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SOUNDING BOARD

CONTINUOUS IMPROVEMENT AS AN IDEAL IN HEALTH CARE

IMAGINE two assembly lines, monitored by two foremen.

Foreman 1 walks the line, watching carefully. "I can see you all," he warns. "I have the means to measure your work, and I will do so. I will find those among you who are unprepared or unwilling to do your jobs, and when I do there will be consequences. There are many workers available for these jobs, and you can be replaced."

Foreman 2 walks a different line, and he too watches. "I am here to help you if I can," he says. "We are in this together for the long haul. You and I have a common interest in a job well done. I know that most of you are trying very hard, but sometimes things can go wrong. My job is to notice opportunities for improvement — skills that could be shared, lessons from the past, or experiments to try together — and to give you the means to do your work even better than you do now. I want to help the average ones among you, not just the exceptional few at either end of the spectrum of competence."

Which line works better? Which is more likely to do the job well in the long run? Where would you rather work?

In modern American health care, there are two approaches to the problem of improving quality — two theories of quality that describe the climate in which care is delivered. One will serve us well; the other probably will not.

The theory used by Foreman 1 relies on inspection to improve quality. We may call it the Theory of Bad Apples, because those who subscribe to it believe that quality is best achieved by discovering bad apples and removing them from the lot. The experts call this mode "quality by inspection," and in the thinking of activists for quality in health care it predominates under the guise of "buying right," "recertification," or "deterrence" through litigation. Such an outlook im-

plies or establishes thresholds for acceptability, just as the inspector at the end of an assembly line decides whether to accept or reject finished goods.

Those in health care who espouse the Theory of Bad Apples are looking hard for better tools of inspection. Such tools must have excellent measuring ability — high sensitivity and specificity, simultaneously — lest the malefactors escape or the innocent be made victims. They search for outliers — statistics far enough from the average that chance alone is unlikely to provide a good excuse. Bad Apples theorists publish mortality data, invest heavily in systems of case-mix adjustment, and fund vigilant regulators. Some measure their success by counting heads on platters.

The Theory of Bad Apples gives rise readily to what can be called the my-apple-is-just-fine-thank-you response on the part of the workers supervised by Foreman 1. The foreman has defined the rules of a game called "Prove you are acceptable," and that is what the workers play. The game is not fun, of course, the workers are afraid, angry, and sullen, but they play nonetheless. When quality is pursued in the form of a search for deficient people, those being surveyed play defense. They commonly use three tactics: kill the messenger (the foreman is not their friend, and the inspector even less so); distort the data or change the measurements (whenever possible, take control of the mechanisms that may do you harm); and if all else fails, turn somebody else in (and divert the foreman's attention).

Any good foreman knows how clever a frightened work force can be. In fact, practically no system of measurement — at least none that measures people's performance — is robust enough to survive the fear of those who are measured. Most measurement tools eventually come under the control of those studied, and in their fear such people do not ask what measurement can tell them, but rather how they can make it safe. The inspector says, "I will find you out if you are deficient." The subject replies, "I will therefore prove I am not deficient" — and seeks not understanding, but escape.

The signs of this game are everywhere in health care. With determination and enormous technical resourcefulness, the Health Care Financing Administration has published voluminous data for two consecutive years about the mortality profiles of Medicare recipients in almost every hospital in the United States — profiles that are adjusted according to complex multivariate models to show many important characteristics of the patient populations.¹ Such information, though by no means flawless, could be helpful to hospitals seeking to improve their effectiveness. Yet the hundreds of pages of data are dwarfed by the thousands of pages of responses from hospitals, trying to prove whatever hospitals need to prove to build their defenses. What else should we expect?

The same game is being played between aggressive Boards of Registration in Medicine and other regulators that require hospitals and physicians to produce streams of reports on the contents of their closets. In Massachusetts, for example, merely talking with

a physician about his or her involvement in a mishap may commit a hospital administrator by law to report that physician to the Board of Registration in Medicine.

