



**Centers for Medicare & Medicaid Services**

# **Guide for Reading Electronic Clinical Quality Measures (eCQMs)**

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# 1. Introduction

An electronic clinical quality measure (eCQM) is a measure specified in a standard format that uses data electronically extracted from electronic health records (EHRs) and/or health information technology (HIT) systems to measure health care quality. Ideally, the data is captured in structured form during the process of patient care. The Centers for Medicare & Medicaid Services (CMS), which uses eCQMs in quality reporting and incentive programs, is working to reduce the burden of collecting and reporting health care quality performance data by drawing on the capabilities of HIT systems and EHRs.

## 1.1 Using This Guide

This guide assists quality analysts, eCQM implementers, and HIT vendors—along with measured entities such as clinicians and hospitals—to understand eCQMs and their associated documentation. The guide provides background on eCQM packages and an overview of the human-readable format of eCQMs.<sup>1</sup> Please note that the eCQM examples provided throughout this guide draw from the eCQM specifications posted for the 2026 reporting/performance period.

For information on how to develop an eCQM, please refer to the Blueprint content on the [CMS Measures Management System \(MMS\) Hub](#) and the supplemental materials on the [MMS Resources and Templates](#) page. For more information on implementing an eCQM, please refer to the eCQM Logic and Implementation Guidance document on the Electronic Clinical Quality Improvement (eCQI) Resource Center's [Eligible Clinician eCQMs](#), [Hospital - Inpatient eCQMs](#), or [Hospital - Outpatient eCQMs](#) Resources tables. For more information on understanding harmonization efforts across the eCQMs, please refer to the Quality Data Model (QDM)-based Clinical Quality Language (CQL) Style Guide on the [eCQI Resource Center CQL Tools & Resources](#) page.

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<sup>1</sup> Further information on Fast Healthcare Interoperability Resources (FHIR) digital quality measures (dQMs) can be located on the [eCQI Resource Center](#).

## 2. eCQM Building Blocks—Standards and Tools

### 2.1 Standards

Measure developers use several standards to identify data, define the data elements used in eCQMs, and express the timing and relationships between them. Visit the [Standards Summary on the eCQI Resource Center](#) to learn more about standards.

#### 2.1.1 Health Quality Measure Format

Health Quality Measure Format (HQMF) is a Health Level Seven International® (HL7) standard format for documenting the content and structure of an eCQM.<sup>2</sup> Intended to represent eCQMs used in a health care setting, the HQMF is an Extensible Markup Language (XML) document describing how to compute an eCQM. The HQMF provides consistency and unambiguous interpretation through standardization of an eCQM's structure, metadata, definitions, and logic. More information on the [HQMF](#) is available on the eCQI Resource Center.

#### 2.1.2 Quality Data Model

The QDM is the information model measure developers use to define the data necessary to describe the eCQM components, such as the numerator and denominator for a proportion measure. To create an eCQM, developers must define data elements consistently based on the QDM. [The Blueprint content on the CMS MMS Hub](#) outlines this process. The eCQI Resource Center provides more information about the [QDM](#). The next subsection provides a brief overview of some of the key elements of the QDM that can help in reading and interpreting eCQMs.

##### 2.1.2.1 QDM Data Element

The QDM uses a specific structure to define a data element. Figure 2.1 shows the structure of a QDM data element:

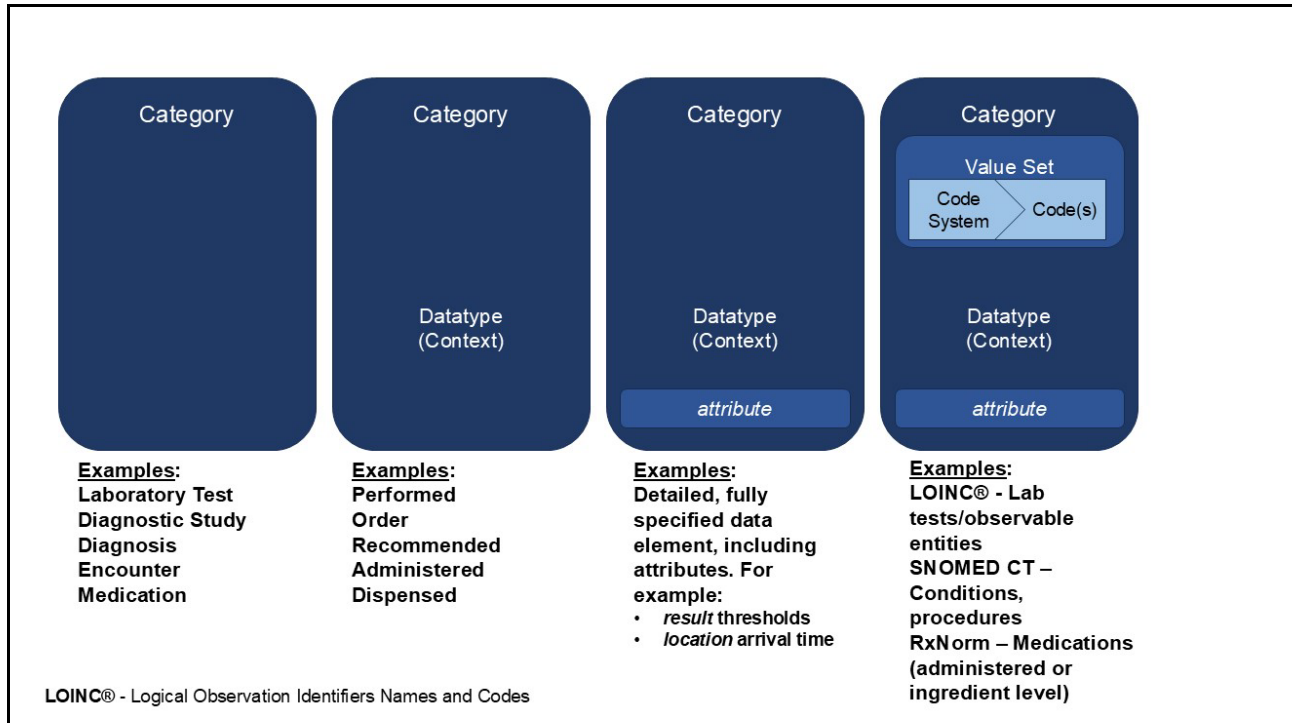
1. QDM category is the class or group of information a quality measure can address (for example, Diagnosis, Medication, Procedure, or Laboratory Test).
2. QDM datatype provides the context, or status, desired with respect to the QDM category. For example, a request for a laboratory test, “Laboratory Test, Order” is distinguished from a completed test, “Laboratory Test, Performed.”
3. QDM attributes represent information about a QDM data element (or metadata) that must exist in data retrieved from the EHR or HIT systems to calculate the eCQM results.
  - Attributes include concepts such as start and stop times, results, and locations. Each QDM datatype has a specific set of attributes acceptable for use in an eCQM. For example, the *author dateTime* or *result* attributes can be used with the “Laboratory Test, Performed” QDM datatype.

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<sup>2</sup> HL7 is a nonprofit organization that develops standards accredited by the American National Standards Institute (ANSI).

4. Combining the QDM datatype with a value set or [direct reference code \(DRC\)](#) makes a QDM data element (for example, [“Laboratory Test, Performed”: “HIV Lab Tests”]).

