Core Quality Measures Collaborative
Digital Measurement Report

FINAL REPORT

September 16, 2022

This report is funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00061I, 75FCMC21F0002.

Table of Contents

Introduction

The Core Quality Measures Collaborative (CQMC) is a broad-based coalition of healthcare leaders working to facilitate measure alignment through the development of consensus-based core sets to assess the quality of healthcare in the United States. The sets are intended for voluntary adoption by payers, purchasers, and regional collaboratives as part of their public reporting, value-based payment (VBP), and alternative payment model (APM) programs to improve healthcare outcomes, reduce provider burden, and offer consumers and payers performance results. As technology and VBP programs have evolved, it has become clear that the CQMC must also evolve toward digital quality measurement to continue reducing stakeholder burden, expand available data sources, and improve the timeliness of performance feedback.

The CQMC recognizes, however, that transitioning to digital measurement presents challenges on several levels. Although there are some well-specified and tested digital quality measures (dQMs), they are often challenging and burdensome for plans and providers to implement across diverse electronic health record (EHR) systems that lack fully standardized and interoperable data. While all CQMC core sets have at least two dQMs, implementation challenges have prevented their widespread use. Further, in some specialty areas, few dQMs exist. These barriers have limited the use of dQMs.

CQMC efforts to advance digital measurement should anticipate and align with the evolving policy and data interoperability landscape. The move to dQMs will take place in the context of the Office of the National Coordinator for Health Information Technology (ONC) and Centers for Medicare & Medicaid Services (CMS) policy as well as private-sector initiatives. CMS has set a strategic goal of fully transitioning to dQMs to lower provider burden and create more timely, impactful measures that are better integrated with the other functions of a learning health system, including quality improvement, clinical decision support, and research. As part of that effort, CMS and ONC are encouraging the industry to move to a common data model: Fast Healthcare Interoperability Resources (FHIR).[1] A major developer of health plan measures, the National Committee for Quality Assurance (NCQA) is also developing and requiring the use of dQMs. Further, the private sector is helping advance data standards and data sharing frameworks through multiple initiatives, such as Health Level Seven (HL7) FHIR Accelerator projects. The shared goal of the transition to dQMs is to lower the burden of data collection for quality measurement, expand the types of standardized data available for measurement, improve overall interoperability, and ultimately improve patient care and outcomes.

The purpose of this report is to further advance digital measurement by establishing a shared understanding of the current landscape, including emerging policy, the stakeholders involved, and data flows among CQMC partners; clarifying the business case for digital measurement; identifying barriers to electronic data capture and exchange; and developing recommendations for the CQMC to take action on. This report supports the CQMC's goal to increase use of dQMs within the CQMC core sets, which are intended to encourage alignment in measurement for VBP programs and APMs across the nation; transitioning the core sets to dQMs will ensure they remain relevant to these programs in the future. As a leading force for measure alignment, the CQMC has the opportunity to help ensure the transition to FHIR addresses standardization of the data needed for the highest-priority quality measures.

To develop this report, the CQMC convened a Digital Measurement Workgroup composed of CQMC members, including payers, providers, professional associations, consumer groups, purchasers,

registries, measure developers, EHR vendors, and health information technology (IT) experts. The Workgroup reviewed the literature, invited speakers to present on foundational work, and shared organizational insights. The culmination of this work is presented in this first iteration of the *CQMC Digital Measurement Report*. The content of this report is structured as both a resource and a call to action to support the transition to digital measurement within the CQMC and across the ecosystem in the near future. This report is organized into the following three sections that build on each other: (1) Emerging Landscape, (2) Implementing dQMs: Data Flow Models and Stakeholder Roles, and (3) Path Forward for the CQMC.

Section 1: Emerging Landscape

To frame the discussion and establish the parameters of this report, the Workgroup examined definitions of dQMs and digital data sources from CMS and NCQA. These definitions helped inform a shared understanding of dQMs, including characteristics and common data sources. In addition, the Workgroup outlined the business and clinical cases for greater dQM adoption, as well as the diverse group of stakeholders who play a key role in digital measurement.

Defining Digital Quality Measures

Digital quality measure (dQM) is an emerging term that both CMS and NCQA have recently defined. Their definitions, which are largely aligned, address the scope of included data, functionality (e.g., integration with quality improvement), and form (e.g., how digital measurement software should be structured, tested, and implemented). Since both CMS and NCQA are CQMC members and are driving these definitions forward, we review these definitions as background to using the term *dQM* for CQMC discussions.

CMS recently shared its preliminary vision for transitioning to dQMs and sought public comment through several requests for information (RFIs). As part of its FY 2023 Inpatient Prospective Payment System Proposed Rule, the agency offered a new definition of dQMs: "quality measures, organized as self-contained measure specifications and code packages, that use one or more sources of health information that is captured and can be transmitted electronically via interoperable systems."[2] CMS stated that digital data sources for dQMs may include administrative systems, electronically submitted clinical assessment data, case management systems, EHRs, instruments (e.g., medical devices and wearable devices), patient portals or applications (e.g., for the collection of patient-generated health data), health information exchanges (HIEs) or registries, and other sources. The agency also stated that the goals of dQMs are to address the "Triple Aim" of improved quality of care, improved population health, and reduced cost. The agency noted in its Inpatient Prospective Payment System Final Rule that commenters generally supported this approach and that it is still reviewing stakeholder comments and has yet to issue a final dQM definition.[3]

Similarly, NCQA defines a dQM as a measure that is written as computer code and is in a machine-readable format.[4] NCQA elaborates that dQMs "…are expressed in a digital format using highly standardized language and data definitions that enable sharing of the fully specified measure electronically between systems."[5] NCQA outlines several characteristics of dQMs, including the following:

