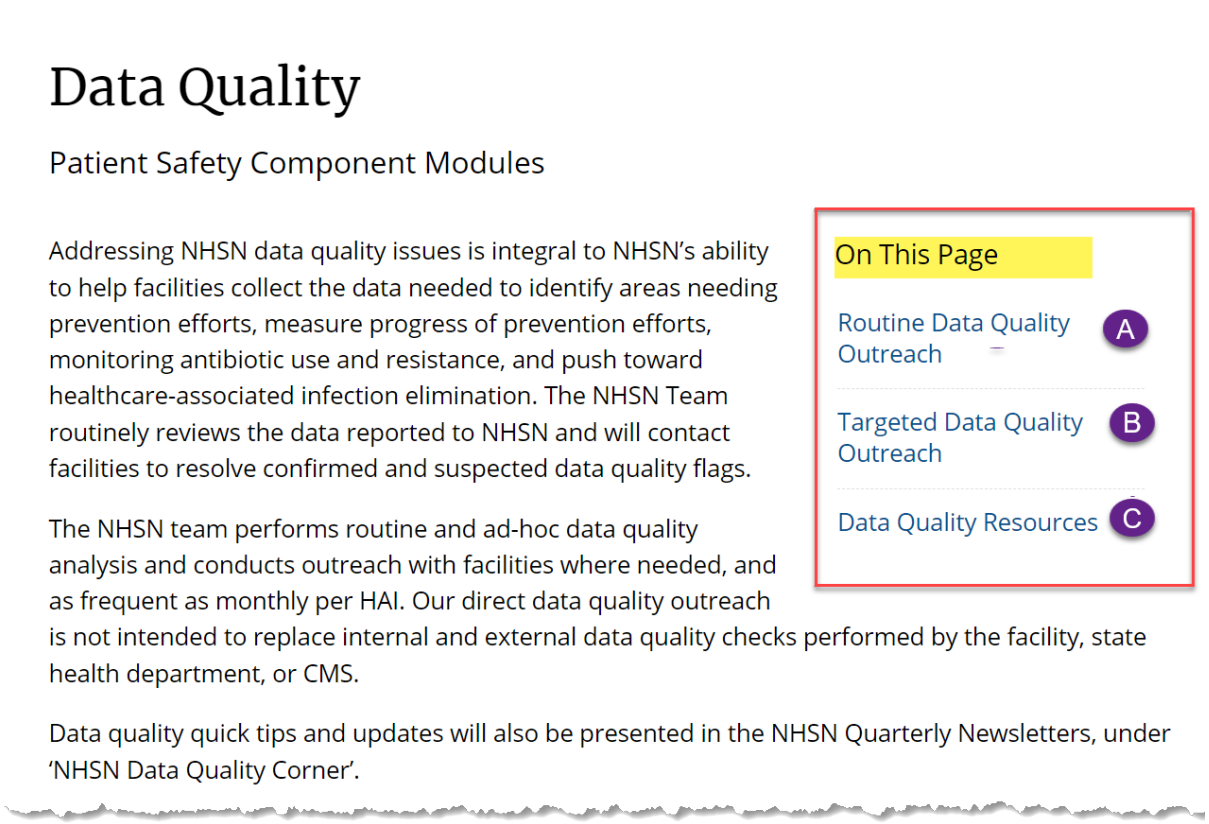
CMS Deadlines:

Quarter 1 (January – March): **August 15th**
Quarter 2 (April – June): **November 15th**
Quarter 3 (July – September): **February 15th**
Quarter 4 (October – December): **May 15th**
Quarter 4 & Quarter 1 (October 1 – March 31) Healthcare Personnel Influenza Vaccination Summary data: **May 15th**

For additional guidance on ensuring your data are accurately sent to CMS for Quality Reporting purposes, please visit our website and navigate to the appropriate section(s) for your facility type: http://www.cdc.gov/nhsn/cms/index.html. If you have any questions, please contact the NHSN Helpdesk: NHSN@cdc.gov. The NHSN Helpdesk is staffed Monday through Friday, 7am ET – 5pm ET, excluding Federal Holidays.

https://www.cdc.gov/nhsn/pdfs/cms/ach-monthly-checklist-cms-iqr.pdf

Data Quality Webpage



Data Quality

Patient Safety Component Modules

Addressing NHSN data quality issues is integral to NHSN's ability to help facilities collect the data needed to identify areas needing prevention efforts, measure progress of prevention efforts, monitoring antibiotic use and resistance, and push toward healthcare-associated infection elimination. The NHSN Team routinely reviews the data reported to NHSN and will contact facilities to resolve confirmed and suspected data quality flags.

