



HOSPITAL HEALTHCARE- ASSOCIATED INFECTIONS (HAI) INTERNAL VALIDATION GUIDANCE

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INTRODUCTION

Each facility has received an Excel workbook report of the 2018 healthcare-associated infections (HAI) data the facility reported to the Oregon Health Authority (OHA) via the National Healthcare Safety Network (NHSN). A portion of these data will be reported publicly on the OHA website. This guidance will explain what data are included in the Excel workbook report, how the report can be used to improve data quality, and how to interpret the report. Please note that the report has not been formatted for printing.

Each facility should review the report and guidance and submit corrections to NHSN by the date provided by the HAI Program. Final data will be emailed back to the facility. Thank you for participating in this review, as it helps OHA provide high-quality publicly reported data.

With questions or for help reviewing data, please contact Roza Tammer at roza.p.tammer@state.or.us or (971) 673-1074.

DATA INCLUDED IN THE REPORT

The HAI Program has provided the date on which data for this report were exported from NHSN. Any changes made in NHSN after this date may not be reflected in the report.

Annual data are presented as standardized infection ratios (SIR) for the calendar year, based on the updated 2015 NHSN baseline.ⁱ Worksheets including monthly data and line listings are also included.

Please note that this guidance document is organized according to the format of the Excel workbook we provide. However, you may still find this information to be helpful when resolving general troubleshooting questions.

DATA IN THE EXCEL WORKBOOK ARE ORGANIZED ON LABELED WORKSHEETS

The worksheets include

- Number of hospital beds and infection preventionists
- Unresolved NHSN alerts
- 2018 reporting exemptions
- Data reported by HAI measure
 - Central line-associated bloodstream infections (CLABSI)
 - Catheter-associated urinary tract infections (CAUTI)
 - Laboratory-identified *Clostridium difficile* infections (CDI LabID Event)
 - Laboratory-Identified Methicillin-Resistant *Staphylococcus aureus* bloodstream infections (MRSA BSI LabID Event)
 - Surgical site infections (SSI) following
 - Coronary artery bypass graft with chest and donor site incisions (CBGB)
 - Colon surgery (COLO)
 - Hip prosthesis (HPRO)
 - Abdominal hysterectomy (HYST)
 - Knee prosthesis (KPRO)
 - Laminectomy (LAM)

WHAT TO DO WITH THESE DATA

Checkboxes are provided to facilitate the data validation process.

UNRESOLVED ALERTS

- Review and address all unresolved alerts.^{ii iii} Reviewing alerts in the NHSN system will give more detailed information and options to resolve many of these alerts. Please note that your report will only include alerts for data that are required to be reported to OHA.

Alert name	Description	Module	Action to take within NHSN
Conferred rights not accepted	The most recent Confer Rights template to one or more group have not been accepted	Not applicable	Click the “Group” option in the blue navigation bar. Any group whose template has yet to be accepted will show as “Not Accepted” under “Status.” Click the group name to view the new template and accept proposed data rights.
Incomplete events	One or more events have missing data elements in required fields	Device-associated (DA), MDRO/CDI	Each incomplete event can be resolved directly in the alert tab by entering the missing information and clicking “Save.”
Missing events	No events were reported into NHSN for a given month, but the facility has not indicated in the summary data that there were no events to report (by clicking “No Events”)	DA, MDRO/CDI	If no events took place in a month, click on the link under “Summary Data Form Type.” In the summary data record, indicate there were no events to report for that month by clicking “Edit” and indicating “Report No Events.” If there are events to be entered, click “Event” and “Add” in the navigation bar.
Incomplete summary data	Summary data records are missing data from required fields	DA, MDRO/CDI	Click “Summary ID” link to that month’s summary data record in the first column of the table. Click “Edit,” fill in the missing data, and “Save.”
Missing summary data	No summary data record has been reported into NHSN for a month and event type that was indicated would be followed in the monthly reporting plan	DA, MDRO/CDI	Add a summary data record by clicking on “Summary Data” and then “Add” in the navigation bar.
Incomplete procedures	One or more procedures have missing data elements in required fields	Procedure-Associated (PA) Module/SSI	Each incomplete procedure can be resolved directly in the “Incomplete Procedures” alert tab by entering the missing information and clicking “Save.”
Missing procedures	No procedures have been reported into NHSN for a month and event type that was indicated would be followed in the monthly reporting plan	PA Module/SSI	Verify that the facility did not perform any of the procedures for the given month by clicking the box “No procedures performed” directly in the alert tab and clicking “Save.” If the facility did perform these procedures, enter them under the “Procedures” section of NHSN.
Missing procedure-associated events	No events have been reported into NHSN for a given month for a given procedure type	PA Module/SSI	If there were no events to report, click the box “Report No Events” directly in the alert tab and click “Save.” If there are events to report for that month and procedure type, enter the data in the Events section of NHSN.
Missing survey data	Information is missing from the annual survey	Not applicable	Click the “Surveys” option in the blue navigation bar. Review the most recent survey and enter any missing information.

