

6.2b Healthcare Quality

10x10 – Introduction to Biomedical Informatics & Artificial Intelligence
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Overview

Definitions and framework for assessing quality

What we know about healthcare quality

Concerns about quality measures

Current quality measures and programs

Role of IT and informatics

Quality programs and measures

Many measures have been developed, reflecting various perspectives

[Catalog of measures](#) maintained by Partnership for Quality Measurement (PQM, Battelle Memorial Institute)

Two major types of programs for quality improvement

- Value-based purchasing
- Reporting

Sampling of PQM measures for diabetes mellitus


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Submission Tool and Repository Measure Database

As the Centers for Medicare & Medicaid Services (CMS) consensus-based entity (CBE), Battelle Memorial Institute (Battelle) discloses com information (e.g., full measure specifications, coding logic, algorithms) regarding each measure to the public for the purpose of evaluating analyzing, or displaying of each measure for endorsement consideration. If an interested party wishes to attain complete measure information for the use and/or implementation of a measure, the interested party should contact the measure steward. Contact information for the measure steward can be found under the "Point of Contact" section of the respective measure page within the Submission Tool and Repository (STAR). Battelle is not responsible for, nor is privy to the measure use agreements that may be established between a measure steward and an interested party.

Search

diabetes

For the filters below, open and close each one at a time for the best experience

No Filters Selected

Measure Type ▾ Level Of Analysis ▾ Endorsement Status ▾ Format ▾

APPLY

RESET

CBE ID 	Title	Steward	Endorsement Cycle Status	Date of Last Endorsement Decision
0003	Bipolar Disorder: Assessment for diabetes	Center for Quality Assessment and Improvement in Mental Health	Endorsement Removed	18 September, 2014
0055	Comprehensive Diabetes Care: Eye Exam (retinal) performed	National Committee for Quality Assurance	Endorsed	25 October, 2018
0056	Diabetes: Foot Exam	National Committee for Quality Assurance	Endorsed	25 October, 2018
0057	Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Testing	National Committee for Quality Assurance	Endorsement Removed	26 May, 2022

0057

Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Testing

National Committee for
Quality Assurance

0575

Comprehensive Diabetes Care: Hemoglobin A1c (HbA1c) Control (<8.0%)

National Committee for
Quality Assurance

Health Plan Employer Data and Information Set (HEDIS)

90+ measures used by health plans for their evaluation across 6 domains of care

- Effectiveness of Care
- Access/Availability of Care
- Experience of Care
- Utilization and Risk Adjusted Utilization
- Health Plan Descriptive Information
- Measures Collected Using Electronic Clinical Data Systems

Maintained by National Committee for Quality Assurance (NCQA)

Effectiveness of care

- Childhood and adult immunizations
- Use of beta blockers after myocardial infarction
- Screening for various types of cancer
- Comprehensive diabetes care

Access/availability of care

- Access to preventive health services
- Availability of primary care providers
- Initiation of prenatal care

Experience of care

- Member satisfaction surveys

Other quality measures

National Surgical Quality Improvement Program (NSQIP)

- American College of Surgeons (ACS) program to measure, risk-adjust, and improve quality of surgical care

CancerLinQ

- American Society of Clinical Oncology (ASCO) program to help clinicians track quality of care in their practices and identify gaps and opportunities for improvement

The Leapfrog Group

Formed by private healthcare purchasers to improve quality of care they pay for

Started with three leaps – only purchase healthcare from systems that

- Use computerized provider order entry (CPOE)
- Maintain adequate physician ICU staffing
- Perform certain high-risk procedures in high-volume centers

Subsequent leap included adoption of the 30 NQF safe practices

Current activities include voluntary surveys

- Leapfrog Hospital Survey – safety, quality, and resource use completed by over 2000 hospitals annually
- Leapfrog Hospital Safety Grade – consumer-friendly letter grade system evaluating nearly 3000 hospitals on how well keep patients safe from harm
- Leapfrog Value-Based Purchasing Program – pay-for-performance program using data from Leapfrog Hospital Survey
- Leapfrog Ambulatory Surgery Center (ASC) Survey – report on the quality and safety of care provided

