NHSN Hospital Respiratory Data (HRD) 2025 Annual Training

Ally Binder, MS

Andrea Cool, MPH

Emily Witt, MPH

Thomeka J. Nelson Oyebade, MPH

CDC Division of Healthcare Quality Promotion (DHQP)

Surveillance Branch (SB), Acute Care Analytics Team (ACAT)

Emergency Preparedness and Response Unit (EPRU)

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Two topics related to NHSN's Hospital Respiratory Data (HRD) will be covered in today's training

- **Running and Modifying HRD Analysis Reports**
  - Creating, modifying and interpreting analysis reports
  - Using analysis reports to assess completeness of reporting
- **Data Processing and Quality Assurance**
  - HRD submission pathways and front-end business rules
  - Data processing, including reconciliation and aggregation

NHSN Hospital Respiratory Data (HRD): Running and Modifying HRD Analysis Reports

Thomeka J. Nelson Oyebade, MPH

Emily Witt, MPH

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.

Objectives

- Identify specific NHSN HRD analysis reports found in the HRD Module folder
- Understand how to modify NHSN HRD analysis reports
- Interpret calculated HRD metrics
- Understand how to assess reporting completeness using the NHSN HRD Module

QUESTIONS!

1. Are you familiar with NHSN's Hospital Respiratory Data (HRD) collection?

2. Have you ever accessed or ran an HRD analysis report in the NHSN application?

Creating and Modifying Analysis Reports

NHSN Hospital HRD Data Reports

- NHSN Hospital HRD Data Reports can be found in the "Hospital Respiratory Data" folder on the Analysis Reports page

- Users can run, modify, and export 2 reports of their facilities' HRD hospital data:
  - Line Listing – Daily Hospital Respiratory
  - Line Listing – Weekly Hospital Respiratory
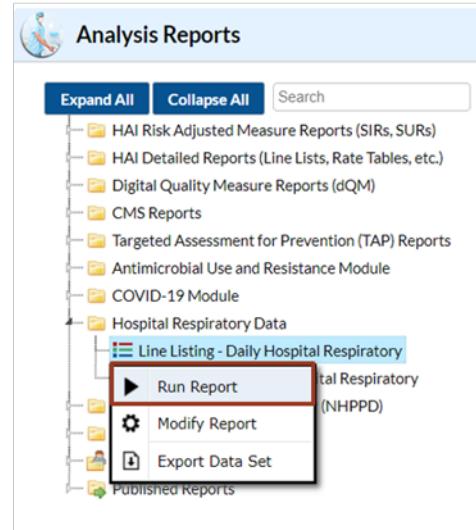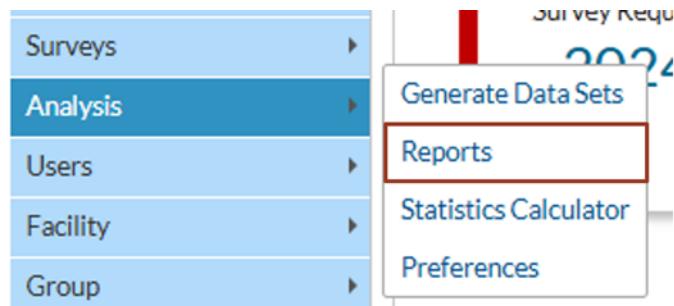
Modifying NHSN Hospital Respiratory Data Reports

- The modify report window allows users to customize features of analysis reports

Modifying reports: Title/Format

Modifying reports: Time Period

NOTE: If you do not select a time period, your results will include all data reported for the time period included in your analysis datasets

Modifying reports: Filters

- Specify criteria for filtering the data that will be included in the report

Modify "Line Listing - Daily Hospital Respiratory"

☑ Show descriptive variable names (Print List)   Analysis Data Set: DailyHRDGold   Type: Line List   4:23 PM

| Title/Format | Time Period | Filters | Display Variables | Sort Variables | Display Options |

