Before coming to Dartmouth, Paul Batalden practiced pediatrics and was an assistant surgeon general in Washington, D.C.
In September of 1955, President Dwight Eisenhower suffered a heart attack. His treatment—the best available at the time—consisted of bed rest, stress reduction, weight control, a low-cholesterol diet, an anti-clotting drug, and a gradual reintroduction of exercise. If a president were to suffer a similar attack today, he would almost certainly receive new cardiovascular plumbing—either catheterization and insertion of a stent (which Vice President Dick Cheney had in 2000) or bypass surgery (which former President Bill Clinton had in 2004). The main care improvement leadership development at Dartmouth Medical School. “So we’re going to have this problem from this time forward.”

But Batalden is not fatalistic about the future of health care, nor is he paralyzed by the seemingly insurmountable task of controlling health-care costs. He believes he’s found a way to reduce costs while improving quality and efficiency. His strategy lies in a concept known as the clinical microsystem. Slowly, clinic by clinic, hospital by hospital, the evidence is growing that the microsystem model may be able to cure American health care.

A clinical microsystem is a fancy term for a relatively simple concept. A microsystem is a frontline unit, the place where patients and care teams meet—such as an outpatient orthopaedic clinic, an operating room, or a chemotherapy infusion suite. It is a group of interdependent people who come together for a common aim. The patient is at the center of any microsystem, but a given patient is not fixed within a single microsystem.

At first glance, it may be difficult to see how such a simple concept could revolutionize health care, but one needn’t look any further than the intensive care nursery at DHMC.

In 1992, Batalden’s colleague Eugene Nelson, D.Sc., M.P.H.—the director of quality education, measurement, and research at DHMC—met with neonatologist William Edwards, M.D.—the director of DHMC’s intensive care nursery (ICN). They sat down to discuss Edwards’s vision for the unit. Edwards wanted DHMC’s ICN to be the best in the world—not to claim bragging rights, but to provide the best care possible. That meeting was, in effect, a tipping point, setting in motion an ongoing quest for excellence in the ICN.

Shortly thereafter, Edwards formed an interdisciplinary team of about seven ICN staff members. The team met regularly for six months to think through their mission and goals. They identified critical clinical outcomes for their tiny patients—

No one ever sat down and designed the U.S. health-care “system.” It simply evolved, in bits and pieces. As it now threatens to crack under its own weight, a DMS faculty member is a leading proponent of the need to stop tinkering and rethink things—from a “microsystem” perspective.

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By Doug McInnis
From 1994 to 1997, using the microsystem approach, the intensive care nursery reduced its hospital-acquired infection rate by about 70% and decreased the mean number of days that infants needed mechanical ventilation.

As illustrated by the ICN example, a microsystem approach to improvement requires the involvement and investment of all frontline players, including patients and families. It also requires observation, data collection, intervention, measurement, and analysis.

The ICN is not the only unit at DHMC that has used the microsystem approach to create change. Others include the Comprehensive Breast Program—which coordinates all aspects of breast cancer diagnosis, treatment, and support for patients; and the Spine Center—internationally known for its approach to back care, in which the biases of surgeons and other specialists are removed from the decision-making process.

J. Brian Quinn, an emeritus professor at Dartmouth's Amos Tuck School of Business Administration, wrote an essay about his care at DHMC's Spine Center for DARTMOUTH MEDICINE'S Fall 2000 issue. When he began to have back pain, he said, “Everyone has advice. . . . I do it all. But nevertheless—slowly but inexorably—the pain gets worse. Advice and results conflict more and more. I am confused. Can’t sit, can’t walk, can’t see any way through the pain.

“Then comes the Spine Center,” he continued. Founded in 1998, it was designed from the ground up as a microsystem. “It is a health-delivery innovation that has given me back my active life,” wrote Quinn. “At its heart are people—an orthopaedist, a neurosurgeon, an anesthesiologist, and a physical...
All are very human and friendly. They focus on me, on my problem, not on their particular skill and how to sell it. All look at the same MRI, the same history, the same charts, simultaneously. They exchange views, give me confidence.” Quinn concluded by calling Dartmouth’s Spine Center “a true jewel.”

