



**Centers for Medicare & Medicaid Services**

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

**Version 10.0**

**May 2024**

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# 1. Introduction

An electronic clinical quality measure (eCQM) uses data from electronic health records (EHRs) and/or health information technology (IT) 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 utilizing the capabilities of health IT and EHRs.

## 1.1. Using This Guide

This Guide seeks to help measured entities (including clinicians and hospitals), quality analysts, eCQM implementers, and health IT vendors understand eCQMs and their related documents. The Guide provides background on eCQM packages and an overview of the human-readable format of eCQMs. For information on how to develop an eCQM, please refer to the Blueprint content on the [CMS Measures Management System \(MMS\) Hub](#) and the [eCQMs Specification, Testing, Standards, Tools, and Community supplemental material](#). 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 eCQM, Eligible Hospital (EH)/Critical Access Hospital (CAH) eCQM, or Outpatient Quality Reporting (OQR) eCQM Resources tables. For more information on understanding harmonization efforts across the eCQMs, please refer to the Clinical Quality Language (CQL) Style Guide on the [eCQI Resource Center CQL Tools & Resources](#) page.

## 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 [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>1</sup> Intended to represent eCQMs used in a health care setting, HQMF is an XML document describing how to compute an eCQM. Through standardization of an eCQM’s structure, metadata, definitions, and logic, the HQMF provides consistency and unambiguous interpretation. More information on [HQMF](#) is available on the eCQI Resource Center site.

#### 2.1.2. Quality Data Model

The Quality Data Model (QDM) is the information model that measure developers use to define the data necessary to describe the eCQM components (such as the numerator and denominator for a proportion measure). Creating an eCQM involves defining data elements consistently based on the QDM, which helps to define the data criteria used in the eCQM. This process is outlined in the [Blueprint content on the CMS MMS Hub](#). More information about the [QDM](#) is available on the eCQI Resource Center site. 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 data model uses a specific structure to define a QDM data element. Figure 2.1 shows the structure of a QDM data element:

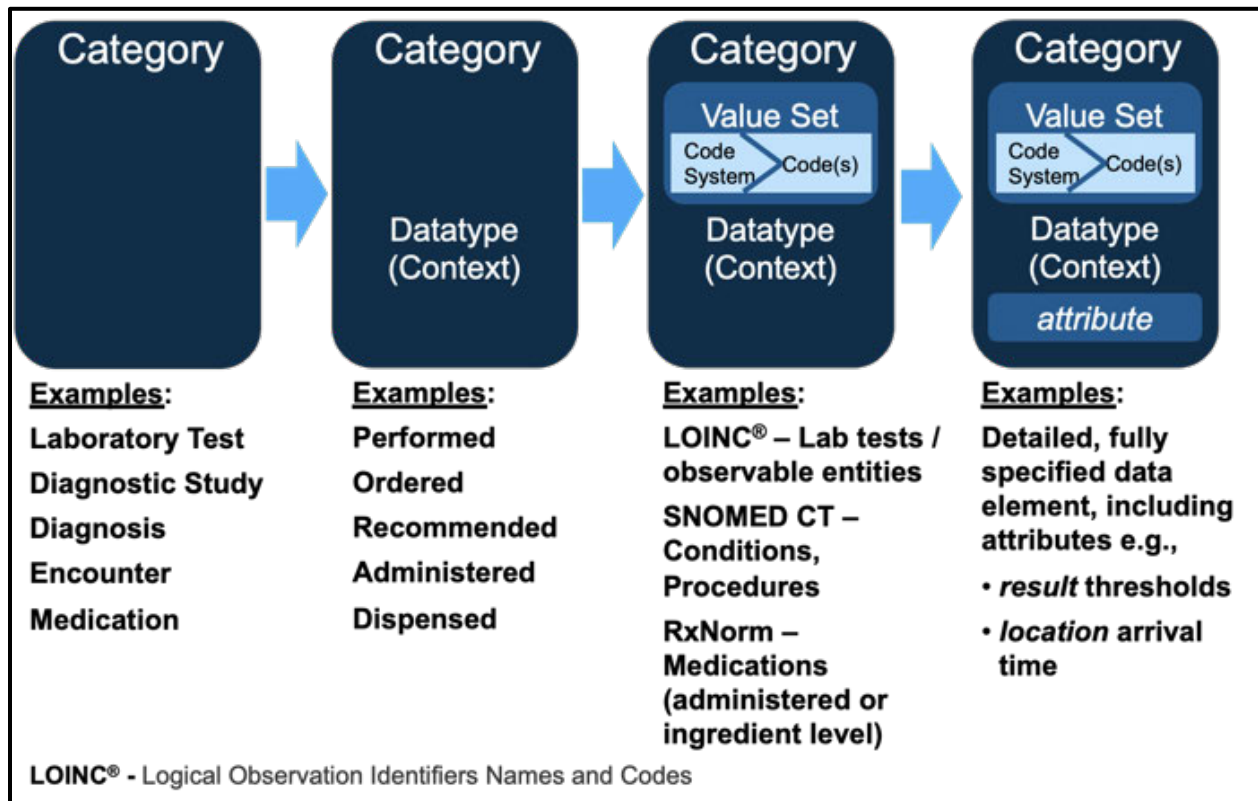
1. QDM category is the particular class or group of information a quality measure can address (for example, Diagnosis, Medication, Procedure, or Laboratory Test).
2. QDM datatype starts with the QDM category and adds the context in which the information is expected to be found with respect to electronic clinical data (for example, “Laboratory Test, Performed;” “Laboratory Test, Ordered”).
3. QDM data elements start with the QDM datatype and include specific values to precisely signify the information desired. The values are referenced as a single code (direct reference code) or a value set.
4. QDM attributes represent information about a QDM data element (or metadata) that must exist in data retrieved from the EHR or health IT to calculate the eCQM results.