**Figure 2.1. QDM Data Element Structure: Building a QDM Data Element Using QDM Categories, Datatype (Context), Attributes, and Value Sets or Direct Reference Codes<sup>3</sup>**



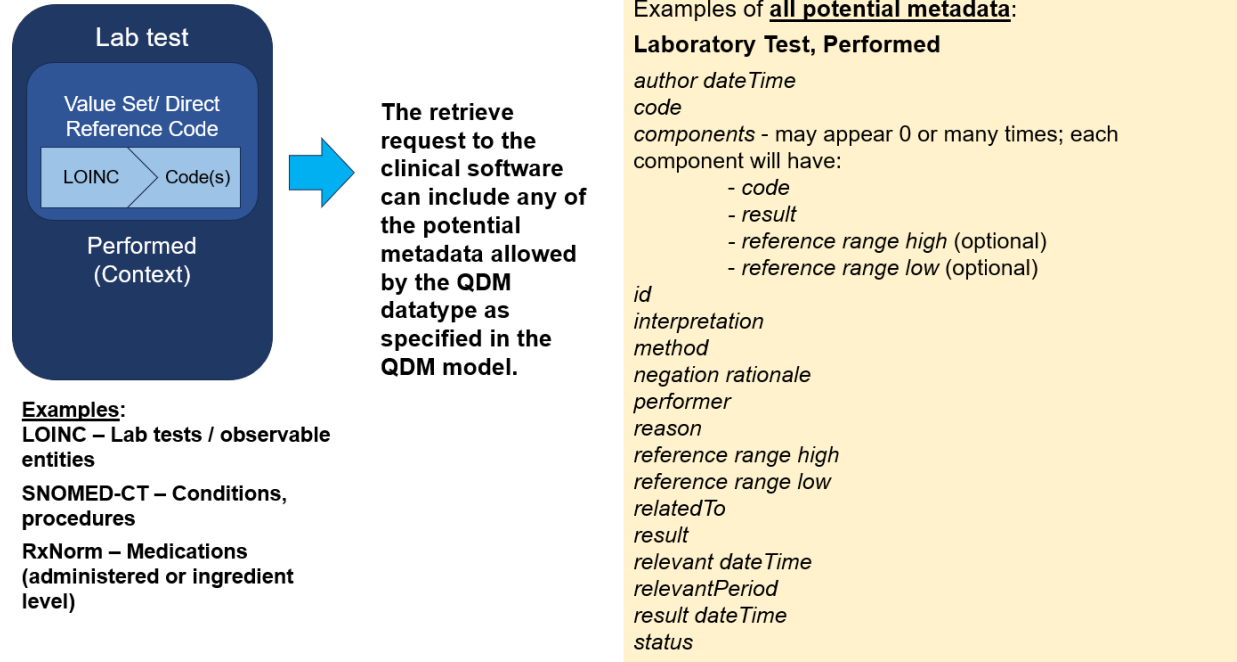
For complete technical details about the QDM, such as definitions of all QDM datatypes and attributes, please refer to the [QDM version 5.6](#) specification. For information on the versions of standards used in eCQMs for each reporting/performance period, please visit the [eCQI Resource Center eCQM Standards and Tools Versions](#) page.

An eCQM specified with CQL logic expressions lists its QDM data elements in the Data Criteria (QDM Data Elements) section and their respective value sets or DRCs in the Terminology section of the measure’s human-readable Hypertext Markup Language (HTML) file. Value sets or DRCs used for QDM attributes appear only in the Terminology section of the HTML file.

The HTML and CQL files include both the measure’s QDM data elements and their respective attributes. However, the HQMF XML file shows only the QDM data elements without the attributes. More information on the different eCQM export file types, like the HTML, HQMF XML, and CQL files, can be found in Section 3 of this guide.

Figure 2.2 shows how measure developers use QDM components with a CQL-based eCQM.

<sup>3</sup> Adapted from Centers for Medicare & Medicaid Services. “Quality Data Model, Version 5.6: QDM Data Element Structure.” Section 2.5, January 2021, p. 7. <https://ecqi.healthit.gov/sites/default/files/QDM-v5.6-508.pdf>.

Figure 2.2. Description of a Laboratory Test<sup>4</sup>

### 2.1.3 CQL

CQL is an HL7 normative standard<sup>5</sup> defining a high-level, clinically focused language used to specify eCQM criteria and clinical decision support rules. The language is understandable to humans but structured enough for implementers to process electronically, streamlining the implementation of eCQMs. CQL provides a common expression standard for eCQMs and clinical decision support. More information on [CQL](#) is available on the eCQI Resource Center.

## 2.2 Tools

### 2.2.1 MADiE

The Measure Authoring Development Integrated Environment (MADiE) is a software tool that provides integrated measure authoring and testing functionalities. MADiE supports editing and testing of eCQMs. As of June 2024, all eCQM authoring and testing occurs in the MADiE tool. To learn how to use the MADiE tool, please refer to the MADiE User Guide on the [MADiE Training & Resources page](#).

<sup>4</sup> Adapted from Centers for Medicare & Medicaid Services. “Quality Data Model, Version 5.6: Description of “Laboratory Test, Performed” Attributes with CQL for QDM 5.6.” Section 2.5, January 2021, p. 8. <https://ecqi.healthit.gov/sites/default/files/QDM-v5.6-508.pdf>.

<sup>5</sup> A normative standard is a relatively stable standard developed by the ANSI to maintain backward compatibility with new versions. Backward compatibility means implementing the new standard will not break the applications using the standard. For additional information, see <https://confluence.hl7.org/display/HL7/Understanding+the+Standards+Process>.

## 2.2.2 Value Set Authority Center

The [Value Set Authority Center \(VSAC\)](#) is the repository for the official versions of value sets and DRCs included in eCQMs. Value sets are lists of codes and corresponding terms drawn from standard clinical vocabularies, defining clinical and administrative concepts, such as diagnoses, clinical visits, and patient characteristics. Examples of standard clinical vocabularies used to create value sets are Current Procedural Terminology ([CPT](#)); International Classification of Diseases, Tenth Revision, Clinical Modification ([ICD-10-CM](#)); Systematized Nomenclature of Medicine – Clinical Terms ([SNOMED CT](#)); and Logical Observation Identifiers Names and Codes® ([LOINC](#)). The National Library of Medicine maintains the VSAC, provides downloadable access to the value sets, and updates versions of the terminology code systems used in CMS quality programs at least once each year. Access to eCQM value sets in VSAC requires a free [Unified Medical Language System® license](#).

### 2.2.2.1 Value Sets

A value set is a specific set of codes and their descriptors that define a clinical or administrative concept. Value sets contain the codes expected to appear (or be available via cross-code system mapping) in the clinical record or administrative data.<sup>6</sup> Each value set has an assigned numeric object identifier (OID). In the human-readable HTML file, value sets have both a name and an OID. The following example depicts the use of a value set within CQL:

```
exists ["Diagnosis": "Diabetes"]
```

Here, “Diabetes” is the value set name, and the value set OID is 2.16.840.1.113883.3.464.1003.103.12.1001, which can be found in the Terminology section of the measure’s human-readable HTML file. This value set is an example of a grouping value set, meaning that it contains several other, related value sets that use different code systems. Measure developers create, manage, and distribute value sets used in eCQMs in the VSAC.

The VSAC provides several options for downloading value set information.

- The VSAC Download tab includes three download options for each reporting/performance period: Sorted by CMS identifier (ID), Sorted by Value Set Name, and Sorted by QDM Category. These workbooks provide additional detail about each value set, including code system OIDs and versions. Please note that in files sorted by CMS ID and value set name, column F (QDM Category) is blank for value sets used only for QDM attributes, because an attribute may be used by more than one QDM category. The download sorted by QDM category does not contain any value sets used only for QDM attributes.
- The Search Value Sets tab in the VSAC is an additional method for browsing and downloading eCQM value sets that are filtered by program. On this tab, users can download Excel spreadsheets containing metadata and contents.
- Users can retrieve eCQM value sets programmatically with the VSAC Sharing Value Sets Application Programming Interface ([VSAC SVS API](#)) using the release parameter

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<sup>6</sup> If cross-code system mapping is conducted, implementers should maintain documentation in case of a CMS audit.

and correct release name corresponding with the desired eCQM publication date listed on the [VSAC Download](#) tab.

For more information about value sets, please reference the [Value Set Information page on the eCQI Resource Center](#).

### 2.2.2.2 Direct Reference Codes (DRCs)

If a single code—rather than a collection of codes in a value set—can define a clinical or administrative concept, the eCQM expression embeds the code directly into the CQL logic statements. This method of expression is called a direct reference code, or DRC. The Terminology section of the HTML file lists DRCs and the OIDs of the code systems from which the codes derive (for example, SNOMED CT or LOINC). As Figure 2.3 shows, the Terminology section for [CMS154v14, Appropriate Treatment for Upper Respiratory Infection \(URI\)](#), contains five DRCs.

**Figure 2.3. Direct Reference Codes in CMS154v14**

<b>Terminology</b>	
•	code "Discharge to healthcare facility for hospice care (procedure)" ("SNOMEDCT Code (428371000124100)")
•	code "Discharge to home for hospice care (procedure)" ("SNOMEDCT Code (428361000124107)")
•	code "Hospice care [Minimum Data Set]" ("LOINC Code (45755-6)")
•	code "Unlisted preventive medicine service" ("CPT Code (99429)")
•	code "Yes (qualifier value)" ("SNOMEDCT Code (373066001)")

Note that the value set workbooks available on the Download tab of the VSAC, discussed in Section 2.2.2.1, do not include the DRCs used in measures. To obtain a separate listing of DRCs, users must select “Direct Reference Codes Specified within eCQM HQMF files Published *Month DD, YYYY*” on the [Download tab of the VSAC](#) under each reporting/performance period dropdown.

