What if American companies used their marketplace clout to demand a certain level of quality from health care providers? What if these companies—individually and collectively—insisted on adherence to performance standards for high-quality care for the medical conditions that have the greatest impact on their employees’ health and their company’s bottom line? What if companies managed health care services the way they manage all other suppliers, with intense rigor and clear parameters? This chapter focuses on these ideas as they were applied by Virginia Mason Medical Center and by Intel—with surprising and encouraging results. The work outlined here indicates a pathway to significant gains in the health of workers in a variety of employment settings—improvements that are pivotal to achieving the Triple Aim. What’s more, the work also demonstrates quite clearly that better care can also come at a lower cost when waste is eliminated.

The foundation for this work was built when Dr. Gary Kaplan, CEO of Virginia Mason Medical Center in Seattle, led his team in
adapting Toyota Production System methods to health care, creating what they call the Virginia Mason Production System. The Toyota system was steeped in the idea of lean manufacturing, and lean tools and methods were to become central to Virginia Mason’s new system. Beginning in 2001, Kaplan led an effort to identify waste in the Virginia Mason system, to provide full transparency around that waste, and to eliminate it. This was a remarkable effort that empowered clinicians at Virginia Mason to identify many different status quo approaches to work as highly wasteful and not patient focused. It was this approach to transparency and waste elimination that set the stage for the work described in this chapter.

**Breakthrough at Virginia Mason**

The innovative breakthrough that Dr. Robert Mecklenburg and his colleagues at Virginia Mason Medical Center achieved started with a crisis. Mecklenburg was chief of medicine at Virginia Mason in 2004 when the insurance company Aetna threatened to exclude Mecklenburg’s health care organization from an elite network. Aetna was in a powerful position as a purchaser of care for such major companies in the Greater Seattle area as Starbucks, Costco, and Alaska Airlines, among others. Losing this business would be a blow not only to Virginia Mason’s finances but to the medical center’s considerable prestige as well.

Aetna was not doing this on a whim. Aetna’s data had revealed that Virginia Mason was more expensive than its major competitors in a number of important specialties. Mecklenburg and his colleagues were alarmed, although the more Mecklenburg thought about it the more he viewed the situation as a potential opportunity. He was deeply engaged in Virginia Mason’s adaptation of the Toyota Production System as its management method and was working closely with Gary Kaplan and the rest of the Virginia Mason leadership team in that process. Kaplan, Mecklenburg, and their colleagues were in their fourth year of establishing the Virginia Mason Production System, and even though they had made great strides toward improving quality and controlling cost, they knew there was still a difficult road ahead. For one thing, Kaplan was receiving vigorous and often hostile pushback from many people within Virginia Mason, most notably a number of
physicians. The idea that a car-manufacturing methodology could in any way apply to health care seemed ludicrous to them. But Kaplan could clearly see its application, and he pressed on with the active support and engagement of leading clinicians such as Mecklenburg.

During a series of discussions with Aetna and a conversation with benefits managers from a number of the major companies that were Aetna customers, Mecklenburg began to focus intently on the question of who his customer was. At Virginia Mason the patient was at the top of a pyramid that embodied the medical center’s strategic plan and its vision to transform health care. But the fact was that employers paid the bills—paid huge dollars for their employees’ care. Mecklenburg realized that neither he nor his physician colleagues had ever really considered the companies paying the bills as customers. In fact, Mecklenburg wasn’t sure he or any of his colleagues had ever met with or talked to the people writing the checks.

Mecklenburg reflected on this and realized that all these major companies purchased services and materials from a wide variety of suppliers. He could see that Virginia Mason was one of those suppliers; a supplier in fact that provided a critically important and increasingly expensive set of services to employees. Health care costs were typically one of the leading employer expenses and the great majority of these companies managed their suppliers with rigor and discipline—with the notable exception of health care suppliers.

To gain a better understanding of what the employers wanted from him, Mecklenburg paid a visit to Annette King, the benefits manager for Starbucks, which is headquartered in Seattle. King was taken aback for she had never before had a doctor come to her office and ask her how he could improve care for her employees. Mecklenburg and King had an amiable discussion, which wound up centering on the problem of back pain among Starbucks workers. King said it was a significant problem for her workforce, causing pain and missed work and driving up her costs while hurting productivity.

Mecklenburg was genuinely surprised that large numbers of Starbucks workers suffered from back pain and that it had such a significant negative impact on the company. He left King's
office with a sense of excitement. He had been working to adapt
the Toyota principles and methods to the medical center’s work
and now he saw an opportunity to take those methods outside into the marketplace. It was, thought Mecklenburg, a huge
opportunity, and Gary Kaplan saw it as “a call to arms.” “It was
the catalytic event we needed to develop clinical value streams,”
Kaplan says. “We were focused on the fact that we needed to
understand the data and make the care better for the people
who receive care, our patients, and more affordable for those who
purchase care, their employers.”

After a series of internal discussions Mecklenburg invited
Starbucks and Aetna to join with Virginia Mason in forming what
he called a marketplace collaborative to identify and solve the qual-
ity and cost issues around treatment of routine or uncomplicated
back pain. Starbucks and Aetna agreed immediately and began
working side by side with Mecklenburg and his team, including
Dr. Andrew Friedman, head of the Virginia Mason spine clinic.
After a series of discussions the collaborative settled on five prin-
ciples. They agreed to

1. focus on customers’ highest costs;
2. adopt customers’ definition of quality;
3. create evidence-based clinical value streams;
4. employ systems engineering tools to remove waste;
5. use a cost reduction business model.

Friedman and his team had discovered that about 80 to 85
percent of patients with back pain suffer from an uncomplicated
medical condition best cured by physical therapy; the remaining
patients needed more advanced treatment. The collaborative
identified uncomplicated back pain as a target of opportunity for
improving efficiency and effectiveness in the delivery of care.

The First Breakthrough Collaborative

At this point the Virginia Mason Production System began to
play a defining role. Mecklenburg and his colleagues developed
a value stream map of back pain care at Virginia Mason. This
map defined each step in the process and revealed the current
state of care—the reality. Kaplan referred to it as “draining the swamp” to see what was underneath. And what was underneath was distressing. The process was chaotic, immensely wasteful, not at all effective for patients—and needless to say, expensive.

The value stream map revealed that patients entered the spine clinic through various portals—via a primary care physician or specialist in neurology or neurosurgery. These visits, especially those with specialists, were extremely expensive and did very little if anything to help a patient with uncomplicated low back pain. Waits for appointments to see such specialists could run into months. Andrew Freidman commented that patients might have an MRI and “then have another wait to review that scan, then they would have another wait in order to finally get into physical therapy.”

After carefully studying the value stream map, Mecklenburg told Annette King and other company representatives in the marketplace collaborative something none of them had ever heard from a physician before, something truly startling: “The value stream showed that most of our care process was no help at all,” says Mecklenburg. The potential gains with the uncomplicated back pain patients was obvious: many were receiving MRI tests, for example, at a cost of $1,200 each to Starbucks, yet the evidence indicated that an MRI for patients with uncomplicated back pain provided zero clinical value. Needless waits and delays for care were substantial and did not add value. It was pure waste.

The collaborative members then focused on what King wanted for her employees, and they defined quality care—from the customer’s perspective—as having five components:

1. Evidence-based care
2. 100 percent patient satisfaction
3. Same-day access
4. Rapid return to function
5. Affordable cost for both providers and employers

These elements guided Mecklenburg, Friedman, and their colleagues in radically reshaping Virginia Mason’s treatment path for uncomplicated back pain. They started with a patient’s initial call with a complaint of back pain. The team designed a standard series of evidence-based questions that separated patients
with uncomplicated back pain from those needing emergent or complicated care. Those in the uncomplicated category would not wait. They would be seen that day—the same day they called. Patients would arrive and meet with a physical therapist (PT) for a fifteen-minute discussion of their condition. For an additional fifteen minutes a physician would join in and, sitting side by side with the PT, discuss the case and approve the treatment program. Patients would then have their first sixty-minute PT treatment.

This marketplace collaborative with Starbucks and Aetna could hardly have been more successful. After just ninety days, the new pathway had cut patients’ waiting time for an appointment from an average of thirty-one days to same-day access. On top of that, the first year’s data showed that 94 percent of patients were returned to work that day or the next. No prescription medications were needed in three-quarters of the cases, and patient satisfaction ratings were through the roof. The results were huge positives for the patients, for Starbucks, and for Aetna. And Virginia Mason turned its loss of revenue from unnecessary procedures (including unnecessary imaging tests) into additional capacity so that staff could see and treat many more patients.

More Breakthrough Collaboratives

Mecklenburg and his colleagues established comparable marketplace collaboratives with various other companies in order to improve treatment for migraine headaches; breast nodules; shoulder, knee, and hip pain; acid reflux; and cardiac disease. Every collaborative achieved substantial improvement in value for purchasers and patients.

