

CONTINUOUS QUALITY IMPROVEMENT IN NEUROMUSCULAR AND ELECTRODIAGNOSTIC PRACTICE: AN EDUCATIONAL REVIEW OF THE AANEM QUALITY IMPROVEMENT COMMITTEE

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ABSTRACT: While the concept of health care quality is difficult to define, its importance is increasingly recognized by policymakers, payers, and patients. Applying performance improvement measures to clinical practice has become mandatory for physician recertification, and quality measures are routinely used by regulatory agencies. It is also widely agreed that quality measures will in some form be incorporated into future payment models. As such, providers should have an understanding of the quality improvement process and knowledge of the quality requirements that are currently expected of them. Impediments to embracing quality improvement protocols have included hesitance on the part of practitioners, as well as the sometimes cumbersome terminology currently used to describe quality control. This document provides clarification of the terms, an overview of performance improvement processes used in health care and other industries, and examples of specific quality improvement projects that can be incorporated into a busy clinical electrodiagnostic or neuromuscular practice.

Keywords: healthcare quality; quality improvement; quality measurement; process improvement; quality

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INTRODUCTION AND GOALS

The concept of quality is intuitively familiar to all practitioners of medicine, but a specific definition of quality is notoriously difficult to produce. Should quality be defined as a low rate of medical errors (clinical outcomes), a high rate of consistency of care (clinical processes), or more pragmatically in terms of patient satisfaction? Regardless of the specific definition, the general sense of quality in medicine relates to how good a job physicians do in caring for their patients. Quality improvement, by extension, refers to the efforts pursued to enhance that care.

The goals of this document are to:

- Introduce quality improvement concepts relevant to neuromuscular and electrodiagnostic (EDX) practice.
- Outline quality improvement processes and how they can be applied.
- Provide case studies demonstrating how quality improvement principles can be implemented into an EDX and neuromuscular practice.
- Identify resources available for development and refinement of quality improvement projects.

WHAT IS HEALTH CARE QUALITY?

As far back as 1980, Donabedian defined quality of care as “that kind of care which is expected to maximize an inclusive measure of patient welfare, after one has taken account of the balance of expected gains and losses that attend the process of care in all its parts.”¹ The American Medical Association² in 1984 defined high-quality care as care “which consistently contributes to the improvement or maintenance of quality and/or duration of life.” This definition encompassed health promotion and disease prevention, timeliness, the informed participation of patients, attention to the scientific basis of medicine, and the efficient use of resources. In 1990, the Institute of Medicine (IOM) defined quality of care as the degree to which health services increase the likelihood of desired health outcomes and are consistent with current professional knowledge in the context of individuals as well as the population.^{3,4} More recently, one major impetus for measuring quality of care is the concern that cost containment of health care should not compromise quality of health care.^{5,6} A related term often equated with quality, that integrates the economic aspect of health care delivery, is “value,” which is defined as health outcomes achieved per dollar spent.⁷ A major thrust of health care reform is to replace the traditional “fee-for-service” model that incentivizes volume of service with a value-based system, which incentivizes high quality care.^{8,9} This change depends on the ability to effectively measure quality of care. While a simple, universal definition of health care quality is elusive, 2001 report from the IOM¹⁰ encapsulated six generally-accepted aims for health care (Table 1). These principles have been adapted by other organizations,¹¹ and serve as a good starting point for understanding the dimensions of quality that can be pursued within a clinical practice.

Table 1. Six aims for quality improvement in health care outlined by the Institute of Medicine.¹⁰

Safe—avoiding injuries to patients from the care that is intended to help them.

Effective—providing services based on scientific knowledge to those likely to benefit from them, but not providing services to those unlikely to benefit (avoiding underuse and overuse, respectively).

Patient-centered—providing care that is respectful of and responsive to individual patient preferences, needs, and values, ensuring that patient values guide all clinical decisions.

Timely—reducing waits and sometimes harmful delays for both those who receive care and those who give care.

Efficient—avoiding waste, including waste of equipment, supplies, ideas, and energy.