- Built using a common standard for sharing healthcare information electronically. The standard NCQA uses is FHIR.
- Use a common data model (i.e., FHIR).
- Use machine-readable measure logic (e.g., Clinical Quality Language).
- Include clinical terms, codes, and other information needed to calculate reliable, comparable measure results.[4]

Both CMS and NCQA consider electronic clinical quality measures (eCQMs), such as those currently included in the CQMC's core measure sets, a subset of more broadly defined dQMs, although they are contemplating the need for additional updates to both eCQMs and the supporting infrastructure to deliver on the desired interoperability and reduction of burden. eCQMs rely on data completely or primarily from EHRs; in contrast, other types of dQMs may include information generated from medical devices, such as ventilators, as well as digitized information from patient portals or other modules.[1]

Claims data is a digital data source already widely used for measurement, and claims-based measures meet the definition of dQMs. However, one of the core reasons for moving to measures incorporating broader digital data sources is to overcome the limitations of claims-based measures, including delays in data availability that limit their use for quality improvement and gaps in the clinical specificity and patient-reported experiences and outcomes available through claims data. The CQMC has acknowledged these limitations and is seeking to better facilitate the use of measures drawing on EHR, registry, and other digital data sources in addition to claims in its core measure sets. For simplicity, we refer to clinically sourced dQMs as dQMs throughout the remainder of this document.

Current Policy Landscape and Activities

Public and private organizations are both working to advance the uptake of dQMs in important ways. Summarized below are select policies. Section 2, under "Current Public and Private Sector Activities," lists additional activities advancing digital measurement, including progress on initiatives shared by NCQA and CMS during CQMC Full Collaborative and Digital Measurement Workgroup meetings.

- ONC's 21st Century Cures Act Final Rule put forth the United States Core Data for Interoperability (USCDI), which defines a minimum interoperable set of data classes and data elements and requires certain providers to maintain access to these data through application programming interfaces (APIs) as a condition for certification. This use of APIs is reinforced by CMS' Interoperability and Patient Access Final Rule, which requires CMS-regulated payers to maintain patient access and provider directory APIs.
- The scope of USCDI-required data is updated annually based on feedback from federal and industry stakeholders, including submissions to the ONC New Data and Element Class Submission System and the Standards Version Advancement Process.
- ONC's USCDI+ initiative builds on USCDI and provides opportunities for federal and industry stakeholders to align on data sets beyond the base USCDI standards (e.g., program-specific requirements), as well as identifying policy opportunities to promote alignment. For example, one recently announced USCDI+ initiative seeks to address interoperability within the Health Resources and Services Administration's (HRSA) Uniform Data System. ONC will support HRSA's design and deployment of the FHIR infrastructure to transition from health center-level reporting to patient-level reporting.
- ONC published a Trusted Exchange Framework and Common Agreement (TEFCA) in January 2022 to facilitate increased sharing of electronic health information among health information networks. The Trusted Exchange Framework establishes principles and minimum terms and

conditions for exchange, while the Common Agreement is a legal agreement between the recognized coordinating entity (i.e., The Sequoia Project) and a health information network to become a Qualified Health Information Network (QHIN) that meets specific criteria. The Sequoia Project will start reviewing applications for QHIN status in fall 2022.

- CMS recently published its vision to transition all measures within its programs to dQMs within the Digital Quality Measurement Strategic Roadmap. CMS also sought stakeholder input on the Roadmap through RFIs published in several quality measurement rules, including the FY 2022 Inpatient Prospective Payment System Final Rule and FY 2023 Inpatient Prospective Payment System Proposed Rule cited above.
- Although CMS continues to support the development and use of eCQMs specified in the Quality Data Model, CMS is working with measure developers to re-specify and test eCQMs used in its programs in FHIR, the leading standard for interoperable data.
- NCQA has developed, tested, and is implementing Electronic Clinical Data Systems (ECDS) measures as part of the Healthcare Effectiveness Data and Information Set (HEDIS). The ECDS reporting standard uses data sources, including EHRs, HIEs and clinical registries, a case management system, and administrative data, and is intended to incentivize more efficient quality reporting by leveraging electronic clinical data.

The CQMC's Current Approach to dQMs

The CQMC has not formally set a goal for transitioning to dQMs as defined earlier in this report. Currently, 30 percent of CQMC core measures are eCQMs or have eCQM reporting options available, a small increase from 24 percent of measures in the original eight core sets developed in 2015-2017. The number and percentage of eCQMs in the 2021 core sets ranged from two measures (10 percent) in the Orthopedics core set to seven measures (58 percent) in the Pediatrics core set. The remainder of the measures are largely claims-based measures, which, although they are technically dQMs, have the limitations noted above.

However, several barriers to adopting these dQMs remain. Payers cite a lack of provider infrastructure to report clinical measures (e.g., EHR, clinical registry), lack of plan infrastructure (e.g., ability to accept electronic measures), and lack of data availability.[6] These feasibility concerns likely prevented the inclusion of additional eCQMs in the CQMC core sets. Several Workgroups also emphasized the need for separate benchmarks for the same measure based on how the data are reported, which reflects additional concerns about data capture and accuracy. These potential differences in measure results based on the reporting method are especially important when comparing measures across entities and linking performance to incentives.

Business Case and Clinical Case for dQM Adoption

VBP and APM programs hold great promise for simultaneously lowering healthcare costs while improving quality, equity, and the experience of care; however, their success requires the effective use of timely, valid quality measures. Digital quality measurement, specifically dQMs based in clinical data sources, such as EHRs and registries, merits investment because such dQMs offer several advantages over "paper" and claims-based measurement that are critical to furthering the success of VBP programs and APMs. The Digital Measurement Workgroup identified several potential advantages of dQMs.