Most quality measurement in US implemented in Medicare

Value-based purchasing programs

- Hospital – current mandatory programs include
 - Hospital Value-Based Purchasing (HVBP)
 - Hospital Readmission Reduction (HRR)
 - Hospital-Acquired Conditions (HAC)
- Physician – many programs over the years, with Medicare Access & CHIP Reauthorization Act (MACRA) replacing Physician Quality Reporting System (PQRS) and others

Public reporting

- Care Compare – started with hospitals and physicians; has expanded to other components of healthcare system

Hospital quality improvement programs

Hospital Value-Based Purchasing (HVBP)

- Medicare payments to hospitals reduced overall and then increased based on Total Performance Score (TPS)
 - Reduction started at 1% in 2014 and increased 0.25% per year up to 2% by 2017
 - Increase started at 1% in 2014 and increased 0.25% per year up to 2% by 2017
- TPS based on four domains
 - Clinical process of care – quality measures in 5 domains
 - Patient experience of care – results on Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey
 - Outcome domain – reports of patient outcome measures
 - Efficiency domain – spending per beneficiary

Evaluations have found no consistent improvement in hospital mortality rates or other measures for hospitals participating in HVBP than those that did not (Figueroa, 2016; Ryan, 2017)

HBVP measures

Clinical Process of Care

Acute myocardial infarction (AMI or heart attack)

- AMI-7a: Heart attack patients given fibrinolytic medication within 30 minutes of arrival

Pneumonia (PN)

- PN-6: Pneumonia patients given the most appropriate initial antibiotic(s)

Surgical care improvement project (SCIP)

- SCIP-Card-2: Surgery patients who were taking heart drugs called beta blockers before coming to the hospital, who were kept on the beta blockers during the period just before and after their surgery
- SCIP-VTE-2: Patients who got treatment at the right time (within 24 hours before or after their surgery) to help prevent blood clots after certain types of surgery

Healthcare associated infections (HAI)

- SCIP-Inf-2: Surgery patients who are given the right kind of antibiotic to help prevent infection
- SCIP-Inf-3: Surgery patients whose preventive antibiotics are stopped at the right time (within 24 hours after surgery)
- SCIP-Inf-9: Surgery patients whose urinary catheters were removed on the first or second day after surgery

Preventive Care

- IMM-2: Patients assessed and given influenza vaccination

Outcome

Acute myocardial infarction (AMI) 30-day mortality rate

- The death (mortality) rate indicates whether a patient with an AMI diagnosis died within 30 days of their hospitalization.

Heart failure (HF) 30-day mortality rate

- The death (mortality) rate shows whether a patient with a HF diagnosis died within 30 days of their hospitalization.

Pneumonia (PN) 30-day mortality rate

- The death (mortality) rate shows whether a patient with a PN diagnosis died within 30 days of their hospitalization.

AHRQ (PSI-90) patient safety for selected indicators (composite)

- The AHRQ PSI-90 is a composite of 8 underlying component indicators - Opens in a new window External Link icon. Lower ratios indicate better quality.

Central line-associated bloodstream infection (CLABSI)

- The CLABSI measure compares the actual number of CLABSIs with the predicted number of infections based on the baseline U.S. experience.

Catheter-associated urinary tract infection (CAUTI)

- The CAUTI measure compares the actual number of CAUTIs with the predicted number of infections based on the baseline U.S. experience.

Surgical site infection (SSI)

- The SSI measure compares the actual number of SSIs from abdominal hysterectomies or colon surgeries with the predicted number of infections based on the baseline U.S. experience.

Hospital quality improvement programs (cont.)

Hospital Readmission Reduction Program (HRRP)

- Reduced payments for hospitals with excess readmissions, measured by dividing number of risk-adjusted 30-day readmissions for acute myocardial infarction (AMI), heart failure (HF), pneumonia, hip/knee replacement, and chronic obstructive pulmonary disease (COPD) by the number that would be expected
- Research has shown mixed results
 - Hospitals may be penalized for higher-risk patients (Roberts, 2018)
 - For heart failure, led to reduction in 30-day and 1-year readmissions but increase in 30-day and 1-year mortality (Gupta, 2018)
 - Early readmissions (within 7 days) more likely to be preventable and amenable to hospital-based interventions than later readmissions (30 days) (Graham, 2018)
 - RCT of program for reduction failed to show benefit (Donzé, 2023)

Retrospective noted small benefit and distraction from other quality concerns (Cram, 2022)

Hospital quality improvement programs (cont.)

