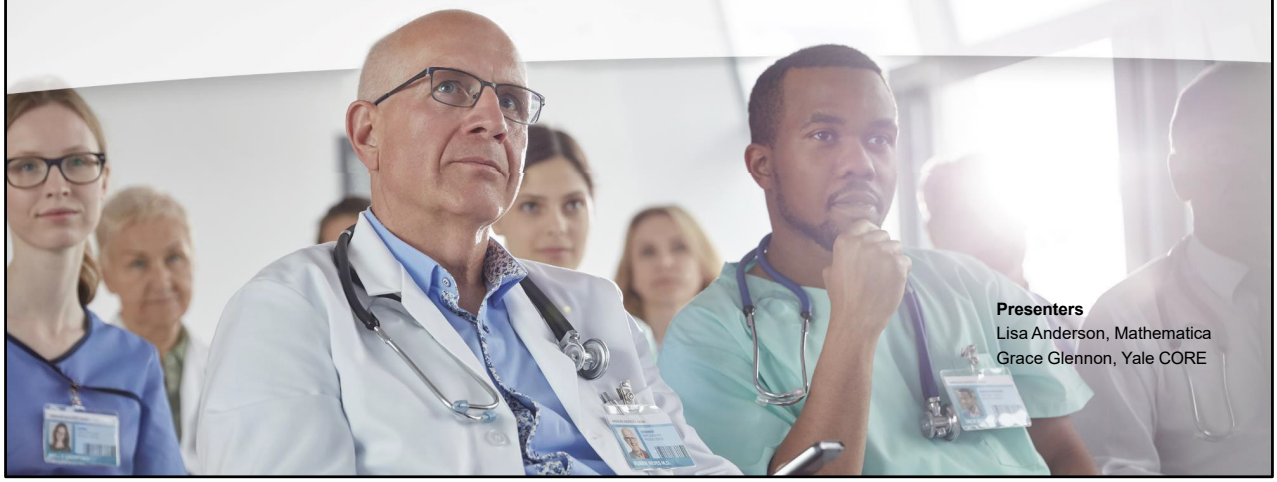
Digital Quality Measures

Specifying the Future of Quality Measurement



Presenters
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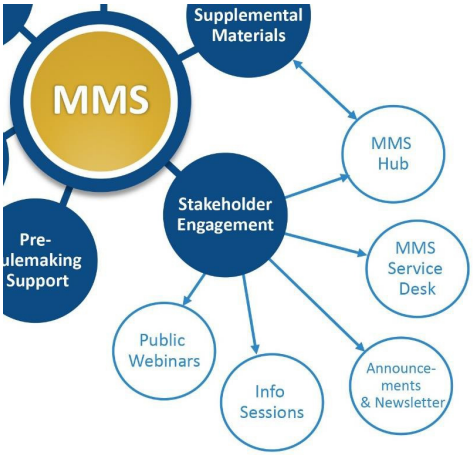
Welcome

- Info Sessions are stakeholder outreach and education activities to engage those interested in CMS measure development.
- Info Sessions are an activity of the Measures Management System (MMS) contract



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CMS is committed to providing *Education and Outreach* opportunities about the quality measure development process to interested stakeholders to improve understanding of the process. CMS also seeks continual feedback to improve and/or expand its offerings to the healthcare quality measure development community and interested stakeholders.

To date, CMS has implemented an *Education and Outreach* webinar series and has created resource materials that break down and explain various components and challenges in the measure development process. There are dedicated websites, listservs, and roadmap documents that are available to support those that are working in quality measure development, or are just curious and want to learn more about how it is done.

Presentation Objectives

- Overview of digital quality measurement transition goals
- Digital quality measure (dQM)-specific specification considerations
  - Converting Quality Data Model (QDM)-based electronic clinical quality measures (eCQMs) to Fast Healthcare Interoperability Resources® FHIR standards

