



Neonatal Component

What's new in NHSN? - Late-Onset Sepsis/Meningitis (LOS/MEN) Protocol and Analysis

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Objectives

- Key steps of **Late Onset Sepsis (LOS)/Meningitis (MEN)** data analysis
- LOS/MEN analytic measures
- Navigate the NHSN application to run LOS/MEN analysis reports
- Execute and customize reports
- Interpretation of results

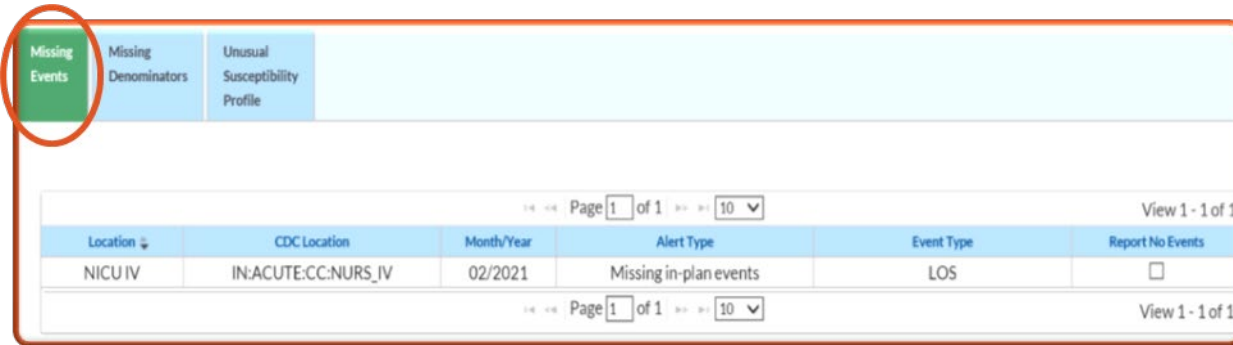
**All data presented is hypothetical test facility data used for presentation purposes only*

Alerts

The screenshot shows the NHSN Neonatal Component Home Page. On the left is a sidebar with a blue header 'NHSN Home' and a list of menu items: Alerts, Reporting Plan, Patient, Event, Denominator, Import/Export, Surveys, Analysis, Users, Facility, Group, and Tools. The main content area has a header 'NHSN Neonatal Component Home Page' with a small image of a baby. Below the header is a blue bar labeled 'Action Items'. Underneath, it says 'COMPLETE THESE ITEMS'. A red circle highlights the word 'ALERTS' in blue text. Below this, a white box with a red vertical bar on the left contains a large blue number '1' and the text 'Missing Events'.

- Alerts are automatic checks in NHSN that remind you of incomplete or missing in-plan data
- Alerts are generated from the Monthly Reporting Plans (MRPs), where in the items that are selected in MRPs are incomplete
- Before using the analysis function, please clear all the alerts
- Alerts can be either found on NHSN Homepage or by clicking on the 'Alerts' tab on the sidebar

Alerts



The screenshot shows a web interface with three tabs: 'Missing Events' (highlighted with a red circle), 'Missing Denominators', and 'Unusual Susceptibility Profile'. Below the tabs is a table with a single row of data. The table has columns for Location, CDC Location, Month/Year, Alert Type, Event Type, and Report No Events. The data row shows 'NICU IV' for Location, 'IN:ACUTE:CC:NURS_IV' for CDC Location, '02/2021' for Month/Year, 'Missing in-plan events' for Alert Type, 'LOS' for Event Type, and an unchecked checkbox for Report No Events. The table is surrounded by a red border, and the 'Missing Events' tab is also circled in red.

Location	CDC Location	Month/Year	Alert Type	Event Type	Report No Events
NICU IV	IN:ACUTE:CC:NURS_IV	02/2021	Missing in-plan events	LOS	<input type="checkbox"/>

- When an alert category is selected, all the incidents in that category will be listed in a table to select
- All incidents in that alert category need to be resolved for the alert to be cleared
- ***Unresolved alerts will prevent data from showing up in Rate reports, even if new datasets are generated***

Generate Datasets

Generate Data Sets (Neonatal)

Reporting Data Sets

Include data for the following time period:

Beginning: 01/2021 | Ending: mm/yyyy

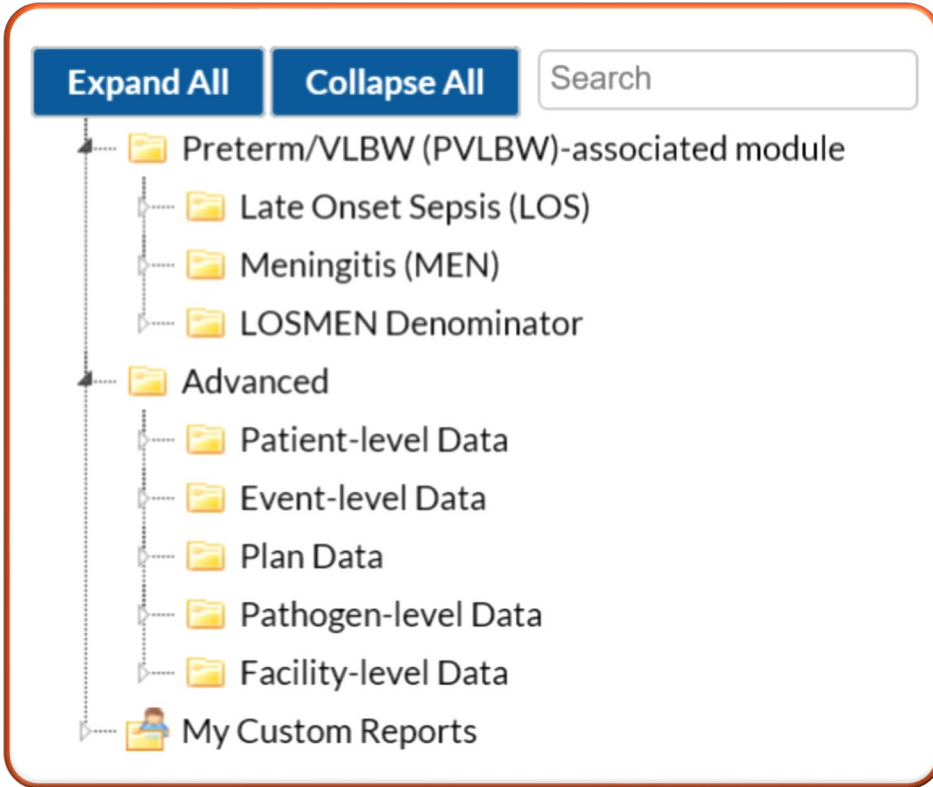
Clear Time Period

Generate Reporting Data Sets

Last Generated: February 25, 2022 3:25 PM to include data beginning 01/2021

- After data entry is completed, the data must be first compiled into your user specific NHSN datasets
- Generate datasets after any changes are made in NHSN so that the changes will be reflected in Analysis Reports

Analysis Reports



- Currently, LOS and MEN are the 2 event types in the Neonatal component
- LOS and MEN folders provide specific analysis reports for respective events and denominator data.
- Advanced folders provide patient-level data, etc. as categorized.

Analysis Reports

The screenshot displays the 'Analysis Reports' interface. At the top left, there is a small image of a baby. Below it, the title 'Analysis Reports' is shown. The interface includes two buttons: 'Expand All' and 'Collapse All', followed by a search input field. The main content is a tree view of report categories and sub-items. The categories are: 'Preterm/VLBW (PVLBW)-associated module', 'Late Onset Sepsis (LOS)', 'Meningitis (MEN)', and 'LOSMEN Denominator'. Each category has several sub-items, each with a small icon representing the report type. The sub-items are: 'Line Listing - All [Category] Events', 'Frequency Table - All [Category] Events', 'Bar Chart - All [Category] Events', 'Pie Chart - All [Category] Events', 'Rate Table - [Category] Crude Monthly Risk', and 'Rate Table - [Category] Cumulative Admission Risk'. The 'Rate Table' sub-items are highlighted in light blue.