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<sup>1</sup> HL7 is a nonprofit organization that develops standards accredited by the American National Standards Institute (ANSI).

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.

**Figure 2.1. QDM Structure – Building a quality data element using QDM categories, context (datatype), value sets, or direct reference codes and attributes<sup>2</sup>**



Combining the QDM datatype with a value set or direct reference code makes a QDM data element.

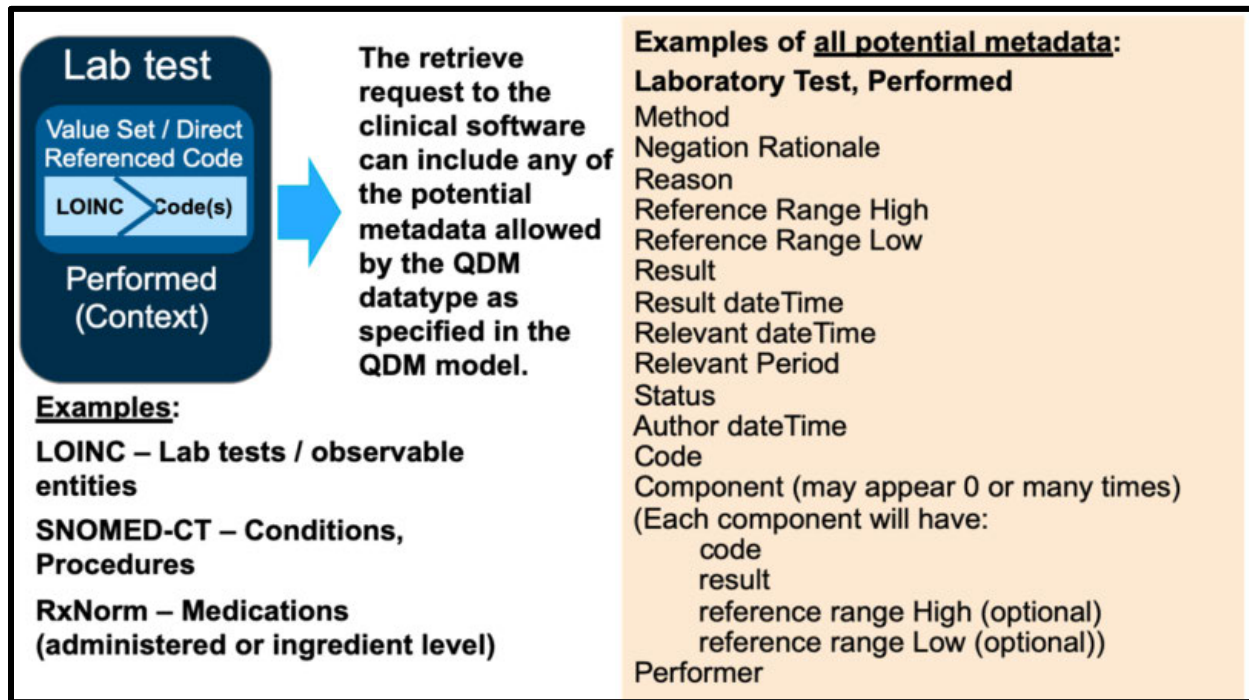
The QDM version 5.6 introduced new attributes for certain datatypes such as “Laboratory Test, Performed.” One such attribute is the “Encounter, Performed” *class* representing the classification of patient encounter concepts such as ambulatory or inpatient. QDM version 5.6 also expanded the use of the *relatedTo* attribute to cover more datatypes to avoid double counting a single event represented by more than one QDM datatype.

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 versions to use in each reporting or performance period, please visit the [eCQI Resource Center eCQM Standards and Tools Versions](#) page.

<sup>2</sup> Source of diagram: Centers for Medicare & Medicaid Services. “Quality Data Model, Version 5.6: QDM Data Element Structure.” Section 2.5, January 2021, page 7. <https://ecqi.healthit.gov/sites/default/files/QDM-v5.6-508.pdf>.

An eCQM specified with CQL logic expressions uses QDM by describing data criteria based on the QDM datatype and its related value or value set. CQL references the QDM attributes separately as part of the CQL expression detail. Therefore, the data criteria section of the eCQM references only the QDM data elements. Any values or value sets that the QDM attributes reference (for example, specific allowable results) appear within the logic expression, and the values or value sets appear only in the terminology section of the eCQM. Note that the QDM datatype appears in the HQMF, whereas the attributes appear in the CQL portion of the eCQM. Figure 2.2 shows how measure developers use QDM components with a CQL-based eCQM.

Figure 2.2. Description of a Laboratory Test<sup>3</sup>



### 2.1.3. CQL

CQL is an HL7 normative standard<sup>4</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 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 site.

<sup>3</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, page 8. <https://ecqi.healthit.gov/sites/default/files/QDM-v5.6-508.pdf>.