On This Page

Routine Data Quality Outreach A

Targeted Data Quality Outreach B

Data Quality Resources C

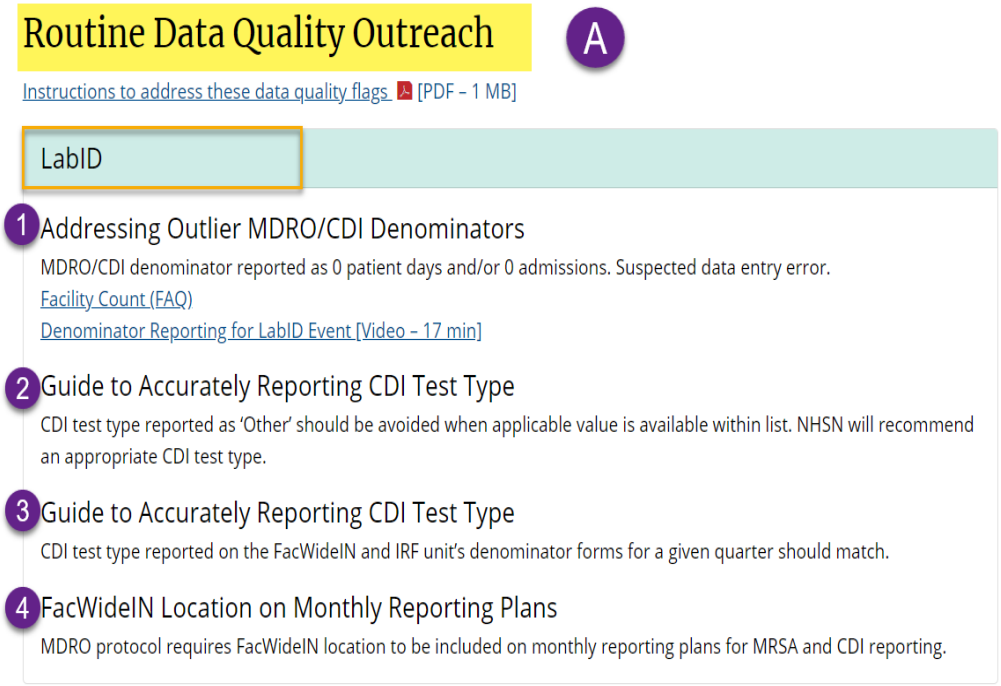
The NHSN team performs routine and ad-hoc data quality analysis and conducts outreach with facilities where needed, and as frequent as monthly per HAI. Our direct data quality outreach is not intended to replace internal and external data quality checks performed by the facility, state health department, or CMS.

Data quality quick tips and updates will also be presented in the NHSN Quarterly Newsletters, under 'NHSN Data Quality Corner'.

- Webpage dedicated to inform NHSN users about routine and targeted data quality checks and outreaches
- The website also provides quick reference guides on how to address the identified data quality issue

https://www.cdc.gov/nhsn/ps-analysis-resources/data-quality/index.html

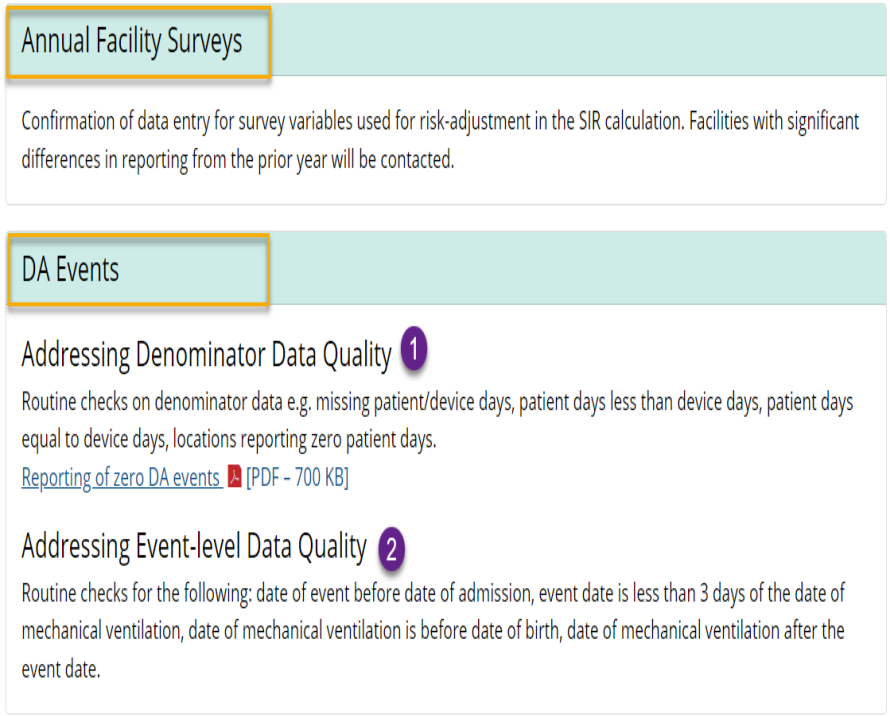
Data Quality Webpage- About Routine Data Quality Outreach