Hospital Acquired Conditions (HAC)

- Reduced payments for hospitals in lowest quartile of AHRQ patient safety indicators, central-line associated bloodstream infection (CLABSI), catheter associated urinary tract infection (CAUTI), and surgical site infection (SSI; colon and hysterectomy) measures
- Program deemed ineffective, mainly due to inaccurate and unreliable measures and disproportionate penalties for teaching and public hospitals (Lawton, 2020)

Physician pay-for-performance: MACRA

MACRA consolidated previous programs into [Quality Payment Program \(QPP\)](#) and allows choice of two programs (Medical Economics, 2016)

- Merit-Based Incentive Payment System (MIPS)
 - Consolidates several programs
 - Quality (50% to 30%) – physician-selected measures
 - Advancing Care Information (25%) – replacement of meaningful use
 - Clinical practice improvement (15%) – activities
 - Measured resource use – (10% to 30%) – measures based on claims
 - Initially incentive-based but eventually will have bonuses or penalties up to 9% of reimbursement
- Alternative Payment Models (APMs)
 - Provide quality incentives (and penalties) based on participation in Accountable Care Organizations (ACOs), Patient Centered Medical Homes, and bundled payment models

Concerns expressed about burden and value of program (McWilliams, 2017; Johnston, 2020)

MIPS scores not associated with performance on other process and outcomes measures (Bond, 2022)

Participation in ACOs showed modest reductions in utilization and cost (Song, 2021)

CMS public reporting

Care Compare - started with hospitals and then physicians; expanded to

- Nursing homes
- Hospice and home health agencies
- Dialysis facilities
- Inpatient rehabilitation centers
- Long-term care hospitals

For hospitals and other institutional facilities, rated from 1-5 stars based on aggregate of quality, cost, and patient satisfaction data

- After expression of concern about validity of measures (Bilimoria, 2016), system has been improved (Bilimoria, 2021)

For physicians, profiled by score of quality activity participation, performance scores, and patient surveys

- Concerns related to completeness of participation (Li, 2019)

CMS Care Compare

Medicare.gov

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MY LOCATION

Portland, OR 97239

PROVIDER TYPE

Hospitals

Doctors & clinicians

Hospitals

Nursing homes

Home health services

Hospice care

Inpatient rehabilitation facilities

Long-term care hospitals

Dialysis facilities

NAME OF FACILITY (optional)

Facility name

Search

Filter by:

Distance

Overall rating

Emergency services

Hospital type

Clear all filters

Showing 1 - 15 of 20 hospitals

Closest

1. Portland VA Medical Center

0.7 mi

ACUTE CARE - VETERANS AFFAIRS

3710 SW US Veterans Hospital Road

Portland, OR 97239

(503) 220-8262

Please note, at this time, Medicare won't pay for services at this hospital except in very limited circumstances.