GENERAL INFORMATION FOR HAI MEASURE VALIDATION

Review each worksheet for accuracy. It can be helpful to review monthly data worksheets and line listings when annual data appear inaccurate. Facilities can compare these data to both what they reported into NHSN and to the resources they use to collect and report data for these measures (such as operative reports for SSI).

- Regenerate your datasets in NHSN before reviewing the report.
- Review numerator data (infections or events). Note: SSIs are reflected in the month the procedure was performed rather than the month in which the event occurred. For example, an event with an August event date linked to a July procedure date is considered a July event.
- Review denominator data (procedures, device days, patient days, or summary data).
- Review months of data. If the facility reported both numerator and denominator data to NHSN for all 12 months of the year, and had complete monthly reporting plans in place, annual SIR data worksheets should show a value of “12”. Any values of less than 12 will be highlighted in yellow to indicate potentially missing months of data.
- Identify any discrepancies between the worksheet data and what the facility expects to see. Feel free to contact the HAI Program if you need help identifying, understanding, or resolving issues.
- Make any needed edits in NHSN to resolve identified discrepancies before the due date provided. After this date, the HAI Program may not be able to accommodate data revisions.

ADDITIONAL STEPS IN NHSN

The following steps will also help to increase the accuracy and security of the facility’s data.

- Review the Patient Safety Component Annual Hospital Survey and all Monthly Reporting Plans for 2018 to ensure data reported are accurate^{iv}
- Review the HAI checklists to help classify reportable events and correctly evaluate NHSN HAI criteria^v
- Review the mapped locations to ensure that all locations are mapped accurately and are appropriately categorized as active or inactive^{vi}
- Review facility users to ensure that each user’s rights do not exceed their role regarding NHSN reporting and that those no longer needing access have been inactivated^{vii}
- Run and review eight Data Quality reports^{viii}
- Run and review the Unusual Susceptibility Profiles Alert^{ix}
- Review the Issue List, which details known issues with the application^x
- Review the NHSN 2018 Toolkit and Guidance for Data Quality Checks for Reporting Facilities: 2018 Internal Validation Guidance^{xi}
- Review the Troubleshooting Guides for additional information^{xii}

SUPPLEMENTAL REPORT INFORMATION

Details regarding the data included in the report are provided below. Please note that the information provided in this guide are not exhaustive and are not meant to replace a thorough reading of, and precise adherence to, NHSN protocols.^{xiii} Please see the References section on the last page of this document for more information.

FACILITY INFORMATION

This worksheet shows data entered by your facility into the 2018 NHSN Patient Safety Component Annual Facility Survey. Some information from this survey is used to calculate a measure that is part of Oregon's State Health Improvement Plan (SHIP), which addresses leading causes of death, disease, and injury in Oregon through evidence-based and measurable strategies.^{xiv}

If this worksheet is blank, it means the facility has not completed the annual survey for 2018.

- Survey Year: The year of annual survey from which data were obtained
- OrgID: The facility's NHSN organization ID
- Name: The name of the facility
- NumICP: The number of full-time infection preventionists working in the facility
- Numbeds: The total number of beds set up and staffed in the facility
- NumICUbeds: The number of ICU beds (including adult, pediatric, and neonatal levels II/III and III) in the facility

UNRESOLVED ALERTS

This worksheet shows unresolved NHSN alerts for 2018 data, which are generated by NHSN. Alerts draw attention to potential errors and appear upon log-in for each NHSN user that has access to the facility. If there are no unresolved alerts, this worksheet will show "No unresolved alerts." The information in the worksheet will provide more detail regarding each specific unresolved alert.

