

Health Care Process Improvement

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Welcome to Quality Matters, a bimonthly roundup of news and opinion on quality and efficiency, information technology, performance improvement initiatives, and policy innovations.

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In Focus: Reengineering Health Care

Summary: *Driven by demands for accountability, many health care organizations are adopting management strategies and systems engineering tools to improve health care processes. Organizations often focus on operational issues related to customer service, labor, and supply. Yet, increasingly, they are also using process improvement techniques to improve the quality and safety of clinical care.*

By Martha Hostetter

During the last decade, ambulatory practices, hospitals, and health systems have begun to adopt innovative management strategies and systems engineering tools to improve their health care processes. Using such approaches as the Baldrige National Quality Program, the Toyota Production System, or "Lean," and Six Sigma, health care organizations have been able to expand access to care (by reducing waiting times and increasing throughput); improve the quality and safety of care (by reducing variation and ensuring the delivery of evidence-based care); and reduce costs (by eliminating waste and increasing productivity).

There is considerable evidence that health care needs a new way of doing business. A 2005 report from the National Academy of Engineering and the Institute of Medicine, [Building a Better](#)

Delivery System: A New Engineering/Health Care Partnership, found that "an estimated thirty to forty cents of every dollar spent on health care ... a half trillion dollars a year ... is spent on costs associated with: overuse, underuse, misuse, duplication, system failures ... and inefficiency." It also found that just over half of patients receive evidence-based care, and each year 98,000 patients die and 1 million are injured as the result of medical errors. The complexity of medicine has increased to the point where no one person can ensure it is delivered reliably and safely; instead, standardized approaches are needed to guide patients from provider to provider throughout the system.

Companies in other industries, such as Toyota, Motorola, and Boeing, have used process improvement tools to dramatically reduce errors and create highly reliable systems. For example, the commercial airline industry sees just 3.4 defects—or crashes—per million opportunities. But it's unclear whether such performance levels can be achieved in health care; healing bodies and flying planes are quite different propositions as no two patients are ever the same.

After a June 2002 trip to Japan, the leaders of Seattle's [Virginia Mason Medical Center](#) decided to aim for "zero defects" by following principles of the Toyota Production System—one of the first health care organizations to do so. Even a 4 percent defect rate at a hospital with 17,000 annual admissions and 16,000 surgical procedures could result in 640 surgical defects a year, 501 transfusion defects, and 40,000 errors in medication administrations. Virginia Mason implemented a Patient Safety Alert system, which requires staff who encounter a situation likely to harm a patient to "stop the line" and cease any activity that could result in further harm. Since 2002, this has resulted in more than 8,000 reported alerts—most

due to communication breakdowns rather than mistakes on the part of individuals—as well as improved patient safety and fewer medical claims.

"Medicine is a highly complex system with a lot of human factors, including people who are sick, vulnerable, and often afraid," says Jennifer Graves, R.N., M.S., administrative director of nursing practice at Virginia Mason. "We're trying to focus on improving the production processes, so that we can increase the value-added time that providers can spend with patients."

Getting Started

While process improvement tools aren't new, many health care organizations have not taken advantage of them. Back in 2005, *Building a Better Delivery System* concluded that the health care sector has been slow to embrace systems engineering and management tools that have proven effective in manufacturing, telecommunications, transportation, and other industries. This is primarily because of health care's lack of financial incentives, regulatory frameworks that discourage innovation, a dearth of knowledge about these tools among health care leaders, and a widespread belief that health care is a unique industry.

Yet, there are signs that such tools are gaining a foothold in health care. Half of the applications made this year for the Baldrige National Quality Award came from health care organizations, a greater percentage than in previous years. There were just nine applications from health care organizations in 1999, compared with 43 this year. And according to Karen Feinstein, Ph.D., director of the Pittsburgh Regional Health Initiative (PRHI), which was formed in 2000 by a group of hospitals, insurers, and employers, a growing number of staff from community hospitals are enrolling in PRHI's [Perfecting](#)

[Patient Care University](#). Enrollees learn how to eliminate errors and streamline and improve care, following Toyota's principles. In previous years, the courses mainly attracted staff from large hospitals.

Mounting evidence of quality and safety shortfalls, growing demands for accountability and public reporting, and declining profits are among the factors pressuring health care organizations to change. But with so many brand-name systems and commercial consulting services available, how should health care leaders get started on improving their work processes?

Harry Hertz, Ph.D., director of the [Baldrige National Quality Program](#), advises health care leaders to begin by creating an organizational profile. "Most organizations can say what they do, but not how they do it," he says. A Baldrige self-assessment clarifies "how you do business, how your leaders provide direction, strategize, engage the workforce, manage processes, serve customers, and reward excellence." In many cases, organizations focus on operational issues related to customer service, labor, and supply. Yet, increasingly, health care organizations are using process improvement techniques to improve the quality and safety of clinical care.

[Denver Health and Hospital Authority](#), Colorado's primary safety net institution, chose "Lean" manufacturing, based on Toyota's approach, to redesign its delivery systems. "I became frustrated that we were doing things in the same way as when I was an intern almost 40 years ago—there are new drugs, new technologies, but the core health care processes are essentially the same," says Patricia Gabow, M.D., CEO of Denver Health. Gabow was attracted to Lean because it offers a philosophy as well as a set of tools to put it into place. "The philosophy fits with health care in general and Denver Health's mission in particular. At the core, Lean is

about respect: the president of Toyota has said waste is disrespectful because it squanders scarce resources and asks workers to do work without value. I'd add to that that it's disrespectful to patients, since it asks them to undergo care processes with no value."

So far, Denver Health has trained 160 employees—from department heads to frontline staff—as "black belts," or experts in process improvement. Among other achievements, they have used Lean to enhance efficiency in primary care clinics and increase the number of patients who receive antibiotics within the appropriate time frame before surgery. Black belts are trained to use Lean tools in their everyday work and to submit monthly reports demonstrating how they do this.