First, dQMs have the potential to **reduce the burden** of measurement. Traditional measures may require manual steps, such as abstracting patient data from a medical record or entering measure specifications into individual organizations' information systems. dQMs can take advantage of standardized data

definitions to leverage data that are collected during the provision of care, thus easing the burden for clinicians and their healthcare teams. In addition, by accessing all-payer data from EHRs, dQMs may allow for greater use of the same data and measures across payers and programs, which would further reduce burden. Moreover, the adoption of standardized data will improve accuracy by limiting the potential for calculation error and reducing the effort and resources required to validate measures.

Our ability to reduce burden and improve data accuracy, however, will require advances in data standardization, data collection, and interoperability. To date, eCQMs that leverage current EHRs have only partially achieved these advantages. Installing eCQM software still requires site-by-site vendor support. Many data definitions vary across providers, and many EHR elements are not routinely collected or fully interoperable. Therefore, national progress on implementing more standardized interoperable data as envisioned by CMS and ONC has the potential to lower the marginal cost of implementing dQMs.

dQMs also hold promise to **make measurement more meaningful**. A transition to dQMs allows the measurement of novel concepts that could not previously be assessed without chart-abstracting data. Digital measurement allows for an expansion of measures that use data beyond claims and medical record data. As a result, measures can assess important areas of quality that may not be reflected in traditional data sources. If as envisioned dQM tooling and reporting are better integrated than current measures with quality improvement technology and provider feedback, dQMs could also provide results closer to real time compared to claims or chart-abstracted measures, allowing providers and health plans to align quality measurement with quality improvement to support a continuously learning health system.

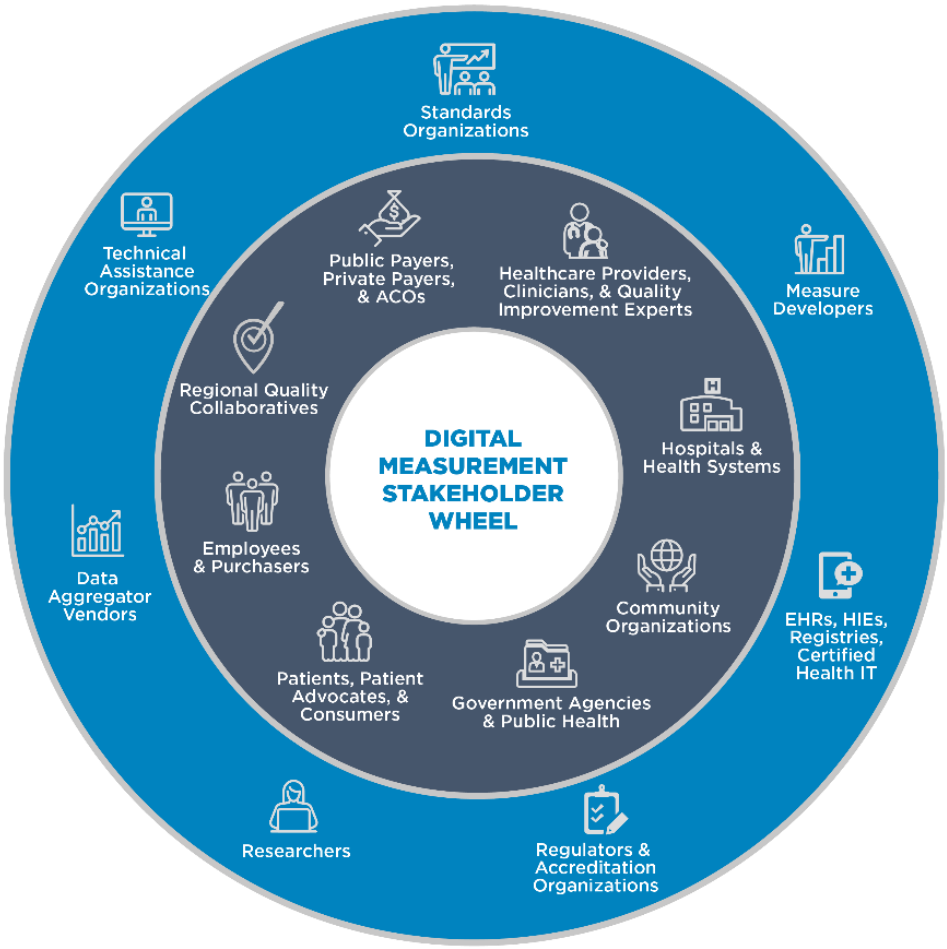
Lastly, dQMs could **promote quality across the healthcare system**. As data become standardized and systems and controls are developed to support data sharing across stakeholders, dQMs could be leveraged to assess quality across care settings, episodes of care, and time. Moreover, dQMs could allow a wider scope of clinical outcomes and facilitate measurement of population health. This could provide a more complete view of the quality of care people experience across the system and motivate stakeholders to cooperate to improve patient outcomes.

Key Stakeholders

Transitioning to digital quality measurement will require more than electronic measure specifications and exchange standards. Stakeholders from across the quality measurement enterprise must play a role in developing, collecting, reporting, calculating, and using the results of dQMs to complete the virtuous cycle of digital quality measurement and integrate it as a foundational component of patient-centered, value-based care and payment. Understanding the stakeholders involved and their respective roles is key to identifying and understanding the challenges to and opportunities for transitioning to dQMs.

The Digital Measurement Workgroup identified key stakeholders as represented in Figure 1 below. Stakeholders may play multiple roles in the digital quality measurement process. For example, private payers often implement measures as well as report measures for federal program participation. The stakeholders are grouped by role and include primary users (listed in the inner grey circle of the wheel), as well as supportive roles (listed in the outer blue circle of the wheel).

Figure 1. Digital Measurement Stakeholder Wheel



The inner circle of the wheel includes the primary users of dQMs. Several CQMC participant groups are categorized as primary users, including providers, payers, employers/purchasers, and patients/consumers. At a basic level, healthcare providers collect and report information on care processes and outcomes to improve the care they provide. Public and private payers may use measures to assess care, incentivize performance, develop networks, and advise patients on where to seek care. Employers and purchasers use this information to choose health insurance providers with which to contract and to direct their employees to where they can access high quality providers of care. Consumers and patients can use the information generated by performance measurement to make informed decisions, including which providers to use as well as to choose a health insurance provider.

