NATIONAL QUALITY FORUM

National Voluntary Consensus Standards for Health Information Technology: Structural Measures 2008

A CONSENSUS REPORT

Foreword

The implementation and use of health information technology (HIT) holds great promise for the overall improvement of healthcare quality in the United States. HIT is not, and never should be considered, a panacea. Technology applications cannot by themselves improve the quality of healthcare. Rather, by helping clinicians access and manage patient information, HIT, when suitably combined with necessary process and structure changes, will enable long-term, sustainable quality improvement.

Unfortunately, healthcare's track record in information technology is unenviable. The field has lagged behind other industries in its adoption of information technology, and many providers have endured clumsy implementations of HIT applications. It has become clear that a critical step to encouraging the adoption of HIT and fostering improvement in healthcare delivery is identifying the metrics with which to measure its acquisition and effective use.

This report identifies nine structural measures to assess and encourage HIT adoption by clinicians. These measures were vetted through NQF's Consensus Development Process, which means they carry special legal status as voluntary consensus standards. They are suitable for public reporting.

We thank the Centers for Medicare & Medicaid Services for its support of this project, and we thank NQF Members and the members of the Health Information Technology Structural Measures Steering Committee for their stewardship of this work. Their clear understanding of the role that HIT must play in fostering quality improvement will encourage and facilitate the successful adoption of these technologies, to the ultimate benefit of the patient.

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Executive Summary

The use of information systems and related technologies—that is, health information technology (HIT)—has the potential to improve each of the six aims of the healthcare system—safety, efficiency, timeliness, efficacy, patient-centeredness, and equitability—by helping clinicians manage large amounts of clinical information. The adoption of HIT by clinicians has been shown to improve quality by reducing medical errors, reducing failure to follow up on abnormal results, eliminating repetitive testing, allowing more timely follow-up of results, and providing clinical decision support (CDS) tools to facilitate evidence-based care. Specific examples of HIT applications with demonstrated quality improvements include electronic prescribing (e-prescribing), electronic results delivery, patient tracking and care management, CDS, computer physician order entry, and fully integrated electronic health records (EHRs). A critical step to encouraging the adoption of HIT and fostering improvement in healthcare delivery is identifying the metrics with which to measure its acquisition and effective use.

As part of its Health Information Technology Structural Measures project, the National Quality Forum (NQF) has endorsed nine structural consensus standards to assess and encourage HIT adoption by clinicians. With its endorsement of these measures, NQF emphasizes the importance of sending a consistent message to all audiences: Quality improvement through the use of HIT requires standards

regarding how clinical information is recorded, stored, and shared. Without universal compliance with such information standards, HIT efforts are inefficient, at best, and clinical care is fragmented and dangerous, at worst. HIT structural quality measures were therefore harmonized with ongoing efforts to standardize clinical information, such as certifying EHRs by the Certification Commission for Healthcare Information Technology and defining EHR capabilities by the Health Level 7 EHR-S Functional Model.

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E-prescribing

- Adoption of medication e-prescribing
- EHR with EDI prescribing used in encounters where a prescribing event occurred

Interoperable EHRs

- Adoption of Health Information Technology
- The ability for providers with HIT to receive laboratory data electronically directly into their qualified/certified EHR system as discrete searchable data elements

Care Management

- The ability to use health information technology to perform care management at the point of care
- Tracking of clinical results between visits

Quality Registries

- Participation in a practice-based or individual quality database registry with a standard measure set
- Participation by a physician or other clinician in systematic clinical database registry that includes consensus endorsed quality measures

Medical Home

- Medical Home System Survey

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Background

The use of information systems and related technologies has the potential to improve each of the six aims of the healthcare system—safety, efficiency, timeliness, efficacy, patient-centeredness, and equitability[1]—by helping clinicians manage large amounts of clinical information. The computer hardware and software used to manage (store, retrieve, share, and use) this clinical information can broadly be defined as health information technology (HIT).

The adoption of HIT by clinicians has been shown to improve quality by reducing medical errors, reducing failure to follow up on abnormal results, eliminating repetitive testing, allowing more timely follow-up of results, and providing clinical decision support (CDS) tools to facilitate evidence-based care. Specific examples of HIT applications with demonstrated quality improvements include electronic prescribing (e-prescribing), electronic results delivery, patient tracking and care management, CDS, computerized physician order entry (CPOE), and fully integrated electronic health records (EHRs).[2]

Despite these quality improvements, the full value proposition of HIT for quality improvement has not been actualized, depending on the care setting and the type of clinical application. For example, although a majority of U.S. hospitals report HIT adoption at some level, applications are often for reviewing results, while CPOE and electronic documentation utilization are estimated to be less than 20 percent.[3] In the ambulatory setting, only one quarter of practices utilize some component of an EHR, and, of those, approximately 6 percent electronically prescribe.[4,5] Some reasons for the slow adoption

of HIT include EHR limitations and the misalignment of incentives.[6]

The federal government has supported and encouraged the adoption of HIT for the purpose of improving the quality and efficiency of healthcare in the United States and has made efforts to regulate EHR products and align incentives. In 2004, President Bush set a goal of widespread adoption of EHRs within 10 years. As a result, the Department of Health and Human Services (DHHS) Office of the National Coordinator for Health Information Technology, often referred to as "ONC" by the public, was established to address the need for a secure, nationwide, interoperable HIT infrastructure. In 2005, DHHS awarded a contract to the Certification Commission for Healthcare Information Technology (CCHIT) to establish EHR standardization criteria and certify EHR products. To encourage adoption, DHHS announced a five-year demonstration project to provide financial incentives for small- to medium-sized clinical practices to utilize EHRs. In October 2007, at the request of the Centers for Medicare & Medicaid Services (CMS), the National Quality Forum (NQF) launched a new effort to achieve national voluntary consensus on a set of structural performance measures to assess the adoption of HIT by clinicians.

A critical step to encouraging the adoption of HIT is identifying the metrics with which to measure its acquisition and effective use. The purpose of NQF's Health Information Technology Structural Measures project is to identify these metrics.

Identifying Potential Consensus Standards for HIT

A Steering Committee (Appendix B) guided the evaluation and recommendation of potential consensus standards. The Steering Committee established selection criteria after considering the purpose and scope of the project.

Purpose

The purpose of these structural measures is to evaluate the adoption and effective utilization of HIT by clinicians to improve quality.

