

Pioneers in Quality Expert to Expert Webinar Series

2023 Annual Updates

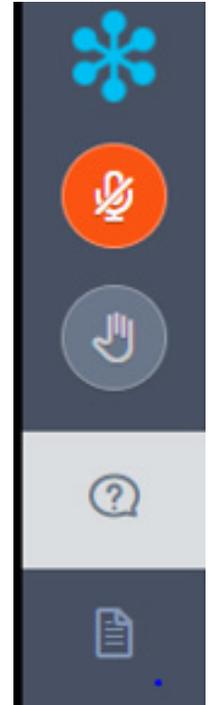
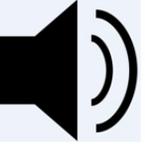
Hospital Harm - Severe Hyperglycemia CMS871v2 (HH-02)

Hospital Harm - Severe Hypoglycemia CMS816v2 (HH-01)

January 24, 2023

Webinar Audio – Information & Tips

- Audio is by VOIP only – Click the button that reads “Listen in! Click for audio.” Then use your computer speakers or headphones to listen
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- Participants are connected in **listen-only mode**
- Feedback or dropped audio are common for live streaming events. Refresh your screen or rejoin the event if this occurs.
- We will not be recognizing the Raise a Hand or Chat features.
- To ask a question, click on the Question Mark icon in the audience toolbar. A panel will open for you to type your question and submit.





Welcome!

But first things first...

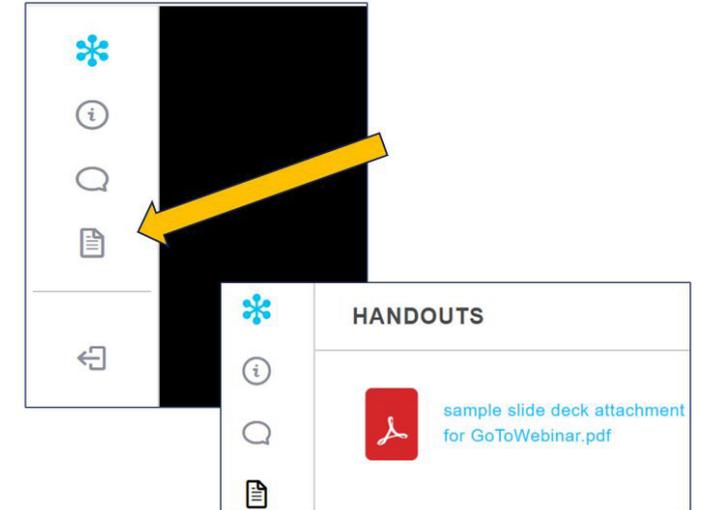
"Get Started with eCQMs"

https://ecqi.healthit.gov/ecqms?qt-tabs_ecqm=4

Slides are available now!

To access the slides:

- click the icon that looks like a document
- select the file name and the document will open in a new window
- you can print or download the slides.



Slides will also be available here within a couple weeks:

<https://www.jointcommission.org/measurement/pioneers-in-quality/pioneers-in-quality-expert-to-expert-series/>

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Learning Objectives

- ✔ Navigate to eCQI Resource Center for the measure specifications, value sets, measure flow diagrams and technical release notes
- ✔ Apply concepts learned about the logic and intent for the Glycemia eCQMs
- ✔ Prepare to implement the Glycemia eCQMs for the 2023 eCQM reporting period
- ✔ Identify common issues and questions regarding the Glycemia eCQMs

Topics Not Covered in Today's Webinar

- ✘ Basic eCQM concepts
- ✘ Topics related to chart abstracted measures
- ✘ Process improvement efforts related to this measure
- ✘ eCQM validation

Disclosure Statement

These staff and speakers have disclosed that they do not have any conflicts of interest. For example, financial arrangements, affiliations with, or ownership of organizations that provide grants, consultancies, honoraria, travel, or other benefits that would impact the presentation of today's webinar content.

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Pioneers in Quality Expert to Expert Webinar Agenda: Glycemia eCQMs

- Demonstrate navigation to measure specifications, value sets, measure flow diagrams and technical release notes
- Review changes made to the Glycemia eCQMs
- FAQs
- Facilitated Audience Q&A Segment

eCQI Resource Center Website <https://ecqi.healthit.gov/>



eCQM Resources	Short Description	Published
Implementation Checklist eCQM Annual Update	Implementation checklist ⓘ	--
Guide for Reading eCQMs 8.0 (PDF)	Assists implementers and measured entities with information on how to read eCQM specifications ⓘ	May 2022
Hospital Quality Reporting Table of eCQMs (PDF)	List of eCQMs available for use ⓘ	May 2022
eCQM Specifications for Hospital Quality Reporting (ZIP)	eCQM technical specifications ⓘ	May 2022
Measure Authoring Tool (MAT) Global Common Library (GCL) Technical Specifications and Technical Release Notes (ZIP)	MAT-CGL specifications and technical release notes ⓘ	May 2022
eCQM Value Sets?	Value sets used in eCQMs ⓘ	May 2022
EH/CAH Pre-Rulemaking Value Sets CMS334 (ZIP)	Value sets used in CMS334v4 ⓘ	May 2022
eCQM Direct Reference Codes List ⓘ	eCQM Direct Reference Codes used in eCQMs ⓘ	May 2022
Binding Parameter Specification (BPS) (ZIP) ⓘ	Value set metadata ⓘ	May 2022
eCQM Logic and Implementation Guidance v6.0 (PDF)	Assists implementers and measured entities with how to use eCQMs and report issues ⓘ	May 2022
Technical Release Notes (PDF)	Year over year changes to eCQM logic and terminology ⓘ	May 2022
Technical Release Notes (ZIP)	Year over year changes to eCQM logic and terminology ⓘ	May 2022
Standards and tool versions used for reporting period	Tools and standards versions measure developers used to create eCQMs and versions of standards and tools used for their reporting ⓘ	May 2022
eCQM Flows (ZIP)	Assists implementers and measured entities with steps to take to calculate an eCQM ⓘ	Aug 2022
2023 CMS QRDA I Implementation Guide for Hospital Quality Reporting (PDF)	Format for reporting eCQMs to CMS ⓘ	May 2022
2023 CMS QRDA I Schematrons and Sample Files (ZIP)	Rules to validate eCQM reports with samples ⓘ	May 2022
eCQM Annual Update Pre-Publication Document (PDF)	Standards and code system versions for the eCQM Annual Update ⓘ	Mar 2022



Pioneers in Quality Expert to Expert Webinar Series

2023 Annual Updates

Hospital Harm - Severe Hyperglycemia CMS871v2 (HH-02)

Hospital Harm - Severe Hypoglycemia CMS816v2 (HH-01)

Mia Nievera, MSN, RN, Senior Research Associate, eCQM Project Director

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January 24, 2023

General Measure Changes from 2022 to 2023

Location of Changes	Pre-Rulemaking PY 2022 (v1)	2023 Reporting Year (v2)
NQF Number	Not Applicable	HH-01: 3503e HH-02: 3533e
Measure Developer	IMPAQ International	American Institutes for Research
Initial population logic to calculate patient's age	Global CalendarAgeInYearsAt function used to calculate patient's age	Native CQL function AgeInYearsAt used to calculate patient's age LOINC code 21112-8 (Birth date) is no longer required and has been removed
Qualifying Encounter definition's timing logic	define Qualifying Encounters: ["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter with ["Patient Characteristic Birthdate": "Birth date"] BirthDate such that Global."CalendarAgeInYearsAt" (BirthDate.birthDatetime, start of Global."HospitalizationWithObservation" (InpatientEncounter)) >= 18 where InpatientEncounter.relevantPeriod ends during "Measurement Period"	'day of' was added to clarify the timing precision level define Qualifying Encounter: ["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter where InpatientEncounter.relevantPeriod ends during day of "Measurement Period" and AgeInYearsAt(date from start of Global."HospitalizationWithObservation"(InpatientEncounter))>= 18
Supplemental Data Elements	Gender	Replaced 'gender' with 'sex' to be consistent across eCQMs

Technical Overview

Global Common Library (GCL) Functions Used in Hypoglycemia and Hyperglycemia

Global.NormalizeInterval() function

Global.NormalizeInterval (pointInTime DateTime, period Interval<DateTime>)

- if pointInTime is not null then Interval[pointInTime, pointInTime]
else if period is not null then period
else null as Interval<DateTime>
- **QDM data types have both a relevantDatetime and relevantPeriod -**
 - Assessment, Performed
 - Device, Applied
 - Diagnostic Study, Performed
 - Intervention, Performed
 - Laboratory Test, Performed
 - Medication, Active
 - Medication, Administered
 - Medication, Dispensed
 - Physical Exam, Performed
 - Procedure, Performed
 - Substance, Administered

Global.HospitalizationWithObservation function

Global.HospitalizationWithObservation (Encounter “Encounter, Performed”)

Encounter Visit

```
let ObsVisit: Last(["Encounter, Performed": "Observation Services"]) LastObs
    where LastObs.relevantPeriod ends 1 hour or less on or before start of
Visit.relevantPeriod
    sort by end of relevantPeriod),
VisitStart: Coalesce(start of ObsVisit.relevantPeriod, start of Visit.relevantPeriod),
EDVisit: Last(["Encounter, Performed": "Emergency Department Visit"]) LastED
    where LastED.relevantPeriod ends 1 hour or less on or before VisitStart
    sort by end of relevantPeriod)
return Interval[Coalesce(start of EDVisit.relevantPeriod, VisitStart), end of Visit.relevantPeriod]
```

- Hospitalization with Observation returns the total interval from the start of any immediately prior (within 1 hour) emergency department visit through the observation visit to the discharge of the given encounter

Measure Overview

Hospital Harm – Severe Hyperglycemia CMS871v2 (HH-02)

CMS871v2 (HH-02)

Measure Description:

This measure assesses the number of inpatient hospital days with a hyperglycemic event (harm) per the total qualifying inpatient hospital days for patients 18 years of age or older at admission.

Rationale/Intent

- Assesses occurrence and extent of severe hyperglycemia; not overall glucose control
- Intended to be used in combination with its companion measure Severe Hypoglycemia to reduce unintended consequences.
- Patients with blood glucose of >200mg/dL are at high risk
- Associated with increased in-hospital mortality, infection rates, and hospital LOS
- Lowering rate improves patient care while reducing costs
- Rates of inpatient severe hyperglycemia events indicate quality of care
- Preventable with proper glycemic management

CMS871v2 (HH-02) Measure Specification Narratives

Initial Population / Denominator:

Inpatient hospitalizations where the patient is 18 years or older at the start of the admission with a discharge during the measurement period, as well as either:

- A diagnosis of diabetes that starts before or during the encounter; OR
- Administration of at least one dose of insulin or hypoglycemic medication during the encounter; OR
- Presence of at least one blood glucose value ≥ 200 mg/dL during the encounter

Denominator Exclusion:

Inpatient hospitalizations for patients with an initial blood glucose result of ≥ 1000 mg/dL anytime between 1 hour prior to the start of the encounter to 6 hours after the start of the encounter

CMS871v2 (HH-02) Measure Specification Narratives

Numerator:

Inpatient hospitalizations with a hyperglycemic event within the first 10 days of the encounter minus the first 24 hours, and minus the last period before discharge if less than 24 hours

A severe hyperglycemic event (harm) is defined as either:

- A day with at least one blood glucose value >300 mg/dL; OR
- A day where a blood glucose was not measured, and it was preceded by two consecutive days where at least one glucose value during each of the two days was ≥ 200 mg/dL

CMS871v2 (HH-02) Measure Specification Narrative

Measure Observation – Associated with the Denominator:

The total number of eligible days which match the initial population/denominator criteria.