- Alert type: See table on page 2 for alert descriptions and how they may be resolved
- Module: The NHSN module ("PA" or procedure-associated, "DA" or device-associated, and "MDRO/CDI" or LabID Event)
- Plan year/month: The month and year of the monthly reporting plan
- Location: The name the facility has given the specific location
- Type of unit: The standard NHSN category selected by the facility when mapping the location
- Event type: For event/numerator-related alerts, the type of infection (SSI, CAUTI, LabID, CLABSI)
- Summary data type: For denominator-related alerts, the type of location (ICU, NICU, SCA)
- Procedure code: For SSI-related alerts, the procedure type
- Survey type: The type of annual survey from which data are missing
- Survey year: The year of annual survey from which data are missing

EXEMPTIONS

The report will include an exemptions worksheet. Exemptions were offered for 2018 data for two of the measures that are reportable to OHA. An exemption means the facility does not need to report that measure to OHA (it does not exempt the facility from collecting and reporting those data to any other organization, including the Centers for Medicare and Medicaid Services [CMS]).

Please note that exemptions based on central line days and surgical procedure counts will no longer be offered by OHA starting with 2019 data to ensure HAI data is representative of all Oregon facilities.

The facility's exemptions for 2018 data fall into one of two categories:

- Reporting: The facility has not claimed an exemption for this measure
- Exempt: The facility has claimed an exemption for this measure, is eligible for an exemption but has chosen to voluntarily report these data to OHA, or does not have applicable location types or perform applicable procedures

HAI MEASURE-SPECIFIC DATA

ALL HAI MEASURE WORKSHEETS SHOW THE TIME PERIOD OF DATA PRESENTED.

- Annual SIR data worksheets include the variable “summaryYR.”
- Monthly data worksheets include the variable “summaryYM,” indicating that each line shows data for one month. If there is no line of data for a given month, it means the facility reported no device days or events, did not enter a monthly reporting plan, or did not complete a monthly reporting plan for that month.
- Line listings include variables that reference a particular date (“eventDate,” “admitDate,” “locationAdmitDate,” “SpecimenDate,” and “procDate”).

ALL ANNUAL SIR DATA WORKSHEETS^{xv} INCLUDE THE FOLLOWING INFORMATION:

- Predicted infections: The number of infections predicted by NHSN, based on 2015 national data (“numPred,” “numPredAdultCmpx,” or “numPredPedCmpx”).
- SIR: The standardized infection ratio, or ratio of observed to predicted infections (“SIR” or “SIRComplex”). If a row of data had fewer than one predicted infections, no SIR will be calculated.
- 95% confidence interval: The 95% confidence interval for the SIR, measuring statistical significance (“SIR95CI” or “SIRComplex95CI”). If a row of data had fewer than one predicted infections, no 95% confidence interval will be calculated.
- HHS target: The goal SIR established by the US Department of Health and Human Services (HHS) for 2020 (“HHS_Target”).
- Performance compared to HHS target: Whether the HHS goal SIR was met (“HHS_Target_Met”).
- Months of data counting towards the SIR: The number of months of data for this measure reported into NHSN during 2018 (“Months”). If the facility reported one or more events and/or device days for each month of the reported quarter, the value of this column will be 12. If the facility reported no device days or events, did not enter a monthly reporting plan, or did not complete a monthly reporting plan for a given month, that month will not count towards this value. Any values of less than 12 will be highlighted in yellow to indicate potentially missing months of data.

CLABSI AND CAUTI DATA

The report includes CLABSI and CAUTI worksheets including annual SIR data,^{xvi} monthly data, and line listings. If the facility has inpatient rehabilitation facility (IRF) locations, it will have additional worksheets for CAUTI IRF data.

CLABSI and CAUTI are device-associated infections, and are reportable to OHA only in certain locations, which align with the CMS reporting requirements. Refer to the CMS Location Mapping Checklist (Step 3) for a list of the CDC location codes (“loccdc”) of reportable units.^{xvii} Annual SIR data worksheets for these HAIs are presented in descending level of detail:

- Overall (“OVERALL”)
- By ICU (“CC”) and ward locations (“WARD”)
- By standard NHSN categories selected by the facility when mapping this location (“loccdc”)
- By individual reporting location names chosen by the facility (“location”)
 - Note: The facility may have more than one unit of the same type, and each will occupy its own row.

Monthly data worksheets show the same data presented on annual SIR data worksheets by month and by location.