### 2.2.2.3 Versioning Value Sets

Value set stewards and measure developers update their value sets in VSAC regularly. All value set versions contained in the VSAC have a publication date (format: YYYYMMDD) as shown in these examples:

- 20250207
- 20240211

Users can view this version identification system by reviewing the eCQM on the VSAC website or on the exported Excel spreadsheets. They can also view the value set definition versions in Search Value Sets tab in VSAC.

Value set stewards and measure developers maintain value sets by reviewing, removing or adding codes. If measure developers modify value sets while the purpose and intent remain the same, the value set version will change within the VSAC, but the OID will not. When measure developers modify value sets, and the purpose and intent of the value set change, the measure developer will assign a new OID to the value set.

## 3. eCQM Package

### 3.1 eCQM Export File Types

Measure developers create an eCQM in MADiE and export it as an eCQM package. Each eCQM package contains the following components:

- **Human-readable HTML file (.html):** File providing the eCQM content in a human-readable format directly in a web browser.
- **HQMF XML file (.xml):** File providing the description of the eCQM data and population criteria that is intended for machine processing. The format of this document includes a header and a body. The header provides metadata about the eCQM. The body contains key eCQM sections such as population criteria, data criteria, supplemental data elements, terminology, functions, and risk adjustment variables. The HQMF points to the CQL library and associated Expression Logical Model (ELM) files.
- **CQL file (.cql):** File providing the expression logic for data criteria, population criteria, and supplemental data elements. It describes the computable content in the eCQM that contains libraries that can be reused or shared between eCQMs and possibly other artifacts, such as decision support rules. In eCQM packages exported from MADiE, CQL files are located in a separate folder named “cql.”
- **ELM file (.xml, .json):** File providing a machine-readable representation of the eCQM’s logic in XML or JavaScript Object Notation (JSON) formats. The ELM file is intended for machine processing and provides the information necessary to automatically retrieve data from an EHR. In eCQM packages exported from MADiE, ELM files are located in a separate folder named “resources.”

#### 3.1.1 CQL Library

Libraries are the basic units of sharing CQL and consist of a foundation of CQL statements used within an eCQM. Every eCQM has a primary CQL library. The primary CQL library, referenced from HQMF, might reference other CQL libraries, such as shared libraries, that are often used in other eCQMs. The measure package includes these CQL and ELM files, which provide CQL source and ELM rendering for collections of CQL expressions used across eCQMs. The measure package also includes the JSON format of the ELM. There are several format versions (i.e., .cql, .json, .xml) of the CQL libraries, so local implementers can use the versions most appropriate to their software and data analysis tools.

#### 3.1.2 Measure Packaging by Setting

CMS publishes multiple eCQM specification zip files annually on the [eCQI Resource Center](#). Each file contains the eCQMs for a specific reporting or performance period. The file names use the first year of the reporting/performance period (format: YYYY) and then setting, as shown in these examples:

- 2027-Hospital-IP-eCQM.zip
- 2027-Hospital-IP-Hybrid-eCQM.zip
- 2027-Hospital-OP-eCQM.zip

- 2027-EligibleClinician-eCQM.zip

### 3.1.3 CMS eCQM ID

During its development in MADiE, each eCQM receives a unique CMS ID. The header of the measure’s human-readable HTML file contains the CMS ID and the eCQM version number. Measure developers create the CMS eCQM ID by prefacing the CMS ID with “CMS” followed by “v” and the major version number. For example, the CMS eCQM ID of the 2026 reporting period hospital - inpatient eCQM, Safe Use of Opioids - Concurrent Prescribing, is **CMS506v8**, as shown in Table 3.1.

**Table 3.1. CMS eCQM Identifier**

eCQM information	Value
eCQM Title	Safe Use of Opioids - Concurrent Prescribing
CMS ID	506
eCQM Major Version Number	8
CMS eCQM ID	CMS506v8

### 3.1.4 eCQM Zip File and Folder

An eCQM package is published on the [eCQI Resource Center](#) as a zip file. The published zip file contains the HTML, HQMF XML, CQL, and ELM (JSON and XML) files discussed in Section 3.1. The package contains separate CQL and ELM (JSON and XML) files for each CQL library. The eCQM package is named according to the CMS eCQM ID, using the eCQM full version number, which contains the major version number, minor version number, and patch number (for example, CMS506-v8.2.000-QDM.zip).

### 3.1.5 Individual eCQM File Components

Table 3.2 shows example file names for eCQMs posted on the eCQI Resource Center. The eCQM package zip, HTML, and HQMF XML file names refer to the CMS eCQM ID with the eCQM full version number. The CQL, ELM XML, and ELM JSON file names refer to the CMS eCQM ID from MADiE as well as a shortened version of eCQM title and the eCQM full version number.

**Table 3.2. eCQM-Specific eCQM File Formats**

File type	Standard file names	Example file names
Zip	{“CMS” + CMS ID} – {“v” + eCQM full version number} – QDM.zip	CMS506-v8.2.000-QDM.zip
HTML	{“CMS” + CMS ID} – {“v” + eCQM full version number} – QDM.html	CMS506-v8.2.000-QDM.html
HQMF XML	{“CMS” + CMS ID} – {“v” + eCQM full version number} – QDM.xml	CMS506-v8.2.000-QDM.xml
CQL	{“CMS” + CMS ID + shortened eCQM title} – {eCQM full version number}.cql	CMS506SafeUseofOpioids-8.2.000.cql
ELM XML	{“CMS” + CMS ID + shortened eCQM title} – {eCQM full version number}.xml	CMS506SafeUseofOpioids-8.2.000.xml
ELM JSON	{“CMS” + CMS ID + shortened eCQM title} – {eCQM full version number}.json	CMS506SafeUseofOpioids-8.2.000.json

## 3.2 Download, Extract, and Access eCQM Documents

Users can download and view an eCQM package in two ways:

- Download the eCQM zip file containing all the eCQMs for the relevant setting from the setting’s eCQM Resources tab on the [eCQI Resource Center](#)
- Go to the *individual* web page associated with an eCQM on the eCQI Resource Center to view and download the specification zip file

**Note:** To view the XML coding, right-click to open the document with a text reader such as WordPad, Notepad, VS Code, or a third-party XML-reading software. CQL library files open in a text reader. Tools such as VS Code (with CQL framework plug-in) can provide syntax highlighting of CQL.

A list of [eCQM Tools and Resources](#) used in various stages of eCQM development, testing, implementation, and reporting is available on the eCQI Resource Center.

## 4. Understanding an eCQM Human-Readable HTML File

The eCQM human-readable format in HTML contains a header and body.

### 4.1 Header

The header of an eCQM in its HTML file provides important general information and metadata about the eCQM. It identifies the eCQM's developer and steward, its measurement period, and other details including but not limited to clinical rationale and measure intent. [Appendix A](#) includes definitions of the header components and an example of an eCQM header.

### 4.2 Body

The body of the HTML file contains the measure logic and is derived from the formal eCQM specification (CQL and HQMF). It is expected that the narrative in the header of the HTML file is consistent and aligned with the logic in the body of the HTML file.

- **Population criteria:** A representation of the CQL definitions specifying the populations for the eCQM. These CQL definitions typically include the set of characteristics for a given eCQM that could include information on specific age groups, diagnoses, procedures, encounters, and timing relationships (for example, the inclusion periods during which the procedures must have occurred). Population criteria might include the initial population, denominator, denominator exclusions, numerator, numerator exclusions, denominator exceptions, measure population, measure population exclusions, measure observations, and stratification. For definitions of these populations, please refer to Section 4.2.1.
- **Definitions:** Additional CQL definitions or expression logic that the population definitions might reference. A CQL definition is the basic unit of logic within the CQL library.
- **Functions:** Named, reusable CQL calculations that produce a specific result and can be called from multiple parts of an eCQM.
- **Terminology:** A list of the value sets and DRCs used in the eCQM.
- **Data criteria (QDM data elements):** A list containing the QDM datatypes and value set names or DRC descriptions used in the eCQM. These are the building blocks used to assemble the population criteria of an eCQM.
- **Supplemental data elements:** Specific information that EHRs or HIT systems retrieve for each patient reported in the eCQM, such as race, ethnicity, payer, and sex. Measure developers may also specify additional supplemental data elements to request data for risk adjustment or population health analytics.
- **Risk adjustment variables:** Outcome eCQMs evaluate the results of care experienced by patients rather than the processes or actions taken by clinicians. Therefore, outcome eCQMs might require risk adjustment to account for the complexity of patient conditions that could affect the ability to achieve outcomes. Measure developers specify risk adjustment variables to identify these patients. Statistical models may also use the variables to revise eCQM scores based on these patient characteristics.