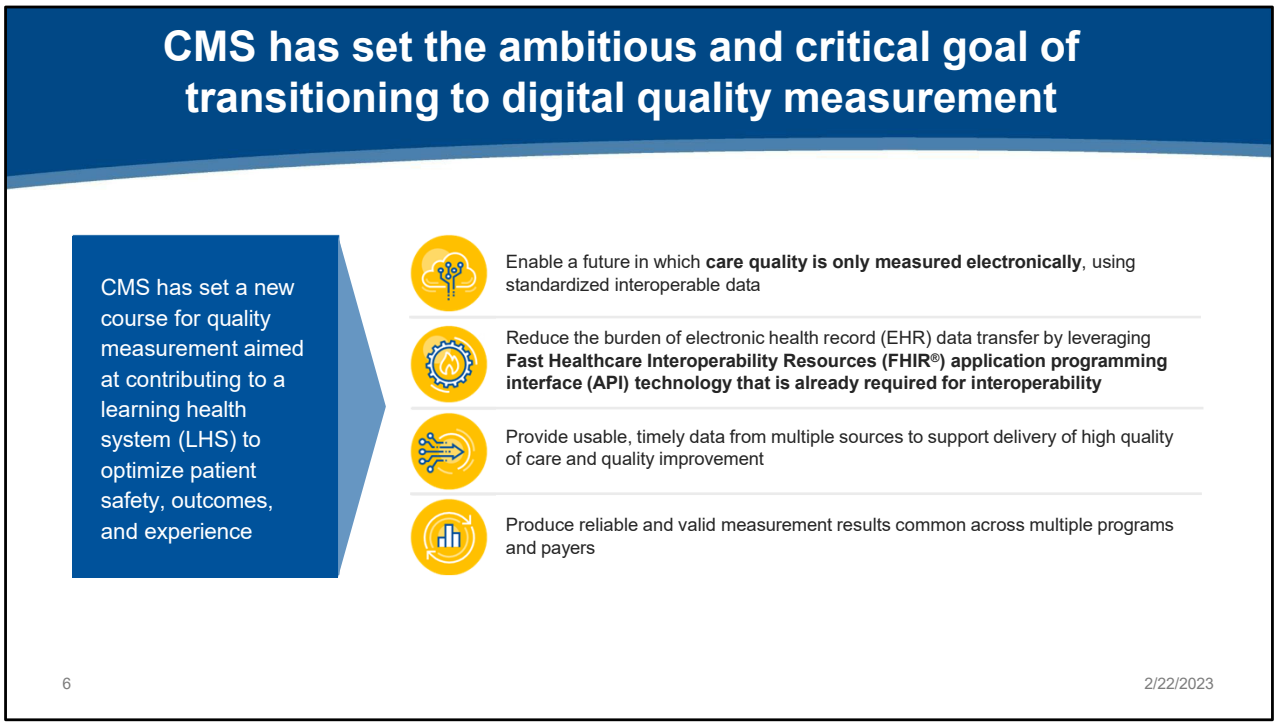
Disclaimer

- This presentation is current at the time of publication or upload onto the web. Medicare policy changes frequently so links to the source documents have been provided within the document for your reference.
- This presentation was prepared as a service to the public and is not intended to grant rights or impose obligations.
- This presentation may contain references or links to statutes, regulations, or other policy materials.
- The information provided is only intended to be a general summary. It is not intended to take the place of either the written law or regulations. We encourage readers to review the specific statutes, regulations, and other interpretive materials for a full and accurate statement of their contents.

Measure Specification

https://mmshub.cms.gov/measure-lifecycle/measure-conceptualization/overview

Overview of CMS digital quality measurement transition goals

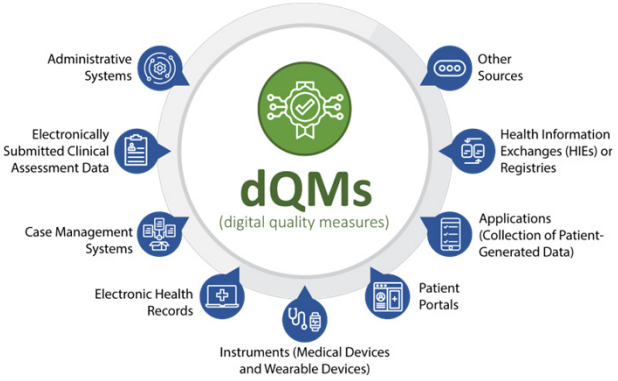


CMS is continually evolving its quality measures, beginning with traditional paper-based measures and introducing eCQMs using data from EHRs and now transitioning to dQMs which can use additional data sources beyond the EHR to streamline the quality measurement data points.

These efforts all build off of recent activities, such as the 2020 CMS and ONC rules requiring providers and health plans to make data more accessible for interoperability and CMS' Meaningful Measures 2.0, ONC's USCDI and USCDI+ initiatives and HL7 FHIR Accelerator work.

dQMs Defined

- **dQMs are quality measures**, organized as self-contained measure specifications and code packages, that use one or more sources of health information that are captured and can be transmitted electronically via interoperable systems
- **Potential data sources** for dQMs include EHR data, patient-generated health data, and registry data, among others
- dQMs will leverage advances in technology (e.g., FHIR APIs) to access and electronically transmit interoperable data, and contribute to a learning health system



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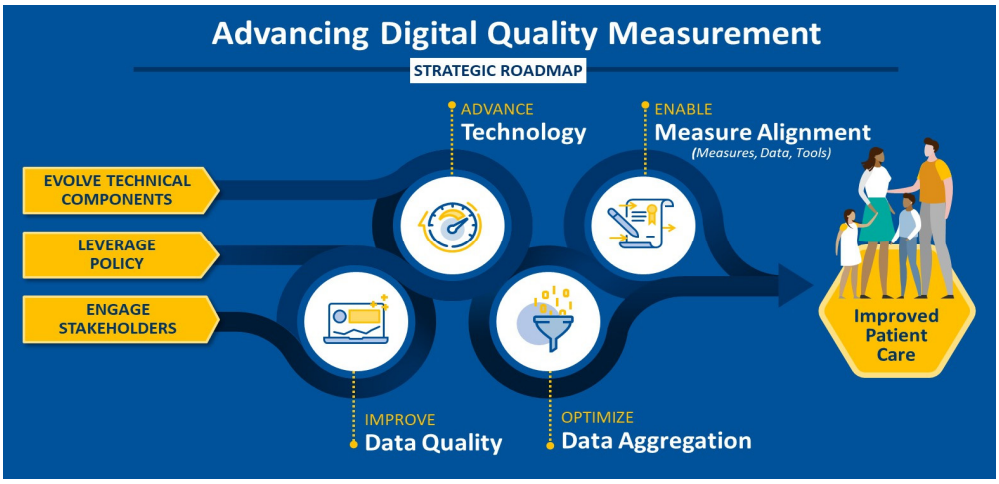
CMS is continuing to refine the dQM definition and has solicited feedback in recent RFIs in the IPPS/PFS rules to ensure a definition is constructed that is clear to the community and describes dQMs thoroughly.