Analysis Reports

Expand All Collapse All Search

- Preterm/VLBW (PVLBW)-associated module
 - Late Onset Sepsis (LOS)
 - Line Listing - All LOS Events
 - Frequency Table - All LOS Events
 - Bar Chart - All LOS Events
 - Pie Chart - All LOS Events
 - Rate Table - LOS Crude Monthly Risk
 - Rate Table - LOS Cumulative Admission Risk
 - Meningitis (MEN)
 - Line Listing - All MEN Events
 - Frequency Table - All MEN Events
 - Bar Chart - All MEN Events
 - Pie Chart - All MEN Events
 - Rate Table - MEN Crude Monthly Risk
 - Rate Table - MEN Cumulative Admission Risk
 - LOSMEN Denominator
 - Line Listing - All LOSMEN Denominators
 - Frequency Table - All LOSMEN Denominators
 - Bar Chart - All LOSMEN Denominators
 - Pie Chart - All LOSMEN Denominators

- Click on 'Reports' under Analysis tab to view the available analysis reports in this component
- Currently, the highlighted reports are the most used report types
- Line lists allow the users to see patient-level data that have been reported in to NHSN
- A frequency table is an analysis report with an organized display of counts and percentages

Analysis Metrics for LOS/MEN

- Crude Monthly Risk (CMR)
- Cumulative Admission Risk (CAR)
- Survival Probability (Time to Event Analysis) – A future metric

Note – All 3 metrics will be calculated by time period and NICU location.

Default Analysis Reports

The screenshot shows a software interface with a tree view of analysis reports. At the top, there are buttons for 'Expand All' and 'Collapse All', and a search box. The tree view is expanded to show the following structure:

- Preterm/VLBW (PVLBW)-associated module
 - Late Onset Sepsis (LOS)
 - Line Listing - All LOS Events
 - Frequency Table - All LOS Events
 - Bar Chart - All LOS Events
 - Pie Chart - All LOS Events
 - Rate Table - LOS Crude Monthly Risk** (highlighted)
 - Rate Table - LOS Cumulative Admission Risk
 - Other reports (partially visible):
 - Bar Chart - All MEN Events
 - Pie Chart - All MEN Events
 - Rate Table - MEN Crude Monthly Risk
 - Rate Table - MEN Cumulative Admission Risk

A context menu is open over the selected report, showing the following options:

- Run Report (highlighted)
- Modify Report
- Export Data Set

- Clicking **'Run Report'** will run a report for LOS Crude Monthly Risk (CMR) rate table for data from 01/2021 and forward

Analysis Reports – Crude Monthly Risk

National Healthcare Safety Network Rate Table - LOS Crude Monthly Risk

As of: February 23, 2022 at 8:56 PM

Date Range: All NEO_LOS_CRUDERISK_RATE S

summaryYM=2021M01

orgID	location	summaryYM	numEvent	numCMRDenom	LOSCMRRate
14596	NICU II	2021M01	1	3	333.333
14596	NICU III	2021M01	1	3	333.333
14596	NICU IV	2021M01	1	3	333.333

This report includes LOS data for 2021 and forward.

Crude Monthly Risk (CMR) rate is calculated by dividing the number of

Data contained in this report were last generated on February 8, 2022 at 6:03 PM

National Healthcare Safety Network Rate Table - LOS Crude Monthly Risk

As of: February 23, 2022 at 8:56 PM

Date Range: All NEO_LOS_CRUDERISK_RATE S

summaryYM=2021M02

orgID	location	summaryYM	numEvent	numCMRDenom	LOSCMRRate
14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	2	0
14596	NICU IV	2021M02	.	2	.

- LOS Crude Monthly Risk (CMR) rate tables are generated and organized by summary year month

$$CMR = \frac{\# \text{ of LOS events}}{\# \text{ of eligible neonates within an eligible location each month}} \times 100$$

In the table, LOS CMR Rate is calculated by a multiplier 1000 which will soon be replaced by a multiplier 100 in the NHSN application.

Analysis Reports – Crude Monthly Risk

National Healthcare Safety Network Rate Table - LOS Crude Monthly Risk

As of: February 23, 2022 at 8:56 PM

Date Range: All NEO_LOS_CRUDERISK_RATEs

summaryYM=2021M01

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14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	2	0
14596	NICU IV	2021M02	.	2	.

$$CMR = \frac{\# \text{ of LOS events}}{\# \text{ of eligible neonates within an eligible location each month}} \times 100$$

Example: In January 2021, NICU II location reported 1 LOS event and 3 eligible neonates. CMR for this location is,

$$= 1/3 * 100$$

$$CMR = 33.33$$

Interpretation: CMR rate for LOS event is 33.3 per 100 neonates in January 2021, NICU II location

Analysis Reports – Cumulative Admission Risk

National Healthcare Safety Network
 Rate Table - LOS Cumulative Admission Risk
 As of: February 23, 2022 at 9:34 PM
 Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M01