Additional Filters: [ ] Show   [ ] Clear

AND **OR**   Add group

   AND OR   Add rule

    [∨]   Delete

A "Group" refers to a set of rules combined to make one filter
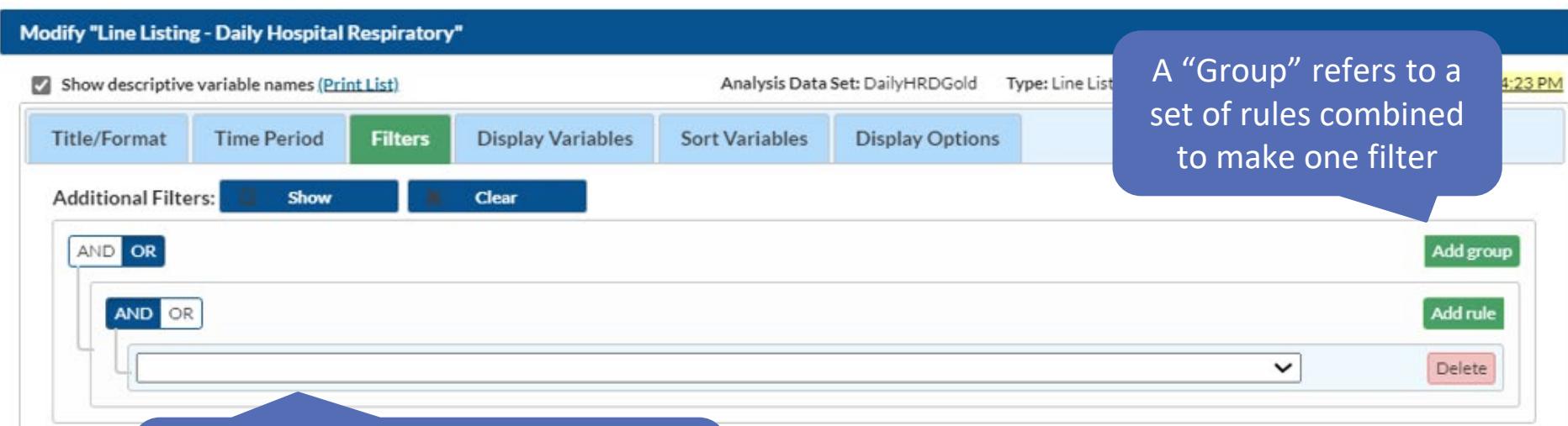
Select variable to filter by and specify desired values of that variable to be included in the report

Modifying reports: Display Variables

- Add, remove, and/or reorder variables that will display in report
- Note: A subset of all variables will be pre-selected to display by default

Check this box to display descriptive variable names instead of field names (e.g., "Facility Org ID" instead of "orgID")

Modifying reports: Display Variables

- Add, remove, and/or reorder variables that will display in report
- Note: A subset of all variables will be pre-selected to display by default

Check this box to display descriptive variable names instead of field names (e.g., "Facility Org ID" instead of "orgID")

Modify "Line Listing - Daily Hospital Respiratory"

☑ Show descriptive variable names (Print List)

Analysis Data Set: DailyHRDGold   Type: Line Listing   Last Generated (UTC) : November 12, 2024 2:01 PM

| Title/Format | Time Period | Filters | **Display Variables** | Sort Variables | Display Options |

Display Variables:

Available Variables:

10a. Adult ICU patients with laboratory-confirmed inf
12e. Number of new admissions of patients with labor
12f. Number of new admissions of patients with labor
12g. Number of new admissions of patients with labor
13a. Number of new admissions of patients with labor
13g. Number of new admissions of patients with labor
14a. Number of new admissions of patients with labor
14b. Number of new admissions of patients with labor
14c. Number of new admissions of patients with labor
14d. Number of new admissions of patients with labor
14e. Number of new admissions of patients with labor
14f. Number of new admissions of patients with labor
14g. Number of new admissions of patients with labor
15a. On hand supply (DURATION in days) n95 respira
15b. On hand supply (DURATION in days) surgical and

All
Selected
Selected
All

Selected Variables:

Facility Org ID
Census ID
Context for which the record applies
Percent COVID-19 Inpatient Bed Occupancy
6a. All hospitalized adult patients with laboratory-cor
6b. All hospitalized pediatric patients with laboratory
2a. All hospital inpatient beds
10b. Pediatric ICU patients with laboratory-confirme
11a. Adult ICU patients with laboratory-confirmed RS
11b. Pediatric ICU patients with laboratory-confirme
12a. Number of new admissions of patients with labor
12b. Number of new admissions of patients with labor
12c. Number of new admissions of patients with labor
12d. Number of new admissions of patients with labor
13b. Number of new admissions of patients with labor

Up
Down
Undo

▶ Run   ▶ Save…   ▶ Export…   Close

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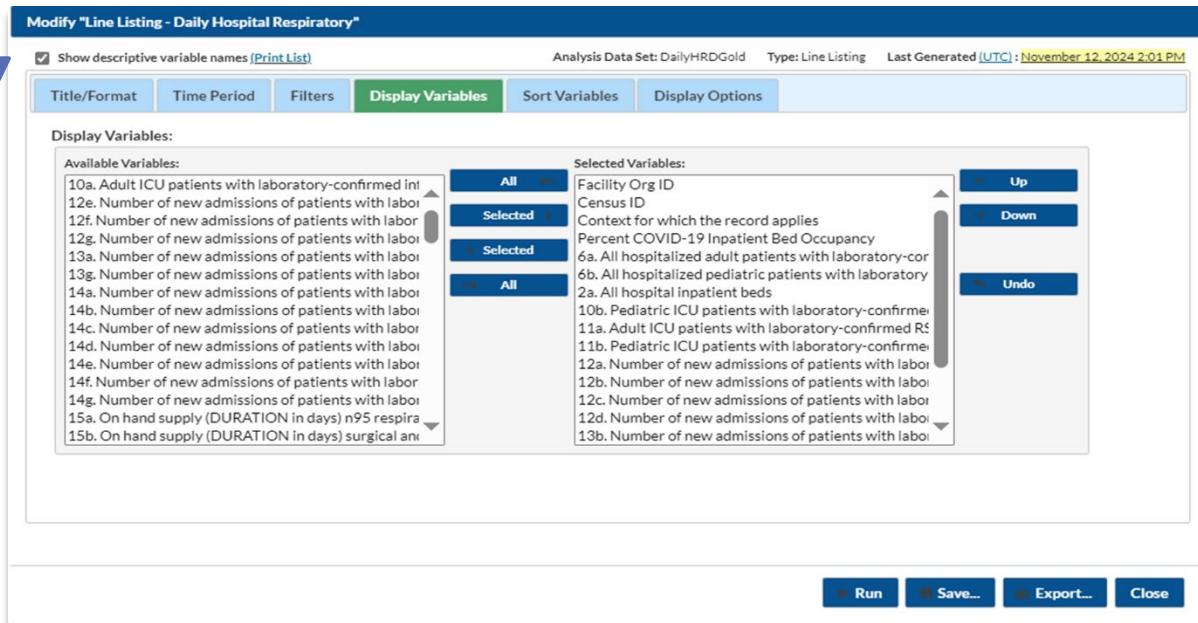
Modifying reports: Sort Variables