## 4.2.1 Population Criteria and Definitions

Population criteria represent eCQM characteristics for a measure, such as information on specific age groups, diagnoses, procedures, medications, and timing relationships. Population criteria are described by narratives in the header section of the HTML file and are expressed by logic definitions in the body of the HTML file.

Populations by measure category or scoring type (that is, ratio, proportion, cohort, and continuous variable) vary. More information on each measure category's required and permitted populations is available on the [MMS Hub Measure Specification Page](#) under the Specifications by Measure Category tab.

A measure may define the following populations:

- **Initial population (IP):** The starting group of patients or episodes eligible for inclusion in a measure before denominator, numerator, or measure population criteria are applied. It establishes the scope of evaluation based on characteristics such as age, diagnoses, procedures, or encounter types occurring during the measurement period.
- **Denominator (DENOM):** The group of patients or episodes used to establish the lower part of the fraction for a rate or ratio calculation. It may be the same as the initial population or a smaller subset, depending on the specific goals of the measure. For continuous variable measures, there is no denominator; instead, a measure population is defined.
- **Denominator exclusions (DENEX):** The group of patients or episodes that should be removed from the denominator before assessing numerator criteria in proportion measures. These exclusions identify cases for which the measure's clinical intent does not apply or where inclusion would be inappropriate. In ratio measures, since the numerator and denominator are distinct populations, patients or episodes meeting denominator exclusions criteria are removed only from the denominator.
- **Numerator (NUMER):** The group of patients or episodes that meet the measure's quality criteria, such as receiving a specific treatment or experiencing a defined outcome, used to calculate a rate, proportion, or ratio. It represents the processes or outcomes of interest for each patient, procedure, or other unit identified in the denominator (for proportion measures) or in the initial population (for ratio measures). The numerator describes the clinical action or outcome being measured.
- **Denominator exceptions (DEXCEP):** The group of patients or episodes that should be removed from the denominator only if they did not meet the numerator criteria and had a valid reason for not meeting the numerator criteria. Used only in proportion measures, these exceptions reflect clinical judgement when care was considered but not provided for an appropriate reason. Valid reasons include:
  1. Medical (e.g., allergy or contraindication)
  2. Patient (e.g., refusal)
  3. System (e.g., unavailable services)

These exceptions prevent unfair scoring when care was not provided for acceptable reasons. Denominator exceptions apply only to proportion measures, and reporting may require documenting the number of patients or episodes with valid exceptions.

- **Numerator exclusions (NUMEX):** The group of patients or episodes that meet the numerator criteria but should be removed due to specific exclusion rules defined in the measure. Used only in proportion and ratio measures.
- **Measure population (MSRPOPL):** In continuous variable measures, the measure population defines the group of patients or episodes from the initial population that qualify to be assessed by the measure. This may be the same as the initial population or a smaller subset, depending on the specific goals of the measure.
- **Measure population exclusions (MSRPOPLEX):** In continuous variable measures, a measure population exclusion is the group of patients or episodes that should be removed from the measure population before calculating the measure observations.
- **Measure observations:** In ratio and continuous variable measures, measure observations define how performance is evaluated—for example, by summing denominator-eligible hospitalization days during the measurement period. In ratio measures, observations may relate to the denominator (denominator observations) or the numerator (numerator observations).

For example, Figure 4.1 defines the initial population of [CMS122v14, Diabetes: Glycemic Status Assessment Greater Than 9%](#):

- Patients 18 to 75 years of age by the end of the measurement period with a visit during the measurement period
- Patients who have an active diabetes diagnosis during the measurement period

**Figure 4.1. Initial Population Criteria in CMS122v14**

#### ▲ Initial Population

```
AgeInYearsAt(date from end of "Measurement Period") in Interval[18, 75]
and exists ( "Qualifying Encounters" )
and exists ( ["Diagnosis": "Diabetes"] DiabetesDiagnosis
where DiabetesDiagnosis.prevalencePeriod overlaps day of "Measurement Period"
)
```

Note that in Figure 4.1, the CQL uses logical linking operators and temporal relationships (timing phrases). Common linking operators include the following:

and, or, not, with, without

Common temporal relationships include the following:

before, during, on or before/after, same or before/after, starts, ends, overlaps, intersects, and includes

The CQL in Figure 4.1 also uses “exists”, a predicate that tests whether a set is non-empty.

**Definitions.** The CQL expression also uses definitions, which are common clauses of data elements and their interrelationships. The definition title is a human-readable name that lets the eCQM refer to expressions without repeating all the logic. The HTML file body of each eCQM has a Definitions section containing the title for each definition followed by the expression logic used to characterize it. Please note that in Figure 4.1, the definition of “Initial Population” includes another definition, “Qualifying Encounters.” The user should review the Definitions

section of the specification to determine what each definition includes. In the human-readable HTML file, definitions are in alphabetical order by the definition name.

Figure 4.2 shows a simple definition of “Denominator,” describing all patients included in the denominator, and it is defined as the “Initial Population” without any further CQL statements.

**Figure 4.2. Example of Population Criteria Definition**

<p>▲ <b>Denominator</b> "Initial Population"</p>
--

**Aliases.** Aliases are words or easily understood abbreviations that help represent logic statements and are meant to reduce their complexity. A measure developer usually assigns an alias to the list results of a CQL query source. The alias is used to refer to each item as the list is iterated over in subsequent CQL logic (e.g. in a “where” clause). In Figure 4.3, using an example from [CMS826v3, Hospital Harm - Pressure Injury](#), the eCQM adds the alias “SkinExam” to the QDM data element [“Physical Exam, Performed”: “Physical findings of Skin”]. As a result, when the eCQM expresses how to relate the timing of the skin exam in this query, it uses the alias when iterating over the results of the initial retrieve (i.e., [“Physical Exam, Performed”: “Physical findings of Skin”]).

**Attributes.** QDM defines a set of allowable attributes for each QDM datatype. An attribute provides specific details about a QDM data element, such as timing, results, and locations. In Figure 4.3, “Physical Exam, Performed” is the QDM datatype, and it includes several attributes, including the *relevantPeriod* timing. QDM defines *relevantPeriod* as the time between the start of an action to the end of an action, also known as a time interval. The CQL references attributes using a period between the alias for the QDM data element and its attribute.

**Figure 4.3. Example of QDM Data Element Expressed in CQL**

<p>with ["Physical Exam, Performed": "Physical findings of Skin"] <b>SkinExam</b> such that Global."NormalizeInterval" ( <b>SkinExam.relevantDatetime</b>, <b>SkinExam.relevantPeriod</b> ) starts 72 hours or less on or after start of Global."HospitalizationWithObservation" (  EncounterInpatient ) and Global."NormalizeInterval" ( <b>SkinExam.relevantDatetime</b>, <b>SkinExam.relevantPeriod</b> ) starts during Global."HospitalizationWithObservation" ( EncounterInpatient )</p>
---

Figure 4.4, also from [CMS826v3, Hospital Harm - Pressure Injury](#), presents the final example of the completed QDM data element in the Data Criteria (QDM Data Elements) section of the eCQM, which lists the DRC or value set the QDM datatype requires. The QDM data element [“Physical Exam, Performed”: “Physical findings of Skin”] uses the “Physical findings of Skin” DRC. Subsection 2.2.2 provides a high-level description of the VSAC, which contains all the eCQM value sets and DRCs.

**Figure 4.4. Example of QDM Data Element Listed in Data Criteria (QDM Data Elements) Section**

<p><b>Data Criteria (QDM Data Elements)</b></p> <ul style="list-style-type: none"> <li>• "Physical Exam, Performed: Physical findings of Skin" using "Physical findings of Skin (LOINC Code 8709-8)"</li> </ul>
---

## 4.2.2 Functions

Functions are named, reusable CQL calculations that produce a specific result and can be called from multiple parts of an eCQM. Rather than repeating common calculations in each eCQM, a measure developer can access a global shared library of functions and include selected functions as part of the eCQM logic. CQL expressions contain functions that perform a variety of calculations. For example, as Figure 4.5 from [CMS155v14, Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents](#) shows, the measure developer uses the function “NormalizeInterval” from the “global” shared library.