Equitable—providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

HOW IS QUALITY OF HEALTH CARE MEASURED?

The three major measures of clinical quality in health care delivery systems are structure, process, and outcome measures. Structure refers to the characteristics of providers and hospitals. Process refers to the encounter between the physician and the patient. And outcome indicates the patients’ health status after the encounter.¹² There are benefits and downsides to each of these measures. More recently, access and patient experience measures have been added to the list of clinical quality measures by the National Quality Measures Clearinghouse (NQMC).¹³ Outcomes that are directly relevant to patients, such as pain, physical functioning, or emotional health, have gained recognition as important measures of quality. These outcomes have been referred to as patient related outcomes (PROs). Lohr defines PROs as those outcomes that “constitute information from patients about a health condition, its management, and impact on well-being.”¹⁴

In practice, various organizations and stakeholders develop quality measures and submit them to the non-profit National Quality Forum (NQF) for endorsement. The NQF has prespecified criteria to evaluate these measures and obtains public comments on them as well. Additionally, quality measures are now being integrated into payment programs (such as the physician quality reporting system [PQRS]) by the Centers for Medicaid and Medicare Services (CMS). Using the PQRS, physicians report specific quality measures using either claims-based or registry-based methods in order to receive a small payment incentive (initially 2% of the provider’s total Medicare Part B Physician Fee Schedule charges provided during the year, which decreased to 0.5% in 2012) and, beginning in 2015, to avoid a penalty “adjustment.” (1.5% in 2015, and 2% thereafter).¹⁵ Additionally, CMS also plans to publish the names of providers who successfully participate in PQRS on the PhysicianCompare website, which helps patients find providers who accept Medicare.¹⁶ The CMS has contracted with the NQF in a Measure Application Partnership to review and make recommendations regarding quality measures developed by stakeholder organizations and submitted to the CMS prior to their incorporation into the PQRS.

WHY IS QUALITY IMPROVEMENT RELEVANT TO MY PRACTICE?

The appeal of quality improvement is obvious, as all physicians aspire to provide the best care possible for their patients. Beyond this, as is evident from the discussion above, quality of health care is also of increasing interest to policymakers, third-party payers, and patients. In this context, it is important to acknowledge provider anxiety and even resistance that may come with increasing expectations for integration of quality improvement systems into health

care delivery. Accepting—if not embracing—quality improvement systems does not imply that current care is delivered below standard. Many concerns hopefully can be relieved with a better understanding of the often arcane vocabulary of quality control and a better sense of what expectations the practitioner will have to fulfill.

WHAT QUALITY IMPROVEMENT REQUIREMENTS PERTAIN TO MY PRACTICE RIGHT NOW?

The specific requirements for integration of quality improvement principles into clinical practice are continually evolving. While recent and ongoing changes to health care policy make specific predictions impossible, it appears quite likely that quality-based outcome measures will be increasingly integrated into payment models (also known as “pay for performance” or P4P). Quality improvement also is gaining currency as part of residency training requirements, requirements for maintenance of specialty board certification, and licensure.

In 2010, the Patient Protection and Affordable Care Act (PPACA or ACA) was signed into law, establishing a number of new quality requirements. Beginning in 2012, quality measures were integrated into payment calculations for inpatient care by CMS through the Value-Based Purchasing (VBP) program. One component of this program is the adjustment of reimbursement from CMS based on performance on patient satisfaction surveys (Hospital Consumer Assessment of Healthcare Providers and Systems or H-CAHPS), emphasizing the role of PROs in measuring quality of care. Performance on a variety of clinical process measures are also included in the VBP calculation. Also in 2012, penalties for high readmission rates for a number of diagnoses went into effect. At the time of this writing, none of the quality measures outlined by the CMS have a specific impact on EDX or neuromuscular practice, but it is likely the list of measured clinical processes and outcomes will expand to include these areas in the future.