- NHSN subject matter experts (SMEs) conduct routine data quality outreach for each HAI or module based on an identified list of potential DQ issues
- A list of the DQ issues for which checks, and outreaches are conducted are listed on the DQ webpage by HAI/module under routine DQ Outreach
- Routine outreaches are sent to facilities with records meeting any of the listed issues under the specified HAI
- See the list for LabID HAIs to the left

https://www.cdc.gov/nhsn/ps-analysis-resources/data-quality/index.html

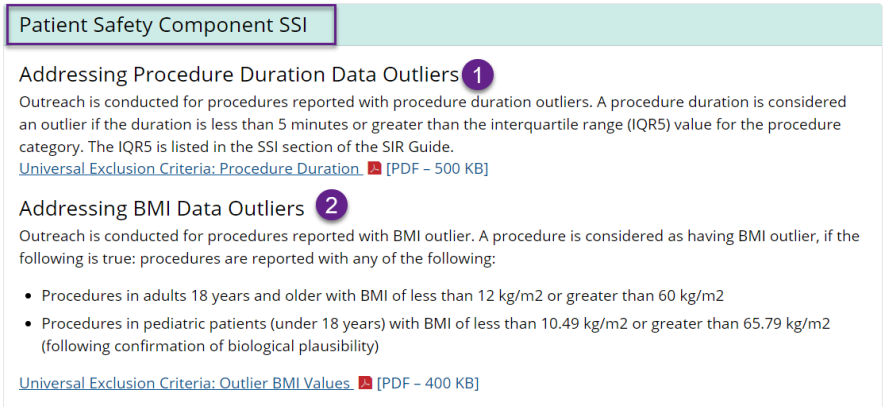
Data Quality Webpage- About Routine Data Quality Outreach



- Protocol and analyses SMEs analyze and confirms data entry for survey variables used for SIR denominator risk adjustment
  - Facilities with significant differences in reporting from prior year are contacted
- NHSN SMEs also check the quality of the device associated HAIs numerator and denominator
  - Among others, SMEs conduct checks for missing patient/device days, locations reporting 0 patient days

https://www.cdc.gov/nhsn/ps-analysis-resources/data-quality/index.html

Data Quality Webpage- About Routine Data Quality Outreach



Patient Safety Component SSI

Addressing Procedure Duration Data Outliers 1

Outreach is conducted for procedures reported with procedure duration outliers. A procedure duration is considered an outlier if the duration is less than 5 minutes or greater than the interquartile range (IQR5) value for the procedure category. The IQR5 is listed in the SSI section of the SIR Guide.

Universal Exclusion Criteria: Procedure Duration [PDF – 500 KB]

Addressing BMI Data Outliers 2

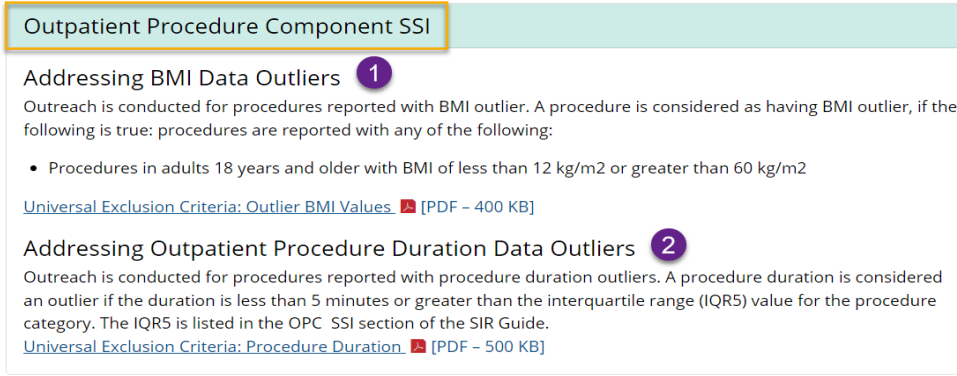
Outreach is conducted for procedures reported with BMI outlier. A procedure is considered as having BMI outlier, if the following is true: procedures are reported with any of the following:

