NHSN Data Quality: A Focus on Patient Safety Annual Facility Surveys, Alerts, and AUR DQ processes

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Learning Objectives

- Review the purpose and features of the NHSN Annual Facility Survey

- Describe data quality checks for the NHSN Annual Facility Survey

- Understand the purpose and function of the alerts page within NHSN

- Discover how to optimize the alerts page within NHSN

- Understand the Antimicrobial Use and Resistance (AUR) Module DQ Processes

A Message about the Data

- All data in this presentation has been created in a testing environment and is for training purposes only

- Information seen on images during this presentation do not represent any actual data submitted to NHSN by participating facilities

Annual Facility Survey

Kathryn Haass, MPH, CPH

Annual Facility Survey Overview

- New Annual Facility Survey must be completed to reflect data from prior calendar year
  - Example
    - For 2023, facilities report data from January 1, 2022 through December 31, 2022.
  - Known as the "survey year"

- **Survey Deadline:** March 1st each year

- Separate surveys by facility type
  - Hospital
    - Acute Care Hospital (general acute care, critical access, oncology, orthopedic, pediatric, women's, women's and children's, military, psychiatric, and Veterans Affairs)
  - LTACH
    - Long-term Acute Care (LTAC) Hospital
  - REHAB
    - Free-standing inpatient rehabilitation facilities and CMS-certified inpatient rehabilitation units
      - Mini IRF Survey: For LTACHs and Hospitals that have a CMS-Certified IRF Unit
      - Mini IRF Survey is in addition to larger survey your facility completes

Annual Facility Survey Overview (cont.)

- Survey sections:
  - Facility characteristics*
  - Lab practices
  - Infection control practices
  - Neonatal and newborn patient care practices (**Hospital survey only**)
  - Antibiotic stewardship practices
  - Sepsis management and practices (**NEW section**)
  - Water management and monitoring program

- Survey data is used across CDC to support
  - Decision making
  - Program planning
  - Research

- Survey provides data that are used to calculate standardized metrics for HAIs
  - Risk adjustment models
    - Standardized Infection Ratio (SIR)
    - Standardized Utilization Ratio (SUR)
    - Standardized Antimicrobial Administration Ratio (SAAR)

Facility Characteristics Section

- Collected on each annual survey, differs by survey type

- Required questions

- Select facility characteristics as risk adjustment factors for select SIR models

Facility Characteristics – Hospital Survey

Facility Characteristics (completed by Infection Preventionist)

*Ownership (check one):

☐ For profit   ☐ Not for profit, including church   ☐ Government

☐ Military   ☐ Veterans Affairs   ☐ Physician owned

If facility is a Hospital:

*Number of patient days: _____

*Number of admissions: _____

For any Hospital:

*Is your hospital a teaching hospital for physicians and/or physicians-in-training?   ☐ Yes   ☐ No

If Yes, what type: ☐ Major   ☐ Graduate   ☐ Undergraduate

*Number of beds set up and staffed in the following location types (as defined by NHSN):

a. ICU (including adult, pediatric, and neonatal levels II/III and III):   _____

b. All other inpatient locations: _____

Facility Characteristics – LTAC Survey

In the previous calendar year, indicate:

*Number of patient days: _____

*Number of admissions: _____

*Average daily census: _____

*Numbers of LTAC beds in the following categories (categories should equal total):

a. Intensive care unit (ICU) or critical care beds: _____

b. High observation/special care/high acuity beds (not ICU): _____

c. General LTAC beds: _____

*Total number of LTAC beds (licensed capacity): _____

*Number of single occupancy rooms: _____

*Total number of admissions with one of the following conditions identified on admission (present on admission, not developing during LTAC stay): (Note: These categories are not mutually exclusive.)