- **Select which variable(s) by which to sort reports**
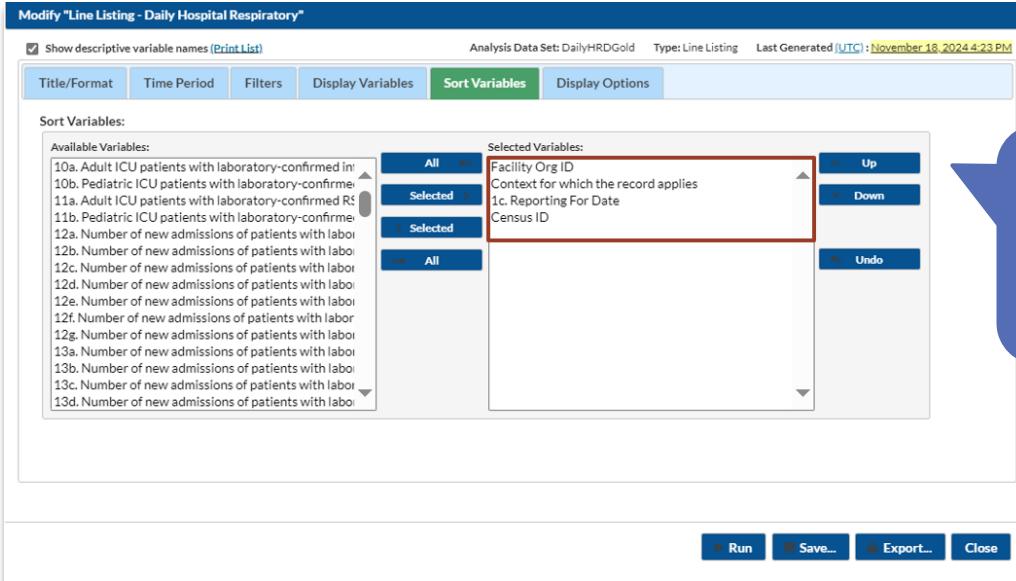
Report will be sorted by the selected variables in the order listed. Use the "Up" and "Down" buttons to change the variable sort order

NOTE: Selected variable(s) must be selected on Display Variables tab in order to sort on that variable

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Modifying reports: Display Options

- Specify variable by which to organize the report
- Report will display one table for each value of the selected "Page by variable"

NOTE: "Page by variable" must also be selected on Display Variables tab

Run customized report

Modify "Line Listing - Daily Hospital Respiratory"

☑ Show descriptive variable names (Print List)   Analysis Data Set: DailyHRDGold   Type: Line Listing   Last Generated (UTC) : November 18, 2024 4:23 PM

| Title/Format | Time Period | Filters | Display Variables | Sort Variables | Display Options |

Title:

Line Listing of Daily Hospital Respiratory

Format:

html   pdf   xls   rtf

When finished modifying report settings, user can choose to run, save, or export the report

▶ Run   🖫 Save...   🔒 Export...   Close

Accessing saved reports

Saved reports can be found in the "Custom Reports" folder within the "Hospital Respiratory Data" folder

Interpreting Analysis Reports

Features of the HRD Analysis Reports

1. Report title

2. Date/time report created

3. Time period of data included in report

4. "Page by variable"

5. Line listing of hospital data reported by facilities meeting the "Page by variable" criteria listed above

6. Data notes

7. Sort variables

Important notes about HRD Analysis Reports

- If multiple records are submitted for a facility within a single day, each record will be displayed with a unique "censusID"

- A value of "0" indicates that the facility reported zero for that field, while a value of "." indicates that the facility did not report any data for that field

- A value of "9999" indicates that the field is not applicable to the facility

National Healthcare Safety Network
Line Listing of Daily Hospital Respiratory
As of: November 14, 2024 at 4:08 PM UTC
Date Range: DAILYHRDGOLD HRDreportingDate After and Including 09/01/2024

orgID=10018

orgID	censusID	context	HRDpctConfC19InPtBedsOcc	HRDnumConfC19HospPatsAdult	HRDnumConfC19HospPatsPed	HRDnumInPtBeds
10018	132	HOSP	15	10	5	100
10018	169	HOSP	15	10	5	100
10018	191	HOSP	15	10	5	100
10018	210	HOSP	15	10	5	100
10018	170	HOSP	15	10	5	100
10018	408	HOSP	15	10	5	100
10018	130	HOSP	.	.	.	100
10018	4340	HOSP	0	0	0	0
10018	255	IPF	.	.	.	200
10018	4341	IPF	0	0	0	0
10018	342	IRF	15	10	5	100
10018	4342	IRF	0	0	0	0

1. Data provided in this report reflect data submitted directly to the NHSN Hospital Respiratory Data Module Daily Reporting Pathway. Values shown have been evaluated using defined data quality checks.
2. Null values may indicate either missing values or a result of failed data quality checks.
3. A value of 9999 indicates the field was not applicable for the facility (e.g., if a facility does not have any ICU beds, a value of 9999 may be reported for numICUBeds).