The Virginia Mason team also began a marketplace collaborative on imaging with the state of Washington purchasing arm, the Health Care Authority. This collaborative took the process Virginia Mason already had for determining whether back pain and headaches required imaging and added a similar process for sinus imaging, with the result that about 25 percent of advanced imaging studies in these three high-volume areas were eliminated. The dramatic reduction in the use of MRIs was an important finding that Mecklenburg and his colleagues shared with the broader medical community in the *Journal of the American College of Radiology* (Blackmore, Mecklenburg, & Kaplan, 2011).
The collaborative solution was simpler, more effective, and much more efficient than methods previously reported in the medical literature for reducing unnecessary imaging. The breakthrough feature was **mistake proofing**, a method learned from Toyota. A provider seeking to order an MRI of the lower back, for example, was presented with a series of checkboxes on the computer screen. Each box represented an evidence-based indication for the test. The test was scheduled when the patient checked a box, indicating an evidence-based reason for the test. One click of the cursor both scheduled the test and ensured that imaging was evidence based. If the patient showed none of the evidence-based indicators, the test could not be ordered. This method immediately and dramatically reduced utilization of advanced imaging. Just as important, it eliminated the need for costly commercial systems that require either time-consuming preauthorization or retrospective audits, reports, delays in payment, or lengthy appeal cycles. These costs are initially absorbed by providers but quickly shifted to employers through increased prices. Other provider groups in the Seattle market have replicated this method with similar success, and the Virginia Mason team offers the method free to anyone who wishes to use it.

**Spreading the Marketplace Collaborative Concept**

Virginia Mason’s singular success in adapting the Toyota Production System to health care resulted in a good deal of international attention. A steady stream of providers from around the world have traveled to Seattle to learn from Virginia Mason. To accommodate the growing demand, Kaplan founded the Virginia Mason Institute to share the organization’s knowledge.

Similarly, the marketplace collaboratives were so successful that in 2007, Kaplan, Mecklenburg, and several colleagues founded the Center for Health Care Solutions at Virginia Mason Medical Center. It was among the most tangible efforts by the organization to pursue its commitment to transform health care, and Mecklenburg transitioned from chief of medicine to medical director of the new center. Mecklenburg was convinced that the marketplace collaborative model could be adopted anywhere in the United States and that it could have a
significant impact on the health care quality and cost challenges facing the country. He believed it would improve access to care, as well. Although Mecklenburg liked much of what was contained in the Affordable Care Act of 2010, he worried that it would not provide enough help fast enough to companies struggling with the mounting costs of care for their employees. “The fundamental system is dysfunctional and the legislation does little in the short term to change that,” he said not long after the law was enacted. In fact, he said, millions of new people would be brought into this existing wasteful system.

As he focused his work on the role of employers in improving cost and quality, Mecklenburg worried that without significant changes, the same trends that had existed for some years would continue and that employers would continue to shift the financial burden of unaffordable health care to their employees. This cost shifting could become a vicious cycle in which employees, who are even less able than employers to cope with the climbing cost of coverage, could end up in a terribly vulnerable position.

That there was no significant short-term relief for employers was where the real opportunity lay in Mecklenburg’s view. The key to fostering rapid change and improvement in both quality and cost was through leveraging the purchasing power of employers. “Purchasing power can bring out the best in health care,” he says, because if leveraged properly, it would improve quality, drive down cost, and create greater opportunities for access.

The lesson of these collaboratives was clear, says Mecklenburg. What we need from providers is the ability to produce quality health care. When providers eliminate waste and produce reliable, quality care, the cost declines. But health plans also have an essential role. They must align reimbursement with value, paying for “high quality and rapid access not poor quality, waits, and delays.” He argues that if health plans continue to be willing to pay for poor-quality care, the marketplace will continue to produce poor-quality care. But if employers and public agencies purchase high-quality care, inefficient and ineffective care will be driven from the marketplace.
Produce Quality; Pay for Quality; Purchase Quality

A fundamental problem, as Mecklenburg sees it, is that employers have been outsourcing the purchase of one of the most important inputs to their organizations: health care. And they have entrusted this most important responsibility to health plans that often have no economic incentive to purchase high quality care for employers. He argues that health plans too often do not purchase care efficiently or intelligently for their clients. In a better system, he says, “the job of health plans is simply to pay for quality. That is all they should do.”

But because health plans do not do that, Mecklenburg believes that the solution is to have employers step in and do it themselves—or to use their leverage to make sure health plans do it. “Employers should take an active role themselves,” he says. “They should know what quality is and buy it.” The difficulty, he says, is that the vast majority of employers do not shop prudently for themselves or their employees, nor do they recognize the difference between high-quality and poor-quality care. Employees end up with inconsistent, expensive health care and the employer—with a combination of employee and company money—picks up the tab.

Gary Kaplan often notes that the entire process would be helped if cost and quality metrics in health care were much more transparent than they currently are.

Mecklenburg’s core belief, and the idea behind the marketplace collaboratives, is that “if you can define and measure quality, why don’t you procure it with the care that you buy other goods and services? It is quite possible to define, measure, and report quality indicators for health care. What health care reform needs are employers willing to demand the best from providers and health plans for their employees.”

Intel Looks to Health Care to Improve Cost and Quality

Bob Mecklenburg and Pat McDonald had never met before September 18, 2007. They had traveled radically different professional pathways. Mecklenburg was a physician in a large medical
Pursuing the Triple Aim

center and McDonald was a plant manager for Intel, one of the world’s leading technology companies and the largest semiconductor chipmaker ever. Pat’s beginnings there were modest: she had started as a summer intern on the manufacturing floor in 1985 and by 2007 had worked her way up to become manager of Fab (fabrication plant) 20, then Intel’s highest-performing chip factory in the world. Yet these very differences—combined with their mutual passion for improvement—would soon make Mecklenburg and McDonald one of the more innovative teams in American health care.

When they first met, McDonald and several of her Intel associates were visiting Seattle to attend a conference where Mecklenburg was one of half a dozen Virginia Mason people who presented that day. As part of the conference, a tour of Virginia Mason was offered, and McDonald and her team eagerly signed on. At Intel, getting inside a plant for a tour is all but impossible, so she jumped at the chance to see the Virginia Mason operations. She was intrigued by the whole concept of applying lean thinking and methods in health care and was eager to see exactly what that meant in reality.

The plan was to tour both the pediatric and sports medicine clinics, and when the group was led into pediatrics, McDonald recalled, “the biggest thing that hit me was there was no one in the waiting room. I thought, well, it’s either staged or everyone is on break.” But the reality was that the flow of work in pediatrics had been completely redesigned by teams of parents and providers—all the providers involved in pediatric care. The result was that patients were being seen within ten minutes of arriving at the clinic.

As a parent McDonald was impressed that “you don’t have all the children in the waiting room coughing and crawling all over you. If you were there with a well child, you’re not going to get a sick child right with him.” She could also see that all supplies were in the exam rooms so that the care team did not have to go looking for anything. “It was clear they had the right tools at the right time at the right places, so it was very analogous to what you do on a manufacturing floor. On the other side—behind the curtain in the working area—they had a great monitoring system for the care units, and the provider teams were sitting together,
which facilitates teamwork and communication. You could see engagement and facilitation of communication, and it was clear how that would lead to error proofing care of the patient.”

McDonald was similarly impressed with the sports medicine section, where a physician on the tour asked a question of a Virginia Mason staff member. He said it was fine to see improvements in flow coming from lean methodology, but he wondered how or whether lean techniques had been used in clinical care.

The answer was absolutely—Toyota techniques had been applied throughout the clinical processes. For example, explained an RN, physicians and physical therapists at Virginia Mason had recognized that treatment of rotator cuff injuries varied widely, which meant not all patients were getting the best care. The clinical team worked together to identify and standardize a best practice for such injuries, and patients subsequently received that standard, best-practice care every time—no matter the provider.

When she left Virginia Mason to return to Portland, McDonald thought very seriously about her own work. She had attended a five-day lean training program in Detroit a couple of months earlier and come away not entirely sure how lean approaches would apply to her business. But seeing the applications in health care—given its immense complexity—impressed her. She realized that although she had applied some lean approaches in her factory, she had done so only in certain areas. And she had not applied the techniques in attempting to solve her most challenging and complex business problems. As she traveled back to Portland, she says, “my light bulb turned on and I thought, if Virginia Mason can apply lean methodology to health care, where peoples’ lives and quality of life are at stake, I certainly can go back and apply it to the most complex problems in my factory.”

But this would not be easy. McDonald’s factory was recognized as a worldwide quality leader, and her manager told her, “Your biggest disadvantage in implementing lean is your success.” Ironic of course but true in a way. Why mess with success?

But McDonald had a very good reason for wanting to bring lean tools and techniques to the factory: She was determined to achieve the ideal state—zero defects and zero quality events (at Intel, quality events were incidents that caused a disruption in normal manufacturing operations). She had reached an elite level
of achievement through traditional management methods, but she believed that to push through to that ideal space, she needed something more rigorous; a method that would lay bare the manufacturing process and in so doing reveal any heretofore hidden glitches. She also believed that lean management would eliminate waste and make her operation even more efficient.