Compare

Heart

2. Shriners Hospital for Children-Portland

0.9 mi

CHILDRENS

3101 SW Sam Jackson Park Road

Portland, OR 97239

(971) 544-3312

Overall rating

Not available

Patient survey rating

Not available

Compare

Heart

3. Ohsu Hospital and Clinics

0.9 mi

ACUTE CARE HOSPITALS

3181 SW Sam Jackson Park Road

Portland, OR 97239

(503) 494-6245

Overall rating

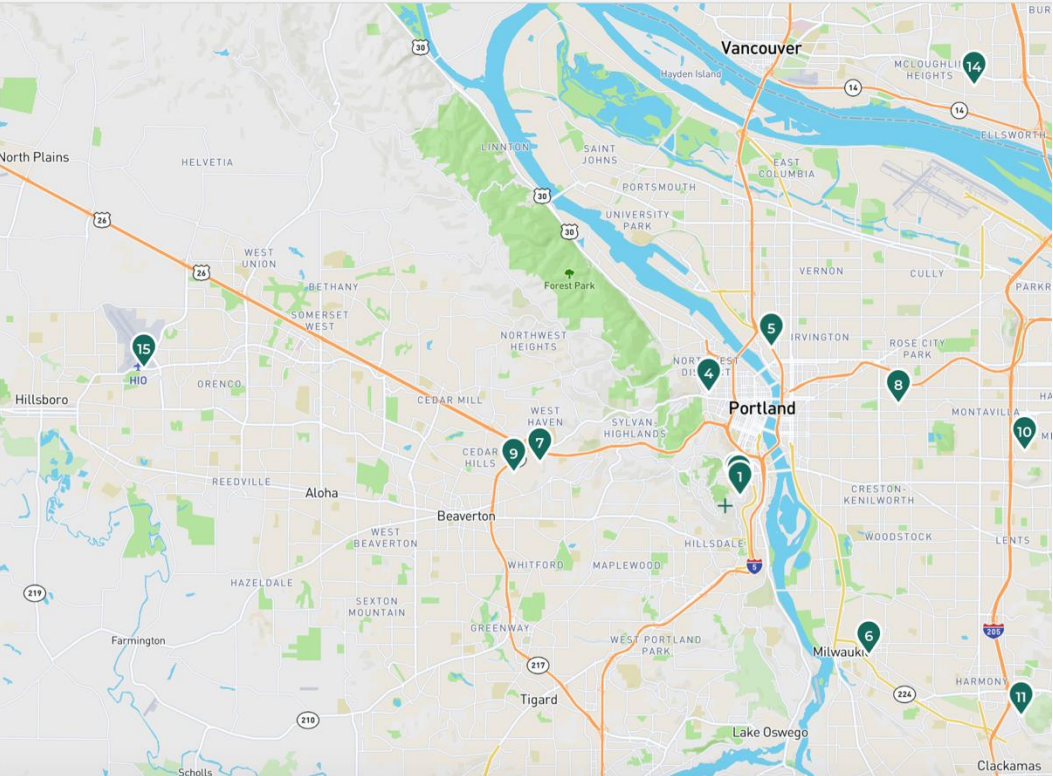
★★★★★

Patient survey rating

★★★★☆

Compare

Heart



Other approaches to quality improvement

Bundled payments

- Payment to hospitals for complete episode of care – consistently shown to reduce costs (Liao, 2022)
- CMS Bundled Payments for Care Improvement Advanced (BPCI-A) program found to reduce cost of care but more than made up by payment of bonuses (Shashikumar, 2022)
- Future of program should “set appropriate benchmarks, minimize market distortions, and strive for equity” (Joynt Maddox, 2022)

Prior authorization

- Requirement by health plans for clinicians to obtain approval of healthcare service or medication before care provided – growing use leading to concerns over burden for clinicians (Pestaina, 2022)
- Process may be streamlined by IT support (ONC, 2022; Turchi, 2024)

Other approaches (cont.)

Expand breadth of measures

- Health equity (Agniel, 2023)
- Clinician experience (DiGiorgio, 2023)

Other delivery models – capitated Medicare Advantage found to reduce utilization and improve quality measures (Landon, 2023)

Role of IT and informatics – electronic quality measures (eCQM)

Goal of eCQMs is to map clinical data directly into quality measures for reporting and use by clinical decision support