The sad game played out in this theory and the predictable response to it imply a particular view of the nature of hazard and deficiency in health care, as it does in any industry playing such a game. The view is that problems of quality are caused by poor intentions. The Bad Apple is to blame. The cause of trouble is people — their venality, incompetence, or insufficient caution. According to this outlook, one can use deterrence to improve quality, because intentions need to be changed; one can use reward or punishment to control people who do not care enough to do what they can or what they know is right. The Theory of Bad Apples implies that people must be made to care; the inevitable response is the attempt to prove that one cares enough.

What a waste! The Theory of Bad Apples let American industry down for decades. It took some visionary theorists, many of them statisticians, in companies with great foresight to learn that relying on inspection to improve quality is at best inefficient, and at worst a formula for failure.²⁻⁶ The Japanese learned first — from American theorists, ironically — that there were far better ways to improve quality, and the result is international economic history.⁷ Today, no American companies make videocassette recorders or compact-disc players or single-lens-reflex cameras; we have simply given up. Xerox engineers visiting Japan in 1979 found copiers being produced at half the cost of those manufactured at Xerox's facilities, with only 1/30 the number of defects.⁸

What Japan had discovered was primarily a new, more cogent, and more valid way to focus on quality. Call it the Theory of Continuous Improvement. Its postulates are simple, but they are strangely alien to some basic assumptions of American industry — assumptions fully evident in health care today. These postulates have been codified most forcefully by two American theorists, W. Edwards Deming^{5,9} and Joseph M. Juran^{4,10} — heroes in Japan today, and among enlightened American companies. Juran and Deming, guided largely by a visionary group of mentors at Western Electric Laboratories (later AT&T Bell Laboratories) in the 1930s, drew on a deepened understanding of the general sources of problems in quality. They discovered that problems, and therefore opportunities to improve quality, had usually been built directly into the complex production processes they studied, and that defects in quality could only rarely be attributed to a lack of will, skill, or benign intention among the people involved with the processes. Even when people were at the root of defects, they learned, the problem was generally not one of motivation or effort, but rather of poor job design, failure of leadership, or unclear purpose. Quality can be improved much more when people are assumed to be trying hard already, and are not accused of sloth. Fear of the kind engendered by the disciplinary approach poisons improvement in quality, since it

inevitably leads to disaffection, distortion of information, and the loss of the chance to learn.

Real improvement in quality depends, according to the Theory of Continuous Improvement, on understanding and revising the production processes on the basis of data about the processes themselves. "Every process produces information on the basis of which the process can be improved," say these theorists. The focus is on continuous improvement throughout the organization through constant effort to reduce waste, rework, and complexity. When one is clear and constant in one's purpose, when fear does not control the atmosphere (and thus the data), when learning is guided by accurate information and sound rules of inference, when suppliers of services remain in dialogue with those who depend on them, and when the hearts and talents of all workers are enlisted in the pursuit of better ways, the potential for improvement in quality is nearly boundless. Translated into cultural norms in production systems and made real through sound statistical techniques, these lessons are at the core of the Japanese industrial revolution.⁷ They have proved their worth.

In retrospect, their success is not all that surprising. Modern theories of quality improvement in industry are persuasive largely because they focus on the average producer, not the outlier, and on learning, not defense. Like Foreman 2, the modern quality-improvement expert cares far more about learning and cooperating with the typical worker than about censoring the truly deficient. The Theory of Continuous Improvement works because of the immense, irresistible quantitative power derived from shifting the entire curve of production upward even slightly, as compared with a focus on trimming the tails. The Japanese call it *kaizen* — the continuous search for opportunities for all processes to get better.¹¹ An epigram captures this spirit: "Every defect is a treasure." In the discovery of imperfection lies the chance for processes to improve.

How far from *kaizen* has health care come! Not that the idea of continuous improvement is alien to medicine; self-development, continuous learning, the pursuit of completeness are all familiar themes in medical instruction and history. Yet today we find ourselves almost devoid of such thinking when we enter the debate over quality. The disciplinarians seek out Bad Apples; the profession, and its institutions by and large, try to justify themselves as satisfactory. It is the rare "customer" and "supplier" of health care today who function as partners in continuous improvement; for the most part, they are playing a different game.