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M01	1	6	166.667
14596	NICU III	2021M01	1	3	333.333
14596	NICU IV	2021M01	1	5	200

This report includes MEN data for 2021 and forward.
 Cumulative Admission Risk (CAR) rate is calculated by dividing the nu
 Data contained in this report were last generated on February 8, 2022 at 6:03 P

National Healthcare Safety Network
 Rate Table - LOS Cumulative Admission Risk
 As of: February 23, 2022 at 9:34 PM
 Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M02

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	3	0
14596	NICU IV	2021M02	.	2	

- By default, LOS Cumulative Admission Risk (CAR) rate tables are generated and organized by summary year month

$$CAR = \frac{\text{\# of LOS events}}{\text{\# of eligible neonatal admissions to an eligible location}} \times 100$$

In the table, LOS CMR Rate is calculated by a multiplier 1000 which will soon be replaced by a multiplier 100 in the NHSN application.

Analysis Reports – Cumulative Admission Risk

National Healthcare Safety Network

Rate Table - LOS Cumulative Admission Risk

As of: February 23, 2022 at 9:34 PM

Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M01

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M01	1	6	166.667
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Data contained in this report were last generated on February 8, 2022 at 6:03 P

National Healthcare Safety Network

Rate Table - LOS Cumulative Admission Risk

As of: February 23, 2022 at 9:34 PM

Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M02

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	3	0
14596	NICU IV	2021M02	.	2	

$$CAR = \frac{\# \text{ of LOS events}}{\# \text{ of eligible neonatal admissions to an eligible location}} \times 100$$

- **Example:** In January 2021, NICU II location reported 1 LOS event and 6 neonatal admissions. CAR for this location is,

$$= 1/6 * 100$$

$$CAR = 16.67$$

- **Interpretation:** CAR rate for LOS event is 16.7 per 100 neonatal admissions in January 2021, NICU II location
- *Note that eligible neonatal admissions for January 2021 accounts for all admissions at the end of that month, including the multiple admissions of the same infant into that location for that month*
- *Note that CAR can also be calculated quarterly, half-yearly, annually or cumulatively*

Crude Monthly Risk

National Healthcare Safety Network Rate Table - LOS Crude Monthly Risk

As of: February 23, 2022 at 8:56 PM
Date Range: All NEO_LOS_CRUDERISK_RATES

summaryYM=2021M01

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14596	NICU II	2021M01	1	3	333.333
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14596	NICU IV	2021M01	1	3	333.333

This report includes LOS data for 2021 and forward.

Crude Monthly Risk (CMR) rate is calculated by dividing the number of

Data contained in this report were last generated on February 8, 2022 at 6:03 PM

National Healthcare Safety Network Rate Table - LOS Crude Monthly Risk

As of: February 23, 2022 at 8:56 PM
Date Range: All NEO_LOS_CRUDERISK_RATES

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14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	2	0
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Cumulative Admission Risk

National Healthcare Safety Network Rate Table - LOS Cumulative Admission Risk

As of: February 23, 2022 at 9:34 PM
Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M01

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M01	1	6	166.667
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This report includes MEN data for 2021 and forward.

Cumulative Admission Risk (CAR) rate is calculated by dividing the nu

Data contained in this report were last generated on February 8, 2022 at 6:03 PM

National Healthcare Safety Network Rate Table - LOS Cumulative Admission Risk

As of: February 23, 2022 at 9:34 PM
Date Range: All NEO_LOS_CUMADM_RATES

summaryYM=2021M02

orgID	location	summaryYM	numEvent	numCARDenom	LOSCARRate
14596	NICU II	2021M02	1	3	333.333
14596	NICU III	2021M02	0	3	0
14596	NICU IV	2021M02	.	2	.