In addition to the PQRS program implemented in 2007, CMS in 2010 implemented the meaningful use (MU) program. In this complex program, practitioners and hospitals obtain a small incentive by demonstrating that they use their electronic health records (EHRs) meaningfully. This is accomplished by reporting data on a set of quality measures to CMS.^{16,17,18} Providers can choose from both Medicaid and Medicare MU programs. A recent review of quality measures describes some details of the program.¹⁹

The ACA also provides incentives for development of new care models including Accountable Care Organizations (ACOs) and Patient Centered Medical Homes (PCMHs). The CMS website defines ACOs as “groups of doctors,

hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients. The goal of coordinated care is to ensure that patients, especially the chronically ill, get the right care at the right time, while avoiding unnecessary duplication of services and preventing medical errors. When an ACO succeeds in both delivering high-quality care and spending health care dollars more wisely, it will share in the savings it achieves for the Medicare program.”²⁰ CMS offers several ACO programs and some hospitals and organizations have started participating in them.²¹ The PCMH concept focuses on strengthening primary care practices and having them take responsibility for providing and coordinating care, taking into account the specific needs of the patient.²² Two components of care—cost and overall quality—are inherent in the definition of these models. The specifics of quality measurements will continue to change as these models evolve.

Quality measurement also is becoming an integral component of medical education. Historically, the establishment and assurance of quality in medicine has occurred at the training level. In other words, the determination of a practitioner’s ability to provide the minimum standard of care was made by the successful completion of an approved or otherwise adequate training program (such as medical or nursing school, residency, or fellowship). Two decades ago, the development of recertification examinations by member boards of the American Board of Medical Specialties (ABMS) introduced measurement of medical knowledge as a requirement for continuing specialty certification. However, ABMS certification generally is not a requisite for the practice of medicine, and the board certification process has not historically included measures of other, important components of quality of care, such as professionalism, patient satisfaction, or clinical outcomes. In 2000, member boards of the ABMS agreed to develop models of continuous professional development, and in 2006 the resulting Maintenance of Certification (MOC) programs were approved for implementation. Member boards, including the American Board of Psychiatry and Neurology and the American Board of Physical Medicine and Rehabilitation, incorporated ongoing quality self-measurement and improvement in practice (“performance in practice” or PIP) as a required element of continued certification. In contrast to prespecified quality measures, these programs provide practitioners an opportunity to identify areas in their own practice that may be improved (after reading literature or guidelines on specific topics relevant to their practice). Having identified these areas, the practitioner then takes specific steps to make improvements in the identified areas and then documents the improvement that results from these steps.

AANEM has PIP modules available at www.aanem.org/marketplace.

In other arenas, quality measures are already used by accrediting bodies such as The Joint Commission on Accreditation of Healthcare Organizations, which has published several quality measures online for hospital accreditation.²³ Demonstration of ongoing quality improvement systems is currently required by the Accreditation Council for Graduate Medical Education (ACGME) for training program certification. The Next Accreditation System (NAS) of the ACGME, which began implementation in July 2013, focuses on outcomes, with emphasis on the quality and safety of the environment to foster learning and patient care.^{24,25}

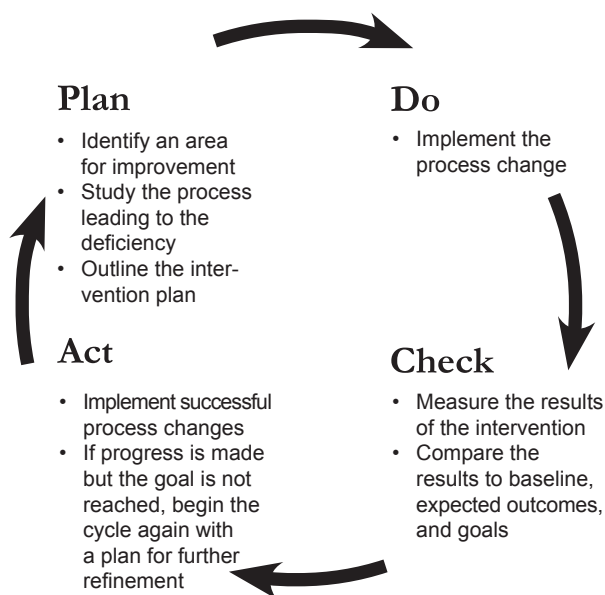
Finally, the Federation of State Medical Boards (FSMB), a nonprofit organization that represents the nation's 70 state medical boards, is working with its membership to develop a Maintenance of Licensure (MOL) system for the United States. The MOL program emphasizes not only medical knowledge, but also patient safety, measurement of quality outcomes, and continuous quality improvement.²⁶

While measurement of health care quality and continuous quality improvement processes are a changing landscape, they are here to stay at all levels of training and clinical practice.