**Figure 4.5. Example of CQL Function**

### ▲ Numerator

```
exists ["Intervention, Performed": "Counseling for Nutrition"] NutritionCounseling
  where Global."NormalizeInterval" ( NutritionCounseling.relevantDatetime,
    NutritionCounseling.relevantPeriod ) during day of "Measurement Period"
```

Some functions exist in the global shared library so that they can be easily used across eCQMs. Figure 4.6 depicts the “NormalizeInterval” function as an example of a calendar function from the “global” shared library.

**Figure 4.6. Example of CQL Global 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>
```

### 4.2.2.1 Libraries

Measure authors can share definitions or functions across eCQMs by including additional libraries. Sharing can occur locally—that is, for use across several eCQMs—or globally through the “global” shared library for use across all eCQMs. Figure 4.6 shows the referenced function of “Global.NormalizeInterval()” from the global shared library, CQMCommonQDM. Figure 4.7 shows the referenced definition of “Hospice.Has Hospice Services,” which determines whether the patient is receiving hospice care, from the local shared HospiceQDM library.

Figure 4.7. Example of Population Criteria Using a Definition from a Local Shared Library

**▲ Hospice.Has Hospice Services**

```

exists ( ["Encounter, Performed": "Encounter Inpatient"] InpatientEncounter
  where ( InpatientEncounter.dischargeDisposition ~ "Discharge to home for hospice care
(procedure)"
    or InpatientEncounter.dischargeDisposition ~ "Discharge to healthcare facility for hospice
care (procedure)"
  )
  and InpatientEncounter.relevantPeriod ends during day of "Measurement Period"
)
or exists ( ["Encounter, Performed": "Hospice Encounter"] HospiceEncounter
  where HospiceEncounter.relevantPeriod overlaps day of "Measurement Period"
)
or exists ( ["Assessment, Performed": "Hospice care [Minimum Data Set]"] HospiceAssessment
  where HospiceAssessment.result ~ "Yes (qualifier value)"
  and Global."NormalizeInterval" ( HospiceAssessment.relevantDatetime,
HospiceAssessment.relevantPeriod ) overlaps day of "Measurement Period"
)
or exists ( ["Intervention, Order": "Hospice Care Ambulatory"] HospiceOrder
  where HospiceOrder.authorDatetime during day of "Measurement Period"
)
or exists ( ["Intervention, Performed": "Hospice Care Ambulatory"] HospicePerformed
  where Global."NormalizeInterval" ( HospicePerformed.relevantDatetime,
HospicePerformed.relevantPeriod ) overlaps day of "Measurement Period"
)
or exists ( ["Diagnosis": "Hospice Diagnosis"] HospiceCareDiagnosis
  where HospiceCareDiagnosis.prevalencePeriod overlaps day of "Measurement Period"
)

```

**4.2.3 Terminology and Data Criteria (QDM Data Elements)**

The Terminology section provides a complete list of value sets and DRCs used in an eCQM, including the value set name with its unique OID. For DRCs, the list contains the code, code system version, and the OID of the code system that each DRC uses.

The Data Criteria (QDM Data Elements) section shows how to assemble the population criteria of an eCQM. Data criteria consist of QDM data elements and the DRCs or value sets that define them. The Data Criteria (QDM Data Elements) section of the human-readable HTML file lists alphabetically all unique QDM data elements, with corresponding value sets, that an eCQM uses.

QDM also defines additional information about a data element that an eCQM might contain, referred to as attributes. All QDM datatypes have a code attribute that an eCQM expression must bind to the terminology, either a value set or a DRC. eCQMs represent other QDM attributes in a “where” clause to further narrow the instances of QDM data elements within a population. For example, a *relevantPeriod* attribute could provide the time interval for a hospital admission and discharge. CQL logic can assess whether this *relevantPeriod* is within the measurement period.

CQL expressions reference the attributes of QDM data elements to further refine and restrict the criteria. Sometimes these criteria involve quantities, such as restricting lab results to a certain threshold. In other cases, the attributes reference values or codes, such as indicating that the *negationRationale* must be a value from the “Patient Refusal” value set. When the CQL uses value sets referenced with attributes, the value sets display in the Terminology section and not in the Data Criteria (QDM Data Elements) section, which is limited to values or value sets

referenced with QDM datatypes. Attributes include concepts such as *result*, *negationRationale*, and *severity*, all of which provide further context for the data element.

For example, [CMS138v14, Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention](#), includes all patients receiving a tobacco screening in its numerator. To identify a tobacco screening, the logic looks for an assessment performed during the measurement period. The result is a QDM data element of [“Assessment, Performed”: “Tobacco Use Screening”]. Figure 4.8 shows an example of this CQL expression.

**Figure 4.8. Example of a CQL Expression for a Tobacco Screening**

```

▲ Most Recent Tobacco Use Screening Indicates Tobacco User
( Last(["Assessment, Performed": "Tobacco Use Screening"] TobaccoUseScreening
  where Global."NormalizeInterval"(TobaccoUseScreening.relevantDatetime,
  TobaccoUseScreening.relevantPeriod) during day of "Measurement Period"
  sort by start of Global."NormalizeInterval"(relevantDatetime, relevantPeriod)
) ) MostRecentTobaccoUseScreening
  where MostRecentTobaccoUseScreening.result in "Tobacco User"

```

The *result* attribute references a value set “Tobacco User.” However, the Data Criteria (QDM Data Elements) section does not include the value set reference, because the *result* attribute (and associated value set) is not in the CQL retrieve filter. In this case, a measured entity can consider the Data Criteria (QDM Data Elements) section as criteria used in the retrieve filter. The value set reference appears only in the Terminology section.

#### 4.2.4 Supplemental Data Elements

All CMS eCQMs include a supplemental data element section. This section requests that a measured entity retrieve specific information for each patient reported in the eCQM. The report recipient can use this information for risk adjustment or population analytics, but the supplemental elements are not included in the calculation as part of the measure logic. Figure 4.9 shows an example of the supplemental data element section with the four elements that CMS requires (ethnicity, payer, race, and sex). Individual eCQMs might include additional supplemental data elements. For example, [hybrid measures](#) identify the list of additional patient data that is required in the Supplemental Data Element section of the eCQM.

**Figure 4.9. Supplemental Data Element Section of an eCQM**

```

Supplemental Data Elements

▲ SDE Ethnicity
  ["Patient Characteristic Ethnicity": "Ethnicity"]

▲ SDE Payer
  ["Patient Characteristic Payer": "Payer Type"]

▲ SDE Race
  ["Patient Characteristic Race": "Race"]