Analysis Metric - Time to Event Analysis, a future metric

$$\text{Survival Probability} = \frac{\text{Number of Neonates without LOS or without MEN event}}{\text{Number of eligible neonates}}$$

Example: Suppose there are 24 neonates without any event and 25 eligible neonates for a given duration of stay in an NICU location

$$\text{Survival Probability} = 24 / 25 = 0.96 \text{ (or 96\% for the given duration of stay)}$$

Note:

- *Survival Probabilities can be calculated for any given duration of stay and can be used to produce a survival plot with increasing clarity as reporting increases.*

Analysis Reports – Modify Report

The screenshot displays a software interface for managing analysis reports. At the top, there are buttons for 'Expand All' and 'Collapse All', and a search box. Below these is a tree view of reports. The 'Preterm/VLBW (PVLBW)-associated module' is expanded, showing several sub-reports. The 'Rate Table - LOS Crude Monthly Risk' report is selected and highlighted in light blue. A context menu is open over this report, showing three options: 'Run Report' (with a play button icon), 'Modify Report' (with a gear icon and highlighted in light blue), and 'Export Data Set' (with a download icon). Other reports visible in the tree include 'Late Onset Sepsis (LOS)' with sub-reports like 'Line Listing - All LOS Events', 'Frequency Table - All LOS Events', 'Bar Chart - All LOS Events', and 'Pie Chart - All LOS Events'. Below these are reports for 'Denominators', including 'Frequency Table - All LOSMEN Denominators' and 'Bar Chart - All LOSMEN Denominators'.

- Clicking **‘Modify Report’** will allow the users to customize the existing report type based on the selections made

Analysis Reports – Modify Report

The screenshot shows a web-based interface for modifying a report. The title bar reads "Modify 'Rate Table - LOS Crude Monthly Risk'". Below the title bar, there is a status bar with the text "Analysis Data Set: NEO_LOS_CrudeRisk_Rates", "Type: Rate Table", and "Last Generated: March 3, 2022 4:07". The main interface has four tabs: "Title/Format", "Time Period", "Filters", and "Display Options". The "Title/Format" tab is active. Under the "Title:" label, there is a text input field containing "Rate Table - LOS Crude Monthly Risk". Under the "Format:" label, there are four radio button options with corresponding icons: "html" (blue globe icon), "pdf" (red document icon), "xls" (green spreadsheet icon), and "rtf" (green document icon). The "html" option is selected. At the bottom of the interface, there are buttons for "Run", "Save...", "Export...", and "Close".

- Users can customize the **Report Title**, **Report Format**, **Time Period**, add **Filters** and customize the **Display Options** as they desire

Reference: *Intro to NHSN Analysis Training Presentation for details pertaining to Modify Report*
<https://www.cdc.gov/nhsn/pdfs/training/2019/intro-nhsn-analysis-508.pdf>

Analysis Reports – Modify Report

Example:

Let's walk through an example where we will be modifying an LOS CMR report with the following selections,

- Data limited to 3 months
- Select a location of interest : NICU II
- Select Display Options

Analysis Reports – Modify Report

Modify "Rate Table - LOS Crude Monthly Risk"

Show descriptive variable names [\(Print List\)](#) Analysis Data Set: NI

Title/Format Time Period Filters Display Options

Time Period:

Beginning Ending

summaryYM 01/2021 03/2021 Clear Time Period

Enter Date variable/Time period at the time you click the Run button

Title/Format Time Period Filters Display Options

Additional Filters: Show Clear

AND OR Add group

CCN
countyName
facType
location
locationType
locCDC
locCDCDesc
LOSCMRRate
medAff
medType
numCMRDenom
numEvent
OID
orgID
OrgID_CL
state
summaryYM

equal NICU II - LEVEL 2 NICU Add rule Delete

Title/Format Time Period Filters Display Options

Rate Table Options:

Group by: Cumulative
summaryYM

Analysis Reports – Modify Report

National Healthcare Safety Network

Rate Table - LOS Crude Monthly Risk

As of: February 24, 2022 at 2:00 PM

Date Range: NEO_LOS_CRUDERISK_RATES summaryYM 2021M01 to 2021M03

if (((location = "NICU II")))

summaryYM=2021M01

orgID	location	summaryYM	numEvent	numCMRDenom	LOSCMRRate
14596	NICU II	2021M01	1	3	333.333

This report includes LOS data for 2021 and forward.