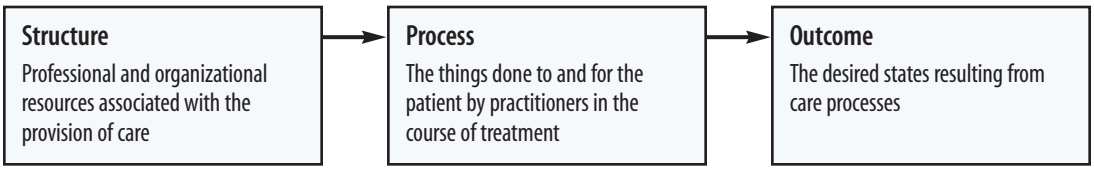
Scope

From a Donabedian perspective, structures are required to enable processes that lead to improved outcomes (Figure 1). Although a strategic goal of NQF has been to move toward increased use of outcome measures, because of the relatively low adoption rates of HIT, this project focuses on structural measures.

Structural measures were solicited pertaining to the following functional domains:

1. e-prescribing, including drug interactions, safety alerts, and formulary management tools;
2. EHRs, including those with the capability for interoperability;
3. evidence-based CDS systems;
4. CPOE; and
5. reporting to clinical registries and tracking systems that have a data repository function and that analyze and report process and outcome data.

Figure 1 – Donabedian Framework



Source: Zinn JS, Mor V, Organizational structure and the delivery of primary care to older Americans. *Health Serv Res,* 1998;33:354-380, p. 355.

Given the early stage of development of performance measures in the HIT domain, NQF provided a 60-day advanced Call for Measures in October 2007. Candidate consensus standards were subsequently solicited though a 30-day Call for Measures in December 2007. The Steering Committee was encouraged to frame its recommendations according to the scope of the project, which was limited to measures related to the adoption or effective use of HIT. A total of 18 measures were evaluated within the project scope.

Evaluating Candidate Consensus Standards

The Steering Committee identified three conceptual frameworks with which to evaluate and select a parsimonious set of HIT structural measures:

1. the standard NQF evaluation criteria;
2. performance thresholds; and
3. the harmonization of existing standards.

NQF Measure Evaluation Criteria

Eighteen candidate consensus standards were evaluated by the Steering Committee using standardized criteria derived from the work of the NQF Strategic Framework Board and endorsed by NQF:[7]

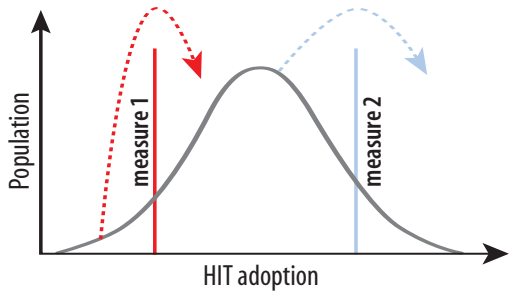
1. Important—the extent to which a measure reflects a variation in quality, low levels of overall performance, and the extent to which it captures key aspects of the flow of care.
2. Scientifically acceptable—the extent to which the measure is evidence based and will produce consistent and credible results when implemented.
3. Useable—the extent to which intended audiences (e.g., consumers, purchasers) can understand the results of the measure and are likely to find them useful for decisionmaking.
4. Feasible—the extent to which data can be obtained within the normal flow of clinical care and the extent to which an implementation plan can be achieved.

Performance Threshold

The Steering Committee grouped the measures into the following content domains: e-prescribing, interoperable EHRs, care management, quality registries, and the medical home. Within each domain, the Committee used the concept of performance thresholds to assist in its selection of measures.

Individual quality measures seek to improve performance for a given fraction of the measured population (Figure 2). The measure specifications define the target measurement audience; structural measures with relatively low requirements ("measure 1") target providers with lower levels of HIT adoption, and measures with high requirements ("measure 2") target the other end of the adoption spectrum—"early adopters." The Steering Committee sought to identify sets of measures within each HIT domain to *both* encourage initial adoption and raise the bar higher for early adopters. Furthermore, the Committee recognized the incremental collection burden for each additional endorsed measure and therefore recommended parsimonious sets of measures within each measure domain and avoided duplicate measures if feasible. Within each domain, the Committee recommended harmonization of concepts among measures, when applicable, and sought to avoid duplicating distinct concepts among similar measures. As a clinical example, HgA1c and LDL management are both important to diabetic care, yet these two concepts may be separated into two measures. Similarly, for e-prescribing, although decision support and EHR integration are both important concepts, these may be separated into two measures. This separation does not imply that one of the individual concepts is more important than the other; rather, it provides an opportunity for modular, step-wise adoption.

Figure 2 – Relative Measure Impact



Existing Standards Harmonization

The Steering Committee recognized the challenges involved in aligning competing standardization efforts. To align with existing and projected future HIT policy, the Committee attempted to align all measures with CCHIT-recommended EHR certification criteria. If such criteria are not yet defined, definitions of specific EHR capabilities should be harmonized with work from the Health Level 7 (HL7) (a standards-development organization) EHR-S Functional Model. This alignment provides a single target for HIT development and adoption and sends a clear message to both consumers and HIT vendors encouraging the development and adoption of CCHIT-certified systems.

Because the majority of candidate consensus standards were new and only

one had been fully tested, the Committee recommended conditions for updating these measures to align them with the overarching goals of parsimony and standardization efforts. The National Committee for Quality Assurance (NCQA) withdrew five of the measures it had submitted for further development and future consideration to better align with the Steering Committee recommendations; four had been initially recommended for endorsement contingent upon specific Steering Committee recommended modifications, and one was not recommended. Nine measures were recommended for endorsement, eight of which were for time-limited endorsement (Table 1).

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Harmonization Recommendations

The Steering Committee made the following harmonization recommendations:

- **Electronic Health Records—**For all measures that reference the use of an EHR, unify them to a single definition structured by CCHIT certification. Because early-adopter clinicians may have purchased an EHR prior to the origination of the CCHIT, the Committee suggested the use of a three-year window to allow for either a) an EHR to become CCHIT certified or b) the clinician to change EHRs, if CCHIT criteria exist for that specialty. All EHRs should have the minimum capabilities of managing a medication and problem list, storing laboratory data electronically, and meeting basic privacy and security elements. All EHRs referenced in these measures must meet the following criteria:

  a. CCHIT-certified EHR at the time of measurement; or

  b. if CCHIT certification is available (in primary care or a specialty) on or before August 1, 2008, but the system in use is not CCHIT certified, the EHR must meet the following criteria:

     1. ability to manage a medication list,[i] AND
     2. ability to manage a problem list,[ii] AND
     3. ability to manually enter or electronically receive, store, and display laboratory results as discrete searchable data elements,[iii] AND
     4. ability to meet basic privacy and security elements,[iv] AND
     5. the EHR (above) must be CCHIT certified on or before August 1, 2011, or another CCHIT-certified product must be in use for compliance after August 1, 2011; OR

  c. if CCHIT certification is not available for a specialty on August 1, 2008, the EHR must have capabilities 1, 2, 3, AND 4 in section b above.

[i] Create, maintain, and display a patient-specific medication list.