▲ SDE Sex
  ["Patient Characteristic Sex": "Federal Administrative Sex"]

```

## 4.2.5 Reporting Stratification

Measure developers might define reporting strata—that is, variable groupings a measured entity should include in the eCQM report. For example, they might report different rates by age or by type of intensive care unit in a facility. As a requirement for reporting measures with stratifications, these measures are always calculated and reported both with stratifications applied to the populations and without the stratifications applied.

The eCQM human-readable document (HTML) always includes a Stratification section in its header. If an eCQM does not have reporting strata defined, the section displays “None” by default. If an eCQM contains reporting stratifications, the section lists each of the reporting strata under its own heading, as shown in Figure 4.10 (example from the eligible clinician measure [CMS155v14, Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents](#)).

Figure 4.10. Reporting Stratification

(a) Stratification Section in Header	
<b>Stratification</b>	Report a total score, and each of the following strata: Stratum 1 - Patients age 3–11 years at the end of the measurement period Stratum 2 - Patients age 12–17 years at the end of the measurement period
(b) Stratification Section in CQL Logic Definitions	
<p>▲ <b>Stratification 1</b></p> <p>AgeInYearsAt(date from end of "Measurement Period" )in Interval[3, 11]</p> <p>▲ <b>Stratification 2</b></p> <p>AgeInYearsAt(date from end of "Measurement Period" )in Interval[12, 17]</p>	

## 4.2.6 Risk Adjustment Variables

Outcome measures, which typically measure patient results rather than the completion of clinical processes, may require risk adjustment to ensure fair and accurate comparison of outcomes. Risk adjustment variables identify patient factors, such as age or comorbidities, that may influence outcomes. An eCQM report receiver may use variables in statistical models to adjust eCQM scores to reflect differences in patient populations or complexity. The eCQM specifies the required variables, and measured entities will retrieve them from existing clinical data. The measure developer will reference a risk adjustment methodology report as a link in the eCQM header, describing how to apply the adjustment. Data used for risk adjustment are submitted to the receiving system in the same manner as the supplemental data elements noted in Section 4.2.4.

## 4.2.7 Measure Observations

Only ratio and continuous variable measures use measure observations. Measure observations return counts that are used to evaluate performance—for example, the sum of denominator-

eligible hospitalization days during the measurement period. In ratio measures, measure observations may be associated with the numerator or denominator.

Figure 4.11 shows an example of measure observation logic referencing the “NumeratorObservations” function located in the Functions section of [CMS871v5, Hospital Harm - Severe Hyperglycemia](#). In this example, the “NumeratorObservations” function is calculating the number of eligible hospital days where a hyperglycemic event occurred. The count returned by this measure observation is then used to calculate the ratio score for this measure.

**Figure 4.11. Measure Observation Example**

**▲ NumeratorObservations(QualifyingEncounter "Encounter, Performed")**

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

## 5. Connect for Assistance

For questions related to eCQM implementation specifications, logic, data elements, standards, or tools, use the Office of the National Coordinator for Health Information Technology (ONC) Project Tracking System (Jira) on the [ONC Project Tracking System website](#).

## Version History

Version	Date	Author/owner	Description of change
4.0	May 4, 2018	CMS	Initial updated draft for comments
5.0	May 2019	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Revised text based on input from interested parties and external reviewers. Added Section 2.2.3.2, Direct Reference Codes.
6.0	May 2020	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Revised text based on input from interested parties and external reviewers.
7.0	May 2021	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Revised text based on input from interested parties and external reviewers.
8.0	May 2022	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Revised text based on input from interested parties and external reviewers.
9.0	May 2023	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Revised text based on input from interested parties and external reviewers.
10.0	May 2024	CMS	Updated measure examples, figures, hyperlinks, and versions of standards referenced throughout. Updated ratio measure specific information. Updated to active voice. Revised text based on input from interested parties and external reviewers.
11.0	May 2025	CMS	Updated measure examples, figures, hyperlinks, and versions of standards throughout. Updated definitions to align with those on the MMS Hub. Updated tooling references from MAT and Bonnie to MADiE.
12.0	May 2026	CMS	Updated measure examples, figures, hyperlinks, and versions of standards throughout. Revised text and examples based on input from interested parties and external reviewers.

## Appendix A. Sample eCQM Header

This appendix presents header component definitions in the order shown in the sample header in Figure A.1, which appears after this list of definitions.

**eCQM Title:** The title of the eCQM.

**CMS ID:** MADiE automatically generates a unique CMS ID number.

**eCQM Version Number:** A number used to indicate the version of the eCQM. The combination of the CMS ID and the major version portion of the eCQM version number creates the CMS eCQM ID naming convention for published measures.

**CBE Number:** The eCQM header includes a consensus-based entity (CBE) number if the eCQM has received endorsement. Users may cross-reference the assigned CBE number with the CBE's [Submission Tool and Repository \(STAR\) Measure Database](#) to verify measure endorsement status.

**GUID:** Represents the globally unique identifier (GUID) for an eCQM. MADiE automatically generates this field. The GUID does not change from year to year when eCQM specifications are updated. Please note that the HQMF uses the tag “setId” for what the human readable HTML labels as “GUID.”

**Measurement Period:** The time period for which the eCQM applies.

**Measure Steward:** The measure steward is an individual or organization that owns a measure and is responsible for overseeing its continued maintenance under a specific program. The measure steward is often the same as the measure developer for a given measure, but that is not always the case. When the measure steward and measure developer of a measure are distinct entities, the steward is responsible for approving, rejecting, or publishing changes submitted by the developer. Measure stewards also serve as the point of contact for parties interested in a given measure (e.g., a medical specialty society or federal health agency). Please note that the HQMF refers to the measure steward as “custodian” and the measure developer as “author.”

**Measure Developer:** The measure developer is an individual or organization that is responsible for the development, implementation, and maintenance of a measure, which involves creating, editing, and submitting measures to stewards for approval.

**Endorsed By:** The organization that endorsed the eCQM through a consensus-based process.

**Description:** A general description of the eCQM’s intent.

**Copyright:** Identifies the organization or organizations that own the intellectual property that the eCQM or its contents represent.

**Disclaimer:** Disclaimer information for the eCQM.

**Measure Scoring:** Indicates how a measured entity should perform the calculation for the eCQM (for example, proportion, continuous variable, cohort, or ratio).

**Measure Type:** Indicates what the eCQM is measuring, such as a structure, process, or outcome. The [MMS Hub Glossary](#) contains definitions of the different measure types.

**Stratification:** Describes the strata that a measured entity should use to evaluate the eCQM. There are several bases for stratification, including different age groupings within the population described in the eCQM; a specific condition, discharge location, or both; and different locations within a facility.

**Risk Adjustment:** The method of adjusting for clinical severity and conditions present at the start of care that can influence patient outcomes for making valid comparisons of outcome measures across measured entities. Risk adjustment indicates whether an eCQM is subject to a statistical process for reducing, removing, or clarifying the influences of confounding factors to allow more useful comparisons.

**Rate Aggregation:** Describes how to combine information calculated based on logic in each of several populations into one summarized result. It can also describe how to risk adjust the data based on supplemental data elements described in the eCQM.

**Rationale:** Succinct statement of the need for the eCQM. Usually includes statements pertaining to importance criteria, such as impact, gap in care, and evidence.

**Clinical Recommendation Statement:** Summary of relevant clinical guidelines or other clinical recommendations supporting the eCQM.

**Improvement Notation:** Information on whether an increase or decrease in score is the preferred result (for example, increased score indicates improvement OR decreased score indicates improvement). Additional text explanation may also be provided. An example of this can be found in [CMS334v7, Cesarean Birth](#).

**Reference(s):** Identifies bibliographic citations or references to clinical practice guidelines, sources of evidence, or other relevant materials supporting the intent and rationale of the eCQM.

**Definition:** Description of individual terms provided as needed.

**Guidance:** Enables measure developers to provide additional guidance so implementers can more easily interpret and implement components of the eCQM.

**Transmission Format:** To be determined (TBD).