Crude Monthly Risk (CMR) rate is calculated by dividing the number of

Data contained in this report were last generated on February 8, 2022 at 6:03 P

National Healthcare Safety Network

Rate Table - LOS Crude Monthly Risk

As of: February 24, 2022 at 2:00 PM

Date Range: NEO_LOS_CRUDERISK_RATES summaryYM 2021M01 to 2021M03

if (((location = "NICU II")))

summaryYM=2021M02

orgID	location	summaryYM	numEvent	numCMRDenom	LOSCMRRate
14596	NICU II	2021M02	1	3	333.333

National Healthcare Safety Network

Rate Table - LOS Crude Monthly Risk

As of: February 24, 2022 at 2:00 PM

Date Range: NEO_LOS_CRUDERISK_RATES summaryYM 2021M01 to 2021M03

if (((location = "NICU II")))

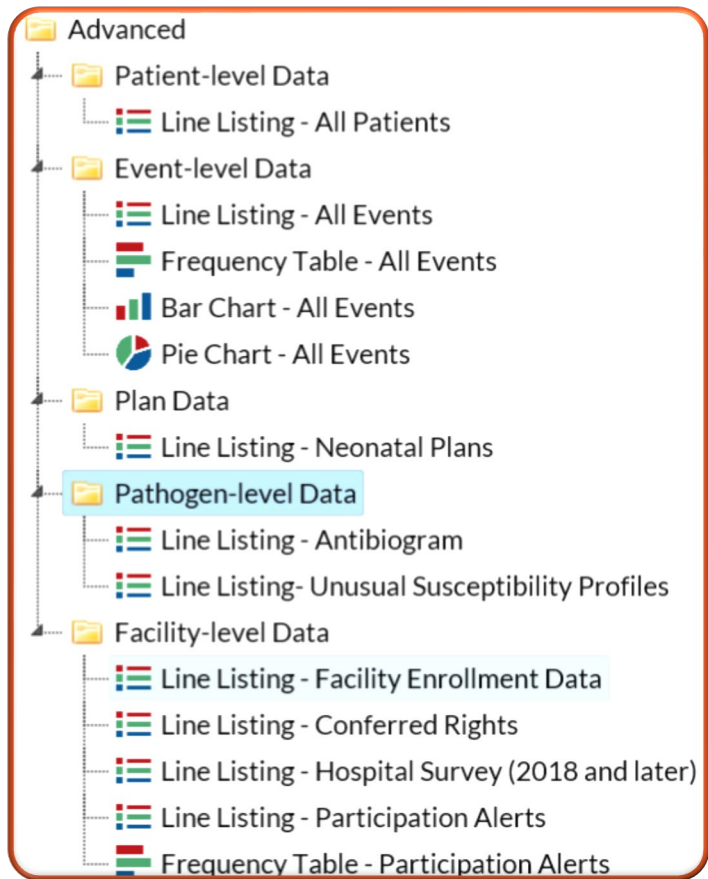
summaryYM=2021M03

orgID	location	summaryYM	numEvent	numCMRDenom	LOSCMRRate
14596	NICU II	2021M03	0	3	0

Example:

- CMR tables are organized by summary months for NICU II location between 01/2021 – 03/2021

Analysis Reports – Advanced Reports



- Advanced Analysis Reports are organized by the following sub-folders,
 - Patient-level Data
 - Event-level Data
 - Plan Data
 - Pathogen-level Data
 - Facility-level Data
- These folders can be accessed for more specific analysis reports.

Knowledge Check

What are the current metrics available for analysis in NHSN Neonatal Component?

- A. Crude Monthly Risk and Cumulative Admission Risk
- B. SIR and SUR
- C. Crude Monthly Risk, Cumulative Admission Risk and Time to Event Analysis

Knowledge Check

What are the current metrics available for analysis in NHSN Neonatal Component?

- A. Crude Monthly Risk and Cumulative Admission Risk ✓
- B. SIR and SUR
- C. Crude Monthly Risk, Cumulative Admission Risk and Time to Event Analysis

Summary

- Resolving Alerts
- Generation of Analysis Datasets
- Current Analysis Measures for LOS/MEN – CMR and CAR
- Run & Modify Reports with examples
- Interpretation of results
- Advanced Reports

Additional Resources

- LOSMEN Protocol
<https://www.cdc.gov/nhsn/pdfs/neonatal/losmen/los-men-protocol-508.pdf>
- Resources on LOS/MEN Events
<https://www.cdc.gov/nhsn/neonatal/los-men/index.html>
- Intro to NHSN Analysis
<https://www.cdc.gov/nhsn/pdfs/training/2019/intro-nhsn-analysis-508.pdf>
- How to Modify a Report <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/howtomodifyreport.pdf>

**For any questions or concerns, kindly contact the NHSN
Helpdesk at nhsn@cdc.gov;
Subject line: LOSMEN Analysis – Vaishnavi Pattabiraman**



**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.