Improving Healthcare Using Toyota Lean Production Methods

46 Steps for Improvement
Also available from ASQ Quality Press:

*Lean-Six Sigma for Healthcare: A Senior Leader Guide to Improving Cost and Throughput*
Chip Caldwell, Jim Brexler, and Tom Gillem

*The Manager’s Guide to Six Sigma in Healthcare: Practical Tips and Tools for Improvement*
Robert Barry and Amy C. Smith

*Nan: A Six Sigma Mystery*
Robert Barry

Raymond G. Carey, PhD and Robert C. Lloyd, PhD

*The Six Sigma Book for Healthcare: Improving Outcomes By Reducing Errors*
Robert Barry, PhD, Amy Murcko, APRN, and Clifford Brubaker, PhD

*Improving Healthcare with Control Charts: Basic and Advanced SPC Methods and Case Studies*
Raymond G. Carey

*The Six Sigma Journey from Art to Science*
Larry Walters

*Six Sigma for the Office: A Pocket Guide*
Roderick A. Munro

*Defining and Analyzing a Business Process: A Six Sigma Pocket Guide*
Jeffrey N. Lowenthal

*Customer Centered Six Sigma: Linking Customers, Process Improvement, and Financial Results*
Earl Naumann and Steven H. Hoisington

*Office Kaizen: Transforming Office Operations into a Strategic Competitive Advantage*
William Lareau

To request a complimentary catalog of ASQ Quality Press publications, call 800-248-1946, or visit our Web site at http://qualitypress.asq.org.
Improving Healthcare Using Toyota Lean Production Methods

46 Steps for Improvement

Second Edition

Robert Chalice

ASQ Quality Press
Milwaukee, Wisconsin
Improving healthcare using Toyota lean production methods: 46 steps for improvement / Robert Chalice. — 2nd ed.

Includes bibliographical references and index.
Stop rising healthcare costs using Toyota lean production methods. II. American Society for Quality. III. Title.

RA410.53.C43 2007
338.4'33621—dc22 2007004991

No part of this book may be reproduced in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

Publisher: William A. Tony
Acquisitions Editor: Matt Meinholz
Project Editor: Paul O'Mara
Production Administrator: Randall Benson

ASQ Mission: The American Society for Quality advances individual, organizational, and community excellence worldwide through learning, quality improvement, and knowledge exchange.

Attention Bookstores, Wholesalers, Schools, and Corporations: ASQ Quality Press books, videotapes, audiotapes, and software are available at quantity discounts with bulk purchases for business, educational, or instructional use. For information, please contact ASQ Quality Press at 800–248–1946, or write to ASQ Quality Press, P.O. Box 3005, Milwaukee, WI 53201–3005.

To place orders or to request a free copy of the ASQ Quality Press Publications Catalog, including ASQ membership information, call 800–248–1946. Visit our Web site at www.asq.org or http://qualitypress.asq.org.

Printed on acid-free paper
# Contents

Preface ........................................ xi
Acknowledgments .................................. xiii

**Part I  U.S. Healthcare System Problems**
and Solutions  .................................... 1

**Chapter 1  U.S. Healthcare System Problems**  ................. 3
Rising Health Insurance Premiums ......................... 3
Why Double-Digit Health Insurance Increases? ........... 9
46.6 Million Americans (Almost 1 in 6) Are Without  Health Insurance .......................... 13
Motivating Healthcare Providers to Reduce Cost and  Improve Quality ............................... 15
Toyota Lean Production ................................. 18
Waste in Healthcare .................................. 21
Excess Healthcare Administrative and Overhead Costs ... 22
Excess Insurance Company Administrative and  Overhead Costs ..................................... 26
U.S. Health Expenditures Are a Growing Percentage  of GDP ....................................... 30
U.S. Spends Twice as Much on Healthcare But Ranks  37th in Health System Performance ....... 32
Quality Problems in U.S. Healthcare ....................... 34
Past Failure of Continuous Quality Improvement and Total  Quality Management ....................... 38
Redesigning the U.S. Healthcare System ................. 39
Chapter 2  Respect for Employees ....................... 41