THE QUALITY IMPROVEMENT PROCESS

The concept of continuous quality improvement in practice is another facet of health care in the 21st century, and it has its historical basis in industrial manufacturing. The basic framework of the quality improvement process is outlined in the Plan-Do-Check-Act (PDCA) cycle (Figure) introduced and popularized by H. Edwards Deming in the mid-20th century.²⁷

Figure: The Plan-Do-Check-Act (PDCA) Cycle.



PLAN

The initial stage of the cycle involves the identification of a deficiency (e.g., incomplete or inconsistent EDX reports based on referring provider satisfaction) and a plan to improve the process responsible for the outcome.

DO

The process change is implemented (e.g., a new EDX report format is introduced).

CHECK

Sometimes referred to as the “Study” step, the results of the change are measured and compared to the baseline and expected outcome (e.g., a repeat survey of referring providers assessing satisfaction with the changes to the report format).

ACT

Successful process changes are implemented (e.g., if favorable responses to report changes were noted on the survey, they would be formalized in the new report template).

Each complete turn of the cycle may result in improvement that does not satisfy the initial goal. Therefore, the PDCA cycle is repeated until either the goal is achieved or no change is rendered. The cyclical nature of the PDCA and similar models lends itself to the concept of continuous process improvement or the integration of the system into ongoing practice rather than a tool used in isolation when problems arise.

Other systems of quality improvement include Lean, which uses the principle of eliminating all non-value adding activities and waste from business,^{28,29} Six Sigma, which, similar to the PDCA cycle on which it is based, uses the steps Define, Measure, Analyze, Improve, and Control (DMAIC),^{30,31} and 5S, which stands for Sort, Straighten, Shine, Standardize, and Sustain.³² DMAIC expands on the importance of planning the intervention and monitoring the ongoing effects of the change after the cycle is complete.^{30,31} In manufacturing, the PDCA cycle is applied to perceived defects in production until a satisfactory level of quality is achieved. Regardless of the specific model employed, standardized approaches to quality improvement provide a systematic tool for improvement in quality of care and emphasize the ongoing, cyclical nature of process improvement.

One of the essential translations of quality improvement concepts into the practice of clinical medicine is to understand how patient care processes can be measured and adjusted in a similar fashion. Examples of how this can be achieved are described in the case studies below, and a list of potential quality indicators in EDX and neuromuscular practice are included in Table 2. The examples provided here

should not be confused with formally developed measures, but rather they should serve as a source for ideas for areas of improvement in specific clinical practices. It is beyond the scope of this document to define the specifics of these broad indicators, such as the frequency of cardiorespiratory evaluation or fall risk assessment, or definitions of “timely,” “adequate,” or “appropriate.” These should be obtained from the relevant, high level literature or practice guidelines where available, as in the case of PIP modules for MOC.

Table 2. Examples of potential quality indicators for quality improvement projects in electrodiagnostic and neuromuscular practice.

Electrodiagnostic medicine (prior to nerve conduction studies/needle electromyography)

- Documentation of adequate patient identifiers
- Documentation of antithrombotic or anticoagulant medication use
- Documentation of implanted device(s)
- Documentation of limb temperature and warming the limb as needed

Neuromuscular medicine

- Adequate laboratory screening in patients with peripheral neuropathy
- Cardiac and respiratory screening in patients with inherited myopathy
- Swallowing evaluation in patients with myopathy
- Reliable and timely reporting of clinical findings back to patient and referring provider
- Evaluation of fall risk at regular intervals and appropriate referrals for mobility safety evaluations in patients at risk for falls
- Appropriate prophylaxis and drug side effect monitoring in patients on chronic corticosteroid treatment or other long-term immunosuppression