If helpful for your facility in identifying these conditions on admission, please review a list of ICD-10 and DRG codes commonly associated with these conditions found here: http://www.cdc.gov/nhsn/xls/DRGs-ICD-9s-NHSN-LTAC-Survey.xlsx

a. Ventilator dependence: _____
b. Hemodialysis: _____

Facility Characteristics – REHAB Survey

In the previous calendar year, indicate the following counts for the Rehabilitation Facility:

*Total number of rehab beds: _____

*Average daily census: _____

*Number of patient days: _____

*Average length of stay: _____

*Indicate the number of admissions with the primary diagnosis for each of the following rehabilitation categories (*must sum to the total number of admissions listed below*)

a. Traumatic spinal cord dysfunction: _____

b. Non-traumatic spinal cord dysfunction: _____

c. Stroke: _____

d. Brain dysfunction (non-traumatic or traumatic): _____

e. Other neurologic conditions (e.g., multiple sclerosis, Parkinson's disease, etc.): _____

f. Orthopedic conditions (incl. fracture, joint replacement, other): _____

g. All other admissions: _____

*Total number of admissions: _____

*Number of admissions on a ventilator: _____

*Number of pediatric (≤ 18 years old) admissions: _____

Standardized Infection Ratio (SIR)

- Track HAIs, compares the number of observed infections to the number of predicted infections
  - CMS Quality Reporting for select HAI and facility types
  - State health departments
  - Other organizations or groups
  - CDC in national surveillance reports
- Risk adjusted
  - HAI-specific risk factors
  - Facility characteristic risk factors

Annual Facility Survey Data Quality for the SIR

- NHSN does monthly data quality checks of survey data
  - DQ checks are done for survey data used for SIR calculations
  - Confirmation of data entry for survey variables used for risk-adjustment in the SIR calculation.
  - Facilities with significant differences in reporting from the prior year will be contacted via outreach email
  - Send outreach email to facilities to review data accuracy

More Information

- Annual Facility Surveys Website
  - Forms, Instructions, and FAQ
  - https://www.cdc.gov/nhsn/psc/locations.html

- Standardized Infection Ratio (SIR) Guide
  - https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf

- Patient Safety Component Use of NHSN Annual Survey Data: Involvement in HAI SIR Models
  - https://www.youtube.com/watch?v=LPNfSZWK2c4

- Data Quality (DQ) Website
  - https://www.cdc.gov/nhsn/ps-analysis-resources/data-quality/index.html

Alerts

Jessamyn Boltz, MPH

Alerts

- Alerts are automatic checks in NHSN that remind you of incomplete or missing **in-plan** data from your Monthly Reporting Plan (MRPs)

- They are found on the Home Page, or by clicking on the 'Alerts' tab on the sidebar

Alerts

- **Monthly Reporting Plan (MRPs) are:**
  - Used by all NHSN facilities to inform CDC which Patient Safety modules will be used in a given month
  - Participating facilities must select the modules used, if any, the events, procedures, and/or locations that will be monitored in-plan
  - MRP is the first step in indicating what data will be submitted from NHSN to CMS as part of Quality Reporting Programs
  - Only in-plan data are submitted to CMS in accordance with CMS's Quality Reporting Programs (QRPs)

Alerts

- There are 11 different types of alerts

Survey Required 2022	527 Missing Events	53 Incomplete Procedures	4 Unusual Susceptibility Profiles
Confer Rights Not Accepted	132 Incomplete Summary Items	175 Missing Procedures	5 Confirm CDI Test Type
109 Incomplete Events	1307 Missing Summary Items	7 Missing Procedure-Associated Events	

Alerts

- Survey Required

  Survey Required 2022

- Alerts when the Annual Survey has not been complete for a facility submitting data to NHSN

Alerts

- Confer Rights Not Accepted

- Alerts when a facility has not accepted the data rights template set up by a Group to which the facility is joined
- This **DOES** mean facilities can share data with groups such as state health departments, hospital systems, quality improvement organizations, etc.
- This **does NOT** mean facilities within a group automatically have access to other facilities' data

Alerts

- Incomplete Events

- Alerts for any **PSC HAI** events where:
  - there is an incomplete event record,
  - required fields were not completed,
  - or the record was not saved appropriately

Alerts

- Missing Events

527
Missing Events

- Alerts when in-plan device-associated or MDRO/CDI module summary data were entered, BUT corresponding events have not yet been reported, nor has the **"Report No Events"** box been checked

Alerts

- Incomplete Summary Items

132
Incomplete Summary Items

- This alert will list months of in-plan **device-associated or MDRO/CDI** module summary data in which a required field is missing