Mapping Work Processes

Most improvement approaches emphasize the need to visualize work processes in order to reveal problems, rather than hide them through workarounds and business as usual. Many organizations hire industrial engineers to help them track their workflow, pinpoint bottlenecks, and develop streamlined processes. Tools such as queuing theory are often used to help predict the demand for services in settings such as emergency departments or open-access clinics.

Mapping workflow at Denver Health was crucial to gaining buy-in among staff. "Our chief of medicine said, 'The reason we're doing things this way is because it's the right way,'" says Gabow. "But the engineer was able to show that a nurse does hundreds of different, often disjointed tasks, each lasting a few minutes, and that a trauma resident walks up to eight and a half miles in a shift. These are processes you would never design from scratch." The chief of medicine is now a champion of the Lean approach.

ThedaCare, a health system based in Wisconsin, used "spaghetti charts" to track the paths that medical technicians, nurses,

and other staff traverse in the operating room during surgery; Figures 1 and 2 show the paths before and after a redesign.

Figure 1

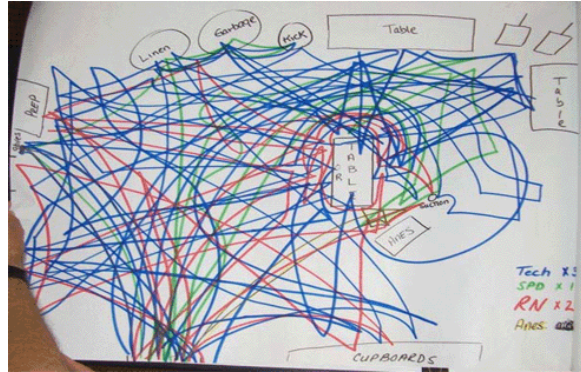
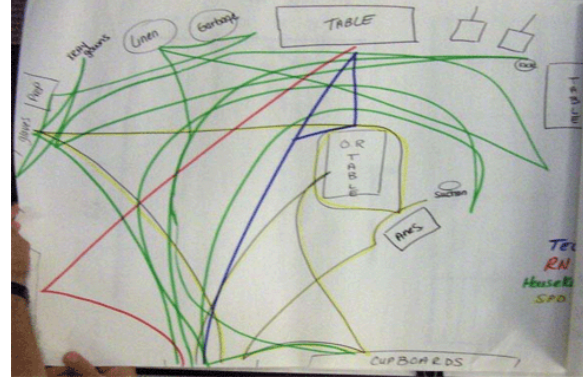


Figure 2



Source: ThedaCare Center for Healthcare Value, 2008

While much of medicine relies on clinical expertise and decision-making, many processes are repeated and highly predictable. Training staff to "do the right thing" can work for a while, but standardized processes are likely to prove more reliable and sustainable, as new nurses, residents, or other providers arrive. Tools such as checklists or color-coded supply systems are designed to make health care delivery as "error-proof" as possible.

Staff-Driven Changes and Patient-Centered Care

Many of the ideas for improving health care processes are developed on the ground level, among the employees actually doing the work. Most approaches follow some version of the Plan-Do-Study-Act cycle, which aims for rapid and continuous improvement.

"Virginia Mason's system is centered on the idea that staff closest to the work know the work best and can make improvements that benefit patients," says Graves. As a result of staff-driven changes, Virginia Mason reduced the time it takes to report lab results to

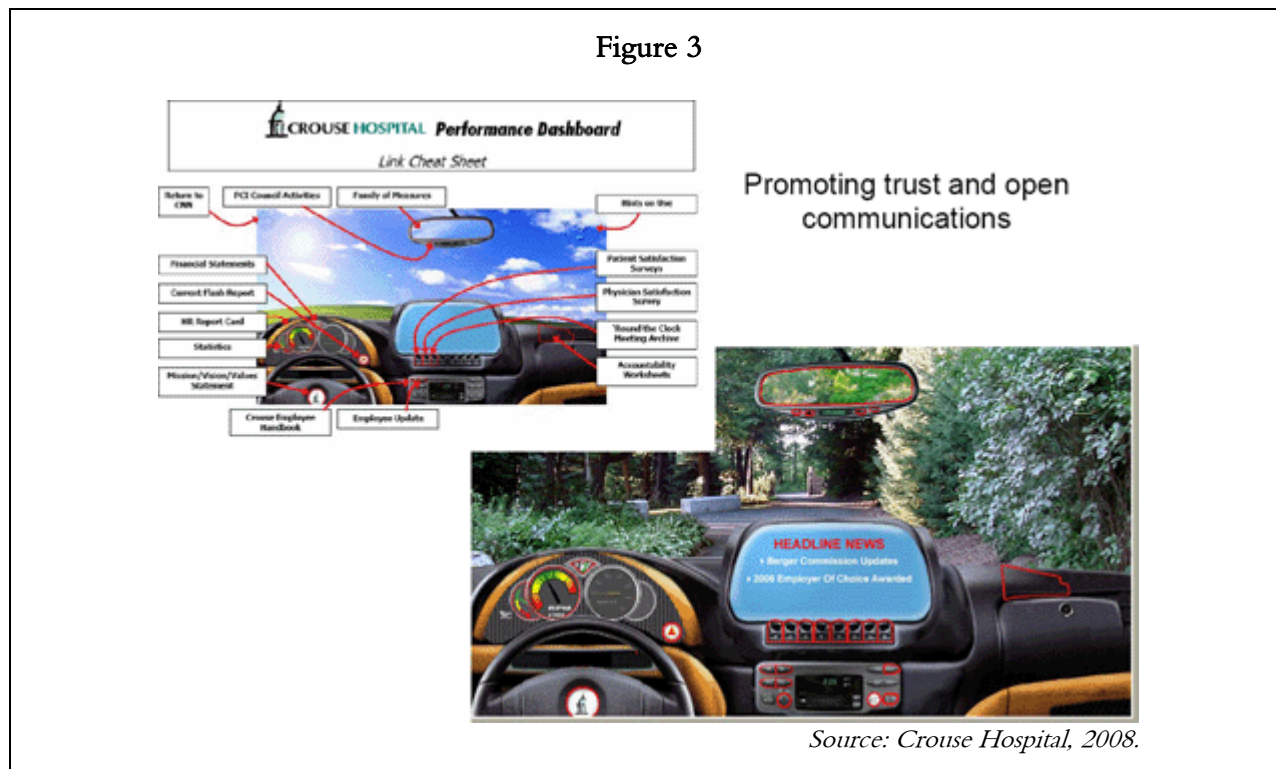
patients by more than 85 percent and increased the amount of time nurses spend providing direct patient care from 35 to 90 percent.