<sup>4</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. Tools

### 2.2.1. Measure Authoring Tool

Measure developers use the Measure Authoring Tool (MAT) to create eCQMs in a highly structured format using the QDM, CQL, and standard vocabularies. eCQMs developed using the MAT produce HQMF-compliant outputs. Measure developers author all eCQMs used in CMS quality reporting programs in the MAT and export measure packages from the MAT for publication and use. To learn how to use the MAT to author eCQMs, please refer to the [Measure Authoring Tool User Guide](#). Starting in June 2024, all measure authoring and testing will occur in the MADiE tool. The MAT tool will be decommissioned at this time.

### 2.2.2. Bonnie

[Bonnie](#) is a software tool that enables eCQM developers to test and verify the behavior of their eCQM logic. The main goal of the Bonnie application is to reduce the number of defects in eCQMs before EHR vendors implement them by providing a robust and automated testing framework. The Bonnie application helps measure developers execute an eCQM's logic against a constructed patient test deck and evaluate whether the logic aligns with the intent of the eCQM. Starting in June 2024, all measure authoring and testing will occur in the MADiE tool. The Bonnie tool will be decommissioned at this time.

### 2.2.3. MADiE

Measure Authoring Development Integrated Environment (MADiE) is a software tool that provides integrated measure authoring and testing functionalities. MADiE is built on the latest technology and supports editing and testing of QDM measures. Starting in June 2024, all measure authoring and testing will occur in the MADiE tool. To learn how to use the MADiE tool, please refer to the MADiE User Guide on the [MADiE MVP page](#).

### 2.2.4. Value Set Authority Center

The [Value Set Authority Center \(VSAC\)](#) is a central repository for the official versions of value sets supporting the 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 \(ICD-10-CM\)](#), [Systemized 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 system 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](#).

#### 2.2.4.1. Value Sets

A value set is a specific set of codes and their descriptors that define a clinical or administrative concept. The codes are from one or more code systems, such as CPT, ICD-10-CM, SNOMED



CT, or LOINC. Value sets contain the codes expected to appear (or be available via mapping) in the clinical record or administrative data. Each value set has an assigned numeric object identifier (OID). In the human-readable HyperText Markup Language (HTML) document, value sets have both a name (*value\_set\_name*) and an identifier (*value\_set\_OID*). In CQL, the use of a value set in an eCQM is indicated by square brackets. The example depicts 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. This value set is an example of a grouping value set that groups together several other value sets. 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 download tab in the VSAC provides Excel workbooks that compile value sets by quality reporting program, eCQM, value set name, and QDM category. These workbooks provide additional detail related to the value set, including code system OIDs and versions. Please note, for value sets used exclusively to describe QDM attributes, the information in the QDM category column of the compiled workbooks is blank because more than one QDM category might use 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 (CMS eCQM). On this tab, users can download Excel spreadsheets containing individual value set metadata and contents. Finally, users can retrieve eCQM value sets programmatically with the VSAC Sharing Value Sets Application Programming Interface ([VSAC SVS API](#)), using the release parameter and correct release name corresponding with the desired eCQM publication date listed on the [VSAC Downloadable Resources page](#).

### 2.2.4.2. Direct Reference Codes

If a single code—rather than a collection of codes in a value set—can define a clinical or administrative concept, then there is an alternative method for associating the concept to the QDM data element. Instead of creating a single-code value set, the eCQM expression directly embeds the code into the CQL logic statements. This method of expression is a direct reference code. The terminology section of the HQMF lists direct reference codes and the OIDs of the code systems from which the codes derive (for example, SNOMED CT or LOINC). As shown in Figure 2.3, the terminology section for CMS154v12, *Appropriate Treatment for Upper Respiratory Infection (URI)*, contains five direct reference codes.

**Figure 2.3. Direct Reference Codes in CMS154v12**

- 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 downloads tab of the VSAC, discussed in Section 3.2.3.1, do not include the direct reference codes used in measures. To obtain a separate listing of direct reference codes, 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.

### 2.2.4.3. Versioning Value Sets

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

- 20210506
- 20200507

Users can view this version identification system by reviewing the eCQM on the VSAC website or on the exported Excel spreadsheet. Users can also view the value set versions (value set definition version) in Search Value Sets of the Value Set Details tab in VSAC.

Measure developers maintain value sets, including removing or adding codes. When measure developers modify value sets and 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 Package Naming Conventions

Measure developers create an eCQM in the [MAT](#) and export it as an eCQM package. Each eCQM package contains these components for use in implementing an eCQM:

- **Human-readable HTML file (.html):** File showing the eCQM content in a human-readable format directly in a web browser.
- **[HQMF](#) Extensible Markup Language (XML) file (.xml):** File provides the description of the eCQM data and population criteria and 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](#), and [supplemental data elements](#). The HQMF points to the CQL [library](#) and associated Expression Logical Model (ELM) files.
- **CQL file (.cql):** File that provides 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.
- **ELM file (.xml, .json):** File that provides 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.

### 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 at least one main CQL library. The main CQL library, referenced from HQMF, might depend on other CQL libraries (that is, shared libraries) that are often used in or shared with 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 of the CQL libraries so that local implementers can use those most appropriate to their software and data analysis tools.