McDonald and her team intensified their efforts, developing tools and processes for delivering rapid, lean improvements in three-week cycles. Essentially, the team would identify an issue or challenge, examine it as a value stream, and determine what constituted a waste or delay and what constituted value. The team then worked to eliminate the waste and delays and focus only on what was value-added.

And it worked well in a number of areas. When her team had become more amenable to the lean methods, she decided it was time to tackle the toughest problem she faced. The unpredictable and recurring nightmares in her professional life were the rare but deeply troubling quality events in manufacturing. These somewhat silent and often hidden problems were by no means unique to Intel. In fact, they are inherent in technology manufacturing. The most troublesome aspect was that when a quality event occurred it might not be recognized at the time and could remain undetected until later—sometimes much later—in the manufacturing process. Quality events could be so serious that the production line would have to be slowed or even shut down altogether while the problem was resolved. Intel engineers could solve these problems once discovered, but McDonald and her team were determined to do better—to find them much earlier in the process, before they had a chance to cause an interruption in the manufacturing operations.

The deeper McDonald and her team dove into the problem using rapid lean tools—including direct observation and value stream mapping—the more they discovered parts of the engineering processes where standardization provided compelling improvements. Identifying and eliminating variation enabled the team to detect and fix problems more quickly, which improved the quality of products and controlled the cost of production.

The initial work focused on a part of the manufacturing process known as lithography. It would be difficult to overstate the
significance of lithography—the process of printing a pattern on silicon wafers—in the manufacture of semiconductor chips. "Lithography is the heart and the most complex operation in semiconductor processing," says McDonald. "And the setup must be precisely correct." Controlling this operation is the daily work of the sophisticated engineering organization in a semiconductor manufacturing facility. Variation is the enemy. If McDonald and her team could identify variation during the manufacturing process rather than further downstream, it would enable them to make quick, cost-effective corrections.

They learned through the lean process that part of the problem was human variability, specifically variation among engineers. "We had not tackled the variation in decision making among the engineers because they were the experts, many of them doing it for decades," McDonald says. "And remember the backdrop—this was the highest-quality, lowest-cost factory. And you’re telling the expert he’s not doing his job?"

At one point McDonald thought the lean work had solved the issue, but soon afterward a quality event occurred. "We’re thinking, ‘life is good,’ and then we hit a speed bump. We had a repeat quality event in a place we did not standardize," says McDonald. With the rapid lean tools in place, they “found it fast and fixed it fast.” They succeeded in standardizing both the process and decision making. The improvements were a breakthrough. In less than a year McDonald and her team achieved their ideal state of zero quality events in the lithography process. The result of this work was not only a dramatic improvement in the manufacturing process but a newfound respect for the lean process generally and, in particular, for the work being done at Virginia Mason.

When he later heard about the work at Intel from Pat McDonald, Bob Mecklenburg was delighted it had gone so well and that the inspiration of Virginia Mason had played a small part. He also found it richly ironic. "The amazing thing to me was that a high-tech, high-performing manufacturing company like Intel would learn anything from Virginia Mason in terms of systems engineering," he says. "The further irony is that we had spent years translating our approaches from Japanese manufacturing to U.S. clinical care and then [making a] further
translation from the language of clinical care to that of purchasers of health care. And here we were translating back again from the language of health care purchasers to that of clinical care to that of manufacturing. It struck me as unusual and remarkable and reinforced the thought that we were all converging on similar approaches for tackling the same fundamental problems.”

The Right Way to Do This Is to Put the Purchaser in Charge

As a plant manager Pat McDonald held one of the most challenging and critical roles within Intel Corporation. Part of succeeding at Intel meant managing and partnering with suppliers, and McDonald had done so through the years. She had also been successful at controlling costs in a wide variety of areas affecting manufacturing. But she had never given much thought to the cost of health care for Intel employees. That changed in 2009 when she was asked to join a committee—known at Intel as a corporate strategic discussion—to explore ways to control the rapidly rising costs of health care for Intel employees. “Health care was the only area of our business where we did not control quality and cost,” she says. “And costs were out of control. When we manage equipment suppliers, we measure safety, quality, and cost. We weren’t doing that with health care suppliers.”

To say that Intel managed suppliers with discipline and rigor was to understate the reality by an order of magnitude. Intel’s Supplier Continuous Quality Improvement (SCQI) Program “is an organized proven program for achieving extraordinary supplier performance,” according to the company. “Suppliers continuously improve their products and services provided to Intel. The program rewards suppliers for quality results and behaviors.” The company’s Quality of Service Health Assessment “is used to assess a supplier’s quality systems against a pre-established set of scoring criteria to determine if systems exist, effectiveness of the systems, and which areas need attention” (Intel Corporation, n.d.[a]).

These and a variety of other programs manage and refine the supplier process at Intel, using rigorous management and state-of-the-art technology. Yet the committee on which
McDonald was serving could see that similar rigor did not apply in health care.

The committee was fairly large, with twenty-plus members from many different areas of the corporation. The idea was to explore the whole topic of health and wellness and to ask how the company could deliver better services to employees while reducing costs. Committee members spent months listening to guest presentations from experts and reading many case studies. Finally, the group was convened for a discussion about what to do. Richard Taylor, an Intel vice president and director of human resources, led the session and asked each person in turn to make a recommendation. It so happened that Pat McDonald was the last to speak.

“If this problem was in manufacturing, the way we would approach it is we would apply lean,” she said. One of the previous speakers had alluded to Virginia Mason’s work with Boeing in Seattle, and McDonald remarked on that and added, “I have seen Virginia Mason and they have started working with employers, so why don’t we apply lean to health care and see if we can copy what they are doing and reproduce it here?”

Richard Taylor liked the idea and gave McDonald the go-ahead to proceed along that pathway. She subsequently took the corporate strategic discussion group to Seattle to see Virginia Mason and, she says, to show the group “why I believed in their approach to apply lean to health care and the health care marketplace collaboratives. My point was that we could do that in Portland.”

McDonald’s Intel team included two senior lean practitioners, and HR executives, including Richard Taylor, who was also the executive sponsor of the project. The team also included a person from the Intel Digital Health Group, a joint venture with GE to develop services that help people live healthy, independent lives at home. In all, the team numbered around eight, and they spent the better part of a day at Virginia Mason. “We were expecting a slide show with one or two presenters not a whole fleet of doctors and nurses taking the time to tour us through Virginia Mason,” says McDonald. “They gave us free, open, flowing dialogue—open access. It was amazing. Their openness and transparency was very impressive.”
McDonald and her Intel associates also vividly recalled meeting Mecklenburg when they had visited two years earlier.

McDonald says that his professional standing and knowledge coupled with his striking sense of transparency had made for a powerful presentation. Mecklenburg had talked about his work and also about the Virginia Mason Production System and their effort to reach zero defects. He had acknowledged that Virginia Mason was not there yet and told a riveting and tragic story about a patient of his—Mrs. Mary McClinton—who had been given an intravascular injection of a colorless antiseptic that had been mistaken for an intended injection that was also colorless. The antiseptic injection was deadly, triggering a fatal shutdown of Mrs. McClinton’s internal systems until she died, weeks later. The Intel team was struck by the fact that the Virginia Mason leadership had released the news publicly so that an understanding of this mistake—and the corrective actions that followed to prevent its recurrence—might help other provider organizations prevent a similar mistake. To the Intel team Mecklenburg had demonstrated not only a commitment to excellence but courage as well, and they felt a real sense of confidence in his professionalism.

Now, on their current visit, McDonald and her colleagues were also impressed with a tour of the Virginia Mason oncology unit, which had been thoroughly redesigned applying the principles and tools of the Toyota Production System. “They showed the redesign to get all oncology services on one floor,” says McDonald.

You could see that people were not just waiting around in a crowded room almost sitting on top of each other. They had a pleasant soothing spacious area. In the treatment rooms you could see how everything was brought to the point of service—to the patient. It was very serene, not rushed, not hurried. They talked about the immense change it took to get all docs and nurses to agree how to lay out oncology floor—to get the treatment at the point of activity and provide the right care at the right time.

We saw where they did real-time blood work, and to us as engineers, seeing the rigor with which they were doing real-time
blood work—seeing incredible reductions in throughput times in terms of turning around the results to patients waiting to hear their latest results in their battle for life—it was quite impressive.

In one conference room, the Virginia Mason team had displayed a list of precisely what they had been working on with measurements indicating progress or lack of it. “It was an entire wall of key indicators,” McDonald recalls, “exactly what they were working on in terms of continuous improvement and care delivery. And even to us as laypeople it was very clear the progress they were making.”

