

Charting the course: 2022 HAI Rebaseline

Frequently Asked Questions Regarding the 2022 HAI Rebaseline Project NHSN Patient Safety Component

1. What is a Baseline?

To promote external comparisons of healthcare-associated infection (HAI) or related outcomes, CDC uses national-level NHSN rate data from a specific year (the “baseline” year) to calculate the predicted number of HAIs or device days for a facility, state, or the nation. The predicted numbers are used as the denominators for the standardized infection ratios (SIRs) and standardized utilization ratios (SURs). These two metrics (SIR and SUR) compare the number of observed infections (or device days) in a facility to the number of infections (or device days) that were “predicted” to have occurred if the facility had rates equal to the rate of the national baseline. The number of predicted infections (or device days) is estimated using a regression model that was developed from the baseline year’s rate data. CDC designates a specific calendar year of data to represent a set of national rates to enable the creation of an external benchmark comparison. This set of rates forms a baseline that promotes timely comparisons to measure change in an outcome. Currently (as of June 2023), 2015 is used as the national baseline year for all SIRs and SURs. Refer to NHSN’s [SIR](#) and [SUR](#) Guides for more information.

2. What is the 2022 HAI Rebaseline?

“Rebaseline” is a term that CDC’s National Healthcare Safety Network (NHSN) staff use to describe the process of updating the national healthcare-associated infection (HAI) baselines and risk adjustment models. The 2022 HAI Rebaseline will update both the source of aggregate data and the risk adjustment methodology used for the SIR and SUR metrics. During the Rebaseline process, national aggregate data reported to NHSN for calendar year 2022 will be analyzed and used to create new risk adjustment models that estimate the number of predicted HAIs or device days in a given facility, state, or national set of exposure data. Depending on the HAI or other related outcome, exposure data could be device days (think CLABSI/CAUTI/VAE), patient days (think MRSA bacteremia/CDI LabID) or surgical procedures (SSI). Once the updated risk adjustment models have been created through the Rebaseline process, the denominator calculations for *all* existing SIRs and SURs will be updated in NHSN to utilize these new models; this includes all facility types, HAI types, and devices for which sufficient national 2022 data exist.

3. What is Risk Adjustment?

Risk adjustment is a methodology used to account for the differences in risk of an outcome or rate among a set of factors that are identified as having a statistically significant association with that outcome. In other words, any factors associated with an outcome risk or rate may explain or account for differences in a way where the resulting measure needs to adjust for them. For instance, if an outcome risk or rate differs significantly between intensive care unit (ICU) and ward patients in a hospital, then this dichotomous factor distinguishing exposure for ICU vs. ward patients will deliver risk adjustment. When the outcome data are increasingly and meaningfully risk-adjusted, hospital performance and comparisons are fairer.

4. Why does the current risk adjustment need to be updated?

CDC updates the baseline year to refresh the data where policy, practice, and/or protocol changes may need to be incorporated in the national data used for external benchmark comparisons and may help drive the progress of preventing HAIs. Specifically, there may have been sufficient changes in surveillance definitions, diagnostic testing, healthcare facility prevention practices, science, technology, and hospital operations since the existing (2015) baseline year. In addition, the Rebaseline will ensure that the risk adjustment models are better able to capture relevant changes in the risk of HAIs since 2015 and will allow hospitals to compare their incidence of HAIs to recent national data.

5. Are the formulas and calculations changing for the SIR and SUR?

The SIR and SUR benchmark comparison metrics will still be calculated by the general formula:

$$\text{SIR} = \frac{\# \text{ observed HAIs}}{\# \text{ predicted HAIs}} \qquad \text{SUR} = \frac{\# \text{ observed device days}}{\# \text{ predicted device days}}$$

The updated risk adjustment models, created using 2022 national data, will be used to calculate revised denominators for SIRs and SURs. In other words, the Rebaseline will produce models that recharacterize the national rates for NHSN's HAI outcome measures, and the updated set of national rates from 2022 will ultimately be used to calculate the number of predicted HAIs and device days for a given facility.

6. Why was 2022 selected as the year for the new baseline?

The NHSN team remains committed to working with facilities to improve HAI prevention. COVID-19-related activities at CDC—and the national increase in HAIs associated with the pandemic—had previously delayed the team's initial plans for a rebaseline several years ago. We have been tracking the [impact of COVID-19 on HAIs](#), and while HAI data for some hospitals may have been impacted by COVID-19 activities to some extent during 2022, national-level analyses show that HAI incidence has returned, or is close to returning, to the pre-pandemic state. In addition, compared to the 2015 baseline and existing risk models, updated risk models that are created using 2022 national data will better reflect current policy, practice, and surveillance protocols. Measuring progress under an updated national standard is important to understanding HAI prevention efforts and standards in the current healthcare environment.