Many actors in the inner circle participate in current eCQM reporting, but as the vision for and technology supporting dQMs are expanding, additional stakeholders, such as regional collaboratives and community-based organizations, are contributing to the process. Regional collaboratives play a key role in bringing combinations of these groups together and could play a central role in the movement to aligned digital measurement; they also play an important role in the identification and adoption of dQMs for regional VBP programs and quality improvement. In addition, community organizations are represented in this inner circle because of their role in creating data focused on drivers of health that increasingly can be integrated into quality measurement and clinical care to support efforts to evaluate and address social drivers of health.

This emerging digital ecosystem is also enabled by other key supporting stakeholders that make information flow possible. Researchers identify measure gaps and opportunities for clinical improvement. Measure developers create and maintain the dQMs. Standard organizations develop content and exchange standards to ensure consistent approaches across stakeholders. EHR vendors build dQMs and related clinical decision support into their products and develop APIs that allow information to be exchanged across systems. HIEs, registries, and vendors facilitate the aggregation and exchange of data to support quality measurement across organizations. Lastly, regulators, including CMS, ONC and state-level agencies, and accrediting bodies, can create requirements to use digital measurement.

Section 2: Implementing dQMs: Data Flow Models and Stakeholder Roles

Barriers and Solutions

The Digital Measurement Workgroup identified barriers that measure adopters could encounter while transitioning to dQMs. These barriers may occur at various points during the process of implementing dQMs and are not associated with one particular point along the data flow continuum. The Workgroup also offered potential strategies that may address these barriers.

Tables 1-3 summarize the barriers and solutions identified by Workgroup members, categorized by Data (Table 1), Infrastructure (Table 2), and Measure Implementation (Table 3). While not exhaustive, these key challenges represent areas the Workgroup suggested should be addressed to support greater implementation of dQMs in VBP programs and APMs. As discussed in Section 3: Path Forward for the CQMC, the Workgroup identified some specific activities the CQMC could undertake to address certain barriers. The Digital Measurement Workgroup intends to revisit and expand on these barriers and solutions as the field continues to evolve.

Table 1. Data Barriers and Potential Solutions

Barriers	Potential Solutions
Lack of universal data standards: While standards do exist, such as FHIR, there is not one data standard accepted by all users.	• Clearly define data quality requirements and incentives • Encourage adoption of a standard (i.e., FHIR) and encourage developers/vendors to do the same • Establish voluntary models that incentivize stakeholders to adopt standardized formats • Disseminate best practices for measure reporting (and encourage EHR vendors to create the appropriate documentation pathways and formatting to collect information)

Barriers	Potential Solutions
Nonstandardized clinical data formats: Clinical data are captured differently from one healthcare setting to the next.	• Improve the technological process to interpret data (i.e., natural language processing) and take steps to further standardize the information collected • Identify and promote the application of commonly formatted standards, thus combining nonstandardized formats with standardized formats • Promote standards that are optional or downloadable and adaptable • Encourage EHR vendors to map data points to specific electronic codes or file formats as part of their basic packages • Promote the building of standardized formats by key stakeholders within the certification of medical record products
Lack of standard patient ID: Currently, there is no standard way to uniquely identify a patient/patient encounter. As a result, patient encounters can be mismatched and lead to errors in a variety of systems and inaccurate dQM calculations.	• Advance the adoption of safe and secure patient-matching strategies advanced by ONC and others, and consider advocating for a unique patient ID and/or for measurement of EHR vendor compliance with required patient attributes • Promote standardization and use of specific instructions on patient data entry (e.g., names with hyphens; use of initials; number of demographic elements required; and use of maiden, alias, or past names)

Table 2. Infrastructure Barriers and Potential Solutions

Barriers	Potential Solutions
Lack of shared technology: Shared technology would include open APIs and other technology that allows for the exchange of data using standard transactions, APIs, or data exchanges.	• Encourage use of low-cost, widely available technology over proprietary technology, in a manner that continues to allow for technology innovation • Encourage organization and standardization of data input and data formatting within EHRs to ease and improve report generation
Lack of integrated tools: Transitioning to an integrated tool set that enables standards-based tools that integrate within EHR workflows.	• Create guidelines that include proposed common language/terminology regarding the use of integrated tools • Promote investments in portfolios of tools with input from developers
Lack of integrated workflow: Transitioning from proprietary EHR workflows to EHR workflows that allow the integration of data exchanges or data collection and verification using standard transactions or APIs.	• Promote best practices on the reporting of measures (e.g., claims-based measures using billing data or Current Procedural Terminology [CPT] codes) and encourage EHR vendors to create the appropriate documentation pathway and formatting to collect information

Table 3. Measure Implementation Barriers and Potential Solutions

Barriers	Potential Solutions
Lack of incentives for adoption and alignment: Transitioning to digital quality measurement requires additional resources in the short-term. While federal incentives are in place to make a limited amount of patient data interoperable via FHIR APIs by the end of 2022, additional data will need to be transitioned to fully realize the benefits of dQMs.	• Determine alternative approaches to encourage adoption, including increasing awareness • Make "the easy thing the right thing" and continuously assess what the most efficient and effective process is • Promote certified EHR technology requirement levels • Promote the use of pilot grants or bonus points • Promote the use of cooperative agreements to medical specialties to convert existing measures to dQMs or create de novo dQMs to support their specialty
Lack of transparency in measure guidance: Measure adopters would benefit from measure guidance that has been developed in a collaborative and transparent process.	• Clearly define the goals and target audience of a measure before creating universal guidance • Avoid measures that are not transparent • Promote the standardization of measurement among payers to minimize confusion
Lack of program alignment: Different measure requirements and measure specifications across programs cause increased clinician and payer burden to calculate and report.	• Create transparency in the development phase to identify opportunities for alignment • Promote a standard measure set • Advocate for the development of more outcome measures that are reflective of the continuum of care • Inform iterative processes that allow clinicians and practices adequate time to transition from current eCQMs and other forms of electronic reporting to clinically-sourced, FHIR-based dQMs