When leaders at Virginia Mason talked about the Virginia Mason Production System they emphasized the specific work they had done around safety, quality, and cost, and McDonald was hearing “many of the same specifics we talk about at Intel when we talk about manufacturing.” The Intel team was also struck by the openness displayed by Mecklenburg and the rest of the Virginia Mason presenters. They talked openly of challenges and barriers and in no way tried to sell any notion that their method was not without its imperfections or challenges. When Mecklenburg displayed the pyramid, a graphic representation of Virginia Mason’s strategic plan, an ever-present guide for decision making with the patient at the top, it was clearly similar to the Intel approach of identifying the customer as their top priority.

Mecklenburg’s message could hardly have been more direct: companies such as Intel should use their purchasing power to get the health care they deserved and were paying for. He compared the cost of care in the United States with the cost in other industrialized nations and said emphatically that Intel “should not be paying 40 percent more than [its] global competitors.”

“We had hours together and we talked in detail about the barriers to health care reform,” says Mecklenburg. “We talked about the challenges of producing quality and reimbursing for quality and purchasing quality.” He talked in some detail about his experience with the Seattle marketplace collaboratives and what he had learned from that experience, that the collaborative was a practical model for harnessing the purchasing power of employers. He recounted some of the difficulties he had encountered along the way and expressed his strongly
held conviction that “the right way to do this would be to put the purchaser in charge.”

“It felt like we didn’t have to do a whole lot of explaining to them,” says Mecklenburg. “They quickly understood what we were talking about. The conversation flowed easily and was relaxed. They really understood what we were trying to do because they had been walking through the briar patch. What we were about was aspiring to produce the same value and pace of improvement they had demonstrated.”

And Mecklenburg went on to mention the prediction of Intel cofounder Gordon Moore that “the number of transistors incorporated in a chip will approximately double every 24 months.” As Intel has pointed out, “This forecast of the pace of silicon technology, popularly known as Moore’s Law, was more than just a prediction. Essentially, it described the basic business model for the semiconductor industry. For more than four decades, Intel has delivered the challenge of Moore’s Law” (Intel Corporation). Of course in health care, achieving an equivalent to Moore’s Law is more complicated. Atul Gawande has noted that a physician with a new patient faces something on the order of 13,600 diagnostic options and over 6,000 medications to choose from. He has also observed that in the mid-1970s, a patient in a hospital required 2.5 staff FTEs (full-time equivalents) for their care and twenty years later, in the mid-1990s, the requirement was more than 15 (personal communication with Maureen Bisognano, 2011).

Transferring Lean Lessons from Health Care to Manufacturing

On May 1, 2009, a few days after the Virginia Mason visit, Pat McDonald and the rest of the Intel team gathered back in Portland for a follow-up discussion. The group members discussed things they had seen and learned at Virginia Mason that they thought might apply to their situation at Intel. Their foundational question—whether Virginia Mason was for real—had been answered. The Intel team came away with no doubt that it was not only for real but that its people had achieved a high level of excellence in applying lean throughout the organization.
The team went through a process often used at Intel, with several steps including a discussion in which team members answer the question, “What did you see?”

They saw, for example, “cases of moving from doctor as customer to patient as customer.” They saw a team that had overcome the “hierarchical structure of the medical industry” and turned it into a “collaborative team structure.” They saw a top-down commitment from executives and the former chief of medicine (Mecklenburg) as well as “bottom-up ideas percolating at the grass roots.” The Intel team saw empty waiting rooms in a service where the exam rooms were full; collaboration with business partners; a culture in which people were willing to take risks to improve care for patients. “We saw that they were the real deal,” says McDonald. “We saw that they were advanced lean practitioners. We walked away believers. These folks genuinely know what they are doing and they were willing to share and be transparent in their practices. They were for real.”

So much so that McDonald wanted to replicate the Virginia Mason marketplace collaborative model in Portland. The Intel team members liked the collaborative’s experience of paying for value, and they were attracted to the way the companies in Seattle had engaged with the health care providers directly rather than working through the insurer. They were also attracted by the idea that the Virginia Mason experiments had informed and empowered patients. Their notes from the meeting convey their thinking clearly: The Intel team liked the “shared savings approach vs. winner/loser (specialist time focused on right patient, practicing their specialty—right patient, right time, right provider).” The idea that the Seattle marketplace collaboratives had succeeded in eliminating expensive, unnecessary treatments—MRIs, for example—while at the same time getting people back to work at peak efficiency very quickly was, of course, immensely appealing to Intel, for this was where the company’s bottom line could be significantly improved.

McDonald could clearly see that Intel did not have the needed expertise in this area but that Mecklenburg was a technical expert with enormous experience and thus the ideal partner and adviser in the venture. As her notes indicated when the Intel team met back in Portland, “Dr. Mecklenburg is the expert/
coach for marketplace collaboratives.” She also recognized a fundamental difference between what had happened in Seattle and what the team was thinking about for Intel. In Portland the marketplace collaborative would be led by Intel—an employer—not by a provider organization as had been the case in Seattle. This was no mere subtle difference. This in fact was what Mecklenburg urgently wanted—this was Virginia Mason’s vision for where U.S. health care could go to improve quality and reduce cost: have employers exercise their market power and leverage to purchase high-quality care and only high-quality care.

“It is important that the collaborative be driven by an employer and not a provider or a health plan,” Mecklenburg says. One main reason for this is that the motives of both providers and health plans are often suspect. “When a provider drives a marketplace collaborative, it does not have as much credibility as when an employer drives the collaborative. Providers have not always done their best for purchasers.” Moreover, “a provider or health plan driving a collaborative oriented toward better, faster, more affordable [care] will likely not be as effective as when the actual purchaser—the stakeholder accountable for the health and well-being of employees—does it. The employer has a strong incentive to secure rapid, high-quality care to ensure a healthy, productive workforce to compete in the global marketplace. The employer has an immense stake in the good health of its employees.”

With the employer driving the process it quickly becomes clear who is paying the bills, who has the purchasing power. It becomes obvious that both providers and health plans are employed by employers; that employers are paying the salaries of providers and health plan staff. In the marketplace collaboratives on which he worked in Seattle, Mecklenburg found that “it was often a challenge to get the employers to flex their muscles and use their purchasing power; to not be unduly influenced by the health plans and the doctors. Employers often hesitate to hold either doctors or health plans accountable for delivering the best in quality and value.”

On June 2, 2009, just weeks after the Intel team’s visit to Virginia Mason, Mecklenburg and Diane Miller, executive director of the Virginia Mason Institute (VMI), accepted an invitation to travel to Portland to meet with McDonald and her team.
“They wanted to seriously explore establishing a partnership with VM [Virginia Mason] to create a marketplace collaborative in Portland—to copy exactly what VM had done in Seattle,” says Mecklenburg. “This was a big deal. I thought it would be remarkable to line up these two organizations around health care. I had practiced for over thirty years and there weren’t many things that would get my pulse rate up too much, but this was one of them: a defining moment.” With Intel involved, Mecklenburg believed the business community throughout the country was likely to take notice and thereby increase employer demand for high-quality, high-value health care.

The message from McDonald to Mecklenburg and Miller was simple: We would like to copy exactly what you are doing. To do that, McDonald wanted to form a partnership with the Virginia Mason Institute whereby Mecklenburg would act as counselor and guide to Intel throughout the process. Before drawing up and agreeing on a contract, however, McDonald hosted a session in Portland where the Intel and Virginia Mason teams went through a process of identifying the gives and gets for each side.

The June 2 meeting brought together Bob Mecklenburg and Diane Miller from Virginia Mason with the Intel team of Pat McDonald, Kevin Carmody, Brian Devore, Dr. Don Fisher, and Richard Taylor. The facilitators were Matt Brownfield and Wendy Fedderly, senior Intel lean management experts.

The objectives were clearly stated in the slide that kicked off the meeting:

- Form a collaborative team with Intel and VMI.
- Understand and agree to the value added proposition for Intel and VMI (note: value added is defined as what each will add, and what each is willing to pay for).
- Plan the process for Phase I partner selection, in a way that will positively disrupt the health care system in Portland, and get the attention of the largest providers in the Portland area.

The group identified the ideal state from Intel’s point of view: to “pay for value” and to provide the right care in the right place at the right cost and the right time. The ideal state would
include a focus on wellness and an “absence of need for reactive care due to flawless performance on proactive care.” It would also be defined by the “elimination of errors: zero defects.”

This approach, which had helped to guide the collaborative work at Virginia Mason, “really resonated with us,” says McDonald. “The elimination of errors—zero defects—is language we use in our factories.”

With Intel’s aspiration for an ideal state defined, the question became how would the team try to achieve it? And the answer came in the form of a pyramid (Figure 2.1)—largely, though not entirely, copied from the pyramid that spells out Virginia Mason’s principles and its vision “to be the Quality Leader and transform health care.”

“We talked about our mutual goals,” McDonald says, “what we each had to give to the formation of a market collaborative and what we would get out of working with each other.”