**Initial Population:** Refers to all patients or episodes that a specific eCQM expects a measured entity to evaluate. The initial population shares a common set of specified characteristics, such as age, diagnoses, diagnostic and procedure codes, and enrollment periods.

**Denominator:** Describes the population that individual eCQM has evaluated. The target population that the denominator defines can be the same as the initial population or it can be a subset of the initial population to further constrain the population for the measure.

**Denominator Exclusions:** Refer to criteria resulting in removal from the denominator. For proportion measures, a patient or encounter meeting the denominator exclusions criteria means the numerator event is not applicable. One example is screening mammography for a woman who had a bilateral mastectomy. The goal of denominator exclusions criteria is to have a population or sample with a similar profile in terms of meeting the numerator criteria.

**Numerator:** Describes the process, condition, event, or outcome that satisfies the eCQM focus or intent.

**Numerator Exclusions:** Define elements that should not be included in the numerator data. Only proportion and ratio measures include numerator exclusions criteria.

**Denominator Exceptions:** Refers to criteria resulting in removal from the denominator after calculating the numerator, if numerator criteria are not met. An exception means the numerator event is applicable but not clinically appropriate. One example is not performing a suicide screening for a patient in an acute medical situation. Only proportion measures include denominator exceptions criteria.

**Supplemental Data Elements:** CMS defines four required supplemental data elements (payer, ethnicity, race, and sex), which are variables used to aggregate data into various subgroups.

Comparing results across strata can identify places where disparities exist or areas in which exposing differences in results is necessary. eCQMs may include additional supplemental data elements required for risk adjustment or other purposes of data aggregation.

Figure A.1. eCQM Header for CMS506v8, Safe Use of Opioids - Concurrent Prescribing

<b>eCQM Title</b>	<b>Safe Use of Opioids - Concurrent Prescribing</b>		
<b>CMS ID</b>	506	<b>eCQM Version Number</b>	8.2.000
<b>CBE Number</b>	3316e	<b>GUID</b>	33b40c00-909a-4490-8093-999fbcdc3480
<b>Measurement Period</b>	January 1, 2026 through December 31, 2026		
<b>Measure Steward</b>	Centers for Medicare & Medicaid Services (CMS)		
<b>Measure Developer</b>	Mathematica		
<b>Endorsed By</b>	CMS Consensus Based Entity		
<b>Description</b>	Proportion of inpatient hospitalizations for patients 18 years of age and older prescribed, or continued on, two or more opioids or an opioid and benzodiazepine concurrently at discharge		
<b>Copyright</b>	<p>Limited proprietary coding is contained in the Measure specifications for user convenience. Users of proprietary code sets should obtain all necessary licenses from the owners of the code sets. Mathematica disclaims all liability for use or accuracy of any third-party codes contained in the specifications.</p> <p>CPT(R) contained in the measure specifications is copyright 2004-2024 American Medical Association. LOINC(R) copyright 2004-2024 Regenstrief Institute, Inc. This material contains SNOMED Clinical Terms(R) (SNOMED CT[R]) copyright 2004-2024 International Health Terminology Standards Development Organisation. ICD-10 copyright 2024 World Health Organization. All Rights Reserved.</p>		
<b>Disclaimer</b>	<p>These performance measures are not clinical guidelines, do not establish a standard of medical care, and have not been tested for all potential applications.</p> <p>THE MEASURES AND SPECIFICATION ARE PROVIDED AS IS WITHOUT WARRANTY OF ANY KIND.</p> <p>Due to technical limitations, registered trademarks are indicated by (R) or [R] and unregistered trademarks are indicated by (TM) or [TM].</p>		
<b>Measure Scoring</b>	Proportion		
<b>Measure Type</b>	Process		
<b>Stratification</b>	None		
<b>Risk Adjustment</b>	None		
<b>Rate Aggregation</b>	None		
<b>Rationale</b>	<p>Unintentional opioid overdose fatalities have become a major public health concern in the United States (Rudd, Aleshire, Zibbel, &amp; Gladden, 2016). Reducing the number of unintentional overdoses has become a priority for numerous federal organizations including, but not limited to, the Centers for Disease Control and Prevention (CDC), the Federal Interagency Workgroup for Opioid Adverse Drug Events, and the Substance Abuse and Mental Health Services Administration.</p> <p>Concurrent prescriptions of opioids or opioids and benzodiazepines places patients at a greater risk of unintentional overdose due to the increased risk of respiratory depression (Dowell, Haegerich, &amp; Chou, 2016; Dowell, Ragan, Jones,</p>		

	<p>Baldwin, &amp; Chou, 2022). An analysis of national prescribing patterns shows that more than half of patients who received an opioid prescription in 2009 had filled another opioid prescription within the previous 30 days (National Institute on Drug Abuse, 2011). Studies of multiple claims and prescription databases have shown that between 5%-15% of patients receive concurrent opioid prescriptions and 5%-20% of patients receive concurrent opioid and benzodiazepine prescriptions across various settings (Liu et al., 2013; Mack et al., 2015, Park et al., 2015). Patients who have multiple opioid prescriptions have an increased risk for overdose (Jena et al., 2014). Rates of fatal overdose are ten times higher in patients who are co-dispensed opioid analgesics and benzodiazepines than opioids alone (Dasgupta et al., 2015). The number of opioid overdose deaths involving benzodiazepines increased 14% on average each year from 2006 to 2011, while the number of opioid analgesic overdose deaths not involving benzodiazepines did not change significantly (Jones &amp; McAninch, 2015). Furthermore, concurrent use of benzodiazepines with opioids was prevalent in 31%-51% of fatal overdoses (Dowell, Haegerich, &amp; Chou, 2016). One study found that eliminating concurrent use of opioids and benzodiazepines could reduce the risk of opioid overdose-related emergency department (ED) and inpatient visits by 15% and potentially could have prevented an estimated 2,630 deaths related to opioid painkiller overdoses in 2015 (Sun, Dixit, Humphreys, Darnall, &amp; Mackey, 2017).</p> <p>A study on The Opioid Safety Initiative in the Veterans Health Administration (VHA), which includes an opioid and benzodiazepine concurrent prescribing measure that this measure is based on, was associated with a decrease of 20.67% overall and 0.86% patients per month (781 patients per month) receiving concurrent benzodiazepine with an opioid among all adult VHA patients who filled outpatient opioid prescriptions from October 2012 to September 2014 (Lin, Bohnert, Kerns, Clay, Ganoczy, &amp; Ilgen, 2017).</p> <p>Adopting a measure that calculates the proportion of patients with two or more opioids or opioids and benzodiazepines concurrently has the potential to reduce preventable mortality and reduce the costs associated with adverse events related to opioid use by (1) encouraging providers to identify patients with concurrent prescriptions of opioids or opioids and benzodiazepines and (2) discouraging providers from prescribing two or more opioids or opioids and benzodiazepines concurrently.</p>
<p><b>Clinical Recommendation Statement</b></p>	<p>The CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022 recommends that clinicians should:</p> <ul style="list-style-type: none"> <li>- “[Use strategies minimizing] opioid use...for both opioid-naïve and opioid-tolerant patients with acute pain when possible. If patients receiving long-term opioid therapy require additional medication for acute pain, nonopioid medications should be used when possible.”</li> <li>- “Use particular caution when prescribing opioid pain medication and benzodiazepines concurrently.”</li> <li>- “Review increased risks for respiratory depression when opioids are taken with benzodiazepines, other sedatives, alcohol, nonprescribed or illicit drugs (e.g., heroin), or other opioids (see Recommendations 8 and 11)”</li> <li>- “Closely monitor patients who are unable to taper and who continue on high-dose or otherwise high-risk opioid regimens (e.g., opioids prescribed concurrently with benzodiazepines) and should work with patients to mitigate overdose risk (e.g., by providing overdose education and naloxone) (see Recommendation 8).”</li> <li>- “Discuss information from the PDMP with the patient and confirm that the patient is aware of any additional prescriptions.”</li> <li>- “Discuss safety concerns, including increased risk for respiratory depression and overdose, with patients found to be receiving overlapping prescription opioids from multiple clinicians who are not coordinating the patient’s care or patients who are receiving medications that increase risk when combined with opioids (e.g., benzodiazepines) (see Recommendation 11), and offer naloxone (see Recommendation 8).”</li> </ul>

	<p>- "Discuss safety concerns with other clinicians who are prescribing controlled substances for the patient. Ideally, clinicians should first discuss concerns with the patient and inform them that they plan to coordinate care with their other clinicians to improve the patient's safety."</p> <p>In addition to the 2022 CDC Clinical Practice Guideline for Prescribing Opioids for Pain, opioid prescribing guidelines issued by various state agencies and professional societies for various settings agree with the recommendation to avoid concurrently prescribing opioids (American Academy of Emergency Medicine (AAEM), 2013; and Washington Agency Medical Directors' Group (WAMDG), 2015), and opioids and benzodiazepines (WAMDG, 2015; American Society of Interventional Pain Physicians (ASIPP), 2012;, and New York City Department Of Health and Mental Hygiene (NYC DPOMH), 2013) whenever possible as the combination of these medications may potentiate opioid-induced respiration.</p>
<b>Improvement Notation</b>	Decreased score indicates improvement
