



NHSN Patient Safety Component

Prep Like a Pro! What to Expect from the 2022 HAI Rebaseline

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Objectives

By the end of this presentation, the audience will have an understanding of:

- 1. What to expect in the NHSN application
 - The impact of the HAI Rebaseline on NHSN's analysis reports & data interpretation
- 2. What to expect from the NHSN team in 2024
 - Future educational materials and training opportunities related to the HAI Rebaseline

Next: High-level overview of the Rebaseline and the SIR

What is the 2022 HAI Rebaseline?

D3-Lastinger-Prep like a Pro-Q1

- Do you have any prior knowledge or experience with NHSN’s “Rebaseline”?
 - A. Rebaseline? Never heard of it!
 - B. I have heard the term “rebaseline” but am not very familiar with the concept
 - C. I was actively analyzing data in NHSN during the last (2015) rebaseline, and/or I have a general idea about the concept of a rebaseline
 - D. I am familiar and comfortable with the rebaseline topic and its implications for data analysis

2022 HAI Rebaseline

- The process of updating the calculations for NHSN's Standardized Infection Ratios (SIRs) and Standardized Utilization Ratios (SURs)
 - Metrics used to measure incidence of HAIs and device utilization
- These metrics require a baseline, from which progress can be measured over time
 - At some point, the baseline must be updated
 - Current baseline: 2015
- The 2022 “Re-baseline” will update the national baseline year from 2015 to **2022**

Note: for educational purposes, this presentation focuses on the SIR metric. The 2022 HAI Rebaseline also applies to the SUR metric in similar ways as those described.



Crash Course in SIR

D3-Lastinger-Prep like a Pro-Q2

- **How many years of experience do you have with analyzing NHSN data?**
 - A. No experience
 - B. Less than 2 years of experience
 - C. 3-5 years of experience
 - D. 6-10 years of experience
 - E. Over 10 years of experience

Standardized Infection Ratio

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}}$$

← HAIs reported into NHSN

← Calculated by CDC

- When # of observed HAIs is greater than the # predicted, the SIR will be greater than 1

$$\frac{5 \text{ observed CLABSIs}}{3.2 \text{ predicted CLABSIs}} = \text{SIR of } \mathbf{1.6}$$

- If # observed HAIs is less than # predicted, the SIR will be less than 1
- P-values and 95% confidence intervals provide information about statistical significance

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}}$$

Calculating the Number of Predicted HAIs

- Calculated in the NHSN application
- Calculated specifically for your facility, based on characteristics (factors) reported to NHSN that significantly impact HAI incidence
 - This is done using risk adjustment models
 - Model details available in NHSN’s Guide to the SIR
 - Models developed by CDC using data reported to NHSN for the baseline year
- Current baseline time period: **2015**

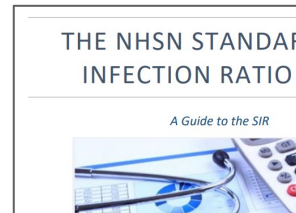
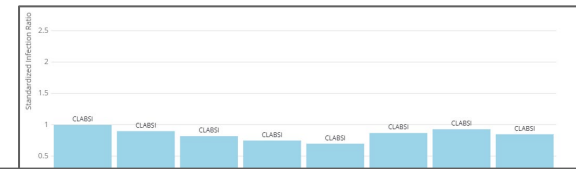


Table 3. CAUTI in Long-Term Acute Care Hospitals (LTACHs)

| Parameter |
|---|
| Intercept |
| Average length of stay*: ≥ 29.33 days |
| Average length of stay*: 26.42 – 29.32 days |
| Average length of stay*: ≤ 26.41 days |
| Setting**: Freestanding |
| Setting**: Within a Hospital |
| Location Type: ICU |
| Location Type: Ward |