- Procedures in adults 18 years and older with BMI of less than 12 kg/m2 or greater than 60 kg/m2
- Procedures in pediatric patients (under 18 years) with BMI of less than 10.49 kg/m2 or greater than 65.79 kg/m2 (following confirmation of biological plausibility)

Universal Exclusion Criteria: Outlier BMI Values [PDF – 400 KB]

- For the procedure-associated module in the PSC, routine checks are performed for both SSI denominator and numerator
  - Outreach is conducted for potential issues surrounding procedure duration and BMI data outliers
    - Details provided in section 1 and 2 highlighted in purple

- A similar check and outreach is performed for the **Outpatient Procedure Component** SSI module



Outpatient Procedure Component SSI

Addressing BMI Data Outliers 1

Outreach is conducted for procedures reported with BMI outlier. A procedure is considered as having BMI outlier, if the following is true: procedures are reported with any of the following:

- Procedures in adults 18 years and older with BMI of less than 12 kg/m2 or greater than 60 kg/m2

Universal Exclusion Criteria: Outlier BMI Values [PDF – 400 KB]

Addressing Outpatient Procedure Duration Data Outliers 2

Outreach is conducted for procedures reported with procedure duration outliers. A procedure duration is considered an outlier if the duration is less than 5 minutes or greater than the interquartile range (IQR5) value for the procedure category. The IQR5 is listed in the OPC SSI section of the SIR Guide.

Universal Exclusion Criteria: Procedure Duration [PDF – 500 KB]

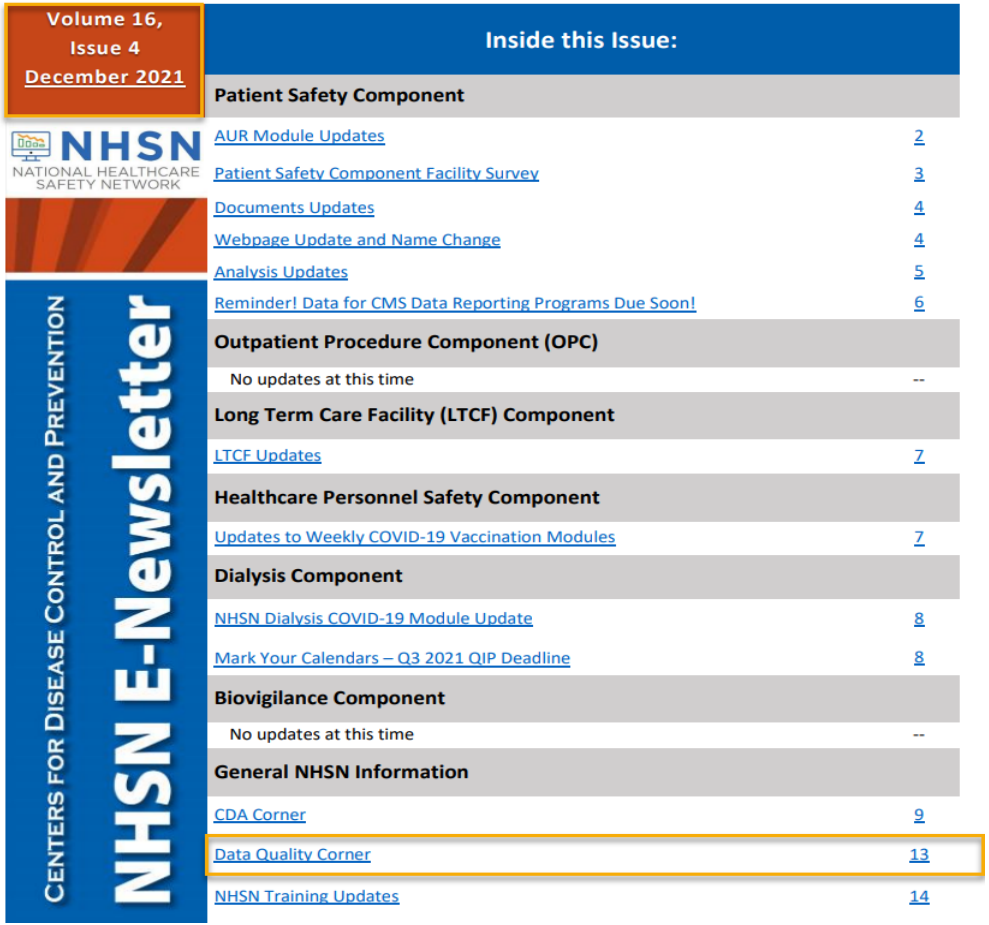
https://www.cdc.gov/nhsn/ps -analysis-resources/data-quality/index.html

