CHAPTER 1

An Open Letter to Healthcare Leaders

When I first began consulting in 1999, after retiring with 21 years at Boeing and another 20 as an Army officer during the Cold War and the Vietnam War, I was warned by consulting veterans to avoid three areas: government, education, and healthcare. Because these areas were so inwardly focused, they said, large-scale change would be a "nightmare." Furthermore, they added, "Healthcare as an industry is probably the least capable of changing because of its cottage-like structure" (i.e., fragmented among many independent medical providers and facilities).

So, as I began my consulting work helping organizations successfully and profitably apply the Toyota Production System (TPS) model—often called **Lean production,** or just Lean—to their own operations, I avoided these three areas. One exception was that, while still at Boeing, I'd spoken at a 1995 quality conference attended by Sister Monica Heeran, then CEO of Peace Health. Sister Heeran invited me to speak at a Peace Health board meeting, and her organization subsequently embarked on the Lean journey—long before Lean became a topic in healthcare. Joanne Poggetti of Poggetti and Associates led the Peace Health implementation for two years. I provided support, and early results were astounding. However, when Sister Heeran retired a few years later and her organization's Lean efforts diminished, I thought Lean in healthcare was over.

Lean production: A term applied to the production and process management methods pioneered in Japan after World War II by Kiichiro Toyoda and Taiichi Ohno of the Toyota Motor Corporation. Based on the Toyota Production System, Lean is a management strategy in which all parts of the system are focused to eliminate waste while continuously increasing the percentage of value-added work. The term *Lean* was coined by John Krafcik of the International Motor Vehicle Program at the Massachusetts Institute of Technology. It was first publicized in the book *The Machine that Changed the World: The Story of Lean Production* by James P. Womack, Daniel T. Jones, and Daniel Roos (1991).

As fate would have it, however, in October 2000 I happened to sit next to a farsighted healthcare president on a plane headed for Atlanta. He became a captive audience as I presented my laptop PowerPoint presentation on Lean. He shared his enthusiasm with his boss, and he and I eventually got together and started Lean operations at Virginia Mason Medical Center (VMMC) in Seattle, Washington. Soon I was again "knee deep" in healthcare consulting, thanks to Mike Rona and his perceptive and visionary boss, Virginia Mason's CEO, Dr. Gary Kaplan.

Virginia Mason's Lean implementation was a success, and news of the success spread rapidly. By 2008, Virginia Mason could no longer keep up with requests for Lean tours and lectures, so it created the Virginia Mason Institute (VMI) to help other healthcare systems—and their patients—by sharing the possibilities Lean brought to healthcare and demonstrating how others could achieve similar improvements. Kaplan became board chair of the globally recognized Institute for Healthcare Improvement, and in 2010 the Leapfrog Group named VMMC America's Top Hospital of the Decade. Rona embarked on a consulting career to spread

the potential of Lean to other healthcare organizations. Eventually I worked on Lean implementations with not only VMMC but many other healthcare clients, including Park Nicollet Health Services, Premera Blue Cross, and Florida Hospital Zephyrhills. I also worked on special projects, such as 3P Lean facility design, for Providence Health and Services (ambulatory care 3P event, Spokane, Washington, and walk-in clinic, Monroe, Washington) and for Seattle Children's Hospital (Japan Super Flow, Japan *kanban*, and Japan 3P seminars).

Then, of course, came the 2010 signing of the Affordable Care Act, commonly known as "Obamacare." As the provisions of this sweeping legislation loomed, the healthcare industry buzzed, with no one quite certain what the changes would mean—except that costs, quality, and waste reduction would become more important than ever. As hospitals, clinics, insurance companies, and physicians faced more financial responsibility, organizations merged and began creating accountable care organizations to try to control costs.

With this backdrop, **Lean healthcare** was presented with one of its largest challenges to date: In March 2011, Saskatchewan, Canada, asked for my help in delivering less wasteful, more patient-centered care across the entire province. Chapters 13 through 16 describe the Saskatchewan experience in detail; in short, I can say that, together, we delivered—for patients, staff, and physicians. In the meantime, healthcare facilities in England suffered catastrophic safety and quality failures that damaged public confidence and sparked investigations. Ultimately, those events brought the United Kingdom's secretary of state for health, Jeremy Hunt, to VMMC in March 2014 to announce that his country's National Health Service would be adopting patient safety measures based on those at VMMC. He called VMMC's approach "an inspiration to health professionals the world over." Lean healthcare is catching on globally, as it should.