[ii] Create, maintain, and display a patient-specific problem list.

[iii] Laboratory data that can be recorded in predefined fields in predefined formats within the EHR that allow for reports to be generated, such as reports that show the trends of a specific element over time.

[iv] For the purpose of this measure, basic privacy and security elements include 1) the ability to audit the date/time and user each time a patient chart is printed AND 2) the ability to archive and retrieve health record information.

Table 1—National Voluntary Consensus Standards for HIT: Structural Measures 2008*

MEASURE NUMBER/MEASURE NAME	MEASURE DESCRIPTION	IP OWNER[a]
E-prescribing		
0486 Adoption of medication e-prescribing**	Documents whether a provider has adopted a qualified e-prescribing system and the extent of use in the ambulatory setting.	CMS
0487 EHR with EDI prescribing used in encounters where a prescribing event occurred	Of all patient encounters within the past month that used an electronic health record (EHR) with electronic data interchange (EDI) where a prescribing event occurred, how many used EDI for the prescribing event.	NYCDHMH
Interoperable EHRs		
0488 Adoption of Health Information Technology	Documents whether a provider has adopted and is using health information technology. To qualify, the provider must have adopted and be using a certified/qualified electronic health record (EHR).	CMS
0489 The ability for providers with HIT to receive laboratory data electronically directly into their qualified/certified EHR system as discrete searchable data elements	Documents the extent to which a provider uses a certified/qualified electronic health record (EHR) system that incorporates an electronic data interchange with one or more laboratories allowing for direct electronic transmission of laboratory data into the electronic health record (EHR) as discrete searchable data elements.	CMS
Care Management		
0490 The ability to use health information technology to perform care management at the point of care	Documents the extent to which a provider uses a certified/qualified EHR system capable of enhancing care management at the point of care. To qualify, the facility must have implemented processes within its EHR for disease management that incorporate the principles of care management at the point of care, which include: a. the ability to identify specific patients by diagnosis or medication use b. the capacity to present alerts for disease management, preventive services, and wellness during the visit via the EHR c. the ability to provide support for standard care plans, guidelines, protocols.	CMS
0491 Tracking of clinical results between visits	Documentation of the extent to which a provider uses a certified/qualified electronic health record (EHR) system to track pending laboratory tests, diagnostic studies (including common preventive screenings), or patient referrals. The Electronic Health Record includes provider reminders when clinical results are not received within a predefined timeframe.	CMS

(more)

*All measures except 0494 are recommended for time-limited endorsement.

**NQF measure ID number.

[a] IP owner—Intellectual Property owner and copyright holder. ALL RIGHTS RESERVED. For the most current specifications and supporting information, please refer to the IP owner.

IP OWNERS
CMS - Centers for Medicare & Medicaid Services (www.cms.hhs.gov)
NCQA - National Committee for Quality Assurance (www.ncqa.org)
NYCDHMH - New York City Department of Health and Mental Hygiene (www.nyc.gov/html/doh/html/home/home.shtml)

Table 1—National Voluntary Consensus Standards for HIT: Structural Measures 2008*

MEASURE NUMBER/MEASURE NAME	MEASURE DESCRIPTION	IP OWNER[a]
Quality Registries		
0492 **Participation in a practice-based or individual quality database registry with a standard measure set**	This registry should be capable of: a. generating population-based reports relating to published guideline goals or benchmarking data b. providing comparisons to the practitioner c. providing feedback that is related to guideline goals d. capturing data for one or more chronic disease conditions (e.g., diabetes) or preventive care measures (e.g., USPTF recommendations) for all patients eligible for the measures.	CMS
0493 **Participation by a physician or other clinician in a systematic clinical database registry that includes consensus endorsed quality measures**	Participation in a systematic qualified clinical database registry involves: a. physician or other clinician submits standardized data elements to registry b. data elements are applicable to consensus endorsed quality measures c. registry measures shall include at least two (2) representative NQF consensus endorsed measures for registry's clinical topic(s) and report on all patients eligible for the selected measures d. registry provides calculated measures results, benchmarking, and quality improvement information to individual physicians and clinicians e. registry must receive data from more than five separate practices and may not be located (warehoused) at an individual group's practice Participation in a national or statewide registry is encouraged for this measure f. registry may provide feedback directly to the provider's local registry if one exists.	CMS
Medical Home		
0494 **Medical Home System Survey**	The Medical Home System Survey is a survey of physician practices that assesses whether the practice is functioning as a patient-centered medical home by providing ongoing, coordinated patient care. Meeting Medical Home System Survey standards demonstrates that practices have physician-led teams that provide patients with: a. improved access and communication b. care management using evidence-based guidelines c. patient tracking and registry functions d. support for patient self-management e. test and referral tracking f. practice performance and improvement functions.	NCQA

- Change the use of "physician" in the measures to "clinician" or "provider."
- If measures utilize CPT-II codes or G-codes, plain English explanations should be included.
- If measures have specific functional requirements (e.g., alerts, reminders, tracking, documenting) in their definitions, these should be aligned with CCHIT definitions, when available, and otherwise they should be aligned with the HL7 EHR-S Functional Model. The Steering Committee emphasized the importance of sending consistent messages to EHR vendors and establishing consistent goals for further EHR development. These have been previously defined by CCHIT and HL7.
- If measures specify a claims-based approach to reporting, include a methodology to extract the data and report directly from EHRs. Although the goal of these measures is to advance HIT adoption, popular incentive programs traditionally are structured around claims reporting; therefore, it is important to maintain this reporting function. However, because the infrastructure is developed for alternative methods of quality reporting, the Committee encouraged the development of reporting from EHRs into the measure specifications.
- If measures are structured around encounters, encounter definitions should be harmonized (usually by means of G-codes or CPT-II codes) across measures and across measure developers. The Steering Committee emphasized that harmonization will improve ease of interpretation across measures.
- If measure specifications state no exclusions, yet numerator reporting generates exclusions, these criteria should be stated explicitly in the exclusion text.
- If measures have exclusions, explicitly state whether those exclusions are to be removed from the numerator or denominator. This philosophical distinction can translate into significant variation in measure results. The Steering Committee recommended that excluded patients and encounters should be removed from the denominator.

Measures Endorsed

Unless otherwise specified, the auditing of measure requirement compliance is at the discretion of the party implementing the measure. Although future specifications may include additional auditing requirements, the Steering Committee considered self-attestation to be the primary means of validating current compliance.

E-prescribing

Quality is improved through e-prescribing by reducing legibility errors, providing interaction and dosing alerts, and reducing costs by comparing equally effective alternative medications. Although these quality improvements are maximized with complete clinical information (e.g., diagnoses, allergies, other medications, age, gender), there are benefits from stand-alone e-prescribing systems that have a limited set of patient information. Therefore, the Steering Committee recommended two measures for e-prescribing to encourage the adoption of either a stand-alone e-prescribing tool with built-in decision support

(e.g., intelligent alerts and reminders), which may be a first step for some clinicians, and also e-prescribing within an EHR. The Committee recommended the harmonization of denominator coding criteria between these two measures.

