

Improving Health Care Quality: Current Concepts

By Michael J Pentecost, MD

According to the 1999 Institute of Medicine *To Err is Human* report, poor quality health care extracts a terrible toll, taking up to 100,000 American lives annually, more than breast cancer, motor vehicular accidents and AIDS combined.¹ At the same time, another 770,000 people are injured in hospitals. Beyond the personal losses, society pays an enormous price, estimated to be between \$37-50 billion a year, in damages and lost productivity.

Perhaps because of the Institute of Medicine (IOM) report, or health care's ever-growing financial drain, or dismay about poor access, or fears of malpractice, or just some unexplained tipping point, public disquietude surrounding medical errors has never been greater. And for many of the same reasons, never have more professionals—providers, policy analysts, engineers, economists, executives, academics—poured more time or more energy into crafting solutions.

These strategies can be divided into five broad categories: cooperation, industrial engineering, validation and certification, exhortation and compensation; each has its own history, case studies, merits and pitfalls.

Cooperation

Cooperation is at the heart of professionalism. Physicians and other providers, even when in competitive situations, freely share experience and perspective about optimal patient

management. Witness the medical literature. No sooner is an innovative therapeutic procedure or diagnostic strategy devised than the originators, without compensation, rush to publish their findings for all the public, including their rivals, to see.

The cooperative approach in health care is exemplified by Quality Improvement Organizations (QIO). QIOs are the performance management tool of the Center for Medicare and Medicaid Services (CMS) overseeing the care of more than 40 million Medicare patients. There are 41 QIOs, a mixture of for-profit and not-for-profit concerns, with a combined annual budget of over \$300 million. As an example of their activities, in collaboration with Qualis, the regional QIO, Dellinger, Hauwmann, Bratzler, et al recently described a 27% reduction in surgical wound infections in 35,000 patients at 44 hospitals in Alaska, Idaho and Washington.² This performance improvement was due to optimization of antibiotic usage, prevention of hyperglycemia, and maintenance of normothermia during surgery.

Consistent with the mission authorized by Congress in 1992, QIOs originally took an adversarial position in their investigations of physicians and hospitals. Few were pleased with this tact and as a part of the Medicare Prescription Drug Act of 2003, Congress authorized the IOM to review the performance of

QIOs. The report suggested that the organizations redirect their energies away from investigation of alleged misconduct and towards a more collegial approach.³ Elements of such cooperation included establishing infrastructure for voluntary hospital and physician quality initiatives, integration of activities with like-minded organizations such as the National Quality Forum, providing technical resources such as computer support, and eliminating jurisdictional barriers to sharing data between providers.

Industrial Engineering

Quality control and performance improvement tools are a vital part of most industries, especially manufacturing. And business school curricula, the executive press and business consultants all reflect this appropriate emphasis, be it total quality management, continuous quality improvement, lean thinking, balanced scorecard, or Six Sigma.

Though created by Motorola, the best known instrument in medicine, Six Sigma, has become equated with General Electric, perhaps because of GE's commercial success (as the world's second most valuable company) and its familiar face in health care. Six Sigma is designed to minimize industrial defects, limiting errors to less than six standard deviations (hence the name), or less than 3.4 times in a million opportunities. Separated into define, measure, ana-

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lyze, improve and control functions, this tool is rigorously quantitative and project-oriented.⁴ So far, it has been used mostly in clinical engineering or workflow improvements such as streamlining laboratory testing, increasing operating room efficiency, and optimizing pharmacy operations.

Validation and Certification

In addition to the well-established Joint Commission on Accreditation of Healthcare Organizations and the National Committee for Quality Assurance, there are several newcomers in the validation and certification business. These groups, which include the Leapfrog Group and the National Quality Forum, seek to gather, distribute, and promote compliance with the best practices of the day.

The Leapfrog Group was established in 2000 by business leaders in response to the *To Err is Human* report. From early members such as Boeing, IBM, General Electric, and General Motors, the Group has now expanded to 170 members, responsible for spending \$67 billion annually on the health care needs of 36 million employees, dependents and retirees.

In order to promote smart purchasing decisions by their members and other companies, Leapfrog's strategy is to survey hospitals in four different areas and to distribute the results in the public domain. The four quality practices are: 1) computerized physician order entry systems, 2) intensivist staffing of ICUs, 3) referral of surgical patients (eg, esophagectomy, pancreatic resection, abdominal aortic aneurysm repair, percutaneous coronary interventions) to high-volume hospitals, 4) adoption of the 27 National Quality Forum's Safe Practices.

Results of these voluntary surveys in 966 hospitals can be found through an individual hospital search online at the Leapfrog Group Web site: www.leapfrog.com/cp.⁵

The National Quality Forum (NQF) was founded in 1999 by Kenneth Kizer, MD, the head of Veterans Affairs health care in the Clinton administration, with the goal of being the standard-setting body for quality in American medicine. With 330 members, the NQF, through a formal voting mechanism, certifies various performance improvement strategies such as those used by Leapfrog. These guidelines in turn originate from groups such as the Ambulatory Care Alliance and the Physician Consortium for Performance Improvement (an offshoot of the American Medical Association).

Examples of NQF Safe Practices include:

- Verbal order readback
- No patient care summaries from memory
- Flu vaccination for health care workers
- Aspiration prevention
- Wrong-site/wrong-patient prevention
- Prevention of mislabeled radiographs
- Contrast-induced renal failure protocol.