What have these experiences shown me? First, healthcare organizations are indeed resistant to change, but no more so than many

Lean healthcare: A patient-centered approach to managing and delivering care that continuously improves how healthcare teams work. Lean, which is based on the Toyota Production System, is about finding and eliminating waste in all processes.

other organizations. For example, surgeons are no more (or less) resistant to change than aerospace engineers. Such resistance can be managed and overcome, especially if the CEO commits to the change. Second, Lean thinking (cutting waste by half, over and over again) is applicable to any organization—and can pay off big for the healthcare industry in particular.

DRAMATIC IMPROVEMENTS IN HEALTHCARE ARE POSSIBLE!

I've written this book for you, the healthcare leader. I've written it because our healthcare system needs an overhaul, one that goes well beyond the considerations of the Affordable Care Act and who will pay for healthcare. The overhaul must address provider burnout, ballooning demand, and unacceptable rates of medical errors, healthcare-acquired infections, and other preventable harm or deaths. I've written this book as a roadmap for how to proceed, because I know you would like to improve your operations. You can increase patient and staff satisfaction; improve patient care; cut waste, clutter, and confusion; eliminate defects (errors, which result in patient and staff harm); lower costs; raise profitability; and enhance your operation's reputation. *My main message to you is that dramatic improvements in healthcare are not only possible but inevitable—if you commit to change and diligently apply Lean thinking, principles, and tools.* The real-life examples and case studies in these pages provide unmistakable proof.

To pique your interest, here are some of the benefits gained by the Virginia Mason Hyperbaric Clinic after its staff used Lean thinking to redesign the facility and its processes in 2005 (Kaplan and Rona 2006; Kenney 2011):

- The workday for staff was shortened from up to 14 hours to 8 hours—a 42 percent reduction. A second shift was no longer needed.
- The number of patients per chamber attendant increased from an average of 2.4 in the old facility to 5.4 in the new one.
- Treatment hours went up 18 percent, so patient wait times basically disappeared.
- Emergencies began being treated simultaneously with routine treatments, so the latter aren't displaced.
- Transportation by ambulance from the main hospital was eliminated, saving more than $50,000 a year.
- Margins per patient more than doubled, and patient satisfaction increased significantly.

If you suspect this particular operation is atypical, consider this systemwide example: Between 2007 and 2012, the incidence of hospital-acquired pressure ulcers (bed sores) at Virginia Mason dropped from 5 to 1.7 percent. And such improvements have come at no cost to profits. To the contrary, the work at VMMC has reduced the center's liability insurance premiums by 60 percent since 2004—in a state without tort reform. Malpractice suits are down as well. Moreover, Lean helped the organization convert operating losses in the years immediately prior to making the commitment to Lean into profits ever since, including a $30 million margin in 2012 (Plsek 2014).

You'll learn more about this remarkable success story in chapters 9 and 10, with a longer perspective on the results in the epilogue. But I'll bet that, even more, you'd like to achieve results like these in *your* organization. This book can help you do it.

NOT FOR THE FAINT OF HEART

I must advise you from the start that the journey to becoming a world-class healthcare organization isn't quick or easy. As Dr. W. Edwards Deming said, "The timid and the fainthearted, and the people who expect quick results, are doomed to disappointment." As I have always told my clients, however, "If you are going uphill and taking one step at a time, you are headed in the right direction."

You may be able to achieve some quick results within parts of your organization, but implementing large-scale, synchronistic change—transformation—across the entire organization takes time. That's because, although you may not realize it, you're deep in ***muda***. *Muda* is a word the Japanese use to describe waste—that is, any activity, service, or supply that consumes time, money, and other resources but creates no value. Translated to the *cost of poor quality*, a term coined by Dr. Joseph Juran, waste likely makes up at least 30 percent of your budget.