7. What factors will be included in the new risk adjustment models?

The NHSN team will assess all suitable factors (i.e., data elements often called variables) reported to NHSN as potential risk factors. To be used for risk adjustment, any eligible risk factor must have a statistically significant relationship with the outcome and improve the statistical fit of the model. Suitable risk factors include facility-level characteristics reported on the NHSN Annual Facility Surveys as well as other applicable patient care location- or patient-level factors reported to NHSN that are complete and available for any given patient population being assessed.

8. What exclusion rules are applied to the new SIRs and SURs calculated under the 2022 baseline?

A set of general exclusion criteria were implemented on the 2022 baseline risk adjustment models, as outlined in the [Implementation Guide & Change Log](#), and the [SIR Guide](#). Some HAIs will have additional measure-specific exclusion criteria applied in addition to the general exclusion criteria. This will also be outlined in HAI specific chapters in the NHSN SIR Guide.

9. Will a patient's COVID-19 status be taken into consideration as a potential risk factor for the SIR?

NHSN collects the patient's COVID-19 status on the HAI event form. However, NHSN does not collect this information on the denominator form which captures all patients (or patient days) eligible for any specific HAI event, and therefore COVID-19 cannot be used as a risk factor.

10. When will the new 2022 baseline be available for use in NHSN?

The 2022 baseline SIR and SUR reports will be phased into NHSN, starting with the Complex 30-day SSI and MRSA bacteremia SIR reports, released in November 2024 for facility and Group use. The remaining HAI SIR reports will be added in future releases. The NHSN Team's progress can be tracked in our Rebaseline Progress Tracker: <https://www.cdc.gov/nhsn/2022rebaseline/progress-tracker.html>

11. What can hospitals and other organizations expect to happen to their SIRs, SURs, and/or SIR and SUR denominators after the 2022 Rebaseline?

The data included in the 2022 baseline will serve as a new "reference point" for measuring progress in HAI prevention. CDC understands that hospital SIRs and SURs calculated using their 2022 data may shift closer to 1.0 since the baseline uses 2022 national data; however, each hospital will need to track their SIRs and SURs to better understand the impact of this Rebaseline. The number of predicted infections (or device days) may increase or decrease for a particular facility depending on the HAI or device type.

12. Will NHSN Groups have access to SIRs and SURs calculated under the 2022 baseline?

Yes. Groups have access to the SIR and SUR reports, at the same time as member facilities based on their membership rights.

13. Will all current SIRs and SURs calculated under the existing 2015 national baseline and the original national baseline remain available in the NHSN application for use?

Yes, all current SIRs and SURs calculated using the 2015 baseline and previous SIRs and SURs calculated using the original baselines will continue to be active in NHSN. NHSN has organized SIR and SUR reports by baseline year into subfolders in the NHSN Analysis Report treeview.

14. Will there be an assessment of changes in facility level SIRs using the 2015 baseline compared to SIRs using the 2022 baseline?

Facilities should expect their SIRs to be different depending on the model baseline year used and this is primarily due to differences in the overall event rate for each of the baseline years (2015 and 2022). However, these differences do not necessarily mean that a particular hospital is better or worse depending on the baseline year used. NHSN conducted analyses investigating the impact of hospital level SIRs calculated on the same year with both baseline models. That analysis showed only marginal changes in the hospital distribution. Please refer to the presentation linked here: <https://www.cdc.gov/nhsn/2022rebaseline/How-Will-My-SIR-Change.pdf>.

15. Will a facility be able to select which baseline is used in running an SIR report?

Yes. The new 2022 baseline HAI SIR and SUR reports appear in their own subfolder in the NHSN Analysis treeview under the HAI Risk Adjusted Measure Reports (SIRs, SURs) main folder. The 2015 baseline reports are located in a separate subfolder and organized into HAI-specific sub subfolder.

16. Will the Annual Progress Report use the 2015 baseline or the 2022 rebaseline?

The National and State HAI Progress Report will adopt the 2022 baseline during the final stage of the HAI Rebaseline Project, once all new risk adjustment models have been implemented in NHSN. Until that time, the report will continue to use the 2015 baseline to produce the national and state SIRs and SURs. You can continue to track the implementation progress using the Rebaseline Progress Tracker, here:

<https://www.cdc.gov/nhsn/2022rebaseline/progress-tracker.html>. Refer to the project stage called "Adoption, Integration, Collaboration".

17. Does the 2022 rebaseline impact the SUR and TAP reports?

Yes, SUR reports and TAP reports will be updated using the 2022 baseline and will be available in the application later. More information will be shared at a later date.

18. Will the same equation utilized in the 2015 baseline for calculating the number of predicted infections be applied in the new 2022 rebaseline?