CMS developed a Strategic Roadmap for advancing digital quality measurement centered around four key domains



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CMS Digital Quality Measurement Strategic Roadmap available at: https://ecqi.healthit.gov/sites/default/files/CMSdQMStrategicRoadmap_032822.pdf

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The dQM roadmap focuses on four key domains — improving data quality, advancing technology, optimizing data aggregation, and enabling alignment of measures, data and tools. Each domain requires an evolution of the technical components, policy considerations and engagement with stakeholders. This presentation will address improving data quality; however, all of these domains are equally important to the transition.

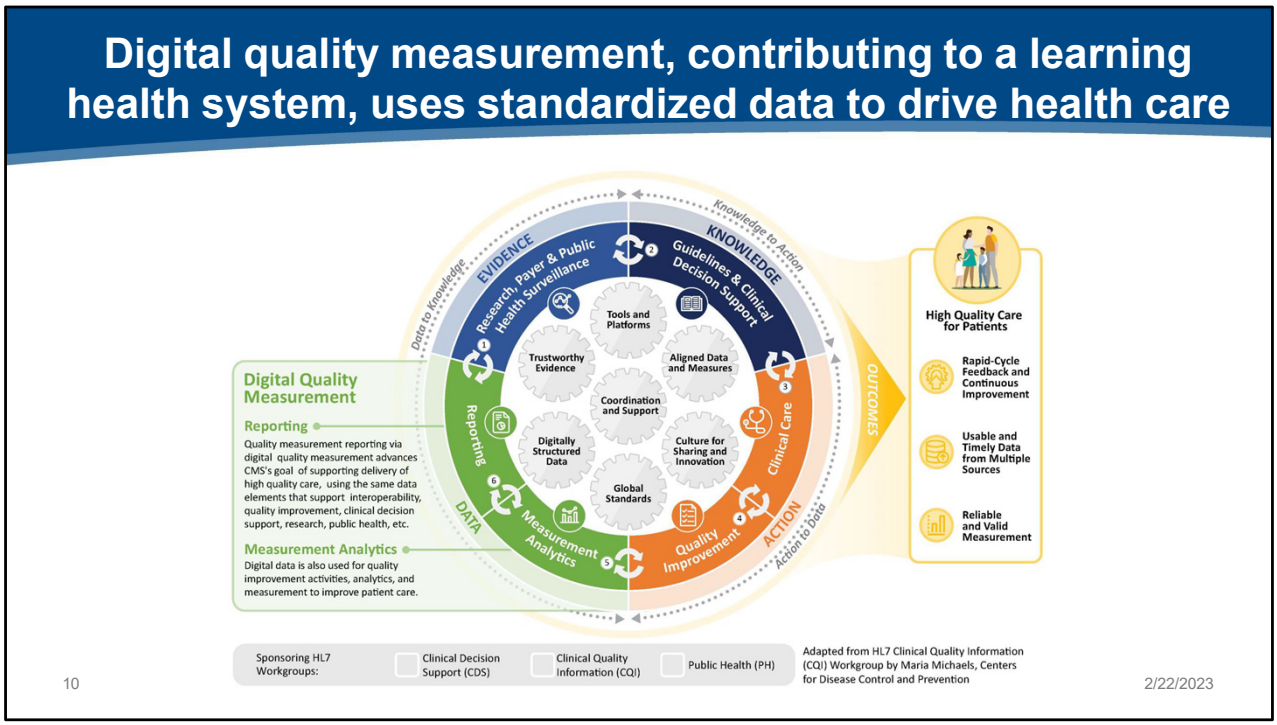
The dQM Strategic Roadmap aligns with the goals of CMS's National Health Care Quality Strategy

National Health Care Quality Strategy Goals

1. Embed quality across the care journey, must also extend quality across payer types
2. Advance health equity
3. Promote safety to prevent harm and death
4. Foster engagement with stakeholders with focus on person and family-centered care
5. Strengthen resiliency in the healthcare system
6. Embrace the digital age
7. Incentivize scientific innovation and technology
8. Increase alignment to promote seamless and coordinated care