Toyota has been engaged in its change effort for decades and hasn't run short of improvement ideas yet. The relentless pursuit of continuous incremental improvement is called ***kaizen*** in Japanese, and it is essential not only to achieving world-class operational performance but also to staying ahead of the competition. Masaaki Imai (1986, 1997), author of the best-selling books *Kaizen (Ky'zen)*

> ***muda*:** Waste, meaning any activity, service, or supply that consumes time, money, and other resources but creates no value.
>
> ***kaizen*:** A way of life focusing on constant improvement efforts. Masaaki Imai defines *kaizen* as continuous improvement by everyone, including both managers and workers.

and *Gemba Kaizen*, defines *kaizen* as continuous improvement by everyone, including both managers and workers.

PEOPLE ARE KEY

Another important thing to keep in mind is that, although technology may sometimes play an important role, the key to success is your *people*. Organizations often use this resource ineffectively. The principles I've outlined in this chapter are aimed at gaining the greatest possible return from the skills and ideas of the people who do the work. Those people are the experts who can identify improvement opportunities, and they provide the creative powerhouse necessary for success. They are the ones doing the actual work with patients in hospital rooms, clinics, care facilities, surgical theaters, and other healthcare settings—in other words, in the ***gemba***. So if you think your organization can achieve the kind of results I've described by sitting back and hoping consultants will lead and do the work, think again. Both you and your people must be committed and deeply involved—especially you, the healthcare leader.

Perhaps you're still asking yourself, "How can a manufacturing model apply to healthcare? Patients aren't products put together on an assembly line." That statement is certainly true, and it's a perspective you should never forget. Indeed, patients aren't the products—they're the *customers*. Speaking broadly, there's just one product you're trying to provide—compassionate, defect-free care with no waiting.

Fortunately, healthcare is susceptible to the same improvement methods as other products or services; in many ways, providing healthcare is no different, as you will learn, from building cars or

> ***gemba*:** The workplace, the office, the shop floor—the place real work gets done for the customer, where value is added. This definition has been popularized by Masaaki Imai.

airplanes. Furthermore, unlike in many manufacturing organizations where the people doing the work never meet the ultimate customer, in healthcare the customer is right in front of those doing the work every day. As Dan Florizone, former deputy minister of health in Saskatchewan, has said, "I think this approach will work *better* in healthcare than manufacturing. People come to this sector because they care. All these non-value-added steps have interfered with them fulfilling their passion."

THREE GREAT REASONS TO IMPROVE

If becoming a world-class organization isn't enough of a "burning platform" and stimulus to get you to embrace Lean, then let me offer three more reasons:

1. *Patients deserve better*. At present, most healthcare delivery is plagued by excessive waiting and other **non-value-added** time. The cost of this waste is paid for by patients (or their insurers). The patient only wants to pay for **value-added** services, not for services that contain as much as 95 percent non-value-added waste. Offering patients an efficient, smooth-flowing, defect-free, and hassle-free experience respectful of their time means greater patient satisfaction and a competitive advantage in the healthcare marketplace.

   Additionally, delayed care tends to be *poor* care. A longer hospital stay, extra waiting time for diagnosis or treatment, or additional procedure time in surgery, for example, correlates with increased rates of infection and other errors. Reducing wasted time, a key Lean strategy, also means reducing the number of handoffs in which mistakes are more likely to occur.
2. *Employees deserve better*. High employee satisfaction and morale are directly correlated with productivity.

value-added: A term that describes expenditures of time, money, or other resources that contribute to the efficient delivery of healthcare. One way to think of the addition of value is to ask, what would the patient be willing to pay for?

non-value-added: A term that describes everything other than value-added expenditures. It applies to mistakes, time waited, and unnecessary movement.

Healthcare employees in environments with a lot of non-value-added activity or idle time grow frustrated, stressed, and angry, especially when they feel the system is broken and not being fixed. They're in this business to help people, not to search for missing supplies, fill out unnecessary paperwork, or spend their days trudging along hallways or "fighting fires." Happy, satisfied workers are much more likely to provide high levels of patient satisfaction than unhappy ones. The employees at Toyota are satisfied, enthusiastic, and highly motivated because they work in a system that rewards problem solving and continuous improvement. Can we say the same about the average healthcare worker?