0486 Adoption of medication e-prescribing (CMS/QIP)[v]

The Steering Committee recommended against allowing handwritten exceptions, because of the overwhelming safety data regarding legibility. However, if prescriptions are required that cannot be sent electronically, such as required by law (e.g., controlled substances), or if the patient cannot identify a recipient pharmacy during the visit, then exclusions are allowed, provided that they are still processed through the e-prescribing system and printed. This process would allow for the benefits of legible prescriptions generated with the decision support. Additionally, the Steering Committee recommended that an inoperable e-prescribing system (e.g., a system malfunction) should not be an exclusion criterion, because as a structural measure, system "up-time" is critical and should be measured. Therefore, an alterative exclusion was recommended to account for system "down-time" of the receiving pharmacy. The Steering Committee commended this measure for allowing the use of a stand-alone e-prescribing system without discouraging the use of such e-prescribing within an EHR.

0487 EHR with EDI prescribing used in encounters where a prescribing event occurred (NYCDHMH)

The Steering Committee enthusiastically supported this second e-prescribing measure, which explicitly requires e-prescribing from within a certified/qualified EHR. Although benefits are present from stand-alone e-prescribing systems, the additional clinical data that are available from within an EHR (e.g., diagnoses/problems, allergies, medications, demographics) provide an increased level of safety checks. Although this measure does not explicitly require safety checks, the Steering Committee proposed that implementers of these measures consider this measure in conjunction with the Adoption of Medication e-prescribing measure to achieve the maximum impact of e-prescribing with safety checks from within an EHR.

Interoperable EHRs

The interoperability of EHRs improves quality through the efficiencies of information sharing, the timeliness of results reporting, and the safety improvements derived from the availability of standardized clinical information. The adoption and utilization of an EHR in clinical practice are typically performed in steps. The Steering Committee recommended two measures to increase the adoption of interoperable EHRs—the first for the adoption of an EHR to manage clinical data within a practice, and the second for receiving external clinical data (e.g., laboratory results) from an external source (e.g., laboratory) into the EHR.

0488 Adoption of Health Information Technology (CMS/QIP)

As reflected in the common definition of a certified/qualified EHR, the Steering Committee emphasized the need for certifying an EHR's compliance with data and functional requirement standards while allowing creative flexibilities in utilizing those standards (i.e., information presentation, workflow design) to encourage innovation in a competitive, open EHR market.

[v] Developed by Quality Insights of Pennsylvania.

The Committee strongly recommended the use of CCHIT-certified EHRs. To avoid penalizing early adopters for purchasing EHRs prior to the formal recognition of CCHIT, the Committee recommended a three-year window to allow for either CCHIT certification by the EHR vendor or for the clinician to obtain a CCHIT-certified EHR. Members of the Committee strongly agreed that during this three-year window, all EHRs must have the minimum capabilities of managing medication lists, problem lists, and electronic laboratory results with basic privacy and security protections in place. These three high-yield data categories can be utilized for a majority of care decisions and therefore will provide the greatest initial impact on quality improvement processes. Although both certification by the vendor or the alternative of an EHR switch by the clinician have their associated costs, the message from the Committee was clear: The benefits of standardized functional requirements and interoperability through CCHIT certification outweigh the associated up-front and maintenance costs of certification.

Because EHR up-time is critical (i.e., the EHR is of no use if the system is not working or "down" because of technical reasons), the Steering Committee recommended removing all exclusion criteria, including "system being inoperable at the time of the visit."

0489 The ability for providers with HIT to receive laboratory data electronically directly into their qualified/certified EHR system as discrete searchable data elements (CMS/QIP)

The Steering Committee recognized the strengths of this measure, including electronic transmission and discrete searchable data. Efficiencies garnered from the electronic transmission are timeliness of results reporting and decreased costs through automation. Although there are additional associated costs for the initial implementation and auditing of electronic transmissions, the Steering Committee recognized the resulting quality improvements associated with the use of these electronically transmitted, discrete, searchable data. Such uses include automated safety checks, reminders, and alerts generated from laboratory data and other patient-specific clinical information in the EHR, including the patient medication list, problem list, and other previously received laboratory results, as required by a certified/qualified EHR.

The Steering Committee recognized a limitation in the reporting methodology for this measure that is specific to the reporting workflow. This measure requires reporting at the end of the encounter at which time laboratory tests are ordered and relies on the provider's assessment of the "anticipated" transmission. Although this is a suboptimal process—because the ultimate question to be answered is whether the laboratory results were entered into the EHR—the alternative workflow would require the provider to submit the measure at a later date *after* the results have been received, which introduces the need for additional work and possible errors if the results are *not* received. An EHR reporting mechanism, also suggested by the Steering Committee, would require clinician order entry to identify which laboratory tests were ordered. Although clinical order entry has been shown to reduce errors, it is beyond the scope of this measure and does not adequately represent the current state of initial EHR adoption. Therefore, the Committee recommended the current claims-based reporting approach and encouraged further workflow development for an EHR-based approach.

Finally, the Steering Committee recognized the limitation of some laboratories that do not set up the electronic data interchanges (EDIs) needed to transmit laboratory results to small clinical practices. Although the standards for transmitting such data are well defined, this barrier is a function of the relatively high incremental laboratory cost of the additional customization required for each EDI that is created. The Steering Committee concluded that providing such an exclusion criterion would remove the provider and vendor impetus to seek EDIs from laboratories. Although this limitation may place small clinical practices at a disadvantage during measurement, the Steering Committee recognized that the measurement process, in and of itself, would emphasize the need to bridge this critical gap in incentives for the automated delivery of laboratory results. Furthermore, the Steering Committee recognized that this measure may encourage the development of alternative solutions for connecting each practice to each laboratory, such as Health Information Exchanges (HIEs) or Regional Health Information Organizations (RHIOs).

Although the Steering Committee recognized the limitations of the reporting mechanism and the lack of EDI setup for small clinical practice EHRs, Committee members agreed with the intent of the measure that the provider should utilize an EHR that is capable of receiving laboratory data and therefore recommended the measure.

Care Management

Care management HIT tools improve quality by identifying patients who may have otherwise fallen through the cracks of the healthcare delivery system. The Steering Committee identified the domains of management to include identifying patients for whom care is required, providing CDS for effective care, and tracking patient preferences, orders, and clinical results that are produced through these tools. The Steering Committee recommended measuring the adoption of care management HIT tools in three phases: during an encounter with a single patient, between visits for a single patient, and between visits for a patient population. The Committee recommended measures for the first two phases and two registry measures (see the quality registries domain below) for population management.