Data Quality Webpage- About Targeted Data Quality Outreach

- Targeted DQ outreach are often used to address changes in reporting and the NHSN application
  - COVID-19 status field became required earlier this year
  - Facilities that failed to report the field were contacted
  - NHSN SMEs provided instructions on how to correct impacted records

https://www.cdc.gov/nhsn/ps -analysis-resources/data-quality/index.html

Data Quality Corner in NHSN Newsletter



Volume 16, Issue 4
December 2021

NHSN
NATIONAL HEALTHCARE SAFETY NETWORK

CENTERS FOR DISEASE CONTROL AND PREVENTION
NHSN E-Newsletter

Inside this Issue:

- We added a data quality corner in the quarterly NHSN newsletter
- Each newsletter issue highlights various data quality topics suitable for that time period
- It is imperative to review each issue for the various topics that are discussed

https://www.cdc.gov/nhsn/pdfs/newsletters/q4 -2021-nl-508.pdf

Data Quality Corner in NHSN Newsletter

Data Quality Corner

UPDATE! **C-Section Duration of Labor and Your SSI SIR**

The CDC continues to conduct regular assessments of the completeness, accuracy and timely submission of the data received in NHSN. During a recent data quality analysis, CDC identified several facilities reported '0' for the required field 'duration of labor' for all their cesarean procedures (CSEC) reported to NHSN. Since the duration of labor is used in the risk adjustment of the SIR denominator and impacts your SIR, NHSN recommends that all facilities review their data routinely for accuracy and completeness.

The 'duration of labor' data field is used in the risk adjustment of the "All SSI Data" and "Complex admission/readmission (A/R) SSI" SIR denominator for both pediatric and adult patients. This variable, in addition to others, is used to determine the likelihood of infection following a c-section procedure. To receive the appropriate risk adjustment for each CSEC procedure, it is important to report the duration of labor data field (in addition to all the other factors used in the risk adjustment of the SIR denominator) correctly. Remember that the sum of each patient's procedure risk, gives you the predicted number of infections.

UPDATE! **C-Section Duration of Labor Definition**

Definition: See Page 5 of Instructions for Completion of Denominator for Procedure Form (CDC 57.121): https://www.cdc.gov/nhsn/forms/instr/57_121.pdf

The duration of labor on the c-section denominator form is conditionally required. If operative procedure is CSEC, enter number of hours the patient labored in the hospital from beginning of active labor to delivery of the infant, expressed in hours. The documentation of active labor can be supplied in the chart by a member of the healthcare team or physician. Active labor may be defined by the individual facility's policies and procedures but should reflect the onset of regular contractions or induction that leads to delivery during this admission.

If a patient is admitted for a scheduled CSEC and has not yet gone into labor, the duration of labor would be 0. Hours should be rounded in the following manner: ≤30 minutes round down; >30 minutes round up.

UPDATE! **Length of Stay (LOS) and Time To Infection (TTI) DQ Outreach**

The Device Associated (DA) team has recently started DQ outreach to NHSN facilities for presumed outliers to LOS and TTI calculations for CLABSI, CAUTI and VAE (LOS only) data that are likely to impact the accuracy of data in NHSN. The NHSN application does not produce soft alerts for LOS and TTI outliers. Please respond to the respective outreach emails if you have any questions or concerns for data resolution. If you have any additional questions or concerns about the above DQ items, please email us at NHSN@cdc.gov with the subject line 'DA Data Quality'.