Measure Observation – Associated with the Numerator:

The total number of days with a hyperglycemic event (harm)

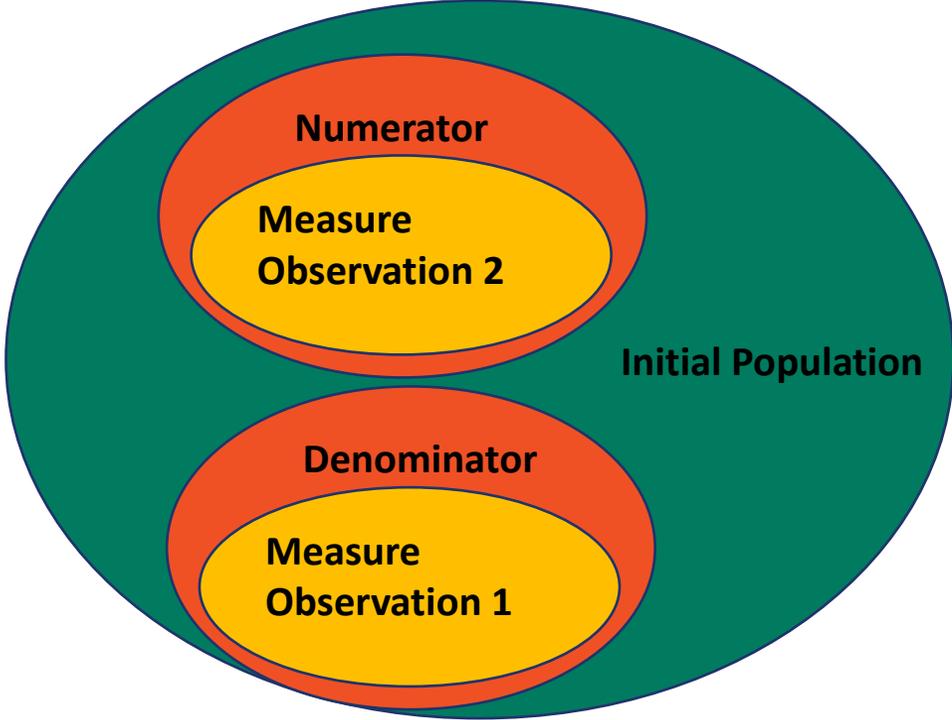
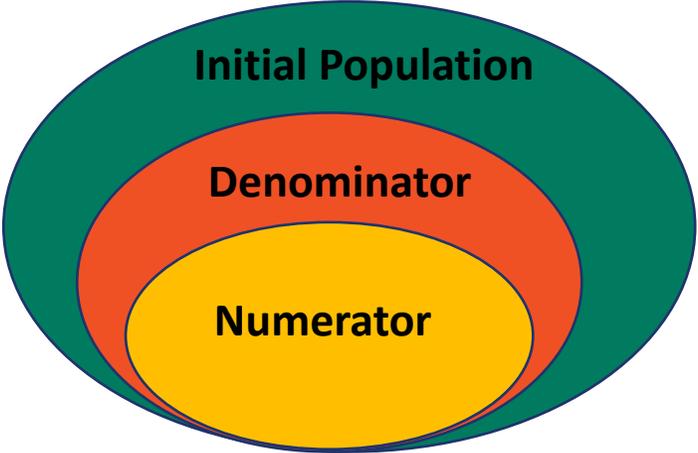
Days with a hyperglycemic event are defined as:

- a) All days with a blood glucose level >300 mg/dL (except those occurring in the first 24-hour period after admission to the hospital (including the emergency department and observation)), OR
- b) All days where a blood glucose was not measured, and it was preceded by two consecutive days where at least one glucose value during each of the two days was ≥ 200 mg/dL.

Measure Score: Proportion vs Ratio

Proportion
Numerator is a subset of Denominator

Example
Patient with stroke discharged with antithrombotic (Numerator)
Patients with stroke (Denominator)



Ratio
The top and bottom numbers of the ratio (the measure observations) come from 2 populations (the Numerator and Denominator)

Example
Number of hyperglycemic event days (Measure Observation from Numerator)
Number of eligible days across all qualifying encounters (Measure Observation from Denominator)

HH- 02 Measure Changes from 2022 to 2023 - Clinical

Measure Components	Pre-Rulemaking PY 2022 (v1)	2023 Reporting Year (v2)
Denominator Exclusion	None	Inpatient hospitalizations for patients with an initial blood glucose result of ≥ 1000 mg/dL anytime between 1 hour prior to the start of the encounter to 6 hours after the start of the encounter
Clinical Recommendation Statement	-	This statement was added to header Clinical Recommendation Statement: For patients who present with hyperglycemic crises, neurologic status must be monitored closely, with frequent re-examination. Care should be taken to prevent over-correction of hyperglycemia and hyperosmolarity following initial fluid resuscitation of these patients to prevent cerebral edema, which carries a high mortality rate. (Gosmanov et al., 2021).
Guidance	Included this statement: To calculate a hospital-level measure result, total the number of hyperglycemic days (numerator events) across the total number of eligible days (denominator) which match the initial population/denominator criteria.	The statement was revised to: To determine the measure outcome, the total number of hyperglycemic days during the inpatient hospitalization is divided by the total number of eligible hospital days of the inpatient hospitalization.

HH-02 Measure Changes from 2022 to 2023 - Technical

Measure Components	Pre-Rulemaking PY 2022 (v1)	2023 Reporting Year (v2)
Population Criteria: Numerator definition	<pre>"Pertinent Encounters With Hyperglycemic Event Days" EncounterWithEventDays where exists (EncounterWithEventDays.eligibleEventDays EligibleEventDay where EligibleEventDay.hasHyperglycemicEvent) return EncounterWithEventDays.encounter</pre>	<p>Replaced with: "Encounter With Hyperglycemic Events"</p>
Numerator logic – Interval To Day Numbers function	<pre>Interval To Day Numbers(Period Interval<DateTime>) (expand { Interval[1, days between start of Period and end of Period]}) DayExpand return end of DayExpand</pre>	<p>Replaced 'days' with 'duration in days' and changed the alias name of 'DayExpand' to 'DayNumber'</p> <pre>Interval To Day Numbers(Period Interval<DateTime>) (expand { Interval[1, duration in days between start of Period and end of Period]}) DayNumber return end of DayNumber</pre>
Measure Observation 2 (association: Numerator) logic	<pre>Count (singleton from ("Days With Hyperglycemic Events" EncounterWithEventDays where EncounterWithEventDays.encounter = QualifyingEncounter return Count(EncounterWithEventDays.eligibleEventDays EligibleEventDay where EligibleEventDay.hasHyperglycemicEvent)))</pre>	<p>Replaced the 'count' operator with 'sum' to align with measure intent</p> <pre>Sum (singleton from ("Days With Hyperglycemic Events" EncounterWithEventDays where EncounterWithEventDays.encounter = QualifyingEncounter return Count(EncounterWithEventDays.eligibleEventDays EligibleEventDay where EligibleEventDay.hasHyperglycemicEvent)))</pre>

HH-02 Measure Changes from 2022 to 2023 – Technical (cont'd)

Measure Components	Pre-Rulemaking PY 2022 (v1)	2023 Reporting Year (v2)
Renamed CQL definitions and functions to more clearly represent intent and to align with CQL style guide:	Definition: “Pertinent Encounters With Days”	Definition: “Days in Hospitalization”
	Definition: “Pertinent Encounters With Glucose Result Days”	Definition: “Days With Glucose Results”
	Definition: “Pertinent Encounters With Hyperglycemic Event Days”	Definition: “Days With Hyperglycemic Events”
	Definition: “Qualifying Encounters With Elevated Blood Glucose Lab”	Definition: “Encounter With Elevated Blood Glucose Lab”
	Definition: “Qualifying Encounters With Existing Diabetes Diagnosis”	Definition: “Encounter With Existing Diabetes Diagnosis”
	Definition: “Qualifying Encounters With Hospitalization Period”	Definition: “Encounter With Hospitalization Period”
	Definition: “Qualifying Encounters With Hypoglycemic Medication”	Definition: “Encounter With Hypoglycemic Medication”
	Function: “Crop Interval to 10 Days(Period Interval<DateTime>)”	Function: “Hospital Days Max 10(Period Interval<DateTime>)”

Initial Population – Severe Hyperglycemia CMS871v2 (HH-02)

Inpatient hospitalizations for patients age 18 and older with either:

- A diagnosis of diabetes that starts before or during the encounter

Initial Population: “Encounter With Existing Diabetes Diagnosis”

Population Definition

Encounter With Existing Diabetes Diagnosis

"Encounter With Hospitalization Period" Hospitalization

with ["Diagnosis": "Diabetes"] Diabetes

such that Diabetes.prevalencePeriod starts before end of Hospitalization.hospitalizationPeriod

return Hospitalization.encounter

Encounter With Hospitalization Period

"Qualifying Encounter" InpatientHospitalization

return Tuple { encounter: InpatientHospitalization, hospitalizationPeriod:
Global."HospitalizationWithObservation" (InpatientHospitalization) }

Qualifying Encounter

["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter

where InpatientEncounter.relevantPeriod ends during day of "Measurement Period"

and AgeInYearsAt (date from start of Global."HospitalizationWithObservation" (InpatientEncounter)) >= 18

Initial Population – Severe Hyperglycemia CMS871v2 (HH-02)

Inpatient hospitalizations for patients age 18 and older with either:

- Administration of at least one dose of insulin or hypoglycemic medication during the encounter

Initial Population: “Encounter With Hypoglycemic Medication”

Encounters With Hypoglycemic Medication

"Encounter With Hospitalization Period" Hospitalization

with ["Medication, Administered": "Hypoglycemics Treatment Medications"] HypoglycemicMed

such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod)

starts during Hospitalization.hospitalizationPeriod

return Hospitalization.encounter“

Initial Population – Severe Hyperglycemia CMS871v2 (HH-02)

Inpatient hospitalizations for patients age 18 and older with either:

- Presence of at least one blood glucose value ≥ 200 mg/dL during the encounter

Initial Population: “Encounter With Elevated Blood Glucose Lab”

Encounter With Elevated Blood Glucose Lab

"Encounters With Hospitalization Period" Hospitalization

with ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab

such that BloodGlucoseLab.relevantDatetime during Hospitalization.hospitalizationPeriod

and BloodGlucoseLab.result ≥ 200 'mg/dL'

return Hospitalization.encounter

Denominator – Severe Hyperglycemia CMS871v2 (HH-02)

Denominator: “Initial Population”

Encounter With Existing Diabetes Diagnosis

"Encounter With Hospitalization Period" Hospitalization
with ["Diagnosis": "Diabetes"] Diabetes
such that Diabetes.prevalencePeriod starts before end of Hospitalization.hospitalizationPeriod
return Hospitalization.encounter

Encounter With Hypoglycemic Medication

"Encounters With Hospitalization Period" Hospitalization
with ["Medication, Administered": "Hypoglycemics Treatment Medications"] HypoglycemicMed
such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod)
starts during Hospitalization.hospitalizationPeriod
return Hospitalization.encounter“

Encounter With Elevated Blood Glucose Lab

"Encounters With Hospitalization Period" Hospitalization
with ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab
such that BloodGlucoseLab.relevantDatetime during Hospitalization.hospitalizationPeriod
and BloodGlucoseLab.result >= 200 'mg/dL'
return Hospitalization.encounter

Denominator Exclusion – Severe Hyperglycemia CMS871v2 (HH-02)

Inpatient hospitalizations for patients with an initial glucose result of ≥ 1000 mg/dL anytime between 1 hour prior to the start of the encounter to 6 hours after the start of the encounter

Denominator Exclusion: “Encounter With First Blood Glucose Greater Than or Equal to 1000”

“Encounter With First Blood Glucose Greater Than or Equal to 1000”

“Qualifying Encounter” InpatientHospitalization

with “First Blood Glucose Within 1 Hour Prior To and 6 Hours After Encounter Start” FirstGlucoseResult such that FirstGlucoseResult.result ≥ 1000 ‘mg/dL’

“First Blood Glucose Within 1 Hour Prior To and 6 Hours After Encounter Start”

First(["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] FirstBloodGlucose with "Qualifying Encounter" InpatientEncounter such that FirstBloodGlucose.relevantDatetime during Interval[(start of Global."HospitalizationWithObservation"(InpatientEncounter)- 1 hour), (start of Global."HospitalizationWithObservation"(InpatientEncounter)+ 6 hours)] sort by relevantDatetime)

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Inpatient hospitalizations with hyperglycemic event day(s) within the first 10 days of the encounter minus the first 24 hours, and minus the last period before discharge if less than 24 hours

A hyperglycemic event is defined as:

1. A day with at least one blood glucose value >300 mg/dL; OR
2. A day where a blood glucose was not measured, and it was preceded by 2 consecutive days where at least one glucose value during each of the two days was ≥ 200 mg/dL.