Part II  Reduce Healthcare Cost and Improve Quality by Using Toyota Lean Production Methods ........ 43

Chapter 3  46 Steps to Improve Cost and Quality in the U.S. Healthcare System .................... 45

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Define value from the perspective of the patient (customer)</td>
</tr>
<tr>
<td>Step 2</td>
<td>Map the patient’s value stream</td>
</tr>
<tr>
<td>Step 3</td>
<td>Walk through all your core processes, and observe how they work in detail</td>
</tr>
<tr>
<td>Step 4</td>
<td>Implement Toyota-style lean production methods</td>
</tr>
<tr>
<td>Step 5</td>
<td>Train administrators, managers, and supervisors to be lean leaders</td>
</tr>
<tr>
<td>Step 6</td>
<td>Provide empathetic “change management” to ease the transition to lean</td>
</tr>
<tr>
<td>Step 7</td>
<td>Change “quality improvement department” to “quality and cost improvement department”</td>
</tr>
<tr>
<td>Step 8</td>
<td>Change the name “quality improvement manual” to “quality and cost improvement manual”</td>
</tr>
<tr>
<td>Step 9</td>
<td>Educate every employee about the basic strategic plan of the organization</td>
</tr>
<tr>
<td>Step 10</td>
<td>Establish an improvement plan with goals to be accomplished by specific people and dates</td>
</tr>
<tr>
<td>Step 11</td>
<td>Implement a simple scorecard for the entire healthcare organization</td>
</tr>
<tr>
<td>Step 12</td>
<td>Use a simple scorecard to monitor each department</td>
</tr>
<tr>
<td>Step 13</td>
<td>The board of directors initiates selected strategic quality and cost improvement goals</td>
</tr>
<tr>
<td>Step 14</td>
<td>Publish an annual quality report for simultaneous review with the annual financial report</td>
</tr>
<tr>
<td>Step 15</td>
<td>Create a rapid improvement team (RIT) to make quick cost and quality improvements</td>
</tr>
<tr>
<td>Step 16</td>
<td>Encourage RIT members to implement Toyota-style work teams</td>
</tr>
<tr>
<td>Step 17</td>
<td>Implement rapid improvement circles of employees (RICs)</td>
</tr>
<tr>
<td>Step 18</td>
<td>Implement a permanent organizational structure for quality and cost improvement</td>
</tr>
</tbody>
</table>
### Table of Contents

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Set a goal for each RIC member to produce one to four new suggestions per month</td>
<td>77</td>
</tr>
<tr>
<td>20</td>
<td>Have a clear reward and recognition program, and communicate negative consequences</td>
<td>79</td>
</tr>
<tr>
<td>21</td>
<td>Adopt and teach continuous improvement to as many people as possible in the organization</td>
<td>79</td>
</tr>
<tr>
<td>22</td>
<td>The rapid improvement team quickly implements a 5S program</td>
<td>80</td>
</tr>
<tr>
<td>23</td>
<td>Identify unnecessary items using red tags</td>
<td>83</td>
</tr>
<tr>
<td>24</td>
<td>Promote visual control throughout the workplace and organization</td>
<td>83</td>
</tr>
<tr>
<td>25</td>
<td>Eliminate all forms of waste</td>
<td>85</td>
</tr>
<tr>
<td>26</td>
<td>Reduce specific examples of potential waste</td>
<td>103</td>
</tr>
<tr>
<td>27</td>
<td>Sequence work and standardize it</td>
<td>109</td>
</tr>
<tr>
<td>28</td>
<td>Eliminate bottlenecks to improve continuous flow</td>
<td>110</td>
</tr>
<tr>
<td>29</td>
<td>Document all important processes in the organization or department</td>
<td>112</td>
</tr>
<tr>
<td>30</td>
<td>Implement and maintain continuous improvement</td>
<td>113</td>
</tr>
<tr>
<td>31</td>
<td>Consider radical improvement where appropriate</td>
<td>114</td>
</tr>
<tr>
<td>32</td>
<td>Videotape each step of entire work processes</td>
<td>115</td>
</tr>
<tr>
<td>33</td>
<td>Use flowcharts to improve core processes</td>
<td>116</td>
</tr>
<tr>
<td>34</td>
<td>Use spaghetti diagrams to trace the path of a patient, employee, or product</td>
<td>117</td>
</tr>
<tr>
<td>35</td>
<td>Measure process cycle times</td>
<td>117</td>
</tr>
<tr>
<td>36</td>
<td>Implement quick changeovers within a process</td>
<td>118</td>
</tr>
<tr>
<td>37</td>
<td>Complement nursing care delivery models with Lean</td>
<td>119</td>
</tr>
<tr>
<td>38</td>
<td>Challenge and work with your extended network of suppliers and partners</td>
<td>120</td>
</tr>
<tr>
<td>39</td>
<td>Automate processes to further improve quality and cost</td>
<td>122</td>
</tr>
<tr>
<td>40</td>
<td>Learn from benchmark nonhealthcare organizations</td>
<td>122</td>
</tr>
<tr>
<td>41</td>
<td>Learn from other benchmark healthcare organizations</td>
<td>127</td>
</tr>
<tr>
<td>42</td>
<td>Learn from the institute for healthcare improvement</td>
<td>129</td>
</tr>
<tr>
<td>43</td>
<td>Hold on to the gains you’ve achieved</td>
<td>129</td>
</tr>
<tr>
<td>44</td>
<td>Reduce administrative overhead costs</td>
<td>130</td>
</tr>
</tbody>
</table>
Step 45  Avoid insurance company overhead costs  
Step 46  Take a total systems view of healthcare for lean 
   improvement  