CASE STUDIES

CASE STUDY #1: ELECTRODIAGNOSTIC REPORT QUALITY IMPROVEMENT PROJECT

In reviewing a chart, Dr. Johnson noted that there was no record of the limb temperature for a patient on whom she recently performed an EDX evaluation for carpal tunnel syndrome. As a physiatrist in solo practice, Dr. Johnson performed her own nerve conduction studies and knew she routinely monitored limb temperature during her studies. However, she also realized that the failure to document the limb temperature could call into question the quality of the procedure she had performed. Recognizing a potential opportunity for improvement, Dr. Johnson decided to review this systematically and improve any identified deficiencies in her EDX reporting.

PLAN

Dr. Johnson asked her secretary to collect the reports from the last 50 EDX evaluations she had performed. These studies reflected evaluations for a number of neuromuscular complaints, and they included Dr. Johnson’s own patients as well as patients referred to her practice.

In reviewing the reports, she found that 8/50 (16%, including the case that brought the concern to her attention) did not include the recorded limb temperature or a mention that temperature was monitored. Dr. Johnson was surprised that only 84% of reports included limb temperature, but she quickly developed several possible explanations.

One possibility was that she was simply not measuring the limb temperature during some studies. To clarify this she reviewed each case stored on her electromyography machine. Only 34/50 studies, including 5/8 without recorded temperature, were still stored on the machine. All of these studies had limb temperatures recorded; they simply had not found their way into the EDX report.

She next reviewed her process for generating EDX reports. Her practice was to sit down with the printed waveforms at the end of the day and dictate the findings and her clinical interpretation, which then was transcribed by her transcription service. She considered the possibility that she was dictating the temperature but it simply was not being transcribed; however, she determined that this would be difficult to measure (she would have to listen to multiple old dictations, assuming they were still available).

Dr. Johnson considered the likelihood that she was not including the temperatures in her dictations. To address this possibility, she developed a new process for dictating her reports.

DO

Rather than dictate her EDX reports in a simple narrative fashion, Dr. Johnson developed a checklist to which she would refer while she was dictating her reports. Realizing that the checklist would offer the opportunity to standardize her reports, she designed it after referring to available online resources and guidelines for EDX report writing. Specifically included (given the concern that initiated the project) was a line item to state the recorded limb temperature at the beginning of the study and a prompt to mention that the limb temperature was monitored throughout the procedure.

Dr. Johnson posted the checklist in her office so it would be easily available when she dictated reports. She determined that she would implement the new process for 3 months, and then remeasure to assess for improvement. Her goal was to record limb temperature in 100% of her EDX reports.

CHECK

After 3 months, Dr. Johnson again asked her secretary to call up all of the reports she had generated since she implemented her dictation checklist. In reviewing the charts, she found that the limb temperature was recorded in 81/84 reports (96%). This seemed to represent a clear improvement on her prior rate of 84%, but it did not reach her goal of 100%.

ACT

Dr. Johnson determined that the dictation checklist had provided a significant improvement in the rate of recording limb temperature during EDX studies. She also noted other improvements in her reports, including better documentation of patient identifiers and antithrombotic medication use (which she had included on her checklist). She recalled that the cases (3/84) that did not include the limb temperature in her postintervention measurement had in fact not been dictated in her office, where she had posted her checklist. Initiating a new PDCA cycle, she decided to post the checklist in other areas of her practice where she occasionally performed her dictations, and she planned to reassess again in 3 months for further improvement.

CASE STUDY #2: PERIPHERAL NEUROPATHY SCREENING QUALITY IMPROVEMENT PROJECT

Dr. Lee, a member of a 20-physician, academic-affiliated neurology practice, was approached by a primary care colleague. She reported to Dr. Lee that she followed a patient with peripheral neuropathy, previously evaluated by another member of the neurology practice, who had not had a serum glucose checked. Dr. Lee discussed the case with the neurologist in question, and it quickly became apparent that it had been a simple oversight.

