NHSN Adverse Drug Event Surveillance – Glycemic Control, Hyperglycemia (Proposed)

Overview for the 2022 HL7 FHIR Connectathon

Tuesday, January 11, 2022
About Lantana & CDC’s National Healthcare Safety Network (NHSN)

NHSN is the largest tracking system in the United States (U.S.) for healthcare-associated infections (HAIs) and other healthcare-acquired conditions

Lantana’s support for data exchange standards and CDC’s NHSN:

• Since 2005, providing standards-based solutions for interoperability, public health, quality reporting
• Since 2007, supporting electronic health record (EHR) reporting directly to NHSN
  - Standards used by nearly 8600 sites that report to NHSN directly from their EHR/infection control applications
• Today, our team supports the NHSN with standards development, analytics, statistics, help desk, informatics and clinical SMEs, and technical application development

Lantana is supporting NHSN in expanding hospital reporting to other patient safety areas, including glycemic control—hypoglycemia (low blood sugar) and hyperglycemia (high blood sugar)
Goal
• To establish an EHR- and vendor-neutral standard for submitting inpatient blood glucose and medication data electronically to NHSN

Objectives
• Enable measurement of hyper/hypoglycemia rates in U.S. hospitals
• Facilitate benchmarking of hyper/hypoglycemia rates for U.S. hospitals
• Support U.S. hospitals in measuring hyper/hypoglycemia to improve glycemic management

Partners
• CDC, hospital clinician, healthcare quality improvement, and patient safety stakeholders
• EHR system vendors, HL7/healthcare standards and public health groups
• Lantana Consulting Group
Serious, common, and preventable patient harm

- Patients with diabetes: 30% to 40% of U.S. hospital admissions and 70% to 80% of critical care stays
- Hyperglycemia can result when glycemic requirements (e.g., medications, meals) of diabetes patients are not managed appropriately
- Inpatient hyperglycemia is associated with excess morbidity, mortality, and medical costs

Varying rates of severe hyperglycemia across hospitals suggests opportunities for improvement in care

Hospital interest in measuring hyperglycemia in a meaningful and standardized way to improve glycemic management
NHSN Hyperglycemia Surveillance: Why

Aligned with federal patient safety reporting requirements

- Hypo/hyperglycemia metrics newly incorporated into CMS Hospital Inpatient Quality Reporting (IQR) Program as options for reporting
- Option for reporting glycemic metric eCQMs beginning in CY 2023 and payment determination for reporting in FY 2025
  - Hospital Harm-Severe Hypoglycemia eCQM (NQF #3503e)
  - Hospital Harm-Severe Hyperglycemia eCQM (NQF #3533e)

“We believe these medication-related adverse event measures are valuable patient safety measures and focus on high-priority measurement areas and patient outcomes. The measures were developed in a manner that allows them to be reported independently, but they can be considered balancing measures if a hospital chooses to report on both measures”*

*42 CFR Parts 412, 413, 425, 455, and 495 CMS Hospital IPPS for Acute Care Hospitals and Long-term Care Hospital Prospective Payment System
## NHSN Glycemic Control Module: Primary Measures

<table>
<thead>
<tr>
<th>Measure (NQF Measure Alignment)</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Hypoglycemia** (NQF 3503e)   | No. of (adult) inpatient encounters with BG <40 mg/dL* preceded by ADD (24 hours prior)  
No. of (adult) inpatient encounters with ≥1 ADD administered |
| **Hyperglycemia** (NQF 3533e)  | No. of inpatient days** with (1) BG >300 mg/dL or (2) day where BG was not measured and it was preceded by two consecutive days where BG levels were measured where at least one BG value was ≥200 mg/dL**  
No. of (adult) inpatient days with (1) a diagnosis of DM that starts before or during the encounter or (2) at least one administration of insulin or any ADD or (3) at least one BG value ≥200 mg/dL at any time during the encounter* |

- Both central laboratory and POC BG data are utilized
- For the first phases of the NHSN Glycemic Control Module, medication order rather than administration data may have to be relied upon to obtain ADD information due to EHR vendor limitations

### Hypoglycemia

- *No repeat BG >80 mg/dL within 5 minutes of the start of the initial low BG (possible false positive event)
- 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 BG was drawn