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**Figure 2.1. Intel Guiding Principles**

"Vision" Right care, right time, right place, right cost

"Mission" Improve the value, efficiency, and cost of health care delivery

"Values" Disease prevention, Effectiveness/efficiency, Making a difference on a big issue

"Transparency" Quality patient care, Innovation/change

"Strategies" Cost, Quality, Customer satisfaction, Customer control, Provider strategy, Collaboration

"Team Structure" Internal and external partners

*Source: Intel Corporation.*
The gives and gets approach was familiar to the Virginia Mason team. Early on in his tenure as CEO in fact, Gary Kaplan and his leadership team had gone through a challenging process that led to agreement on a compact with the Virginia Mason physicians—essentially a gives and gets agreement between doctors and the organization. The Intel and Virginia Mason meeting was designed to identify areas of agreement and disagreement between the two organizations’ teams, but as the meeting progressed it became clear that there were no areas of substantial disagreement and many areas where their interests aligned.

Intel would get superb clinical guidance from the developer of the marketplace collaborative concept, and Virginia Mason would get to test its work in a new market with one of the nation’s blue-chip companies. Most important, if the collaborative was successful, Intel employees would get better quality care at a more affordable price. Or as McDonald put it, “the right care at the right time at the right cost.”

From McDonald’s perspective, Intel wanted to affiliate with a highly credible health care provider organization. “One of our internal values at Intel is technical expertise, and we were very conscious that we were not the technical experts in health care,” she says. McDonald also emphasizes what a central role Mecklenburg played from the start. “He was really our voice of confidence—’you guys can do this,’” she says. “And he had proof of concept because he could talk about work the Virginia Mason team had already done. I don’t think we really got the concept of using our purchasing power, because we were daunted by the fact that we were not the technical experts. But his message was, ‘you are the employer. You are paying the bill. You need to sit down with providers and specify what you’ll pay for.’”

Ultimately, of course, this made perfect sense to McDonald. “That’s the way we handle our other suppliers,” she says. Intel’s manufacturing equipment suppliers were improving quality and reducing cost year after year, “but we were not taking the same approach in health care.”

McDonald felt hopeful. She and her colleagues had worked well with Mecklenburg and Miller, and it was clear now to McDonald—clearer than it had been before—that the timing of the work was just right and that Mecklenburg was right when he
said that as an employer Intel possessed significant market clout. “I’ve been in thousands of meetings and many are sort of vague; heads nod affirmation but when you finish the meeting it’s not like there is strong agreement, it’s often a more casual agreement,” says Mecklenburg. “This is not the case with Intel. These are decisive people.”

There was clear definition about what each side would contribute and get in return. Mecklenburg, for Virginia Mason, would provide content and counsel based on his experience with the Seattle marketplace collaboratives. He would help guide Intel in trying to copy what he had done in Seattle. Mecklenburg would review and analyze claims data to identify areas of heavy cost for Intel. He would advise providers what they could do to be successful within the collaborative.

In exchange, Intel’s major give was that they were spreading the Virginia Mason concept to another major marketplace and they would compensate Virginia Mason for Mecklenburg’s time and for the purchase of value stream maps Virginia Mason had completed for a variety of care areas including low back pain. Figures 2.2 and 2.3 display what the gives and gets from the meeting looked like after the session.

Though the Intel team was initially uncertain that the company had the market power to leverage providers, Mecklenburg continuously reassured them. “We found that [in 2008] 20 percent of all claimants drove 64 percent of all health care costs in Oregon,” says McDonald. “That 5 percent drives 39 percent and the next 5 percent drives 12 percent.”

McDonald aspired to spend 80 percent of Intel’s health care dollars on prevention and wellness, leaving 20 percent or so to cover those who needed more intensive care and treatment. The company data were interesting for they showed that during 2008 and 2009, about 25 percent of the ailments suffered by Intel employees were musculoskeletal. But this 25 percent accounted for 55 percent of the company’s health care cost. In addition, these ailments caused employees to miss work, thus increasing the cost to Intel. In a close examination of claims data from many employers, Mecklenburg found their major costs. First was the cost of screening and prevention that included office visits, blood work, and tests such as
mammograms and colonoscopies. Next came upper respiratory ailments and then musculoskeletal issues, including back, knee, hip, and shoulder ailments.

The group could see that Providence Health & Services, a not-for-profit network of hospitals, health plans, and physicians, and Tuality Healthcare, a much smaller community-based provider in Portland, were logical choices for Intel’s collaborative, as was CIGNA, one of the health plans serving Intel. Initially, there was some concern among the group members about
Figure 2.3. VMI Gives and Intel Gets

<table>
<thead>
<tr>
<th>Value VMI Will Add (Give)</th>
<th>Value Intel Will Pay For (Get)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Help identify greatest cost opportunity direct and indirect</td>
<td>• Quality: Right care, right place, right cost, right time—strong agreement on what/when those are</td>
</tr>
</tbody>
</table>
| • Expertise in determining value and monetize value | • Patient-centric care
  • Phase I 20% is addressed |
| • Provider expertise/change management | • Wellness focus
  • Absence of need for reactive care due to flawless performance on proactive care
  • Disease prevention |
| • Tools to support doing the right thing right, e.g., mistake-proofing tool applied to health care | • Innovation/change |
| • Experience with non-zero sum aligning all stakeholders | • Making a difference |
| • Experience with patients involved in care design | • Effectiveness and efficiency |
|                           | • Transparency |
|                           | • Identifying and improving non-data driven key issues |
|                           | • Elimination of errors: zero defects |
|                           | • Compelling cost benefit to all parties involved |
|                           | • Patient/employee satisfaction (would you send your mother here for care?) |
|                           | • Positive external press linking to marketing/lobbying in D.C. |
whether the doctors at Tuality and Providence would be willing to participate. Mecklenburg was amused by this.

“Can we really talk with these doctors?” McDonald asked Mecklenburg.

“I said, ‘Pat, they will be here in ten minutes,’” recalls Mecklenburg. “It took almost zero effort to line up the providers. Intel is the customer every provider wants.”

**Intel Uses Purchasing Power to Put the Patient First**

On September 28, 2009, McDonald, joined by Mecklenburg, hosted a meeting of the collaborative participants at the Venetian Restaurant in Hillsboro, Oregon. About thirty-five people in all, from Intel, Providence, Tuality, and CIGNA, attended. McDonald talked about Mecklenburg’s work in Seattle, and she explained that she wanted to get a better grasp on quality improvement and cost control for Intel employees. She also talked about the crucial role that lean principles played at Virginia Mason and at her Intel plant, citing the results of her lean work.

One of the most striking aspects of the meeting to McDonald was the unanimity among the providers about wanting to put the patient at the top of the pyramid. Gathered at the meeting were physicians, nurses, physical therapists, and administrators, and all were deeply committed to doing what was best for the patient. “They all share that higher level goal,” says McDonald. “It’s unique to their field. I had been involved in semiconductor consortiums for many years and there was no higher level goal that could tie everyone together. But here we were talking about something that was for the good of a human being. That’s an amazingly powerful area of inclusion and it is very difficult for anyone to walk away from that.”

The meeting was also a key moment for Mecklenburg, who witnessed the purchasing power of Intel. “Pat could see the power and influence she had as a purchaser,” he says. “Pat felt her authority, her ability to help providers and health plans move in the right direction. She understood that she is the customer and these are her suppliers who will do what she wants and that was a wonderful moment—to see Pat gain confidence in this domain.”
When Mecklenburg spoke at the session he sought to convince Providence, Tuality, and CIGNA that by changing the way they delivered certain care they had the chance to significantly improve quality and efficiency. He also sought to reassure providers “that this was going to be OK. That they weren’t going to harm the finances of their institutions.”

The fact that Mecklenburg had been a practicing physician for more than three decades as well as chief of medicine at Virginia Mason and a member of the Virginia Mason board of directors—in addition to his marketplace collaborative experience—gave him great credibility with the provider groups. Providers were hesitant, Mecklenburg says, to ask accountability of health plans, who control the flow of crucial information. The role of health plans is a particular sticking point for Mecklenburg, who is frustrated that health plans control essential information that both providers and employers need to improve the cost picture for employees. “Health plans control billing data and are in the position of using that data to interpret value for employers,” he says.

Billing data clearly conveys information about cost and this is very important, but billing data is not designed to measure quality or value and has serious limitations in these areas. For example, billing data cannot tell if an MRI is necessary or not, if it was interpreted correctly or if the care that followed the MRI was appropriate. Absence of billing data for a flu shot from a primary care provider does not mean that the patient did not obtain a free flu shot at work. Health plans are in a good position to be arbiters of cost but are not in a good position to be reliable arbiters of quality or value.

Mecklenburg is also concerned that providers have generally not been particularly skilled at gathering good data concerning the quality of care provided to their patients, and that providers have ceded this critical role to health plans. Thus, he says, “health plans become arbiters of quality by default.”