Chapter 4  A Capsule Summary of a Lean Toyota-like Production 
   System for Healthcare  

Chapter 5  A Short To-Do List to Nationally Improve 
   U.S. Healthcare Cost and Quality  

Appendix A  Automaker Benchmarks  

Appendix B  Children’s Hospital and Regional Medical 
   Center Emergency Department Patient Flow—Rapid 
   Process Improvement (RPI)  

Appendix C  5-S Catches on at the VA Pittsburgh 
   Health System  

Appendix D  Error-free Pathology: Applying Lean Production 
   Methods to Anatomic Pathology at the University of Pittsburgh 
   Shadyside Hospital  

Appendix E  Going Lean in Healthcare  

Appendix F  Creating Lean Healthcare  

Appendix G  Fixing Healthcare from the Inside, Today  

Appendix H  Lean and Healthy  

Appendix I  No Satisfaction at Toyota  

Notes  
Bibliography  
Glossary of Lean Terms  
Index
What differentiates this book from other healthcare improvement books is that it is the only currently available book that presents a simple recipe of 46 lean steps for healthcare providers to reduce cost and improve quality. By taking these straightforward steps, healthcare providers can adopt the same lean methods that have enabled companies like Toyota to become so successful.

This book has two teaching objectives. The reader will learn to:

1. Understand cost and quality issues facing healthcare in the United States.

2. Understand and implement a 46-step recipe to reduce healthcare costs and improve quality at healthcare providers by using Toyota lean production methods.

Although other books have presented Toyota’s lean methods, this book goes further by showing how to directly apply those methods to healthcare, where they are sorely needed. This book is intended to be a practical manual for healthcare providers for improving quality and reducing costs. It represents a multiyear strategic direction for healthcare providers to adopt.

This second edition includes additional improvement steps and five new appendices of practical examples written by renowned lean experts. The author Robert Chalice may be contacted via email at authors@asq.org.
Acknowledgments

Special thanks go to the Institute for Healthcare Improvement (IHI) and all the authors of Appendix E “Going Lean in Healthcare”: James Womack, PhD; Arthur Bryne, MBA; Orest Flume, MA; Gary Kaplan, MD; and John Toussaint, MD. This is a remarkable group of experts who have made major contributions to lean healthcare.

Thank you also to George Alukal, for his co-authorship of Appendix F, “Creating Lean Healthcare.” Mr. Alukal is a respected lean professional who is well known within the American Society for Quality.