- Here is an example of the Data Quality Corner in Volume 16 Issue 4 released in December 2021
- In this issue, we updated users on the following:
  - Importance of reporting the correct duration of labor with C-section procedures
  - Outreach regarding length of stay and time to infection for DA infections

https://www.cdc.gov/nhsn/pdfs/newsletters/q4 -2021-nl-508.pdf

Data Quality Outreach Example

Prachi Patel

Time to BSI Infection

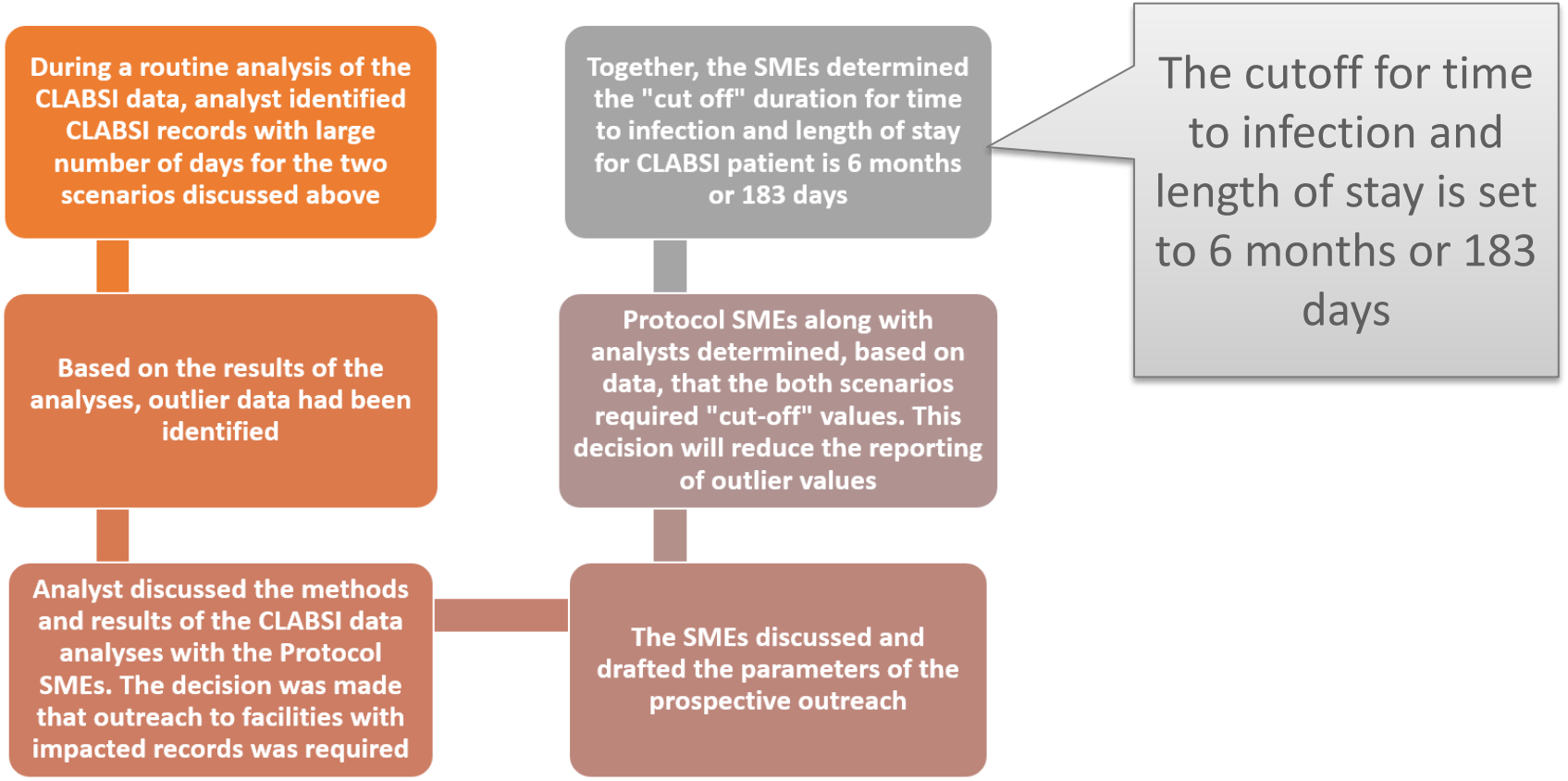
In this section, we will discuss two examples of DQ outreaches conducted by NHSN SMEs

- A DQ issue identified on the CLABSI event form impacted the **time to BSI infection**
  - Time to infection is defined as the time between device insertion (central line) and the event date
    - Central line was inserted on 06/22/2021
    - Date of CLABSI event was 1/01/2022
    - Time to CLABSI infection would be 194 days