In a marketplace collaborative, however, the employer and provider together define and measure quality. For marketplace collaboratives to be successful, they must have what Mecklenburg
describes as *actionable information*: that is, data that reveal areas that can be targeted for quality and cost improvement. “What the health plan should contribute is actionable cost information based on all these millions of transactions, claims, that is organized in a way to help inform decisions,” he says. But health plans do not typically package the data that way. “It does not come across as actionable information,” he says. “It comes across as scrambled and unapproachable data. You have to find all the various line items that health plans use to process for billing for back pain entries in order to understand the real cost to the employer of uncomplicated back pain. When you start to use a little more sophisticated approach to analyzing the data, you can create actionable information from claims data. You can find the top ten conditions in terms of cost to the employer that are appropriate for reducing unnecessary cost. It then becomes apparent where opportunity is for providers and employers.”

The first step for the Portland collaborative members needed to be training. The teams from Providence, Tuality, and CIGNA agreed to participate in a five-day lean methods class hosted by Intel just prior to Thanksgiving 2009. And it was during that week-long session that the participants in the collaborative began to find common ground. Although McDonald knew the training would establish a common language as well as lean tools for improvement, she had not anticipated that the two competing provider organizations would begin sharing right away, yet they did. “They have this overriding value and it is amazing to see these health care providers together,” she says. “The thing that unifies them, that helps them transcend their position or organization, is their commitment to do things for the good of their fellow human beings.”

**Making Care Better, Faster, and More Affordable**

The Intel-driven Portland Healthcare Marketplace Collaborative was officially launched on December 1, 2009. The meeting room walls were plastered with data—current state and ideal state. McDonald emphasized lean work and Mecklenburg, delivering a sort of keynote, explained how he considered this a win-win for providers and employers.
He led the group through the value stream map for uncomplicated back pain, which revealed massive waste and focused the solution not with specialists but with physical therapists—the key to the success of the effort in Seattle. The room was jammed with representatives from the two provider organizations—Providence and Tuality—and although they were committed to the work, they were not without misgivings. There was concern expressed about losing money and about having unfilled appointments. How can you hold appointments open so that patients could have same-day access? What if the slots went unfilled? There was concern among the doctors about one of the big differences between this effort and the work in Seattle. At Virginia Mason the physicians are employees of the medical center whereas in Portland the doctors worked in independent groups. How could that be overcome?

At this point Mecklenburg took a step back, explaining that he believed that health care in the United States was unaffordable because the processes for paying for care, purchasing care, and delivering care had failed. The challenge for providers, he said, was to produce value-added care. He emphasized the high cost of imperfect quality, saying that the line items in claims data for complications—“imperfect quality”—“cost the employer twice what breast cancer and diabetes and depression cost” to treat and “four times what stroke and colon cancer cost.” He estimated that “at least half of that is avoidable.” He said that delays in access exacted high costs as well. “What does it cost to have someone off work?” he asked. “A three-day wait for an appointment may cost the employer more than an MRI, for example. That is why same-day access and rapid return to function is so important.”

This all meant that change was necessary. A standardized systems approach would build in quality through evidence-based medicine and patient-centered care. It would build in speed, providing patients with just what was needed, when and where it was needed. The result would be less waste and lower cost; care that would be, in the words of the Mecklenburg mantra, “better, faster, more affordable.”

He explained that the marketplace collaborative model would allow its participants to produce better, faster, more affordable care if three things happened: if employers used their purchasing power “to specify standards of quality, timeliness, and
price”; if providers were to “produce value, improve [the] quality of health care, and increase access”; and if health plans were to “reduce costs to employers by rapidly aligning reimbursement with value.” He explained that the Seattle marketplace collaboratives had demonstrated that customers—individually and employers paying for care—needed these five dimensions of quality from providers: (1) evidence-based care, (2) 100 percent patient satisfaction, (3) same-day access, (4) rapid return to function, and (5) affordable cost for both providers and employers.

He showed a slide of the original Virginia Mason back pain value stream map that had revealed that nearly everything the medical center was doing was wasteful: that is, added no value. “I wanted to see the opportunities for improvement,” he says. “I wanted to convey the humility that is the necessary first step for self-improvement. When you say that on a relative scale we’re outstanding but on an absolute scale we’re no good, it shows a great opportunity for improvement.”

He then displayed the new value stream for care from the Seattle Marketplace collaborative, which showed an order of magnitude improvement on every measure. He offered metrics demonstrating that companies saved millions with the new approach, that patients got back to work much faster, that patient satisfaction was through the roof, and that provider finances not only survived the changes but thrived. “We showed that this model does not harm providers financially,” he says. “Access is improved and throughput increased because they have a desirable product and there is a reduced cost of production because it requires fewer FTEs to deliver more care. Margin for providers increases as cost for employers decreases.”

The substantive case for marketplace collaboratives was compelling if not overwhelming. But Mecklenburg also knew there was an issue that lay beyond the substantive, an issue or perhaps series of questions that troubled the doctors, in particular. And he did his best to address those questions during the session.

They had the same fears and concerns I had when we had started the process in Seattle at VM. I had lived through this. There had been a question about my identity as a physician when we began to create teams that used standardized process and a
prominent role for nonphysician providers. When you talk about standard work and the increased value of physical therapists versus doctors, there is concern. “You mean I’m going to give up control of this patient to someone who doesn’t have the knowledge or training I have?” “Is the PT going to be up to this?” “Am I still valuable as a physician?”

The toughest thing about being a doctor by far is the fear of harming people. I have awakened at 4:00 AM with “demons,” worried about my care of a patient. Had I done everything right with Mrs. Jones in the ICU? Did I order the serum potassium, or was I distracted with other calls, pages, and the care of other patients? So I’d get up and call the ICU because I can’t remember if I ordered the potassium level. This situation is typical of a system that depends on individual performance of physicians. Docs make an extraordinary effort to manage the dynamic environment of patient care as isolated individuals and without help from fail-safe systems, so it is no wonder that they have concerns that they can delegate their tasks to others.

We have this sacred trust and when we don’t get it right we can kill people, so now we’re saying to doctors that they should turn over the patient to someone less trained in a system we know is dysfunctional and we’re still asking the doc to be accountable. “Is the PT going to miss important medical items I am accountable for? Will they miss a spinal tumor?” “What’s my value to the system?” “Are they going to be able to do as good a job as I can?”

“And what does this do to my financing and kids’ education and my mortgage payments?” “Is my salary going down?” These are concerns I had as an independent practitioner, as a section head, and as the chief of medicine. I knew these docs in Portland would be worried about this and I tried to reassure them that, of course, they are highly valuable, that the PT would do a good job because they were going to install fail-safe systems for the entire team, that they weren’t going to lose salary, that they would have safe practices; that they would do a better job with more patients; and that this new approach would allow them to deliver more care and better quality care.
The Portland marketplace collaborative started with uncomplicated back pain because it was an ongoing problem for Intel employees and an expensive malady for the company, in terms of both direct cost of care and indirect cost—employees missing work or coming to work in pain. It was a good place to start because it was a fairly straightforward problem, and the value stream map that Virginia Mason had created in Seattle showed a clear pathway to a more efficient way to deliver care.

Perhaps most significantly, it was also a statement by Intel that the company had decided to use its purchasing power “to nudge providers toward standardization,” as Mecklenburg put it. It was, of course, unusual in America for companies to get involved on the clinical side in an effort to improve care and control costs for its employees. But the inexorable and seemingly uncontrollable rise in health care costs from providers in recent years drove Intel to the point where it saw no alternative but to try to manage health care as it did other suppliers.

But nothing was automatic. Nothing was a given. McDonald and Mecklenburg had no intention of barging into the Portland medical community and throwing down a gauntlet. Certainly, however, Intel’s marketplace clout was a major factor in its ability to quickly convene providers from both Providence health system and Tuality, a small community hospital in the geographical region where many Intel employees lived and worked.

Mecklenburg, in particular, was sensitive to not overstepping his bounds with medical colleagues in Portland. The physicians from Providence and Tuality were “well-qualified, highly experienced practitioners,” he says.

Dr. Tom Lorish from Prov is the local authority on this stuff. I’m not an authority on back pain. I had worked with authorities, including my colleague at Virginia Mason Dr. Andrew Friedman. And I had studied this a lot, but I had no direct credentials as a practitioner of musculoskeletal disease. Tom is a physiatrist, board certified in physiatry. The same with Dr. Mary K. O’Neil from CIGNA, a board certified physiatrist. I am coming to them with a different model of configuring care, and I’m going to try and reach common ground with experts in this condition. My task was to reach accord with these two content experts.
Pursuing the Triple Aim

But the evidence for a different approach to treating uncomplicated low back pain in a different way was overwhelming—and not new to either Lorish or O’Neil. They had studied this area over the years, and they agreed that patients with uncomplicated low back pain received a lot more medical resources than were necessary or appropriate and that a new care pathway was needed.