Sorted by orgID context HRDreportingDate censusID

Using analysis reports to validate facilities' data reported to the HRD Module

- Confirm that data is displayed as expected based on submitted data

- Validate Hospital Respiratory metrics against data used in calculations

  - **Tip:** Customize display variables list to include only variables of interest for validation

As of: November 14, 2024 at 4:08 PM UTC
Date Range: DAILYHRDGOLD HRDreportingDate After and Including 09/01/2024

orgID=10018

orgID	censusID	context	HRDpctConfC19InPtBedsOcc	HRDnumConfC19HospPatsAdult	HRDnumConfC19HospPatsPed	HRDnumInPtBeds
10018	132	HOSP	15	10	5	100
10018	169	HOSP	15	10	5	100
1001					5	100
100					5	100
100					5	100
100					.	100
100				0		0
100					.	200
100				0		0
100					5	100
100				0		0

E.g., *the selected variables have been modified to include the calculated metric, "Percent of inpatient beds occupied by COVID-19 patients" (HRDpctConfC19InPtBedsOcc), as well as the variables used to calculate this metric*

1. Data provided in this report reflect data submitted directly to the NHSN Hospital Respiratory Data Module Daily Reporting Pathway. Values shown have been evaluated using defined data quality checks.
2. Null values may indicate either missing values or a result of failed data quality checks.
3. A value of 9999 indicates the field was not applicable for the facility (e.g., if a facility does not have any ICU beds, a value of 9999 may be reported for numICUBeds).

Assessing Completeness of Reporting

Emily Witt, MPH

Assessing completeness using HRD Line Listing reports

- **The <u>Line Listing – Weekly Hospital Respiratory </u> report can be used to assess weekly completeness of fields required for reporting by CMS**
  - The variable *weekCMSStatus* indicates whether a facility has met the requirements for reporting for a given week
    - **"Complete":** Facility has submitted data for all required fields for the given week
    - **"Incomplete":** Facility has submitted some data for the given week but has not met the minimum requirement for CMS

National Healthcare Safety Network
Line Listing of Weekly Hospital Respiratory
As of: June 6, 2025 at 3:36 PM UTC
Date Range: WEEKLYHRDGOLD datepart(HRDweekEndingDate) After and Including 09/01/2024

orgID=10000

orgID	context	userTag	HRDsource	HRDweekEndingDate	createDate	censusID	name	state	county	zip	factype	weekCMSStatus
10000	HOSP		CSV	05OCT2024:00:00:00.000	08OCT2024:10:35:16.407	114	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Complete
10000	HOSP		CSV	02NOV2024:00:00:00.000	11NOV2024:15:18:08.820	22512	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Complete
10000	HOSP	Healthcare Facility		05APR2025:00:00:00.000	.	.	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Incomplete
10000	HOSP	Healthcare Facility		12APR2025:00:00:00.000	.	.	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Incomplete
10000	HOSP	Healthcare Facility		19APR2025:00:00:00.000	.	.	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Incomplete
10000	HOSP	Healthcare Facility		31MAY2025:00:00:00.000	.	.	DHQP Memorial Hospital	GA	GA121	30329	HOSP-GEN	Incomplete

Assessing completeness using HRD Line Listing reports (continued)

- **Missing values can be identified by generating a report of all required data elements and looking for fields with a value of ".", meaning no data was reported for that field**

  - Use the **Filters** tab to filter to records with a *weekCMSStatus* of "Incomplete" to more easily identify facilities/weeks that have not met the CMS reporting requirements

Reminder: Chat and Q & A features are limited to only 1000 participants

Assessing completeness using HRD Calendar View – Facility Users

- If using the Daily pathway, a green record banner in each day of the reporting week (Sunday-Saturday) indicates complete reporting

