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The Benefits of a FHIR-CQL Model for Clinical Quality Measure Evaluation

How a FHIR-CQL Platform Streamlines Data Exchange and Computable Logic for Digital Quality Measure Reporting

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WHITEPAPER | JANUARY 2025

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Bryn Rhodes is currently the Director of Standards Strategy for Smile Digital Health, and is also a key contributor and Subject Matter Expert in the Clinical Quality Framework initiative, primarily involved with the development and support of the Clinical Quality Language Specification. His expertise in Clinical Decision Support stems from implementation experience building a real-time Clinical Decision Support system for an industry leading Electronic Health Records system. With 20 years in software development, he has a broad range of implementation experience, from desktop client/server line-of-business and medical applications to enterprise and web-scale information systems. His career has focused on the expression and implementation of logic systems, from simple printer-command and build automation interpreters, through full-scale database query compilers and 4GL interface engines.

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Summary

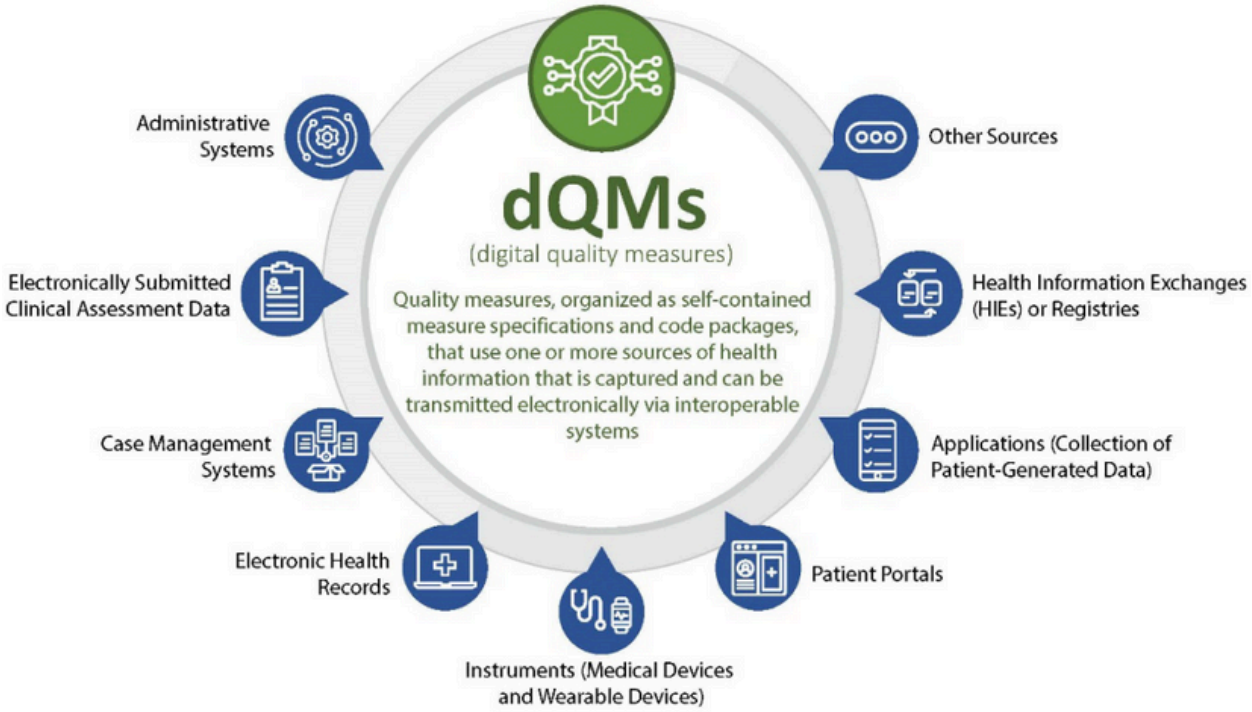
In recent years, evidence-based quality measurement in healthcare has received greater attention as various stakeholders, including state and federal agencies, certifying bodies, payers, and providers work together to improve patient outcomes and lower healthcare costs. Instrumental to these efforts are digital quality measures (dQMs), which assess observations, processes, treatments, experiences, and outcomes of patient care.

Adopting dQMs based on the HL7 ®FHIR ®and CQL standards can enhance care quality, improve star ratings, increase operational efficiencies, and streamline population health management. A FHIR-CQL platform that can execute dQMs is a wise investment for current quality measurement and future applications such as Care Gap Management and Clinical Practice Guidelines.