Some have criticized systems such as Six Sigma or Lean for requiring specialized language or complex mathematical models. Derrick Suehs, chief quality officer at Syracuse's **Crouse Hospital**, says it's important to talk about health care improvement in ways that resonate with staff. At Crouse, staff are encouraged to report "Oh My God" moments—errors or near misses—and to apply the "momma test" to their work: *If this patient were your momma, would you be happy with the care she's getting?* "We try to use language that grabs at the heart," says Suehs. "What most places miss is the psychology around work—people have a need to achieve. You need to combine the technical improvement tools with the people side to make real change." To promote trust and accountability, Crouse created a "performance dashboard" to communicate clinical, administrative, and financial data to staff (Figure 3).

Taking a cue from other industries, health care organizations have made customer service a focus of their improvement efforts. For example, "value-stream" maps are used to identify the steps taken to deliver a certain service, such as a clinic visit. Processes that bring value to patients are highlighted, while efforts that add time or resources without improving care are reduced or eliminated.

Rapid Improvement Events in Denver Health's pediatric clinics led to medical office assistants and providers working in parallel, rather than sequentially—reducing the cycle time from 45 to 25 minutes while maintaining value for patients. As a result, clinics were able to expand patients' access to care by adding nearly two appointment slots for each provider.

Figure 3



The Bottom Line

Process improvements can bring significant savings by more efficiently using space or supplies, reducing labor costs, and increasing productivity. Denver Health, Virginia Mason, and Crouse Hospital have realized millions in savings without laying off staff or curtailing access to care.

For example, in 2001, Crouse Hospital filed for bankruptcy; by 2007, after making several changes based on Baldrige criteria, it had achieved an operating margin of 3.5 percent. One area that hospital leadership targeted

was worker's compensation claims. Employees often were injured in the course

of moving patients from gurneys to beds or operating tables. The hospital invested in "HoverMatts," which use a cushion of air to make it easier to lift and move patients. Within nine months, the hospital recovered \$1.2 million from the lower costs of worker's compensation insurance and reduction in lost employee time that resulted; there have been no injuries among employees who use the HoverMatt technology.

The Pittsburgh Regional Health Initiative has enabled its members to gain a competitive advantage in the region. "We wanted to see if we could deliver the highest-value in health care, in terms of the best outcomes at a reasonable cost," says its director, Karen Feinstein. Participating providers have reduced infection rates and errors, improved clinical quality, and expanded access to care. In addition, says Feinstein, improving health care processes has been an effective workforce recruitment and retention strategy.

In some cases, improving work processes may curtail earnings for providers, for example if it means reducing the average length of stay for hospital patients. But, increasingly, health care leaders are weighing such concerns against the costs of unnecessary variation, inefficiency, and poor-quality care. Later this year, the Centers for Medicare and Medicaid Services (CMS) will stop paying for certain types of "never" events, including pressure ulcers and infections acquired during hospital stays. Further, moves by CMS and other payers to adopt performance-based payments or

bundled payments for episodes of care or patient populations create incentives for hospitals to improve the effectiveness and efficiency of care.

Islands of Improvement in a Broken System

Improving health care processes at individual practices, hospitals, or health systems can have a big impact on the local level, as has been shown through the Pittsburgh Regional Health Initiative. But health care organizations need to be given far-reaching incentives to change, and there may be limits to how far engineering and management tools can go. In the end, many say, health care needs to be reengineered at the community, state, and national levels—something that will require financial incentives, changes to the regulatory and professional environments, and support for new infrastructure such as health information technology.

"Health care in America is not sustainable the way it is now," says Denver Health's Gabow. "We need to start developing different models."

Case Study: Applying the Quality Improvement Techniques of Manufacturing Industries to Medical Practice

By Sarah Klein

***Summary:** With the help of consultants with expertise in the automotive industry, a large ophthalmology practice in Lansing, Mich., reduced patient wait times and its need for clinical support staff. Before implementing this program, the clinic's administrators and its consultants had to persuade doctors and staff that the new system would make their work processes better and not worse.*

Issue

The business improvement techniques known as Six Sigma and Lean manufacturing have been used to identify and reduce

defects in production methods for more than two decades. Though commonly used in the automobile and manufacturing industries to reduce costs and increase profits and efficiency, they have only recently been used to identify and reduce variance in care

processes within physician offices. Part of the reason is that medical professionals tend to believe that the complexity of health care routines defies the type of categorization necessary to eliminate process variation—and thus, waste. But, with the help of consultants, a large ophthalmology practice proved it could be done.

Organization and Leadership

Lansing Ophthalmology has 14 physicians and seven optometrists, and a staff of 144 employees who provide clinical and administrative support. The practice has a base of 100,000 patients, of whom 75,000 are seen annually. Nearly 80 percent of patients visit the East Lansing office, a 35,000-square-foot facility where clinicians conduct eye exams, perform surgery, and dispense eyewear. The remaining patients are examined in six satellite offices within a 67-mile radius.