### 3.1.2. Measure Packaging by Setting

CMS publishes multiple eCQM specification zip files annually. Each file contains the eCQMs for a specific reporting or performance period. The files are named using the setting and then publication date (format: YYYY-MM), as shown in these examples:

- EH-CAH-eCQM-2024-05.zip
- EC-eCQM-2024-05.zip

### 3.1.3. CMS eCQM ID

During its development in the MAT, each eCQM receives a unique CMS eCQM ID. The eCQM ID is found in the header of the HQMF for the measure and consists of the eCQM Identifier and a major eCQM Version Number. Measure developers create the eCQM ID by prefacing the eCQM Identifier with “CMS” followed by “v” and the major version number. For example, the eCQM ID of eligible clinician measure, Diabetes: Hemoglobin A1c (HbA1c) Poor Control (> 9%), is **CMS122v12**, as shown in Table 3.1.

**Table 3.1. CMS eCQM Identifier and Version Number**

eCQM information	Value
eCQM Identifier (MAT)	122
eCQM Version Number	12
CMS eCQM ID	CMS122v12

### 3.1.4. eCQM Zip File and Folder

An eCQM package is published as a zip file. The published zip file contains the HTML, HQMF XML, CQL, ELM (JSON and XML), and CQL libraries discussed in Section 3.1. There are separate CQL and ELM (JSON and XML) files for each CQL library. The eCQM package name includes the CMS eCQM ID (for example, CMS122v12.zip).

### 3.1.5. Individual eCQM File Components

Table 3.2 shows examples of these filenames for eCQMs posted on the eCQI Resource Center. The eCQM specification zip, HTML, and HQMF XML filenames refer to the CMS eCQM ID. The CQL, ELM XML, and ELM JSON file names refer to the abbreviated eCQM title, which is often the same as the CMS eCQM ID from the MAT and the eCQM version number, except in the case of a long title abbreviation.

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

File type	Filename standard	Filename example
Zip	{CMS eCQM ID and version}.zip	CMS122v12.zip
HTML	{CMS eCQM ID and version}.html	CMS122v12.html
HQMF XML	{CMS eCQM ID and version}.xml	CMS122v12.xml
CQL	{CMS eCQM ID}-{eCQM version}-QDM-5-6.cql	CMS122-v12-0-000-QDM-5-6.cql
ELM XML	{CMS eCQM ID}-{eCQM version}-QDM-5-6.xml	CMS122-v12-0-000-QDM-5-6.xml
ELM JSON	{CMS eCQM ID}-{eCQM version}-QDM-5-6.json	CMS122-v12-0-000-QDM-5-6.json

## 3.2. Download, Extract, and Access eCQM Documents

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

- Downloading the eCQM zip file containing *all the eCQMs* for the relevant setting from the [eCQI Resource Center](#)
- Going to the *individual* webpage associated with an eCQM on the eCQI Resource Center webpage to view and download the specification zip file

Users can open the file by:

1. Downloading the zip file
2. After it finishes downloading, double click on the zip file to open it
3. Double click on the file you wish to view

**Note:** To view the XML coding, right click to open the document with a text reader such as WordPad, Notepad, or a third-party XML-reading software. To open in a text editor or an XML editor, right click on the file, select “Open with,” and then select the text editor or an XML editor. CQL library files open in a text reader. Tools such as VS Code (with CQL plugin) 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 webpage.

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

The eCQM human-readable format (in HTML) contains a header and body. eCQMs have six or eight key components, depending on type and level of detail.

### 4.1. Header

The header of an eCQM provides important general information or metadata about the eCQM. The header identifies the eCQM's developer and steward, the dates during which it is valid, and other details about how the eCQM works or how eCQM implementers use the measure.

[Appendix A](#) includes definitions of the header component and an example of an eCQM header.

### 4.2. Body

The body is derived from the formal eCQM specification (CQL and HQMF). It is expected that the header (narrative) and the formal specification (CQL and HQMF) are consistent.

- **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 observation, and stratification. For definitions of these populations, please refer to Section 4.2.1.
- **Definitions:** Additional CQL definitions (expression logic) that the population definitions might reference. A CQL definition is the basic unit of logic within the CQL library.
- **Functions:** CQL expressions performing a calculation frequently found in eCQMs to return a value. For example, measure developers usually express age calculations as functions.
- **Terminology:** A list of the value sets and direct reference codes used in the eCQM.
- **Data criteria (QDM data elements):** A list containing the QDM datatypes and value set names or direct reference code 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 health IT retrieve for each patient reported in the eCQM, such as race, ethnicity, payer, and sex. Measure developers may also specify supplemental data elements to request data for risk adjustment or population health analytics.
- **Risk adjustment variables:** 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 consist of a definition statement or reference another definition. eCQMs describe these concepts in the definition section within the human-readable format of the eCQM. CQL specifies the data criteria within each population criterion and references the data elements based on the QDM data model.