https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/CMS-Quality-Strategy

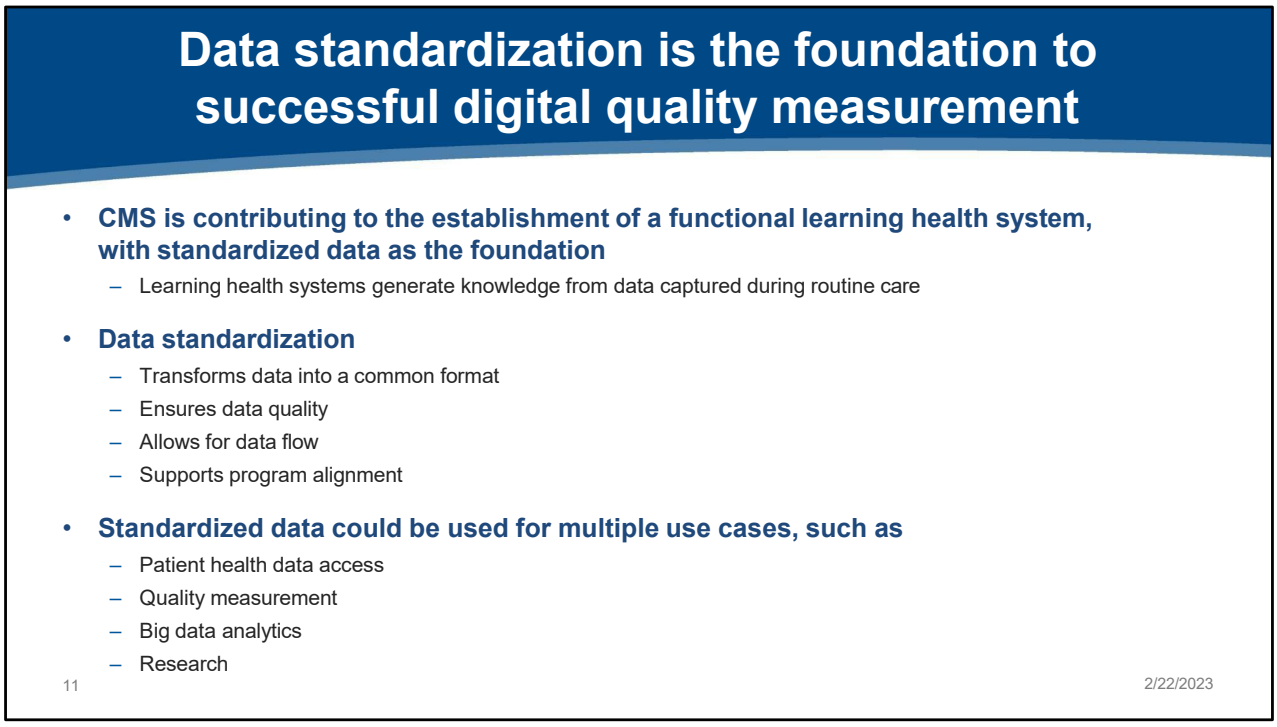
The digital quality measurement strategic roadmap and CMS plans and activities for transitioning to dQMs align directly with the NQS. Here data used for measurement live on to serve the healthcare system and provide better care and support while embedding quality throughout the patient care journey, and advancing health equity, preventing harm and embracing the digital age.



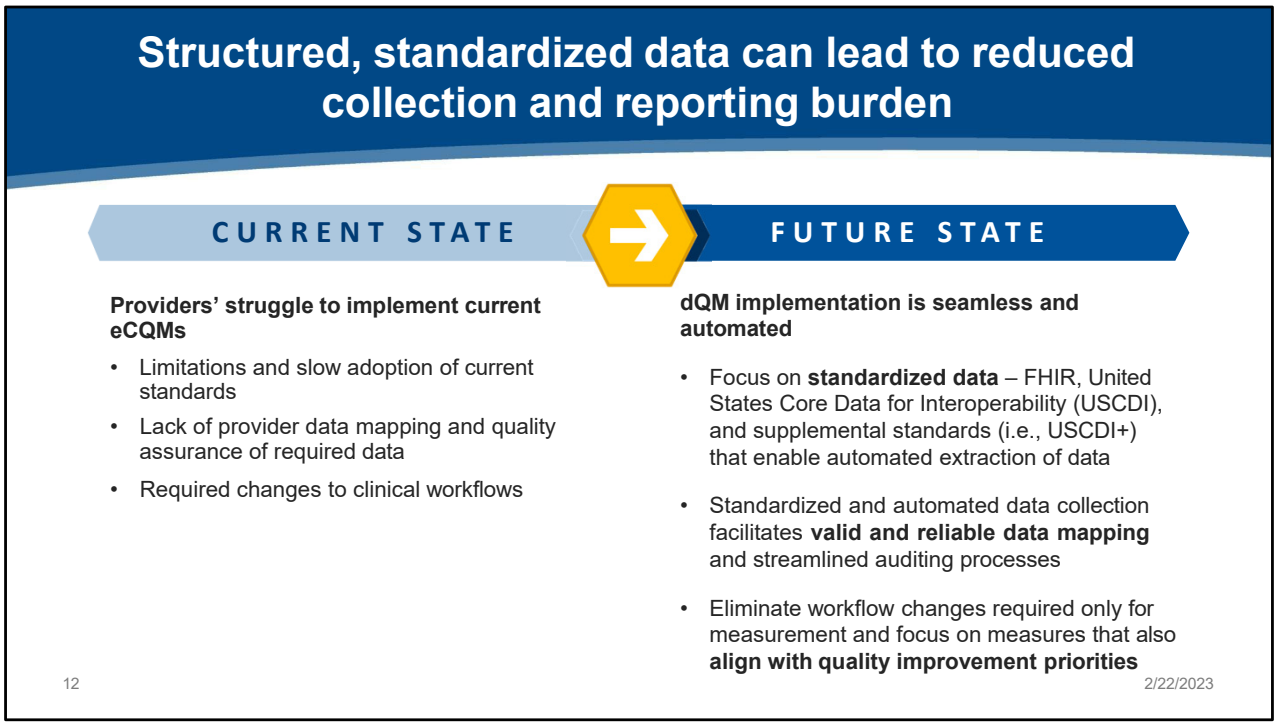
Data standardization is the foundation to effective and lower burden digital quality measurement. A use case of that data in an LHS CMS is focusing on leveraging standardized and interoperable data for dQMs.