### Hyperglycemia

- **Includes inpatient hospitalizations that began in the emergency department or in observational status. Admissions with diagnosis of diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar syndrome (HHS) are excluded.**

ADD: antidiabetic drug; BG: blood glucose; CMS: Centers for Medicare & Medicaid Services; NQF: National Quality Forum; POC: Point of care

NHSN Hyperglycemia Surveillance: How

**FHIR query of active inpatient encounters for a reporting period**
- Patient-level diagnosis data (for diabetes diagnosis)
- Patient-level laboratory data (for blood glucose orders and results)
  - Including from central laboratory devices (CLD) and point-of-care (POC) devices
- Patient-level medications administered (for diabetes medication data)
  - Ideally: from eMAR, if not feasible, from “medication list” in the medication request resource

**Storage of results in a secure data repository**

**Data analysis at CDC to generate hyperglycemia “metrics”**

**Aggregate data and “metrics” reported back to hospitals**

**Exclusions:**
- Continuous glucose monitoring devices (unless linked to EHR laboratory systems)
### NHSN Hyperglycemia Surveillance: How

#### FHIR Resources (Selected)

<table>
<thead>
<tr>
<th>Data Element Required</th>
<th>FHIR Resource Requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admission date</td>
<td>Encounter (US Core)</td>
</tr>
<tr>
<td>Discharge date</td>
<td>Encounter (US Core)</td>
</tr>
<tr>
<td>Patient sex at birth</td>
<td>Patient (US Core)</td>
</tr>
<tr>
<td>Patient date of birth</td>
<td>Patient (US Core)</td>
</tr>
<tr>
<td>Patient race</td>
<td>Patient (US Core)</td>
</tr>
<tr>
<td>Patient ethnicity</td>
<td>Patient (US Core)</td>
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<tr>
<td>Patient location</td>
<td>Location (US Core)</td>
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<tr>
<td>ADD name</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
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<tr>
<td>ADD dosage form</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
</tr>
<tr>
<td>ADD route of administration</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
</tr>
<tr>
<td>ADD dose</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
</tr>
<tr>
<td>ADD start date</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
</tr>
<tr>
<td>ADD stop date</td>
<td>MedicationRequest (US Core) / MedicationAdministration</td>
</tr>
<tr>
<td>Diagnoses</td>
<td>Condition (US Core)</td>
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<td>Chief complaint</td>
<td>Condition (US Core)</td>
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<tr>
<td>Procedures</td>
<td>Procedures (US Core)</td>
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<tr>
<td>Discharge disposition</td>
<td>Encounter (US Core)</td>
</tr>
<tr>
<td>BG lab orders and results</td>
<td>Observation (US Core)</td>
</tr>
</tbody>
</table>

#### Vocabularies (examples)

- SNOMED CT, ICD-10 (diagnoses)
- LOINC (BG labs)
- RxNorm (medications)
Project Scope Statement developed and presented

- Project ID: 1655
- Primary sponsor: Public Health
- Reviewed by HL7 Public Health, Pharmacy, and USRSC workgroups, and Clinical Steering Committee

Implementation Guide in progress

Alpha testing in progress

- Interested in being a testing site? Contact: Nadine.Shehab@lantanagroup.com
• Jan 2021 – March 2022: SME input from endocrinology/glucometrics, hospital medicine, nursing, pharmacy, patient safety, healthcare quality measures, accreditation, and laboratory point-of-care domains

• March 2022: ADE Glycemic Control FHIR IG R1D2 STU May 2022 HL7 WGM Ballot Submission

• May 2022: HL7 Working Group meeting, start of STU Ballot Reconciliation

• July 2022: Complete STU Ballot Reconciliation

• August 2022: Public Health Working Group Approval

• August 2022: FHIR Management Group Approval

• September 2022: Steering Division Approval

• September 2022: Technical Steering Committee Approval

• September 2022: HL7 Publication of ADE Glycemic Control FHIR IG R1D2 STU

• January 2023: Begin NHSN Development, Beta Testing with Pilot Hospitals, and Preliminary Metrics

• May 2024: Project End, all objectives have been met
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