It would be naive to counsel the total abandonment of surveillance and discipline. Even in Japan, there are police. Politically, at least, it is absolutely necessary for regulators to continue to ferret out the truly avaricious and the dangerously incompetent. But what about the rest of us? How can we best be helped to try a little *kaizen* in our medical back yards? What follows are a few small steps.

First, leaders must take the lead in quality improvement. Those who speak for the profession, for health

care institutions, and for large-scale purchasers must establish and hold to a shared vision of a health care system undergoing continuous improvement. The volleys of accusation and defense badly need to be replaced by efforts to clarify the goals that producers and payers share, beginning with this assumption: "Health care is very good today; together, we intend to make it even better."

Second, investments in quality improvement must be substantial. In other industries, quality improvement has yielded high dividends in cost reductions¹²; that may occur in health care as well. For the time being, however, improvement requires additional investments in managerial time, capital, and technical expertise. With the high discount rate in health care planning today, such investment calls for steadfast long-term vision. The most important investments of all are in education and study, to understand the complex production processes used in health care; we must understand them before we can improve them.

Third, respect for the health care worker must be reestablished. Physicians, hospital employees, and health care workers, like workers anywhere, must be assumed to be trying hard, acting in good faith, and not willfully failing to do what they know to be correct. When they are caught in complex systems and performing complex tasks, of course clinicians make mistakes; these are unintentional, and the people involved cannot be frightened into doing better. In fact, if they are afraid, they will probably do worse, since they will be wasting their time in self-defense instead of learning.

Fourth, dialogue between customers and suppliers of health care must be open and carefully maintained. As an incentive to improve quality, the threat of taking one's business elsewhere is pale compared with the reminder that one is committed to a long-term relationship. Quality improves as those served (the customers) and those serving (the suppliers) take the time to listen to each other and to work out their inevitable misunderstandings. Just as marriages do not improve under the threat of divorce, neither, in general, will health care.

Fifth, modern technical, theoretically grounded tools for improving processes must be put to use in health care settings. The pioneers of quality improvement — Shewhart,^{2,3} Dodge, Juran,^{4,10} Deming,^{5,9} Taguchi,¹³ and others¹⁴ — have left a rich heritage of theory and technique by which to analyze and improve complex production processes, yet until recently these techniques have had little use in our health care systems. The barriers have been cultural in part; physicians, for example, seem to have difficulty seeing themselves as participants in processes, rather than as lone agents of success or failure. The techniques of process flow analysis, control charts, cause-and-effect diagrams, design experimentation, and quality-function deployment, to name a few, are neither arcane nor obvious^{14,15}; they require study, but they can be learned. Many will be as useful in health care as they have been in other industries. Processes that can be improved by means of systematic techniques abound

in medicine. Those within institutions are obvious, such as the ways in which hospitals dispense medications, transfer information, or equip and schedule operating rooms. But even individual doctors create and use "production processes." In this sense, the way a physician schedules patients constitutes a process, as does the way he or she prescribes medicines, gives a patient instructions, organizes office records, issues bills, or ensures that high-risk patients receive influenza vaccine.

Sixth, health care institutions must "organize for quality." When other types of companies have invested in quality improvement, they have discovered and refined managerial techniques requiring new structures, such as are not currently found in the American hospital or health maintenance organization. Quality engineers occupy a central place in such structures, as quality is brought to center stage in the managerial agenda, on a par with finance. Flexible project teams must be created, trained, and competently led to tackle complex processes that cross customary departmental boundaries. Throughout the organization, a renewed investment must be made in training, since all staff members must become partners in the central mission of quality improvement.

Furthermore, health care regulators must become more sensitive to the cost and ineffectiveness of relying on inspection to improve quality. In some regulatory functions, inspection and discipline must continue, but when such activities dominate, they have an unfavorable effect on the quality of care provided by the average worker. This is not to argue against measuring quality and developing tools to do so; without them, artisans could not improve their craft. The danger lies in a naive and atheoretical belief, rampant today in the orgy of measurement involved in health care regulation, that the assessment and publication of performance data will somehow induce otherwise indolent care givers to improve the level of their care and efficiency. In other industries, reliance on inspection as the agent of change has instead more commonly added cost and slowed progress toward improvement. So it will be in health care. Without doubt, regulators who willingly learn and respect modern principles of quality improvement can have a helpful role. They can do so as the partners of care givers in developing sound measurement tools that represent common values and are for use primarily by the producers themselves; by aggregating data centrally to help care givers learn from each other; by providing technical support and training in methods of quality improvement; and by encouraging and funding studies of the efficacy of technologies and procedures and thus expanding the scientific basis for specifying rational processes of care.

