

NHSN Analysis for Digital Quality Measures (dQM)

A Focus on the New Medication Safety Component

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Objectives



By the end of this presentation, you will be able to:

- Understand NHSN's new digital quality measures process and data flow
- Describe how the NHSN Digital Measure Reporting Plan determines data analysis reports
- Navigate and access the NHSN data analysis reports for a preview of the hypoglycemia Digital Quality Measure

Overview of NHSN Digital Quality Measures

NHSN Digital Quality Measures (dQMs) to Advance Patient Safety Surveillance

Digital Quality Measures are fully automated and based on nationally recognized standards, measurement science, benchmarking, risk-adjustment at facility and patient level.

Benefits of dQMs:

- ✓ **Reduce time** for data collection
- ✓ Provide **patient-level** data for risk adjustment and stratification
- ✓ **Remove** potential **biases** due to different interpretations
- ✓ **Adjust** measures quickly in response to changes in practices



NHSN Digital Quality Measures (dQMs) to Advance Patient Safety Surveillance

With Manual or Semi-Automated Measures	With Digital Quality Measures
Data standards are specific to the measure and the organization to which they are reported	Data are represented using nationally recognized standards across the EHR vendors, facilities, and agencies
Data are pushed (NHSN waits for the facility to transmit data)	Data can be pulled, making real-time surveillance feasible
Data are often aggregated, <i>facility</i> -level risk adjustment is typical	Data are at the patient level, <i>patient</i> -level risk adjustment is possible
Measures are pre-determined before transmission	Measures can be adapted after data transmission

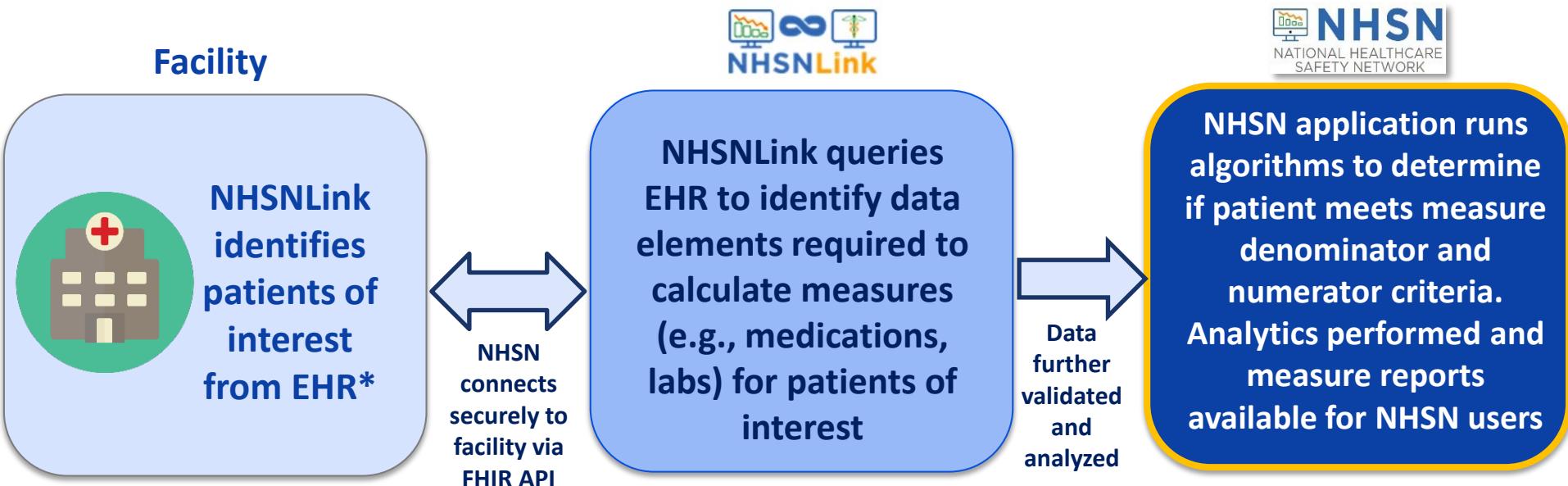
NHSNLink: NHSN's FHIR Application

- NHSN dQMs are reported via NHSNLink, NHSN's open-source public health application for FHIR reporting
- **FHIR®**: Fast Healthcare Interoperability Resources
- International standard for healthcare-data exchange, published by Health Level Seven International (HL7®)
 - A standards-based approach to accessing “patient-level” (vs. aggregated) data
 - Increasingly adopted by EHR vendors, hospitals, and government agencies
 - Most U.S. EHRs have FHIR capability, but may need to enable the FHIR API
- NHSNLink connects securely with the facility's EHR endpoint and pulls selected FHIR “resources” required for dQM calculation



HL7, CDA, FHIR, and the FHIR [FLAME DESIGN] are the registered trademarks of Health Level Seven International and their use does not constitute endorsement by HL7.