Addressing Barriers to Digital Measurement Data Flow

As a foundational step to enable the CQMC to better discuss and address barriers related to the flow of data from providers to various endpoints (e.g., payers, regional collaboratives) and challenges associated with dQM collection and reporting, several individuals engaged with the Digital Measurement Workgroup and collaborated to create a diagram of digital data flows. The group included representatives from CMS, NCQA, National Quality Forum (NQF), and the Council of Medical Specialty Societies (CMSS). The group focused primarily on the near-term, future state-planned transition to widespread implementation of the FHIR data standard and the use of standardized APIs to facilitate data exchange.

The resulting data flow diagram (Figure 2), drafted by CMS and reflecting the small group's input, represents core components and systems that will be present when FHIR standards are more fully implemented regardless of which organization(s) are involved in implementing a dQM. The diagram spans data flow between clinicians and payers but does not encompass physician workflow activities. The diagram was provided as background to the CQMC's planning and does not yet represent the CQMC's full consideration of data flows from health plans' or providers' perspectives. It represents

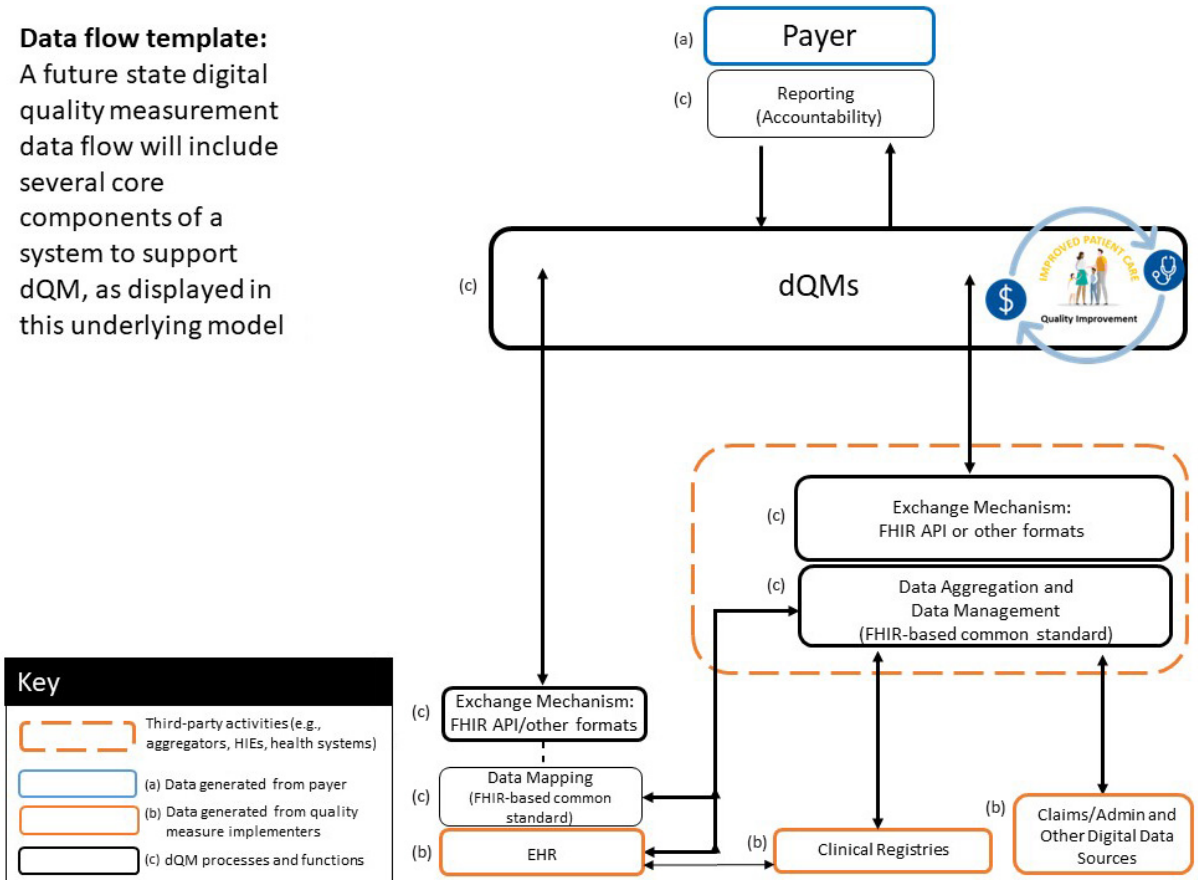
functional steps in data exchange rather than the actors at each step, as most steps can be conducted by various entities. For example, data aggregation across care sites or multiple providers for measure score calculation can be supported by registries, HIEs, payers, and additional “third party” (other than provider or payer) organizations.

Three major types of data are represented at the bottom of the diagram: EHR data, clinical registry data, and other claims and administrative data. Two general pathways for data flow are illustrated on the left and right sides of the diagram. The left-side path represents direct data flow from providers or vendors to payers (e.g., data mapped to the FHIR standard is exchanged through an FHIR API or other file format). The right-side path represents a more indirect pathway, by which data may flow through a third party that aggregates data across providers and that may provide other potential functions, such as data validation and measure score calculation.

Both pathways demonstrate the use of a dQM to calculate measure scores using the data formatted in FHIR and shared via an FHIR API or through other exchange mechanisms. This data flow and dQM calculation software supports quality measurement reporting and accountability reporting at the payer level, located at the top of the diagram.