Numerator: “Encounter With Hyperglycemic Events”

Encounter With Hyperglycemic Events

“Days With Hyperglycemic Events” HyperglycemicEventDays

where exists (HyperglycemicEventDays.eligibleEventDays EligibleEventDay

where EligibleEventDay.hasHyperglycemicEvent)

return HyperglycemicEventDays.encounter

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Days With Hyperglycemic Events

"Days With Glucose Results" EncounterWithResultDays

let eligibleEventDays: EncounterWithResultDays.relevantDays EncounterDay where EncounterDay.dayIndex > 1

return Tuple { **dayIndex**: EncounterDay.dayIndex, **dayPeriod**: EncounterDay.dayPeriod, **hasHyperglycemicEvent**: (EncounterDay.hasSevereResult
or (EncounterDay.hasNoGlucoseTest and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex- 2].hasElevatedResult
and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex - 3].hasElevatedResult)) }

return Tuple { encounter: EncounterWithResultDays.encounter,
relevantPeriod: EncounterWithResultDays.relevantPeriod,
eligibleEventDays: eligibleEventDays }

Days With Glucose Results

"Days in Hospitalization" InpatientHospitalDays

return Tuple {encounter: InpatientHospitalDays.encounter, relevantPeriod: InpatientHospitalDays.relevantPeriod, relevantDays:
(InpatientHospitalDays.relevantDays EncounterDay

return Tuple {**dayIndex**: EncounterDay.dayIndex, **dayPeriod**: EncounterDay.dayPeriod, **hasSevereResult**: exists (["Laboratory Test, Performed":
"Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1 where BloodGlucoseLab1.result > 300 'mg/dL' and
BloodGlucoseLab1.relevantDatetime during EncounterDay.dayPeriod), **hasElevatedResult**: exists (["Laboratory Test, Performed": "Glucose
Lab Test Mass Per Volume"] BloodGlucoseLab2 where BloodGlucoseLab2.result >= 200 'mg/dL' and BloodGlucoseLab2.relevantDatetime
during EncounterDay.dayPeriod), **hasNoGlucoseTest**: not exists (["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"]
BloodGlucoseLab3 where BloodGlucoseLab3.relevantDatetime during EncounterDay.dayPeriod)}}

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Days in Hospitalization

```
"Initial Population" EligibleInpatientHospitalization
let period: Global."HospitalizationWithObservation" ( EligibleInpatientHospitalization ), relevantPeriod: "Hospital Days Max 10"(period)
return Tuple {encounter: EligibleInpatientHospitalization, hospitalizationPeriod: period, relevantPeriod: relevantPeriod, relevantDays: "Days In Period"(relevantPeriod) }
```

Hospital Days Max 10(Period Interval<DateTime>)

```
Interval[start of Period, Min({
end of Period, start of Period + 10 days })]
```

Days In Period(Period Interval<DateTime>)

```
( "Interval To Day Numbers"(Period)) DayIndex
let startPeriod: start of Period + ( 24 hours * ( DayIndex - 1 ) ),
endPeriod: if ( hours between startPeriod and end of Period < 24 ) then startPeriod
else start of Period + ( 24 hours * DayIndex )
return Tuple { dayIndex: DayIndex, dayPeriod: Interval [startPeriod, endPeriod) }
```



Interval To Day Numbers(Period Interval<DateTime>)

```
( expand { Interval[1, days between start of Period and
end of Period]} ) DayNumber
return end of DayNumber
```

Encounter start: 7/20/22 9:00am
 Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end
1	7/20 9:00am – 7/21 8:59am
2	7/21 9:00am – 7/22 8:59am
3	7/22 9:00am – 7/23 8:59am
4	7/23 9:00am – 7/24 8:59am
5	7/24 9:00am – 7/25 8:59am
6	7/25 9:00am – 7/26 8:59am
7	7/26 9:00am – 7/27 8:59am
8	7/27 9:00am – 7/28 8:59am
9	7/28 9:00am – 7/29 8:59am
10	7/29 9:00am – 7/30 8:59am

LOS crops at 10 days max



Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Days With Hyperglycemic Events

"Days With Glucose Results" EncounterWithResultDays

```
let eligibleEventDays: EncounterWithResultDays.relevantDays EncounterDay where EncounterDay.dayIndex > 1
```

```
return Tuple { dayIndex: EncounterDay.dayIndex, dayPeriod: EncounterDay.dayPeriod, hasHyperglycemicEvent: ( EncounterDay.hasSevereResult  
or (EncounterDay.hasNoGlucoseTest and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex- 2].hasElevatedResult  
and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex - 3].hasElevatedResult ) ) }
```

```
return Tuple { encounter: EncounterWithResultDays.encounter, relevantPeriod: EncounterWithResultDays.relevantPeriod, eligibleEventDays:  
eligibleEventDays }
```

Days With Glucose Results

"Days in Hospitalization" InpatientHospitalDays

```
return Tuple {encounter: InpatientHospitalDays.encounter, relevantPeriod: InpatientHospitalDays.relevantPeriod,  
relevantDays: (InpatientHospitalDays.relevantDays EncounterDay
```

```
return Tuple {dayIndex: EncounterDay.dayIndex, dayPeriod: EncounterDay.dayPeriod,
```

```
hasSevereResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1 where  
BloodGlucoseLab1.result > 300 'mg/dL' and BloodGlucoseLab1.relevantDatetime during EncounterDay.dayPeriod),
```

```
hasElevatedResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab2 where  
BloodGlucoseLab2.result >= 200 'mg/dL' and BloodGlucoseLab2.relevantDatetime during EncounterDay.dayPeriod),
```

```
hasNoGlucoseTest: not exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab3 where  
BloodGlucoseLab3.relevantDatetime during EncounterDay.dayPeriod )}}
```

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Days With Glucose Results

"Days in Hospitalization" InpatientHospitalDays

```
return Tuple {encounter: InpatientHospitalDays.encounter, relevantPeriod: InpatientHospitalDays.relevantPeriod, relevantDays:  
(InpatientHospitalDays.relevantDays EncounterDay return Tuple {dayIndex: EncounterDay.dayIndex, dayPeriod: EncounterDay.dayPeriod,  
hasSevereResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1 where  
BloodGlucoseLab1.result > 300 'mg/dL' and BloodGlucoseLab1.relevantDatetime during EncounterDay.dayPeriod),  
hasElevatedResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab2 where  
BloodGlucoseLab2.result >= 200 'mg/dL' and BloodGlucoseLab2.relevantDatetime during EncounterDay.dayPeriod),  
hasNoGlucoseTest: not exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab3 where  
BloodGlucoseLab3.relevantDatetime during EncounterDay.dayPeriod )}}
```

Encounter start: 7/20/22 9:00am
Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end	Glucose Results
1	7/20 9:00am – 7/21 8:59am	Glucose result = 320
2	7/21 9:00am – 7/22 8:59am	
3	7/22 9:00am – 7/23 8:59am	Glucose result = 310
4	7/23 9:00am – 7/24 8:59am	Glucose result = 190
5	7/24 9:00am – 7/25 8:59am	
6	7/25 9:00am – 7/26 8:59am	Glucose result = 201
7	7/26 9:00am – 7/27 8:59am	Glucose result = 220
8	7/27 9:00am – 7/28 8:59am	
9	7/28 9:00am – 7/29 8:59am	
10	7/29 9:00am – 7/30 8:59am	Glucose result = 299

LOS crops at 10 days max

Has Severe Result: DayIndex- 1, 3

Has Elevated Result: DayIndex- 1, 3, 6,7,10

Has No Glucose Test: DayIndex- 2,5,8, 9

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Days With Hyperglycemic Events

"Days With Glucose Results" EncounterWithResultDays

```
let eligibleEventDays: EncounterWithResultDays.relevantDays EncounterDay where EncounterDay.dayIndex > 1
```

```
return Tuple { dayIndex: EncounterDay.dayIndex, dayPeriod: EncounterDay.dayPeriod,
```

```
  hasHyperglycemicEvent: ( EncounterDay.hasSevereResult or (EncounterDay.hasNoGlucoseTest and
```

```
    EncounterWithResultDays.relevantDays[EncounterDay.dayIndex- 2].hasElevatedResult
```

```
    and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex - 3].hasElevatedResult ) ) }
```

```
return Tuple { encounter: EncounterWithResultDays.encounter, relevantPeriod: EncounterWithResultDays.relevantPeriod,
```

```
  eligibleEventDays: eligibleEventDays }
```

Days With Glucose Results

"Days in Hospitalization" InpatientHospitalDays

```
return Tuple {encounter: InpatientHospitalDays.encounter, relevantPeriod: InpatientHospitalDays.relevantPeriod,
```

```
  relevantDays: (InpatientHospitalDays.relevantDays EncounterDay
```

```
return Tuple {dayIndex: EncounterDay.dayIndex,
```

```
  dayPeriod: EncounterDay.dayPeriod,
```

```
  hasSevereResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1 where
```

```
    BloodGlucoseLab1.result > 300 'mg/dL' and BloodGlucoseLab1.relevantDatetime during EncounterDay.dayPeriod),
```

```
  hasElevatedResult: exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab2 where
```

```
    BloodGlucoseLab2.result >= 200 'mg/dL' and BloodGlucoseLab2.relevantDatetime during EncounterDay.dayPeriod),
```

```
  hasNoGlucoseTest: not exists ( ["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab3 where
```

```
    BloodGlucoseLab3.relevantDatetime during EncounterDay.dayPeriod )}}
```

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Hyperglycemic Events Criteria:

1. A day with at least one blood glucose value >300 mg/dL

Encounter start: 7/20/22 9:00am

Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end	Eligible Days	Glucose Results	Hyperglycemic Event Days
1	7/20 9:00am – 7/21 8:59am	1st 24 hrs is not eligible	Glucose result = 320	
2	7/21 9:00am – 7/22 8:59am	Eligible day 1		
3	7/22 9:00am – 7/23 8:59am	Eligible day 2	Glucose result = 310	true
4	7/23 9:00am – 7/24 8:59am	Eligible day 3	Glucose result = 190	
5	7/24 9:00am – 7/25 8:59am	Eligible day 4		
6	7/25 9:00am – 7/26 8:59am	Eligible day 5	Glucose result = 201	
7	7/26 9:00am – 7/27 8:59am	Eligible day 6	Glucose result = 220	
8	7/27 9:00am – 7/28 8:59am	Eligible day 7	No glucose result	true
9	7/28 9:00am – 7/29 8:59am	Eligible day 8		
10	7/29 9:00am – 7/30 8:59am	Eligible day 9	Glucose result = 299	

Has Severe Result:
DayIndex 1
DayIndex 3

LOS crops at 10 days max

Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Hyperglycemic Events Criteria:

2. A day where a blood glucose was not measured, and it was preceded by 2 consecutive days where at least one glucose value during each of the two days was ≥ 200 mg/dL.

Encounter start: 7/20/22 9:00am

Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end	Eligible Days	Glucose Results	Hyperglycemic Event Days
1	7/20 9:00am – 7/21 8:59am	1st 24 hrs is not eligible	Glucose result = 320	
2	7/21 9:00am – 7/22 8:59am	Eligible day 1		
3	7/22 9:00am – 7/23 8:59am	Eligible day 2	Glucose result = 310	true
4	7/23 9:00am – 7/24 8:59am	Eligible day 3	Glucose result = 190	
5	7/24 9:00am – 7/25 8:59am	Eligible day 4		
6	7/25 9:00am – 7/26 8:59am	Eligible day 5	Glucose result = 201	
7	7/26 9:00am – 7/27 8:59am	Eligible day 6	Glucose result = 220	
8	7/27 9:00am – 7/28 8:59am	Eligible day 7	No glucose result	true
9	7/28 9:00am – 7/29 8:59am	Eligible day 8		
10	7/29 9:00am – 7/30 8:59am	Eligible day 9	Glucose result = 299	

LOS crops at 10 days max

Has No Glucose Test:

- DayIndex 2
- DayIndex 5
- DayIndex 8
- DayIndex 9

Has Elevated Result:

- DayIndex 1
- DayIndex 3
- DayIndex 6
- DayIndex 7
- Dayindex 10

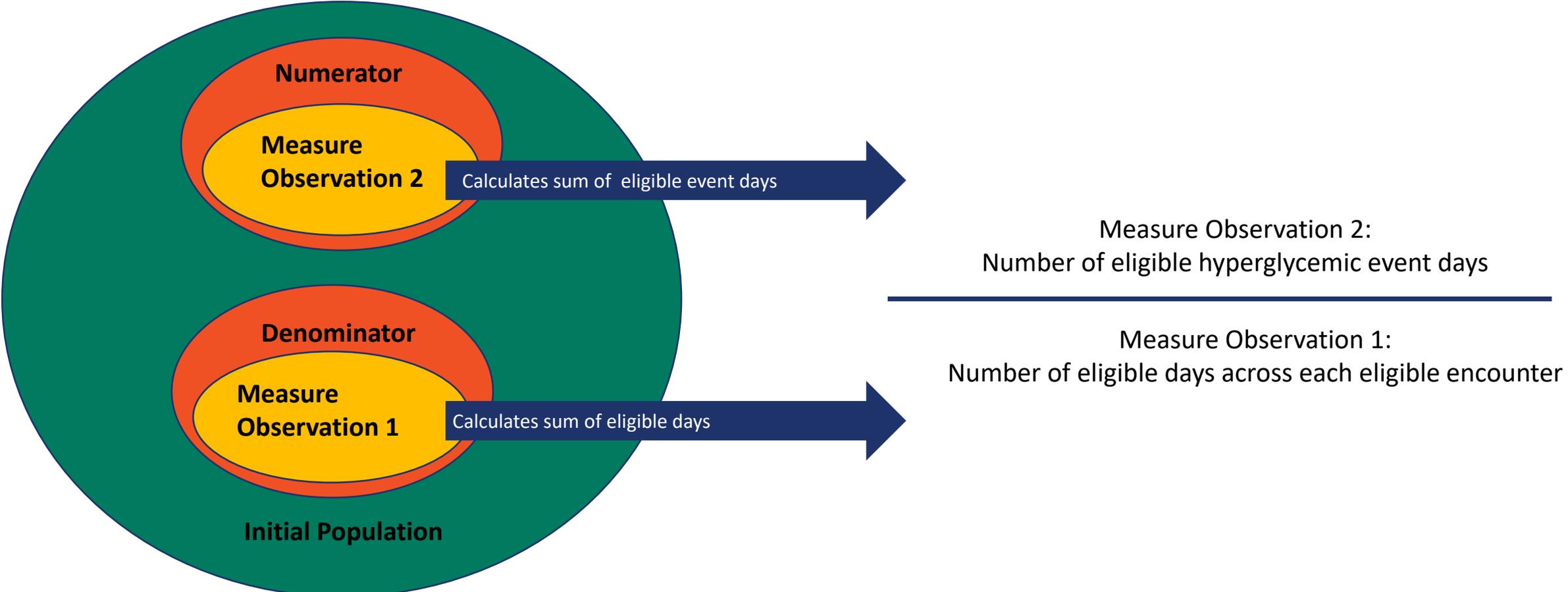
Numerator– Severe Hyperglycemia CMS871v2 (HH-02)

Numerator: “Encounter With Hyperglycemic Events”

Encounter With Hyperglycemic Events

```
"Days With Hyperglycemic Events" HyperglycemicEventDays  
  where exists ( HyperglycemicEventDays.eligibleEventDays EligibleEventDay  
    where EligibleEventDay.hasHyperglycemicEvent )  
  return HyperglycemicEventDays.encounter
```

Measure Observation Calculation – Severe Hyperglycemia CMS871v2 (HH-02)



Measure Observation 1 – Severe Hyperglycemia CMS871v2 (HH-02)

The total number of qualifying days which match the initial population/denominator criteria.