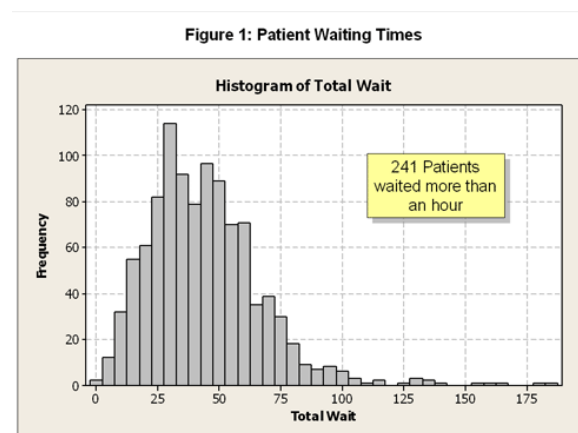
Charles Dobis, CMPE, has been executive director of the practice for more than 20 years. Teresa Prior, R.N., who has been the practice's clinical director for almost eight years, oversaw the project. The practice relied on the consulting advice of David Lalain, director of life sciences for the Automotive Action Industry Group (AIAG), a Southfield, Mich.-based member organization that applies quality and process improvement techniques to auto industry suppliers, including those in the health care sector, and David Watkins, executive vice president and director of international operations for OMNEX Inc., an Ann Arbor, Mich.-based training, software, and consulting company, who has advised manufacturing, advertising, and shipping companies about process improvement.

Target Population

The practice's process improvement was focused on its main office in East Lansing, which handles roughly 63,000 patient visits annually. The practice sees patients of all ages, nearly 40 percent of whom are age 65 or older and, as such, covered by Medicare.

Process of Change

In early 2007, Lansing Ophthalmology volunteered to take part in a pilot project sponsored by AIAG, which aimed to demonstrate the value of applying Lean Production and Six Sigma techniques to the health care industry. The administrative leaders at Lansing hoped to use the methodology to streamline the flow of patients through its main clinic. At the time, patients were waiting as long as 90 minutes to see a doctor; they tended to bunch outside the physicians' offices, putting additional pressure on doctors (Figure 1).



Source: Lansing Ophthalmology, 2007. Data were collected over a five-day period

The group had tried without success to find its own solution to the problem. "People would try to schedule their way out of it. That never worked," Dobis says. For example, doctors had tried to schedule their more difficult cases in the afternoon and the simpler ones in the practice's early hours. But that strategy only overwhelmed the

technicians, who were faced with handling the most difficult cases all at once. "It might have worked if [the doctors] were in a solo practice or worked with one other person. But they were a spoke within a wheel," Prior says.

Drawing on Six Sigma methods, the consultants recommended collecting patient flow data for a period of seven business days, measuring how long it took patients to advance through every step of the process. Clinic staff kept a separate time sheet for each person, noting how long it took to register the patient, gather a history, perform a refraction, and provide other services. The chart also captured how long patients waited between these care processes.

Before project leaders began gathering data, they held meetings to gain the cooperation and support of the practice's physicians and staff. "That was the most difficult part," Dobis says. Although the clinicians and staff agreed patient flow was a problem, they were reluctant to change the existing system, which allowed physicians great latitude in how they prioritized patients and managed their time. "No one wanted to give up control of his or her own schedule," he says. It wasn't strictly self-interest. There was also a prevailing sense that wait times might increase. "They thought things might get worse; that instead of seeing improvement, things might degenerate further," Dobis says.

Such resistance to change is common among professionals such as lawyers, engineers, and doctors, Watkins says. "They say, 'There is no such thing as a process. What we do is an art form.'" That was the case at Lansing as well. "They were adamant there were no processes," Lalain says.

The data would show otherwise, but until they could collect it, Dobis and Prior had to convince the physicians and staff they needed

outside help. The two stressed that the patient flow problem was a longstanding one, which the practice had not previously been able to solve. In essence, Prior argued: "Now we have experts. We have to try it."

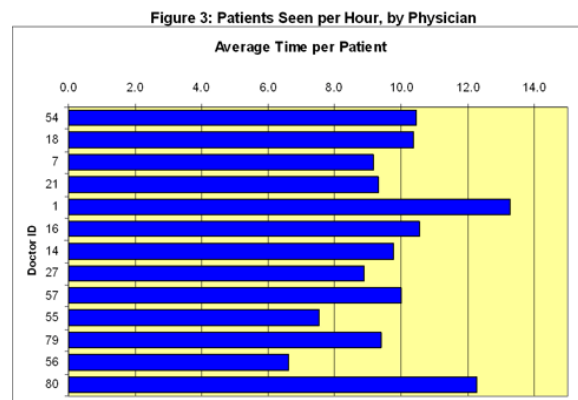
The staff had other concerns. Because so many of their activities were being measured and timed, they were concerned that the data would be used to reward high performers and punish low performers. To address those concerns, the project leaders emphasized that the overall goal was to improve efficiency and not to target individual employees. "We did that repeatedly," Prior says.

The staff collected data on 1,227 patients, using the previously described time sheet, which was attached to each patient chart during the data collection period. The time required for each exam was entered into an Excel spreadsheet and analyzed by the consultants. The data showed that 241 patients—or 19.6 percent of those measured—had spent more than one hour waiting during their visit. The data also showed that, while there were some 149 exam combinations required by patients, nearly 50 percent followed one of five set patterns. The 242 patients who came for a history, a refraction, dilation, and an exam with the doctor spent an average of 79 minutes in the office, of which 45 minutes was spent waiting (Figure 2).

The consultants found great variability in the time taken to perform various procedures. The number of patients seen by doctors per hour ranged from less than two to nearly six (Figure 3). The practice made a decision not to try to alter that variation at the outset. In some cases, there were good reasons for the variability: some physicians were performing more complex procedures or seeing long-term patients who required more face time with doctors. "Eventually they are going to

get pulled into the process," Lalain says. But not at first. "Once they are sold on eliminating variation with technicians and everything else, then they might swallow the pill that says they are part of the problem," Lalain says.