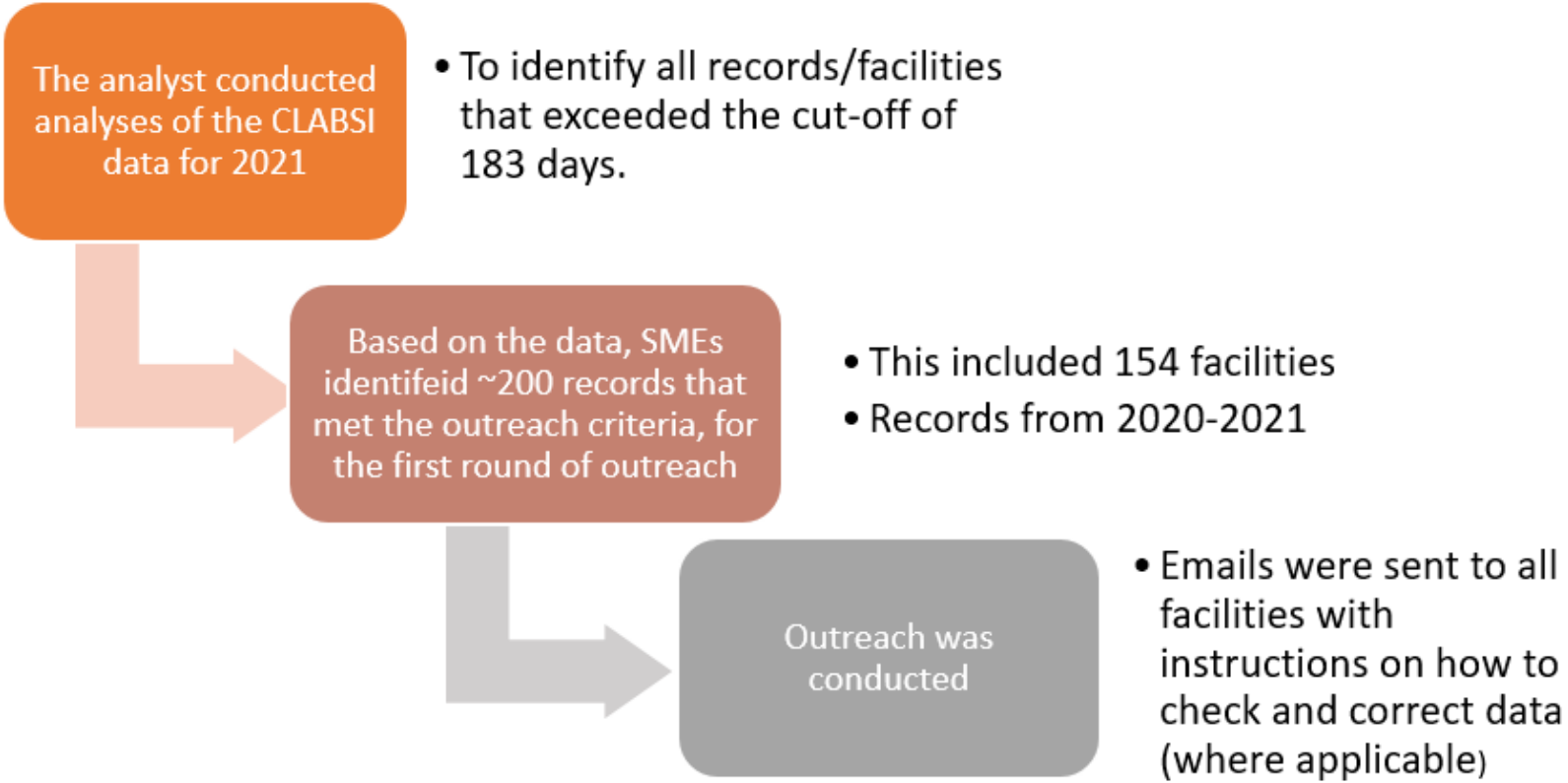
Length of Stay

- A DQ issue identified on the CLABSI event form impacted the **Length of stay**
  - Length of stay is defined as the time between admission, for the CLABSI patient, and discharge
    - Admit date of patient was on 12/19/2020
    - Discharge date of patient 1/07/2022
    - Length of stay would be 386 days

NHSN Data Quality Checks and Outreach Process



NHSN Data Quality Checks and Outreach Process

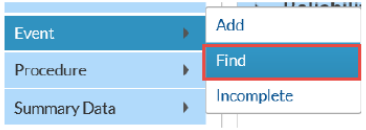


NHSN Data Quality Outreach

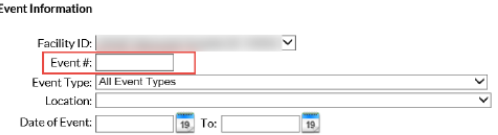
- An automated program with an email template is used to send the outreach to facilities with impacted records
  - Included details of the record to help facilities easily find records
- Emails were sent to facilities with specific instructions for resolving any potential inaccuracies.