Alerts

- Missing Summary Items

1307
Missing Summary Items

- Alerts when facilities are missing in-plan summary data records
- Note, it will list in-plan months in which no summary data have been entered, **regardless** of whether a corresponding event has been reported

Alerts

- Incomplete Procedures

53
Incomplete Procedures

- Alerts when there are in-plan procedure records that have been reported with incomplete data
- [This alert is specific to the **Procedure-Associated (PA) Module**]

Alerts

- Missing Procedures

175
Missing Procedures

- Alerts when there are no monitored procedures reported or "zero procedures" checked after a reporting month is complete
- [This alert is specific to the Procedure-Associated (PA) Module]

Alerts

- Missing Procedure-Associated Events

7

Missing Procedure-Associated Events

- Alerts when there are months with reported in-plan NHSN operative procedures *but* no in-plan procedure-associated events (e.g., SSIs) have been reported and **"Report No Events"** is not checked

- [This alert is specific to the Procedure-Associated (PA) Module]

Alerts

- Unusual Susceptibility Profiles

- Alerts when a user enters a pathogen's susceptibility testing result into the NHSN application that aligns with one of the unusual susceptibility profiles

Alerts

- Confirm CDI Test Type

5

Confirm CDI Test Type

- Alerts when the CDI test type entered on the IRF MDRO denominator form does not match the CDI test type selected on the FACWIDEIN denominator form for the same month

Resolving Alerts

Resolving Alerts

- Alerts must be cleared before using other functionalities within NHSN
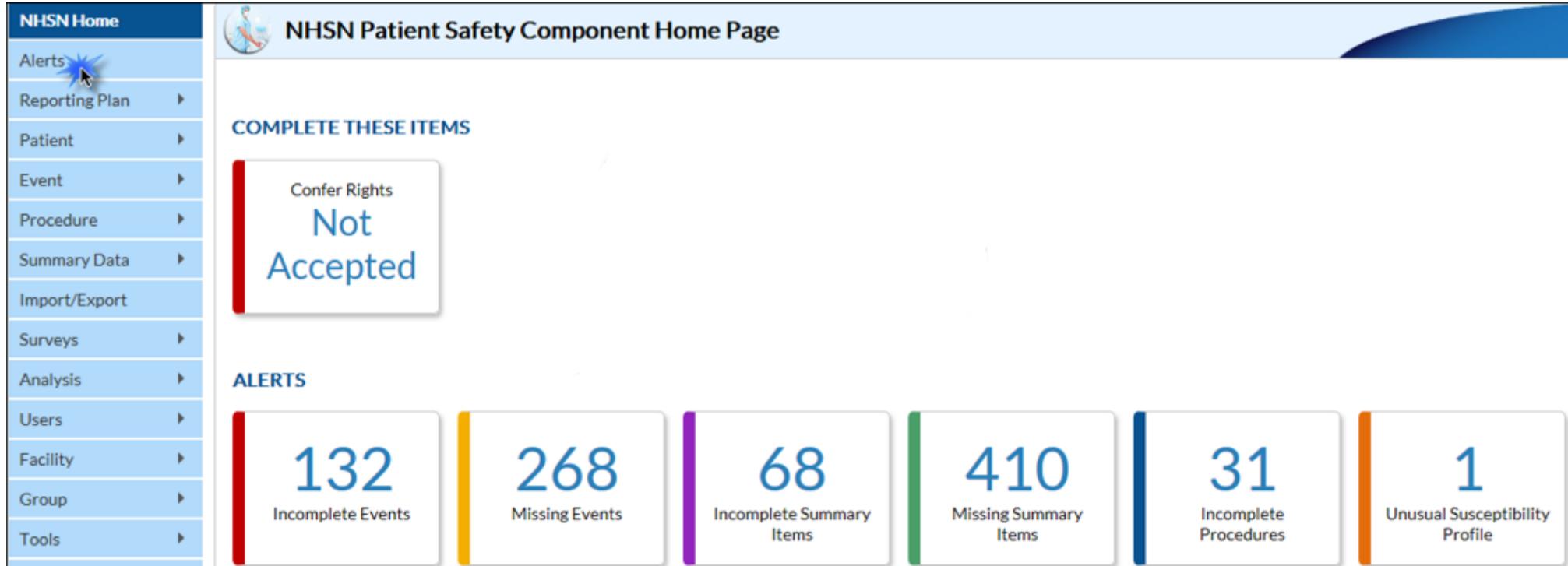
- **An alerts left unresolved = incomplete data**