“We all felt this was an area of improvement for the community and that it was particularly important for patients and employers and that we had an obligation to do better,” says Mecklenburg. “Mary Kay and Tom are team-minded, community-minded practitioners. They had the capacity to embrace change and they did so. This is very important in terms of [the] change management piece of this. You need people who are confident and are unafraid of change, who are fundamentally unthreatened by change.” And Lorish certainly fit that description. He had developed innovative programs for low back over the previous couple of decades, and he was attracted to Mecklenburg’s approach because engaging with large employers meant obtaining a patient base large enough to make a specialized back program work.

Mapping the Value Stream and Finding Improvements to VM’s Process

Intel relied on a precise, two-step process to take on large, complex problems, and the Intel team applied this process with the collaborative. Step one involved premapping—identifying key elements of the solution—and mapping involved pulling all the many disparate elements of the execution plan together.

On December 17, 2009, participants in the collaboration gathered for a premapping session. This was a tried-and-true Intel practice in which McDonald had great confidence. “With large, complicated projects, if you get content experts together ahead of time, you can create a timeline divided into parallel work streams and then you have events and deliverables for each work stream,” she says. “Premapping allows the content experts to start filling out the specific path in their area of expertise.”

The premapping session ended with a determination of how ready participants were for mapping day, when the highly
detailed plan for the back pain collaborative would be laid out. The Intel technique requires that participants indicate how strongly they agree with two specific questions: what the objective is, and how they will attain it. McDonald says that “when you ask, ‘Do we all understand what we are trying to achieve and how we will achieve it?’ usually people understand with 90-percent-plus clarity what we are trying to achieve, but very often on the how it’s something like 50 percent. Then we ask, ‘What would it take to get you to get closer to 100 percent on both?’”

In response to questions about the how, McDonald and Mecklenburg went back over the process Virginia Mason and others used in the Seattle marketplace collaboratives. “VM had developed and implemented it, and they shared their learning and they shared the fact that outcomes were predictable both clinically and financially,” says McDonald. “It was clear to people we could learn from that value stream to implement and develop ours in Portland.”

Map day was January 8, 2010. The participants—about 50 people in all from Intel, Providence, Tuality, and CIGNA—convened at a Courtyard Marriott to map out the existing state of treatment for uncomplicated low back pain. The large group was divided into smaller segments with each subgroup assigned a particular area of the low back pain treatment process to study and map out. When the participants arrived, all of the work for various swim lanes—a visual representation of the process steps—was already posted on the map. In all, it was about eight feet high and ran along two walls for more than thirty feet. The collaborators then proceeded to walk through the map, step-by-step, week-by-week, determining precisely what tasks had to be accomplished to implement the back pain value stream at Providence and Tuality.

When they began digging into specifics, they were faced with the five-dimension definition of quality that had been developed by the Seattle marketplace collaboratives and which Intel wanted adopted in Portland: (1) evidence-based care, (2) 100 percent patient satisfaction, (3) same-day access, (4) rapid return to function, and (5) affordable cost for both providers and employers. If this collaborative was going to work, the group as a whole had to approve all five dimensions of the model, and after some
discussion they did so. However, in the course of this discussion it became clear that achieving these five dimensions would require a systems approach to providing care; a systems approach with rather strict control of variation in order to increase reliability. It would be an approach, as Mecklenburg put it, that was “systems dependent not operator dependent.”

As much as the stars seemed to be aligned in Portland for precisely this type of approach, there remained unanswered questions. “One of the precarious, less-certain dimensions of health care reform on a larger scale,” says Mecklenburg, “is whether a plan developed somewhere else will be acceptable and transferable to the providers, to a new health plan, a new employer, a new marketplace with perhaps a different culture.”

In Seattle the Virginia Mason team had eliminated huge amounts of waste from the process of treating low back pain. Waiting time had gone from thirty-one days to same-day access. Wasteful employer spending on imaging tests and specialist appointments had been eliminated. The process had been trimmed down to just what the patient needed to get better and no more. At least that is what the team had believed. But in Portland Dr. Tom Lorish and others pushed to streamline the process even more, to make it even leaner and less costly while maintaining everything needed for quality. And the main change that Lorish suggested was eliminating the physician from the process. His basic case was that the access tool—the five screening questions asked over the telephone by the person scheduling the appointment and then reviewed a second time by the physical therapist—was sufficient and anything more was wasteful. He argued that the physician added no value.

Mecklenburg was a bit taken aback by this. Although he and his colleagues at Virginia Mason had discussed this possibility, they had decided to keep the doctor involved for that fifteen-minute segment when the physician and PT together met with the patient. But the Portland marketplace collaborative team wanted to push the process further and believed patients would be fine with seeing the PT only and not the doctor. In addition, Lorish noted that eliminating the doctor from the routine part of the process would make the job of scheduling patients into
the clinic vastly easier. Instead of having to coordinate the schedules of physical therapists and doctors as was the case in Seattle, it would be a simple matter of slotting a patient in with the PT.

Mecklenburg was apprehensive. What happens, he said, if the access tool—the five screening questions designed to identify patients with uncomplicated back pain—somehow proved flawed or unreliable? What if patients were underestimating their symptoms? Or misrepresenting their symptoms? Mecklenburg had found in Seattle that between 5 and 10 percent of patients who had successfully gotten through the access tool actually had symptoms more challenging than the uncomplicated treatment stream could handle, and these patients were referred to other doctors for examination and treatment. “When the doctor is there with the patient embedded in the process this is less of a problem,” says Mecklenburg. “The doctor is backing up the PT, retaking pertinent parts of the history. This is a conservative thing we did in Seattle for redundancy to back up the PT.”

But was it necessary? Because if it was not necessary for the patient’s well-being, it was waste. And that was how Lorish and others in Portland viewed it. Mecklenburg and his colleagues in Seattle had discussed the same issue themselves in some depth but had decided in the end to be conservative. Lorish had a different take on it. He had previously established a program at Providence in which core groups of physical therapists in various clinics focused on active treatment for low back pain. In this program, when patients called in they were scheduled to see the PTs without seeing a physician in the interim. Lorish found that in a typical case the patient dramatically improved after anywhere from two to six sessions with a PT. In cases where patients had more complex issues, the PTs referred them to doctors.

Having served as a member of the physical therapy board in Oregon, Lorish says he knew the PTs “could do initial evaluation and screening.” Lorish also knew that open access was much more easily achieved in a PT clinic, which had the framework to take on a large patient caseload more quickly than a physician practice could. More than that, Lorish believes that when doctors treat uncomplicated low back pain they are operating at the lower end of their licenses, whereas when physical therapists treat it they are operating at the top of theirs. Given his experience
and knowledge of how physical therapists worked, Lorish felt great confidence that the therapists would be able to manage the patients quite well without a doctor’s intervention. And he noted that in Oregon, the law allowed patients direct access to physical therapists without a physician referral, which is not the case in many other states.

Mecklenburg was persuaded by Lorish’s experience and reasoning, but he had one request, he says: “I asked that the doctor be available close by so that when you had one of these situations, . . . the physical therapist was not in a position of trying to convince a doctor to come across the street or [from] four blocks away, so that the doc was immediately available to see the patient.”

Before a final decision was made on this issue the Portland collaborative members decided to try a three-month experiment. They set up processes for treating uncomplicated low back pain both at Providence and at Tuality, with everything being the same except that at Tuality doctors would be involved in precisely the same way doctors were at Virginia Mason and at Providence the doctors were not involved. “We proposed to try both models in parallel fashion to see if there was a difference,” says Mecklenburg. “To see if patients had lower satisfaction rates without the doctor involved, to see if they recovered as quickly, to see if the physical therapists were anxious about not having a doc with them.”

The experiment was not perfect because the numbers of patients involved during this period were small, but the bottom line was that there appeared to be no discernible difference between the two approaches. The Portland collaborative had improved on the value stream achieved in Seattle while retaining standardization and reliability.

Eventually, the Portland marketplace collaborative developed a new health care service for back pain, called DirectLine to Healthcare. It was initially offered only to Intel employees by both Providence and Tuality at their medical facilities, but a month later the service was offered to all patients at these providers. Instead of waiting days for an appointment, an individual using DirectLine to Healthcare meets with a medical provider within twenty-four hours of his or her phone call.
Erasing a Gap in the Value Stream

The issue of whether or not doctors would be involved in the treatment process for uncomplicated low back pain was not the only hurdle the collaborative faced before the new service could be instituted. During the collaborative’s value stream mapping process, each subgroup identified the activities related to its particular area. Each subgroup also had a leader or spokesperson who would stand in the middle of the room and walk along the map as he or she explained what the group proposed for the new process. The groups were thus able to identify redundancies, waste, and gaps. The product of this work was a highly detailed value stream map that showed each step in the process of a patient going through treatment at Tuality and Providence.