Yes, the 2022 rebaseline uses logistic regression for surgical site infections (SSI) data and negative binomial regression for device-associated HAIs, CDI and MRSA LabID Event. The SIR will continue to use the same equation as well. See question 5 above for additional details.

19. How should providers interpret a high SIR, such as one exceeding 2.0, when the corresponding p-value is greater than 0.05 and the confidence intervals encompass 1.0?

A high SIR (for example, one that is above 2.0), with a p-value greater than 0.05 and confidence intervals that include 1.0, suggests that the observed infections is not statistically different from the predicted number of infections. Although the statistical results conclude the value is not different from 1.0, the value of observed infection reported by the facility in this example is higher (double) than what was predicted, and providers should exercise caution in drawing conclusions and consider additional factors in taking further action.

20. Will emergency, trauma and wound class risk factors be included in the Complex 30-day SSI SIR model for colon surgery under the 2022 rebaseline?

As recently shared, the 2022 baseline model for colon surgery using the Complex 30-day SSI SIR report is live in the NHSN application and supporting documentation are available on the NHSN website. The full details of the Complex 30-day SSI SIR model for colon surgery and abdominal hysterectomy including the risk factors found to be positive predictors of infection are published in the [SIR Guide](#).

21. How should we interpret and compare SIRs from 2015 and 2022, given that the baselines are not directly comparable?

It's important to note that NHSN has updated its national baseline twice since the original baseline: first using 2015 data (the 2015 "Rebaseline") and later with 2022 data (the 2022 "Rebaseline"). These updates involved changes in risk adjustment models and the inclusion of different factors, leading to variations in how SIRs are calculated. Consequently, SIRs derived from these different baselines are not directly comparable. When interpreting and comparing SIRs from multiple time periods, it's essential to ensure that both SIRs are calculated using the same baseline. For example, comparing a 2022 SIR based on the 2015 baseline with a 2022 SIR based on the 2022 baseline would be inappropriate due to differences in risk adjustment factors and baseline populations. For detailed guidance on interpreting SIRs and understanding the implications of different baselines, refer to NHSN's official resources, such as the "NHSN Guide to the SIR" and the "2022 HAI Rebaseline Talking Points" documents. More information about proper comparisons across different baselines can also be found in this webinar:

<https://www.cdc.gov/nhsn/2022rebaseline/How-Will-My-SIR-Change.pdf>

22. How do the hospital survey risk factors such as medical school affiliation impact the calculation of the number of predicted infections?

Many of the HAI SIR and SUR models use annual survey factors in the SIR denominator risk adjustment. Factors such as medical school affiliation are found to be significant predictors of infection following exposures to medical devices or procedures. Facilities affiliated with medical schools often experience different patient populations, case complexities, and healthcare practices, which can influence infection rates. To account for these variations, NHSN incorporates medical school affiliation into those risk adjustment models where a statistically significant difference in infection rate was observed between facilities with varying medical school affiliations. This adjustment ensures that comparisons of infection rates across hospitals are fair and account for inherent differences associated with medical school affiliation. It is important that facilities update their annual surveys promptly and appropriately to receive the correct risk adjustment for their facility SIRs. Missing or incorrect annual survey data impacts all the data included in the SIR calculation.

Rebaseline Resources

- An Introduction to updating the National Baseline: <https://www.youtube.com/watch?v=pMYwYIV86Ek>
- Rebaseline Progress Tracker: <https://www.cdc.gov/nhsn/2022rebaseline/progress-tracker.html>
- Prep Like a Pro: <https://www.youtube.com/watch?v=Iwqkz3XQMCO>
- Rebaseline Fact Sheet: What is the Rebaseline and Why it is Important? <https://www.cdc.gov/nhsn/pdfs/rebaseline/Rebaseline.pdf>
- How Will My SIR Change; Understanding the Impact of the 2022 HAI Rebaseline: <https://www.cdc.gov/nhsn/2022rebaseline/How-Will-My-SIR-Change.pdf>
- 2022 NHSN Rebaseline webpage and resources: <https://www.cdc.gov/nhsn/2022rebaseline>
- NHSN's Guide to the 2022 Baseline SIR (pdf): <https://www.cdc.gov/nhsn/2022rebaseline/sir-guide.pdf>
- NHSN SIR Model Explorer, which includes parameter estimates for models: <https://www.cdc.gov/nhsn/2022rebaseline/sir-risk-factors.html>
- All archived communications and newsletter articles related to the Rebaseline project: <https://www.cdc.gov/nhsn/2022rebaseline/newsletters/index.html>
- Rebaseline Talking Points: <https://www.cdc.gov/nhsn/2022rebaseline/analysis-resources.html>
- Implementation Guide & Change Log (using new reports in the NHSN application): <https://www.cdc.gov/nhsn/pdfs/rebaseline/Implementation-Guide-Change-Log.pdf>