NATIONAL QUALITY FORUM

Quality Data Model (QDM) Style Guide

June 2012

Quality Data Model (QDM) Style Guide for EHR Feasibility

Background

The Quality Data Model (QDM) Style Guide (June 2012) is a companion document to the QDM Update June 2012. Please refer to the QDM Update June 2012 document for a general description of the QDM as well as changes that have occurred since the October 2011 publication. The changes are based on NQF member and public comment and also from experience gained by measure developers retooling or creating new measures that address data expected from electronic health records (EHRs).

Introduction to the Style Guide

The QDM Style Guide addresses feasibility of QDM components with respect to EHRs certified for the 2014 EHR Certification Program proposed by the Office of the National Coordinator for Health IT (ONC). The QDM Style Guide provides guidance as to which information can be expected in structured form in referenced EHRs and which information may be important to measures but would likely require additional effort if certified EHRs are used as the only source of data. Such effort within EHRs can include adjustment of the user interface data to capture data that satisfies both practice and measure reporting needs as well as post-documentation adjustment of data such as natural language processing or other means to translate point of care data into quality measurement data while preserving semantic meaning.

Intended Use

The QDM Style Guide is not intended to restrict quality measure development for the purpose of testing and evaluation for more advanced EHR implementations. It is intended to provide direction to measure developers about the floor of feasibility and availability for specific data within any 2014 Certified EHR. The style guide will help measure developers or others seeking data directly within EHRs meeting certification standards to focus on readily available data as they consider data elements to define measure content. NQF expects to update the QDM Style Guide as EHR certification requirements change over time.

Structure of Style Guide

The QDM Style Guide is presented in a table format. For each QDM Category, the related standards recommended by the Federal Advisory Act (FACA) Health IT Standards Committee and those incorporated in the Proposed 2014 Edition EHR Certification Criteria[1] are provided. The Guide also provides guidance as to what might be expected as structured data available in EHRs that adhere to the proposed 2014 certification criteria and what data criteria may require additional effort within EHRs. Definitions of the QDM categories can be found in the QDM June 2012 Update located here.

[1] Available at: http://www.gpo.gov/fdsys/pkg/FR-2012-03-07/pdf/2012-4430.pdf.

Column Header Definitions:

1. **QDM Category** refers to a particular group of information that can be addressed in a quality measure. Definitions are provided as Appendix A in this style guide for reference. Complete descriptions of the categories, states and attributes can be found in the companion publication, QDM Update June 2012.
2. **Standards** list the ***Vocabulary (Code system)*** recommendations provided by the HITSC with modifications as included in the Proposed 2014 Edition EHR Certification Criteria and ***ONC 2014 EHR Certification Standard (proposed)*** section that discusses the information category.
3. **Feasible** includes those *states* (context of use) and attributes that should be present in structured form in an EHR meeting proposed 2014 certification requirements.
4. **Feasible but require additional effort, e.g., workflow changes** lists states (or contexts of use) and attributes that *cannot* be expected to be present in an EHR meeting proposed 2014 certification requirements. Some EHRs may be able to provide the level of detail required by these states or attributes. Many will require a change to clinician workflow to document in structured format data currently captured external to the EHR or in unstructured text, or to document information that is not part of a standard workflow. Such data may be available by *post-documentation* methods such as natural language processing and/or abstraction of some data components. To limit the potential extra burden on the part of clinicians, such elements should not be used in measures designed for data captured exclusively by EHRs without testing to be certain of data availability. In summary, this second column of feasibility issues require one of the following:
    a. entry by clinicians of structured data where current practice addresses unstructured data, OR
    b. entry by the clinician that is not currently documented, or request of the clinician to evaluate the output of other post-documentation methods such as natural language processing and/or abstraction of some data components.