Figure 2: Top Five Traffic Flow Patterns	
Pattern 1	
<ul style="list-style-type: none"> • Check-in • Podium (<i>a routing station</i>) • History • EPIC exam (<i>refraction, or measurement of near- or far-sightedness</i>) • Dilation • Doctor's exam • Check-out 	<p>242 patients</p> <p>Average time: 79 minutes (45 spent waiting)</p>
Pattern 2	
<ul style="list-style-type: none"> • Check-in • Podium • History • Doctor's exam • Check-out 	<p>159 patients</p> <p>Average time: 58 minutes (37 spent waiting)</p>
Pattern 3	
<ul style="list-style-type: none"> • Check-in • Podium • History • Dilation • Doctor's exam • Check-out 	<p>90 patients</p> <p>Average time: 68 minutes (45 spent waiting)</p>
Pattern 4	
<ul style="list-style-type: none"> • Podium • History • Doctor's exam • Check-out 	<p>64 patients</p> <p>Average time: 55 minutes (35 spent waiting)</p>
Pattern 5	
<ul style="list-style-type: none"> • Check-in • Podium • History • EPIC exam • Dilation • Doctor's exam • Test • Check-out 	<p>45 patients</p> <p>Average time: 94 minutes (53 spent waiting)</p>
<i>Source: Lansing Ophthalmology, 2007.</i>	



Source: Lansing Ophthalmology, 2007. Data were collected over a five-day period.

Among the technicians, there was also great variability in the time taken to gather histories from patients and perform refractions. Histories took from five to 16 minutes, while EPIC exams (a refraction to measure the degree of a patient's nearsightedness or farsightedness, if any) took from five to 21 minutes, depending on the technician. That variation made it difficult to present a patient to the doctor at the appropriate time.

Another problem revealed by the data was the variation in patient arrival times. Some were as much as an hour early and others were up to 45 minutes late. Because the clinic had a policy of seeing patients when they arrived, patients were inadvertently encouraged to game the schedule, which had tremendous downstream consequences for staff trying to predict the flow of patients and manage their care appropriately.

The data also confirmed what physicians had complained about: patients were bunching outside doctors' offices in large numbers. The problem, consultants pointed out, was caused by the fact that patients were being moved through the system without any recognition for the pace at which doctors were seeing those patients.

To reduce variation in the patient-flow process, the practice:

- instituted a policy of seeing patients at the appointed time. If patients came early, they were told the clinic had to see patients who were scheduled before them. If patients came later than 20 minutes, their visit had to be approved by their physician. Patients are gradually learning that they can't game the system by arriving at a different time than their scheduled visit. This makes it easier to predict what tests will be needed and at what time.
 - The clinic formalized its training for technicians to reduce the variation in exam times. The goal was not to bring everyone to the pace of the fastest technicians but rather to address the education and training needs of the outliers. "We really felt we could work on the work-up times," Prior says. "We produced standardized practices for each and had structured training." Among the problems, says Lalain: "They had never taught people how to cut off a conversation gracefully." The result was that patients who chatted with technicians would throw off the schedule.
 - The clinic also created a queuing system that limited the number of patients entering the doctors' waiting area. Although this did not address overall wait times for patients, it substantially reduced the stress that doctors felt upon seeing six, seven, or eight patients waiting outside their door. The system they used was relatively simple: A staff member created color-coded cards for each doctor. The number allotted to each was based upon the number of patients he or she could see in one hour. The cards were placed at a desk, which patients were allowed to pass only when a card for his or her doctor was available.
- The scheduling system itself is being restructured to anticipate the time patients require to complete vision tests before meeting with their doctors. This means, in essence, that there are two appointment times: one for meeting with the technician to gather the history and perform a refraction and any additional tests and a second for the time at which the patient will see the physician. Depending on the tests required, the arrival time may be as little as five minutes and as much as 60 minutes before the exam. Because the clinic's software system does not allow schedulers to put two different appointment times in for one patient, the schedulers now have to call patients to notify them of their arrival time. But practice leaders are hopeful that its next software program will automate the process.

Key Measures

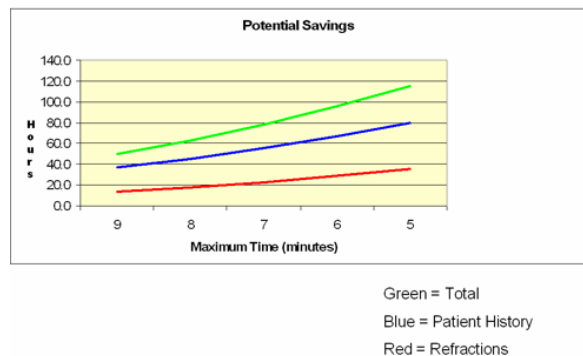
The data collection process focused on three measures, as defined below.

Technician time: The goal is 10 minutes for each exam (the previous range was five to 21 minutes). "Everyone is hitting it except for some new people," says Prior. The consultants determined that if the clinic could train the technicians to complete both the history and the refraction in eight minutes each, they could save the equivalent of one and one-half staff positions per year (Figure 4). Prior says that, because the clinic is growing, it would not lay off staff but would use any extra staff to meet the needs of new physicians.

Wait times: "We met the benchmark for a complete eye exam, which is one hour and 16 minutes," says Prior. The average prior to implementation was three minutes more. The clinic expects to see greater time savings

when it fully implements the new scheduling system.

Figure 4: Potential Hours Saved from Reducing Average Time Spent on Refractions and Patient Histories



Source: Lansing Ophthalmology, 2007.

Bunching: Doctors only see one or two patients waiting for their visit at any given time. That doesn't mean more patients aren't waiting, as there can still be clusters of patients after 11 am or 4 pm. In those cases, the clinic managers or patient coordinator tries to assign patients to different doctors to smooth out the flow. The goal is to pull patients through the system at the pace at which doctors can see them, rather than push them through without regard for such timing.