Numerator, or event, data for CLABSI and CAUTI are presented as the number of infections that occurred during the year in applicable locations and were reported into NHSN by the facility (“infCount”).

Denominator data for CLABSI and CAUTI are presented as device days (“numCLDays” and “numcathdays,” respectively). These are the number of days during which patients in applicable locations had the device during the year and were reported into NHSN by the facility.

Depending upon the facility, the CLABSI model used to generate the report is the:

- “SIR – Acute Care Hospital CLAB Data,”
- “SIR – Critical Access Hospital CLAB Data,” or
- “SIR – Long Term Acute Care CLAB Data.”

The report will not include:

- BSI events where central line = “No”
- Mucosal barrier injury laboratory-confirmed BSI (MBI-LCBI) events
- Data from any location that is not categorized as an adult, pediatric, or neonatal intensive care unit (ICU) or an adult or pediatric medical, surgical, or medical/surgical ward

Depending on the facility, the CAUTI model(s) used to generate the report is the:

- “SIR – Acute Care Hospital CAU Data,”
- “SIR – Critical Access Hospital CAU Data,”
- “SIR – Long Term Acute Care CAU Data,” or
- “SIR – Inpatient Rehab Facilities CAU Data.”

The report will not include:

- UTI events where urinary catheter = “Neither”
- Data from any location that is not categorized as an adult or pediatric ICU or an adult or pediatric medical, surgical, medical/surgical, or inpatient rehabilitation ward

MRSA BSI AND CDI LABID DATA

The report will include MRSA BSI and CDI worksheets including annual SIR data,^{xviii} monthly data, and line listings.

MRSA BSI and CDI are LabID Events and are reportable to OHA only in certain locations categorized as “FACWIDEIN” as well as emergency departments, 24-hour observation units, and inpatient rehabilitation facility locations. Annual SIR data worksheets for these HAIs are presented on one line for the entire facility; however, if the facility has inpatient rehabilitation facility (IRF) locations, it will have additional worksheets for MRSA BSI and CDI IRF data. Monthly data worksheets show the same data presented on annual SIR data worksheets by month.

Numerator, or event, data for MRSA BSI and CDI are presented as the number of positive laboratory results that were collected for clinical purposes during the year in applicable locations and were reported into NHSN by the facility and (“MRSAbldIncCount” and “CDIF_facIncHOCCount,” respectively).

Denominator data for MRSA BSI and CDI are presented as patient days (“numpatdays”). These are the number of days spent by patients in applicable locations during the year and reported into NHSN by the facility.

Depending on the facility, the CDI model used to generate the report is the:
 -“SIR – Acute Care Hospital CDI Facwide IN LabID Data,”
 -“SIR – Critical Access Hospital CDI Facwide IN LabID Data,” or
 -“SIR – Long Term Acute Care CDI Facwide IN LabID Data.”

The report will only include:

- Specimens collected in an inpatient location (in acute-care or critical-access hospitals, these include CMS-certified inpatient rehabilitation [IRF] or psychiatric [IPF] locations with a separate CMS certification number [CCN]), as determined by the standard NHSN category selected by the facility when mapping each location (“loccdc”), in an ED, or in a 24-hour observation location
- Specimens classified as “healthcare facility-onset” (HO), meaning the specimen collection date was >3 days after the patient’s facility admission date (day of admission=Day 1).
- Incident events, meaning the event occurred >56 days after the most recent CDI LabID Event for that patient that occurred in any applicable location as defined above.

Depending on the facility, the MRSA BSI model used to generate the report is the:
 -“SIR – Acute Care Hospital MRSA Blood Facwide IN LabID Data,”
 -“SIR – Critical Access Hospital MRSA Blood Facwide IN LabID Data,” or
 -“SIR – Long Term Acute Care MRSA Blood Facwide IN LabID Data.”

The report will only include:

- MRSA-positive blood specimens
- Specimens collected in an inpatient location (in acute-care or critical-access hospitals, these do not include CMS-certified IRF or IPF locations with a separate CCN), as determined by the standard NHSN category selected by your facility when mapping each location (“loccdc”), in an ED, or in a 24-hour observation location
- Specimens classified as “healthcare facility-onset” (HO), meaning the specimen collection date was >3 days after the patient’s facility admission date (day of admission=Day 1).
- Incident events, meaning the patient did not have any prior positive MRSA blood specimen LabID events in the previous 14 days in any applicable location as defined above (specimen collection date=Day 1).