Advantages of dQM

Electronic clinical quality measures (eCQMs) are digital measures of healthcare quality that draw upon data from electronic health records (EHRs) and/or health IT systems. Electronic clinical quality measures are considered electronic because their specifications are designed to be machine-readable. In comparison, CQMs have historically been chart based, requiring healthcare organizations to invest resources and time to manually extract and validate information from patient medical records in order to report on these measures and submit the information to the Centers for Medicare & Medicaid Services (CMS). Although the transition to eCQMs makes manual abstraction unnecessary, assessing clinical patient data from EHRs for the purpose of quality reporting remains burdensome and emerging data sources like patient-reported outcomes and patient-generated health data are not easily integrated.

To improve upon eCQMs, CMS has committed to transition entirely to digital quality measures (dQMs) as outlined in the CMS digital quality measurement roadmap. As part of this transition, the agency has expanded its guidance for implementing FHIR-based measures. CMS now emphasizes the use of FHIR Bulk Data APIs and Flat FHIR formats to streamline population-level reporting, enabling scalability for large organizations. NCQA is also transitioning to dQMs to align with the CMS initiative, redesigning HEDIS® measures to utilize FHIR-based data exchange.



Credit: CMS Digital Quality Measurement Strategic Roadmap

HEDIS® is a registered trademark of the National Committee for Quality Assurance (NCQA)." at the end of the page?

FHIR-based dQMs enable efficient, standardized data exchange across systems and, improve accuracy and timeliness of quality measures

FHIR was designed for interoperable exchange of healthcare information across a variety of use cases —including quality measurement. Using a FHIR model, dQMs now align with interoperability standards used in other healthcare exchange scenarios and brings the following benefits:

1.) Enabling the aggregation of data from multiple sources, such as EHRs, wearable devices, laboratory systems, and patient-generated data. This delivers a more comprehensive view of the patient record.

2.) Providing real-time data access to clinical and administrative data via FHIR APIs, critical for calculating quality measures dynamically during care delivery.

3.) Streamlining the reporting process by using Measure and MeasureReport resources, eliminating the need for legacy formats like Quality Reporting Document Architecture (QRDA), reducing the complexity of mapping and submission workflows.

4.) Allowing for scalability through its modular structure and use of RESTful APIs, making it suitable for both small clinics and large health systems.

5.) Delivering better accuracy through the use of standardized terminologies such as SNOMED CT, LOINC, and ICD-10, reducing variability and errors in data interpretation.

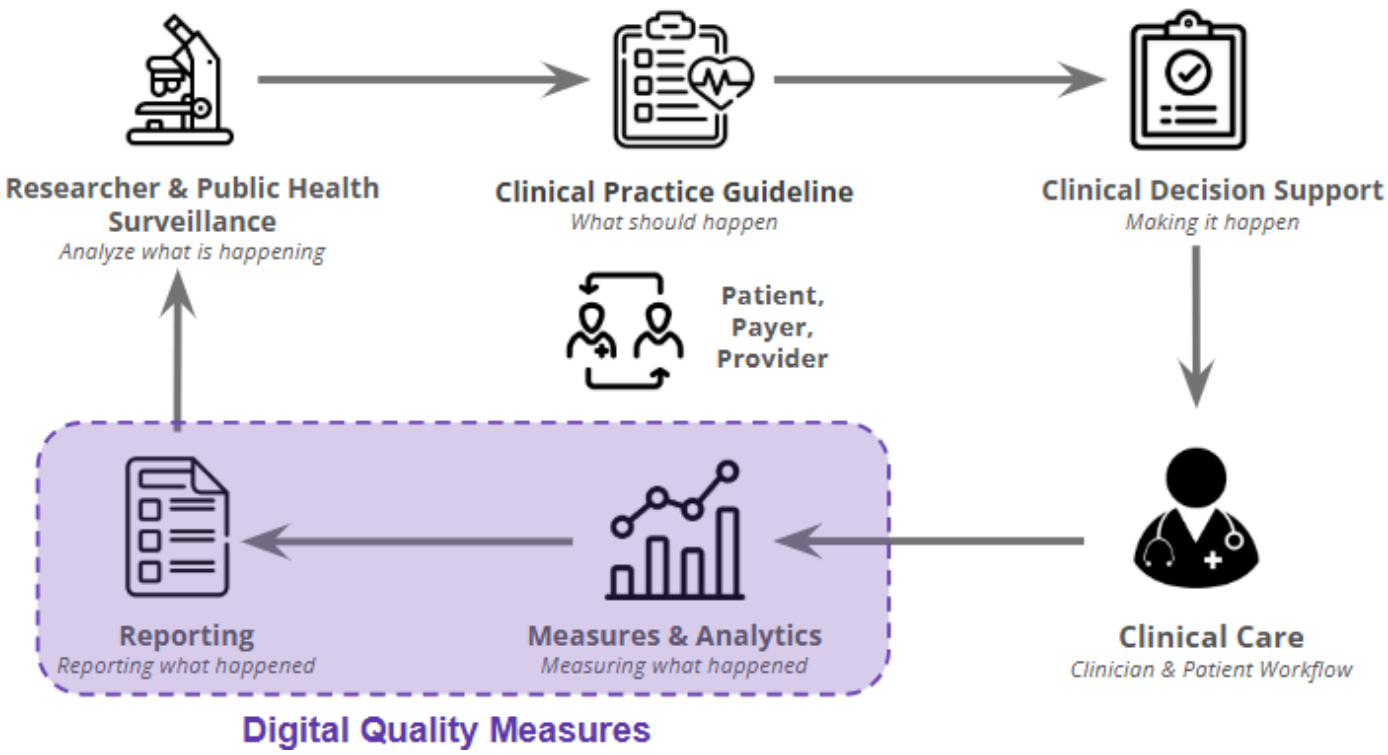
The other required component for dQMs under the CMS roadmap is logic expressed in Clinical Quality Language (CQL). CQL is a Health Level Seven (HL7) standard used to define the logic for quality measures and clinical decision support in a human-readable and machine-readable format. It works with the FHIR Measure and MeasureReport resources to calculate and report quality measures. CQL provides a standardized way to author and share this logic, improving consistency across organizations and enabling the reuse of measure logic for different programs.