Implications

There are some general lessons to learn from the Lansing practice's use of these manufacturing techniques, as outlined below.

Financing: The consultants' services were provided to the clinic at no cost through the AIAG pilot project and, while Prior devoted up to a year on the project, spending anywhere from 10 to 20 hours per week on the improvements, she did this in addition to her regular job. Thus, the practice spent no money for the project. The consultants' fee would have amounted to \$20,000, says Lalain. Would the practice have been willing to pay for these services? Only if there was a

track record proving that the procedure would be financially worthwhile, answers Dobis. "The issue also is that the process has to have some efficiency in the minds of the doctors, because ultimately they are the ones who are paying for it. They have to be convinced there would be value. I think long term, yes. But the track record has to be (established)," he says.

Having learned process improvement techniques, Prior says the group could apply it to another problem—provided it could find staff with the time to do it. "We would have to take a simple project with a simple goal," she says.

As for savings, the changes allowed the clinic to add slightly fewer support staff when it hired two additional doctors for the practice this year. The ratio of staff to doctors in the main office dropped to 3.1 to 1 from 3.3 to 1.

Applicability to other practices: It's easier to implement such programs in specialties that compete for patients, such as ophthalmology and plastic surgery, as well as practices where the provided services are more routine. It's not impossible to make the same improvements in a primary care practice, says Watkins. "Even in an apparently unpredictable system, there's predictability," he says.

Because of employee resistance to change, it's important to have a highly motivated person shepherding the project. This leader also needs reinforcement. When Prior was frustrated, for example, she could turn to one of the consultants, who would remind her that the things she was experiencing were typical.

For More Information

Contact David Lalain, director of life sciences for the Automotive Industry Action Group, dlalain@aiag.org, or Teresa Prior, clinical director, Lansing Ophthalmology, tprior@loeye.com.



**Improving Efficiency in Ambulatory Care: An Interview with David Watkins,
Process Improvement Consultant, OMNEX, Inc. (MP3)**

Interviewed by Sarah Klein

To listen to the interview, please visit the Fund's Web site
www.commonwealthfund.org/qualitymatters

News Briefs

Mortality Rates, Pediatric Asthma Care Data Added to Hospital Compare

The Centers for Medicare and Medicaid Services (CMS) last month posted 30-day mortality rates for patients hospitalized for heart attack, heart failure, and pneumonia for nearly every U.S. hospital on the Hospital Compare [Web site](#). Last year, CMS published comparisons showing whether hospitals' mortality rates were higher than, the same as, or lower than the national average; this year, they published actual mortality rates. In addition, CMS posted two measures of care for children's asthma—the first time the site has included data on children's health care.

Also in August, CMS posted 10 measures of hospital patients' satisfaction with their care, based on the Hospital Consumer Assessment of Healthcare Providers and Systems. This survey examines issues such as whether patients are treated with courtesy and respect by physicians and nurses, whether providers explain treatments clearly, whether the facilities are clean, and whether pain is well managed.

In the early 1990s, CMS' attempt to publish mortality rates was met with widespread criticism from many providers, who argued

that the analysis did not account for hospitals' patient mix, including the severity of disease and age of their patients. The new formula for calculating mortality rates examines deaths among 35 million Medicare beneficiaries that occurred within 30 days of hospital admission, accounting for hospitals' patient mix as well as the number of expected deaths.

Report Names 100 'Most-Improved' Hospital

The information agency Thomson Reuters released a report last month identifying 100 U.S. hospitals showing the most rapid, substantial improvement over the past five years. Many quality improvement experts say that, to be most effective, public reporting and pay-for-performance initiatives must recognize rates of improvement, in addition to hospitals' achievement of benchmark performance levels.

The report, *Thomson Reuters 100 Top Hospitals: Performance Improvement Leaders*, assessed the performance of 2,867 non-federal hospitals on eight factors: patient mortality, medical complications, patient safety, length of stay, expenses, profitability, cash-to-debt ratio, and use of evidence-based medicine. It identified hospitals that, while initially posting below-average scores across all of the measures, managed to achieve

significant improvement over the five-year study period.

The 100 hospitals included on the list of most improved had fewer than expected adverse events, increased profit margins, and reduced their average length of stay. Hospital leadership and team-based care appear to have been key drivers of improvement among the leading hospitals, according to the study authors.

Overall, hospitals in the Midwest performed in the top quintile. The study was based on Medicare cost reports, Medicare Provider Analysis and Review, and information from the CMS Hospital Compare Web site.

Joint Commission to Develop Standards of Culturally Competent Care

The Joint Commission announced in August that it will develop or revise accreditation standards for measuring cultural competency in patient care. With support from The Commonwealth Fund, the Joint Commission will assess whether diversity, culture, language, and health literacy issues should be combined with current standards measuring quality of care or become separate standards.

Previous Joint Commission research has found that hospitals use widely varying practices to promote effective provider-patient communication and other aspects of patient-centered, culturally competent care.

New accreditation standards would establish principles and expectations for the provision of culturally competent care, including efforts to hire or train interpreters or provide technology-based interpreter services. As part of this project, the Joint Commission will establish an expert advisory panel to review evidence-based practices and identify principles that can serve as the basis for the standards.

Consumer Use of Tools to Compare Quality, Costs Limited

Increasingly, health plans have been developing tools to help enrollees compare cost and quality of care information across hospitals and physicians. Yet, according to a [report](#) by the Center for Studying Health System Change published last month, the tools have not attracted many consumers and have limited usefulness.

Large employers have been pushing health plans to make information on costs and quality of care available to their employees, regarding transparency as part of a strategy to encourage employees to take on more responsibility for their treatment choices and lifestyle decisions.

Today, most health plans provide some information on the costs of inpatient and outpatient services to enrollees. But the information often does not apply to individual providers or services provided in physicians' offices, and it is limited to certain service regions, the study found. Further, cost information generally is not customized according to enrollees' particular benefit designs, and health plans typically rely on publicly available, third-party sources to provide information on quality of care.