PLAN

Noting a possible opportunity for improvement, Dr. Lee and his neurology colleague reviewed 100 patient records from within the practice, identified by their office manager as patients who had a coded diagnosis of peripheral neuropathy. Because the purpose of the review was for quality improvement, they were aware that they did not require a review from their Institutional Review Board (IRB) and that the review was protected under the quality improvement provisions of the Health Insurance Portability and Accountability Act (HIPAA, 45 CFR 164.506). In their review, they found that 8/100 (8%) patients with peripheral neuropathy did not have a documented serum glucose or other diabetes screening study. In addition, they noted that several other patients had not had studies commonly performed to review for other recognized causes of neuropathy, and by consensus they determined that 14/100 (14%) of these patients had not been adequately screened for relevant conditions (including diabetes).

Dr. Lee identified several interested members of his practice to collaborate on a quality improvement project, with an overall goal of improving laboratory screening of patients with peripheral neuropathy. During a series of meetings over several weeks, the team discussed possible knowledge- and system-based shortfalls leading to missed screening opportunities.

To measure a potential knowledge gap, Dr. Lee and his team surveyed the practice regarding which conditions are typically screened when evaluating patients with peripheral neuropathy. They learned there was considerable variability in testing ordered in this clinical scenario. The survey also brought to light some concerns among the group regarding perceived difficulty ordering some tests, specifically that the various laboratory tests commonly performed in this setting required a number of separate ordering steps.

DO

After consulting the medical literature and specialty organization guidelines and practice parameters, Dr. Lee and his team developed a list of tests which should be considered in evaluating all patients with newly diagnosed peripheral neuropathy. To address the difficulties in ordering some tests, they discussed with their EHR vendor possible means of organizing the needed tests in their electronic ordering platform. Collaboratively, they designed a “peripheral neuropathy” screen that could be accessed from the software’s main ordering screen, and it included testing options for all of the relevant conditions. Before it was released, the update was advertised to the practice through posters in office work areas, electronic communications, and through an announcement at the monthly staff meeting. The goal of the project was to reduce the rate of missed screens for common predisposing conditions to 5% of peripheral neuropathy patients or less. The implementation phase of the project was set at 6 months.

CHECK

After 6 months, Dr. Lee and the quality improvement team met again and reviewed 125 charts from patients who had been evaluated for new diagnoses of peripheral neuropathy during the implementation phase of the project. Of these, they determined that 119 of these (95%) had received adequate predetermined screening for conditions which could predispose the patient to peripheral neuropathy. They performed a satisfaction survey regarding the new ordering process and found it to be generally well received.

ACT

Dr. Lee and his colleagues believed that the project had achieved its stated goals and left the new process in place following their review. They did agree to meet again in

12 months with a new review of the practice's peripheral neuropathy patients to ensure that the screening process remained effective.

SUMMARY AND CONCLUSIONS

The integration of quality improvement principles into the daily practice of medicine is advancing at a rapid pace. Health care providers need to be familiar with quality improvement concepts as policymakers, regulatory agencies, and patients continue to raise their expectations for high quality care. While this document may serve as a reference and guide to the EDX and neuromuscular practitioner, providers will need to remain vigilant for continuing change in the landscape of healthcare quality improvement.

QUALITY IMPROVEMENT RESOURCES AND GLOSSARY

Agency for Healthcare Research and Quality (AHRQ)—In 2002, CMS partnered with AHRQ, which now represents the health services research arm of the United States Department of Health and Human Services (HHS), complementing the biomedical research mission of its sister agency, the National Institutes of Health. The AHRQ mission is to improve the quality, safety, efficiency, and effectiveness of health care for all Americans. As 1 of 12 agencies within the HHS, AHRQ supports research that helps people make more informed decisions and improves the quality of health care services. CAHPS and H-CAHPS are two of many initiatives supported by AHRQ. Further information is available at: <http://www.ahrq.gov/>.