Measure Observation 1 (Association: Denominator):

```
Sum (singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays where  
EncounterWithEventDays.encounter = QualifyingEncounter  
return Count(EncounterWithEventDays.eligibleEventDays)))
```

Measure Observation 1

```
Sum (singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays  
where EncounterWithEventDays.encounter = QualifyingEncounter  
return Count(EncounterWithEventDays.eligibleEventDays)))
```

Denominator Observation Function

```
singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays  
where EncounterWithEventDays.encounter = QualifyingEncounter  
return Count(EncounterWithEventDays.eligibleEventDays)
```

Measure Observation 1– Severe Hyperglycemia CMS871v2 (HH-02)

Days in Hospitalization

"Initial Population" EligibleInpatientHospitalization

let period: Global."HospitalizationWithObservation" (EligibleInpatientHospitalization),
 relevantPeriod: "Hospital Days Max 10"(period)

return Tuple {encounter: EligibleInpatientHospitalization, hospitalizationPeriod: period,
 relevantPeriod: relevantPeriod, relevantDays: "Days In Period"(relevantPeriod) }

Encounter start: 7/20/22 9:00am

Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end	Eligible Days	Glucose Results	Hyperglycemic Event Days
1	7/20 9:00am – 7/21 8:59am	1 st 24 hrs is not eligible	Glucose result = 320	
2	7/21 9:00am – 7/22 8:59am	Eligible day 1		
3	7/22 9:00am – 7/23 8:59am	Eligible day 2	Glucose result = 310	true
4	7/23 9:00am – 7/24 8:59am	Eligible day 3	Glucose result = 190	
5	7/24 9:00am – 7/25 8:59am	Eligible day 4		
6	7/25 9:00am – 7/26 8:59am	Eligible day 5	Glucose result = 201	
7	7/26 9:00am – 7/27 8:59am	Eligible day 6	Glucose result = 220	
8	7/27 9:00am – 7/28 8:59am	Eligible day 7	No glucose result	true
9	7/28 9:00am – 7/29 8:59am	Eligible day 8		
10	7/29 9:00am – 7/30 8:59am	Eligible day 9	Glucose result = 299	

LOS crops at 10 days max

Denominator Measure Observation: 9 days

Measure Observation 2 – Severe Hyperglycemia CMS871v2 (HH-02)

Associated with the Numerator: The total number of hyperglycemic days during the inpatient hospitalization

Measure Observation 2 (Association: Numerator):

```
Sum (singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays
  where EncounterWithEventDays.encounter = QualifyingEncounter
  return Count(EncounterWithEventDays.eligibleEventDays EligibleEventDay where EligibleEventDay.hasHyperglycemicEvent)))
```

Measure Observation 2 (Association: Numerator):

```
Sum (singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays
  where EncounterWithEventDays.encounter = QualifyingEncounter
  return Count(EncounterWithEventDays.eligibleEventDays EligibleEventDay where
  EligibleEventDay.hasHyperglycemicEvent)))
```

Numerator Observation function

```
singleton from ( "Days With Hyperglycemic Events" EncounterWithEventDays
  where EncounterWithEventDays.encounter = QualifyingEncounter
  return Count(EncounterWithEventDays.eligibleEventDays EligibleEventDay
  where EligibleEventDay.hasHyperglycemicEvent))
```

Measure Observation 2– Severe Hyperglycemia CMS871v2 (HH-02)

Days With Hyperglycemic Events

"Days With Glucose Results" EncounterWithResultDays

let eligibleEventDays: EncounterWithResultDays.relevantDays EncounterDay where EncounterDay.dayIndex > 1

return Tuple { dayIndex: EncounterDay.dayIndex, dayPeriod: EncounterDay.dayPeriod, hasHyperglycemicEvent: (EncounterDay.hasSevereResult or (EncounterDay.hasNoGlucoseTest and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex- 2].hasElevatedResult and EncounterWithResultDays.relevantDays[EncounterDay.dayIndex - 3].hasElevatedResult)) } return Tuple { encounter: EncounterWithResultDays.encounter, relevantPeriod: EncounterWithResultDays.relevantPeriod, eligibleEventDays: eligibleEventDays }

Encounter start: 7/20/22 9:00am

Encounter end: 8/02/22 10:00am

dayIndex	24-hour Intervals start & end	Eligible Days	Glucose Results	Hyperglycemic Event Days
1	7/20 9:00am – 7/21 8:59am	1st 24 hrs is not eligible	Glucose result = 320	
2	7/21 9:00am – 7/22 8:59am	Eligible day 1		
3	7/22 9:00am – 7/23 8:59am	Eligible day 2	Glucose result = 310	true
4	7/23 9:00am – 7/24 8:59am	Eligible day 3	Glucose result = 190	
5	7/24 9:00am – 7/25 8:59am	Eligible day 4		
6	7/25 9:00am – 7/26 8:59am	Eligible day 5	Glucose result = 201	
7	7/26 9:00am – 7/27 8:59am	Eligible day 6	Glucose result = 220	
8	7/27 9:00am – 7/28 8:59am	Eligible day 7	No glucose result	true
9	7/28 9:00am – 7/29 8:59am	Eligible day 8		
10	7/29 9:00am – 7/30 8:59am	Eligible day 9	Glucose result = 299	

LOS crops at 10 days max

Numerator Measure Observation: 2 days

Severe Hyperglycemia CMS871v2 (HH-02) - Measure Observation Example

Use Case:

- When does dayIndex 1 begin?
- Does 7/20 count as a hyperglycemic event day because it has a glucose result >300?

Encounter start: 7/20/22 9:00am

Encounter end: 7/24/22 9:00am

dayIndex	Day Period	Glucose Results	Hyperglycemic Event Days
1	7/20 9:00am – 7/21 8:59am	Glucose result = 301	
2	7/21 9:00am – 7/22 8:59am	Glucose result = 220	
3	7/22 9:00am – 7/23 8:59am		True
4	7/23 9:00am – 7/24 8:59am	Glucose result = 120	
5	7/24 9:00am – 7/25 8:59am		

Measure Overview

Hospital Harm – Severe Hypoglycemia CMS816v2 (HH-01)

Rationale/Intent- Severe Hypoglycemia CMS816v2 (HH-01)

Description:

Inpatient hospitalizations for patients 18 years of age or older at admission, who were administered at least one hypoglycemic medication during the encounter and who suffer the harm of a severe hypoglycemic event during the encounter

Rational/Intent:

Severe Hypoglycemia is a hospital harm event

- One of the most common adverse drug events
- Rates of inpatient hypoglycemia events indicate quality of care
- Preventable by careful use antihyperglycemic medications

Goals:

- Improve safety for patients at risk
- Track and trend performance
- Drive implementation of best practices

Hospital Harm – Severe Hypoglycemia CMS816v2 (HH-01)

Initial Population / Denominator:

Population

Inpatient hospitalizations where the patient is 18 years of age or older at the start of the encounter, and at least one hypoglycemic medication was administered during the encounter.

Numerator:

Inpatient hospitalizations where a severe hypoglycemic event occurred during the encounter, which is:

1. A blood glucose result less than 40 mg/dL

AND

2. A hypoglycemic medication administered within 24 hours prior to the start of the severe hypoglycemic event (i.e., the glucose result less than 40 mg/dL)

AND

3. No subsequent repeat test for blood glucose with a result greater than 80 mg/dL within five minutes of the start of the initial blood glucose test with result less than 40mg/dL

Only the first qualifying severe hypoglycemic event is counted in the numerator, and only one severe hypoglycemic event is counted per encounter. The 24-hour and 5-minute timeframes are based on the time the blood glucose was drawn, as this reflects the time the patient was experiencing that specific blood glucose level

HH-01 Measure Changes from 2022 to 2023 – Technical

Measure Components	Pre-Rulemaking PY 2022 (v1)	2023 Reporting Year (v2)
Renamed CQL definitions to more clearly represent intent and to align with CQL style guide:	“Qualifying Encounter with Hypoglycemic Medication Administration”	“Encounter With Hypoglycemic Medication Administration”
	“Severe Hypoglycemic Harm Event”	“Encounter With Severe Hypoglycemic Harm Event”

Initial Population – Severe Hypoglycemia CMS816v2 (HH-02)

Inpatient hospitalizations for patients age 18 and older and at least one hypoglycemic medication was administered during the encounter.

Initial Population: "Encounter With Hypoglycemic Medication Administration"

Encounter With Hypoglycemic Medication Administration

"Qualifying Encounter" InpatientEncounter

with "Hypoglycemic Medication Administration" HypoglycemicMed

such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts during Global.HospitalizationWithObservation (InpatientEncounter)

Qualifying Encounter

["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter

where InpatientEncounter.relevantPeriod ends during day of "Measurement Period"

and AgeInYearsAt(date from start of Global."HospitalizationWithObservation"(InpatientEncounter))>= 18

Hypoglycemic Medication Administration

["Medication, Administered": "Hypoglycemics Severe Hypoglycemia"]

Denominator– Severe Hypoglycemia CMS816v2 (HH-02)

Inpatient hospitalizations for patients age 18 and older and at least one hypoglycemic medication was administered during the encounter.

Denominator: “Initial Population”

Encounter With Hypoglycemic Medication Administration

"Qualifying Encounter" InpatientEncounter

with "Hypoglycemic Medication Administration" HypoglycemicMed

such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts during Global.HospitalizationWithObservation (InpatientEncounter)

Qualifying Encounter

["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter

where InpatientEncounter.relevantPeriod ends during day of "Measurement Period"

and AgeInYearsAt(date from start of Global."HospitalizationWithObservation"(InpatientEncounter))>= 18

Hypoglycemic Medication Administration

["Medication, Administered": "Hypoglycemics Severe Hypoglycemia"]

Numerator– Severe Hypoglycemia CMS816v2 (HH-01)

Inpatient hospitalizations where a severe hypoglycemic event occurred during the encounter, which is:

1. A severe hypoglycemic event during the encounter, defined as a test (laboratory or point-of-care (POC)) for blood glucose with a result <40 mg/dL
2. A hypoglycemic medication administered within 24 hours prior to the start of the severe hypoglycemic event and during the encounter
3. No subsequent repeat test for blood glucose with a result > 80 mg/dL within five minutes of the start of the initial low blood glucose test.