Quality Data Model (QDM) Style Guide for EHR Feasibility

QDM Category	Standards	Feasible*	Feasible but require additional effort, e.g., workflow changes**
Adverse Effect: Allergy	**Vocabulary (Code system):** SNOMED-CT to describe the allergic reaction RxNorm for Medications that are the causative agents SNOMED-CT for non-medication substances that are causative agents **ONC 2014 EHR Certification Standard (proposed):** 170.314(a)(2) – Drug-drug, drug-allergy interaction checks § 170.314(a)(7) – Medication allergy list	**States:** Documented (*that the type of allergy reaction is documented)* **Attributes:** Causative Agent Start datetime	**States:** Acknowledged Updated Alerted **Attributes:** Severity *Suggest retire these contexts from QDM:* Declined (Removal suggested: *That a patient declined to report allergies is significant for clinical care but a measure or clinical decision support requires only knowledge that an allergy exists or does not exist)* Reconciled (Removal suggested: *An allergy list is reconciled, an individual allergy is updated*)
Adverse Effect: Non-Allergy	**Vocabulary (Code system):** SNOMED-CT to describe the reaction RxNorm for Medications that are the causative agents SNOMED-CT for non-medication substances that are causative agents **ONC 2014 EHR Certification Standard (proposed):** Specific to allergy only - - - 170.314(a)(2) – Drug-drug, drug-allergy interaction checks § 170.314(a)(7) – Medication allergy list	**States:** Documented (*that the type of non-allergic effect is documented)* **Attributes:** Causative Agent Start datetime	**States:** Acknowledged Updated Alerted **Attributes:** Severity **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to report non-allergic effects is significant for clinical care but a measure or clinical decision support requires only knowledge that a non-allergic effect exists or does not exist)* Reconciled (Removal suggested: *An allergy list is reconciled, an individual allergy is updated*)

Care Goal	**Vocabulary (Code system):** Dependent on the type of information expressed as the goal. E.g.: a) Improvement in Body Mass Index (BMI) uses the vocabulary for the physical exam element (LOINC) and numerical or SNOMED-CT for the result b) Patient understanding of education provided uses SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** § 170.205(a)(3) – § 170.314(a)(7) – Consolidated CDA	**States:** Documented **Attributes:** *None*	**States:** Start datetime Stop datetime Updated Resolved Reviewed Ordinality (principal, secondary, etc.) Cardinality (1,2,3,...) Acknowledged Provider preference **Attributes:** Patient preference Start datetime Stop datetime **NQF seeks comment on a new attribute suggestion, *Expected Time*, to align with needs for care planning and care coordination.** *(While Care Goal is important for Care Coordination and Care Planning, most EHRs do not have a standard way to capture and manage this type of information)* **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to state a care goal is important for clinical care but the presence or absence of a goal is the element important to measures and clinical decision support*)

Characteristics	**Vocabulary (Code system):** Varies by characteristic: • ISO 639-2 constrained to elements in ISO 639-1 for Patient's Preferred Language (Mapping maintained by Library of Congress: http://www.loc.gov/standards/iso639-2/php/code_list.php) • CDC PHIN-VADS HL7 for Administrative Gender • CDC PHIN-VADS HL7 Race and Ethnicity (use broadest range of code sets within CDC listed for Race, Ethnicity, or both combined) – Identical to OMB Race and Ethnicity values • LOINC-For assessment instruments, (including tobacco use) • SNOMED-CT-Appropriate Responses to Instruments (including patient preferences and behaviors) • Payer Typology of the Public Health Data Standards Consortium for characterizing payers **ONC 2014 EHR Certification Standard (proposed):** • § 170.314(a)(3) – Demographics • § 170.207(j) – ISO 639-1:2002 (preferred language) • No standard specified –Administrative Gender • § 170.207(f) OMB standards for the classification of federal data on race and ethnicity • § 170.207(l) – smoking status types • No standard specified – Patient preferences and behaviors • No standard specified – Payer	**States:** Documented **Attributes:** Start datetime	**States:** Ordered Cardinality (1,2,3,...) Stop datetime **Attributes:** *None* **Suggest retire these contexts from QDM:** Reported (Removal suggested: *There is no real difference between documented and reported. The two will add confusion.*) Reconciled (Removal suggested: *Individual characteristics may be updated, but reconciliation is not an EHR certification standard requirement for patient characteristics)* Declined (Removal suggested: *That a patient declines to provide demographics is important to the clinical care process but a quality measure or clinical decision support processes will use presence or absence of data as the factors to evaluate.*)