Personal thanks go to Dr. Steven J. Spear of IHI and to Harvard Business Publishing for the excellent Appendix G, “Fixing Healthcare from the Inside, Today.” Dr. Spear is a 2005 recipient of the Shingo prize for his paper, first published in the May 2004 issue of Harvard Business Review. The Shingo Prize, dubbed the “Nobel prize of Manufacturing” by Business Week in 2000, is a Utah State University award that recognizes contributions to business and manufacturing excellence.

Thank you to Andrew Scotchmer for Appendix H, “Lean and Healthy,” which includes commentary on how lean is improving healthcare in Great Britain and the United States. This article first appeared in the August 2006 issue of Qualityworld, the magazine for the Institute of Quality Assurance (www.iqa.org/publication).

Thank you to quality professional Barry Ross for his encouragement to add the change management and theory of constraints (that is, removing bottlenecks) improvement steps.

Many thanks go to Jennifer Condel, Anatomic Pathology Team leader; Dr. Stephen S. Raab, MD; David T. Sharbaugh; and Karen Wolk Feinstein, PhD at the University of Pittsburgh Medical Center Shadyside Hospital. They contributed an excellent lean case study in Appendix D, “Error-free Pathology: Applying Lean Production Methods to Anatomic Pathology.” A related article, “Small Improvements Yield Big Results in Shadyside Pathology Lab,” appears in the August 2004 newsletter of the Pittsburgh Regional Healthcare Initiative (PRHI) Web site, http://prhi.org/newsletters.cfm. The online article was written with the help of PRHI Communications Director Naida Grunden. The PRHI Web site, http://www.prhi.org, contains numerous improvement examples that may be replicated by other healthcare providers.

Thank you to communications director Naida Grunden, RN team leader Ellesha McCray, and CEO Michael Moreland for “5-S Catches On at the VA Pittsburgh Health System” in Appendix C.

Thank you to Barb Bouché, Continuous Performance Improvement manager at Seattle Children’s Hospital and Regional Medical Center for the lean improvement example in Appendix B.

I wish to thank Lief Larson, CEO of Valhalla Worldwide LLC, for his review of the manuscript. I also wish to thank Mr. Dave LaCourse, IE, MS, for his past help, contributions, and encouragement. Thank you to Paul Spaude, past president of Aspirus Health System (Wausau, WI) and current president of Borgess Health Alliance (Kalamazoo, MI), for his review of an early manuscript.

Special thanks to Paul O’Mara, Matt Meinholz, and the folks at Thistle Hill Publishing Services for publishing assistance via the American Society for Quality.

Finally I wish to thank my stepmother and father, Eva and Walter, for their encouragement and guidance throughout my life, and my mother, Mae, for her nourishing love.
Part I

U.S. Healthcare System Problems and Solutions
U.S. Healthcare System Problems

RISING HEALTH INSURANCE PREMIUMS

Health coverage premiums rose at an annual rate of 7.7 percent in 2006, according to a survey of 3100 companies by the Kaiser Family Foundation done between January and May 2006.

A pessimistic cost outlook was released in November 2006 by PricewaterhouseCoopers, which reported that health benefit costs are expected to jump between 10.7 percent and 11.9 percent in 2007, depending on the insurance plan type. That increase would be more in line with the double-digit health benefit cost jumps during the 2001–2003 period that a Mercer report recalled. Thus Mercer is projecting that health insurance costs will continue increasing at double-digit rates.

Health insurance premiums have increased an average of 11 percent per year over the past 5 years (7.7 percent in 2006, 9.2 percent in 2005, 11.2 percent in 2004, 13.9 percent in 2003, and 12.9 percent in 2002). We are experiencing seemingly ever-increasing costs for health insurance. Over the past 7 years, health insurance premiums have approximately doubled. If the current trend continues, health coverage premiums will double again in about 7 years. By then, who will be able to afford it? Many companies with fewer than 25 employees have absorbed yearly premium increases of 25 percent or more. Imagine what you now pay for health coverage. Then imagine yourself paying double that in possibly less than 7 years. This crisis is happening now.
The graph in Figure 1.1 shows the year-to-year percentage change for health insurance premiums since 1988. The 2006 increase of 7.7 percent for health insurance premiums was approximately twice the general inflation rate of 3.5 percent, or the annual increase of worker earnings of about 3.8 percent. Over the last 20 years health insurance premiums have increased annually on average at approximately three times the annual inflation rate.