Resolving Alerts

- The alerts are interactive icons, meaning when you click on the alert itself, it will direct you to the page where the specific alert(s) can be resolved

Resolving Alerts

- Once you select an alert icon, all incomplete or missing in-plan data related to the selected alert will be listed on a separate page for ease of adding incomplete or missing data

Resolving Alerts

- A common alert: completing a Summary Data Form for a month with no DA or MDRO/CDI Events (and this is intentional)

- A simple fix: If there are no events for a given month, check the **Report No Events** box

A Final Note

Generating Datasets

- Once all alerts have been resolved and data entry is complete, your user specific NHSN dataset must be re-generated so that the change will be reflected in Analysis reports

- Generate datasets after anything is changed in NHSN

AUR Module data quality issues: What the AUR Team looks for

Laura Blum, MPH

AUR Module data quality activities

- AUR Team performs routine and ad hoc data quality analyses to ensure metrics use highest quality data possible
  - Prior to annual AU Data Reports
  - During risk-adjusted metric development (baseline and re-baseline)
  - Analysts notice unusual data points or patterns
  - Issues discovered with NHSN application
  - Preparation for research or new NHSN features
- Data with issues are excluded from analyses and/or AUR Team conducts outreach to facilities to verify the data

AU Option data quality issues

- Zero days present and greater than zero antimicrobial days in the same month and location

- Total antimicrobial days greater than the sum of routes of administration for a given antimicrobial in the same month and location

- Duplicate reporting of combination drugs (e.g., piperacillin and piperacillin-tazobactam)

- Potential issues (unlikely though not impossible):
  - Zero antimicrobial days reported, especially for antimicrobials commonly used in hospital setting
  - Total antimicrobial days greater than days present for a single antimicrobial
  - Administrations via incompatible or unusual routes

AR Option data quality issues

- Zero patient days but AR events were reported in the same month and location

- Admissions greater than patient days in the same month and location

- No summary data but AR events were reported in the same month and location

- AR summary data submitted but no AR events reported and "Report No Events" box not checked

- Patient date of birth after admission date

- More than one non-invasive isolate reported in a calendar month for the same patient (see AUR Module Protocol for details)

AR Option data quality issues (cont.)

- Potential issues (unlikely though not impossible):
  - Patient age greater than 120 years
  - Irrational test value or test sign error
  - Specimen date before admission date
  - No AR events reported, especially for pathogens most frequently isolated in hospital settings

How to prevent AUR Module data quality issues

- Validate AUR Module data regularly

  - Instructions available in "Data Validation" section of [AUR Module webpage](#)

- Run [AU Option data quality line list](#) report regularly

  - Zero or missing antimicrobial days

  - Antimicrobial days reported with zero days present

  - Antimicrobial days greater than or equal to days present

  - Sum of routes of administration less than total antimicrobial days

- Contact NHSN Help Desk (NHSN@cdc.gov) if questions arise

NHSN Resources

Additional Resources

- Data Entry and Analysis Training

  http://www.cdc.gov/nhsn/training/analysis/index.html

- Annual Facility Survey

  https://www.cdc.gov/nhsn/psc/locations.html

- NHSN SIR Guide

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

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

- Patient Safety Component Use of NHSN Annual Survey Data: Involvement in HAI SIR Models

  https://www.youtube.com/watch?v=LPNfSZWK2c4

- Patient Safety Annual Facility Survey Reports

  https://www.cdc.gov/nhsn/datastat/psc-survey-reports.html

- DQ Resources

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

Additional Resources

- How to Resolve Alerts

   https://www.cdc.gov/nhsn/pdfs/gen-support/NHSN-Alerts.pdf

- Introduction to NHSN Analysis; 2018 NHSN Annual Training; Monday February 26, 2018

- Introduction to NHSN Analysis

   https://www.cdc.gov/nhsn/pdfs/training/2022/Introduction-Analysis-508.pdf

- Generate Datasets

   Generate Datasets PSC (cdc.gov)

Thank You!

NHSN@cdc.gov

Thank You!

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.