- If using the Weekly pathway, green record banner for reporting week (Sunday-Saturday) indicates complete reporting
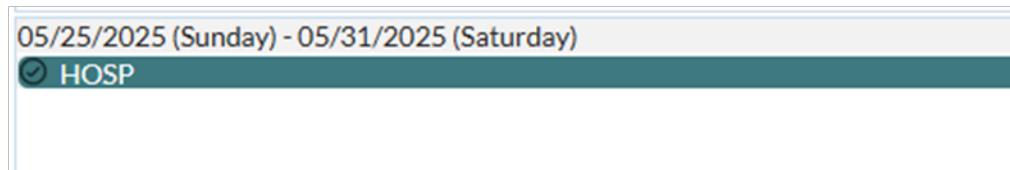
Assessing completeness using HRD Completeness Viewer – Group Users

- **NHSN Group users can access the Completeness Viewer to identify reporting completeness for facilities within the Group for the reporting week**

  - **Complete:** Green complete record indicator shows complete data submission for a facility for the reporting week

  - **No records available:** No data submitted for the facility for the reporting week

  - **Incomplete:** Incomplete data submitted for the facility for the reporting week. For example, 3 days out of 7 submitted in the daily pathway

Resources

- **Modifying and Running NHSN Hospital Respiratory Data (HRD) Reports:** https://www.cdc.gov/nhsn/pdfs/Hospital-Respiratory-Data_HRD_AR_QRG.pdf

- **Patient Safety Analysis Quick Reference Guides:** https://www.cdc.gov/nhsn/ps-analysis-resources/reference-guides.html

- **General Tips and Tools for NHSN Analysis:** https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/General-Tips-NHSN-Analysis.pdf

- **Generating Data Sets – Guidance for PSC:** https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/generatedatasets-psc-508.pdf

- **How to Modify a Report Quick Reference Guide:** https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf

- CDC'S NHSN Hospital Respiratory Data

NHSN Hospital Respiratory Data Processing and Quality Assurance

Andrea Cool, MPH

Objectives

- Review HRD submission pathways and front-end business rules
- Review data processing steps, including data reconciliation and aggregation steps

HRD Data Submission Pathways

- **Hospital Respiratory Data (HRD) are submitted to CDC via the NHSN HRD module located in the Patient Safety Component (PSC), through either the HRD Daily or the HRD Weekly Pathway**
  - Users may choose which pathway they would like to use to submit their facility's data
  - Users may choose to report their facility's data using either the web form entry, CSV upload, or API direct upload
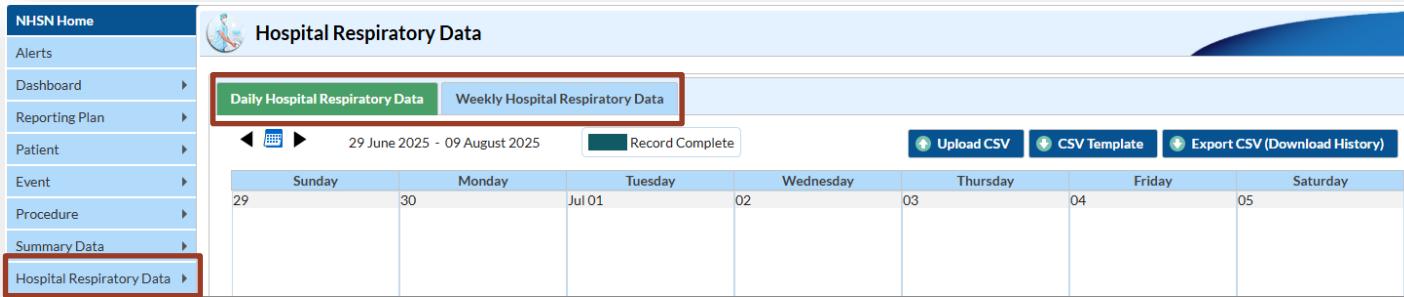
Front-End Specifications & Business Rules