Numerator: “Encounter With Severe Hypoglycemic Harm Event”

Numerator– Severe Hypoglycemia CMS816v2 (HH-01)

1. A severe hypoglycemic event during the encounter, defined as a test (laboratory or point-of-care (POC)) for blood glucose with a result <40 mg/dL

Numerator: “Encounter With Severe Hypoglycemic Harm Event”

“Encounter With Hypoglycemic Medication Administration ” QualifyingEncounter
where exists (["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1
with ["Medication, Administered": "Hypoglycemics Severe Hypoglycemia"] HypoglycemicMed
such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts
24 hours or less before or on BloodGlucoseLab1.relevantDatetime
and Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts
during Global."HospitalizationWithObservation" (QualifyingEncounter)
without ["Laboratory Test, Performed": "Glucose lab test"] BloodGlucoseLab2
such that BloodGlucoseLab2.relevantDatetime during Global."HospitalizationWithObservation"
(QualifyingEncounter)
and BloodGlucoseLab2.relevantDatetime 5 minutes or less after BloodGlucoseLab1.relevantDatetime
and BloodGlucoseLab2.result > 80 'mg/dL'
where BloodGlucoseLab1.relevantDatetime during Global."HospitalizationWithObservation" (QualifyingEncounter)
and BloodGlucoseLab1.result < 40 'mg/dL')

Numerator– Severe Hypoglycemia CMS816v2 (HH-01)

2. A hypoglycemic medication administered within 24 hours prior to the start of the severe hypoglycemic event and during the encounter

Numerator: “Encounter With Severe Hypoglycemic Harm Event”

“Encounter With Hypoglycemic Medication Administration” QualifyingEncounter
where exists (["Laboratory Test, Performed": "Glucose Lab Test Mass Per Volume"] BloodGlucoseLab1
with ["Medication, Administered": "Hypoglycemics Severe Hypoglycemia"] HypoglycemicMed
such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts
24 hours or less before or on BloodGlucoseLab1.relevantDatetime
and Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts
during Global."HospitalizationWithObservation" (QualifyingEncounter)
without ["Laboratory Test, Performed": "Glucose lab test"] BloodGlucoseLab2
such that BloodGlucoseLab2.relevantDatetime during Global."HospitalizationWithObservation"
(QualifyingEncounter)
and BloodGlucoseLab2.relevantDatetime 5 minutes or less after BloodGlucoseLab1.relevantDatetime
and BloodGlucoseLab2.result > 80 'mg/dL'
where BloodGlucoseLab1.relevantDatetime during Global."HospitalizationWithObservation" (QualifyingEncounter)
and BloodGlucoseLab1.result < 40 'mg/dL')

Numerator– Severe Hypoglycemia CMS816v2 (HH-01)

3. No subsequent repeat test for blood glucose with a result > 80 mg/dL within five minutes of the start of the initial low blood glucose test.

Numerator: “Encounter With Severe Hypoglycemic Harm Event”

“Encounter With Hypoglycemic Medication Administration” QualifyingEncounter where exists (["Laboratory Test, Performed": "Glucose lab test"] BloodGlucoseLab1 with ["Medication, Administered": "Hypoglycemics Severe Hypoglycemia"] HypoglycemicMed such that Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts 24 hours or less before or on BloodGlucoseLab1.relevantDatetime and Global."NormalizeInterval" (HypoglycemicMed.relevantDatetime, HypoglycemicMed.relevantPeriod) starts during Global."HospitalizationWithObservation" (QualifyingEncounter) without ["Laboratory Test, Performed": "Glucose lab test"] BloodGlucoseLab2 such that BloodGlucoseLab2.relevantDatetime during Global."HospitalizationWithObservation" (QualifyingEncounter) and BloodGlucoseLab2.relevantDatetime 5 minutes or less after BloodGlucoseLab1.relevantDatetime and BloodGlucoseLab2.result > 80 'mg/dL' where BloodGlucoseLab1.relevantDatetime during Global."HospitalizationWithObservation" (QualifyingEncounter) and BloodGlucoseLab1.result < 40 'mg/dL')

The Office of the National Coordinator for Health Information Technology (ONC) Project Tracking Website- Issue Tickets

Jira Issue Links	Jira Issue Links
https://oncprojecttracking.healthit.gov/support/browse/CQM-4797	https://oncprojecttracking.healthit.gov/support/browse/CQM-5379
https://oncprojecttracking.healthit.gov/support/browse/CQM-5028	https://oncprojecttracking.healthit.gov/support/browse/CQM-5415
https://oncprojecttracking.healthit.gov/support/browse/CQM-5139	https://oncprojecttracking.healthit.gov/support/browse/CQM-5421
https://oncprojecttracking.healthit.gov/support/browse/CQM-5145	https://oncprojecttracking.healthit.gov/support/browse/CQM-5433
https://oncprojecttracking.healthit.gov/support/browse/CQM-5146	https://oncprojecttracking.healthit.gov/support/browse/CQM-5437
https://oncprojecttracking.healthit.gov/support/browse/CQM-5158	https://oncprojecttracking.healthit.gov/support/browse/CQM-5503
https://oncprojecttracking.healthit.gov/support/browse/CQM-5176	https://oncprojecttracking.healthit.gov/support/browse/CQM-5526
https://oncprojecttracking.healthit.gov/support/browse/CQM-5178	https://oncprojecttracking.healthit.gov/support/browse/CQM-5566
https://oncprojecttracking.healthit.gov/support/browse/CQM-5204	https://oncprojecttracking.healthit.gov/support/browse/CQM-5579
https://oncprojecttracking.healthit.gov/support/browse/CQM-5205	https://oncprojecttracking.healthit.gov/support/browse/CQM-5619
https://oncprojecttracking.healthit.gov/support/browse/CQM-5208	https://oncprojecttracking.healthit.gov/support/browse/CQM-5622
https://oncprojecttracking.healthit.gov/support/browse/CQM-5218	https://oncprojecttracking.healthit.gov/support/browse/CQM-5685
https://oncprojecttracking.healthit.gov/support/browse/CQM-5271	https://oncprojecttracking.healthit.gov/support/browse/CQLIT-321

Additional Resources

eCQI Resource Center – EH Measures:

<https://ecqi.healthit.gov/eligible-hospital/critical-access-hospital-ecqms>

Teach Me Clinical Quality Language (CQL) Video Series

https://ecqi.healthit.gov/cql?qt-tabs_cql=2

- [Coalesce](#)
- [Normalize Interval](#)
- [Time Zone Considerations](#)
- [Latest, LatestOf, Earliest, EarliestOf, HasStart, HasEnd](#)

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<https://www.jointcommission.org/measurement/pioneers-in-quality/>

Expert to Expert

<https://www.jointcommission.org/measurement/quality-measurement-webinars-and-videos/expert-to-expert-webinars/>

ONC Issue Tracking System

<https://oncprojecttracking.healthit.gov/>



Live Q&A Segment

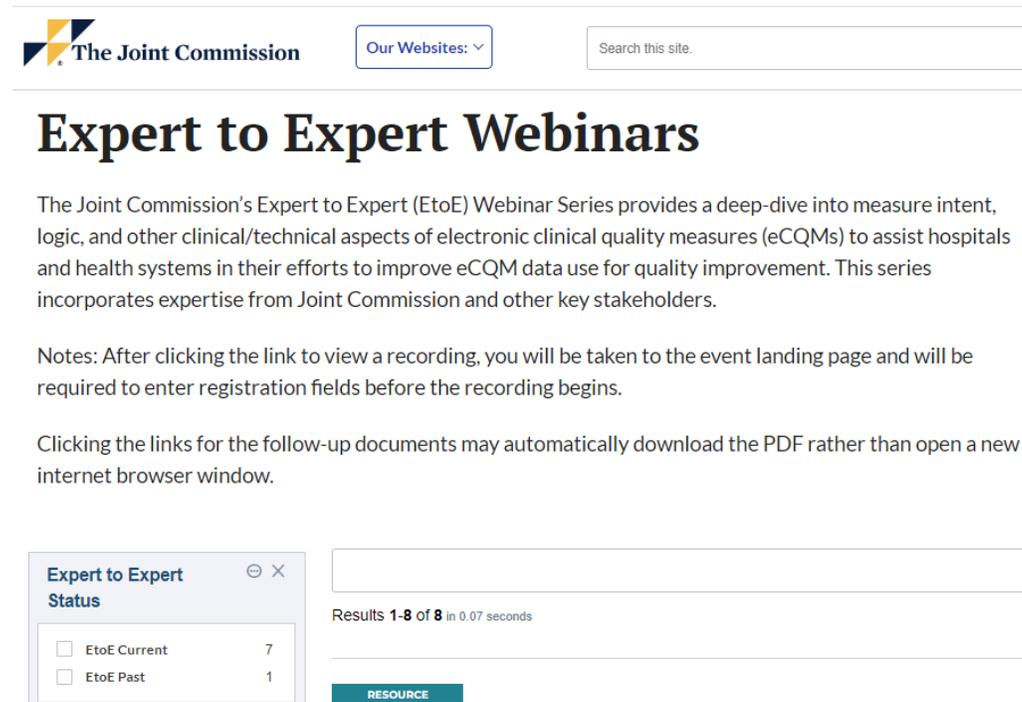


- Please submit questions via the question pane
- Click the Question mark icon in the audience toolbar
- A panel will open for you to type and submit your question
- Include slide reference number when possible
- All questions not answered verbally during the live event will be addressed in a written follow-up Q&A document
- The follow-up document will be posted to the Joint Commission website several weeks after the live event

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Notes: After clicking the link to view a recording, you will be taken to the event landing page and will be required to enter registration fields before the recording begins.

Clicking the links for the follow-up documents may automatically download the PDF rather than open a new internet browser window.

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Results 1-8 of 8 in 0.07 seconds

RESOURCE

Expert to Expert Annual Update Webinars

- 2023 eCQM Annual Update Webinar series began in August with Joint Commission's PC-01 and PC-06 eCQMs and will continue until Jan 2023. The series incorporates expertise from The Joint Commission, Centers for Medicare & Medicaid Services, Mathematica, and other measure stewards to address the 2023 eCQM Annual Updates for: STK, VTE, PC, ED, Safe Opioid Use, and Hyper- and Hypo-Glycemia measures.
- Information will be available at this link as each webinar is offered: <https://www.jointcommission.org/measurement/pioneers-in-quality/pioneers-in-quality-expert-to-expert-series/>



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Transcript

Joint Commission Pioneers in Quality Expert to Expert Webinar Series 2023 Annual Webinar Hyper- and Hypo- Glycemia eCQMs

Broadcast date: January 24, 2023

00:00:04

Welcome everyone and thank you for joining us today for our Expert to Expert series Webinar 2023 annual updates for the hospital harm Severe Hyperglycemia and Severe Hypoglycemia eCQMs.

00:00:20

Before we start, just a few comments about today's webinar platform. Audio is by Voice Over Internet Protocol only. Click the button that reads "Listen in! Click for audio." Then use your computer speakers or headphones to listen. There are no dial in lines. Participants are connected in listen only mode. Feedback or dropped audio are common for live streaming events. Refresh your screen or rejoin the event. If this occurs, we will not be recognizing the Raise a Hand or Chat features. To ask a question, click on the Question Mark icon in the audience toolbar. A panel will open for you to type your question and submit.

00:01:01

We would like to welcome you to our webinar. Before we get started, we do want to explain that this webinar is fairly technical in nature and requires a baseline understanding of eCQMs. Participant feedback from previous webinars indicated that the content may have been too technical for individuals that are new to eCQMs.

00:01:19

If you are new to eCQMs, this content might be too technically advanced for your comprehension. We recommend that those new to eCQMs visit the eCQI Resource Center at the hyperlink listed on this slide. You'll find a collection of resources to help you get started with eCQMs.

00:01:40

The slides are available now and can be found within the viewer toolbar. To access the slides, click on the icon that looks like a document, select the file name and a document will open in a new window. You can print or download and save the slides. The slides will also be available several weeks after the session at the link denoted on this slide.

00:02:04

CE credit is offered for this webinar. This webinar is approved for one continuing education credit for the entities listed on this slide, the Accreditation Council for Continuing Medical Education, American Nurses Credentialing Center, American College of Healthcare Executives, California Board of Registered Nursing, International Association for Continuing Education and Training.

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Tomorrow you will see will receive an automated e-mail with the survey link when you complete the online evaluation survey. After you click submit, you will be redirected to a URL from which you can print or download and save a PDF certificate. An automated e-mail will also be sent from the survey platform after you complete the survey that includes the link to access your PDF certificate.

00:03:09

For more information on the Joint Commission's continuing education policies, visit the link at the bottom of this slide. The learning objectives for this session are navigate to the eCQI Resource Center for the measure specifications, Value Sets, measure flow diagrams, and technical release notes, apply concepts learned about the logic and intent for the Glycemia eQMs, prepare to implement the Glycemia eQMs for the 2023 eCQM reporting period, and identify common issues and questions regarding the Glycemia eQMs. This webinar does not cover these topics basic eCQM concepts, topics related to chart abstracted measures, process improvement, efforts related to this measure and eCQM validation.

00:04:06

These staff and speakers have disclosed that they do not have any conflicts of interest, for example, financial arrangements, affiliations with or ownership of organizations that provide grants, consultancies, honoraria, travel or other benefits that would impact the presentation of today's webinar content.

Susan Funk, Mia Nievera, Michelle Lefebvre and Susan Yendro.

00:04:34

The agenda for today's discussion follows. Demonstrate navigation to measure specifications, Value Sets, measure flow diagrams, and technical release notes. Review changes made to the Glycemia eQMs frequently asked questions and facilitated audience Q&A segment.