The SIR is Everywhere

- Main metric used by CDC to measure HAI incidence in the U.S
 - National and State HAI Progress Report
 - Antimicrobial Resistance & Patient Safety Portal
 - Other studies and surveillance reports
- Department of Health & Human Services (HHS)
- Centers for Medicare & Medicaid Services (CMS)
- State and local health departments
- Quality improvement organizations
- NHSN facility and Group users
- More



CLABSI

STATE: All States | HOSPITAL TYPE: General Acute Care Hospitals | YEAR: 2022

↓ 16% Lower Compared to Nat'l Baseline

This report, summarized by state, is based on 2022 data published in 2023, and uses the 2015 Baseline and risk-adjusted models. HAI data summarized at the hospital-level are published on the [Care Compare website](#). For detailed HAI-specific information regarding the current national baseline and risk adjustments, please see the [SIR Guide](#).

KEY DATA POINTS

10% Among the 3,728 national ACHs with enough data to calculate an SIR, 10% had an SIR significantly higher (worse) than 0.84, the value of the national SIR.

National Data for General Acute Care Hospitals, Year: 2022

National Healthcare Safety Network
SIR for MRSA Blood FacwideIN LabID Data in Acute Care Hospital (2015 baseline)
 As of: November 30, 2016 at 9:10 AM
 Date Range: B52_LABID_RATE_SMRSA_summaryYQ_2015Q1 to 2015Q2

Facility Org ID= [] CMS Certification Number= []

| Location | Summary Yr/Qtr | Months | MRSA Blood Incident LabID Count | Number Predicted | Patient Days | SIR | SIR p-value | 95% Confidence Interval |
|-----------|----------------|--------|---------------------------------|------------------|--------------|-------|-------------|-------------------------|
| FACWIDEIN | 2015Q1 | 3 | 3 | 1.003 | 10621 | 2.991 | 0.1000 | 0.761, 8.140 |
| FACWIDEIN | 2015Q2 | 2 | 4 | 0.262 | 5650 | - | - | - |

Figure 1. Changes in the 2020 national healthcare-associated infection (HAI) Standardized Infection Ratios (SIRs) for acute-care hospitals, compared to respective 2019 quarters

| | 2020 Q1 | 2020 Q2 | 2020 Q3 | 2020 Q4 |
|---------------------------------------|----------|------------------------|------------------------|----------|
| CLABSI | ↓ -11.8% | ↑ 27.9% | ↑ 46.4% | ↑ 47.0% |
| CAUTI | ↓ -21.3% | No Change ¹ | ↑ 12.7% | ↑ 18.8% |
| VAE | ↑ 11.3% | ↑ 33.7% | ↑ 29.0% | ↑ 44.8% |
| SSI: Colon surgery | ↓ -9.1% | No Change ¹ | ↓ -6.9% | ↓ -8.3% |
| SSI: Abdominal hysterectomy | ↓ -16.0% | No Change ¹ | No Change ¹ | ↓ -13.1% |
| Laboratory-identified MRSA bacteremia | ↓ -7.2% | ↑ 12.2% | ↑ 22.5% | ↑ 33.8% |
| Laboratory-identified CDI | ↓ -17.5% | ↓ -10.3% | ↓ -8.8% | ↓ -5.5% |

What is the impact of a Rebaseline on the SIR?

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}}$$

Rebaselining the SIR

- The formula for calculating the SIR is **not changing**
- Generally, the criteria used for the SIR numerator are **not changing**
 - For example: community-onset events are not counted in the MRSA bacteremia or CDI SIR numerators
- New risk adjustment models used to calculate the number of predicted events **will be available** later this year
 - New risk adjustment models will be based on 2022 data
 - Current risk adjustment models (2015 baseline) will also remain available

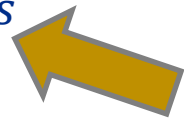
New Risk Adjustment Models

- Risk adjustment models, created based on 2022 national HAI data submitted, allows the SIR to provide a comparison of a facility's HAI experience to a more recent national benchmark
- SIRs calculated using 2022 risk adjustment models:

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}}$$



HAIs reported into NHSN



**Calculated based on new
2022 risk adjustment
models**

Creating New Risk Adjustment Models

- NHSN's Statisticians are currently analyzing national data from 2022
 - Negative binomial & logistic regression models
 - Over 200 models will be created, based on type of healthcare setting and infection
- All suitable factors are being assessed for a statistically significant relationship with incidence of each HAI, including factors from:
 - NHSN annual facility survey
 - NHSN enrollment and location mapping
 - Other factors that are entered into NHSN and are available at the facility-level (e.g., CDI test type), or available for all patients in numerators and denominators (e.g., factors entered on the procedure form)
- Significant factors identified may differ by HAI and/or setting

Sneak Peek: Implementing new risk adjustment models into the NHSN application

Rebaseline Scope

- Phased approach
 - Modeling work is ongoing
 - New SIR Reports, SUR Reports, TAP Reports, and TAP Dashboard will be created within NHSN
- Goal: All new SIRs and SURs available in NHSN by the end of 2024

Facility Types

Acute care hospitals (ACHs)

Critical access hospitals (CAHs)

Inpatient rehabilitation facilities (IRFs)

Long term acute care hospitals (LTACs)

HAIs (for SIRs)

CLABSIs (including MBIs)

CAUTIs

SSIs all procedure codes, model types (All SSI, Complex A/R, Complex 30 day), and patient populations (adults, pediatrics)

VAE and pediatric VAE

MRSA bacteremia LabID

CDI LabID

Devices (for SURs)