- Each reporting pathway and submission method requires certain NHSN front-end specifications to be met when submitting and saving data
  - specified data element formats
  - valid value ranges and response options
  - business rules
- Business rules are specified checks applied upon submission that flag and/or reject illogical data from being saved
  - e.g., reporting a greater number of adult inpatient beds than total inpatient beds
- HRD Daily and Weekly Reporting Tables of Instructions and Import File Specifications documentation available here:
  - https://www.cdc.gov/nhsn/psc/hospital-respiratory-reporting.html

Submission Rejection and Error Notifications

- **When a record is rejected due to failure to meet submission specifications, the user will receive an error notification detailing the reason(s) for rejection**
  - Notification type depends on submission method (i.e., web form, CSV, API)

Error Notification: Web Form

Respiratory Data Reporting Form For **05/18/2025 - 05/24/2025**   Submit

Reporting Context: * [HOSP - Hospital ▼]

Staffed Bed Capacity, Occupancy, and Prevalent Hospitalizations

Important: Please ensure that the values reported for the Staffed [...] aggregated to weekly totals. The data should provide a single day snapshot of the overall, adult, and pediatric inpatient and ICU bed capacity and occupancy and [...] ecifically for Wednesday of the reporting week.

Section 1: Staffed Bed Capacity and Occupancy

Inpatient Beds

Error

All hospital inpatient beds must be greater than or equal to All adult inpatient beds

OK

2a. * All hospital inpatient beds
100

2b. * All adult inpatient beds
110

2c. * All pediatric inpatient beds
40

3a. * All ho[...]
80

3b. * All adult inpatient occupancy
60

3c. * All pediatric inpatient occupancy
20

[...]CU beds

4b. * Adult ICU beds
30

4c. * Pediatric ICU beds
20

5a. * All ICU bed occupancy
20

5b. * Adult ICU bed occupancy
15

5c. * Pediatric ICU bed occupancy
5

34

Error Notification: CSV Upload

Error Notification: API-Email Notification

Errors, no warnings, required fields missing

NHSN (CDC)
To

failed-records.csv
2 KB

CDC National Healthcare Safety Network (NHSN)

Dear
Thank you for submitting data to the CDC National Healthcare Safety Network (NHSN) Hospital Respiratory Data (HRD) Weekly Portal.

The file (test_submission.csv) was received and partially processed with errors on 05/29/2025 13:47:28. Not All records were submitted. Please review the attached document (failed-records.csv). Then, please resolve the error(s) and upload the corrected data. All records without errors were successfully saved.

Warning - A possible data quality issue has been detected for the specified data field and collection date, but the record was saved and submitted successfully. Please review and update or correct the reported values if indicated.

Error - A confirmed data quality issue has been detected for the specified data field and collection date and must be resolved before the record can be saved and acceptable for submission. Please review and update the reported values where indicated.

Please note your data is incomplete. The file (test_submission.csv) was received and processed with required fields missing on 05/29/2025 13:47:28.

Please review the attached document (failed-records.csv) for specific missing daily and weekly required fields.

CDC National Healthcare Safety Network (NHSN) Client Support team is available Monday - Friday, 7 AM - 5 PM EDT. Should you have questions about the registration process or the information that needs to be entered, we are here to assist.

E-mail: nhsn@cdc.gov

Thank you again for all that you do.
CDC National Healthcare Safety Network (NHSN)

Data Processing Steps

- **Deduplication of Records**
  - A single record is retained per facility and reporting date (Daily pathway) or week (Weekly pathway) based on the completeness of the record for CMS enforcement purposes
    - If more than one record is considered equal based on these criteria, then the record submitted most recently will be retained

- **Logic Checks**
  - Suppression is applied to the deduplicated data in both the Daily and Weekly data pipelines for values that fail specified logic checks for priority data elements
  - Logic checks are intended to remove logically implausible data from final aggregate metrics used for reporting, analytics, and public dissemination
    - E.g., all inpatient bed fields are nulled if the following logic check **fails**: (numInPtBedsAdult + numInPtBedsPed) <= numInPtBeds