00:04:53

We will now share a demo that illustrates the navigation to the eCQI Resource Center. Before we dive into our measures, we'd like to refer you to the eCQI Resource Center website where you can find these highlighted items, the measure specifications, measure flow diagrams, Value Sets, and technical release notes for all measures in the CMS program. You can click on this link on the slides, which will take you to the eCQI Resource Center landing page. And if you hover over the eQMs menu items, you can see the Eligible Hospital Critical Access Hospital eQMs Go ahead and double click on that link. Take you to its web page and select the reporting period 2023. And now you will see all the related resources. And just to go through a few items on our list, let's start with the eCQM specifications for hospital quality reporting. Double click on the zip file. You will see additional zip files listed for each of the measures included in the CMS program. I will go ahead and choose CMS816 as an example and now this opens up all the elements in the measure package.

00:06:15

And if you'd like to know more about each of these individual items, please go to the get started with eCQMs on the home page of the eCQI Resource Center. But for now, let's take a quick look at the HTML document which is also referred to as the human readable. This is where you will find all the details related to the measure. The top portion of the document highlighted in gray is referred to as a metadata or header information.

00:06:44

This is where you will find measure developer, rationale, references, helpful guidance and the populations defined in easy-to-understand language. By scrolling down, you will see the population criteria and further below all the definitions making up the logic.

00:07:00

Functions are listed but followed by the terminology. For instance, the Value Sets or Direct Reference Codes, Quality Data Model, Data Elements, the Supplemental Data Elements, and Risk Adjustment Variables if it's applicable at the bottom of the page.

00:07:16

This is a source of truth for all of the measure details, and I know I went through this pretty quickly. But again, just to show how to locate this document and to give you a basic understanding of its contents. So, jumping back to the eCQI Resource Center, let's take a look at the Value Sets.

00:07:34

We can click on this link here for eCQM Value Sets. And you will see that the list does go back as far as 2013. I do want to note that you have to be signed in to the VSAC, or the Value Set Authority Center, in order to access the Value Sets. And for our demo today, we will look at the most recent reporting year 2023 by double clicking on the May 2022 release.

00:07:59

Now you'll see several available downloads, but for this example I'm going to go ahead and choose the Excel sorted by CMS ID. Let's keep with the same example. So, looking across our tabs for CMS816. You will see the CMS ID, Value Set name, Object Identifier or also known as an OID, the QDM categories definition, expansion version, the purpose statements of each of the Value Sets of the measure. I do want to note that the direct reference codes are not listed here as they are not included in Value Sets. That information you can find on the measures specifications itself.

00:08:43

So now let's go ahead and jump back to the Technical Release Notes and you have two options for TRNs for all measures, either PDF or ZIP. And here is a nice concise list of all the changes to the measures for the 2023 reporting year. This is for a different measure, but just to give you the lay of the land, you'll notice the first column contains a technical release note. The second column contains a type of TRN, so whether it's a header change logic or a value set change, the TRN's are sorted by the type of TRN. So, all header changes are grouped, as are all logic changes and all Value Set changes. Alright, and getting back then to our resource page. The last thing we'll review are the measure flows. These are eCQM flows. These are all in a zip file.

00:09:37

The measure flows are in a PDF format for each measure, so you'll want to choose the flow you're interested in viewing. Again, going back to my same example of CMS816, alright, so let's look at this Measure Flow at a very high level. And I want to note that the eCQM flows are designed to assist in interpretation of the eCQM logic and calculation methodology for performance rates. These flows provide an overview of each of the population criteria components and associated data elements that lead to the inclusion or exclusion into the measure. These flows are intended to be used as an additional resource when implementing eCQMs and should not be used in place of the eCQM specification.

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So, you'll see here on this page. There's a CMS number, the version number, and the title of the measure, followed by the diagram in a horizontal row for every population applicable to the measure. So, this measure has Initial Population, a Denominator on page 2, the Numerator and you will see an algorithm guiding you through each of the populations. A standard flow chart symbols are used, so for example a diamond is used to indicate a question, or a decision and input and output symbols are used for denoting inputs and outputs. After the flow diagram we'll find a sample calculation here at the bottom and after that, are two pages describing each of the population in its narrative form. So now that we've done a quick review, let's go ahead and begin the presentation for the Glycemia measures.

00:11:26

Great, Mia, when you're ready and the presentation is up, feel free to take it away.

00:11:35

Great thanks, Susan. So, my name is Mia Nievera. I am the eCQM Project Director for the Development and Maintenance of the Hospital Harm Patient Safety Measures at American Institutes for Research. I'm also joined by my colleague today, Michelle Lefebvre, who is the Measure Lead for these two measures and will be assisting in the Q&A portion of the session.

00:12:03

Alright. So first, we'll talk about general changes that are applied to both Glycemia measures. These changes do not impact intent. So, these are just general changes that will go through. They have, these measures have both been endorsed by the National Quality Forum, which is also now reflected in the header. IMPAQ was acquired by AIR last year, so you'll see that reflected in the header under the measure developer.

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The next three changes were to align with the other eCQMs in the program. So Global CalendarAgeInYearsAt function was replaced with the Native CQL function AgeInYearsAt, and as such the birth date LOINC Code has been removed from the terminology section. The addition of day of before measurement period and also the replacement of gender with sex in the header.

00:13:08

So, we'll start with the technical overview to review the GCL functions use in our measures that come from one of the main shared CQL libraries use across a lot of the eCQMs. This is the mat global common functions library. The use of this library can be easily recognized when you CQL definitions and functions that are prefaced by the word global.

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So, the first one here is the NormalizeInterval function. Now you may have seen this previously, but just as a refresher, this is meant to account for differences in EHR vendors capture of timings of measure criteria to help decrease implementation burden. So, for example, these list of data types have both a relevant datetime and a relevant period associated to them. So, in this case, the Normalize Interval allows for either a point in time that relevantDatetime or an interval so that relevantPeriod to meet the timing criteria across several measures.

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Our measures also use this function HospitalizationWithObservation. This determines the interval of the entire hospitalization encounter, which includes time in the emergency department or observation. When these are encounters are within one hour or less of the inpatient admission.

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Alright. That was a quick review. So today we'll start with CMS871 version two Hospital Harm-02 is its short name. And this is an outcome Ratio measure to assess the number of inpatient hospital days with a hyperglycemic event, a harm event. Per the total qualifying inpatient hospital days for patients 18 years of age or older at the start of the admission. I do want to note that this measure does not aim to measure overall glucose control in hospitalized patients. Rather, the goal is to assess the occurrence and extent of Severe Hyperglycemia. This measure is intended to be used in combination with its companion measure, the Severe Hypoglycemia measure, to reduce unintended consequences of measurement. Hyperglycemia is common among hospitalized patients, especially those with pre-existing diabetes, but can also affect individuals with no prior history of diabetes and may be induced by medications like steroids or tube feedings.

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Patients with elevated blood glucose of greater than 200 milligrams per deciliter are also considered hyperglycemic and are considered at high risk for Severe Hyperglycemia. And Severe Hyperglycemia, where the blood glucose level is extremely elevated, is significantly associated with a range of harms, including increased in hospital mortality, infection rates and hospital length of stay. Lower rates of inpatient Severe Hyperglycemia may not only improve care for patients but also reduce costs for healthcare payers. The rate of inpatient Hyperglycemia can be considered a marker for quality of care hospital care, since inpatient Hyperglycemia is largely avoidable with proper glyceemic management.

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And because this measure is relatively new, we'll do a quick read through the measure narratives here. The initial and the Initial Population and Denominator are the same where we are looking for inpatient hospitalizations where the patient is 18 years of age or older at the start of the admission who have at least one of the three criteria, a diagnosis of diabetes that starts before or during the encounter or an administration of at least one dose of insulin or hypoglycemic medication during the encounter. Or the presence of at least one blood glucose value greater than or equal to 200 milligrams per deciliter during the encounter. We did add a new Denominator Exclusion, inpatient hospitalizations for patients with initial blood glucose results of greater than or equal to 1000 milligrams per deciliter anytime between one hour prior to the start of the encounter, just six hours after the start of the encounter.

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Now the Numerator looks for inpatient hospitalizations with a hyperglycemic event within the first 10 days of the encounter minus the first 24 hours and minus the last period before discharge if less than 24 hours.

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So, we define hyperglycemic event as defined as either a day with at least one blood glucose level greater than 300 milligrams per deciliter. Or a day where I blood glucose was not measured and it was preceded by two consecutive days where at least one glucose value during each of those two days was greater than or equal to 200 milligrams per deciliter.

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Now, as mentioned, this is a Ratio measure, so Ratio measures use Measure Observations in order to calculate the Ratio. This measure has two Measure Observations. Measure Observation associated with the Denominator, which is the total number of eligible days which match the Denominator criteria. And Measure Observation associated with the Numerator the total number of days with the hyperglycemic event.

00:19:38

Alright. And then this slide, we wanted to illustrate the key difference between a Proportion measure in comparison to a Ratio. As you see, both measures contain similar measure components. They both have an Initial Population, a Denominator and Numerator. In a Proportion measure, the Numerator is a subset of the Denominator, so the Numerator over Denominator equals the measure score. However, in a Ratio measure, the Numerator Denominator come from the Initial Population. So, the Numerator and Denominator returned their respective encounters, and from there we use Measure Observation 1 to count the number of days from the Denominator as the bottom number of the Ratio, and Measure Observation 2 to count the number of days from the Numerator as the top number of the Ratio. And that's how we calculate the measure score.

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Alright, now before we get into the logic review, I do want to quickly review the changes specific to the Hyperglycemia measure. As mentioned, a Denominator Exclusion was added to exclude encounters with patients who present with hyperglycemic crisis and therefore we also made updates to the Clinical Recommendation Statement and references to support this change. On the guidance section was also updated to more clearly explain how the measure outcome is calculated. We also added a few technical updates for better clarity for the logic intent.

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The Numerator definition was updated to EncountersWithHyperglycemicEvents. Also, in the Numerator we replaced days with days duration and change the alias of day expand to DayNumber. And lastly, in the Measure Observation 2 logic, we replaced the Count operator with Sum. And will review these changes in more detail during this presentation.

00:22:04

Alright. And this slide, this is just for your reference. There were no logic changes made to these definitions. The only changes made were to the definition names for more clarity and alignment with the CQL style guide use and CMS quality programs.

00:22:25

Alright. So now getting into the logic review, let's just quickly level set on the layout of the slide here. At the top of the slide, we describe the population narrative. It's followed by the CQL measure population logic definition here that's in the bold blue text box. Beneath that will be all of the nested definitions used to create that population, and we use this waterfall layout with the arrows and for this slide specifically, just to point out, how these definitions are nested within one another?

00:23:04

Throughout the presentation you will see also see some yellow highlights which indicate a change was made to the definition and for simple name changes or alignments with the standards those will not be the focal point, but it is just something for note for your reference. The red text however are the key elements I will be speaking to in the slide. So, this will be the the basic format as we go through the presentation.

00:23:34

Alright. So, with that said. Let's look at this first criteria in the Initial Population. We are looking for a history of diabetes diagnosis. So, beginning with the broadest criteria, we want to define the Qualifying Encounter. This creates the inpatient encounter, where the patient has to be 18 years of age at the start of an encounter during the measurement period. Following that arrow upwards, the Qualifying Encounter is nested within the Encounter with Hospitalization Period definition. Now seeing this definition, we use a Tuple. A Tuple is used to collate the information being asked for into a list. So looking at this logic, we are asking to return or compile a list that for every Qualifying Encounter include the inpatient hospitalization code, the hospitalization start, and end times and using this Tuple concept, as the measure developer, we can use this collated information elsewhere in the logic, but also for implementers it makes the data easier to analyze and troubleshoot for issues.

I do highlight this because we use this concept a lot in the measure, so it's something to keep in mind as we go through this specifications.

00:24:55

Alright, so now following the arrow upwards again to the Encounter with Existing Diagnosis. We are looking for a diabetes diagnosis where the prevalence period or the onset or of the diabetes can start any time before discharge.

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Alright, so moving to the next slide, no logic changes were made in this definition. We are looking for the administration of hypoglycemic medication to the patient during the hospitalization. The hypoglycemic treatment medication Value Sets includes medications such as Metformin and insulin just for a frame of reference.

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And in here, no logic changes are made in the third Initial Population criteria we are looking for a glucose test was done during the hospitalization and more specifically the draw time since we are using that relevant datetime attribute and the dot results should be greater than or equal to 200 milligrams per deciliter to meet criteria.

00:26:24

Alright. So, moving to the Denominator, which is the same as the Initial Population. So rather than repeating that whole thing again, we simply call in the Denominator statement and call it Initial Population. So now looking at the new Denominator Exclusion, we are looking for a glucose result greater than or equal to 1000 milligrams per deciliter and if it was drawn within the first six hours of the start of the hospitalization. Then the patient will be excluded from the Denominator.

00:27:14

Alright. Moving to the Numerator, the Numerator looks for severe hyperglycemic events within the first 10 days of the encounter. However, the first 24 hours is excluded as well as the last period before discharge if it was less than 24 hours. So, we'll get into this timing more in detail in the following slides, but for now understand that the evaluation for the hyperglycemic event is limited to the first 10 days of the encounter.