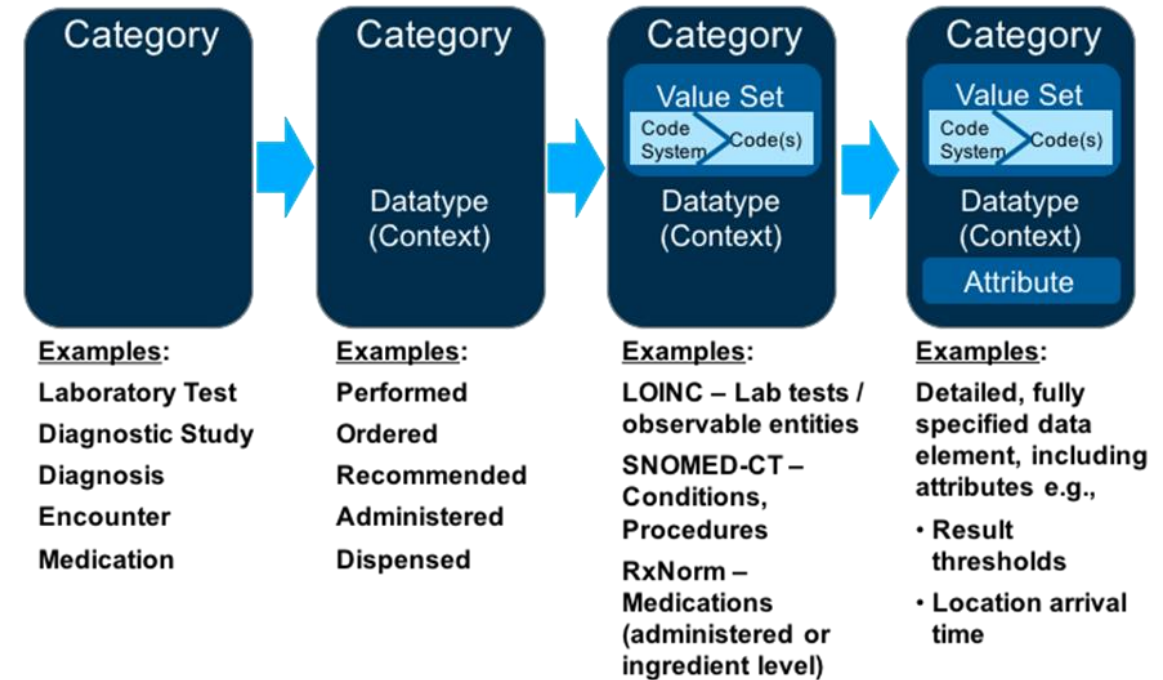
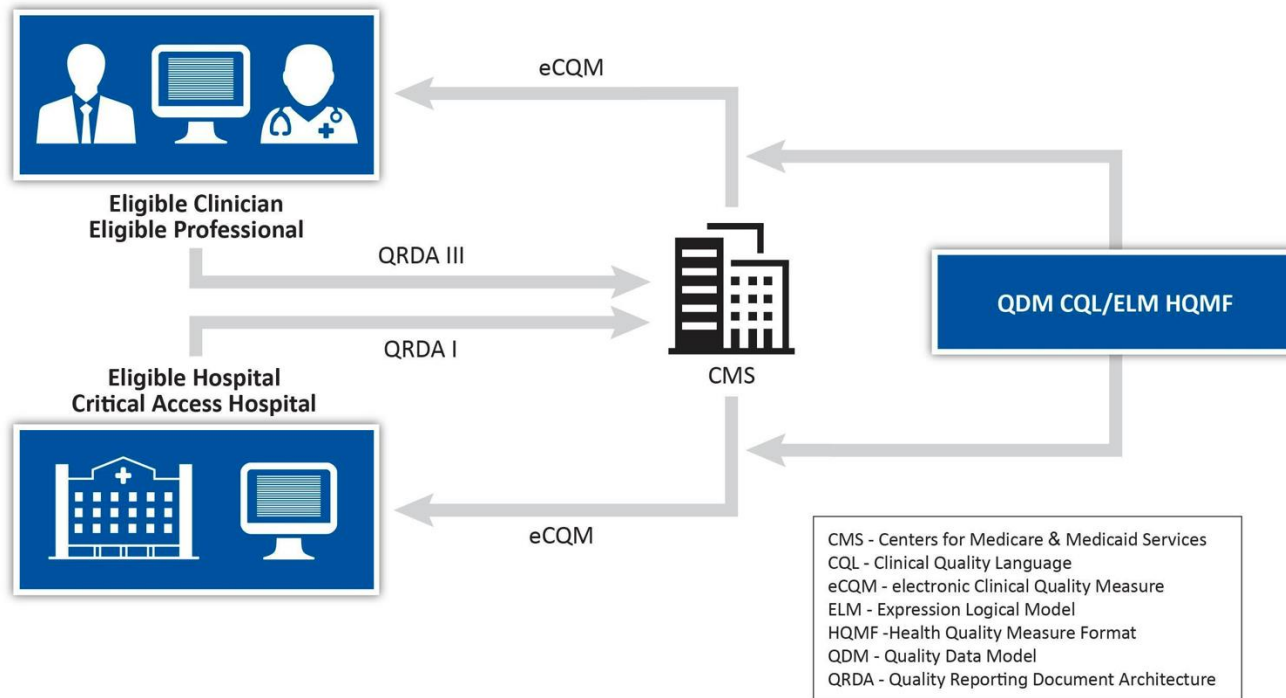
Formatted in Hospital Quality Measures Format (HQMF), an HL7 standard