0490 The ability to use health information technology to perform care management at the point of care (CMS/QIP)

The Steering Committee recognized the strengths of the CDS provided in this measure, as a result of the minimum qualified/certified EHR requirements (medication list, problem list, and laboratory results). The Committee recommended the removal of the between-visit reminders from this measure, because they would inhibit the initial adoption of care management tools by adding complexities inherent to between-visit reminders. Furthermore, the Committee recognized that such between-visit reminders already were represented in a separate measure. The Committee emphasized that for effective decision support, the correct information needs to be presented in the correct format to the correct person at the correct time, as defined by this measure.

0491 Tracking of clinical results between visits (CMS/QIP)

The Steering Committee recognized the importance of tracking laboratory tests, diagnostic studies (e.g., exercise treadmill test, x-rays, and CT scans), and referrals (e.g., eye exam for diabetics from an ophthalmologist, recommendations from

subspecialists). Although the first care management measure helps with managing clinical tests *during* the visit, this measure closes the loop of care to ensure that ordered tests or referrals are completed *between* visits.

The Steering Committee acknowledged a missing component of care management: identifying tests between visits that have not yet been ordered. For example, the result of the first care management measure listed may remind a provider *during* a patient visit to refer that patient to a gastroenterologist for routine colorectal cancer screening, and the results of this measure may remind the provider *between* visits if no consultation letter or testing results have been received from the gastroenterologist. However, the initial reminder is dependent upon that first visit and would not have occurred if that patient had not scheduled the visit. Therefore, there is a need for *patient tracking* between visits when screening or follow-up tests are required but have not been ordered, and this needs to operate independently of patient visits (see the research recommendations in this report). Some components of this need are met through the quality registry measures.

Quality Registries

Registries improve quality *directly*, by tracking patients in need of care and providing feedback to providers, and *indirectly*, by collecting data on the efficiency, safety, equitability, and effectiveness of care to guide quality improvement efforts. For optimal direct impact, registry results should be available to clinicians in real-time, at the point of care. Yet broad regional and national data are required from disparate care settings to identify opportunities for improvement and effect change on a larger scale. Because of limitations in sharing clinical data, the Steering Committee recommended separating local and remote registries. Therefore, two registry measures are recommended: one for participation in local registries and one for statewide or national registries.

0492 Participation in a practice-based or individual quality database registry with a standard measure set (CMS)

The Steering Committee recognized the critical components of this measure: utilizing standard measures and providing direct feedback to clinicians. Although this measure does not require data from remote practice sites in real-time, the Steering Committee recommended including published guideline goals and available benchmarking summary data, when available. The Committee recognized that the benefit from comparison among clinicians within the same practice and guideline goals outweighed the burden of broad data collection from multiple sites required for real-time regional or national comparison. Therefore, the Committee recommended incorporating the latter requirement into a separate statewide or national registry measure. The Committee encouraged the inclusion of chronic disease and preventive care measures.

0493 Participation by a physician or other clinician in a systematic clinical database registry that includes consensus endorsed quality measures (CMS)

The Steering Committee recognized the critical components of this measure: utilizing *nationally* recognized measures and collecting data from disparate practices. The Steering Committee recommended including, at a minimum, NQF-endorsed® measures. The Committee recognized the relatively low minimum requirement of at least *five* separate practices, but believed

this would encourage further development of the registry market and advance initial adoption. Finally, although an optimal registry function would be direct communication between local and remote registries, existing EHRs and remote registries do not commonly support this function. Therefore, to encourage initial participation, the Steering Committee recommended that local-remote communication remain optional.

Medical Home

The medical home is a broad model of primary care that aims to improve quality by providing coordinated, effective, continuous, patient-centered care. Although each of the previously discussed measures focuses on particular aspects of care delivery, the medical home concept highlights the cumulative impact of information management on coordinated care.

0494 Medical Home System Survey (NCQA)

The Steering Committee acknowledged the strengths of the medical home concept as the cumulative result of numerous HIT efforts. However, the Committee highlighted opportunities for improvement for this version of the Medical Home System Survey. First, although other measures in this project have been aligned with CCHIT and HL7 EHR-S Functional Model definitions, some criteria in this survey are not specifically aligned. This lack of alignment has the potential to provide two different endpoints for HIT adoption, thus inhibiting coordinated HIT progress. Although the measure developer agreed with the need for further alignment, the survey tool currently is in use and the version in development is not in cycle with this project. Therefore, as a condition of recommendation, the measure developers agreed to align terminologies with the certified/qualified EHR requirements discussed in this report, as well as functional requirements defined by CCHIT or the HL7 EHR-S Functional Model, during the next revision of the survey tool, which is expected within the next year.

Second, the Committee recognized discrepancies between the non-HIT processes allowed in the survey and the HIT processes encouraged by the measures endorsed through this project. For example, although the survey encourages HIT adoption, test and referral tracking can be completed with handwritten spreadsheets, but the measure Tracking of Clinical Results Between Visits (above) requires use of an EHR for this function. The rationale of the measure developer for these non-HIT allowances is one that balances the benefits of handwritten processes with that of the cost of automating the processes within an EHR. Both the Steering Committee and the measure developer recognized that although the ultimate goal may be no handwritten allowances, the handwritten processes were established in the survey to encourage initial adoption and will change to stricter HIT requirements as HIT adoption rates increase. The Steering Committee recognized that although the broad benefits of reforming internal practice structures and processes outweigh the costs of HIT misalignment, the quality goal is the same: to create a more effective medical home for patients.

Finally, the Steering Committee recognized the need to differentiate between the survey tool and the formal NCQA recognition program. According to NQF policy, the specifications for all measures recommended for endorsement must be made public so that any party can complete the measure according to the specifications. Recommendation for endorsement of the

survey tool is based on the importance, scientific acceptability, usability, and feasibility of the survey tool. The method by which the survey tool is implemented, whether by using public specifications for process improvements or through the formal NCQA recognition program, is beyond the purview of NQF's endorsement.

Measures Not Endorsed

ST-001-08[vi] Electronic fax prescribing used in encounters where a prescription event occurred (NYCDHMH)

The Steering Committee recognized the limited quality improvement potential realized by using electronic fax alone, in the absence of safety checks with decision support and communication efficiencies with EDI. Furthermore, this measure is not aligned with the future CMS regulations regarding prescription facsimile. The Steering Committee recommended other e-prescribing measures with greater potential for quality improvement.

ST-002-08 Standalone e-prescribing with EDI used in encounters where a prescription event occurred (NYCDHMH)

The Steering Committee acknowledged the communication efficiencies derived from EDI but recommended against this measure because of a lack of decision support. In the interest of having a parsimonious set of e-prescribing measures, the Steering Committee recommended other measures that captured the two critical components separately: e-prescribing decision support and incorporation into the EHR, as opposed to being stand-alone, as a goal.