In an LHS digital measures support quality improvement, CDS and are informed by clinical guidelines, research and surveillance. Standardized data are used throughout the LHS cycles, which include surveillance activities to derive evidence from data, evidence translated to clinical guidelines and CDS, data and guidelines being used to transform clinical care, quality improvement activities, data interpreted/applied to support measurement and analytics and results. These actions are bidirectional and lead to improved patient

outcomes and delivery of high quality care.



Common format data standardization enables data to flow across existing institutional silos and provides a platform to improve the quality of data as individuals in the healthcare ecosystems gain access to a wider array of information which is less constrained by existing data silos. This standardization provides the ability to align data requirements across quality programs within CMS, among other federal partners and beyond the domain of quality measurement.



Future dQMs can leverage advances in data standardization in FHIR to improve quality measurement and allow dQMs to be implemented in a seamless way. By building on the common formats with aligned definitions as the basis for quality measurement, we enable automated data transmission that provides a common basis for reliable data mapping and supports the auditing of data capture with less burden.

Why the FHIR standard?

- **Reduces burden**
  - Align CMS eCQM reporting with industry clinical data exchange framework and Clinical Decision Support (CDS)
  - Data exposed in a consistent format enables automated data retrieval from EHRs and submission of quality data through use of standards-based APIs
  - Enable the provision of near real-time feedback on quality measurement results to providers
- **Simplifies data mapping**
  - Single mapping to FHIR vs. mapping to Health Quality Measure Format (HQMF) and Quality Reporting Document Architecture (QRDA)
- **Promotes interoperability**
  - Aligns data exchange requirements for quality measurement and reporting with interoperability standards used in other healthcare exchange methods
  - Flexibility of the standard allows access to and exchange of information; suitable for use in a variety of contexts
  - FHIR is also being embraced by the commercial community and big tech

dQM-Specific Specification Considerations: Converting QDM-based eCQMs to FHIR standards

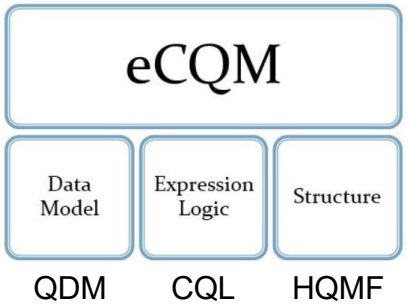
What is an eCQM?

- A clinical quality measure expressed and formatted to use data from EHRs and/or health information technology systems to measure healthcare quality, ideally data captured in structured form during the process of patient care
- eCQMs are used for reporting in several CMS quality programs, including Merit-based Incentive Payment System (MIPS), Hospital Inpatient Quality Reporting (IQR), and Hospital Outpatient Quality Reporting (OQR)
- eCQM specifications and supporting documentation are available on the Electronic Clinical Quality Improvement (eCQI) Resource Center

Source: https://ecqi.healthit.gov/glossary/ecqm.

eCQMs and Standards

- eCQMs use several standards to describe and define the data and operations on the data to enable measure calculation and reporting
- Current eCQM standards include QDM, Clinical Quality Language (CQL), and HQMF
- Additional standards are used for reporting eCQMs



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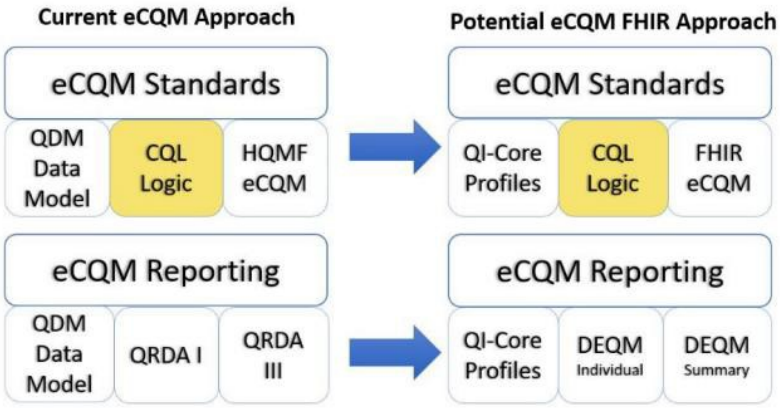
The standards are integrated across tools used to develop eCQMs, including MAT and Bonnie. Standards undergo continuous improvements and eventually trickle down to updates to the measure tools ensuring its alignment. The updated standards in the tools are used in the eCQM annual maintenance cycle to remain up to date with current clinical guidelines and standards.

Transitioning to New FHIR-based Standards



DEQM = Date Exchange for Quality Measures
QI-Core = Quality Improvement-Core.