As it happens, although Quinn wrote that essay from the perspective of a patient, not an academic, the concept he benefited from in 2000 had its origins in his own scholarly work. “The inspiration for microsystem thinking,” says Gene Nelson, who worked with Batalden at the Hospital Corporation of America before both came to Dartmouth, “was in 1992 when Brian Quinn wrote the book Intelligent Enterprise.” Quinn, who is also a longtime DHMC Trustee, “was studying the best service organizations in the world,” continues Nelson, such as Federal Express and Sony. “What he discovered was that these [corporations] were fanatical about figuring out when their customer comes in contact with their organization [and] what happens to create value for that customer.”

Nelson, Batalden, and Donald Berwick, M.D.—who at that time, with Batalden’s help, was starting the Institute for Healthcare Improvement in Cambridge, Mass.—realized they could apply many of the innovations taking place in industry to health care. All three had worked on various quality improvement efforts throughout their careers.

Batalden had served in Washington, D.C., as assistant surgeon general and director of the Bureau of Community Health Services from 1972 to 1975. He was also influenced in the 1980s by the guru of quality improvement, W. Edwards Deming. By then in practice as a pediatrician, Batalden read of Deming’s work in transforming manufacturing companies and signed up for one of his seminars. Batalden found himself in a smoke-filled room where Deming was talking about ball bearings. “It was awful,” Batalden remembers thinking at first. “But then I realized he was not really talking about ball bearings. He was talking about a theory of work, a theory of the workplace, a theory of workers, and a theory that linked all of that to the people who benefited from the work.”

For years, American industrialists had ignored Deming while he helped the Japanese make astounding leaps in quality and productivity. But in the 1980s, Ford Motor Company—losing money for the first time in its history—asked for his help in turning the company around. One result of that collaboration was the revolutionary Ford Taurus. Deming prodded Ford to focus on making the new car well, while seeking manufacturing efficiencies that wouldn’t cheapen the product. The company offered special training to thousands of white-collar and production workers. It bought top-quality cars from competitors, took them apart, and tried to figure out how to improve on their best features. Ford also worked closely with 5,000 outside companies that would supply parts for the Taurus.

And Ford made two clean breaks with tradition. Instead of picking suppliers that offered the lowest cost, the company made its choices based on quality. Ford also built prototypes of the Taurus for potential buyers to test so the kinks could be fixed before the first commercial models rolled off assembly lines. Typically, the American auto industry had resolved problems after the first batch of owners discovered them.

To gain maximum production efficiency, the company asked its assembly and parts plants to suggest better ways to build the new car. Ford amassed 1,400 ideas and used 550 of them. The Taurus came in $400 million under budget, eventually replaced the Honda Accord as the best-selling car in America, and boosted Ford’s bottom line.

Ford’s strategy involved an unhurried reexamination of every step involved in building a new car. The clinical microsystems approach employs a similar strategy, but in the health-care setting.

When Batalden and Nelson came to Dartmouth Medical School in the mid-1990s, their emerging
“If we keep doing what we have been doing,” Batalden says, “we’ll keep getting what we’ve always gotten”—an expensive, high-tech, inefficient health-care system. “The health-care system needs to be redesigned.”

The United States spends more on health care per person then any other country in the world. According to a 2005 report from the World Health Organization, U.S. health-care spending is 14.6% of the country’s gross domestic product (GDP). No other country comes close to that figure. In Canada, for instance, health-care spending is only 9.6% of the country’s GDP; it’s 9.7% in France, 10.9% in Germany, 9.2% in Sweden, and 11.2% in Switzerland.