ST-016-08 Use of registry generated quality reports to assess clinic quality (GE)

The Steering Committee recognized the utility of quality measurement feedback from a registry, but recommended against endorsing this measure in favor of two alternative registry measures with more complete specifications required for successful implementation. Furthermore, this measure had no measure steward that would be responsible for maintenance.

Research Recommendations

The Steering Committee recommended a number of quality measurement research objectives to further advance the role of HIT in improving clinical care. The Committee encouraged continued collaboration between the quality and vendor communities to standardize measure representation and automate quality measurement calculations and reporting as EHR functions. Additional measures should be developed to:

- identify patients who required care between visits;
- build upon these structural measures to more clearly extend thinking regarding effective use of HIT;
- encourage the development and use of personal health tools, including personal health records and patient portals, and optimize their interoperability with EHRs;
- encourage the use of Web 2.0 technologies to enhance information sharing, standardization, and collaboration between EHRs;
- align with the Markle Foundation's Connecting for Health Common Framework;

[vi] Review number.

- evaluate CPOE;
- evaluate laboratory/procedure results received as a result of CPOE;
- evaluate image and imaging results transmission;
- evaluate HIT adoption using existing EHR data;
- evaluate the communication between EHRs and ancillary systems;
- evaluate the quality of EHR data;
- evaluate the EHR interoperability and coordination between providers using standardized data structures (e.g., Continuity of Care Record, Clinical Document Architecture);
- evaluate EHR interoperability and coordination with the public health system;
- evaluate EHR interoperability and coordination with subacute care facilities (e.g., dialysis centers);
- evaluate the composite adoption and utilization of HIT;
- evaluate effective medication reconciliation;
- evaluate the quality of decision support knowledge and use case testing; and
- evaluate change management/hand-off methodology.

Acknowledgment

This work was conducted under a contract from CMS.

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Appendix A

Specifications of the National Voluntary Consensus Standards for Health Information Technology: Structural Measures 2008

This table presents the specifications for each of the National Quality Forum (NQF)-endorsed® consensus standards for health information technology: structural measures 2008. All information presented has been derived directly from the measure developer without modification or alteration (except when the measure developer agreed to such modification during the NQF Consensus Development Process) and is current as of October 2008.

All NQF-endorsed voluntary consensus standards are open source, meaning they are fully accessible and disclosed.

Notes

(1) All references to electronic health records (EHRs) must meet the following criteria:

a. Certification Commission for Healthcare Information Technology (CCHIT)-certified EHR at the time of measurement; or

b. If CCHIT certification is available (in primary care or a specialty) on or before August 1, 2008, but the system in use is not CCHIT certified, the EHR must meet the following criteria:

1. ability to manage a medication list AND
2. ability to manage a problem list AND
3. ability to manually enter or electronically receive, store, and display laboratory results as discrete searchable data elements AND
4. ability to meet basic privacy and security elements AND
5. the EHR (above) must be CCHIT certified on or before August 1, 2011, or another CCHIT-certified product must be in use for compliance after August 1, 2011; or

c. If CCHIT certification is not available for a specialty on August 1, 2008, the EHR must have capabilities 1, 2, 3, AND 4 in section b above.

Manage a medication list—create, maintain, and display a patient specific medication list.

Manage a problem list—create, maintain, and display a patient specific problem list.

Discrete searchable data elements—laboratory data that can be recorded in predefined fields in predefined formats within the EHR that allow for reports to be generated, such as trends of a specific element over time. This cannot be easily done if data are entered via a free text format or by merely scanning a report into the EHR.

Basic privacy and security elements—for the purpose of this measure, basic privacy and security elements include 1) the ability to audit the date/time and user each time a patient chart is printed AND 2) the ability to archive and retrieve health record information.

(2) All measures except 0494 have time-limited endorsement.

(3) For all measures developed by CMS, the reporting period is defined by the program implementing the measure. As defined by CMS for the PQRI program, this is one calendar year.

(4) The following applies to measures 0486 and 0487: A CPT code or G-code is required to identify patients for denominator inclusion. 90801, 90802, 90804, 90805, 90806, 90807, 90808, 90809, 92002, 92004, 92012, 92014, 96150, 96151, 96152, 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, G0101, G0108, G0109.

(5) The following applies to measures 0488, 0489, 0490, and 0491: A CPT service code or G-code is required to identify patients for denominator inclusion. 90801, 90802, 90804, 90805, 90806, 90807, 90808, 90809, 92002, 92004, 92012, 92014, 96150, 96151, 96152, 97001, 97002, 97003, 97004, 97750, 97802, 97803, 97804, 98940, 98941, 98942, 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99241, 99242, 99243, 99244, 99245, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, D7140, D7210, G0101, G0108, G0109, G0270, G0271.

(6) See Appendix C for a glossary that provides definitions for bolded words and phrases.

Appendix A—Specifications of the National Voluntary Consensus Standards for Health Information Technology: Structural Measures 2008

E-PRESCRIBING

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0486 **Adoption of medication e-prescribing**	CMS	Documents whether provider has adopted a qualified **e-prescribing** system and the extent of use in the ambulatory setting.	All patient encounters.	All prescriptions created during the encounter were generated using an **e-prescribing** system (*G8443*) that is capable of ALL of the following: 1. generating a complete active medication list incorporating electronic data received from applicable pharmacies and pharmacy benefit managers (PBM) *if available* 2. selecting medications, printing prescriptions, electronically transmitting prescriptions, and conducting all **alerts** for **e-prescribing** including undesirable or unsafe situations, such as potentially inappropriate dose or route of administration of a drug, drug-drug interactions, allergy concerns, or warnings and cautions 3. providing information related to the availability of lower cost, therapeutically appropriate alternatives (if any) 4. providing information on formulary or tiered formulary medications, patient eligibility, and authorization requirements received electronically from the patient's drug plan.	E-Prescribing System available but no prescriptions were generated. *G8445: No prescriptions were generated during the encounter. Provider does have access to a qualified e-prescribing system OR,* E-prescribing System available but not used for one or more prescriptions due to system/patient reasons. *G8446: Provider does have access to a qualified e-prescribing system. Some or all prescriptions generated during the encounter were printed or phoned in as required by state or federal law or regulation, patient request, or pharmacy system being unable to receive electronic transmission.* *(more)*

E-PRESCRIBING (continued)

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0487 **EHR with EDI prescribing used in encounters where a prescribing event occurred**	NYCDHMH	Of all patient encounters within the past month that used an electronic health record **(EHR)** with **electronic data interchange** (EDI) where a prescribing event occurred, how many used EDI for the prescribing event.	All patient encounters.	Number of encounters using an electronic health record (EHR) with EDI, where EDI was used for a prescribing event.	1. Controlled substance(s) requiring non-EDI prescription are printed, *OR* 2. prescriptions are printed due to patient preference for non-EDI prescription and indicated in a structured and auditable format, *OR* 3. no prescriptions are generated during the encounter, *OR* 4. the receiving-end of EDI transmission is inoperable and unable to receive EDI transmission at the time of prescribing.