The populations that a measure defines may include:<sup>5</sup>

- **Initial population (IP):** All events for measured entities to evaluate regarding a quality measure involving patients or episodes who share a common set of characteristics within a specific measurement set to which a given eCQM belongs. Subsequent eCQM populations (for example, numerator, denominator) draw patients or episodes from the initial population.
- **Denominator (DENOM):** The lower part of a fraction used to calculate a rate, proportion, or ratio. It can be the same as the initial population or a subset of the initial population to further constrain the population for the purpose of the measure. Continuous variable measures do not have a denominator, but instead define a measure population.
- **Denominator exclusions (DENEX):** In proportion measures, a patient or episode measured entities remove from the denominator before determining if the case meets the numerator criteria. In ratio measures, because the denominator and numerator are distinct, this is a case that will be excluded from the denominator population.
- **Numerator (NUMER):** The upper portion of a fraction used to calculate a rate, proportion, or ratio. Also called the measure focus, it is the target process, condition, event, or outcome. Numerator criteria are the processes or outcomes expected for each patient, procedure, or other unit of measurement defined in the denominator. A numerator statement describes the clinical action satisfying the conditions of the performance measure.
- **Denominator exceptions (DEXCEP):** Any condition that should remove a unit of measurement (specific patient, episode, or procedure) from the denominator of the performance rate only if the patient or episode does not meet numerator criteria. A denominator exception allows for adjustment of the calculated score for those measured entities with higher risk populations or to exercise clinical judgement while performing care. Allowable reasons for a denominator exception fall into three general categories: medical reasons, patient reasons, or system reasons. Only proportion measures use denominator exceptions. When removing denominator exception cases from the denominator, the measured entity may still be required to report the number of patients or episodes with valid exceptions.
- **Numerator exclusions (NUMEX):** Defines an instance that measured entities should not include in the numerator data. Measure developers only use numerator exclusions in ratio and proportion measures.

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<sup>5</sup> Except for measure population, all definitions are available on the eCQI Resource Center website at <https://ecqi.healthit.gov/glossary>.



- **Measure population** (used only in continuous variable measures): The measure population—for example, all patients seen in the emergency department (ED) during the measurement period. The measure population could be the same as, or contain a subset of, the IP.
- **Measure observations** (used only in continuous variable measures): The computation that reporting entities should perform on the members of the measure population after removing the measure population exclusions. For example, CMS111v11, Median Admit Decision Time to ED Departure Time for Admitted Patients, computes the median time (in minutes) from admit decision time to time of departure from the ED for ED patients admitted to inpatient status.

For example, Figure 4.1 defines the specifications about the initial population of CMS122v12, Diabetes: Hemoglobin A1c (HbA1c) Poor Control (> 9 percent):

- Patients 18 to 75 years of age by the end of the measurement period with a visit during the measurement period
- Patients who have a diagnosis of diabetes identified any time up to the end of the measurement period

**Figure 4.1. Initial Population Criteria in CMS122v12**

### Initial Population

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

Note that in the example shown in Figure 4.1, CQL uses common linking operators and timing phrases such as “exists.” These examples demonstrate common linking operators and timing phrases found within CQL expressions:

and, not, or, is, is not, starts/ends, during, before, on or before/after, same or before/after, with/without, overlaps, count, sort, null, is true/false, greater/less, same as, equal, exists, intersects, sort, first/last, return, let, where, union, intersect, except, includes

**Definitions.** The CQL expression also uses definitions, which are common clauses of data elements and their interrelationships. The definition title, displayed in quotation marks, is a human-readable name enabling the eCQM to reference expressions without having to repeat all of the logic each time. Each eCQM has a definition section containing a definition title followed by the expression logic used to characterize it.

Figure 4.2 shows a simple definition of “Initial Population,” describing all patients included in the denominator. As noted in Figure 4.1, the definition of “Initial Population” specifies the content of the definition “Initial Population.”

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

**Denominator**

```
"Initial Population"
```

Note the definition of “Initial Population” includes other definitions such as “Qualifying Encounters” (see Figure 4.1). The user should review the definition section of the specification to determine what each definition includes (for example, what a “Qualifying Encounter” means). In the human-readable HQMF, definitions are in alphabetical order by the definition name.

**Aliases.** Aliases are words or easily understood abbreviations that help describe logic statements and are meant to reduce their complexity. A measure developer can apply an alias to an expression in CQL and reference that same concept elsewhere in the eCQM, reducing complexity rather than repeating the entire expression each time it is needed. In Figure 4.3, the eCQM adds the alias *Diabetes* to the QDM data element [“Diagnosis”: “Diabetes”]. As a result, when the eCQM expresses how to relate the timing of the diabetes diagnosis, it can use the alias instead of repeating the entire expression to which it refers.

As shown in Figures 4.3 and 4.4, CQL displays QDM data elements in brackets and QDM datatypes in quotation marks, followed by a colon and then the value or value set used to specify the element—for example, [“*Diagnosis*”: “*Diabetes*”].

**Attributes.** QDM defines a set of allowable attributes for each datatype. In Figure 4.3, “Diagnosis” is the QDM datatype and it includes a number of attributes, one of which is the *prevalencePeriod*. QDM defines *prevalencePeriod* as an interval starting with the onset date and ending with the abatement date (the date the diagnosis ends). If there is no abatement date, the measured entity may assume the diagnosis remains active. The CQL references attributes using a period between the alias for the QDM data element and its attribute. Figure 4.3 shows the QDM data element alias “Diabetes” followed by the attribute *prevalencePeriod* (*Diabetes.prevalencePeriod*).

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

```
and exists ( ["Diagnosis": "Diabetes"] Diabetes
  where Diabetes.prevalencePeriod overlaps "Measurement Period" )
```

Figure 4.4 presents the final example of the completed QDM data element in the data criteria section of the eCQM, which lists the value or value set the QDM datatype requires. The QDM data element “Diagnosis”: “Diabetes” uses the diabetes value set with its OID. Subsection 3.2.3 provides a high-level description of the VSAC, which contains all of the eCQM value sets and their OIDs.