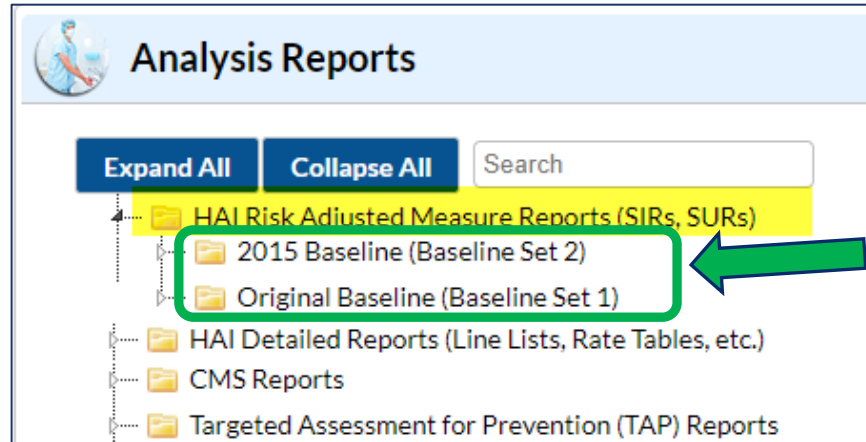
Central line

Urinary Catheter

Ventilator

NHSN's SIR Reports are Organized by Baseline Year

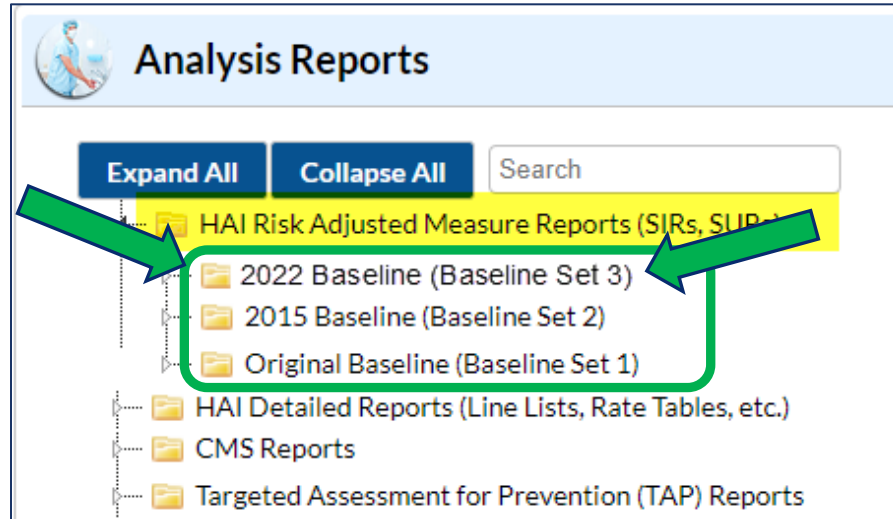
Current Treeview in NHSN



- Dedicated subfolders exist in the analysis treeview for each baseline
 - Original Baseline = “Baseline Set 1” (bs1)
 - 2015 Baseline = “Baseline Set 2” (bs2)

New SIR Reports Coming Soon in 2024

Future



- Dedicated subfolders exist in the analysis treeview for each baseline
 - 2022 baseline = “Baseline Set 3” (bs3)
- Earlier baselines will remain available

What Will Remain the Same in the New SIR Reports?

- SIR is only calculated when # predicted events is at least 1
- General “look and feel” of the reports
- Same types of statistics provided
 - Yellow-shaded columns
- Same report modifications and export functionality will be available
- Same report functionality for Groups
- Certain model characteristics used to calculate # predicted
 - CLABSI & CAUTI: location-based risk adjustment
 - SSI: same model types (All SSI, Complex A/R, Complex 30 day)
 - MRSA & CDI LabID Events: SIRs available for facility-wide inpatient (FACWIDEIN) and IRF units

What Will be Different in the New SIR Reports?

- Once available in NHSN, reports on the 2022 baseline can be used for 2022 HAI data and forward
- You may notice:
 - Different footnotes
 - Changes to inclusion/exclusion rules, in rare scenarios
 - New report names, titles, and placement within treeview
 - Some modifications to supplemental data tables shown within the report
 - Different variables may be available in the source analysis datasets
 - New names for analysis datasets
- Different interpretation of results
 - SIRs under the 2022 baseline must be interpreted **differently** compared to SIRs under the 2015 baseline

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}}$$

Interpretation

2015 baseline

Number of predicted HAIs:

*The number of HAIs predicted to occur in a facility based on the national HAI incidence levels and surveillance definitions from **2015***

SIR:

*“How does the HAI experience in my facility compare to what was predicted for my facility, based on national HAI data and risk models from **2015**?”*

2022 baseline

Number of predicted HAIs:

*The number of HAIs predicted to occur in a facility based on the national HAI incidence levels and surveillance definitions from **2022***

SIR:

*“How does the HAI experience in my facility compare to what was predicted for my facility, based on national HAI data and risk models from **2022**?”*



Remember, NHSN Team is Here to Help!

- NHSN Team will be ready with ample training materials, webinars, and educational resources
- Models will be implemented in a phased approach
- Current reports are not going away
- Take your time to get familiar with the new reports and educational materials



D3-Lastinger-Prep like a Pro-Q3

- Which of the following choices best describes how the SIR will change as a result of the 2022 Rebaseline?
 - A. The formula for calculating an SIR ($\# \text{ observed} / \# \text{ predicted}$) will change
 - B. The criteria for determining the SIR numerator ($\# \text{ observed HAIs}$) will change
 - C. The formula for calculating the SIR denominator ($\# \text{ predicted HAIs}$) will change
 - D. Everything I've ever learned about the SIR is going to change, including all answers above

Answer

- C. The formula for calculating the SIR denominator (# predicted HAIs) will change

New risk models, based on 2022 national data, will be used by CDC to calculate the number of predicted HAIs.

Let's Look at a Practice Scenario!

Example SIR Report on the 2022 Baseline

Fictitious mock-up.
Actual report may differ.