When they had completed the mapping process Pat McDonald looked at it and saw a huge gap. Many project activities were crammed into the time between January and April 1, 2010, and then there was a blank space until June 1, the date they had decided to launch the project and see the first patient. McDonald asked the group why the providers could not see their first patient on April 1. An intense debate ensued, with many reasons offered to explain why it was sensible and prudent to wait until June 1 and why April 1 would not work. But McDonald did not believe that. One enhancement developed in Intel’s Rapid Integrated Lean process is *cadence*, a three-week cycle time for improvements. It was this approach McDonald had in mind as she urged the attendees to revise the schedule and to break the remaining work into three-week cycle times.

As the debate progressed, McDonald asked: “What’s the right thing to do for the patient?”

And Janet Meyer from Tuality responded immediately, “You’re right. We’re forgetting who’s at the top of the pyramid.”

Every week thereafter the members of the collaborative’s steering committee would meet to walk the map—literally walk along the map discussing tasks, challenges, deadlines, coordination, and more. “We walk the map every meeting,” says McDonald. “What is the status on training, on communications, on finance, on clinical?”

McDonald and others leading the collaborative also invested time doing direct observation of work in the Providence and
Tuality clinics to determine the current state. The providers “allowed us to go into their clinics and directly observe the process from check-in until treatment, with the permission of the patient,” she says. “What really impressed me was how caring and outgoing the physical therapists were in the patient’s whole life, not just with their back pain. They would have personal conversations. Not just you’re here; we need to get treatment done and send you on your way. These personal conversations allowed the physical therapists to learn more and more about the patient’s habits, and they were able to give better coaching in terms of taking care of back and weight and smoking status.”

In early February the physical therapists, who would be so crucial to the success of the uncomplicated back pain collaborative, were invited to Virginia Mason in Seattle to see the Virginia Mason back pain clinic in action.

Launching the Treatment Program

Five weeks after the collaborative commenced, Pat McDonald provided a status update on the project to Steven Megli, her manager at Intel, vice president of the Technology and Manufacturing Group, and co-general manager of Assembly Test Manufacturing. Megli liked the collaborative’s work enough that he authorized a budget to provide full-time employees to work on the collaborative at Intel. This was greatly helpful to McDonald, who at the time was moving to a bigger job within Intel, from plant manager at FAB 20 to director of the Product Health Enhancement Organization, which was designed to apply software programs to test Intel products for quality and reliability before shipping.

When the project commenced on April 1, it was overseen by a team led by McDonald that included providers from Tuality and Providence, personnel from CIGNA, and Bob Mecklenburg. The members of this core team met weekly—with some participants calling in if necessary—to review where the project stood and the work that needed to be done going forward.

On August 17, 2010, the Portland marketplace collaborative’s effort focused on shoulders, knees, and hips was launched. The team members applied the lessons learned from their work
on back pain to defining and mapping a process for treating uncomplicated shoulder, hip, and knee problems, and this new program was implemented on October 18, 2010. After just eight months these results were reported:

- Patient satisfaction 97 percent
- Same-day access 91 percent
- Rapid return to function 100 percent
- Use of evidence-based medicine 78 percent

The individual numbers are impressive but McDonald looks at the work from a broader standpoint. Considering the uncomplicated back pain treatment program, for example, she says that the cycle time for care was reduced from fifty-two to twenty-one days. “When you think of a thirty-day time improvement, the employee is giving back thirty days of productivity improvement,” she says. “So the employee feels better thirty days earlier. Let’s assume a productivity improvement by that employee of 20 percent—which is conservative. Take the revenue per employee per year and multiply that by the number of employees affected a year by back pain, and you get the revenue increase that you just benefited from by getting them effective care earlier and helping them move through. That is many millions of dollars for many employers. There’s really something here that could shift the paradigm.”

As of March 16, 2011, eleven months after the uncomplicated low back pain treatment process had officially commenced, the results of the five metrics were as follows:

- Use of evidence-based medicine 96 percent.
- Patient satisfaction 98 percent.
- Same-day access 98 percent.
- Rapid return to function 100 percent.
- An apparent savings of 10 to 30 percent for patients participating in the value stream process over patients who did not. The cost metric results were preliminary—based on six months of claims—but encouraging. (Most employers of course are thrilled to see a decrease in the rising trend of health care costs. The program’s results showed a negative trend.)
The Intel team learned a great deal from this program. For one thing it found that same-day access was challenging. There were days when that metric fell to 80 percent, but overall the providers managed to make good on that promise nearly all the time. The team also learned that getting real-time data was very difficult in many instances.

As of late 2011, the Intel-driven marketplace collaborative efforts in Portland had established standardized care for uncomplicated back pain, breast nodules, migraine headaches, and problems with shoulders, knees, and hips. In each case the Virginia Mason model was used as a template. In the case of care for headaches and breast nodules, Virginia Mason’s design did not use physicians as initial care providers. In the case of care for shoulders, knees, and hips, Virginia Mason had retained a combined physician and physical therapist visit, and again the Portland collaborative, with the input of Dr. Tom Lorish, delegated initial care to a PT without a physician being present, reducing scheduling and provider cost beyond that which Virginia Mason had achieved.

In addition, Bob Mecklenburg and his Virginia Mason colleagues were on track to create an additional six value streams for the Intel collaborative in 2011. They addressed

- Upper respiratory symptoms
- Screening and prevention
- Depression
- Diabetes
- Abdominal pain
- Chest pain

Thus by the end of 2011, the Intel collaborative was on track to press ahead with improved quality and reduced cost on ten of the most common and expensive conditions for Intel employees.

Although screening and prevention is obviously not a malady, it is nonetheless a high-cost item for Intel and other employers, and Virginia Mason was finding wide variation in how screenings and preventive care were provided; variation that did no good for patients yet was extremely expensive for employers. Upper respiratory issues were found in claims data and hospital records to account for a significant percentage of care patients received,
again at a high cost. Mecklenburg’s colleague Kim Pittenger had found that Virginia Mason was “spending a great deal of unnecessary physician resources on” screening and prevention and upper respiratory issues. “Both are important,” says Mecklenburg, “and patients with upper respiratory problems do need care, but that does not mean they need a physician office visit. With screening and prevention, far too many people are getting unnecessary testing while others are not receiving the care they need. In many cases . . . [appropriate care] does not require a physician visit for screening and prevention—certainly not in many younger, healthy patients with no symptoms, or worries or family history.”

Moving Forward

Pat McDonald started her current journey at Virginia Mason, gaining some initial learning about lean tools that enabled her to manage her plant more efficiently. She then brought the Virginia Mason marketplace collaborative approach to Portland and did so with considerable success. But something else happened in the process of this work. Pat McDonald and her Intel colleagues saw how dysfunctional the American health care system is, and they vowed to play a role in helping to fix it. They now declare that they are on a mission to “transform health care in the United States.” And they believe marketplaces collaboratives are a powerful way to help accomplish that goal. Intel is replicating more than the marketplace collaborative model; it is adopting Virginia Mason’s vision to transform health care.

Thus the next phase in the work is focusing on expanding the marketplace collaborative concept beyond Intel and Oregon to other major companies in several other states. The goal is to enlist a number of other companies willing to use their purchasing power, along with additional provider groups, who, as Mecklenburg puts it, “don’t want to be left out in the cold.”

“You pick a topic, define the value stream and your membership, and kick it off,” McDonald says. “You observe the work, map it, look at variation and redundancy, eliminate waste, determine a new operating standard, and develop a set of indicators that tell you that you are getting results or not. Then you continuously improve the value stream.” Intel’s work in Portland
has accomplished all that Gary Kaplan had envisioned and that Bob Mecklenburg hoped it would and more. “At this point Intel is clearly demonstrating that an employer-led collaborative implementing value streams is successful,” he says. “Providers in other markets with other cultures can replicate the results that the Virginia Mason collaborative achieved. The results in Portland are nearly identical to Seattle. They copied the recipe.”

Mecklenburg expects that by spring 2012 the Intel collaborative will have “implemented effective value streams for the top ten most costly conditions, and this will demonstrate in scale the results we have had with the initial value streams. It will show that we can take a huge bite out of the top ten conditions and realize a 20 to 30 percent reduction in costs. Not a lower trend rate. A reduction in health care costs. And we will do so by improving quality and speed of access to care.”

Virginia Mason’s marketplace collaborative work demonstrates progress toward using metrics to manage health care suppliers’ performance in achieving standards for quality improvement and cost reduction. It is a supplier management model that can be replicated across Intel and other companies.

**Keys to Doing This Work**

- **Know your customer.** Understand the top employers you serve, their workforce demographics, and the health challenges they face in the type of work they do.
- **Know your customer’s needs.** Know the top diagnoses of the major employers you serve, including the top issues for your own staff.
- **Establish a clear and measurable definition of quality to guide production, payment, and purchasing of health care.** Work with an employer to define the market-relevant quality they need for the top five diagnoses.
- **Willingness to move ahead.** Be willing to take a leap of faith as a leader and apply the concepts of collaborating, value stream mapping, and putting the patient first to your most complex problems.
- **Engagement of the finance team.** Use the data from finance and purchasing to track and trend progress.