3. *Your nation deserves better*. Healthcare in the United States is becoming increasingly unaffordable for a growing number of citizens, and the costs are rendering American businesses less competitive in the global marketplace. These costs are projected to reach nearly 20 percent of the entire US economy by 2024 (Centers for Medicare & Medicaid Services 2014). For Canada, where my team has spent considerable time, healthcare costs are more than 11 percent of the gross domestic product (GDP). In the United States, the Affordable Care Act has slowed the cost trend somewhat, but healthcare costs are still growing

faster than GDP. Economists say such increases are not sustainable. If, however, healthcare as a whole were to adopt proven concepts of Lean to reduce wasted patient and staff time, as well as other resources, thereby creating new capacity, the costs could be spread over greater patient volumes, and per-patient costs could be reduced.

But this book isn't about helping you improve an entire national healthcare system. It's about helping you improve your own organization. Hopefully, the kinds of improvements Lean can provide are ones you'd like to achieve.

FOUR ESSENTIALS FOR SUCCESS

You're probably wondering exactly what implementing Lean entails. What are the elements? How do you apply them? That's what the rest of the book is about. Think of this book as a tutorial for applying these methods to your operations. Before continuing, however, I need to stress four points:

1. You have to commit to personally leading the charge and the change. Otherwise, they won't happen.
2. I highly recommend that you have a teacher to guide you through the improvement process. This teacher should be a consultant with training equivalent to that of a Japanese ***sensei***—one who has become a master of the art and science of improvement through at least a decade of consulting on the Toyota Production System. The typical consulting process is not going to work. Remember, you are implementing the *Toyota* Production System.
3. You must be willing to commit to a long-term "slog" through the swamp of waste and defects that lies hidden beneath the surface of your daily operations. Without an

understanding that real change is hard and takes time and commitment, your improvement effort will not survive much beyond its first year.

4. Finally, you must have the will, belief, wherewithal, and commitment to action that CEO and quality improvement expert Bill Conway taught to Boeing managers in the mid-1980s. The will is the "guts" to do it, along with the in-your-face belief that you, as the leader, can make it happen regardless of pushback (e.g., opinions that "what you're trying to do is too much rigor and discipline for our culture"). The wherewithal is your passion to read the books; to study, learn, and practice the tools and methods; and then to lead by example. The action, of course, is what you do, such as demonstrating the "patient-first" philosophy in every decision. Quality improvement is tough stuff and tough duty, particularly if the organization you're leading seems to be falling apart around you. But that's exactly when your will, belief, wherewithal, and commitment matter the most—and when Lean can have the most impact.

LEAN PRODUCTION

Now, let me briefly explain what I mean by Lean production, or simply Lean, which is based on the Toyota Production System.

At its heart, Lean focuses on driving waste from the system. You'll learn more in chapter 2 about the seven kinds of waste, but two obvious ones are *waste of time* and *waste of inventory*. What Lean

***sensei*:** An individual teacher or trainer with mastery of a body of knowledge, in this case Lean production.

continually asks is whether a product or service is *adding value*. If not, it is waste. One of Lean's goals is to reduce by half such costs as time spent performing a task, space requirements, and investment in tools—and then repeat this reduction again and again. Gains may become smaller and smaller, but the organization gets closer and closer to *world-class*, which we will define as *waste-free*.

Although Lean has many elements, its two main pillars as they apply to healthcare are

1. **just-in-time production**—consistently delivering only the healthcare service that is needed, in just the required amount, where it is needed, and when it is needed—and
2. ***jidoka***—the intelligent use of both people and technology, with the ability (even an obligation) to stop any process at the first sign of an abnormality. This concept is reflected in a system that eliminates harm to keep the patient safe. Remember: First, do no harm.

just-in-time production: Production that consistently delivers only what is needed, in just the required amount, where it is needed, and when it is needed.

***jidoka*:** The intelligent use of both people and technology, with the ability to stop any process at the first sign of an abnormality.

flow: The progressive achievement of tasks along the value stream so that a service proceeds from request to delivery smoothly and efficiently, without stoppages and waste.