NHSN FHIR dQMs: Process Flow from EHR to NHSN



*Patients in emergency department, observation, or inpatient *location* or *status* during the measurement period

NHSNCoLabs

- The NHSN Collaborative, or NHSNCoLab, is a collaboration between public and private stakeholders to pilot, implement, and validate new NHSN healthcare surveillance measures
- Network of CDC's healthcare partners with institutional commitments, data-use agreements, and technical infrastructure already in place
- Informs feasibility and validity of new NHSN surveillance concepts





CLABSI
CAUTI
VAE
pedVAE

SSI

MDRO/CDI

AUR

Hospital
COVID, Flu

Nursing
Hours

**Glycemic control:
hypoglycemia and hyperglycemia**

New dQMs under development

Community-Onset Adult Sepsis mortality

Respiratory pathogen surveillance

Hospital-onset bacteremia and fungemia

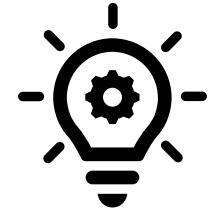
Healthcare facility-onset, antibiotic-treated *C. difficile* infection

Knowledge Check

What is one benefit of digital quality measures?
(please answer in chat)



Knowledge Check Answer



Question: What is one benefit of digital quality measures?

Answer:

All of the following are benefits of the digital quality measures:

- ✓ ***Reduce time*** for data collection (minimizes reporting burden)
- ✓ ***Provide patient-level*** data for risk adjustment and stratification
- ✓ ***Remove*** potential ***biases*** due to different interpretations (improves accuracy, validity, quality)
- ✓ ***Adjust*** measures quickly in response to changes in practices (speed & efficiency)

NHSN Digital Measure Reporting Plan

Digital Measure Reporting Plan (DMRP): Purpose

- Authorizes NHSN to query the facility's FHIR server to collect EHR data elements per the dQM protocol.
- Agreement to comply with dQM reporting requirements
 - Includes NHSN locations codes and other standardized value sets (e.g. RxNorm, LOINC etc)
- Selects the measure(s) and reporting period for data analysis reports to be available



Form Approved

OMB No. 0920-0666
Exp. Date: 12/31/2026
www.cdc.gov/nhsn

Medication Safety- Digital Measure Reporting Plan (CDC57.700)

Page 1 of 1

*required for saving

Facility ID: _____

Measure

Glycemic Control Module

Glycemic Control: Measure data are collected by facility and include all inpatient locations, emergency departments, 24-hour observation units, and IRF/IPF locations.

Hypoglycemia (HYPO)

Measure	Following	Start Month*	Start Year*	End Month	End Year
HYPO	<input type="checkbox"/>				

Digital Measure Reporting Plan

Facilities interested in reporting to one or more of NHSN's Digital Quality Measures (dQMs) must complete a Digital Measure Reporting Plan (DMRP) after they have enrolled.

- DMRP is found in both Medication Safety & Patient Safety Components
- To participate in dQMs, an Annual Survey must be completed and submitted by March 1 every year.
- After March 1st, facilities will be prevented from entering new DMRPs until the completion of applicable survey(s).

Digital Measure Reporting Plan: *Place in the Process?*

01

Facility Status

Enroll in NHSN and
activate the
Medication Safety
Component (MSC)



02

Complete

NHSN MSC Annual
Hospital Survey



03

Add

Digital Measure
Reporting Plan



Digital Measure Reporting Plan Navigation

- Navigate to “Reporting Plan”
- Select “Add”
- Select “Following” for the measure of interest
- Enter desired reporting Start Month & Year

**Example from Medication Safety Component (Patient Safety will have an additional selection screen)*

 Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

 NATIONAL HEALTHCARE SAFETY NETWORK

NHSN - National Healthcare Safety Network

Reporting Plan

Add

Find

Mandatory fields marked with *

Facility

Facility ID *:

Glycemic Control Module

Data are collected from and include all inpatient locations, ED locations, 24H Observation Unit locations, and IRF/IPF locations.