Exhortation

In the vanguard of the quality movement is the Institute for Healthcare Improvement (IHI) headquartered in Cambridge, Massachusetts and headed by Donald Berwick, MD, a pediatrician. Supported by the Robert Wood Johnson Foundation, the Association of American Medical Colleges, Kaiser Permanente, the Mayo Clinic and others, IHI, since 1991, has used the public square to raise awareness of medical mistakes and has served as a catalyst for change.

In December 2004, that strategy reached a new level when IHI announced *The 100,000 Lives Campaign*, a highly publicized effort to enlist all 5759 American hospitals in an effort to avoid such mortality within an 18-month period.⁵ The voluntary, unfunded, self-reporting campaign used six quality improvement measures:

- *Employ Rapid Response Teams*—Similar to code teams, these units are organized to respond emergently, but earlier, with the goal of pre-empting clinical decline
- *Standardize Care for Acute Myocardial Infarction*—Optimize reperfusion strategies and pharmacologic therapies such as aspirin, beta-blockers and angiotensin-converting enzyme inhibitors
- *Medication Reconciliation*—Regimented, documented review to avoid drug errors during patient transfers within hospitals
- *Central Line Infections*—Reduction of infections with improved skin and hand hygiene, optimal catheter placement, and other measures
- *Surgical Wound Infections*—Prevention by monitoring body temperature, perioperative glucose; appropriate skin preparation and antibiotic selection
- *Ventilator-Associated Pneumonia*—Use of the “ventilator bundle,” which includes elevation of the head of the bed, deep vein thrombosis prophylaxis and other steps.

These evidence-based interventions were based on guidelines developed by the Centers for Disease Control and Prevention, American Heart Association, American Thoracic Society and others.⁶

On June 14, 2006, IHI announced

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that the program had exceeded expectations and saved 122,300 lives.

Compensation

One of the latest strategies to improve health care quality is pay-for-performance (P4P). No more accolades, or public attention, or professional respect, but hard cash and lots of it.

P4P programs, using bonuses or at-risk pools, seek to improve quality in preventive, acute or chronic care, promote patient satisfaction, and encourage the deployment of information technology.

The director of the CMS, Mark McClellan, MD, has estimated that, by 2012, 20-30% of federal provider payments will be on the basis of P4P.⁷

Such programs include Bridges to Excellence, Integrated Healthcare Association, Medicare Physician Group Practice Demonstration and the Premier Group. Of these, the Premier trial is the largest with 260 participating hospitals and, to date, has the greatest financial stakes (eg, a 2% bonus for the top 10% performers; 1% for the next 10%).

Premier, a hospital purchasing alliance headquartered in San Diego, began the CMS-funded project in 2003 focusing on five clinical conditions:

- *Acute Myocardial Infarction* (AMI)—Aspirin and beta-blockers on arrival
- *Coronary Artery Bypass Graft* (CABG)—Use of internal mammary artery
- *Community-Acquired Pneumonia* (CAP)—Blood cultures prior to antibiotics
- *Heart Failure* (HF)—Angiotensin-converting enzyme inhibitor for left ventricular dysfunction
- *Hip and Knee Replacement* (HIP)—Postoperative hematoma, hemorrhage.

In April 2006, Premier released

Table 1. Premier Quality Incentive Demonstration Project: Quality performance, 2003-2005

	AMI	CABG	CAP	HF	HIP
Quarter 4-03	87.4%	84.9%	69.4%	64.6%	84.9%
Quarter 3-04	90.8%	89.7%	79.1%	74.2%	90.1%

AMI – acute myocardial infarction; CABG – coronary artery bypass graft; CAP – community-acquired pneumonia; HF – heart failure; HIP – hip and knee replacement

their 2004 compliance results (see Table 1).⁸

So, as a result of all this innovation and hard work, there is lots of good news on the quality front. All the tools—cooperation, industrial engineering, validation and certification, exhortation, compensation—have their proponents, advantages, success stories ... and skeptics.

Regarding QIOs, Snyder and Anderson, in the only published controlled study, found no benefit from their activities in stroke, pneumonia and cardiac care in Maryland, Nevada, New York, Utah, and Washington.⁹

Six Sigma, for all its value in logistics, has not found a major place in clinical processes such as surgery or interventional therapies. And many in health care have found its project orientation cumbersome to implement and fleeting in benefit.

More than five years after founding of the Leapfrog Group, a recent study found less than 4% of hospitals complying with one of its core tenets, the 24-hour intensivist staffing of ICUs.¹⁰

Before the cheers for IHI's *The 100,000 Lives Campaign* had quieted, the *Wall Street Journal* was raising questions about sample bias, attribution and inflated results.¹¹

Bradley and colleagues found that compliance with P4P-styled treatment strategies for acute myocardial infarction (ie, aspirin, angiotensin-converting enzyme inhibitors, beta-blockers) only accounted for a 6% variation in 30-day mortality.¹²

Finally, no less an authority than Michael E Porter, Harvard Business School professor and the maven of American management research, regards P4P programs as too process-oriented, micro-managed, simplistic and ponderous.¹³

What is the verdict? Which instrument, if any, will be the solution to health care's quality woes? For that answer, just like any other scientific question, these interventions will need to be subjected to the same scrutiny as a new drug, or diagnostic test, or surgical procedure. And, despite all the impatience around the crisis of medical mistakes, that answer is not immediately forthcoming.

This deliberative approach, as necessary and appropriate as it is, exposes perhaps the greatest threats to patient safety ... inertia and the status quo. ♦

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Synthesizers

We are drowning in information, while starving for wisdom. The world henceforth will be run by synthesizers, people able to put together the right information at the right time, think critically about it, and make important choices wisely.

— Edward O Wilson, b 1929, American biologist, researcher, theorist, and naturalist