SIR for MRSA Blood FacwideIN LabID Data in Acute Care Hospital (2022 Baseline)

| Facility Org ID | CMS Certification Number | Location | Summary Yr/Qtr | Months | MRSA Blood Incident LabID Count | Number Predicted | Patient Days | SIR | SIR p-value | 95% Confidence Interval |
|-----------------|--------------------------|-----------|----------------|--------|---------------------------------|------------------|--------------|-------|-------------|-------------------------|
| 10401 | 999999 | FACWIDEIN | 2022Q1 | 3 | 3 | 2.500 | 1450 | 1.200 | 0.6988 | 0.305, 3.288 |



- Year of the baseline is indicated in the report name and title
- Same columns as the current report
- 2022 national baseline & risk models were used to calculate the number of predicted events

SIR for MRSA Blood FacwideIN LabID Data in Acute Care Hospital (2022 Baseline)

| Location | Summary Yr/Qtr | Months | MRSA Blood Incident LabID Count | Number Predicted | Patient Days | SIR | SIR p-value | 95% Confidence Interval |
|-----------|----------------|--------|---------------------------------|------------------|--------------|-------|-------------|-------------------------|
| FACWIDEIN | 2022Q1 | 3 | 3 | 2.500 | 1450 | 1.200 | 0.6986 | 0.305, 3.266 |

Interpretation for 2022 Q1

- 3 healthcare-onset MRSA bacteremia events and 1,450 patient days
- Based on national 2022 data, NHSN predicted 2.5 healthcare-onset events
- SIR = 1.20
 - SIR > 1: Facility observed more HAIs than what was predicted by the 2022 national baseline
- p-value = 0.6986
 - No significant difference between the number of observed HAIs and number predicted



Important Point!

- SIRs under the 2015 baseline are not comparable to SIRs under the 2022 baseline
 - Different baseline time period, baseline incidence levels, and risk models
 - SIRs may provide different conclusions and interpretation of results
 - Some differences in inclusion/exclusion rules
- **SIRs under either baseline should be analyzed and assessed independently of the other baseline**

Same Scenario: SIR Report using the 2015 Baseline

SIR for MRSA Blood FacwideIN LabID Data in Acute Care Hospital (2015 Baseline)

| Facility Org ID | CMS Certification Number | Location | Summary Yr/Qtr | Months | MRSA Blood Incident LabID Count | Number Predicted | Patient Days | SIR | SIR p-value | 95% Confidence Interval |
|-----------------|--------------------------|-----------|----------------|--------|---------------------------------|------------------|--------------|-------|-------------|-------------------------|
| 10401 | 999999 | FACWIDEIN | 2022Q1 | 3 | 3 | 3.200 | 1450 | 0.938 | 0.9824 | 0.238, 2.551 |

Interpretation for 2022 Q1:

- 3 healthcare-onset MRSA bacteremia events and 1,450 patient days
 - Same values shown on 2022 baseline report
- Based on national 2015 baseline data, NHSN predicted [3.2](#) events
- SIR = 0.938
 - SIR < 1: Facility observed fewer HAIs than what was predicted by the 2015 national baseline
- p-value = 0.9824
 - No significant difference between the number of observed HAIs and the number predicted

Final Thoughts & Timeline

How Does the NHSN Team “do” a Rebaseline?