Authoring measures in a standardized fashion will reduce errors among organizations implementing those measures. There may be one specification for an eCQM, but there could be countless different implementations of it among various organizations. Standardization with dQMs ensures that quality measures are reported consistently across organizations. When specifications are authored using FHIR and CQL, they can be shared seamlessly among hospitals, clinics, and providers. This allows a measure to be authored once and used across multiple provider organizations, streamlining the process and ensuring uniformity.

Employing FHIR-based standards provides common representation of the data, while using CQL as the authoring language allows for a common expression of logic.

In a real-world scenario, consider the treatment of diabetes patients. Best practices for diabetes care are determined through research and public health surveillance. These are then used to develop a clinical practice guideline which is disseminated through various clinical decision support mechanisms and applied during clinical care encounters. CMS needs to ensure that providers are following this guideline and treating diabetes patients according to these best practices. To verify compliance, quality measures are leveraged to evaluate whether patients are receiving care in alignment with the guideline.

Digital quality measures consist of two phases: Measures & Analytics and Reporting. The goal is to ensure a single standard of care and to measure whether it is being followed. This underscores the importance of a standardized, uniform implementation of quality measures to accurately assess compliance. Standardization is essential to ensure that quality measures are implemented consistently across institutions, without variation.



Steps in the clinical quality lifecycle. Digital quality measures consist of the Measures & Analytics and the Reporting steps.

Impacts of Implementing dQM

Enhanced Quality of Care

Implementing, maintaining, and reporting quality measures poses a large burden on clinicians and healthcare institutions. Compounding this is the massive amount of content continuously being disseminated by non-profit and private sector organizations, including guideline development societies, accreditation organizations, and registries. It is virtually impossible for any one provider or organization to keep up with all the best practices and changing guidelines which is why it can take up to 17 years for an improved practice or treatment to be widely adopted. With dQMs, updated clinical measurements can be disseminated quickly and consistently, ensuring that patients receive care aligned with the latest best practices. By using FHIR and CQL to create computable, standardized representations of clinical guidelines, they can be encoded once and deployed universally across systems.

Improvement in Star Ratings

Currently, measures are run and submitted once a year plus an additional wait time for results on star ratings. By the time the rating is revealed, it's too late to impact that care being delivered for the patient. It's truly a rearview mirror. FHIR APIs enable real-time access to clinical data from EHRs, health information exchanges (HIEs), and other sources. This allows dQMs to evaluate compliance with guidelines dynamically and deliver real-time performance tracking. dQMs can be integrated into clinical workflows to trigger alerts or decision support that proactively intervene in care delivery, ultimately delivering better scores.

Operational Efficiencies and Cost Reduction

One of the most immediate impacts of dQMs is the improvement in efficiency and reduction of the administrative burden. By automating the collection, calculation, and submission of quality measures, dQMs eliminate the need for manual data extraction and streamline workflows. Leveraging FHIR APIs allows seamless integration of data across EHRs, registries, and other systems, reducing duplication of effort and enabling scalable solutions that adapt more easily to changing regulatory requirements. Automating quality reporting also reduces the resources required for compliance, leading to lower reporting costs. Improved resource allocation helps healthcare organizations focus on areas of inefficiency or poor outcomes, while timely compliance with quality reporting requirements allows providers to avoid financial penalties associated with regulatory programs. Furthermore, dQMs support value-based care models by enabling organizations to measure performance effectively, demonstrating value in care delivery and ensuring alignment with pay-for-performance requirements.