Yet the U.S. ranks behind most of Western Europe in key health measures, such as infant mortality and life expectancy. In a 2000 report, the World Health Organization ranked the American health-care system 37th in the world in overall performance. Perhaps most surprising, given that the United States does not have a nationalized system, is the fact that health-care spending makes up 23% of this country’s government expenditures—a much higher percentage than in most European countries that do offer universal health care.

“The medical system is kind of like a deer in the headlights,” says Susan Dentzer, a 1977 Dartmouth College alumna who tracks health-care spending as the health correspondent for the PBS NewsHour with Jim Lehrer. “Nobody can quite figure out what to do about it.

“In many industries,” she adds, “technology decreases costs. It’s just the opposite in health care.”

That’s a key difference between health care and the industries with which Deming worked. A recent series of articles in the New York Times illustrated the problem. The Times focused on four diabetes prevention and treatment centers that opened in the late 1990s at New York hospitals. Seven years later, three of them had closed and the number of New Yorkers with preventable type II diabetes had nearly doubled.

“They did not shut down because they had failed their patients,” the Times explained. “They closed because they had failed to make money. They were victims of the byzantine world of American health care, in which the real profit is made not by controlling chronic diseases like diabetes, but by treating their many complications. Insurers, for example, will often refuse to pay $150 for a diabetic to see a podiatrist, who can help prevent foot ailments associated with the disease. Nearly all of them, though, cover amputations, which typically cost more than $30,000.”

The problem exists to varying degrees in all specialties. “We had a visiting surgeon from Bosnia,” Batalden recalls. “While he was here, he leaned over to me and under his breath, he asked, ‘How can you spend so much money?’ I said, ‘It’s easy. If you divide a problem into enough pieces and you charge by the piece, you can run up the cost.’

“For instance,” Batalden continues, “we say, ‘Go see so and so. He’s the best at treating the left eyelid.’ We get better and better at less and less. It’s amazing how much knowledge you can get about some part of the body. But who’s going to pay for this,” he concludes, “is really a tricky issue.”
Employers, who historically have financed private insurance for their employees, are pulling back from that role more and more to remain competitive. “People who work in international markets are very concerned because the cost of health care is making American industries less competitive,” says James Strickler, M.D., former cochair of the board of directors for the International Rescue Committee and former dean of DMS. “If they can’t compete, they will shut down or move operations overseas, which means there will be fewer insured workers putting money into the health-care system.”

A recent study by the Commonwealth Fund reported that the percentage of Americans making between $20,000 and $40,000 a year who lacked health insurance for part or all of the year was 41% in 2005—a dramatic jump from 28% in 2001. “Many people of the liberal persuasion think we should provide good health care because it’s the right thing to do,” Strickler continues. “I believe that. But this isn’t what influences the political system. What does influence it is hard, cold reality . . . that American business is increasingly compromised by its health-care costs.”

Until recently, most efforts to “fix” U.S. health care have simply shifted costs somewhere else—to individuals, private insurers, employers, the government, or academic medical centers and other nonprofit hospitals—rather than trying to reduce the cost of the entire system. Batalden, his microsystems team, and their colleagues in Dartmouth’s Center for the Evaluative Clinical Sciences (CECS) have shown repeatedly that spending more on care doesn’t necessarily result in better care. Rather, systems that spend less on health care often have better outcomes and are more efficient than their high-spending counterparts. (This field of research was pioneered by CECS’s director, John Wennberg, M.D., who recruited Batalden to Dartmouth.) Furthermore, improving quality and efficiency often results in cost savings, as demonstrated by the efforts in the Dartmouth ICN.

Neither Batalden nor any other reasonable health-policy expert expects to solve the cost problem by returning to the low-tech medicine of Eisenhower’s era. But the unbridled use of costly technology hasn’t worked either.

What’s needed, Batalden and his colleagues argue, is a systematic approach—one that recognizes that the greatest power for change lies on the front lines, where patients and caregivers meet.

Microsystems are “not something you install,” Batalden continues. “Microsystems just are.”

Batalden continues.
The microsystems toolkit developed at Dartmouth has been translated into several languages.

