

# Quality—A Radiology Imperative: Report of the 2006 Intersociety Conference

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Recent publications by the Institute of Medicine have pointed out the many medical errors that occur and the adverse effect of those errors on patient outcomes. These errors are often the result of problems within our health care systems. In an effort to improve patient care outcomes, many health care providers have developed improved policies and practices. Third-party payers are encouraging participation in quality efforts through a variety of mechanisms, including pay for performance, pay for participation, and the creation of centers of excellence. If the quality of health care is to be improved and monitored, appropriate metrics must be developed. Such metrics must be within the control of providers, measurable, and likely to improve patient outcomes. The participants of the 2006 Intersociety Conference developed 49 metrics, which are offered for adoption by health care networks, payers, and regulation agencies.

**Key Words:** Quality, quality metrics, pay for performance, medical errors

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The Intersociety Conference was established in 1979 to promote collegiality within radiology, foster communication among national radiology societies, and make recommendations on areas of concern. The topic of each conference is selected by its executive committee approximately 6 months before the meeting. The 53 professional radiology societies that participate in the Intersociety Conference include both diagnostic and interventional radiology, radiation oncology, and radiologic physics.

The Intersociety Conference met July 21 to 23, 2006, in Banff, Canada, to discuss quality in radiology and develop metrics to assess and improve the quality of practice. Eighty-seven members and executive directors participated.

## QUALITY IMPERATIVE

In November 1999, the Institute of Medicine published the landmark report *To Err Is Human: Building a Safe Health System* [1]. This report and subsequent publications [2,3] highlighted the magnitude of the problem of safety in medical care in the United States. As many as 98,000 patients die each year from preventable medical errors—making medical errors the eighth leading cause of death [4]. More Americans die from medical errors than from motor vehicle accidents or breast cancer.

In radiology departments, a number of significant problems can occur. The size and complexity of our departments make communication difficult. The drive for increased efficiency and cost reduction adds stress to the system. Radiologists, nurses, and technologists seldom have primary responsibility for their patients and see them only in the context of the specific procedures being performed. Thus, we perform a large number of complex procedures every day on patients with whom we are relatively unfamiliar. We use a large number of drugs (including contrast media), needles, catheters, and other devices, as well as ionizing radiation, that can cause injury. If the flow of information about patients is not optimal, serious errors may occur.

Safety concerns spread across many small steps in the process of radiologic care, from patient registration to the delivery of the final report. To draw attention to the spectrum of potential problems, the acronym PERFECT

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AIMS was developed (R. L. Arenson, personal communication):

- Patient: patient misidentification
- Equipment: equipment failures
- Reading: misinterpretation of findings
- Fall: patient falls
- Environment: environmental factors such as patient accident after sedation
- Communication: miscommunication with referring provider
- Test: performing the wrong procedure or procedural complications
- Allergy: allergic reaction
- Injection: wrong material or dose injected
- Metal: ferromagnetic metal in a magnetic resonance system
- Side: performing procedure on wrong side

An inaccurate or incomplete patient history contributes to misdiagnosis or the performance of an inappropriate procedure. False-positive interpretations may lead to additional testing, more invasive examinations, or treatments, with all of the associated costs and risks. False-negative results are likely to misdirect a patient's evaluation and delay appropriate therapy. Changes from preliminary interpretations can be a significant problem if clinical action has been taken already. Confusing the right and left sides and the use of negative modifiers that may not be transcribed properly are more examples of interpretation and transcription errors.

Miscommunication between radiologists and referring physicians or other health care providers has a number of ramifications. Even if an interpretation is accurate, poorly constructed reports may lead to miscommunications or misunderstandings between a radiologist and a referring physician and result in serious errors. Preliminary interpretations and "curbside" consultations are often associated with miscommunication. Curbside consultations are particularly dangerous because there is no verified written statement to which to refer [5,6].

The timely communication of all reports is the responsibility of the radiologist, who may have little control over a report once it is signed. This is often the case at large medical centers that rely on electronic medical records. Yet, radiologists are expected to communicate immediately any urgent or unexpected finding to referring physicians [7]. However, it is often quite difficult to reach a responsible member of a patient's health care team when these urgent findings are discovered. Confusion over which physician is the attending physician of record and an inability to reach the responsible physician, especially after hours, contribute to treatment delays or even a failure to act on the diag-

nostic information, even though it was contained in the radiology report [8,9].

In the current fee-for-service health care system, we are reimbursed for the performance of imaging tests regardless of the quality with which those tests were performed [10]. However, few reimbursement requirements demonstrate service quality, accuracy, safety, or patient satisfaction. (One exception is the Mammography Quality Standards Act [11].) The Centers for Medicare and Medicaid Services and others are beginning to provide incentives for quality through "pay-for-performance" (P4P) mechanisms [12]. Until now, most payers have focused only on the quantity of services provided, not on the quality of those services. Medicare has never adjusted payments on the basis of experience, quality, or credentials beyond basic medical licensure and training [13,14]. Medicine, unlike most other professions, has been reduced to a commodity business. Anyone who has finished training can bill and be reimbursed the same amount as the most experienced and expert provider.

Despite the high cost of health care in the United States, the quality of that health care is low compared with that available in many other countries [15]. And those costs continue to escalate. In 2004, the most recent year for which data are available, 16% of the gross domestic product of the United States was spent on health care, up from 15.4% in 2002 and 13.8% in 2000 [16]. Medicare and other insurers face growing pressures to reduce the cost of health care and find ways to improve quality at the same time. Because of the high cost of modern imaging and the many opportunities for medical errors in radiology, we are clearly in the crosshairs in the quality and safety debate. The radiology community must take the lead in developing solutions and do so quickly.

## QUALITY DEFINED

There are many definitions of quality, and we each hold our own views depending on our experience and values. According to the Institute of Medicine, "Quality care is patient-centered, timely, efficient, effective, safe, and equitable." It is also coordinated, compassionate, and innovative [17]. This latter aspect of the definition of quality is not measured and is at risk for being ignored.

The proliferation of computerized networks in health care has created an enormous and sometimes bewildering amount of data. With this information overload, how do we select the best quality metrics? Some metrics would be easy for us to select but may not be meaningful or result in quality improvement. For example, work relative value units are a ubiquitous measurement, but they do not measure quality or safety. Other important quality metrics, such as interpretation accuracy, patient outcomes,

professionalism, ethics, communication, and compassion, are difficult to measure.

Whenever we measure something, there is the risk for mismeasurement, a lack of acceptance of the metric, and “gaming” the system. There is a natural human tendency to expend efforts on those things that will maximize personal reward rather than improve the system. This is to some extent expected and unavoidable, but it can be limited if we are not careful in our selection of metrics. For example, rather than equal weighting for each metric, we could create a set of metrics covering a wide spectrum of patient care issues that is summarized into a score to measure the quality of a radiology department. The set of metrics selected should help us achieve our goal as practicing radiologists: to perform the right test at the right time on the right patient for the right reason.

## INCENTIVES TO PARTICIPATE

### Congress and the American Medical Association

The P4P strategy picked up momentum earlier this year when Congress and the American Medical Association signed an agreement to create 140 metrics by the end of 2006 [18]. By the end of 2007, “physician groups will have developed performance measures to cover a majority of Medicare spending for physician services.” Medicare spent more than \$57 billion under its physician fee schedule last year. The agreement stops, at least for now, the reductions in professional reimbursement in the Medicare program. Medical specialty professional organizations, including the ACR, were not involved in this proposal, but we are faced with its implementation.

### State Medical Licensing Boards

Although the federal government plays a significant role in the delivery and reimbursement of health care through the Medicare program, the regulation of health care remains largely the prerogative of the states. The individual states determine the credentials an applicant must have to obtain a license to practice medicine. These credentials typically include graduation from a medical school or school of osteopathy and the completion of at least 1 year of postgraduate medical training. Individual states may also require board certification, and some state medical licensing boards are considering their own state examinations for license applicants. In recognition of the need for continuous medical education or board certification within the past 10 years, participation in a maintenance of certification (MOC) program could become an added requirement [19].

## Health Care Provider Networks

Health care provider organizations may require both MOC and P4P participation by all physicians in their networks. This has several potential advantages for providers’ networks. The participation of a physician in MOC may improve the quality of medical care that physician provides. Either program, but especially P4P, may result in systems improvements that improve patient outcomes. Finally, participation by a network and its provider physicians can serve as an advertisement for the health care network.

## Pay for Performance

There are 3 main strategies for quality improvement that health policy experts are advocating today. These strategies are (1) centers of excellence, (2) P4P, and (3) pay for participation, otherwise known as “pay to play” [20]. The most recent and popular of these 3 is the P4P quality movement. The stated goal of P4P is to create a compelling set of incentives to drive breakthrough improvements in clinical quality and patient experience. The 3 main components of this payer-led quality movement are the creation of a common set of measures, health plan, or provider payments for meeting these quality metrics, and the availability of a public scorecard for consumers. A major driver for this movement by payers is also to control health care costs. The most recent estimates suggest that there are more than 100 individual P4P efforts under way in the US health care sector [21,22]. Pay-for-performance programs vary widely in metrics, financial rewards, or penalties, and the level at which these are applied (plan, group, or individual provider). A large and innovative program in California called the Integrated Healthcare Association has 3 main categories of metrics with differing assigned values: (1) clinical quality metrics that include rates of screening mammography and blood pressure control (worth 50% initially, increasing to 70%), (2) an information technology infrastructure (assigned 20%), and (3) patient satisfaction surveys (30% initially, decreasing to 10%).

One of the advantages of the P4P approach to quality improvement is that it could encourage the adoption of simple but effective diagnostic tests and treatments. Pay for performance rewards quality with financial bonuses. For example, Medicare is using P4P programs to provide financial incentives for hospitals to use appropriate peri-operative antibiotics. A disadvantage of P4P is the lack of existing evidence-based measures. And although there are limited clinical measures available, they are more numerous than imaging ones. At present, the main disadvantage of the P4P movement is a lack of buy-in by physicians [20].

There are 2 current alternatives to the P4P strategy to improve the quality of care: centers of excellence and pay for participation. Centers of excellence use selective contracting to providers and financial incentives to patients to direct them to the best providers or hospitals. The main advantage to the centers-of-excellence strategy, according to Birkmeyer and Birkmeyer [20], is a low measurement burden. It is inexpensive and easy to implement because it rewards providers through enhanced reputations and more patients rather than with financial bonuses. However, payers have limited ability to influence patient care patterns and find it challenging to determine which providers are “excellent.” The remaining strategy for quality improvement is pay for participation. This strategy uses clinical outcomes registries and quality improvement activities to improve quality in all hospitals. The main advantages to this strategy are that it has the greatest acceptance among physicians and the greatest potential to identify and disseminate improved processes of care [20]. The main disadvantages are its expense and the difficulties in organizing quality improvement teams.

At present, P4P remains the most attractive quality improvement strategy for policymakers. Yet there were unpredicted results from early P4P programs that were outlined in a commentary by Wachter [21]. When metrics are created, the focus of individuals and health care systems becomes achieving the metrics, not improving patient care. This is called “playing for the test,” something we see residents do as they prepare for the board examinations. Other ways of gaming the system are being reported, including the practice of exception reporting to achieve quality metrics [22]. Perhaps the movement is too new to make any conclusions about its value. In the only systematic review of P4P programs, Petersen et al [13] noted that there are limited published data to prove or disprove that P4P programs improve the quality of health care. They concluded that “ongoing monitoring of incentive programs is critical to determine the effectiveness of financial incentives and their possible unintended effects on quality of care. Further research is needed to guide implementation of financial incentives and to assess their cost-effectiveness.” Organized medicine must be vigilant in developing and monitoring metrics for P4P to redirect policies that are not working well or do not improve the quality of patient care.

## METRICS

For third-party payers to encourage improvement in health care through financial incentives, there must be metrics to measure that quality. Consumers have a similar desire for quality metrics to gain the information needed to select their health care plans or providers. A

spectrum of safety as well as quality items should be included in the set of metrics.

There are several requirements for these quality and safety metrics. They must be simple and readily understood. They must also be measurable, and they must use common definitions to compare different providers or groups of providers. However, for these measurements to be meaningful, national benchmarks must be available. This will require a national database to collect large amounts of data to determine reasonable benchmarks. The metrics should be part of a process to improve patient care by enhancing access, improving the processes of care, and being outcomes oriented. Finally, the metrics must be accessible not only to those who provide and pay for health care but also to consumers.

The Intersociety Conference participants generated 49 metrics they felt measure aspects of quality health care. They were grouped into categories of access and appropriateness, patient safety, interpretation, and the use of satisfaction surveys.

## Access and Appropriateness

1. Percentage of phone calls answered within  $x$  minutes
2. Percentage of patients scheduled within  $x$  minutes from initiating the phone call
3. Percentage of times in which the third available outpatient imaging examination appointment is available within  $x$  days
4. Percentage of patients in whom the examination is initiated within  $x$  minutes of registration in the examination facility
5. Percentage of patients in whom therapy is initiated within  $x$  days of consultation
6. Positivity rate for high-cost or high-risk examinations
7. Frequency with which expensive equipment (computed tomography, magnetic resonance, positron emission tomography, angiography, therapy) is inoperative (stratified by modality)
8. Frequency with which the information technology infrastructure is inoperative

## Patient Safety

1. All modalities are accredited by a recognized accrediting body
2. Percentage of equipment that is included in an annual quality assurance program
3. Percentage of technologists who are registered
4. Frequency with which patients are screened for pregnancy before using ionizing radiation
5. Frequency with which patients are screened for risk of idiosyncratic reaction before intravenous iodinated contrast media administration

6. Frequency with which patients are screened for ferromagnetic materials before undergoing magnetic resonance examinations
7. Percentage of examinations in which standardized imaging protocols are written
8. Frequency with which standardized imaging protocols are followed
9. Percentage of studies performed on equipment that meets ACR Technical Standards
10. Frequency with which conscious sedation follows ACR guidelines
11. Frequency with which radiation exposures are maintained for each patient examination
12. Frequency with which examinations are performed on the wrong patients
13. Frequency with which the wrong side (of the correct patient) is examined or treated
14. Frequency with which the wrong examination is performed (on the correct patient)
15. Frequency with which at least 2 methods of patient identification are used
16. Frequency with which images are mislabeled with regard to patient, side, date, or time
17. Frequency with which contrast extravasations occur
18. Frequency with which a written protocol is available for handling contrast extravasations
19. Frequency of adverse contrast reactions (stratified by severity)
20. Frequency of adverse safety events related to the magnetic field
21. Frequency with which procedural or therapy complications occur
22. Frequency with which radiation therapy treatment errors occur
23. Frequency of examinations repeated because of inadequate or incomplete examinations
24. Frequency with which informed consent is obtained when needed
25. Frequency with which adequate tissue is obtained on biopsy
26. Frequency with which there is a reportable patient incident such as "slip and fall"
5. Frequency with which the treatment plan is reviewed by the radiation oncologist before starting treatment
6. Frequency with which structured reporting is used
7. Frequency of interpretation errors
8. Frequency with which the radiology report is changed after transmission to the referring physician
9. Percentage of examinations or procedures in which the final reports are completed within 24 hours (stratified by clinical setting)
10. Percentage of cases dictated within  $x$  days
11. Percentage of cases in which critical values are communicated to the referring physicians within  $x$  hours
12. Frequency with which the radiologist recommends additional studies

### Satisfaction Surveys

1. Use of patient satisfaction surveys on an annual or more frequent basis
2. Use of referring physician surveys on an annual or more frequent basis
3. Frequency with which survey data are evaluated and acted on

These metrics reflect aspects of radiology that the conference participants considered important, measurable, and amenable to improvement. We must remember, however, that quality from the perspective of patients extends across department lines and involves institutional resources as well. Although these suggested metrics may be a good starting point for radiology, broader and more inclusive metrics may be better measures of patient outcomes.

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### Interpretation

1. Percentage of physician staff members who are board certified
2. Percentage of medical physicists who are board certified
3. Percentage of physician staff members who are participating in MOC
4. Percentage of physician staff members who are fellowship trained

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