Streamlining Population Health Management

Interoperability is a cornerstone of dQMs, as they use the standardized frameworks of FHIR and CQL to ensure compatibility between systems and facilitate seamless data exchange among providers, payers, and public health entities. As mentioned previously, these measures also broaden data integration creating a comprehensive view of patient care. This interoperability extends to support for population health management, as dQMs enable insights into trends and risks, allowing healthcare organizations to implement preventive strategies and better manage chronic diseases. Public health reporting also benefits from real-time data sharing, which supports faster and more accurate responses to emerging health challenges

The Smile FHIR-CQL Model

Smile Digital Health has a FHIR-CQL digital measure evaluation solution that simplifies digital quality measure reporting while driving better health outcomes. Based on a deep expertise in FHIR and CQL, Smile provides clinicians and organizations with reliable, consistent results while helping ensure a uniform standard of care.

Smile's flagship product, the Health Data Platform, can aggregate, store, and present patient and data in FHIR. This platform is tightly integrated with Smile's Clinical Quality Intelligence Engine powering the **Smile dQM Solution** which provides quality measure evaluation operations. Given access to the patient data within Smile, our dQM Solution initiates an operation called $evaluate-measure which examines all suitable FHIR resources, then leverages CQL to calculate a measure score for each patient. This measure score can then be submitted to CMS.

When it comes to reporting, requirements vary among organizations and are based on the regulations they are subject to: Medicare and Medicaid, NCQA HEDIS, state level, or institution level reporting. Smile dQM can support various levels of any type of reporting. Smile has experience building HEDIS measures, CMS program measures (including MIPS), and customized institution-specific quality measures.

Underlying the Smile Clinical Quality Intelligence Suite (CQIS) is a guiding belief that technology should not be a silo solution. The FHIR-CQL model can be used throughout the quality improvement lifecycle, whether for clinical decision support, guideline recommendations, or quality measures. The Smile Clinical Quality Intelligence Suite will also deliver in the future Care Gaps Management and Clinical Practice Guidelines solutions based on the same FHIR-CQL technology.

- Care Gaps Management identifies patients at risk of failing quality measures unless proactive interventions are taken. This enables provider organizations to analyze care gaps in advance and address them before falling short of requirements. By addressing care gaps early, organizations can achieve higher measure scores during year-end reporting, which CMS directly links to payment incentives. Additionally, CMS's value-based programs reward healthcare providers with bonuses for delivering high-quality care to Medicare patients.

- Clinical Practice Guidelines provide real-time decision support for clinicians at the point of care. The ability to disseminate the latest guidelines electronically assists clinicians and organizations in delivering the most effective care. This can also be used to increase patient engagement in their own proactive care through automated notifications.

The stages of the quality improvement lifecycle can leverage the same FHIR and CQL technology when it comes to defining the guideline logic involved and accessing the patient data required by that logic, including Clinical Practice Guidelines, Clinical Decision Support, Clinical Care, Measures & Analytics, and Reporting. The reusability of that logic means there can be one single source of truth that allows for updates to be disseminated and adopted quickly across all connected systems.

Just as the FHIR standard facilitates data interoperability, the CQL standard enables knowledge interoperability, allowing organizations to share decision-making logic seamlessly across systems.

Moving Your Organization into the Future

As agencies and regulatory bodies place greater emphasis on improving healthcare quality, and stakeholders strive for greater interoperability, adopting digital quality measures is essential to keeping up with regulations and setting your organization up for success. A standards-based approach reduces variability and decreases the risk of errors when translating medical knowledge into a computable format.

Just as the FHIR standard facilitates data interoperability, the CQL standard enables knowledge interoperability, allowing organizations to share decision-making logic seamlessly across systems.The Smile Clinical Quality Intelligence Suite is designed on this foundation of a FHIR-CQL model and our dQM Solution is designed to streamline measure execution and reporting. Implementing the Smile dQM Solution can enhance quality of care, improve star ratings, deliver operational efficiencies, and streamline population health management.

The Smile Clinical Quality Intelligence Suite offers CQL as a consistent mechanism for representing clinical knowledge across various use cases. By investing in a FHIR-CQL platform that has future expansion built in, organizations can reduce their IT footprint and operational costs. Standardizing and simplifying the clinical quality improvement cycle processes enables healthcare organizations to focus on their core mission: delivering high-quality care and achieving better patient outcomes.

Contact us today to learn more about how to harness the benefits of the FHIR-CQL module to streamline data exchange for eCQM reporting for your organization.

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