In addition, professionals must take part in specifying preferred methods of care, but must avoid minimalist "standards" of care. Linked closely to the reliance on inspection to improve quality is the search for standards of care, which usually implies minimal thresholds of structure, process, or outcome above which one is safe from being labeled a Bad Apple.

Quality-control engineers know that such floors rapidly become ceilings, and that a company that seeks merely to meet standards cannot achieve excellence. Specifications of process (clear, scientifically grounded, continuously reviewed statements of how one intends to behave) are essential to quality improvement, on the other hand, and are widely lacking in medical care. Health care producers who commit themselves to improvement will invest energy in developing specific statements of purpose and algorithms for the clinical processes by which they intend to achieve those purposes. For example, they will specify rules both for routine procedures (e.g., "What is our system for dispensing medications correctly?") and for the content and evaluation of clinical practices (e.g., "What is our best current guess about the proper sequence of tests and therapies for back pain, and how well are they working?"). Ideally, such specifications are guidelines that are appropriate locally and are subject to ongoing assessment and revision.

Finally, individual physicians must join in the effort for continuous improvement. It may seem at first that the Theory of Continuous Improvement, coming as it does from experience in large manufacturing companies, has little relevance to individual physicians, at least those not involved in managed care organizations. But the opposite is true. At the very least, quality improvement has little chance of success in health care organizations without the understanding, the participation, and in many cases the leadership of individual doctors. In hospitals, physicians both rely on and help shape almost every process pertaining to patients' experience, from support services (such as dietary and housekeeping functions) to clinical care services (such as laboratories and nursing). Few can improve without the help of the medical staff.

Furthermore, the theory of quality improvement applies almost as well to small systems (such as a doctor's office) as it does to large ones. Individual physicians caring for individual patients know that defects in the care they provide do not usually stem from inattention or uninformed decisions. Yet hazards and defects do occur. Often they originate in the small but complex sequences on which every doctor depends, even sole practitioners. A test result lost, a specialist who cannot be reached, a missing requisition, a misinterpreted order, duplicate paperwork, a vanished record, a long wait for the CT scan, an unreliable on-call system — these are all-too-familiar examples of waste, rework, complexity, and error in the doctor's daily life. Flawless care requires not just sound decisions but also sound supports for those decisions. For the average doctor, quality fails when systems fail. Without the insights and techniques of quality improvement embedded in their medical practice, physicians are like anyone else who depends on others to get a complicated job done. They can remain trapped by defects they do not create but will nonetheless be held accountable for. The solo doctor who embodies every process needed to ensure high-

est-quality care is now nearly a myth. All physicians depend on systems, from the local ones in their private offices to the gargantuan ones of national health care.

Physicians who doubt that methods designed to improve quality can help them in daily practice may consider several questions. When quality fails in your own work, why does it fail? Do you ever waste time waiting, when you should not have to? Do you ever redo your work because something failed the first time? Do the procedures you use waste steps, duplicate efforts, or frustrate you through their unpredictability? Is information that you need ever lost? Does communication ever fail? If the answer to any of these is yes, then ask why. How can it be changed? What can be improved, and how? Must you be a mere observer of problems, or can you lead toward their solution? Physicians and health care managers who study and apply the principles of continuous improvement daily will probably come to know better efficiency, greater effectiveness, lower cost, and the gratitude and loyalty of more satisfied patients. They will be able to make better decisions and carry them out more faithfully.

We are wasting our time with the Theory of Bad Apples and our defensive response to it in health care today, and we can best begin by freeing ourselves from the fear, accusation, defensiveness, and naiveté of an empty search for improvement through inspection and discipline. The Theory of Continuous Improvement proved better in Japan; it is proving itself again in American industries willing to embrace it, and it holds some badly needed answers for American health care.

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