THE SEVEN FLOWS OF MEDICINE

Flow is a fundamental concept in Lean production. "Toyota's system was primarily about flow—information flow, physical flow of parts, overall production flow—via standardized processes and continuous improvement" (Bohmer and Ferlins 2005). The idea is to eliminate delays and obstacles along the line of production or, in the case of healthcare, in the delivery of service to the patient. In manufacturing, Sensei Yoshiki Iwata, who founded Shingijutsu Company, Ltd., in 1987, described the seven factory flows. While consulting at Virginia Mason, I developed the seven flows of medicine. In a healthcare environment, the seven flows are as follows:

1. Flow of patients
2. Flow of family
3. Flow of providers
4. Flow of medications
5. Flow of supplies
6. Flow of information
7. Flow of equipment

Note that patients come first. All these flows must work together to provide the best possible care for the patient with no waiting. The flows are described in detail in chapter 7, and the pages to come contain examples of healthcare organizations tackling all of them to increase efficiency. Efficient flow minimizes **lead time**, or the total time a customer (patient) must wait to receive a product (or service) after placing an order (requesting a service). So long as quality and safety are not compromised, the compression of lead time means that resources can be used more efficiently and patients will be more satisfied and less stressed. Efficiency is created when quality and safety are added to a process; it is not just a matter of "going faster."

lead time: The time to complete a patient-care event, including processing time and waiting time—in other words, the time from when the patient requests a service to when it is provided.

As you'll see later, one way to reduce lead time is for the system to "pull" patients through, with patients going at their own pace without being "pushed" or rushed by staff. A system with effective **pull production** has **standard work** in place—that is, a set of specific instructions that allow processes to be completed in a consistent, timely, and repeatable manner with, above all, respect for the individual patient.

Through the application of Lean, Virginia Mason has been able to reduce overall patient lead time by 53 percent, or the equivalent of 708 days of patient time (Bohmer and Ferlins 2005). Similarly, in just a few years of Lean implementation, Saskatchewan's wait times for inpatient surgery—which previously averaged more than 294 days, or most of a year—were slashed. Lean wasn't the only change that contributed to improvement, but overall, since 2010, the number of patients waiting more than three months for surgery is down by 89 percent. The list of those waiting for surgery for more than six months is down by 96 percent.

A PROVEN TRANSFORMATION MODEL

I hope the improvements I've described are enough to catch your attention, but you may be wondering what qualifications I have to write about healthcare—after all, I'm neither a doctor nor the administrator of a healthcare system. What I have is more than 35 years of experience leading transformational change, including full Lean implementations for major healthcare organizations—events detailed in my 2008 book *Lean Production: Implementing a*

pull production: A system where parts, supplies, information, and services are pulled by internal and external customers exactly when those elements are needed. In healthcare, pull production can mean, for instance, that services, medications, rooms, and provider attention are provided to the patient when the patient is ready for them. This approach contrasts with the experience of patients who must wait for providers or equipment to become available or for the next service to be requested or scheduled.

standard work: A prescribed, repeatable sequence of steps (or actions) that balances people's work to *takt* time. In healthcare, standard work is a set of specific instructions that allow processes to be completed in a consistent, timely, and repeatable manner, with respect for the individual patient above all.

World-Class System. In brief, my understanding of the infrastructure needed to drive change in healthcare came from my experience at Boeing. I was in the trenches of the "quality revolution" of the 1980s, first in 1980 for the Boeing Commercial Airplane Company (BCAC) 757 airplane program, then moving to Boeing Aerospace (the company's military division) in 1983, and working for BCAC again in 1985. The Lean transformation at Boeing was an incredible challenge, one twice the size of the Saskatchewan transformation that we'll examine later.

In 1982, Ernie Fenn, vice president and general manager of Boeing's 757 program, asked me, "What can we do to make the 757 program into a more participative culture?" I told him that we couldn't change how employees behaved without changing how managers behaved and that, to succeed, this change had to start with him. He asked me how long it would take to answer his question in more detail. After extensive research and discussion with

leaders and employees at many levels, I appeared in his office with a four-foot-by-six-foot cardboard model I'd put together. "This is it," I told Fenn. "This is our process for increasing employee involvement, and we should get to work on implementing it."