Communication	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** § 170.314(d)(1) –Authentication, access control, and authorization – Patient preferences § 170.314(a)(15) – Ambulatory setting only – patient reminders § 170.314(b)(1) – Incorporate summary of care record § 170.314(b)(2) – Create and transmit summary care record § 170.205(a)(3) – Consolidated CDA § 170.202(a)(1) – Applicability Statement for Secure Health Transport § 170.202(a)(2) –XDR and XDM for Direct Messaging § 170.202(a)(3) – SOAP Based Secure Transport RTM version 1.0 § 170.314(b)(1) and (2) –Transitions of Care	**States:** Transmitted Documented **Attributes** Receiver Sender Subject Start datetime Stop datetime	**States:** Acknowledged **Attributes** Recorder Method Related to **-** {Task, Diagnosis, etc.} Cardinality (1,2,3..) **Suggest retire these contexts from QDM:** Declined *(Removal suggested: That a patient declines to a communication is important to the clinical care process but a quality measure or clinical decision support processes will use presence or absence of data as the factors to evaluate.*)

Condition/ Diagnosis/ Problem	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** § 170.314(a)(5) – Problem List § 170.207(m) – Encounter diagnoses [ICD-10 (ICD-10-CM and ICD-10-PCS, respectively)]	**States:** Active Inactive Resolved **Attributes:** *None*	**States:** *None* **Attributes:** Severity Anatomical structure Cardinality (1,2,3...) Laterality Ordinality (principal, secondary, ...) **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to report diagnoses or conditions is a significant issue for clinical care but a measure or clinical decision support requires only knowledge that a diagnosis or condition exists or does not exist)* Reconciled (Removal suggested: *An individual condition is not reconciled, but the problem list is reconciled, an individual problem or condition is updated*)

Device	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.210(e) – Record actions related to electronic health information, audit log status, and encryption of end user devices – for purposes of reporting safety events No standard directly related to device use	**States:** Applied Ordered Declined **Attributes:** Start datetime Stop datetime	**States:** Planned *(Removal suggested: NQF seeks comment on the value of 'Planned'* *as a state, or context of use for devices.)* **Attributes:** Anatomical structure Cardinality (1,2,3...) Device Characteristic (identifier) Visual inspection Facility location Laterality Method Ordinality (principal, secondary, ...) Reason Source Recorder Related to Patient preference **Performer** (*new*) **Assistant** *(new)* **Suggest retire these contexts from QDM:** Discontinued (Removal suggested: *A device has a start datetime and stop datetime to handle placement or insertion and end of use or removal. Discontinued is a process context generally used with ordering. For the purpose of measures or clinical decision support, actual end of use or removal may be the preferred concept.)*

Diagnostic Study (non-laboratory)	**Vocabulary (Code system):** LOINC – study name SNOMED-CT – appropriate findings UCUM – specific units of measure **ONC 2014 EHR Certification Standard (proposed):** **Standard** 170.314(a)(12) – Imaging [Level 2 Effort]	**States:** Performed Ordered Declined **Attributes:** Result Start datetime Stop datetime	**States:** Recommended *(NQF seeks comment on the value of 'Recommended' as a state, or context of use for diagnostic studies.)* **Attributes:** Cardinality (1,2,3…) Ordinality (principal, secondary, ...) Facility location Method Laterality Reason Recorder Patient preference **Performer** (*new*) **Suggest retire these contexts from QDM:** NA

Intervention	**Vocabulary (Code system):** LOINC – for interactions that produce an assessment or measurable results SNOMED-CT – for appropriate results and interventions that do not produce measurable results (e.g., counseling) **ONC 2014 EHR Certification Standard (proposed):** **Standard** 170.314(a)(16) – Patient-specific education resources [At a minimum, each one of the data elements included in the patient's: problem list; medication list; and laboratory tests and values/results; and the standard specified at § 170.204(b)(1)]	**States:** Documented Performed Declined **Attributes:** Start datetime	**States:** Acknowledged Requested Received **Attributes:** Stop datetime Method Cardinality (1,2,3...) Ordinality (principal, secondary, ...) Facility location Reason Source Recorder Subject Result Patient preference Provider preference **Performer** (*new*) **Participant** (*new)* **Suggest retire these contexts from QDM:** NA

Encounter (*Patient-professional interactions*)	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify an encounter. Standards are identified for Encounter diagnoses (See Condition / Diagnosis / Problem section)	**States:** Performed Documented Ordered Declined **Attributes:** Start datetime (admission) End datetime (discharge) Start datetime (arrival) (*NQF seeks comments on the differentiation of admission and arrival times)* End datetime (departure) (*NQF seeks comments on the differentiation of discharge and departure times)* Discharge status Facility location Frequency (for Home Care Use)	**States:** NA **Attributes:** Cardinality (1,2,3…) Ordinality (principal, secondary, ...) Reason Recommended *(NQF seeks comment on the value of 'Recommended' as an attribute for encounters.)* Patient preference **Performer** (*new*) **Participant** (*new)* **Suggest retire these contexts from QDM:** Active (State) Length of Stay (*Length of stay is derived from start and stop times*)

Experience	**Vocabulary (Code system):** LOINC for assessment instruments SNOMED-CT for appropriate responses **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify experience	**States:** *None* **Attributes:** *None*	**States:** Documented Acknowledged **Attributes:** Patient preference Provider preference Recorder* Related to Source Start datetime Stop datetime Subject **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to provide information about experience is a significant issue for clinical care but a* *measure or clinical decision support requires only knowledge that a patient's experience is documented or it was not.)*
Response to care *NQF seeks comment regarding the addition of a new QDM Category: Response to care to express the individual's outcome with respect to care provided (e.g., success, failure, non-response).*	**Vocabulary (Code system):** TBD **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify	**States:** *TBD* **Attributes:** *TBD*	**States:** *TBD* **Attributes:** *TBD*

Family History	**Vocabulary (Code system):** LOINC for assessment instruments SNOMED-CT for appropriate responses (conditions present in family history) **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify family history	**States:** *None* **Attributes:** *None*	**States:** Documented Updated **Attributes:** *None* Cardinality (1,2,3...) Ordinality (Principal, Secondary,…) Laterality Recorder Severity Source Subject (*to be able to express degree of relationship – e.g., first degree relative, and gender of the relative)* Start datetime **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to provide family history is a significant issue for clinical care but a measure or clinical decision support requires only knowledge that a family history is documented or it was not.)*

Functional Status	**Vocabulary (Code system):** ICF (International Classification of Functioning, Disability and Health) for categories of function LOINC for assessment instruments SNOMED-CT for appropriate responses **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify functional status	**States:** Performed (*Note: Limited to Calculated Form and use of validated instruments registered in LOINC*) Declined **Attributes:** Result Start datetime	**States:** Performed (*Note: for functional status performed other than Calculated Forms and use of validated instruments registered in LOINC*) Ordered Reconciled (*NQF seeks comment about the value of reconciled for functional status. Comparison of results over time can be performed using distinct functional status results.)* **Attributes:** Result Start datetime **Performer** (*new*) **Subject** (*new)* **Suggest retire these contexts from QDM:** NA

Health Record Component	**Vocabulary (Code system):** LOINC for naming the components and their relationships HL7 for messaging among systems **ONC 2014 EHR Certification Standard (proposed):** **Standard** 170.314(b)(4) – Clinical record reconciliation (covers Medication List, Allergy List and Problem List)	**States:** Documented Reconciled (*NOTE: limited to Problem List, Medication list,* *Allergy list, Care Plan)* Transmitted Updated **Attributes:** *None*	**States:** (*NQF seeks comment regarding which uses of health record components are valuable for quality measurement.*) Created Accessed Acknowledged Alerted Calculated Discontinued Received Reviewed **Attributes:** Recorder Sender Source Start datetime Status Stop datetime Subject **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined permission for a health record component to be populated it is a significant issue for clinical care but a measure or clinical decision support requires only knowledge that a health record component is exists or it does not.)* Reminded

Laboratory Test	**Vocabulary (Code system):** LOINC for the test name and its results SNOMED-CT for applicable result values UCUM for units of measure **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.314(b)(5) –Incorporate laboratory tests and values/results	**States:** Ordered Performed Declined **Attributes:** Start datetime Result	**States:** *None* **Attributes:** Stop datetime Status Source Recorder Reason Method Laterality Facility location Cardinality (1,2,3...) Alerted **Suggest retire these contexts from QDM:** NA

Medication	**Vocabulary (Code system):** RxNorm for medications CVX for vaccinations (acknowledging that vaccinations are treated as medications in some contexts and as a separate category in others) **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.299 – by reference includes medications § 170.207(h) – Medications for transitions of care and ambulatory clinical summaries § 170.314(b)(4) – Clinical record reconciliation (covers Medication List, Allergy List and Problem List)	**States:** Active Administered Dispensed Ordered Declined Reconciled **Attributes:** Dosage Frequency Effective time Start datetime Stop datetime Drug name	**States:** Inactive **Attributes:** Infusion duration Method Recorder Reason Route Cardinality (1,2,3...) Patient preference Source **Suggest retire these contexts from QDM:** Discontinued (Removal suggested: *A medication has a start datetime and stop datetime. Discontinued is a process context generally used with ordering. For the purpose of measures or clinical decision support, actual end of use may be the preferred concept.)*

Physical Exam	**Vocabulary (Code system):** LOINC for assessment instruments and individual examination elements SNOMED-CT for appropriate responses **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.314(a)(4) – Vital signs, body mass index, and growth charts	**States:** Performed Declined **Attributes:** Result (*limited to vital signs that are captured as structured data and also data that are captured in routine inpatient assessments)*	**States:** Ordered Result (*In addition to vital signs that are captured as structured data)* **Attributes:** Environmental location Anatomical structure Laterality Facility location Reason Recorder Alerted Patient preference **Performer** (*new*) **Participant** (*new)* **Suggest retire these contexts from QDM:** NA

Procedure	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.207(b)(2) – HCPCS and CPT-4 OR § 170.207(b)(3) – ICD-10 PCS	**States:** Ordered Performed Declined **Attributes:** Result Start datetime Stop datetime	**States:** Recommended *(NQF seeks comment on the value of 'Recommended' as a state, or context of use for procedures)* *NQF seeks comment on the concept of "Planned," e.g., an abdominal surgical procedure that was not performed based on findings and the final procedure category is listed as "laparotomy" The intent is to capture the procedure initially planned and that finalized.* **Attributes:** Anatomical structure Environmental location Facility location Frequency Laterality Method Reason Recorder Source Status Cardinality (1,2,3...) Patient preference **Performer** (*new*) **Participant** (*new)* **Suggest retire these contexts from QDM:** Discontinued (Removal suggested: *A procedure has a start datetime and stop datetime to handle the occurrence of the procedure. Discontinued is a process context generally used with ordering. For the purpose of measures or clinical decision support, actual end of the procedure may be the preferred concept.*