Reconciliation of Complete and Valid Daily Data to Weekly Pathway

- NHSN users may choose to submit data via either a *weekly reporting pathway* or a *daily reporting pathway* to satisfy CMS requirements

- Data submitted to the weekly pathway represent two types of information:

  - **Single-day snapshots:** the 24 data elements within the reporting form sections for *Bed Capacity and Occupancy and Prevalent Hospitalizations* are required to be reported as **single day snapshots** (**Wed) of the reporting week**

  - **Weekly totals:** the 21 data elements within the reporting form sections for *New Admissions* are required to be reported as aggregated data for the **entire reporting week (Sun-Sat)**

Reconciliation of Complete and Valid Daily Data to Weekly Pathway

- **Complete** and **valid** daily data (i.e., non-null values reported for all 45 required data elements, passing all logic checks) submitted for a given reporting week (Sun – Sat) to the Daily HRD pathway will be reconciled with data submitted via the Weekly HRD pathway

  - Values reported for the Wednesday during the reporting period will be retained for the 24 *Bed Capacity and Occupancy and Prevalent Hospitalizations* data elements (see example below for data element 3a)

  - Weekly aggregate totals will be calculated for the 21 *New Admissions* data elements by summing the values reported each day of the reporting week (see example below for data element 13c)

Sample Data Submitted to Daily HRD Pathway

Reporting Date	Day of Week	3a. All hospital inpatient occupancy	13c. Number of new admissions of patients with COVID-19, 18-49
6/1/2025	Sun	100	1
6/2/2025	Mon	105	0
6/3/2025	Tues	95	2
6/4/2025	Wed	102	2
6/5/2025	Thurs	105	0
6/6/2025	Fri	100	1
6/7/2025	Sat	100	0

Sample Data Stored in Weekly HRD Pathway

Reporting Week	3a. All hospital inpatient occupancy	13c. Number of new admissions of patients with COVID-19, 18-49
6/7/2025	102	6

Wednesday single-day snapshot stored

Sum of values reported for entire week (Sun-Sat) stored

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Reconciliation of Complete and Valid Daily Data to Weekly Pathway

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Sample Data Submitted to Daily HRD Pathway

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6/3/2025	Tues	95	2
6/4/2025	Wed	102	2
6/5/2025	Thurs	105	0
6/6/2025	Fri	100	1
6/7/2025	Sat	100	0

Sample Data Stored in Weekly HRD Pathway

Reporting Week	3a. All hospital inpatient occupancy	13c. Number of new admissions of patients with COVID-19, 18-49
6/7/2025	102	6

Wednesday single-day snapshot stored

Sum of values reported for entire week (Sun-Sat) stored

Aggregate Data Pipeline

- **Reconciled, de-duplicated weekly hospital respiratory data with logic checks applied are ingested into the 1 CDC Data Platform (1CDP) for further transformation and aggregation prior to analytics, reporting, and public release**
  - Weekly hospital level data are first aggregated to the NHSN Facility ID level, aggregating data reported across multiple contexts for a single hospital
- **Exclusion criteria are applied to remove inactive hospitals and those that are not required to report weekly hospital respiratory data under the CMS CoP**
- **Weekly hospital data are aggregated to various geographic levels allowing for calculation of aggregate metrics (e.g., admission rates, inpatient/ICU occupancy percentages)**
  - Aggregate data are published to data.cdc.gov and CDC's NHSN HRD website every Friday afternoon.

Resources

- **CDC'S NHSN Hospital Respiratory Data**
- **Hospital Respiratory Data Weekly Reporting Form**
- **Hospital Respiratory Data Table of Instructions**
- **Hospital Respiratory Data Daily Reporting Form**
- **Hospital Respiratory Data Table of Instructions**

For NHSN questions or concerns related to the Annual Training

Post questions in the Annual Training Community

After June 10th, please submit questions to the NHSN Help Desk.
- Access new portal at **https://servicedesk.cdc.gov/nhsncsp** .
- 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, 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.