17 Image source: https://www.healthit.gov/sites/default/files/2019-08/ONCFHIRFSWhatIsFHIR.pdf.

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The current eCQM standards serve as building blocks for eCQMs. Here we see the QDM, CQL and HQMF. We will transition to new standards listed in the graphic on the right of the slide. QDM is transitioning to the QI-Core profile while CQL remains the same and HQMF is transitioning to the FHIR eCQM.

On the bottom are the reporting mechanisms. Currently, eCQMs use QRDA I/ QRDA III standards for reporting EH/EC respectively. As we move to FHIR, reporting moves to the DEQM individual/summary based on FHIR standards.

Data Model Standards: QDM and QI-Core

QDM

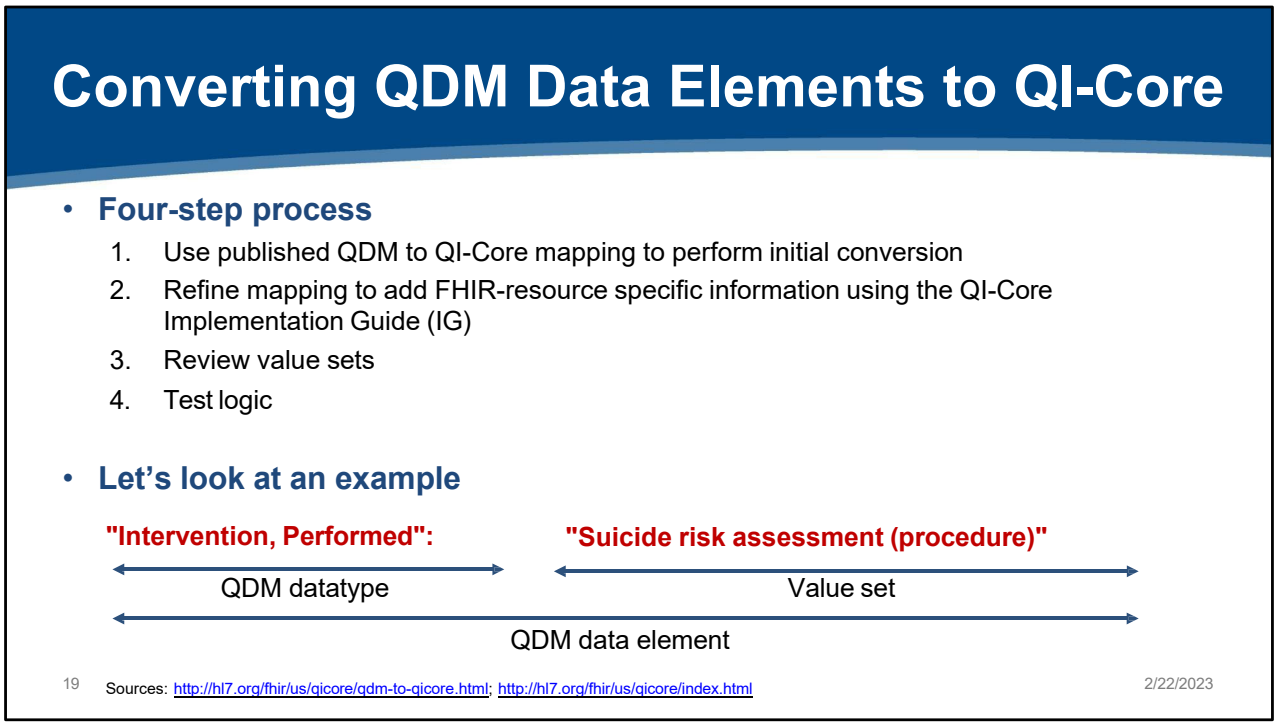
- Data model containing the information needed for quality measurement
- Used to represent current eCQM data elements
- Maintained by CMS for use in eCQMs
- Updated by the QDM user group

QI-Core

- Health Level Seven International® (HL7) defines FHIR profiles for quality improvement
- Informed by QDM
- Maintained by the HL7 Clinical Quality Information work group

Source: https://www.youtube.com/watch?v=uBSH8VwGgO4.

A key standard that will change from QDM to FHIR is the data model. Currently, eCQMs use the QDM to build their measure logic while transitioning to FHIR data will be modeled in QI-Core. For purposes of our quality measures we are using the QI-Core profile in FHIR.



Four-step process

- *First*, use the QDM to QI-Core for mappings found in the QI-Core IG to perform the initial conversion.
- *Second*, use the QI-Core IG to refine and add additional measure-specific context to the logic by evaluating additional FHIR elements.
- *Third*, value sets should be applied to the converted logic and evaluated for applicability.
- *Fourth*, test cases for clinical scenarios or covering edge cases should be created to test the converted logic.

QDM data element example—"Intervention performed" is the QDM data type and "suicide risk assessment" is the value set, which together make up the data element in the context of the QDM. Next, we will use this QDM data element as our example to walk through the four conversion steps.