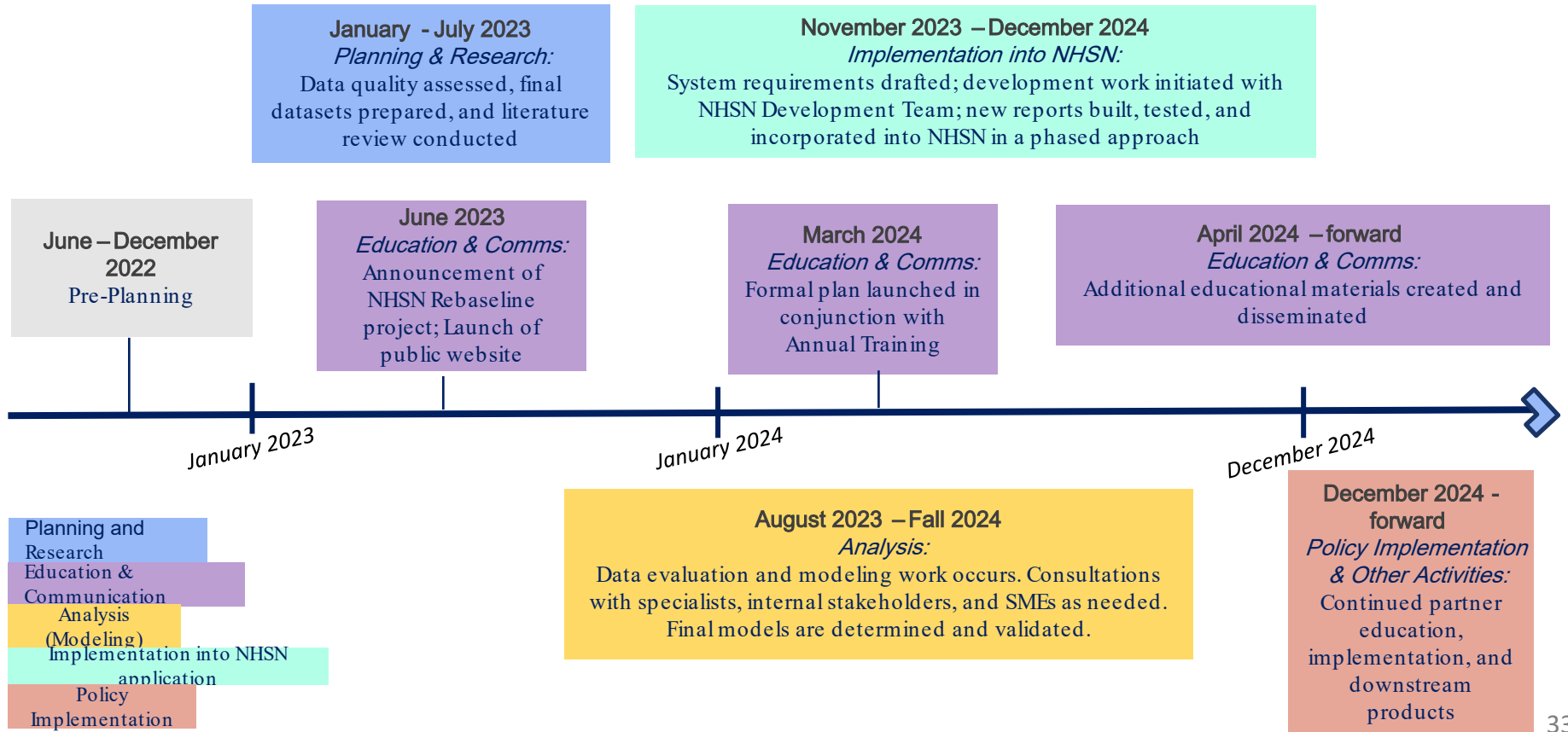
- A multi-year, multi-phased project completed with extensive collaboration with subject matter experts and NHSN partners
- Diverse project team includes staff from across CDC’s Division of Healthcare Quality Promotion:
 - Project manager, statisticians, program analysts, epidemiologists & data analysts, clinicians, infection preventionists, program managers, health educators, policy analysts, communication specialists, partner liaisons, application developers, business analysts, quality assurance specialists, user support specialists, and more!