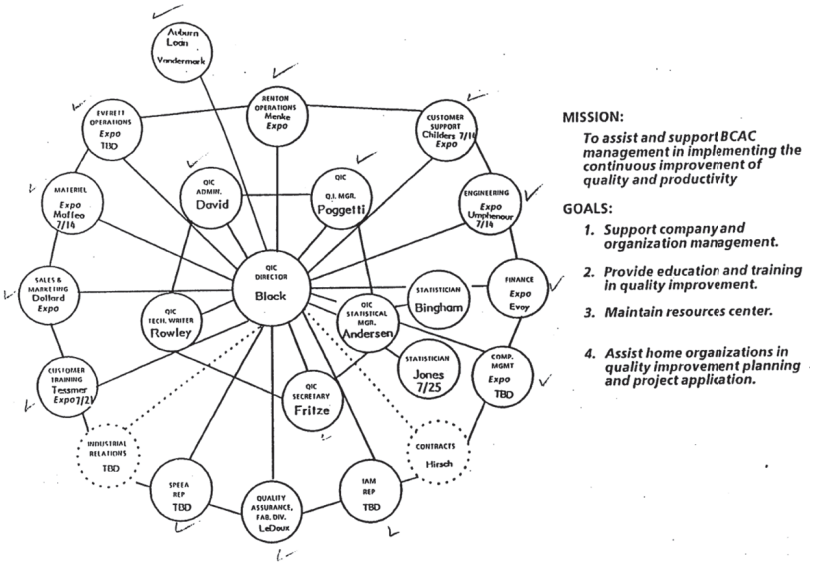
He agreed. The model became a plan, the plan became a handbook, and the handbook in turn became a process that permeated Boeing's 757 production program. It became so successful that Phil Condit, chief engineer, briefed a customer about it—former astronaut Frank Borman, who'd circled the moon in Apollo 8 and later became CEO of Eastern Airlines. Borman then asked for me to help put the 757 employee involvement program in place at Eastern Airlines as well. Over eight months, I made many trips to Miami, working with Borman and his management team, including Charlie Bryan, the head of Eastern's Machinists Union.

In 1983, I found myself reporting to Bill Selby, director of operations for the Defense and Space Division of Boeing Aerospace. I brought with me five file cabinets full of research and training materials from my work on the Boeing 757 program, as well as the insight I'd gained from Eastern Airlines. We soon embarked on a holistic, people-focused change process. Selby led a *continuous quality improvement* (CQI) steering committee that I organized, and we became the first at Boeing to start "quality of work life" programs based on concepts being introduced at that time by General Motors and Ford. I sent representatives to training held at the Quality of Work Life Institute in Dearborn, Michigan; we were the only aerospace company to participate in GM's culture-change efforts.

Under Selby's direction, we benchmarked several leading companies that he and I visited together. We drafted the first Boeing quality plan and established the first quality center in 1984. We also conducted the first Boeing supplier symposium focused on quality improvement. Our program was touted by Boeing chairman Malcolm Stamper as the model all Boeing sites should be following.

In early 1985, BCAC executives came to Selby and said that, based on the success of quality and productivity efforts in his organization, they were making me an offer I could not refuse. They had decided that I was needed in BCAC because airline customers were complaining about deteriorating product quality and we urgently needed to fix the problems. Shortly thereafter, I was assigned to report to Jim Blue, the vice president of a newly created centralized quality assurance organization. I came back to Blue just like I came back to Fenn—with a plan that required we form a *quality improvement center* (QIC). The vision and wherewithal to tackle this challenge stemmed from my previous military assignments in human resource development for Headquarters US Army Europe and from my initial assignment at Boeing creating its Equal Employment Opportunity (EEO) program. Those

Exhibit 1.1: Quality Improvement Center Organizational Chart



The nontraditional organizational chart of the Boeing Quality Improvement Center, where I learned and refined how to successfully lead Lean transformations

experiences prepared me well to form dynamic teams that could bring about difficult cultural transformation.