Step 1: QDM to QI-Core Mapping

- Map each QDM datatype and attribute to FHIR using the HL7 QDM to QI-Core mapping
  - Found in the QI-Core IG
- For our example, the QDM datatype **Intervention, Performed** maps to the QI-Core resource **Procedure**

9.15.2 Intervention, Performed

QDM Context	QI-Core R4	Comments
Intervention, Performed	Procedure	
	Procedure.category	Helps differentiate "intervention" from "procedure"
QDM Attributes		
status	Procedure.status	constrain to "completed"
code	Procedure.code	
id	Procedure.id	
relatedTo	Procedure.basedOn	A reference to a resource that contains details of the request for this procedure. New in QDM 5.6
method	N/A	Procedure.method does not exist in FHIR. Rather than create an extension, QI-Core's approach is to assume the Procedure.code includes reference to the method.
rank	Encounter.extension.extension:rank.value[x]:valuePositiveInt	Referenced as attributes of Encounter (Encounter.extension.extension:rank.value[x]:valuePositiveInt).
priority	qicore-encounter-procedure	This QDM attribute is intended to reference elective from non-elective procedures. QI-Core references procedure.priority based on the relationship of the procedure to the Encounter; hence, Encounter.procedure (which is an extension). The elective nature of a procedure can also be referenced based on the elective nature of an Encounter (Encounter.priority) for which the respective procedure is a principal procedure. The concept may also be addressed as an Encounter, Order or Procedure, Order (both using ServiceRequest) and ServiceRequest.priority.
anatomicalLocationSite	Procedure.bodySite	
reason	Procedure.reasonCode	
result	Observation that includes the element Observation.partOf to reference the procedure to which it applies.	Procedure.report references DiagnosticReport-note, DocumentReference, Composition (histology result, pathology report, surgical report, etc.); the latter two are not QI-Core resources. However, based on feedback regarding the use of the Observation resource, a procedure result might be better referenced as an Observation that includes the element Observation.partOf to reference the procedure to which it applies.
	Observation.partOf	Reference to a resource that contains details of the request for this procedure.
negationRationale	See Below	
relevantDatetime	Procedure.performed[x] dateTime	
relevantPeriod	Procedure.performed[x] Period	

Image source: http://hl7.org/fhir/us/qicore/qdm-to-qicore.html.

The eCQMs will use the QI-Core profile, which is a very-specific data model built directly on top of FHIR resources that includes US Core and base FHIR resources. In the HL7 QI-Core IG you will find a mapping of QDM data types and attributes to the QI-Core resource and elements. Each QDM data type is mapped to a QI-Core resource, and each attribute maps to the elements. The links and the mapping will direct the user to the QI-Core resource page where the snapshot table can be reviewed.

The initial conversion from QDM to QI-Core will be performed for all measure libraries/shared libraries used by the measure. The MAT has functionality to convert a QDM-based eCQM to FHIR, while this provides a start to the

conversion, essentially applying the QDM to QI-Core mapping.

*For additional information on how QI-Core is built on FHIR resources, please visit the FHIR page on the **eCQI Resource Center** website.*

Step 2: QDM to FHIR Refinements

- Review the QI-Core IG and QDM to QI-Core mappings for elements that would refine the specification beyond what was possible in QDM
- For our example, the QDM data element “Intervention, Performed” indicates that the Intervention was completed
- To indicate this “completeness,” we would introduce a ‘status’ attribute to the QI-Core data element

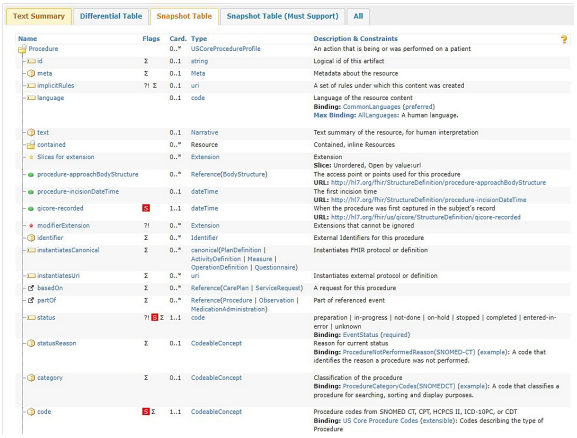


Image source: http://hl7.org/fhir/us/qicore/StructureDefinition-qicore-condition.html.

QDM to QI Core Conversion Example

QDM

"Major Depressive Disorder Encounter"
MDDEncounter

**with ["Intervention, Performed": "Suicide risk assessment (procedure)"]
SuicideRiskAssessment**

such that Global."NormalizeInterval" (
SuicideRiskAssessment.relevantDatetime,
SuicideRiskAssessment.relevantPeriod) during
MDDEncounter.relevantPeriod

QI-Core

"Major Depressive Disorder Encounter"
MDDEncounter

**with ["Procedure": "Suicide risk assessment (procedure)"]
SuicideRiskAssessment**

such that SuicideRiskAssessment.status = 'completed'

and QICoreCommon."ToInterval" (
SuicideRiskAssessment.performed) during
MDDEncounter.period

Depicted here the QDM data type is “intervention performed” in yellow and green on the left in the current QDM-based eCQMs. This QDM data type maps to a FHIR resource of “procedure” to capture the intent of this logic, which in QDM requires the procedure of a suicide risk assessment be performed. The FHIR element of status with a code for “completed” highlighted in green was identified for addition. In this example both data models express that a suicide risk assessment was actually performed.

Step 3: Value Set Review

- Value sets are lists of codes from standard vocabularies that define clinical concepts and facilitate effective exchange of health information
- In conversion, measure specific value sets should be unchanged
  - This statement is based on work completed to date
- New elements added will require addition of value sets or direct reference codes (DRCs)
  - These may be measure-specific value sets/DRCs or HL7-specific value sets/DRCs depending on the element and syntax

Source: https://ecqi.healthit.gov/value-set-guidance.