Rebaseline Project

- Stages of the Rebaseline project:
 - Planning
 - Research
 - Analysis (Modeling)
 - Implementation
 - Communication and Education
 - Policy Implementation
- Internal and external subject matter experts are consulted
- Team continually assesses progress to identify how and when to engage NHSN users and partners

Current Rebaseline Timeline

*Subject to change



Stay Informed & Follow Along with our Progress

- Review existing materials on NHSN Rebaseline webpage:
<https://www.cdc.gov/nhsn/2022rebaseline/>
 - Scope of the Rebaseline
 - Rebaseline FAQs
 - Additional resources coming soon
- Keep an eye out for rebaseline-related articles in the NHSN Newsletter

Charting the Course: 2022 NHSN HAI Rebaseline

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Introduction


The NHSN Team will be updating the national baseline used to calculate all healthcare-associated infections (HAI) standardized infection ratios (SIRs) and standardized utilization ratios (SURs) in the Patient Safety Component. This process of updating the national baseline, referred to as the "Rebaseline," will involve the NHSN team analyzing national data and creating updated risk adjustment models, in a phased approach, to be used in the calculations of future SIR and SUR denominators. Refer to the tables below for information about the scope of this Rebaseline and the types of models that will be assessed and created.

The new baseline will represent data reported to NHSN for **2022**. New SIR and SUR reports, based on the **2022** national baseline, will be created in the NHSN application in a phased approach; our goal is to have all new SIR and SUR reports available in the NHSN application by the end of **2024**.

Where We're Going

Multiple opportunities for education and communication around the 2022 Rebaseline and its implications will be available to the NHSN community later this year. This website will be updated in an on-going manner; please check this site and the FAQs below to get regular updates as this effort progresses.

The NHSN team remains committed to working with facilities to improve HAI prevention. Measuring progress under an updated national standard is



On This Page

- [Introduction](#)
- [2022 HAI Rebaseline Scope: Overview](#)
- [2022 HAI Rebaseline Scope: Surgical Site Infections](#)
- [NHSN Acronyms](#)

Other Resources

- [HAI Rebaseline FAQ](#)
 - [HAI Rebaseline FAQ](#) [PDF - 219 KB]

D3-Lastinger-Prep like a Pro-Q4

- How do you prefer to receive updates and communications from the NHSN team related to the HAI rebaseline?
 - A. Live webinars
 - B. Recorded presentations
 - C. Newsletter articles
 - D. Emails
 - E. No preference; any of the above

What Can you Expect from the NHSN Team?

- SIR and SUR reports on the 2022 baseline aren't available yet
 - Anticipated timelines for the phased release of new reports will be shared in advance
- Numerous educational opportunities
 - Webinars
 - Quick Learns, Fact sheets
 - Updated version of “NHSN’s Guide to the SIR”
 - Resources to guide your understanding of the new SIR reports
 - Presentations from NHSN team about new models and interpretation
 - More information about how SIRs under the new baseline might be different than SIRs under current (2015) baseline

What Can you Expect from the NHSN Team?

- Working with CMS colleagues to understand the impact of the Rebaseline on CMS Programs
 - No timelines have been set for incorporation of the new SIRs into CMS Quality Reporting Programs
- NHSN Team is available to answer questions at any time through the NHSN Helpdesk
 - Use subject line “2022 HAI Rebaseline”

D3-Lastinger-Prep like a Pro-Q5

- How do you prefer to receive education from the NHSN team related to the HAI rebaseline?
 - A. Static training documents: PDFs, slide decks
 - B. Live webinars
 - C. Recorded presentations
 - D. Newsletter articles
 - E. No preference; any of the above

Thank you!

The Rebaseline Team thanks NHSN users for your commitment to HAI surveillance and prevention, your interest and dedication in the analysis of HAI data from your organization/jurisdiction, and for working tirelessly to keep all patients safe.

We will keep you updated on the Rebaseline efforts. Stay tuned!

For any questions or concerns, contact the NHSN Helpdesk using

NHSN-ServiceNow to submit questions to the NHSN Help Desk.

The new portal can be accessed at <https://servicedesk.cdc.gov/nhsncsp>.

Users will be authenticated using CDC's Secure Access Management Services (SAMS) the same way you access NHSN. If you do not have a SAMS login, or are unable to access ServiceNow, you can still email the NHSN Help Desk 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

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.