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

- "Diagnosis: Diabetes" using "Diabetes (2.16.840.1.113883.3.464.1003.103.12.1001) "

**4.2.2. Functions**

Functions are CQL expressions that perform a calculation frequently found in eCQMs. Rather than repeating common calculations in each eCQM, a measure developer can express the logic to access a 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 shown in Figure 4.5, to avoid restating logic to include all use cases for date time points around a data element in each eCQM, the measure developer uses the function “NormalizeInterval” from a global common function library.

**Figure 4.5. Example of CQL Function****Numerator 2**

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

Some functions are global functions and exist in the global common library; that is, many eCQMs can use them. Figure 4.6 depicts the “NormalizeInterval” function as an example of a global calendar function from the global 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 also share definitions or functions across eCQMs via libraries. Sharing can occur locally; that is, within an eCQM set for use across several eCQMs. Figure 4.7 shows the referenced definition of “Hospice.Has Hospice Services” determines whether the patient is receiving hospice care. As shown in Figure 4.6, library sharing can also occur globally across all eCQMs, using the global library function “Global.NormalizeInterval”).

**Figure 4.7. Example of Population Criteria Using a Local 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 "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 "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 "Measurement Period"
)

```

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

The terminology section provides a complete list of value sets and direct reference codes used in an eCQM, including the value set name with its unique OID. For direct reference codes, the list contains the code and terminology version and the OID of the terminology that each direct reference code uses.

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

Note that QDM also defines additional information about a QDM data element that an eCQM might contain. QDM refers to this additional information as attributes. All QDM datatypes have a code attribute that an eCQM expression must bind to the terminology (a value set or a direct

reference code). 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 values to reference attributes, the value sets display in the terminology section and not in the data criteria section, which is limited to values or value sets referenced with QDM datatypes. Attributes include such concepts as *result*, *negationRationale*, and *severity*, all of which provide further context for the data element expressed with the QDM datatype.

For example, CMS138v12, 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 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 section as criteria used in the retrieve filter. The value set reference appears only in the eCQM 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 various risk adjustment or population analytics, but the supplemental elements are not included in the calculation as part of the basic 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. In particular, hybrid measures and risk-adjusted measures may represent “cohort” measures, which ask that specific information about patients or episodes and the calculation method is reported. These types of measures may identify the list of patient data that is required in the Supplemental Data Element section of the eCQM.

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

<b>Supplemental Data Elements</b>	
<b>SDE Ethnicity</b>	["Patient Characteristic Ethnicity": "Ethnicity"]
<b>SDE Payer</b>	["Patient Characteristic Payer": "Payer Type"]
<b>SDE Race</b>	["Patient Characteristic Race": "Race"]
<b>SDE Sex</b>	["Patient Characteristic Sex": "ONC 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.

The eCQM human-readable document (HTML) always includes a reporting stratification section. 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 CMS155v12, Weight Assessment and Counseling for Nutrition and Physical Activity for Children/Adolescents).

**Figure 4.10. Reporting Stratification**

##### (a) Stratification Section in Header

Stratification	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

###### **Stratification 1**

```
AgeInYearsAt(date from
  end of "Measurement Period"
)in Interval[3, 11]
```

###### **Stratification 2**

```
AgeInYearsAt(date from
  end of "Measurement Period"
)in Interval[12, 17]
```

## 4.2.6. Risk Adjustment Variables

Outcome measures might require risk adjustment to account for the complexity of patient conditions that could affect the outcomes. Risk adjustment variables serve to identify these patients. An eCQM report receiver may use variables in statistical models to revise eCQM scores to reflect these patient characteristics. The eCQM will express risk adjustment variables and measured entities will ensure retrieval of such elements from existing clinical data. The measure developer will likely include risk adjustment methodology as an attachment or link in the eCQM header to describe how to adjust scores using the variables. Data that measured entities use as risk adjustment variables are submitted to the receiving system in a manner similar to supplemental data elements noted in Section 4.2.4.

## 4.2.7. Measure Observations

Only ratio and continuous variable measures use the term measure observations. Measure observations describe how to evaluate performance (for example, the sum of denominator-eligible hospitalization days during the measurement period).

Figure 4.11 shows an example of measure observation logic referencing the *Denominator Observations* function located in the functions section of CMS871v3, Hospital Harm - Severe Hyperglycemia:

**Figure 4.11. Measure Observation Example**

### **Measure Observation 1 (Association: Denominator)**