Measure	Following	Start Month *	Start Year *
Hypoglycemia Measure Reporting	<input type="checkbox"/>	<input type="button" value="▼"/>	<input type="button" value="▼"/>

Add Row

During the specified reporting period, the facility authorizes NHSN to query your facility's FHIR server to collect the specified data elements as per the NHSN Glycemic Control protocol. Based on these data, your facility will be provided with measure results reflecting glycemic event rates, as well as additional analytic and reporting options (e.g., line-level lists).

- To participate in the NHSN Glycemic Control Module, a Medication Safety Glycemic Control Annual Survey must be completed and submitted. The survey must be completed annually and submitted by the end of February. This will allow addition of reporting plans for the current year. Data will only be pulled when there is a completed annual survey.
- Completion of the reporting plan indicates that data transmitted by your facility conforms to the NHSN Glycemic Control module protocol and instructions for reporting FHIR dQMs to NHSN. This includes adherence to technical specifications for value sets (i.e., local or non-standardized codes are mapped to established value sets such as RxNorm, LOINC, and HSLOC).

Save Back

Knowledge Check

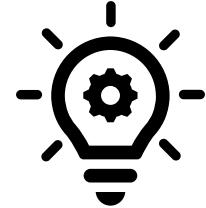
What *must* facilities complete prior to entering their Digital Measure Reporting Plan?

(please answer in chat)