(more)

Appendix A—Specifications of the National Voluntary Consensus Standards for Health Information Technology: Structural Measures 2008

INTEROPERABLE EHRs

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0488 **Adoption of Health Information Technology**	CMS	Documents whether provider has adopted and is using health information technology. To qualify, the provider must have adopted and be using a certified/qualified electronic health record (EHR).	All patient encounters.	Patient encounter documentation substantiates use of certified/qualified electronic health record (EHR). *G8447: Patient encounter was documented using a CCHIT-certified EHR.* *G8448: Patient encounter was documented using a qualified, non-CCHIT-certified EHR.*	None.
0489 **The ability for providers with HIT to receive laboratory data electronically directly into their qualified/certified EHR system as discrete searchable data elements**	CMS	Documents the extent to which a provider uses a certified/qualified electronic health record (EHR) system that incorporates an electronic data interchange with one or more laboratories allowing for direct electronic transmission of laboratory data into the electronic health record (EHR) as discrete searchable data elements.	All patient encounters.	Patient encounter with follow-up laboratory data anticipated to be transmitted electronically directly into the EHR. *GEDI01: The patient required at least one qualified laboratory test at the encounter and was referred to a laboratory that has the capability of transmitting the results to the electronic health record as discrete searchable data elements.*	Patient Encounter NOT Requiring Laboratory Test *GEDI02: The patient did not require a qualified laboratory test at the encounter.*

(more)

CARE MANAGEMENT

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0490 **The ability to use health information technology to perform care management at the point of care**	CMS	Documents the extent to which a provider uses a certified/qualified electronic health record (EHR) system capable of enhancing **care management** at the point of care. To qualify, the facility must have implemented processes within its EHR for disease management that incorporate the principles of care management at the point of care, which include: a. the ability to identify specific patients by diagnosis or medication use b. the capacity to present **alerts** for disease management, preventive services, and wellness during the visit via the EHR c. the ability to provide support for standard **care plans, practice guidelines,** and protocols.	All patient encounters.	Patient encounter documented on a certified/qualified electronic health record capable of enhancing **care management** at the point of care. To qualify, the facility must have implemented processes within its EHR for disease management that incorporate the principles of care management at the point of care. The system shall have the ability, at the point of clinical decisionmaking, to identify patient specific suggestions/ **reminders,** screening tests/exams, and other preventive service in support of disease management, routine preventive, and wellness patient care standards. The system shall have the ability to provide access to the standard **care plan,** protocol, and **practice guideline** documents when requested at the time of the clinical encounter. These documents may reside within the system or be provided through links to external sources. *GCM01 (in the process of creation): Patient encounter was documented using a certified/qualified electronic health record at the point of care, which includes:*	None. *(more)*

CARE MANAGEMENT (continued)

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0490 **The ability to use health information technology to perform care management at the point of care** *continued*				1. *The ability to identify specific patients by diagnosis or medication use* 2. *The capacity to present **alerts** to the clinician for disease management, preventive services and wellness during the visit via the EHR* 3. *The ability to provide support for standard **care plans,** guidelines, and protocols.*	
0491 **Tracking of clinical results between visits**	CMS	Documentation of the extent to which a provider uses a certified/qualified electronic health record (EHR) system to track pending laboratory tests, diagnostic studies (including common preventive screenings), or patient **referrals**. The Electronic Health Record includes provider **reminders** when clinical results are not received within a predefined timeframe.	All patient encounters.	Patient encounter documented on a certified/qualified electronic health record capable of tracking clinical results between visits including pending laboratory tests, diagnostic studies (including common preventive screenings), or patient referrals. The Electronic Health Record includes provider reminders when clinical results are not received within a predefined timeframe. *GTLT01: At the time of the patient encounter, all resulting orders for laboratory tests, diagnostic studies (including common preventive screenings), or patient referrals were entered into a a certified/qualified electronic health record capable of tracking clinical results between visits. The Electronic Health Record includes provider reminders when clinical results are not received within a predefined timeframe.*	Patient Encounter NOT Requiring Laboratory Test, Diagnostic Studies, Referrals *GTLT02: Patient had no orders for laboratory tests, diagnostic studies (including common preventive screenings) or patient referrals at this patient encounter.* *(more)*

QUALITY REGISTRIES

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0492 **Participation in a practice-based or individual quality database registry with a standard measure set**	CMS	This registry should be capable of: a. generating population-based reports relating to published guideline goals or benchmarking data b. providing comparisons to the practitioner c. providing feedback that is related to guideline goals d. capturing data for one or more chronic disease conditions (e.g., diabetes) or preventive care measures (e.g., USPTF recommendations) for all patients eligible for the measures.	1	The clinician participates in a practice-based or individual clinical database registry capable of the following: a. generating population-based reports relating to published guideline goals or benchmarking data b. providing comparisons to the practitioner c. providing feedback that is related to guideline goals d. capturing data for one or more chronic disease conditions (e.g., diabetes) or preventive care measures (e.g., USPTF recommendations) for all patients eligible for the measures.	None.

(more)

QUALITY REGISTRIES (continued)

Measure Number Measure Name	IP Owner	Measure Description	Measure Denominator	Measure Numerator	Measure Exclusions
0493 Participation by a physician or other clinician in a systematic clinical database registry that includes consensus endorsed quality measures	CMS	Participation in a systematic qualified clinical database registry involves: a. physician or other clinician submits standardized data elements to registry b. data elements are applicable to consensus endorsed quality measures c. registry measures shall include at least two (2) representative NQF consensus endorsed measures for registry's clinical topic(s) and report on all patients eligible for the selected measures d. registry provides calculated measures results, benchmarking, and quality improvement information to individual physicians and clinicians e. registry must receive data from more than 5 separate practices and may not be located (warehoused) at an individual group's practice. Participation in a national or state-wide registry is encouraged for this measure f. registry may provide feedback directly to the provider's local registry if one exists.	1	The clinician participates in a systematic qualified clinical database registry capable of the following: a. physician or other clinician submits standardized data elements to registry b. data elements are applicable to consensus endorsed quality measures c. registry measures shall include at least two (2) representative NQF consensus endorsed measures for registry's clinical topic(s) and report on all patients eligible for the selected measures d. registry provides calculated measures results, benchmarking, and quality improvement information to individual physicians and clinicians e. registry must receive data from more than 5 separate practices and may not be located (warehoused) at an individual group's practice. Participation in a national or state-wide registry is encouraged for this measure f. registry may provide feedback directly to the provider's local registry if one exists.	None.