Steps to verify time to a BSI event:

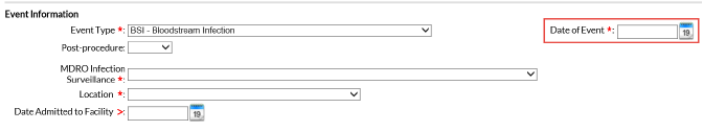
1. Navigate to Events within NHSN. Select Find Events.



2. Enter in Event ID that was included in the outreach email.



3. Open Event and confirm the "Date of Event" within the Event Information section.



4. Confirm the "Date of Device Insertion" within the Risk Factors section.

NHSN Facility OrgID:

Title: Attempt 1: NHSN Data Quality for BSI events with time to infection greater than 183 days

Addressing NHSN data quality (DQ) issues is integral to NHSN's ability to help facilities collect the data needed to identify problem areas, measure progress of prevention efforts, and push toward HAI (Healthcare Associated Infection) elimination. We understand that considering the ongoing pandemic response, prioritizing data quality activities may present a challenge to many facilities at this time. Thank you for your ongoing commitment to data quality and completeness.

Hello X Facility,

We are reaching out to inform you about a DQ issues in your data that were identified during our routine recent monthly DQ check of NHSN data. We identified that for *event id*, the time to a BSI was greater than 183 days. The time to infection is the number of days between the event date and device insertion date.

Although there is a possibility that some patients can have a time to infection longer than six months (183 days), we request you to validate these entries because they can impact the SIR/SUR calculations at the location/facility level or inter-facility comparisons. It is important to have accurate data entries which will in turn help in the calculation of accurate analytic measures.

Please see the attached document for more information on verifying the event and device insertion dates within the event form.

Let us know if you have any questions or concerns.

Thank you,

Prachi Patel

Device-associated Team

Email: nhsn@cdc.gov

Website: www.cdc.gov/nhsn/

Here is a sample of the email that was sent to facilities with impacted records

Outreach Feedback and Impact

- Replies are requested from the facilities to verify the accuracy of the data. About 65% of facilities replied to outreach.
- As we receive replies, internal documentation is updated to capture the results of the outreach.
  - Majority of the facilities reported that they did have patients with very long length of hospital stay and greater time to infection.
  - However, some facilities did report that this was a data quality error and they fixed their records.
- Incorrect data entry was impacting the event level criteria when conducting data analysis.

Data Quality is Integral to NHSN's Data Activities

- Data quality is integral to NHSN's data activities
- Thus, data quality checks and outreach are routinely performed by NHSN program SMEs
- NHSN CDC define output options for data quality checks in the NHSN applications are intended to inform and empower facilities to take ownership of their data quality checks

Additional Resources

- Data Quality Website
  - Data Quality | NHSN | CDC
- Data Entry and Analysis Training
  - http://www.cdc.gov/nhsn/training/analysis/index.html
- NHSN SIR Guide
  - https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf
- NHSN SUR Guide
  - https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sur-guide-508.pdf
- Analysis Quick Reference Guides
  - https://www.cdc.gov/nhsn/PS-Analysis-resources/reference-guides.html
- 2015 Rebaseline Page
  - https://www.cdc.gov/nhsn/2015rebaseline/index.html

Additional Resources

- How to see and create Modify Dates_2020
  - http://www.cdc.gov/nhsn/pdfs/analysis/how2view-create-modify-dates-in-nhsn.pdf
- How to Modify a Report
  - https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf
- How to Run Analysis on Custom Fields
  - https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/customfields.pdf
- Internal Validation Guidance and Toolkit
  - https://www.cdc.gov/nhsn/pdfs/validation/2021/2021-nhsn-iv-for-facilities-508.pdf
- Patient Safety Component Manual
  - https://www.cdc.gov/nhsn/pdfs/pscmanual/pcsmanual_current.pdf

Thank you!

Questions?

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

For any questions or concerns, contact the NHSN Helpdesk at nhsn@cdc.gov

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov