Date: May 6, 2011

From: Clinical Decision Support Consortium

To: Agency for Healthcare Research and Quality

Re: Recommendations for Quality Measure Developers Regarding Translation of Clinical Knowledge

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**Introduction**

Along with the United States (U.S.) Federal Government's intense push for adoption and meaningful use of electronic health records (EHRs) by all eligible health care providers will come an equally intense push to identify and develop real-time, point-of-care, clinical decision support (CDS). This CDS is necessary if we are to achieve both Meaningful Use[1] targets as well as the transformational improvements in patient safety, quality, and efficiency of care that have been promised. To document these improvements in quality, clinical quality measure developers (QMDs) must work with clinical guideline developers, EHR vendors, and CDS developers to effectively gather the required data to demonstrate the impact of these guidelines on various health care processes and outcomes.

On March 1, 2008, the Agency for Healthcare Research and Quality (AHRQ) funded two research teams to develop CDS demonstration projects: the Guidelines Into Decision Support (GLIDES) project headed by Richard Shiffman, MD, based at Yale University in New Haven, Connecticut, and the Clinical Decision Support Consortium headed by Blackford Middleton, MD, MPH, MSc, based at the Brigham and Women's Hospital in Boston, Massachusetts. The goal of these projects is the "development, implementation and evaluation of demonstration projects that advance understanding of how best to incorporate CDS into the delivery of health care…with the overall goal to explore how the translation of clinical knowledge into CDS can be routinized in practice and taken to scale in order to improve the quality of health care delivery in the U.S."[2]. A major objective has been identification of CDS-related tools, techniques, and standards that will be necessary if we are to achieve these goals.

**Specific Recommendations for Quality Measure Developers Regarding Translation of Clinical Knowledge**

It seems logical that both CDS implementers and clinical QMDs will turn to existing clinical practice guidelines as their first source of high-quality, evidence-based clinical knowledge. However, most of this knowledge is often expressed in free-text prose or graphical flowcharts; therefore, it must undergo significant transformation, often including the addition of details that were not in the original document to get this knowledge into a machine-executable format suitable for 1) delivery to clinicians via EHRs at

the point-of-care, or 2) use for the extraction of the data required to measure the effect of application of this knowledge. This document identifies a set of recommendations that clinical QMDs could undertake to help facilitate the process by which current clinical knowledge is accurately translated into machine-executable quality measure definitions.

CDS is often viewed as a means to improve the quality of care delivered in health care organizations with advanced health information technology (IT) systems. As such, clinical QMDs should work closely with the CDS community. Specifically, we recommend the following:

**Recommendation 1: Collaborate with guideline developers to eliminate ambiguous language from clinical guidelines.** Clinical QMDs need to work hand-in-hand with both CDS developers and clinical guideline developers to significantly reduce and, if possible, to eliminate all ambiguous statements that are often contained in current clinical guidelines. For example, they must help clinical guideline developers to move away from statements such as, "achieve adequate glycemic control in diabetic patients" toward statements like, "for all patients billed for ICD-9 codes 250.*, check that the value of their most recent HbA1c (LOINC code: 4548-4 or 17856-6 or 4549-2) (in the last 12 months) is <= 9.0%".

**Recommendation 2**: **Define methods of measuring the effect of CDS interventions on the behavior of clinicians.** In order to improve the quality of health care delivered, many organizations have turned to advanced, state-of-the-art, point-of-care CDS interventions. Unfortunately, as currently implemented, many of these interventions are not being used as anticipated [3,4]. If the CDS community is going to improve their performance, they must have standard, reproducible methods of measuring the effect of these interventions on the behavior of clinicians. A key component of any measure is a clear definition of how to make the calculation (i.e., often including careful definitions of both the numerator and denominator used). These are often poorly described. Therefore, clinical QMDs should focus a portion of their attention on defining measures such as the alert override rate or order set usage rate (i.e., how often are order sets used [e.g., user opens an order set and chooses to enter at least one order from the set] in patients for whom they are applicable [e.g., the patient has one or more of the diagnoses on their problem list for which the order set was designed]). QMDs should work closely with the National Quality Forum on their "Driving Quality—A Health IT Assessment Framework for Measurement: A Consensus Report" initiative to ensure that clinicians and QMDs can evaluate the effect of the CDS interventions they are developing [5].

**Recommendation 3: Continue to participate in refinement of the Health Quality Measure Format (HQMF) standards development process.** The HQMF represents a health quality measure in a machine-readable electronic format. Through standardization of a measure's structure, associated metadata, definitions and logic, the HQMF provides quality measure consistency and unambiguous interpretation. QMDs should also closely follow the National Quality Forum's (NQF) eMeasures work[6] that is designed to develop machine-readable, standard quality measures for direct incorporation into existing EHRs.

**Recommendation 4: Begin developing measure assessment software services**. In much the same manner that we are experimenting with the creation of internet-based CDS services that take Continuity of Care Documents (CCDs) as input and return an evidence-based clinical recommendation, clinical

QMDs should begin to develop measure assessment software services. Such a service would take a series of CCDs from a clinician's EHR and return an estimate of that measure's value in the form of a report. A key assumption is that all the required information necessary to compute the measure would be available within the CCDs [7]. In addition, it is critical that a clinician submit either a) a random sample of patient visits, or b) a consecutive series of patient visits over a pre-defined time frame (i.e., over the entire year) to allow for the accurate measurement of the rate of compliance with the measure (i.e., accurate numerator and denominator for the calculation). A first use of such reports could be for the certification of meeting the U.S. Department of Health and Human Services' new Meaningful Use criteria. For example, we believe that a measure of compliance with a diabetic guideline stating that all diabetics should have their HbA1c levels checked every 6 months could be calculated using a service like this. These services could be developed by the clinical QMDs themselves and hosted by regional health information exchanges.

**Recommendation 5: Incorporate more clinical data from EHRs into measure specifications**. As the percentage of clinicians and health care organizations using state-of-the-art EHRs continues to increase, clinical QMDs should begin incorporating more clinical data from EHRs into their measure specifications. This switch from relying on administrative and payers data to clinical data must be carefully phased in so that clinicians who are slow to adopt EHRs are not further penalized by not being able to be included in any national quality measure benchmarks.

**Recommendation 6: Develop standards and infrastructure for submitting quality measurement results electronically.** Clinical QMDs should begin developing the standards and infrastructure to allow individual clinicians and large health care organizations to submit their quality measurement results electronically. These results should then be rolled-up to create standard, nationwide quality measurements. These benchmarks should be available for review by any participating member (i.e., people or organizations who have submitted data).

**Recommendation 7: Provide feedback mechanism for clinicians and organizations regarding quality measures.** Clinical QMDs should create an internet-based mechanism for individual clinicians and large health care organizations to provide their comments and feedback directly to the clinical QMDs regarding newly developed quality measures. Such a mechanism could greatly increase the speed by which specific problems are identified and overall increase the turnover in the iterative refinement process for new measures.

**Recommendation 8: Work with clinical guideline developers ensuring that CDS interventions are aligned with the quality measures they develop.** Before one can expect an EHR to improve the quality of care, there must be at least one CDS intervention designed to change clinician behavior. And to evaluate the effect of this intervention one must be able to extract the relevant data required to make the appropriate measurements. Clearly, the more closely aligned the CDS interventions are with the measurements, the more likely there is to be some discernable improvement in clinical quality.

**Summary**

CDS is necessary if we are to achieve both the U.S. Federal Government's Meaningful Use targets as well as the transformational improvements in patient safety, quality, and efficiency of care that have been promised. CDS implementers and clinical QMDs ultimately turn to existing clinical practice guidelines as their first source of high-quality, evidence-based clinical knowledge. Most of this knowledge, however, currently exists in free text form or graphical flowcharts, requiring significant transformation and often revision to achieve a machine-executable format suitable for delivery to clinicians via EHRs at the point of care. This document identified a set of recommendations that clinical QMDs could undertake to help facilitate the process by which current clinical knowledge is accurately translated into machine-executable quality measure definitions.

In summary, the Clinical Decision Support Consortium recommendations for QMDs regarding translation of clinical knowledge include:

- Eliminate ambiguous language from clinical guidelines
- Define methods of measuring the effect of CDS interventions on the behavior of clinicians
- Continue to participate in refinement of the Health Quality Measure Format (HQMF) standards development process
- Begin developing measure assessment software services
- Incorporate more clinical data from EHRs into measure specifications
- Develop standards and infrastructure for submitting quality measurement results electronically
- Provide feedback mechanism for clinicians and organizations regarding quality measures
- Work with clinical guideline developers ensuring that CDS interventions are aligned with the quality measures they develop

**List of Acronyms**

**AHRQ** Agency for Healthcare Research and Quality

**CCD** Continuity of Care Document

**CDS** Clinical decision support

**EHR** Electronic health record

**GLIDES** Guidelines Into Decision Support

**HQMF** Health Quality Measure Format

**IT** Information technology

**NQF** National Quality Forum

**QMD** Quality measure developer

**References**

[1] http://healthit.hhs.gov/portal/server.pt?open=512&objID=2996&mode=2

[2] AHRQ Clinical Decision Support Services -- Request for proposals; (Accessed 3.8.09) available at: www.ahrq.gov/fund/contarchive/rfp0710045.htm

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[4] Campbell EM, Sittig DF, Ash JS, Guappone KP, Dykstra RH. Types of unintended consequences related to computerized provider order entry. J Am Med Inform Assoc. 2006 Sep-Oct;13(5):547-56.

[5] National Quality Forum (NQF), *Driving Quality—A Health IT Assessment Framework for Measurement: A Consensus Report,* Washington, DC: NQF; 2010.

[6] http://www.hl7.org/v3ballot/html/domains/uvqm/uvqm.html

[7] D'Amore JD, Sittig DF, Wright A, Iyengar MS, Ness RB. The Promise of the CCD: Challenges and Opportunity for Quality Improvement and Population Health. AMIA Fall Symposium, 2011. (Manuscript under review).

**Acknowledgement:** This research was funded in part by a contract from the Agency for Healthcare Research and Quality HHHSA29020080010.