Use of the tools among consumers has been limited, in part because of such shortfalls and in part because there are few incentives to encourage their use.

The study draws on site visits to 12 nationally representative metropolitan communities: Boston; Cleveland; Greenville, S.C.; Indianapolis; Lansing, Mich.; Little Rock, Ark.; Miami; northern New Jersey; Orange County, Calif.; Phoenix; Seattle; and Syracuse, N.Y.

Recent Publications of Note

Selected articles on quality improvement from a number of journals, including the *American Journal of Medicine*, *Annals of Internal Medicine*, *Archives of Pediatric and Adolescent Medicine*, *BMJ*, *Health Affairs*, *Health Services Research*, *International Journal for Quality in Health Care*, *Joint Commission Journal on Quality and Safety*, *Journal of the American Medical Association*, *Journal of General Internal Medicine*, *Journal of Patient Safety*, *Journal of Safety and Quality in Health Care*, *Medical Care*, *The Milbank Quarterly*, *The New England Journal of Medicine*, and *Pediatrics*. The articles are nominated by Editorial Advisory Board members from a preselected list.

Patient Safety

Postdischarge Interviews Identify Errors

A random sample survey was used to determine whether postdischarge patient interviews could be used to detect adverse events that are not documented in the medical record. Among the 998 study patients, record review identified 11 serious, preventable events (1.1% of patients) and interviews identified an additional 21 serious and preventable events. The authors recommend that hospitals consider monitoring patient safety by adding questions about adverse events to postdischarge interviews. J. S. Weissman, E. C. Schneider, S. Weingart et al., [Comparing Patient-Reported Hospital Adverse Events with Medical Record Review: Do Patients Know Something That Hospitals Do Not?](#) *Annals of Internal Medicine*, July 15, 2008 149(2): 100–108.

Evaluating Medication Errors in Primary Care

This article abstracted and analyzed 194 medication-related errors using a medication error coding tool—Medication Error Types, Reasons, and Informatics Preventability (METRIP). The errors were voluntarily reported by more than 440 primary care

clinicians and staff from 52 physician offices as part of two error reporting studies

conducted by the American Academy of Family Physicians National Research Network. Among the medication errors, 126 (70%) were prescribing errors, 17 (10%) were medication administration errors, 17 (10%) were documentation errors, 13 (7%) were dispensing errors, and five (3%) were monitoring errors. More than half of the errors reached patients, and those that didn't were prevented by pharmacists, physicians, patients, and nurses. The authors conclude that 102 (57%) of the reported errors might have been prevented with enhanced electronic prescribing and monitoring tools. G. M. Kuo, R. L. Phillips, D. Graham et al., [Medication Errors Reported by US Family Physicians and their Office Staff](#), *Quality and Safety in Health Care*, Aug. 2008 17: 286–290.

Physician and Nurse Reports of Errors Vary

This descriptive study of a standardized, electronic error reporting system (e-ERS) compared the reporting practices of physicians and nurses at 29 acute care hospitals and one long-term care organization. These institutions implemented a secure, Web-based portal, available on all hospital computers, between August 2000 and December 2005—and reported some 266,224 events over 7.3 million inpatient

days, or one event per 27.5 days. Physicians reported 1.1 percent of total events, nurses 45.3 percent, and other hospital employees 53.6 percent, with physicians more likely to be the reporter for events that caused permanent harm, near death, or death of a patient. The authors conclude that physicians should be encouraged to increase their reporting of adverse events. E. J. Rowin, D. Lucier, S. G. Pauker et al., [Does Error and Adverse Event Reporting by Physicians and Nurses Differ?](#) *Joint Commission Journal on Quality and Patient Safety*, Sept. 2008 34(9): 537–545.

Quality Reporting

Creating Measures without Negative Consequences

Though improving health care quality depends on measurement, few quality outcome measures have been validated. The quality standard measuring time to first antibiotic dose for patients presenting to a hospital with community-acquired pneumonia, for example, was recently revised to six hours from four hours. This resulted from criticism that the original standard pressured clinicians to rapidly administer antibiotics despite diagnostic uncertainty. The authors conclude that missteps like this will happen, but recommend taking actions to increase the probability that future publicly reported quality measures improve care without creating unintended and potentially negative consequences. R. M. Wachter, S. A. Flanders, C. Fee et al., [Public Reporting of Antibiotic Timing in Patients with Pneumonia: Lessons from a Flawed Performance Measure](#), *Annals of Internal Medicine*, July 1, 2008 149(1): 29–32.

Quality Indicators for Inpatient Pediatric Care

Agency for Healthcare Research and Quality quality indicators were adapted for use with a pediatric population and rated by four expert panels through a two-stage modified Delphi process. This process identified 18 indicators for inclusion in the pediatric quality indicator set, including 13 hospital-level indicators, with 11 based on complications, one based on mortality, and one based on volume, as well as five area-level potentially preventable hospitalization indicators. The authors conclude that using these indicators to track "potentially preventable complications and hospitalizations has the potential to help prioritize quality improvement efforts at both local and national levels, although additional validation research is needed to confirm the accuracy of coding." K. M. McDonald, S. M. Davies, C. A. Haberland et al., [Preliminary Assessment of Pediatric Health Care Quality and Patient Safety in the United States Using Readily Available Administrative Data](#), *Pediatrics*, Aug. 2008 122(2): e416–e425.

Financial Incentives for Quality

Evaluating P4P's Effect on Quality

This study evaluated the impact on quality of all pay-for-performance (P4P) programs introduced into physician group contracts by the five major commercial health plans operating in Massachusetts from 2001 to 2003. It found that the initial generation of P4P contracts may have lacked key ingredients necessary to have a notable impact on quality performance. However, the authors conclude that "P4P can be viewed as an integral part of recent changes to medical practice that also include public reporting of quality, tiering of physician networks, and other mechanisms that create an explicit or implicit link between physician performance and future income." They also

recommend future research to explore whether changes to the magnitude, structure, or alignment of P4P incentives can lead to improved quality. S. D. Pearson, E. C. Schneider, K. P. Kleinman et al., [The Impact of Pay-for-Performance on Health Care Quality in Massachusetts, 2001–2003](#), *Health Affairs*, July/Aug. 2008 27(4): 1167–1176.