Lastly, the multidirectional arrows throughout the diagram represent the flow of data between levels; while provider data moves “upward” through the diagram for reporting purposes, data should also flow back to patients and providers to support timely quality improvement efforts and inform clinical decisions. Data can also be shared horizontally directly among data sources (e.g., between provider EHRs and clinical registries).

Figure 2. Digital Measurement Data Flow. *This diagram represents a near-term, future-state, digital quality measurement data flow using FHIR-formatted data. Data from multiple sources—EHR data; clinical registries; and other claims, administrative, and digital data—flow up to payers for reporting and accountability reporting through two general pathways. The left side of the diagram illustrates a direct flow between providers and vendors to payers. The right side of the diagram illustrates an indirect flow of digital data from clinical data sources to payers through a third party who aggregates and manages data. In the data flow, (1) the data from the initial source are mapped to the FHIR-based common standard; (2) the data are exchanged with the entity that will run the dQM to calculate the measure score using an FHIR API or other exchange formats; and (3) the payer, public reporting entity, or aggregator uses the dQM and aggregated data to calculate the measure score. When an aggregator is used (right side), they subsequently submit the measure score to the payer or public-reporting entity. The measure score result and other related information can be shared back to the provider (both pathways) to inform quality improvement. (Source: draft provided by CMS)*

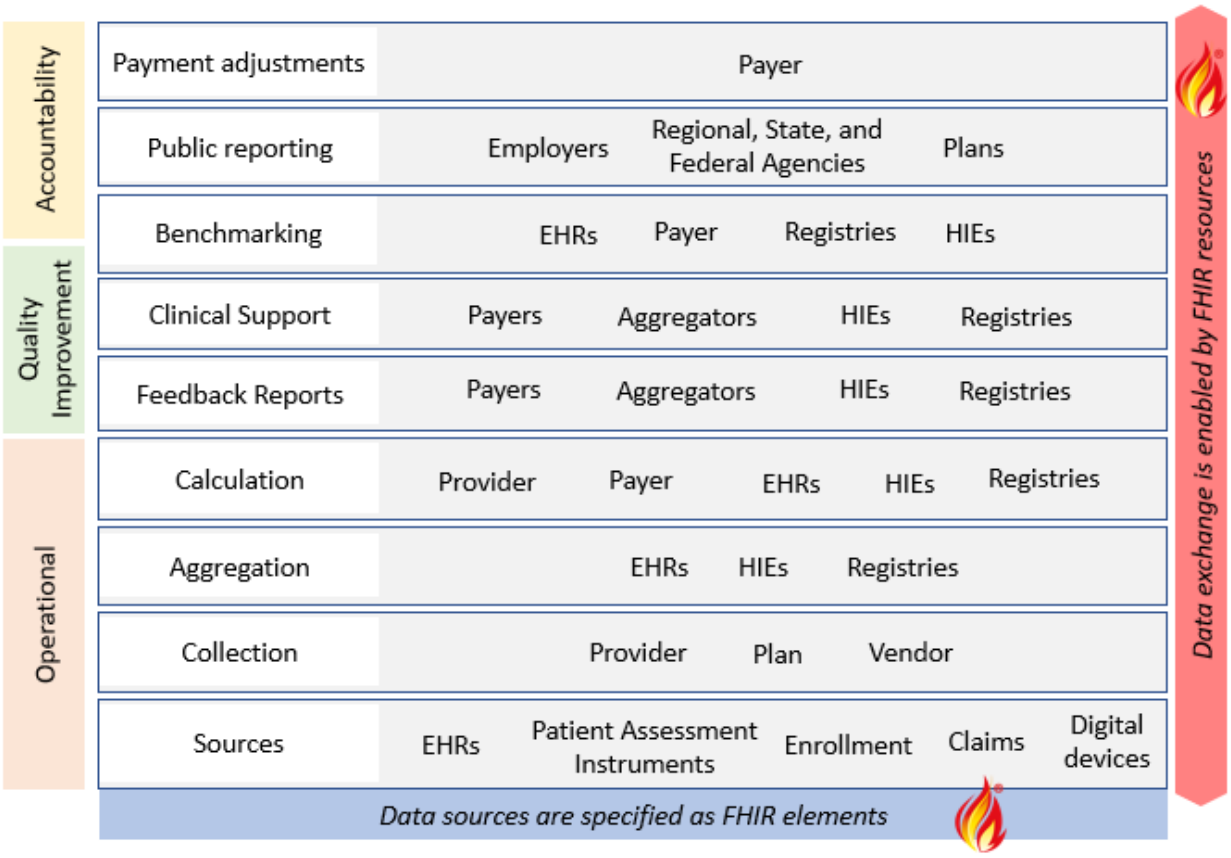


The proposed data flow diagram reflects both public- and private-sector stakeholders. For instance, CMS' current efforts are concentrated on developing the direct data flow illustrated on the left side of the diagram, to ensure that data are collected consistent with regulatory requirements; however, CMS continues to consider the role of the right side, third-party path to provide flexibility for providers with limited resources to manage data in-house. Meanwhile, NCQA's efforts are focused on the right side of the diagram, given the organization's expertise in aggregating data from multiple sources for plan- and population-level measures. NCQA's measure development efforts will use the FHIR data model to align with national initiatives but will allow flexibility for data formats (i.e., NCQA will build from existing data flows and will recommend but not require the use of FHIR APIs).

Building off the above data flow, the Workgroup visualized elements of an aligned future state system. The ideal future state system is aligned not only on quality measures, but also on individual data elements. Data models, data formats, transmission protocols, and system infrastructure are standardized to allow for interoperability, and measure specifications can be used to directly compute quality metrics without additional customization within each provider's system. Lastly, a future state system includes mechanisms for updating measures over time to reflect changes in measurement, as well as mechanisms to provide continuing feedback for continuous quality improvement in addition to supporting end-of-year reporting.