(more)

Appendix A—Specifications of the National Voluntary Consensus Standards for Health Information Technology: Structural Measures 2008

MEDICAL HOME

Measure Number Measure Name	IP Owner	Measure Description
0494 **Medical Home System Survey***	NCQA	The Medical Home System Survey is a survey of physician practices that assesses whether the practice is functioning as a patient-centered medical home by providing ongoing, coordinated patient care. Meeting Medical Home System Survey standards demonstrates that practices have physician-led teams that provide patients with: a. improved access and communication b. care management using evidence-based guidelines c. patient tracking and registry functions d. support for patient self-management e. test and referral tracking f. practice performance and improvement functions.

Standard 1: Access and Communication	**Pts**
A. Has written standards for patient access and patient communication	4
B. Uses data to show it meets its standards for patient access and communication	5
	(9)

Standard 2: Patient Tracking and Registry Functions	**Pts**
A. Uses data system for basic patient information (mostly non-clinical data)	2
B. Has clinical data system with clinical data in searchable data fields	3
C. Uses the clinical data system	3
D. Used paper or electronic-based charting tools to organize clinical information	6
E. Uses data to identify important diagnoses and conditions in practice	4
F. Generates lists of patients and reminds patients and clinicians of services needed (population management)	3
	(21)

Standard 3: Care Management	**Pts**
A. Adopts and implements evidence-based guidelines for three conditions	3
B. Generates reminders about preventive services for clinicians	4
C. Uses non-physician staff to manage patient care	3
D. Conducts care management, including care plans, assessing progress, addressing barriers	5
E. Coordinates care/follow-up for patients who receive care in inpatient and outpatient facilities	5
	(20)

Standard 4: Patient Self-Management Support	**Pts**
A. Assesses language preference and other communication barriers	2
B. Actively supports patient self-management	4
	(6)

*Full survey implementation details are available at www.ncqa.org/ppcpcmh.

(more)

MEDICAL HOME (continued)

Standard 5: Electronic Prescribing	Pts
A. Uses electronic system to write prescriptions	3
B. Has electronic prescription writer with safety checks	3
C. Has electronic prescription writer with cost checks	2
	(8)

Standard 6: Test Tracking	Pts
A. Tracks tests and identifies abnormal results systematically	7
B. Uses electronic systems to order and retrieve tests and flag duplicate tests	6
	(13)

Standard 7: Referral Tracking	Pts
A. Tracks referrals using paper-based or electronic system	4
	(4)

Standard 8: Performance Reporting & Improvement	Pts
A. Measures clinical and/or service performance by physician or across the practice	3
B. Survey of patients' care experience	3
C. Reports performance across the practice or by physician	3
D. Sets goals and takes action to improve performance	3
E. Produces reports using standardized measures	2
F. Transmits reports with standardized measures electronically to external entities	1
	(15)

Standard 9: Advanced Electronic Communications	Pts
A. Availability of interactive website	1
B. Electronic patient identification	2
C. Electronic care management support	1
	(4)

Appendix B
Steering Committee and Project Staff

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Appendix C
Glossary

Term[i]	Definitions
Alert	Written or acoustic signals to announce the arrival of messages and results and to avoid possible undesirable situations, such as contradictions, conflicts, erroneous entry, tasks that are not performed in time, or exceptional results. A Passive Alert will appear on the screen in the form of a message. An Active Alert calls for immediate attention, and the appropriate person is immediately notified, for example, by beeper.
Care management	Proactively coordinating interventions and follow-up to ensure that patients are complying with recommended treatment plans, taking medications, improving their health habits, and adhering to best practices as determined by current evidence.
Care plan	An ordered assembly of expected or planned activities, including observations, goals, and services, appointments, and procedures, usually organized in phases or sessions, which have the objective of organizing and managing healthcare activity for the patient. Often, these activities are focused upon one or more of the patient's healthcare problems. Care plans may include order sets as actionable elements, usually supporting a single session or phase. Also known as a treatment plan.

[i] Unless otherwise specified, terms and definitions are from the *HL7 EHR-S Functional Model Glossary of Terms 2007.*

Clinical decision support (CDS)	Providing clinicians or patients with clinical knowledge and patient-related information, intelligently filtered or presented at appropriate times, to enhance patient care. Clinical knowledge of interest could range from simple facts and relationships to best practices for managing patients with specific disease states, new medical knowledge from clinical research, and other types of information.
Electronic data interchange (EDI)[ii]	The computer-to-computer interchange of strictly formatted messages that represent documents other than monetary instruments. EDI implies a sequence of messages between two parties, either of whom may serve as originator or recipient. The formatted data representing the documents may be transmitted from originator to recipient via telecommunications or physically transported on electronic storage media.
E-prescribing	Entering a prescription for a medication into an automated data entry system that generates a prescription electronically instead of handwriting the prescription on paper.
Health information exchange (HIE)[iii]	The electronic movement of health-related data and information among organizations according to agreed standards, protocols, and other criteria.
Patient-centeredness[iv]	Refers to healthcare that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients' wants, needs, and preferences and that patients have the education and support they need to make decisions and participate in their own care.
Practice guidelines	Systematically developed statements to standardize care and to assist in practitioner and patient decisions about the appropriate healthcare for specific circumstances. Practice guidelines are usually developed through a process that combines scientific evidence of effectiveness with expert opinion. Practices guidelines are also referred to as clinical criteria, protocols, algorithms, review criteria, and guidelines.
Referral	The act of requesting treatment or advice on treatment/management from an additional provider.
Regional Health Information Organization (RHIO)	An organization that brings together healthcare stakeholders within a defined geographic area and governs the electronic exchange of health-related information among them for the purpose of improving health and care.
Reminder	A method of reminding oneself or others of an impending required action. In clinical documentation, this is typically an electronic reminder for follow-up, and it is distinct from an alert, for which immediate action is required or an action is contraindicated.

[ii] Kantor M, Burrows JH, *Electronic Data Interchange (EDI),* National Institute of Standards and Technology; 1996.

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The National Quality Forum (NQF) is a private, nonprofit, open membership, public benefit corporation whose mission is to improve the American healthcare system so that it can be counted on to provide safe, timely, compassionate, and accountable care using the best current knowledge. Established in 1999, NQF is a unique public-private partnership having broad participation from all parts of the healthcare industry. As a voluntary consensus standards setting organization, NQF seeks to develop a common vision for healthcare quality improvement, create a foundation for standardized healthcare performance data collection and reporting, and identify a national strategy for healthcare quality improvement. NQF provides an equitable mechanism for addressing the disparate priorities of healthcare's many stakeholders.

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