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'American Academy of Emergency Medicine (AAEM). (2013). Emergency department opioid-prescribing guidelines for the treatment of non-cancer-related pain. Retrieved from <a href="https://www.aaem.org/UserFiles/file/Emergency-Department-Opioid-Prescribing-Guidelines.pdf">https://www.aaem.org/UserFiles/file/Emergency-Department-Opioid-Prescribing-Guidelines.pdf</a>'</p>
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'American Society of Interventional Pain Physicians (ASIPP). (2012). Guidelines for responsible opioid prescribing in chronic non-cancer pain; Part 2-guidance. Retrieved from <a href="https://pubmed.ncbi.nlm.nih.gov/22786449/">https://pubmed.ncbi.nlm.nih.gov/22786449/</a>'</p>
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'Dasgupta, N., Funk, M. J., Proescholdbell, S., Hirsch, A., Ribisl, K. M., &amp; Marshall, S. (2015). Cohort study of the impact of high-dose opioid analgesics on overdose mortality. Pain Medicine. <a href="https://doi.org/10.1111/pme.12907">https://doi.org/10.1111/pme.12907</a>'</p>
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'Dowell D., Ragan K., Jones C., Baldwin G., &amp; Chou R. (2022). CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022. Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports, 71(No. RR-3):1–95. DOI: <a href="http://dx.doi.org/10.15585/mmwr.rr7103a1">http://dx.doi.org/10.15585/mmwr.rr7103a1</a>'</p>
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'Dowell, D., Haegerich, T., &amp; Chou, R. (2016). CDC guideline for prescribing opioids for chronic pain—United States, 2016. Morbidity and Mortality Weekly Report (MMWR) Recommendations and Reports, 65(No. RR-1):1-49. 'DOI: <a href="https://dx.doi.org/10.15585/mmwr.rr6501e1">https://dx.doi.org/10.15585/mmwr.rr6501e1</a>'</p>
<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'Jena, A. B., Goldman, D., Weaver, L., &amp; Karaca-Mandic, P. (2014). Opioid prescribing by multiple providers in Medicare: Retrospective observational study of insurance claims. BMJ, 348, g1393. DOI: 10.1136/bmj.g1393'</p>

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<b>Reference</b>	Reference Type: Citation  Reference Text: 'Lin, L. A., Bohnert, A. S. B., Kerns, R. D., Clay, M. A., Ganoczy, D., & Ilgen, M. A. (2017). Impact of the opioid safety initiative on opioid-related prescribing in veterans. Pain, 158(5), 833–839. 'DOI: 10.1097/j.pain.0000000000000837''
<b>Reference</b>	Reference Type: Citation  Reference Text: 'Liu, Y., Logan, J., Paulozzi, L., et al. (2013). Potential misuse and inappropriate prescription practices involving opioid analgesics. American Journal of Managed Care, 19(8), 648–665. Retrieved from <a href="http://www.ajmc.com/journals/issue/2013/2013-1-vol19-n8/Potential-Misuse-and-Inappropriate-Prescription-Practices-Involving-Opioid-Analgesics/">http://www.ajmc.com/journals/issue/2013/2013-1-vol19-n8/Potential-Misuse-and-Inappropriate-Prescription-Practices-Involving-Opioid-Analgesics/</a> '
<b>Reference</b>	Reference Type: Citation  Reference Text: 'Mack, K., Zhang, K., Paulozzi, L., & Jones, C. (2015). Prescription practices involving opioid analgesics among Americans with Medicaid, 2010. Journal of Health Care for the Poor and Underserved, 26(1), 182–198. Retrieved from <a href="http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4365785">http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4365785</a> '
<b>Reference</b>	Reference Type: Citation  Reference Text: 'National Institute on Drug Abuse. (2011). Analysis of opioid prescription practices finds areas of concern.
<b>Reference</b>	Reference Type: Citation  Reference Text: 'New York City (NYC) Department of Health and Mental Hygiene (NYC DOHMH). (2013). Opioid prescribing resource for emergency department. Retrieved from <a href="https://www1.nyc.gov/site/doh/providers/health-topics/opioid-prescribing-resources-for-emergency-departments.page">https://www1.nyc.gov/site/doh/providers/health-topics/opioid-prescribing-resources-for-emergency-departments.page</a> '
<b>Reference</b>	Reference Type: Citation  Reference Text: 'Park, T. W., Saitz, R., Ganoczy, D., Ilgen, M. A., & Bohnert, A. S. (2015). Benzodiazepine-prescribing patterns and deaths from drug overdose among U.S. veterans receiving opioid analgesics: Case-cohort study. BMJ, 350(h2698). 'DOI: 10.1136/bmj.h2698''
<b>Reference</b>	Reference Type: Citation  Reference Text: 'Rudd, R., Aleshire, N., Zibbell, J., & Gladden, M. (2016). Increases in drug and opioid overdose deaths—United States, 2000–2014. Morbidity and Mortality Weekly Report, 64(50), 1378–1382. Retrieved from <a href="http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm">http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm</a> '
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<b>Reference</b>	<p>Reference Type: Citation</p> <p>Reference Text: 'Washington Agency Medical Directors' Group (WAMDG). (2015). Interagency guideline on prescribing opioids for pain, Part II: Prescribing opioids in the acute and subacute phase. Retrieved from <a href="http://www.agencymeddirectors.wa.gov/Files/2015AMDGOpioidGuideline.pdf">http://www.agencymeddirectors.wa.gov/Files/2015AMDGOpioidGuideline.pdf</a></p>
<b>Definition</b>	<p>For the purpose of this measure, the following are defined as:</p> <ul style="list-style-type: none"> <li>- Opioid: Schedule II, III and IV Opioid Medications that do not include naloxone.</li> <li>- Benzodiazepine: Schedule IV benzodiazepine medications.</li> <li>- Medications for Opioid Use Disorder: Methadone, buprenorphine and buprenorphine in combination with naloxone.</li> <li>- Prescribed: The intent of the measure is to capture opioid and/or benzodiazepine medications continued or ordered at discharge</li> <li>- Numerator criteria: Two or more unique orders for opioids, or an opioid and benzodiazepine at discharge</li> </ul>
<b>Guidance</b>	<p>Clinician judgement, clinical appropriateness, or both may indicate concurrent prescribing of two unique opioids or an opioid and benzodiazepine is medically necessary, thus the measure is not expected to have a zero rate.</p> <p>New or continuing opioid and benzodiazepine medications are included with the use of the QDM "Medication, Discharge" datatype. This datatype indicates medications that should be taken by or given to the patient after being discharged from an inpatient encounter, which could include previously or newly prescribed medications. The definition of this datatype is located on eCQI Resource Center.</p> <p>Inpatient hospitalizations with discharge medications of an opioid or benzodiazepine prescription should be included in the initial population.</p> <p>Inpatient hospitalizations with discharge medications of two or more opioids or an opioid and benzodiazepine resulting in concurrent therapy at discharge should be included in the numerator. Each benzodiazepine and opioid included on the medication discharge list is considered a unique prescription.</p> <p>The denominator population includes patients with inpatient hospitalizations and patients from Acute Hospital Care at Home programs, who are treated and billed as inpatients but receive care in their home.</p> <p>This eCQM is an episode-based measure. An episode is defined as each inpatient hospitalization or encounter that ends during the measurement period.</p> <p>This version of the eCQM uses QDM version 5.6. Please refer to the eCQI Resource Center (<a href="https://ecqi.healthit.gov/qdm">https://ecqi.healthit.gov/qdm</a>) for more information on the QDM.</p>
<b>Transmission Format</b>	TBD
<b>Initial Population</b>	Inpatient hospitalizations that end during the measurement period, where the patient is 18 years of age and older at the start of the encounter and prescribed one opioid and/or benzodiazepine at discharge
<b>Denominator</b>	Equals Initial Population

<b>Denominator Exclusions</b>	Inpatient hospitalizations where patients have cancer pain that begins prior to or during the encounter or are ordered or are receiving palliative or hospice care (including comfort measures, terminal care, and dying care) during the hospitalization or in an emergency department encounter or observation stay immediately prior to hospitalization, patients receiving medication for opioid use disorder (OUD) with active OUD diagnosis or Opioid Medication Assisted Treatment (MAT), patients with sickle cell disease, patients discharged to another inpatient care facility or left against medical advice, and patients who expire during the inpatient stay
<b>Numerator</b>	Inpatient hospitalizations where the patient is prescribed two or more opioids or an opioid and benzodiazepine at discharge
<b>Numerator Exclusions</b>	None
<b>Denominator Exceptions</b>	None
<b>Supplemental Data Elements</b>	For every patient evaluated by this measure also identify payer, race, ethnicity and sex

## Acronyms

<b>ANSI</b>	American National Standards Institute
<b>CBE</b>	consensus-based entity
<b>CMS</b>	Centers for Medicare & Medicaid Services
<b>CPT</b>	Current Procedural Terminology
<b>CQL</b>	Clinical Quality Language
<b>DRC</b>	direct reference code
<b>eCQI</b>	electronic clinical quality improvement
<b>eCQM</b>	electronic clinical quality measure
<b>ED</b>	emergency department
<b>EHR</b>	electronic health records
<b>ELM</b>	Expression Logical Model
<b>GUID</b>	globally unique identifier
<b>HIT</b>	health information technology
<b>HL7®</b>	Health Level Seven International®
<b>HQMF</b>	Health Quality Measure Format
<b>HTML</b>	Hypertext Markup Language
<b>ICD-10-CM</b>	International Classification of Diseases, Tenth Revision, Clinical Modification
<b>JSON</b>	JavaScript Object Notation
<b>LOINC</b>	Logical Observation Identifiers Names and Codes
<b>MADiE</b>	Measure Authoring Development Integrated Environment
<b>MMS</b>	Measures Management System
<b>OID</b>	object identifier
<b>ONC</b>	Office of the National Coordinator for Health Information Technology
<b>OQR</b>	Outpatient Quality Reporting
<b>QDM</b>	Quality Data Model
<b>SNOMED CT</b>	Systematized Nomenclature of Medicine, Clinical Terms
<b>VSAC</b>	Value Set Authority Center
<b>XML</b>	Extensible Markup Language