The microsystem approach is also being applied in England, Sweden, France the Netherlands, Germany, Kosova, and elsewhere.

The nuts and bolts of microsystems

For over a decade, Paul Batalden, M.D., and members of his quality improvement team—Eugene Nelson, D.Sc., M.P.H., and Marjorie Godfrey, M.S., R.N.—have been singing the praises of “clinical microsystems,” the building blocks of every health-care system. About six months ago, they released a “toolkit” titled Clinical Microsystems: A Path to Healthcare Excellence. Intended to help others understand the microsystem concept, it was featured at the Institute for Healthcare Improvement’s national forum in December 2005 in Orlando, Fla.

The toolkit includes a choice of a video or a DVD describing the characteristics of high-performing clinical microsystems; two workbooks, including an exercise to help users see health care through patients’ eyes; and a tutorial on adapting the workbooks to individual microsystems.

Following is an edited transcript of interviews conducted by Dartmouth Medicine’s associate editor, Laura Stephenson Carter, with Batalden, Nelson, and Godfrey. Batalden is the director of health-care improvement leadership development at DMS. Nelson is the director of quality education, measurement, and research at DHMC. And Godfrey is the director of clinical practice improvement at DHMC.

DM: Where did the microsystems idea come from?

Nelson: The spark was in 1992, when Brian Quinn [now an emeritus professor at Dartmouth’s Tuck School of Business and a longtime DHMC Trustee] wrote the book Intelligent Enterprise. He discovered that the best service organizations in the world were focused on what was happening between the customer and the frontline service provider, such that customers get what they want and need. We realized how far away we are in health care from focusing attention on what happens to the patient.

Batalden: As I read that book, I wondered what the analogue was in health care. I thought back to my own practice as a pediatrician. Another pediatrician and I, a nurse practitioner, a nurse, and a secretary all worked in the same hallway. We had a group of patients that we shared. Bingo—there it was, a microsystem.

DM: What do you mean by a “microsystem”?

Godfrey: It’s the place where patients, families, and care teams meet. It’s frontline care, and it includes the support staff, processes, technology, and recurring patterns of information and behavior and results. The patient is central to every clinical microsystem.

DM: Why is it important to look at microsystems?

Batalden: What microsystems are about is understanding what you are trying to change or improve. You can’t do quality improvement that’s going to last unless you understand the work and how people interact.

DM: How do you know what a good microsystem is?

Nelson: We visited 20 of the best performing clinical microsystems in North America. We chose them by evaluating published results, award winners, and organizations that had done best in Institute for Healthcare Improvement (IHI) assessments; by talking to people in the know; and then by asking the selected organizations to identify their best microsystems. Some were inpatient units; some were ambulatory units; some were home health; some were nursing homes.

Then we observed what they did, what made each microsystem so good on quality, on efficiency, a place you’d like to work in. Our work was supported by a Robert Wood Johnson Foundation grant—$300,000 for three years—and after we did the work we published a nine-part series in the Joint Commission Journal on Quality Improvement. We learned a lot of lessons.

DM: What sort of lessons did you learn?

Nelson: That it was a blend of five things that made these units so great. First, they were very focused on the patient. Second, they were very focused on staff. The staff felt like they were important and that their work was valued, no matter if they were the newest hire, the most senior person, or the housekeeper. A third was excellent leadership. There were always two leaders—be it a nurse and a doctor, or a doctor and an administrator. The leaders reinforced the idea that patients were at the center and that staff contributions were valued.

Fourth was the emphasis on providing good care—on outcomes and on the processes that produce those outcomes. They were always trying to figure out how to get better results, because that’s what delivered the health benefit to the patients. Fifth was innovative and/or easily usable informa-
It’s essential to have a basic understanding of how a given system works. If you don’t understand the way things work and you try to change them, it won’t be sustainable change... And to create a high-performing organization, you have to have high-performing small systems within it.

For more information about microsystems and the toolkit, visit http://www.clinicalmicrosystem.org/.