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So now a hyperglycemic event is defined in two ways. The first is, a day with at least one blood glucose value greater than 300 milligrams per deciliter. Or the 2nd, a day where a blood glucose was not measured, and it was preceded by two consecutive days where at least one glucose value during each of those two days was greater than or equal to 200 milligrams per deciliter.

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So, for the Numerator population, we are looking for encounters with hyperglycemic events. And so, let's take a look at the nested definition a days with hyperglycemic events here highlighted in red.

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So, these two definitions Days with Hyperglycemic Event and Days With Glucose Results, are probably the most frequently asked logic intent questions we've received, because they are not only used in the Numerator, but they are also referenced in the Measure Observations as well. So, I'd like you to earmark that for now because we will come back to this concept later in the presentation. For now, I want to turn our focus to the dayIndex and dayPeriod here highlighted in red. You'll note that these are used throughout both logic statements and are critical timing elements used in the measure. And so, we do need to gain a better understanding of the days and hospitalization definition.

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Alright, so looking into the days and hospitalization definition as a whole, it defines the hospitalization time frame that is eligible for measure evaluation. So, recall the narrative for the Numerator. We are looking for hyperglycemic event days within the first 10 days of the encounter minus the first 24-hour period and minus that last period before discharge if less than 24 hours.

00:30:04

So, to identify what days are included and excluded in hospitalization period we use three functions: The Hospital Days Max 10. Days in Period and Interval to Day Numbers. Now the easiest way to understand this is by applying them to an example. And just as a quick aside, many of the examples I'm using today were questions submitted through Jira and so I did include the quick links to these Issue Tickets and the reference slides later on in the presentation if you wanted to take a deeper dive into the details. But again, this is the best way to really understand, the intent of this logic. So, looking at if this example, if a patient is admitted on 7/20 9:00 am and discharged on 8/02 10:00 am. There are 13 calendar days in the hospitalization.

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The Hospital Days Max 10 function shortens the hospitalization to the first 10 days of the encounter, meaning everything passed that 10 day mark is excluded from the measure evaluation. The Interval To Day Numbers function, simply numbers each day in the hospital period. So, we now have day 1,2,3,4,5, etcetera. This is also called the dayIndex. Now the days and period function dictates how to account for a day. So here each day is a 24-hour interval, not a calendar day. Which means because it's encounter started at 9:00 AM, the 24-hour interval ends at 9:00 AM the following day. Likewise, if the encounter started at 1:00 PM, then the 24-hour interval also ends at 1:00 PM the following day.

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Alright, so now I want to pull focus to the Includes and Excludes boxes. As this concept also comes up several time times in Jira tickets. This section of the logic this gets pretty technical, but this section of the logic is defining the start point and the end point of that 24-hour interval. Now here's the caveat. Because the end point of the 24 hours is using a parens and not a bracket. Okay, this means that the last minute of the 24-hour interval is not included in the current day. But it actually begins the next 24-hour interval, so if the start point of the day is at 9:00 AM. Then because of that closed parens, the 24-hour interval actually ends at 8:59 AM. So once that clock hits 9:00 AM, that is a start of the next 24-hour interval.

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And this is important because the precision of CQL can impact whether something is included or excluded in the calculations. And again, we get this question often from hospital implementers and abstractors when they are troubleshooting why certain cases fall out of the measure when it looks like the criteria is met. And so, I also want to highlight that the precision and CQL allows for whatever the smallest increment of time your system uses. So, if your system measures down to a millisecond, then the precision of these timing elements will also be at that millisecond level. Very important note there.

Okay, so there are two additional considerations for the start and end periods.

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So, number one: The first 24 hours or day one, okay we we identified day one is excluded from being eligible as a hyperglycemic event day.

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And secondly, if that last day of the hospital period is less than 24 hours, then that is excluded from the hospital period. So again, let's take a look at that example. If the patient was discharged on dayIndex5. At 11:00 AM. Then the day 5, would not be included in the hospitalization period, because day five did not meet the full 24-hour period criteria. So, the hospitalization would be day index 1, to dayIndex4. Okay.

00:35:13

Now let's going back to Days With Glucose Results. And let's break these down. These three highlighted elements hasSevereResults, hasElevatedResults and hasNoGlucoseTest. Again, we're just breaking down the intent of these functions in these definitions just for more clarity.

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Alright. So, we are looking for the occurrence of a severe glucose result greater than 300 or an elevated result greater than or equal to 200 or a day with glucose results that exists within the hospitalization.

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So, using the same encounter example, we now have some glucose results across the hospitalization. There are two days with severe results right dayIndex1 and dayIndex3. Because they're there, they are both greater than 300. And five days within the elevated results. dayIndex1,3,6,7, and 10. Because they all are greater than or equal to 200. And four days where there are no glucose test results were done. Now note that this is also using a Tuple. So, all of this definition is doing is compiling 3 lists as I've done on the slide, a list of days with severe glucose results, elevated glucose results and days with no glucose results. And this information will then be used later in the definitions.

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Okay, now I'm going back and forth. I know between these two definitions, but again, it's the best way to get at the root of what the logic is doing, so please stay with me. And so far, we've identified how to measure a day. How many days to include in the hospitalization period. And the list of the severe elevated and non glucose test days. So next we look to see if any of those glucose results are considered an eligible hyperglycemic event. And so highlighted here has is the has hyperglycemic event.

00:38:07

Alright, so let's go back to that same example. And we are now evaluating eligibility of the first criteria. Glucose greater than 300 milligrams per deciliter, so we know that there are two days with severe results, dayIndex1 and 3. However, the hospitalization period excludes the first 24 hours from the evaluation, which will always be dayIndex1. So, although it has a severe result, it does not count as an event day. The reason for this is to account for when a patient comes into the hospital with a glucose already uncontrolled. Which would not be considered a hospital harm event. So now the only other severe result occurs on date Index 3, which is an eligible day.

And therefore, is considered a hyper glyceemic event day, which we noted here as true.

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Alright, so now let's look at the second criteria. Where we are looking for a day with no glucose results. That was also preceded by two elevated result days. So, we see that there are four days with no results. But dayIndex 8 is the only day where the two preceding days, are day 6 and day 7. Both have an elevated glucose result and because dayIndex 8 is an eligible day in the hospitalization, it is also considered a hyperglycemic event day. I do want to note that there can only be one event per day.

Alright. So now going back to the Numerator definition, let's tie those components together and this logic returns all the encounters that have eligible hyperglycemic events.

00:40:42

Okay, so now moving. Into the next concept and before we get into the Measure Observation definitions again, I want to take a minute and to further explain a Measure Observation, what it is and what it does. The Measure Observation again is how we calculate the top and bottom numbers of the ratio. So, for top number we take the Numerator population and apply the Measure Observation to to get the total number of hyperglycemic event days across those Numerator encounters. And for the bottom number, we look at the Denominator population and apply the Measure Observation 1. To get the total number of eligible days for the Denominator encounter. So now let's talk about Measure Observation 1. Which is associated to Denominator. So, remember here it looks at all encounters that meet the Denominator and counts all eligible days within that encounter. So, looking at the logic, you probably wondering two things, what is considered an eligible day and why is days with hyperglycemic events, the Numerator definition used here for the Denominator Measure Observations. This is a frequently asked question that we've received. Now here's where we go back to that earmark I mentioned earlier in the presentation. I'm bringing us back to our example. So, recall this logic defines the measurement of a day. And which days are included in the hospitalization period. So yes, all the same timing parameters applies. The first 24 hours are not eligible. The hospitalization is maxed out at 10 days and each day has to meet the 24-hour interval to be included in the hospitalization. So not the Tuple which collates all the eligible days into a list. So, my list of eligible days for this encounter are dayIndex2 through dayIndex10. And because the first 24 hours is not eligible, the maximum number of eligible days will always be 9. So, the Denominator observation function leverages this pre-collated information if you will that is collected on the Initial Population and count the number of eligible days in that list. In this example there are nine days in Measure Observation 1.

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Alright, so let's jump to Measure Observation 2, which is looking for the total number of hyperglycemic event days across each Numerator encounter. Note, it refers to that same definition days with hyperglycemic events.

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So, we go back to our example and recall this definition identifies all hyperglycemic events that occurred. Again, that Tuple so it collates all the events per encounter into a list. And the Measure Observation 2 counts all those events listed. So, the list from this encounter consists of dayIndex3 and dayIndex8. Therefore, there are two days in the Measure Observation. And that takes us to the end of this logic review.

00:44:46

But before we transition to the next measure, I do want to review some additional FAQs we received during the measures regarding the Measure Observations. So, let's quickly look at this case. The encounter starts on 7/20 at 9:00 AM and ends on 7/24 9:00 AM. The first question is when does dayIndex1 begin? If you haven't caught already, dayIndex1 will always be the first 24 hours interval of the hospitalization, so that will never change regardless of when the first glucose results are taken. The clock will always start on the first 24 hours of the hospitalization. Now for the second question, does 7/20 count as a hyperglycemic event day? In short, the answer is no, it does not count as an event because the first 24 hours again is not eligible day in the hospitalization period. So as a standalone event it is not eligible. However, it can be used as one of the preceding days to evaluate a non glucose result day. As this example shows, dayIndex3 has no glucose result. Therefore, the measure evaluates the two days preceding right and we do find in dayIndex1 and in dayIndex2 there were two glucose values greater than or equal to 200 milligrams per deciliter. So again, DayIndex1 is not the event day but rather dayIndex3. So, we do allow for that dayIndex1 to be evaluated as one of the preceding days. Not just, it's just not eligible as an event day. And why do we allow this? Well, again, if a patient comes into the hospital with an elevated glucose level, then the expectation is for adequate glucose monitoring to occur.

00:47:04

Alright. So, moving on to the next measure, we'll review CMS816 version 2 Severe Hypoglycemia. Severe Hypoglycemia is a hospital harm event that causes patients to experience distressing symptoms ranging from confusion to coma and is also associated with the increased odds of in hospital mortality. Hypoglycemia events in the hospital are among the most common adverse drug events. In a recent study published by the Office of Inspector General, Adverse Drug events represent one-third of all adverse events in hospitals.

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Among Medicare patients. Of those, Hypoglycemia represented the third most common adverse drug events. A rates of inpatient Hypoglycemia events are considered an indicator of quality of care provided by a hospital. And Severe Hypoglycemia events are largely avoidable by careful use of hypoglycemic medications.

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Moreover, the rate of Severe Hypoglycemia varies across hospitals, indicating an opportunity for improvement in care. The literature and measure testing results show variable performance across hospitals and definite room to improve harm rates. The goal of this measure is to improve safety for inpatients, at risk for Severe Hypoglycemia and to provide a means for hospitals to track and trend performance to drive implementation of best practices to lower their rates of hospital harm caused by Severe Hypoglycemia.

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This is an outcome measure that assesses inpatient hospitalizations for patients age 18 years of age and older who received at least one hypoglycemic medication during their hospital stay and who suffered a severe hypoglycemic event. This is defined as a blood glucose less than 40 milligrams per deciliter within 24 hours of the administration of the hypoglycemic medication. This measure is not risk adjusted as evidence supports that Severe Hypoglycemia can be avoided independent of patients underlying characteristics if hospitals follow best practices. There were no changes to measure, intent or logic, only definition names to align with the CQL style guide standards. So, unlike the previous measure, these highlights are key areas of focus.

00:49:48

Okay, so jumping into the Initial Population. Encounter With Hypoglycemic Medication Administration. No intent changes to the logic. We are simply looking for the administration of a hypoglycemic medication like insulin. Given to the patient during the hospitalization.

And because the Denominator also equals the Initial Population, again we use the Initial Population defined statement as the Denominator.

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And moving to Numerator. To qualify for the Numerator, the inpatient hospitalization must include all three. A Severe Hypoglycemic event during the encounter, that's defined as a test for blood glucose for the results of less than 40 milligrams per deciliter. A hypoglycemic medication administered within 24 hours prior to the start of the severe hypoglycemic events. And during the encounter. And no subsequent repeat test for glucose blood glucose with the results of greater than 80 milligrams per deciliter within 5 minutes of the start of the initial low blood glucose test.

00:51:15

So, for ease of reference, we'll call this lab. I'm sorry one more. Apologies. So, for this Numerator criteria, the severe hypoglycemic event is defined as a test for blood glucose within with the results of less than 40 milligrams per deciliter. This is highlighted here in yellow and so for ease of reference, we call this lab test BloodGlucoseLab1, which has to occur during the hospitalization and must be less than 40 milligrams per deciliter. Again, you'll note we use that attribute of relevant datetime, which is the draw or collection datetime, not results.

00:52:09

And moving to the second part of the Numerator, criteria. Where we are looking for the administration of a hypoglycemic medication to the patient. That must start 24 hours or less before or on the same time as BloodGlucoseLab1 was drawn.

00:52:39

And the third part of the Numerator. No subsequent repeat test for blood glucose test with the result of greater than 80 within 5 minutes of the start of the initial blood glucose test. Again, that is here highlighted in yellow.