Step 4: Test Case Development

- Use QDM developed test cases as a starting point
- Test cases must be FHIR compliant
  - All elements with a cardinality starting with a '1' must be in the test case, even if the element is not in the logic

- Add test cases to address new elements to achieve 100% coverage

The purpose of test case development is to ensure that the logic is performing as expected. Since the QDM measure is the basis of the FHIR measure, regardless of the data model, at a minimum the same test case scenarios and edge cases should be tested. As such, the QDM-developed test cases will be the basis of QI-Core test case development.

The CMS-sponsored tools — Bonnie, FHIR, MADI — have functionality to assist in the conversion of test cases. In using the QI-Core standard as the data model there is a requirement for test cases to be FHIR-compliant, meaning that each test case must include all elements that have a cardinality lower bounds of one, even if the element is not found within the measure

logic, which is slightly different from the expectations for QDM test cases.

For purposes of this work, the expectation is the same from testing in Bonnie QDM and Bonnie FHIR and/or MADI. The goal is to achieve 100% coverage of the logic and 100% passing for each measure. To meet 100% coverage new test cases need to be added to address any new elements introduced from the conversion from QDM to QI-Core.

Steps to achieve FHIR eCQM reporting

- **Conversion**
  - Complete conversion of each CMS program eCQM in new tooling
- **Information Gathering**
  - Solicit public comment on FHIR eCQMs
- **Testing**
  - Conduct end-to-end testing for FHIR eCQM reporting
- **Voluntary Reporting**
  - Voluntary reporting of FHIR eCQMs, based on program readiness

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We are working on the conversion of all CMS programs using the Measure Authoring Development Integrated Tool (MADI), which combines what historically was done via the MAT and Bonnie, to author measures and complete test cases within one tool. Here we complete specification, test logic with test cases and conduct a logic and standards review across the measures.

Once the conversion sets are complete, CMS will hold a public comment period, which occurs for both EC/EH measures during different timeframes. Vendors and implementers may provide feedback on the FHIR eCQMs.

The second upcoming milestone is CMS inpatient hospital quality reporting, specific voluntary and mandatory reporting, once the FHIR eCQMs become active and published. Other CMS programs such as MIPS will follow with implementation in the coming years. As CMS moves through a steady follow out of FHIR eCQMs, CMS will need to dually maintain and publish the current QDM-based eCQMs, as well as the FHIR-based eCQMs on an annual basis.

FHIR Impacts

- **What information and skillsets are needed for FHIR conversions?**
  - A strong understanding of the QI-Core data model and mapping
  - A strong understanding of how data is stored and clinical workflows
  - Knowledge of quality reporting standards
- **How will FHIR impact other collection types in the future?**
  - Different collection types may have additional conversion steps as they do not use a formalized data model and elements

As CMS expands dQMs beyond eCQMs to include CQMs or claims-based measures, new conversion steps are required which may pose different challenges as they are not structured using a formalized data model and may not have clearly defined data elements like are utilized today for eCQMs.

Resources and Links

- QI-Core Implementation Guide
  - http://hl7.org/fhir/us/qicore/index.html
- QDM v5.6 to QI-Core R4 Mapping
  - http://hl7.org/fhir/us/qicore/qdm-to-qicore.html
- Digital Quality Measures
  - https://ecqi.healthit.gov/dqm
- CMS HHS YouTube Channel
  - https://www.youtube.com/@CMSHHSgov
- eCQM and FHIR Acronym Descriptions
  - https://ecqi.healthit.gov/glossary/ecqm

FHIR Opportunities for Collaboration

- Quality Data Implementation (QDI) User Group (Monthly)
- FHIR Collaboration Call (Weekly)
- eCQM Work Group Meeting (Weekly)
- Cooking with CQL Webinar(Monthly)

Questions

- What questions can we answer on the transition to:
  - eCQMs in FHIR?
  - dQMs?
- What topics would be helpful to cover in the future as quality programs transition to dQMs?

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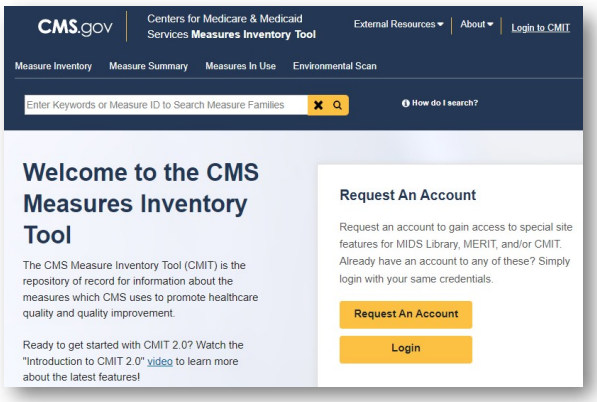
CMIT 2.1 - Coming Soon!

- The CMS Measures Inventory Tool (CMIT) is improving to enhance your experience!
  - Updated terminology, IDs, and new features and content
  - Join our webinar on March 29th at 2 PM E.T. to learn more
- CMIT 2.1 will launch in late **March**
- **Join us for an Info Session 3/29** **Register here!**

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