Quality Reporting Document Architecture (QRDA) generates quality reports

Quality Data Model (QDM) is information model for eCQMs

Clinical Quality Language (CQL) is authoring language for specifying eCQMs in systems

How does it all fit together?



CQL implementation

CQL has human-readable but precise logic (Rhodes, 2018)

Expression logic model (ELM) has machine logic implemented in various programming languages

Component terms expressed in value sets of controlled terminologies maintained by National Library of Medicine

[Example measure for Discharged on Antithrombotic Therapy](#)

[Other example measures](#)

Moving to align with

- [CDS standards](#)
- [FHIR](#)

Recommendations for using EHR and other tools to improve care

Obtaining and using data in practice improvement (AHRQ, 2022) – strategies for using EHRs, CDS, patient portals and engagement, incorporating patient-generated data, and using other sources of data

Leveraging EHR-sourced measures to improve care communication and coordination (NQF, 2022) – recommendations include

- Collect and share standardized data
- Optimize EHR usability for patients and caregivers
- Optimize EHR usability for clinicians
- Develop novel EHR data elements to improve measurement
- Leverage EHR data to fill measurement gaps

Demonstration of eCQM use in cancer care (Murphy, 2023)

EHRs and quality measures – challenges

Data for quality indicators incomplete or inaccessible

- In primary care, variation in data quality (Barkhuysen, 2014)
- In congenital heart disease, variation by data type, with image interpretation and overuse measures most difficult (Broberg, 2015)
- Small data errors can have big impact in EDs (Ward, 2015)
- Can be difficult to implement in lower-resource primary care practices (Cohen, 2018; Richardson, 2022)
- Variation between manually abstracted and EHR data in performance scores (Homco, 2020)
- Exchange of measures across family medicine practices with mature HIT still difficult (Phillips, 2021)
- Underfilling and inconsistency of data elements in EHRs render automated oncology quality measurement calculations impractical (Schorer, 2022)

Impacted by workflow and documentation practices, which can result in underreporting of some preventive measures (Parsons, 2012)

Requires additional work beyond routine documentation; who in organization to perform (Morrison, 2013)?

Data quality may be improved by

- Guidance in quality measure selection and calculation (D'Amore, 2018)
- Health information exchange (HIE) (D'Amore, 2021)

Where do we go from here?

How do we hold providers accountable for health outcomes (Baker, 2018)?

- Strong evidence should exist that good medical care leads to improvement in the outcome within the time period for the measure
- The outcome should be measurable with a high degree of precision
- The risk-adjustment methodology should include and accurately measure the risk factors most strongly associated with the outcome
- Implementation of the outcome measure must have little chance of causing adverse consequences

Data standards and interoperability critical (D'Amore, 2018; McClure, 2020)

Negative public reporting can lead to improved safety practices in hospitals (Holmgren, 2021)

Where do we go? (cont.)

Do we need a “time out” from proliferation of measures, data required for collection, and resources used? (MacLean, 2018)

Focus of efforts should shift from progress in measurement to progress in results (D'Avena, 2020)

Should efforts focus on inability to de-adopt low-value care? (Powers, 2020)

- Behavioral economics interventions (Kullgren, 2024)?

Priorities going forward (Burstin, 2025 from Pines, 2025)

- Shift to digital measurement - including use of AI
- Reducing measurement burden
- Building equity into quality measurement
- Reflecting provision of care
- Voice of the patient
- Measurement science matters