- Hint: This should be completed every year before March 1st



Knowledge Check Answer

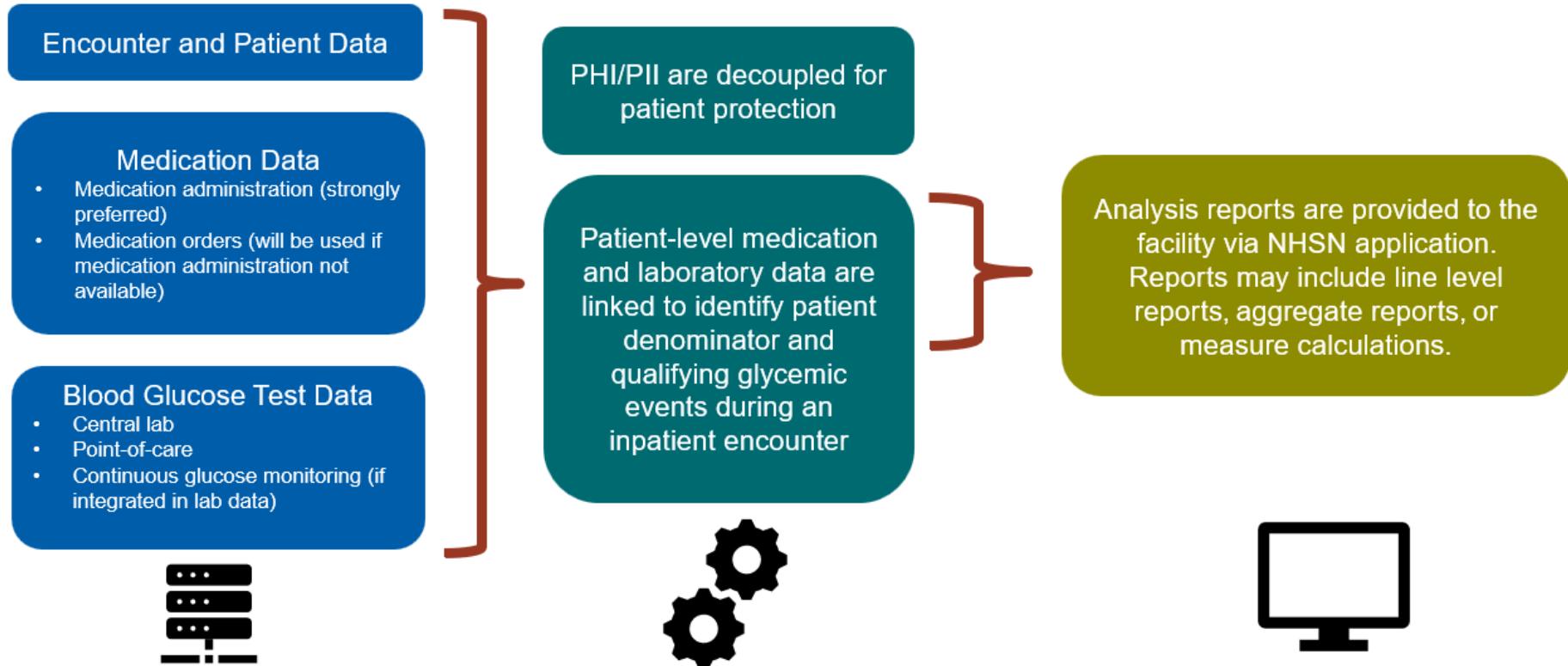


Question: What *must* facilities complete prior to entering their Digital Measure Reporting Plan?

Answer: NHSN Annual Hospital Survey

NHSN Digital Quality Measures Analysis Reports

How Data Flows to Glycemic Control Reports



NHSN dQM Analysis Reports: *What will be available?*

- Analysis reports will be available in the NHSN application as new NHSN dQMs are implemented
- Analysis reports will include metric calculations for a facility, as well as selected supplemental reports (e.g., line-level listing of events by location)
- Additional analysis reports (e.g., group user reports) will be phased in
- Glycemic Control will be the first dQM to be implemented



NHSN Glycemic Control Module - Primary Metric

Measure	Numerator	Denominator
Primary Metric: Aligned with Centers for Medicare & Medicaid Services (CMS) Reporting Requirements		
Metric 1, Hospital Harm, Severe Hypoglycemia	No. of (adult) inpatient encounters with BG <40 mg/dL preceded by hypoglycemic medication (24 hours prior)*	No. of (adult) inpatient encounters with ≥ 1 hypoglycemic medication administered**

$$\frac{\text{Total no. of adult inpatient encounters with severe hypoglycemia}}{\text{Total no. of adult inpatient encounters with } \geq 1 \text{ hypoglycemic medications administered}} \times 100$$

Note: When calculated based on medication administration data, this metric aligns with the CMS Hospital Harm—Severe Hypoglycemia measure. For hospitals that do not report medication *administration* data via FHIR, a separate metric will be calculated based on medication *request* data.

*Includes ED and Observation visits that end within 1 hour of an inpatient admission; ecqi.healthit.gov/ecqm/eh/2024/cms0816v3.

**Date/time of medication *ordered* are used when EHR vendors do not make medication administration data available via FHIR.

NHSN Glycemic Control Module - Secondary Metrics

Secondary Measures - Quality Improvement	
Metric 2, Hypoglycemia Event Days	A “hypoglycemia day” is an inpatient day (for patients of all ages) with at least one documented hypoglycemia event*
Metric 3, Recurrent Hypoglycemia Event Days	A “recurrent hypoglycemia day” is a hypoglycemic medication day (for patients of all ages) with: <ol style="list-style-type: none">1. at least one documented hypoglycemia event*2. that is preceded by another inpatient day with a hypoglycemia event within a 24-hour period. The measure will be qualified by the BG level of the first event during the original day.
Metric 4, Severe Hypoglycemia Resolution	Median time between hypoglycemia event <40 mg/dL and first BG ≥ 70 mg/dL thereafter (for patients of all ages)

*Metric 2 & 3 will be evaluated at the following Blood Glucose thresholds: <40 mg/dL, 40-53 mg/dL, and 54-69 mg/dL

NHSN Glycemic Control Module - Secondary Metrics

Secondary Measures	
Metric 2, Hypoglycemia Event Days	$\frac{\text{Total no. of hypoglycemia days per month}}{\text{Total no. of hypoglycemic medication days per month}} \times 100$
Metric 3, Recurrent Hypoglycemia Event Days	$\frac{\text{Total no. of recurrent hypoglycemia days per month}}{\text{Total no. of hypoglycemic medication days per month}} \times 100$
Metric 4, Severe Hypoglycemia Resolution	Median, in minutes (Time of BG result ≥ 70 mg/dL immediately following <40 mg/dL) – (Time of hypoglycemia event <40 mg/dL)

Types of NHSN Glycemic Control Reports

PHASE 1

Line Lists*

- All Inpatient Encounters with at least one Hypoglycemic Medication
- Severe Hypoglycemia Encounters, Adult

Rate Table*

Severe Hypoglycemia Encounters, Adult (Metric 1)