```
Sum (  
  if QualifyingEncounter.id in "Denominator  
  Exclusions".id then singleton from ( "Days With  
  Hyperglycemic Events" EncounterWithEventDays  
    where EncounterWithEventDays.encounter =  
  QualifyingEncounter  
    return 0  
  )  
  else singleton from ("Days with Hyperglycemic  
  Events" EncounterWithEventDays where  
  EncounterWithEventDays.encounter =  
  QualifyingEncounter return  
  Count(EncounterWithEventDays.eligibleEventDays)  
  )  
)
```

## 5. Connect for Assistance

For questions related to eCQM implementation specifications, logic, data elements, standards, or tools, use the eCQM Issue Tracker in the Office of the National Coordinator for Health IT (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.

## Appendix A. Sample eCQM Header

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

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

**eCQM Identifier (Measure Authoring Tool):** The MAT automatically generates a unique eCQM identifier.

**eCQM Version Number:** A number used to indicate the version of the eCQM. The combination of the eCQM identifier and the major version portion of the eCQM version number creates the CMS eCQM ID.

**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. The MAT automatically generates this field. The GUID does not change from year to year when eCQM specifications are updated.

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

**Measure Steward:** The individual or organization that owns an eCQM and is responsible for its continued maintenance. The measure steward can be the same as the measure developer.

**Measure Developer:** The individual or organization that is responsible for the development, implementation, and maintenance of an eCQM.

**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, or ratio).

**Measure Type:** Indicates what the eCQM is measuring, such as a structure, process, or outcome.

**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, a higher score indicates better quality OR a lower score indicates better quality OR quality is within a range).

**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:** Can be to be determined (TBD), a URL, or hyperlink to the transmission formats a reporting program specifies.

**Initial Population:** The initial population refers to all patients 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:** The denominator statement 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:** A denominator exclusion refers to criteria resulting in removal from the denominator before calculating the numerator. An exclusion means the numerator event is not applicable. One example of an exclusion is a screening mammography for a woman who had a bilateral mastectomy. The goal of denominator exclusion criteria is to have a population or sample with a similar profile in terms of meeting the numerator criteria.

**Numerator:** The numerator statement describes the process, condition, event, or outcome that satisfies the eCQM focus or intent.

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

**Denominator Exceptions:** A denominator exception refers to criteria resulting in removal from the denominator after calculating the numerator. An exception means the numerator event is applicable, but not clinically appropriate. One example of a denominator exception is not performing a suicide screening for a patient in an acute medical situation.

**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 CMS122v12 Diabetes: Hemoglobin A1c (HbA1c) Poor Control (> 9 percent)**

<b>eCQM Title</b>	<b>Diabetes: Hemoglobin A1c (HbA1c) Poor Control (&gt; 9 percent)</b>		
<b>eCQM Identifier (Measure Authoring Tool)</b>	122	<b>eCQM Version Number</b>	12.0.000
<b>CBE Number</b>	Not Applicable	<b>GUID</b>	f2986519-5a4e-4149-a8f2-af0a1dc7f6bc
<b>Measurement Period</b>	January 1, 20XX through December 31, 20XX		
<b>Measure Steward</b>	National Committee for Quality Assurance		
<b>Measure Developer</b>	National Committee for Quality Assurance		
<b>Endorsed By</b>	None		
<b>Description</b>	Percentage of patients 18–75 years of age with diabetes who had hemoglobin A1c > 9.0 percent during the measurement period		
<b>Copyright</b>	<p>The National Committee for Quality Assurance (NCQA) developed and owns the Physician Performance Measure (Measure) and related data specifications. NCQA is not responsible for any use of the Measure. NCQA makes no representations, warranties, or endorsement about the quality of any organization or physician that uses or reports performance measures and NCQA has no liability to anyone who relies on such measures or specifications. NCQA holds a copyright in the Measure. The Measure can be reproduced and distributed, without modification, for noncommercial purposes (for example, use by healthcare providers in connection with their practices) without obtaining approval from NCQA. Commercial use is defined as the sale, licensing, or distribution of the Measure for commercial gain, or incorporation of the Measure into a product or service that is sold, licensed or distributed for commercial gain. NCQA must approve all commercial uses or requests for modification and are subject to a license at the discretion of NCQA. (C) 2012–2022 National Committee for Quality Assurance. All rights reserved.</p> <p>The Measure specifications contain limited proprietary coding for user convenience. Users of proprietary code sets should obtain all necessary licenses from the owners of the code sets. NCQA disclaims all liability for use or accuracy of any third-party codes contained in the specifications.</p> <p>CPT(R) codes, descriptions and other data are copyright 2022. American Medical Association (AMA). All rights reserved. CPT is a trademark of the American Medical Association. No fee schedules, basic units, relative values, or related listings are included in CPT. The AMA assumes no liability for the data contained herein. Applicable FARS/DFARS restrictions apply to government use.</p> <p>LOINC(R) copyright 2004–2022 Regenstrief Institute, Inc.</p> <p>This material contains SNOMED Clinical Terms(R) (SNOMED CT[R]) copyright 2004–2022 International Health Terminology Standards Development Organisation.</p> <p>ICD-10 copyright 2022 World Health Organization. All rights reserved.</p>		