Expanded and Affordable Health Care Reform

This article reviews the need for comprehensive health care reform to require proposals that both expand coverage and redesign the delivery system so as to achieve greater value for the increased investment. To address this challenge, the authors propose five different accountable care system (ACS) models, defined as entities "that can implement organized processes for improving the quality and controlling the costs of care and be held accountable for the results." Though few physician organizations currently have the capacity to manage both quality and costs, they believe that the number of ACSs could increase rapidly if "incentives for improving quality and efficiency become more widespread and of greater magnitude." S. M. Shortell and L. P. Casalino, [Health Care Reform Requires Accountable Care Systems](#), *Journal of the American Medical Association*, July 2, 2008 300(1): 95–97.

MedPAC Recommends Bundled Payment for Medicare

The authors review three recommendations from the Medicare Payment Advisory Commission (MedPAC) June report intended to create collective accountability across providers for selected hospital episodes, such as those for congestive heart failure, chronic obstructive pulmonary disease, and cardiac bypass surgery. "Our hope is that this

set of policies will create an environment that encourages and enables providers to accept bundled payments while also testing the feasibility of this payment design. Under a bundled payment approach, Medicare would pay a single provider entity (comprising a hospital and its affiliated physicians) a fixed amount intended to cover the costs of providing the full range of Medicare-covered services delivered during the episode, which might be defined as the hospital stay plus 30 days after discharge. Bundling payments in this way should provide incentives to increase efficiency, coordinate in-hospital and post-hospital care, and, if combined with pay-for-performance initiatives, improve the quality of care." G. Hackbarth, R. Reischauer, and A. Mutti, [Collective Accountability for Medical Care—Toward Bundled Medicare Payments](#), *New England Journal of Medicine*, July 3, 2008 359(1): 3–5.

Using Cost-Effectiveness Analysis to Evaluate Payment Models

This study sought to demonstrate the use of cost-effectiveness analysis for evaluating different reimbursement models, using cases of Medicaid patients with severe mental illness. The authors compared the cost-effectiveness of fee-for-service payments with capitation payments (both for-profit and not-for-profit models). They identified cases that minimized baseline differences across the groups and reported quality-adjusted life years for each group. Based on this analysis, the authors concluded that a capitation model with a for-profit element was more cost-effective for Medicaid patients with severe mental illness than not-for-profit capitation or fee-for-service models. R. Grieve, J. S. Sekhon, T. Hu et al., [Evaluating Health Care Programs by Combining Cost with Quality of Life Measures: A Case Study Comparing Capitation and Fee for Service](#), *Health*

Services Research, Aug. 2008 43(4): 1204–1222.

Quality Tools in Practice

Reducing Outpatient Antibiotic Prescribing

A systematic review and quantitative literature analysis was used to assess the effectiveness of quality improvement (QI) strategies to reduce antibiotic prescribing in the ambulatory care setting. Among the 30 identified trials that were found to be eligible for quantitative analysis, the median reduction in the proportion of subjects receiving antibiotics was 9.7 percent over six months median follow-up. Although no single QI strategy or combination of strategies was clearly superior, active clinician education strategies trended toward greater effectiveness than passive strategies, and broad-based interventions extrapolated to larger community-level impacts on total antibiotic use, compared with studies targeting specific conditions or patient populations. S. R. Ranji, M. A. Steinman, K. G. Shojania et al., [Interventions to Reduce Unnecessary Antibiotic Prescribing: A Systematic Review and Quantitative Analysis](#), *Medical Care*, Aug. 2008 46(8): 847–862.

Report Card's Effect on Nursing Home Quality

This study analyzed primary and secondary data from 2001 to 2003—including 701 survey responses of a random sample of nursing homes, the Minimum Data Set (MDS) with information about all residents in these facilities, and the Nursing Home Compare published quality measure scores—to examine associations between the quality of care in nursing homes and publication of the Nursing Home Compare quality report

card. The authors found two of the five quality measures showed improvement following publication of the report card, suggesting that report cards may motivate providers to improve quality and raising questions as to why this tool is not effective across the board. D. B. Mukamel, D. L. Weimer, W. D. Spector et al., [Publication of Quality Report Cards and Trends in Reported Quality Measures in Nursing Homes](#), *Health Services Research*, Aug. 2008 43(4): 1244–1262.

Hospitalist and Non-Hospitalist Heart Failure Care Quality Similar

This study used data from the Multicenter Hospitalist Study to retrospectively evaluate quality of care in patients admitted with heart failure who were assigned to hospitalists (n=120) or non-hospitalists (n=252) among six academic hospitals. It found that, compared with non-hospitalist physicians, hospitalists' patients had similar rates of ejection fraction measurement (85.3% vs. 87.5%), angiotension-converting enzyme inhibitor (ACE-I) (91.5% vs. 88%), or beta-blocker (46.9% vs. 42.1%) prescriptions; they also had high odds of 30-day follow-up. However, there were no significant differences between the groups' frequency of cardiac testing, length of stay, costs, or risk for readmission or death by 30-days. The authors conclude that academic hospitalists and non-hospitalists provide similar quality of care for heart failure patients, and recommend that "future efforts to improve quality may require attention towards system-level factors." E. E. Vasilevskis, D. Meltzer, J. Schnipper et al., [Quality of Care for Decompensated Heart Failure: Comparable Performance Between Academic Hospitalists and Non-Hospitalists](#), *Journal of General Internal Medicine*, Sept. 2008 23(9): 1399–1406.

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