PHASE 2

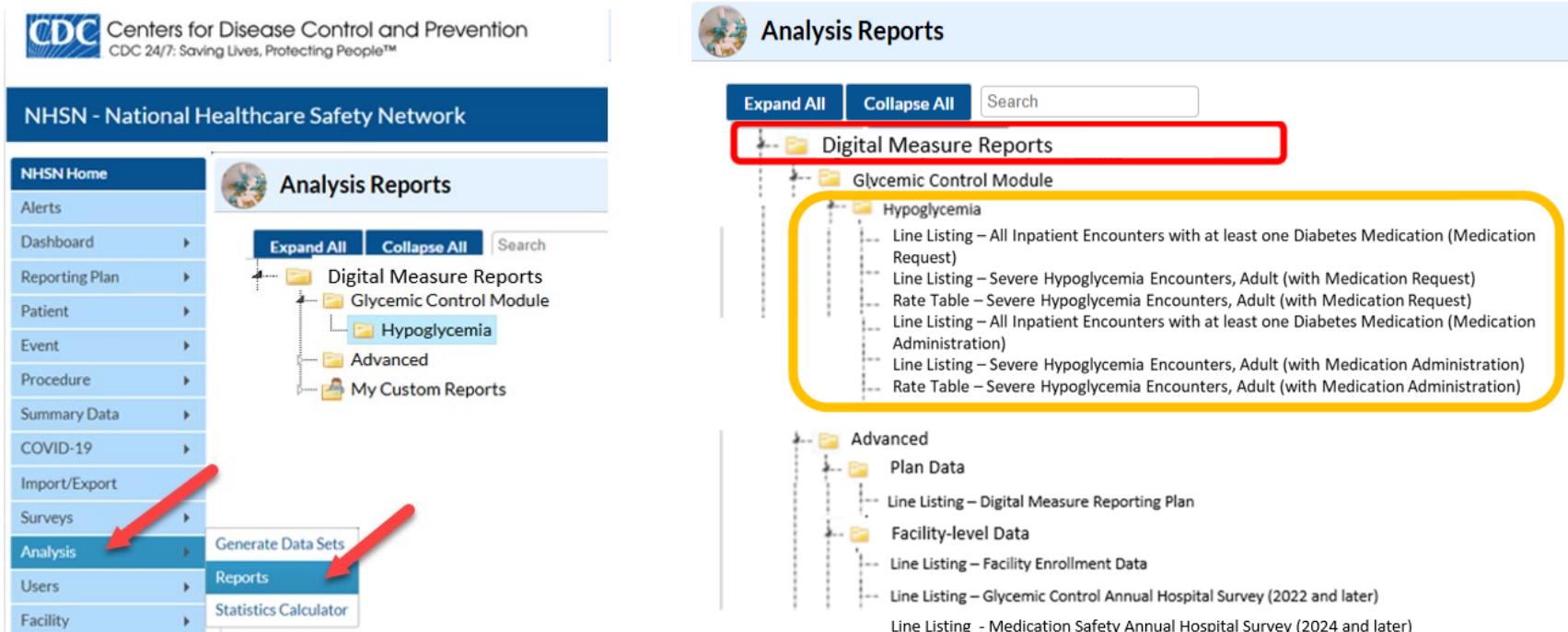
Additional Line Lists, Frequency Tables, Rate Tables, including:

- Stratified Rate Table reports for metric 1
- Calculation of all secondary metrics

*Separate reports will be generated using Medication Administration or Medication Request data, depending on which is submitted by the facility

NHSN dQM Analysis Reports: *Where*

Navigate to the “Analysis” section of the corresponding NHSN component in the application



The image shows two screenshots of the NHSN application. The left screenshot displays the main navigation menu with a red arrow pointing to the 'Analysis' section. Within the 'Analysis' section, another red arrow points to the 'Reports' sub-menu item. The right screenshot shows the 'Analysis Reports' page, which includes a search bar and buttons for 'Expand All' and 'Collapse All'. A red box highlights the 'Digital Measure Reports' section, and a yellow box highlights the 'Glycemic Control Module' section, which is expanded to show 'Hypoglycemia' and its associated reports.