00:53:04

So, I want to note the Without Clause, which means it must not include a repeat blood glucose lab test that is greater than 80 milligrams per deciliter. We also alias that as BloodGlucoseLab 2 What this is accounting for is false positives due to possible inaccurate point of care test results. So, if the initial glucose is less than 40 and a repeat is done within 5 minutes and it is greater than the 80 milligrams per deciliter, then the initial glucose will not be considered a Numerator event. Again, this is accounting for false positives.

00:53:55

Alright, so that does take us to the end of the presentation. And as promised, here are the quick links to the Jira tickets. For the two Glycemia measures, I've just collated here for your ease of reference. Again, majority of these tickets do relate to the Hyperglycemia measure but do reference a few for Hypoglycemia as well. And that's it for me. Thanks, everyone. Susan, I'll turn it back over to you.

00:54:23

Great. If you can go to the next slide, Mia, thanks for your presentation. Mia. We've included an additional resource slide here to direct our audience to the eCQI Resource Center Eligible Hospital measures page. The Teach Me Clinical Quality Language Video series that includes shorts on several Clinical quality language concepts that are listed on this slide. The Pioneers in Quality landing page, the Expert to Expert webinar series landing page and the ONC Issue Tracking System where the clinical and technical questions about these eCQM should be submitted.

00:54:59

We're now going to move into our live Q&A segment. Please submit your questions via the question pane. Click the Question mark icon in the Audience Toolbar and a panel will open for you to type and submit your question.

00:55:10

All questions that are not answered verbally during the live event will be addressed in a written follow up Q&A document. And the follow up Q&A document will be posted on The Joint Commission website within several weeks. After the live event, just as a reminder, this webinar is scheduled to go until it's scheduled for another 15 minutes. It was a 75-minute session, so please stay stay on while our team reads off some of the answers that have been submitted so far and I'll turn it over to Marilyn and Susan. You guys take it away. Thank you.

00:55:47

Okay. Our first question, "Does glycemic event reporting apply to CAHs or critical access hospitals?"

And the answer is if the CAHs participates in CMS Hospital Quality reporting program, then the Glycemia measures can be selected as voluntary reporting measures for 2023 reporting. Thank you.

00:56:13

Okay, next question, "Has CMS released baseline targets/goals for these eQMs?"

And the answer is benchmarks are established using historical measure performance data and since these measures are being introduced for 2023, reporting performance rates and benchmarks from CMS will not become available until at least 2024.

00:56:41

Great. Thank you. So, we've received a lot of questions about the requirements of for this collection, collecting these measures and if they're mandatory and when they start.

So, CMS approved the measures for use in the hospital inpatient quality reporting program for payment year 2023 as a voluntary measure. Actually, that that'll be for collection year of 2023. So, CMS evaluates these measures on an annual basis to determine if submission is voluntary or mandatory. So, we would refer you to reference the CMS Hospital Inpatient Quality Reporting Program website for more information and we'll include that link with the posted Q&A in a couple of weeks. Thank you.

00:57:35

Okay. Next question, "Is there, is anyone interested in fasting insulin levels as well as A1C levels?"

And the answer to that that is the value set glucose lab test mass per volume which is used in the measures includes fasting glucose test. Hemoglobin A1C levels are not considered because they show the average blood sugar level over the past two to three months. The intent of the measures is to capture or severe event that occurs at a single point in time.

00:58:14

Thank you. I just wanted to reiterate that as we approach the top of the hour, we did plan this webinar to go until 15 minutes after. So, we will continue with more of the questions and answers until 15 after the hour.

00:58:30

Okay. So, the next question is, "Why is less than 40 milligrams per deciliter considered critical low for this eQm?"

And the answer is we understand that the American Diabetics Association has made recommendations which viewed blood glucose value as low if it's 54 milligrams per deciliter as concerning. But we know that when measuring patients on something that is truly indicative of abnormally or abnormality and severity, 40 milligrams per deciliter will help us avoid making false positives. 54 milligrams per deciliter may suggest patients suffering from Hypoglycemia but not Severe Hypoglycemia.

00:59:19

Okay. Next question, "Why are there no rechecks allowed for the Hyperglycemic measures?"

Okay. So, we thank you for that question. To clarify the logic and the Hypoglycemia measure does not require a repeat blood glucose level to be performed. The expectation is that in most cases of Severe Hypoglycemia, the clinical team will be treating the patient and will not immediately repeat the test. However, if the severe hypoglycemic event is suspected to be spurious, for example if the patient is clinically asymptomatic and a repeat test is performed to confirm that suspicion, this step will remove false positives that can occur in point of care testing to ensure hospitals are not penalized erroneous results. The five-minute time frame extends from the time that the initial blood glucose test was performed to the time that the repeat blood glucose test was performed.

01:00:27

For patients with Hyperglycemia are clinical lead indicates that finger stick false positives are less problematic on the high side. The value might be 10 to 20% off, but that difference does not cause panic or affect how the patient is managed. As it does on the low side. Additionally, hyperglycemic patients are generally asymptomatic, so there is no clinical basis for doubting the numeric result.

01:01:02

Okay. So, the next question is regarding the Hypoglycemia measure. "Can you discuss if Hypoglycemia event resulting from administering Insulin for Hyperglycemia Hyperkalemia would be included?"

So, the answer is a severe hypoglycemic event is a glucose result of less than 40 millimeters per deciliter that occurs within 24 hours of administration of a hypoglycemic medication such as insulin. The reason for the hypoglycemic medication such as Hyperkalemia is not considered in the evaluation. The Severe Hypoglycemic event, regardless of the patient's diagnosis, is considered a harm.

01:01:50

Okay. Next question, "How will patients with DKAHHS be recognized if blood glucose remains high past a 24-hour period?"

The answer to that is the measure is specified excludes hyperglycemic events that occur in the first 24 hours since patient arrival, allowing for correction of high glucose that was present on admission. Clinical practice guidelines support the assertion that 24 hours is sufficient to lower glucose level below 300 milligrams per deciliter, even among patients with DKA or HHS.

01:02:34

Okay, the next question asks, "Does the measure count the first and one occurrence of each patient?"

01:01:18

So, the answer is that in both measures only one occurrence that meets the Numerator will be counted and it may not necessarily be the first as the logic is not constrained to only capture the first harm event. In the Hyperglycemia measure, we also capture two Measure Observations. The Measure Observation associated with the Numerator counts the total number of hyperglycemic days during the inpatient hospitalization that meet the Numerator criteria. The Measure Observation associated with the Denominator counts the total number of eligible days of the inpatient hospitalization which the Initial Population or Denominator criteria.

01:03:36

Okay. Next question, "If the hypo/hyper incident is contributed to a non-DM factor. Would the parameter change or case be excluded?"

And the answer to that is severe hypo/hyper events are considered a harm regardless of the patient's diagnosis. Therefore, if a harm occurs to a patient who does not have DM, the case will not be excluded solely based on them having a non-DM diagnosis.

01:04:13

Okay. The next question is, "Do patients have to have diagnosis of DM to qualify for the Severe Hyperglycemia metric, assuming they meet other criteria?"

So, the answer is that patients do not need to have the diagnosis of DM to qualify for the Severe Hyperglycemia done Denominator. The Denominator includes inpatient hospitalizations for patients age 18 or older that end during the measurement period, as well as at least one of the following:

- A diagnosis of diabetes that starts before
- or during the encounter or administration of at least one dose of insulin or any hypoglycemic medication during the encounter
- or presence of at least one glucose value greater than or equal to 200 at any time during the encounter. Okay.

01:05:10

Next question, "Can you clarify whether this is encounter based or patient day based? The guidance section of the measures specs say both."

01:05:22

The measure is encounter based. The guidance section indicates this by the following statement. This eCQM is an episode-based measure. An episode is defined as each inpatient hospitalization or encounter that ends during the measurement period. The Measure Observations for the measure count eligible days during the hospitalization, but this is not patient based.

01:05:51

Okay, the next question asks, "Who is the steward of these measures?"

And the steward is the Centers for Medicare and Medicaid Services, or CMS.

01:06:07

Okay.

"Can you please confirm that when calculating the Denominator observation the days of encounters that have been excluded are not included within the Denominator observation."

Correct, if the encounter meets the Denominator Exclusion criteria, the Denominator Measure Observation will not be calculated.

01:06:35

Okay, our next question asks, "Is Clinical quality language CQL a programming language? How do we use it to calculate the measure?"

So, the answer is that CQL is a measure authoring language standard. So please refer to the eCQI Resource Center website for detailed information on CQL. And again, we will include the link to that in the written answers to the questions in a couple of weeks.

01:07:07

Thank you. Okay, "Our current policy if blood sugar is less than 70 is to check every 15 minutes till it's greater than 70. With the five-minute time frame. Should it be checked every 5 minutes to meet this measure?"

01:02:02

The answer to that is to clarify the logic in the Hypoglycemia measure does not require a repeat blood glucose test to be performed. The expectation is that in most cases of Severe Hypoglycemia, the clinical team will be treating the patient and will not immediately repeat the test. However, if the severe hypoglycemic event is suspected to be spurious, for example, if the patient is clinically asymptomatic and repeat test is performed to confirm that suspicion, this step will remove false positives that can occur in point of care testing to ensure hospitals are not penalized for erroneous results. The five-minute time frame extends from the time that the initial blood glucose test was performed to the time that the repeat blood glucose test was performed. Therefore, if repeat glucose test performed more than 5 minutes after the low glucose test would not be considered.

01:08:27

Okay, the next question asks, "Many point of care tests do not measure blood glucose up to 1000 for example, the results will read greater than 700. How will this affect the capture results greater than 1000 for the exclusion?"

So, the answer is that in addition to point of care test, glucose levels can also be obtained by laboratory draw test. To meet the exclusion, a result of greater than 1000 must be captured. So, if a point of care result is greater than 700, this would not meet the exclusion criteria.

01:09:10

Okay. "Do bedside glucose count or lab panels or both?"

The answer to that is blood glucose levels are determined by laboratory or point of care test including those at the bedside?

01:09:27

I'm just scanning for some new questions here. "What is the definition of encounter start, arrival to ED or admission to IP?"

So, the answer is that inpatient hospitalization for these measures includes time in the emergency department and observation when the transition between these encounters, if they exist and the inpatient count encounter are within an hour or less of each other.

01:09:59

Okay, "What is done when several glucoses are obtained each day? How are multiples managed?"

01:10:06

The answer to that is each glucose result is evaluated to see if it meets the measures criteria, but only one qualifying glycemc event is counted in the Numerator.

01:10:20

Okay. So, more questions regarding point of care testing and lab results greater than 200 or 300 day after day one. So just to reiterate, the value set refers to glucose results from either point of care or lab test results.

01:08:27

Okay. The next question is hypothetical situation. "Lab one is less than 40 milligrams, but a lab result of exactly 40 is not included since the logic is not equal to or less than 40, correct?"

And the answer to that is you are correct for the Hypoglycemia measure, only glucose values of less than 40 are considered when calculating the measures Numerator.

Okay. So, we'll take one last question, the Another one confusion regarding observation language.

01:11:26

"Does encounter with observation status count towards this measure?"

01:11:30

So yes, observation encounters do count if the observation ends within one hour or less of the start of the inpatient admission.

01:11:41

And with that, I thank everyone for all of your wonderful questions, and I'll hand it back over to Susan Funk to close this out.

01:11:49

Great. Thank you so much Susan and Marilyn for facilitating the Q&A segment and thanks to the team in the background that answered so many of them. And we'll post the responses to any questions we didn't address during the live broadcast via the written document we've referenced that will be posted online. And, when available, all the Expert to Expert webinar recording links, slides, transcripts and Q&A documents can be accessed for previous and On Demand webinars on the Joint Commission's website via the link shown on this slide.

01:12:19

The 2023 eCQM annual Update Webinar series began with an On Demand webinar released in August on the Joint Commission's PC-01 and PC-06 eCQM and has continued with stroke PC, ED, VTE and today's Glycemia eCQMs. The series concludes in February 2023 with the Safe Use of Opioids concurrent prescribing eCQM and this series incorporates expertise from The Joint Commission, CMS, Mathematica, and other measures stewards to address the 2023 eCQM Annual Updates.

01:12:52

If you missed any of the topics, the link on this slide will provide you access to the recordings and slides when they're available.

01:13:01

Before the session concludes, just a few words about the CE survey. We use your feedback to inform future content and assess the quality of our educational programs. Tomorrow, an automated e-mail sent to the participants e-mail address used to register will include the survey link. At the end of the survey, when you click submit, you are redirected to a page from which you can print or download a PDF CE certificate and an automated e-mail will also be sent to you that includes the link to that printable and downloadable PDF CE certificate.

01:13:36

So finally, to close out. Thanks, Mia, for your excellent presentation. Susan and Marilyn for facilitating the Q&A segment and to the content experts that were in the background answering all of the submitted questions. Mostly thanks to all of you who attended today's broadcast and have a great day.