The QIC's organizational chart is shown in exhibit 1.1. As director of the center, my first assignment was to build a team of the best and the brightest, who would quickly figure out how Boeing could improve quality and productivity. The challenge was huge, and we needed an array of firepower. BCAC had 86,000 employees, most of whom had to be taught to do things differently. In addition, many of our managers believed that having the largest market share automatically made Boeing world-class, even though metrics showed that we were not. To kick-start the improvement engine and get us started on the road to true world-class performance, I created a highly skilled "special operations" core team, which provided technical support and horsepower. Going outside Boeing, I recruited organizational development consultant Joanne Poggetti, who worked with Boeing statisticians Julian Anderson, Tom Bingham, and Rob Jones and statistical aide Kent Blanton. We also brought in consultants Jean Chen and Deb Vandermark and author John Imre, who would document progress and communicate results, as well as two systems administrators. Next, I selected 13 upwardly mobile, executive-potential (or "expo") candidates representing all the company's major functional organizations for an intensive, two-year learn/do experience. Everyone was sent to off-site seminars conducted personally by Deming, Juran, and Bill Conway of Conway Quality.

When the team members came back, they designed and launched 18 quality improvement courses and seminars that would be attended by more than 34,000 employees. We also sent hundreds more managers to educational seminars by Deming and Juran. In addition, we created innovative partnerships with both of Boeing's major unions, which represented more than 30,000 employees. The union business managers eventually had offices next to mine and participated in all training. This leadership development process evolved in the 1990s into the Boeing Production Systems Specialists Program, which in 2002 evolved further

into the *Kaizen* Fellows program. You'll read more about *Kaizen* Fellows in chapter 14.

I personally contacted CEOs and invited them to speak at our two-day "Managing Quality" seminars. Due to high demand, these seminars were held at local hotels. Each session was attended by 250 managers, and between 1986 and 1989, a total of 7,297 were educated. Attendees heard from CEOs who were leading quality revolutions at IBM, Ford, Alcoa, Caterpillar, Federal Express, General Dynamics, Harley Davidson, Hewlett-Packard, Honeywell, and Xerox. We had dinners with the visiting CEOs and key Boeing executives to continue the learning. I also contracted with Bill Conway to conduct one-day seminars at the University of Washington, and we bused Boeing managers to the university 400 at a time. Conway covered the details of the Toyota Production System and the teaching of Deming, who had been a consultant to Conway's former company. A total of 6,894 managers attended the Conway seminars between 1986 and 1989. At the QIC during the same period, we trained a total of 15,497 people in courses on facilitation, team leadership, team membership, introduction to process control, and quality improvement. Soon, people from around the world were coming to see what the Boeing QIC was doing.

My first model of Lean implementation consisted of four steps, and it has been used successfully by others over and over again:

1. Form a team of leaders.
2. Educate them.
3. Establish a sense of urgency.
4. Once they learn, have them *do*.

By 1990, I'd been named director of world-class company studies for BCAC. I convinced Bruce Gissing, senior vice president of operations, that we needed to go to Japan to understand what

world-class really meant. Gissing's vision, experience, and presence made the trip happen.

Boeing's first Japan study tour took place after participants read five books and spent 45 hours in classroom training. The group visited world-class companies including Hitachi, Komika, and Toyota. Six more teams made the trip by the end of 1991, a total of 99 executives that included chairman and CEO Frank Shrontz and all of Boeing's presidents, general managers, and other executives, down to the vice president/director levels. Colin Fox, CEO of Deltapoint Consulting, and his firm helped us launch world-class competitiveness training for what eventually became more than 100,000 employees, not only those in our own organization but also in Boeing Aerospace, renamed the Defense and Space Group. Over the next ten years, we implemented Lean, adapting Japanese methods to the Boeing culture and sending hundreds of managers to Shingijutsu *Kaizen* Seminars in Japan.

By 1996, I'd become director of Lean manufacturing education and training support, responsible for best practices, managing all external consultants, expanding our Lean knowledge base, and handling employee training and certification. Boeing soon began to focus on *kaizen* events. In 1997, we called them Accelerated Improvement Workshops, and we conducted more than 100 in the first two months of that year. More than 6,000 employees participated in 756 *kaizen* events over two years, demonstrating the degree to which improvement was becoming part of their jobs. Between 1997 and March 1999, these workshops saved $900 million in costs; reduced inventory by 313,689 units for a savings of $156 million; and cut distances traveled by workers by nearly 7 million feet (almost 1,300 miles!), saving $342 million in labor hours. They also reduced cycle times by 43,173 hours for a savings of $4.3 million; eliminated 48,680 hours of lead time, saving $4.8 million; reduced setup times by 5,303 hours, saving $1 million; and freed 146,443 square feet of floor space, saving $286 million. That adds up to a lot of savings!