American Medical Association Physician Consortium for Performance Improvement® (AMA-PCPI®)—a national, physician-led program dedicated to enhancing quality and patient safety, whose mission is to align patient-centered care, performance measurement, and quality improvement. The AMA-PCPI® develops evidence-based performance measures that are clinically meaningful, meet the current and future needs of the PCPI® membership, and are used in national accountability and quality improvement programs. Further information is available at: <http://www.ama-assn.org/ama/pub/physician-resources/physician-consortium-performance-improvement.page>.

Centers for Medicare & Medicaid Services (CMS), formerly the Health Care Financing Administration (HCFA)—a branch of the HHS that administers Medicare, Medicaid, and the Children's Health Insurance Program and provides information for health professionals, regional governments, and consumers. On their consumer website,³³ CMS defines "Better Care" as a "roadmap to better health and lower costs for patients, providers, and taxpayers" by "working together to improve care coordination, tie

payments to quality, keep patients safe, and hold insurance companies accountable."

Change management—the process of "assisting individuals and organizations in passing from an old way of doing things to a new way of doing things."³⁴

Clinical quality measures (CQMs)—tools defined by the meaningful use (MU) program, intended for measuring and tracking the quality of health care services provided by eligible professionals, eligible hospitals, and critical access hospitals. The measures are defined by the National Quality Forum (NQF) (with input from other entities, such as the AMA-PCPI® and National Committee for Quality Assurance (NCQA)) and overlap with many of the defined Physician Quality Reporting System (PQRS) measures. Further information is available at: <http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/ClinicalQualityMeasures.html>.

A listing of the 2014 CQMs for eligible professionals: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/EP_MeasuresTable_Posting_CQMs.pdf.

Consumer Assessment of Healthcare Providers and Systems (CAHPS)—a multiyear initiative of the AHRQ launched in 1995 to support and promote the assessment of consumers' experiences with health care.

Continuous quality improvement (CQI)—the principle that opportunity for improvement exists in every process on every occasion. Within an organization, it requires a commitment to constantly improve operations, processes, and activities to meet patient needs in an efficient, consistent, and cost-effective manner. The CQI model emphasizes the view of health care as a process and focuses on the system rather than the individual when considering improvement opportunities.³⁵ Common CQI methodologies used in health care include Plan-Do-Check-Act (PDCA), Six Sigma, and Lean strategies.

Health care quality—According to the AHRQ³⁶: doing the right thing, at the right time, in the right way, for the right person to achieve the best possible results.

According to the NCQA³⁷: getting the right care in the right amount at the right time.

According to the the Institute of Medicine (10) and World Health Organization¹¹: (a health system) seeking to make improvements in six areas or dimensions of quality:

Effective, delivering health care that is adherent to an evidence base and results in improved health outcomes for individuals and communities, based on need;

Efficient, delivering health care in a manner which maximizes resource use and avoids waste;

Accessible, delivering health care that is timely, geographically reasonable, and provided in a setting where skills and resources are appropriate to medical need;

Acceptable/patient-centered, delivering health care which takes into account the preferences and aspirations of individual service users and the cultures of their communities;

Equitable, delivering health care which does not vary in quality because of personal characteristics such as gender, race, ethnicity, geographical location, or socioeconomic status;

Safe, delivering health care which minimizes risks and harm to service users.”

Hospital Consumer Assessment of Healthcare Providers and Systems (H-CAHPS) (pronounced “H-caps,” also known as the CAHPS® Hospital Survey)—a 27-item survey instrument and data collection methodology for measuring patients’ perceptions of their hospital experience. The six composites summarize how well nurses and doctors communicate with patients, how responsive hospital staff are to patients’ needs, how well hospital staff help patients manage pain, how well the staff communicates with patients about medicines, and whether key information is provided at discharge. Two individual items address the cleanliness and quietness of patients’ rooms, while two global items report patients’ overall rating of the hospital and whether they would recommend the hospital to family and friends. Further information is available at: <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html>.

Lean—an approach to continuous improvement that identifies and eliminates waste that fails to add customer value, including waiting, defects, unneeded processing, inventory, excessive motion, transportation, overproduction, and underutilized employees.^{28,29}

Meaningful use (MU)—a set of standards defined by the CMS Electronic Health Record (EHR) Incentive Program that governs the use of EHRs and allows eligible providers and hospitals to earn incentive payments by meeting specific criteria, including many defined quality metrics (see Clinical Quality Measures).¹⁶⁻¹⁸

National Association for Healthcare Quality (NAHQ)—a professional association founded in 1976 dedicated to the advancement of health care quality and patient safety and the individual professionals working in the field. Largely focused on nursing, NAHQ provides education and leadership development opportunities. NAHQ offers a certification examination in health care quality, the Certified Professional in Healthcare Quality. Further information is available at: <http://www.nahq.org/>.

National Committee for Quality Assurance (NCQA)—a private, not-for-profit organization founded in 1990 and dedicated to improving health care quality. NCQA offers accreditation, certification, and recognition programs to health plans, health maintenance organizations, preferred provider organizations, physician networks, medical groups, and individual physicians. Specifically, NCQA accredits Accountable Care Organizations and recognizes Patient-Centered Medical Homes. Further information is available at: <http://www.ncqa.org>.

National Quality Forum (NQF)—a nonprofit, private-sector, standard-setting organization whose efforts center on the evaluation and endorsement of standardized performance measurement to improve the quality of American health care. NQF represents the consensus of many health care providers, consumer groups, professional associations, purchasers, federal agencies, and research and quality organizations. Further information is available at: www.qualityforum.org.

National Quality Measures Clearinghouse (NQMC)—an initiative of the AHRQ, an arm of Health Human Services (HHS). It is a database and website for information on specific evidence-based health care quality measures and measure sets. NQMC is sponsored by AHRQ to promote widespread access to quality measures by the health care community and other interested individuals. Further information is available at: <http://www.qualitymeasures.ahrq.gov/>.

Pay for performance (P4P)—a strategy to improve health care delivery that relies on the use of market or purchaser power; “financial incentives that reward providers for the achievement of a range of payer objectives, including delivery efficiencies, submission of data and measures to payer, and improved quality and patient safety.”³⁸ Further resources are available at: <http://www.ahrq.gov/qual/pay4per.htm#1>.

Plan-Do-Check-Act (PDCA)—also known as the Deming Cycle, PDCA is a four-step system of quality improvement for business management, based on the scientific method, which is implemented in repeated cycles for continuous improvement.

Physician Quality Reporting System (PQRS), formerly Physician Quality Reporting Initiative (PQRI)—a reporting program employed by CMS that uses a combination of incentive payments and payment adjustments to promote reporting of quality metrics by eligible professionals. From 2007 to 2012, the program provided a financial incentive for satisfactorily reporting data on quality measures for covered outpatient services furnished to Medicare beneficiaries. Beginning in 2015, the program penalizes eligible professionals who do not satisfactorily report data on quality measures for covered professional services in 2013. Further information is available at: <http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/PQRS/index.html>.

Process improvement—identifying, analyzing, and improving existing processes, activities, tasks, and workflows within a health care organization to meet new goals and objectives, such as increasing quality, decreasing cost, improving patient and employee satisfaction, and eliminating waste.

Process mapping—identifying the current state, future state, and ideal state processes in a step-by-step flowchart, which represents a key step of process improvement.

Quality assurance (QA)—a system for evaluating the delivery of services or the quality of products.

Quality control—a system for verifying and maintaining a desired level of quality. Isolated quality control and QA methods are not adequate to enhance outcomes in health care. Checking for errors and recommending changes without recognizing the impact of these changes on other parts of the organization may improve one process but harm others. Consequently, high reliability organizations are now combining quality assurance with proactive CQI.³⁵

Quality improvement (QI)—the efforts pursued to enhance patient care.

Six Sigma—a methodology used to improve business processes by utilizing statistical analysis to achieve cost savings, while increasing customer satisfaction. Six Sigma trainees attain green belts and advance to black belts, master black belts, and ultimately champion status. Further information is available at: <http://www.6sigma.us>.^{30,31}

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