

eMeasures: A standard format for Health Quality Measures

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Abstract. Health quality measures can be used to improve the effective use of Electronic Health Record systems (EHRs) in health care delivery. The Health Quality Measures Format (HQMF) is a standard for representing a health quality measure as an electronic document. This presentation will present the standard, review the development process of quality measures for EHR system using HL7 CDA R2, and reflect on the outlook for eMeasures implementation and adoption.

Keywords. health information technology standards, quality measures

1. Introduction

Health quality measures can be used to improve the effective use of Electronic Health Record Systems in health care delivery. The National Quality Forum aims to significantly improve the quality and efficiency of patient care by making possible the capture and reporting of quality measure information for physicians and other health care providers [1]. The Collaborative for Performance Measure Integration with EHR systems has the following objectives [2]: (a) To create a standardized way of communicating Performance Measures; (b) To establish standards that permit structured, encoded Performance Measure information to be incorporated into EHR applications while preserving the clinical intent of the Performance Measure; and (c) To improve the process of Performance Measure update and maintenance for EHR vendors.

The Health Quality Measures Format (HQMF) is a standard for representing a health quality measure as an electronic document. Quality measures or indicators provides indications of outcome regarding the performance of an individual or an organization in relation to specific actions, processes or outcome measured based on a set of clinical criteria and evidence base [3]. The next section (Methods) describes the HQMF standard, which as of March 2010 is a HL7 Draft Standard for Trial Use (HL7 DSTU). Then, Results and Outlook cites areas that the HQMF reflecting on opportunities for global adoption.

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2. Methods

Through standardization of a measure's structure, metadata, definitions, and logic, the HQMF provides for quality measure consistency and unambiguous interpretation. A health quality measure encoded in the HQMF format is referred to as an "eMeasure". Standardization of document structure (e.g. sections), metadata (e.g. author, verifier), and definitions (e.g. "numerator", "initial patient population") enables a wide range of measures, currently existing in a variety of formats, to achieve at least a minimal level of consistency and readability, even if not fully machine processable.

An HQMF document is a defined and complete information object that can exist outside of a messaging context and/or can be a payload within an HL7 Version 2 or Version 3 message. Thus, the HQMF complements HL7 messaging specifications. The exact method by which an eMeasure is exchanged is outside the scope of this standard.

```
<QualityMeasureDocument>
  ... eMeasure Header ...
  <section>
    <title>Measure description</title>
    <text>... narrative measure description...</text>
    <entry>... Measure description multimedia ...</entry>
    <entry>... Measure description multimedia ...</entry>
    ...
  </section>
  <section>
    <title>Data criteria</title>
    <text>... narrative data criteria descriptions ...</text>
    <entry>... Formal data criteria definition ...</entry>
    <entry>... Formal data criteria definition ...</entry>
    ...
  </section>
  <section>
    <title>Population criteria</title>
    <text>... narrative population criteria descriptions ...</text>
    <entry>... Formal population criteria definition ...</entry>
    <entry>... Formal population criteria definition ...</entry>
    ...
  </section>
  <section>
    <title>Measure observations</title>
    <text>... narrative measure observation descriptions ...</text>
    <entry>... Formal measure observation definition ...</entry>
    <entry>... Formal measure observation definition ...</entry>
    ...
  </section>
  <section>
    <section>...</section>
  </section>
</QualityMeasureDocument>
```

Figure 1: Structure of an HQMF document.

HQMF requires that a receiver of an eMeasure be able to algorithmically display the document on a standard Web browser such that a human reader would extract the same quality data as would a computer that is basing the extraction on formally encoded eMeasure entries. Material within a section to be rendered is to be placed into the section.text field. The content model of this field is the same as that used for other Structured Document specifications (see Figure 1).

The HQMF Model is derived from the HL7 Reference Information Model (RIM), through the use of the HL7 XML Implementation Technology Specification (ITS). It is a "Constrained Information Model" (CIM), derived from a broader "Domain Information Model" (DIM).

The QualityMeasureDocument class is the entry point into the HQMF model, and corresponds to the <QualityMeasureDocument> XML element that is the root element of an eMeasure document. An eMeasure document is logically broken up into a header and a body. The QualityMeasureDocument class inherits various attributes from the InfrastructureRoot class of RIM, including templateId and typeId. Setting the value of templateId in an instance signifies the application of a set of templates, which may be applicable at the level of the QualityMeasureDocument or at a finer granularity i.e. section or entry.

Key notions of HQMF are: *Data Criteria*, *Population Criteria*, and *Measure Observations*. Data Criteria are assertions that can be *True* or *False* frequently looking at raw EHR data and they are used primarily to define whether a patient is included in Numerator, Denominator, etc. In HL7 terms, Data Criteria are formalized as RIM patterns coupled with vocabulary. Population criteria, just like data criteria are assertions that can be found to be true or false, thereby providing a means for HQMF to formalize a measure's population parameters based on combinations of Data Criteria. Measure observations are not criteria, but rather, are definitions of observations, used to score a measure and are tied to a specific population e.g. average systolic blood pressure.

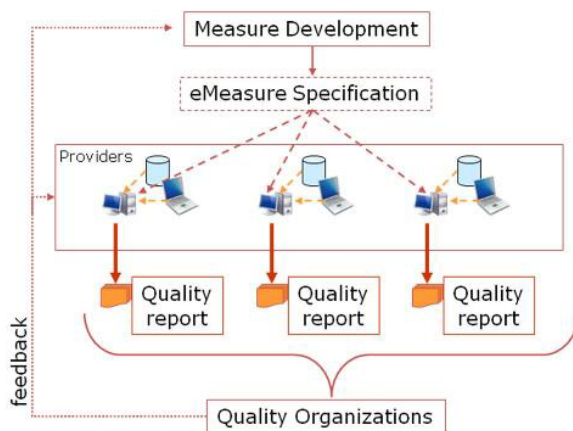


Figure 2: eMeasure Development Process

3. Results and Outlook

Health Quality Measures Format (HQMF) supports the development process of eMeasures for quality reporting (see Figure 2). It is an HL7 standard developed to streamline the process of developing interoperable quality measures for EHR systems using HL7 CDA R2 [4]. Looking into the future of HIT, it is important that eMeasures are taken into account in the HL7 EHR-S Functional Model and its emerging profiles. Furthermore, education with eMeasures and wide world-wide awareness and adoption fostering shared understanding of concepts and interoperable implementations will help develop consistent tools for measuring health care quality, and as Lord Kelvin put it: "If you cannot measure it, you cannot improve it." Lord Kelvin (1824-1907).

References

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