NHSN - National Healthcare Safety Network

Analysis Reports

Digital Measure Reports

Glycemic Control Module

- Hypoglycemia
 - Line Listing – All Inpatient Encounters with at least one Diabetes Medication (Medication Request)
 - Line Listing – Severe Hypoglycemia Encounters, Adult (with Medication Request)
 - Rate Table – Severe Hypoglycemia Encounters, Adult (with Medication Request)
 - Line Listing – All Inpatient Encounters with at least one Diabetes Medication (Medication Administration)
 - Line Listing – Severe Hypoglycemia Encounters, Adult (with Medication Administration)
 - Rate Table – Severe Hypoglycemia Encounters, Adult (with Medication Administration)

Advanced

Plan Data

- Line Listing – Digital Measure Reporting Plan

Facility-level Data

- Line Listing – Facility Enrollment Data
- Line Listing – Glycemic Control Annual Hospital Survey (2022 and later)
- Line Listing – Medication Safety Annual Hospital Survey (2024 and later)

Line Listing - All Inpatient Encounters with >=1 Hypoglycemic Medication (Medication Request)

National Healthcare Safety Network

Line Listing - All Inpatient Encounters with >=1 Hypoglycemic Medication (including ED / OBS ending within 1 hour of Inpatient Admission)

As of:

DateRange:

Default Sort By NHSNOrgID EncRecID Default Page By: None Default Time Period (opt): (opt): Default Filters

Facility Org ID	Encounter ID	Patient ID	Admission Date	Patient Age at Encounter	Discharge Date	Hypoglycemic medication 1	Hypoglycemic medication 2	Hypoglycemic medication 3
NHSNOrgID	EncounterID	PatientID	admitDateTime	patAgeAtEnc	dischargeDateTime	hypoglycemic Medication1	hypoglycemic Medication2	hypoglycemic Medication3
99999	eYw1Th FF62bcn U9YOn9 94TA3	45698	17OCT91:14: 25:32	63	21OCT91:14: 25:32			

Data contained in this report were last generated on March 16, 2023 at 12:30PM

Data are for adult (≥ 18 years) inpatient encounters, including ED/Observation visits ending within 1 hour of an inpatient admission.

Rate Table - Severe Hypoglycemia Encounters, Adult (with Medication Request)

National Healthcare Safety Network

Rate Table for Severe Hypoglycemia Encounters, Adult (with Medication Request)

As of:

DateRange:

Time period default (opt):
XX to XX

Filters default (opt):
Variable Name

Group By default:
SummaryYM

Facility Org ID	Summary Year/Month	Severe Hypoglycemia Encounters	Hypoglycemic Medication Encounters	Percent Hypoglycemic Medication Encounters with Severe Hypoglycemia
orgID	SummaryYM	numSevereHypoEnc	numHypoglycemicMedEnc	
99999	2023M01	4	875	0.45
99999	2023M02	2	984	0.20

(1) Data contained in this report were last generated on March 16, 2023 at 12:30PM

(2) Data are for adult (≥ 18 years) inpatient encounters and ED/Observation visits ending within 1 hour of an inpatient admission. Severe hypoglycemia refers to blood glucose < 40 mg/dL events linked to medication exposure as defined in the NHSN Glycemic Control, Hypoglycemia protocol.

(3) This calculation is an approximation of the CMS eCQM 3503e, Hospital Harm – Severe Hypoglycemia measure. Hypoglycemic medication exposure in this calculation is based on medication request instances versus medication administration instances.

When will NHSN Glycemic Control Module be available?

- Anticipated to open to early adopters in 2026
- Hospitals interested in participating as an “early adopter” for the NHSN Glycemic Control can express interest here : <https://bit.ly/3VokZir>
 - Early adopters must be able to report measures to NHSN via FHIR
 - Contact your IT department to ensure that your facility is “FHIR-ready”, including:
 - FHIR Release 4 (or later) APIs deployed to Production environment
 - Compliant with U.S. Core 6.1.0
 - Permission for third-party applications to access the FHIR APIs for public health reporting
 - Check for updates on requirements here: www.cdc.gov/nhsn/fhirportal
 - Participation is contingent on NHSN release schedules and meeting technology requirements and is not guaranteed.

Summary

Summary



During this presentation, we have reviewed:

- How data flows through the NHSN dQM pipeline
- Purpose of NHSN Digital Measure Reporting Plan
- Location of NHSN data analysis reports when available

Post questions in the Annual Training Community

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 Annual Training Community, you can still email the NHSN Help Desk at nhsn@cdc.gov include **Annual Training 2025** in Subject Line

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.