Risk Evaluation	**Vocabulary (Code system):** LOINC for assessment instruments SNOMED-CT for appropriate responses **ONC 2014 EHR Certification Standard (proposed):** **Standard** No specific standard to identify risk evaluation	**States:** Performed (*Note: Requires Calculated Form Capability and use of validated instruments registered in LOINC*) Documented Declined **Attributes:** Result Datetime	**States:** Performed (*Note: for risk evaluations performed other than Calculated Forms and use of validated instruments registered in LOINC*) Reviewed (*NQF seeks comment on the value of 'reviewed' as a context required for measures.*) **Attributes:** Cardinality (1,2,3...) Reason Recorder Related to Source Status Stop datetime Patient preference **Performer** (*new*) **Subject (*new*)** **Suggest retire these contexts from QDM:**

Substance	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** Non-medication substances are not referenced	**States:** Administered Ordered Active Declined Reconciled (e.g., Intake and Outputs) **Attributes** Route Start datetime Stop datetime	**States:** Dispensed **Attributes** Frequency Start datetime Stop datetime Dosage Reason Source Cardinality (1,2,3...) Radiation dosage Radiation duration Method Patient preference Laterality **Suggest retire these contexts from QDM:** Discontinued (Removal suggested: *A substance has a start datetime and stop datetime. Discontinued is a process context generally used with ordering. For the purpose of measures or clinical decision support, actual end of use may be the preferred concept.)* Reconciled (Removal suggested: *A substance should be on a list analogous to a medication list. That list can be reconciled, an individual substance is updated)*

Symptom	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** Symptoms are not referenced	**States:** *None* **Attributes:** *None*	**States:** Active Inactive Resolved Documented *(NQF seeks comment regarding the value of 'documented' if 'active,' 'inactive,' or 'resolved' are available.)* **Attributes:** Anatomical structure Frequency Laterality Severity Recorder Related to Source Start datetime Status Stop datetime Cardinality (1,2,3...) Ordinality (principal, secondary, ...) **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined to inform the clinician about symptoms is a significant issue for clinical care but a measure or clinical decision support requires only knowledge that a symptom is documented or it is not.)* Assessed *(Removal suggested: A symptom is assessed if it is documented or 'active,' 'inactive,' or 'resolved.' The additional context is unnecessary, it the mechanism to determine the contexts already listed.)*

System resources (refers to the configuration of an organization – e.g., nurse staff ratios, availability of durable medical equipment, health information technology infrastructure and capabilities, etc.	**Vocabulary (Code system):** LOINC for healthcare resources (staffing) HL7 for EHR functions SNOMED-CT for equipment **ONC 2014 EHR Certification Standard (proposed):** **Standard** System resources are not referenced	**States:** Ordered **Attributes:** *None*	**States:** Acknowledged Documented Transmitted Updated **Attributes:** Facility location Frequency Method Patient preference Reason Recorder Start datetime Status Stop datetime Cardinality (1,2,3…) Environmental location Related to Source **Suggest retire these contexts from QDM:** Declined (Removal suggested: *That a patient declined system resources is a significant issue for clinical care but a measure or clinical decision support requires only knowledge that a system resource is used or it is not.)*

Transfer	**Vocabulary (Code system):** SNOMED-CT **ONC 2014 EHR Certification Standard (proposed):** **Standard** § 170.205(a)(3) references information requirements for transitions of care but the process of transition is not referenced	**States:** Documented Ordered Performed Declined **Attributes:** Origin Destination Status Source **Equipment Performer** (*new*) **Participant** (*new)*	**States:** *None* **Attributes:** Discharge status Environmental location Facility location Method Start datetime Stop datetime Subject Patient preference Reason Recorder **Suggest retire these contexts from QDM:** NA

*** Data that should be present in structured form in a Meaningful Use 2014 Certified EHR**

**** Feasible but require additional effort, such as the following workflow changes**