SSI DATA

The report will include SSI worksheets including annual SIR data, monthly data, a line listing of all events, and a line listing of all procedures excluded. Procedures in adult (≥ 18 years of age at the time of the procedure) and pediatric patients are presented separately on annual and monthly data worksheets. Please note that two line listings are provided for SSI data; one listing all events contributing to the SIR, and one listing all procedures excluded from the SIR. These line listings may help your facility determine the reason why certain procedures or events were included in or excluded from the analysis. Page 6 of the October 2018 NHSN Newsletter contains additional information regarding procedures and events excluded from the SSI SIR.^{xix}

SSI data are procedure-associated infections, and are reportable to OHA following six types of procedures in all facility locations. Annual SIR data worksheets for these HAIs are presented on one row for all procedure types combined, and on one line per procedure type (“procCode”). Monthly data worksheets show the same data presented on annual SIR data worksheets by month and procedure type.

Numerator, or event, data for SSI are presented as the number of infections associated with procedures of a given type (CBGB, COLO, HPRO, HYST, KPRO, and LAM) carried out during the year and reported into NHSN by the facility (“procCount”).

Denominator data for SSI are presented as the number of procedures of a given type carried out during the year and reported into NHSN by the facility (“infCountAdultCmpx” and “infCountPedCmpx”).

The SIR model used to generate the report is the “Complex Admission/Readmission [A/R] SSI Model.”

The report will only include:

- Procedure and event data for CBGB, COLO, HPRO, HYST, KPRO and LAM
- Inpatient procedures and associated SSIs
- In-plan data
- Deep Incisional Primary SSIs and Organ/Space SSIs
- SSIs identified on admission or readmission to the facility where the procedure was performed

As referenced in the line listing of the procedures excluded worksheet, the SIR report will not include:

- Superficial incisional secondary (SIS) or deep incisional secondary (DIS) SSIs
- SSIs associated with
 - Procedures carried out in 2017, even if the SSI occurred in 2018
 - Outpatient procedures and associated SSIs
- Procedures performed on patients with
 - Gender = “Other”
 - Age at the time of procedure greater than 109 years
 - Body Mass Index (BMI) of less than 12 or greater than 60 in adult patients
 - BMI of less than 10.49 or greater than 65.79 in pediatric patients
- Procedures with
 - Present at time of surgery (“PATOS”)=Yes
 - Duration of less than 5 minutes
 - Duration of greater than interquartile range=5
- Procedures with missing data
 - Closure technique
 - ASA score
 - Gender
- Procedures or SSIs reported by facilities with data missing from the Annual Facility Survey
 - Medical affiliation
 - Medical affiliation=“Y” and “Medical Type” missing
 - Number of beds

REFERENCES

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- i <https://www.cdc.gov/nhsn/2015rebaseline/index.html>
 - ii <http://www.cdc.gov/nhsn/pdfs/gen-support/nhsn-alerts.pdf>
 - iii <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/group-alerts.pdf>
 - iv https://www.cdc.gov/nhsn/pdfs/pscmanual/3psc_monthlyreportingplancurrent.pdf
 - v <https://www.cdc.gov/nhsn/hai-checklists/index.html>
 - vi https://www.cdc.gov/nhsn/pdfs/pscmanual/15locationsdescriptions_current.pdf
 - vii https://www.cdc.gov/nhsn/PDFs/slides/NHSN_Getting_Started.pdf
 - viii https://www.cdc.gov/nhsn/pdfs/pscmanual/instructions_dq.pdf
 - ix <https://www.cdc.gov/nhsn/pdfs/gen-support/usp-alert-current.pdf>
 - x <https://www.cdc.gov/nhsn/releasemgt/index.html>
 - xi <https://www.cdc.gov/nhsn/pdfs/validation/2018/2018-nhsn-iv-for-facilities-508.pdf>
 - xii <https://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html>
 - xiii <https://www.cdc.gov/nhsn/acute-care-hospital/index.html>
 - xiv <https://www.healthoregon.org/ship>
 - xv <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>
 - xvi https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/clabsicauti_sirtroubleshooting.pdf
 - xvii <https://www.cdc.gov/nhsn/pdfs/cms/Location-Mapping-Checklist.pdf>
 - xviii https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf
 - xix <https://www.cdc.gov/nhsn/pdfs/newsletters/nhsn-nl-oct18-508.pdf>