To further apply and interpret the above diagram, the Digital Measurement Workgroup developed a schematic consistent with the above data flow diagram. Figure 3 highlights a set of interrelated functions that support the digital transition and illustrates some of the key stakeholders who participate at each step. It adds the functionality of benchmarking and highlights two-way information flow supporting quality improvement and clinical care. While the stages are loosely ordered, they are not intended to represent a strict hierarchy or linear flow of data—they depict data sources as a common foundation that can be used for multiple endpoints (e.g., quality improvement and accountability activities) after being captured and mapped to FHIR. This diagram is intended to serve as a starting point to understand stakeholder involvement and will be adapted and updated over time.

Figure 3. Key Stakeholders and Stages Involved in Data Exchange. *This diagram illustrates the organization and potential involvement of various stakeholders at different points of data exchange. As in Figure 2, data from various digital data sources (at the bottom of the diagram) can be aggregated and used to support multiple functions, including quality improvement via feedback reports, clinical decision support and benchmarking, and accountability through public reporting and payment adjustments. A system built on interoperable data consistently mapped to FHIR-based common standards facilitates alignment of data and tooling to support the integration of these functions and reduction of data collection burden.*



Current Public and Private Sector Activities

Fully FHIR-specified data sources and FHIR-enabled data exchange represent the future rather than the current state. This future state is aligned with policy direction at the federal level and many public and private sector activities. The Digital Measurement Workgroup reviewed activities underway to make progress toward implementation of standardized FHIR data and advance data exchange. Current initiatives from public and private stakeholders aim to support this future state system. These include, but are not limited to, the following:

- **HL7's Da Vinci Project.** HL7's Da Vinci Project convenes private sector stakeholders, including payers, providers, vendors, and other industry associates, to develop implementation guides and share best practices and experience to accelerate the adoption of FHIR. Stakeholders participate in events including roundtables and Connectathons for FHIR development and testing.
- **The Social Interventions Research & Evaluation Network's (SIREN) Gravity Project.** The Gravity Project is a national public collaborative that convenes stakeholders to align on data elements and value sets used to capture social drivers of health (e.g., food insecurity, housing, and transportation

access). The project is currently in phase 2, which focuses on testing SDOH data sets for use in FHIR and developing an implementation guide.

- **NCQA's supplemental Data Aggregator Validation (DAV) programs.** NCQA developed the DAV program to support improved data flow; participants in this program are evaluated based on policies and processes for intake, management, and output of data, as well as final Continuity of Care Document output files, to confirm the accuracy of aggregated clinical data for use in quality reporting. NCQA is also in the process of developing a related program, NCQA DAV-FHIR EHR, which would validate data directly sourced from an FHIR-enabled EHR.
- **NCQA's development of dynamic, next-generation software for continuous measure feedback.** Earlier this year, NCQA launched its Digital Quality Solutions Pilot in partnership with six organizations, including health plans, delivery systems, and health IT firms. The organizations will provide feedback on the usability and features of a next-generation measure calculation tool and measure prototypes, as well as the implications for reporting and quality improvement efforts.
- **CMS' efforts related to measure calculation tools and improved data aggregation.** Along with setting incentives for interoperability and continuing efforts addressing measure alignment, CMS outlined future actions to enable digital measure transformation as part of the Digital Quality Measurement Strategic Roadmap. These potential plans include a redesign of CMS' eCQMs to open-core, self-contained measure calculation tools that interface with FHIR APIs, as well as updated guidelines to improve data aggregation for CMS quality reporting.
- **Creating Access to Real-Time Information Now Through Consumer-Directed Exchange (CARIN) Alliance.** The CARIN Alliance convenes consumers, providers, plans, researchers, infrastructure firms, and other entities as part of five workgroups addressing consumer identification, health plans, policy and regulation, real-time pharmacy benefit checks, and a trust framework. The workgroups contribute to proposed policies and frameworks as well as providing input to federal partners.
- **CMS and MITRE's Post-Acute Care Interoperability (PACIO) Project.** The PACIO Project focuses on interoperability within the context of post-acute care and seeks to establish a framework for the development of FHIR implementation guides and reference implementations that will facilitate data exchange from post-acute care providers to other providers, patients, etc., via FHIR APIs.

Even as requirements for interoperability are advancing, Workgroup members emphasized that there is limited readiness to implement data exchange of FHIR data via FHIR APIs. Workgroup discussions acknowledged that measures will be calculated and exchanged through multiple mechanisms during the transition to FHIR and noted the value of system flexibility.

Section 3: Path Forward for the CQMC

Building on the definitions, data sources, stakeholders, and data flows identified in this report, the Digital Measurement Workgroup considered how the CQMC can best align with other initiatives and encourage the adoption and implementation of dQMs in the CQMC core sets. Through iterative discussions, the CQMC explored several next steps for continuing its digital measurement work.

Measure Driven Prioritization of Data Elements

The Workgroup identified that FHIR data standards will play a key role in advancing interoperable data for measurement, given the ONC interoperability requirements and CMS' Digital Quality Measurement Strategic Roadmap. The Workgroup recommended measure-driven prioritization of data elements as a high value, high-priority activity for the CQMC. The CQMC recognizes the benefits of moving towards digital measurement and intends to develop a process to set priorities for dQMs in the core sets and identify the data elements that would need to be interoperable to support these priority measures.

With input from both the core set workgroups and the Digital Measurement Workgroup, the CQMC plans to identify the highest-priority measures to transition to dQMs based on factors such as applicability to multiple specialties, anticipated impact, etc. Building multistakeholder consensus on these highest-priority elements can inform national priorities for the FHIR data most needed for aligned dQMs and directly inform ONC standards and progress on national interoperability through the USCDI versioning and USCDI+ processes.