<b>Disclaimer</b>	The performance Measure is not a clinical guideline, does not establish a standard of medical care, and has not been tested for all potential applications. THE MEASURE AND SPECIFICATIONS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND.		

	Due to technical limitations, registered trademarks are indicated by (R) or [R] and unregistered trademarks are indicated by (TM) or [TM].
<b>Measure Scoring</b>	Proportion
<b>Measure Type</b>	Intermediate Clinical Outcome
<b>Stratification</b>	None
<b>Risk Adjustment</b>	None
<b>Rate Aggregation</b>	None
<b>Rationale</b>	<p>Diabetes is the seventh leading cause of death in the United States (Centers for Disease Control and Prevention [CDC], 2022a). In 2019, diabetes affected more than 37 million Americans (11.3 percent of the U.S. population) and killed more than 87,000 people (American Diabetes Association [ADA] 2022a). Diabetes is a long-lasting disease marked by high blood glucose levels, resulting from the body's inability to produce or use insulin properly (CDC 2022a). People with diabetes are at increased risk of serious health complications including vision loss, heart disease, stroke, kidney damage, amputation of feet or legs, and premature death (CDC 2022b).</p> <p>In 2017, diabetes cost the United States an estimated \$327 billion: \$237 billion in direct medical costs and \$90 billion in reduced productivity. This is a 34 percent increase from the estimated \$245 billion spent on diabetes in 2012 (ADA 2018).</p> <p>Controlling A1c blood levels helps reduce the risk of microvascular complications (eye, kidney and nerve diseases) (ADA 2022b).</p>
<b>Clinical Recommendation Statement</b>	<p>ADA (2022b):</p> <ul style="list-style-type: none"> <li>- An A1c goal for many nonpregnant adults of &lt;7 percent (53 mmol/mol) without significant hypocalcemia is appropriate. (Level of evidence: A)</li> <li>- On the basis of provider judgement and patient preference, achievement of lower A1c levels than the goal of 7 percent may be acceptable and even beneficial if it can be achieved safely without significant hypoglycemia or other adverse effects of treatment. (Level of evidence: B)</li> <li>- Less stringent A1c goals (such as &lt;8 percent [64 mmol/mol]) may be appropriate for patients with limited life expectancy or where the harms of treatment are greater than the benefits. (Level of evidence: B)</li> </ul>
<b>Improvement Notation</b>	Lower score indicates better quality
<b>Reference</b>	<p>Reference Type: CITATION</p> <p>Reference Text: 'American Diabetes Association. "Economic Costs of Diabetes in the U.S. in 2017." <i>Diabetes Care</i>, vol. 41, 2018, pp. 917–928. <a href="http://care.diabetesjournals.org/content/early/2018/03/20/dci18-0007">http://care.diabetesjournals.org/content/early/2018/03/20/dci18-0007</a>'</p>
<b>Reference</b>	<p>Reference Type: CITATION</p> <p>Reference Text: 'American Diabetes Association. "Statistics About Diabetes." 2022a. <a href="https://diabetes.org/about-us/statistics/about-diabetes">https://diabetes.org/about-us/statistics/about-diabetes</a>'</p>
<b>Reference</b>	Reference Type: CITATION

	Reference Text: 'American Diabetes Association. "6. Glycemic Targets: Standards of Medical Care in Diabetes–2022." <i>Diabetes Care</i> 2022, vol. 45, suppl. 1, 2022b, pp. S83–S96. <a href="https://doi.org/10.2337/dc22-S006">https://doi.org/10.2337/dc22-S006</a> '
<b>Reference</b>	Reference Type: CITATION  Reference Text: 'Centers for Disease Control and Prevention. "What is Diabetes?" 2022a. <a href="https://www.cdc.gov/diabetes/basics/diabetes.html">https://www.cdc.gov/diabetes/basics/diabetes.html</a> '
<b>Reference</b>	Reference Type: CITATION  Reference Text: 'Centers for Disease Control and Prevention. "Diabetes Report Card 2021." US Dept of Health and Human Services, 2022b. <a href="https://www.cdc.gov/diabetes/library/reports/reportcard.html">https://www.cdc.gov/diabetes/library/reports/reportcard.html</a> '
<b>Definition</b>	None
<b>Guidance</b>	If the HbA1c test result is in the medical record, the test can be used to determine numerator compliance.  This eCQM is a patient-based measure.  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.
<b>Transmission Format</b>	TBD
<b>Initial Population</b>	Patients 18–75 years of age by the end of the measurement period, with diabetes with a visit during the measurement period
<b>Denominator</b>	Equals Initial Population
<b>Denominator Exclusions</b>	Exclude patients who are in hospice care for any part of the measurement period.  Exclude patients 66 and older by the end of the measurement period who are living long term in a nursing home any time during the measurement period.  Exclude patients 66 and older by the end of the measurement period with an indication of frailty for any part of the measurement period who also meet any of the following advanced illness criteria: <ul style="list-style-type: none"> <li>- Advanced illness with two outpatient encounters during the measurement period or the year prior</li> <li>- OR advanced illness with one inpatient encounter during the measurement period or the year prior</li> <li>- OR taking dementia medications during the measurement period or the year prior</li> </ul> Exclude patients receiving palliative care for any part of the measurement period.
<b>Numerator</b>	Patients whose most recent HbA1c level (performed during the measurement period) is >9.0 percent, or is missing, or was not performed during the measurement period
<b>Numerator Exclusions</b>	Not Applicable

<b>Denominator Exceptions</b>	None
<b>Supplemental Data Elements</b>	For every patient that this measure evaluates, also identify payer, race, ethnicity, and sex.

## Acronyms

<b>ANSI</b>	American National Standards Institute
<b>CAH</b>	critical access hospital
<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>eCQI</b>	electronic clinical quality improvement
<b>eQOM</b>	electronic clinical quality measure
<b>ED</b>	emergency department
<b>EH</b>	eligible hospital
<b>EHR</b>	electronic health records
<b>ELM</b>	Expression Logical Model
<b>GUID</b>	globally unique identifier
<b>Health IT</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>MAT</b>	Measure Authoring Tool
<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