WHAT I'VE LEARNED ABOUT TRANSFORMATION

Boeing's Lean implementation still continues today, even though I've moved on to consulting with other organizations. The lessons I learned from Boeing were invaluable, and I've carried them forward into multiple healthcare transformations. They frame the requirements for any successful Lean transformation:

1. Self-regulation is realistic, and empowering people to make their own decisions is a basic requirement.
2. Traditional controls by management do not allow for the creation of new systems.
3. Small, flexible teams of highly motivated people who are organized nontraditionally and have clear goals and support can work wonders.
4. The strategy must be *organizational* transformation—the entire organization must be tackled.
5. The premise should be that the organization is highly addicted and must be placed in recovery to respond to change.
6. Succession planning combined with short-term assignments (e.g., two-year rotations) will develop strong, innovative leaders.
7. Management must have a high degree of trust in people for these concepts to work.
8. Flat organizations do not need traditional controls.

The rest of this book examines what these lessons can mean—and how your teams can benefit from them—when they reach the front line in emergency departments, surgical operations, primary care organizations, long-term care facilities, and all the other moving parts of a complex healthcare organization.

FACING REAL CHANGE CAN BE INTIMIDATING

If what I've said so far seems both daunting and strange to you, don't worry. Real change usually appears that way. That's why change is often avoided, even when it might be crucial to survival.

Remember, though, that knowledgeable people are available to help, and outside eyes often provide the perspective you need to see more clearly what can be done. Also remember that change can only be tackled one step at a time. The most critical factor in success is your personal commitment and involvement in the process. Successful improvement efforts such as the ones I've been discussing always happen from the top down. The first step is a change in *mind-set*—believing that dramatic improvement is possible and that you can lead the change.

If you're still with me, let's get started.

Chapter Takeaways

- Healthcare organizations are no more resistant to change than other organizations.
- Lean thinking (cutting waste by half, over and over again) is applicable to any organization.
- Dramatic improvements in healthcare are possible with Lean.
- The journey is not for the impatient or faint of heart. Real change is hard and takes time and commitment.
- The entire organization must be tackled; successful organizational transformation can happen a step at a time, but it cannot be piecemeal.
- The relentless pursuit of continuous incremental improvement (*kaizen*) is essential to achieving world-class operational performance.

(continued)

(continued from previous page)

- You'll need to find an outside *sensei*, a master teacher, with a corporate operations and Lean implementation track record. This person should have a deep knowledge of *kaizen*, preferably with training from the Japanese. Provide "air cover" for the *senseis* so they can move forward aggressively.
- People are your most important resource.

REFERENCES

Bohmer, R. M. J., and E. M. Ferlins. 2005. "Virginia Mason Medical Center." Harvard Business School Case 606-044. Boston: Harvard Business School Publishing.

Centers for Medicare & Medicaid Services. 2014. "National Healthcare Expenditure Projections 2014–2024." Accessed October 9, 2015. www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/proj2014.pdf.

Imai, M. 1997. *Gemba Kaizen: A Commonsense, Low-Cost Approach to Management*. New York: McGraw-Hill Education.

———. 1986. *Kaizen (Ky'zen): The Key to Japan's Competitive Success*. New York: McGraw-Hill Education.

Kaplan, G. S., and J. M. Rona. 2006. "Seeking Zero Defects . . . Applying the Toyota Production System to Health Care—Five Years Later." Presentation to the Institute for Healthcare Improvement, December 10.

Kenney, C. 2011. *Transforming Health Care: Virginia Mason Medical Center's Pursuit of the Perfect Patient Experience.* New York: Productivity Press.

Plsek, P. 2014. *Accelerating Health Care Transformation with Lean and Innovation: The Virginia Mason Experience*. Boca Raton, FL: CRC Press.

Womack, J. P., D. T. Jones, and D. Roos. 1991. *The Machine That Changed the World: The Story of Lean Production*. New York: Harper Perennial.