Additional Future Opportunities

The Workgroup discussed ideas for potential next steps the CQMC could take, coordinating among its members and potential partners. These activities could include:

Use Case Pilot: To build upon the Workgroup's ongoing work to review data flows and outline approaches to exchanging data between payers and providers, the CQMC membership may develop and test a relevant use case that demonstrates the process of transitioning one or two specific quality measures in a core set to fully digital measures. To select the measures to map the use case, the CQMC could consider factors such as use across multiple programs, applicability across specialties, and current data sources used for the measures. The CQMC could then plan a data transfer pilot, which would include demonstrating feasible specifications and data flows between payers and providers using FHIR-specified data for key data elements from the selected measures. Future data mapping opportunities could be expanded to better understand physician workflows for collecting and entering dQM data into the EHR.

Readiness Survey: The CQMC may explore developing and collecting a readiness survey that assesses stakeholders' (e.g., providers', payers') readiness to transition to dQMs and identifies major implementation challenges. These data can help to inform how the CQMC can best support advancement based on member needs and the pace at which digital transition should occur. Readiness survey results could also identify candidates for any piloting the CQMC undertakes in the future.

Assessing the CQMC Core Sets for a Transition to dQMs: In addition to an in-depth pilot of one or two quality measures and their transition to dQMs, the CQMC may more broadly assess the current state of all its measure sets and their readiness to transition to dQMs. This work could include identifying the existing data sources used in various core sets (e.g., claims-based only, registry data, and eCQM reporting options) and important measures that were discussed by the CQMC core set workgroups but were not included in the core sets due to implementation concerns (e.g., specialty registry measures).

Creating Guidance for Inclusion of dQMs in the Core Sets: The CQMC, through its core set measure selection principles, emphasizes the importance of selecting dQMs for inclusion in the core sets when they are available and appropriate. The CQMC may consider establishing more detailed guidance for Workgroup members as they consider the inclusion of dQMs during the core set maintenance process (e.g., how to consider feasibility of data sources). Having established criteria specific to dQMs would also allow for more concrete feedback on why measures were included or not included that can be shared with developers so they can refine their measures and increase the chance of adoption over time. This guidance will likely need to evolve over time as digital measurement advances to include new data sources and leverage technologies, such as natural language processing.

Collaborations With External Partners: To ensure alignment with ongoing efforts in the field to promote digital measurement, the CQMC may engage with existing efforts to align data standards and set priorities for interoperable data (e.g., USCDI/USCDI+, mCODE, mCARD, and HL7 Connectathons). The CQMC may also engage with registries to better understand their potential role in sharing performance data on an ongoing basis and supporting data aggregation and management functions. In addition, the CQMC may explore measure concepts that should be prioritized for development based on new opportunities to use clinical data for quality measurement. Collaboration opportunities also include the potential for the CQMC to contribute to digital measurement guidance for EHRs, data vendors, and/or measure developers. To avoid duplicating efforts, the CQMC should stay informed of parallel initiatives related to digital measurement and engage where it can add the most value.

Conclusion

The transition to dQMs poses opportunities to reduce the burden of quality measurement, improve data accuracy, make measurement more meaningful, and contribute to a more complete understanding of quality of care at the population level. Misalignment and nonstandardized data limit the ability to fully leverage clinical data to understand patient outcomes. Stakeholders across the nation must collaborate to fully realize the benefits of a modernized, learning health system and overcome dQM implementation challenges.

Through its discussions in 2021 and 2022, the CQMC's multistakeholder Digital Measurement Workgroup has established common definitions, identified relevant stakeholders, and contributed to diagramming near-term future data flows aimed at facilitating lower burden, higher-impact quality measurement. The Workgroup's focus is consistent with ongoing efforts in the quality measurement environment of both public and private stakeholders to advance the data, technology, and agreements needed to facilitate data standardization and data sharing for quality measurement and to better integrate quality measurement with related uses that advance quality. The content summarized in this report provides a common foundation that will inform the CQMC's next steps to support the ongoing transition to dQMs, an important direction for VBPs and APMs. The Digital Measurement Workgroup will continue to convene in the coming months to make final recommendations for the CQMC's future activities.

References

1 Centers for Medicare & Medicaid Services (CMS). *Digital Quality Measurement Strategic Roadmap*. Centers for Medicare & Medicaid Services (CMS); 2022:65. https://ecqi.healthit.gov/sites/default/files/CMSdQMStrategicRoadmap_032822.pdf.

2 Centers for Medicare & Medicaid Services (CMS). Medicare Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long-Term Care Hospital Prospective Payment System and Proposed Policy Changes and Fiscal Year 2023 Rates; Quality Programs and Medicare Promoting Interoperability Program Requirements for Eligible Hospitals and Critical Access Hospitals; Costs Incurred for Qualified and Non-Qualified Deferred Compensation Plans; and Changes to Hospital and Critical Access Hospital Conditions of Participation. Federal Register. https://www.federalregister.gov/documents/2022/05/10/2022-08268/medicare-program-hospital-inpatient-prospective-payment-systems-for-acute-care-hospitals-and-the. Published May 10, 2022. Last accessed September 2022.

3 Centers for Medicare & Medicaid Services (CMS). FY 2023 IPPS Final Rule Home Page. CMS.gov. https://www.cms.gov/medicare/acute-inpatient-pps/fy-2023-ipps-final-rule-home-page. Published August 18, 2022. Last accessed August 2022.

4 National Committee for Quality Assurance (NCQA). 3 Things to Know About Digital Quality Measures. *NCQA.org*. July 2021. https://www.ncqa.org/blog/3-things-to-know-about-digital-quality-measures/. Last accessed August 2022.

5 Stratton A. HEDIS® Measure Types Compared. *NCQA.org*. May 2021. https://www.ncqa.org/digital-measures/resources/blogs/c93ecbc4-987d-42b3-a5d4-6c77ceebcc36/. Last accessed August 2022.

6 Higgins A, Greenberg L, Nwosu C, et al. *Adoption of Core Quality Measures Collaborative Core Measure Sets*; 2017.