The graph in Figure 1.2 shows the corresponding annual premiums for employee-sponsored health insurance. The annual family health insurance premium grew to $11,480 in spring 2006, and the premiums for singles grew to $4,242 for employer-based coverage. In response, employers are shifting more and more healthcare costs to employees. Since 2000, the portion of the premium that employees pay has risen by nearly 50 percent. If you have the misfortune of paying for your own health coverage, you are in an ever-tightening vise of increasing costs. Check out your own health insurance premium increases this year—up by 12 percent, 22 percent, or possibly even 40 percent. My personal group health insurance premium went up by 33 percent in 2002, 10 percent in 2003, 29 percent in 2004, 14.5 percent in 2005, and 6.9 percent in 2006. My premiums

\[\text{Figure 1.1} \quad \text{Year-to-year percentage change for health insurance premiums.}\]
increased by 2.3 times in about 5 years and I’m not alone. So the problem we are now addressing in this book is “How do we stop these skyrocketing increases in healthcare costs?”

Dr. W. Edwards Deming criticized “excessive medical costs” in the book *Four Days with Dr. Deming.* Dr. Deming stated that his friend, William Hoglund, who was manager of Pontiac Motor Division prior to 1995, told him, “Blue Cross is our second largest supplier. The cost of medical care is $400 per car.” Six months later Mr. Hoglund added that Blue Cross had overtaken steel as the most costly component in the automobile. That book was published over 10 years ago, and with skyrocketing healthcare costs, the cost of healthcare in the automobile has risen from $400 then to $1500 now, that is, more than tripling. Relevant data from a GM source in 2006 are as follows:

- GM Spends $6 billion annually on healthcare.
- GM spends half as much on steel as it does on healthcare. Note that Starbucks also spends more on its healthcare than on coffee.
- Healthcare costs add about $1500 to the price of each GM car.

Figure 1.2 Annual premiums for employer-sponsored health insurance.
According to the United Autoworkers Union, “As of the second quarter of 2003, a UAW-represented assembler earns $25.63 per hour of straight time. A typical UAW-represented skilled-trades worker earns $29.75 per hour of straight time.” Appendix A shows that U.S. automobile manufacturers generally expend about 25 labor hours per manufactured vehicle. So if we use a worker’s wage of $30 per hour times 25 hours per vehicle, the cost of labor in each vehicle is about $750. Therefore, GM’s current cost for healthcare of $1500 per vehicle is also almost double its labor cost of $750 per vehicle. The healthcare cost per vehicle is now greater than either the cost of the steel or the workers’ wages in each manufactured vehicle.

On February 11, 2005, the Washington Post published an article titled “U.S. Firms Losing Health Care Battle, GM Chairman Says.” Statements from that article include:

American manufacturers are losing their ability to compete in the global marketplace in large measure because of the crushing burden of health care costs, General Motors Corp. chairman and chief executive G. Richard Wagoner Jr. said as he called on corporate and government leaders to find “some serious medicine” for the nation’s ailing health system.

In a speech at the Economic Club of Chicago, the auto executive, who is responsible for providing health insurance for more people than any other private employer in the nation, graphically detailed how rising medical bills are eating into his company’s bottom line and ultimately threatening the viability of most U.S. firms.

“Failing to address the health care crisis would be the worst kind of procrastination,” Wagoner said, “the kind that places our children and our grandchildren at risk and threatens the health and global competitiveness of our nation’s economy.

“GM and the United Auto Workers didn’t cause this double-digit inflation in health care,” he said. And if GM pushed for sharp reductions in health benefits, the powerful union would likely strike and send the company into Chapter 11 bankruptcy protection, he predicted.

But the figure that prompted Wagoner to raise his voice is $1,500. That is the amount of money added to the price of
every single vehicle to cover health care, a cost that his foreign competitors do not bear.

“The cost of health care in the U.S. is making American businesses extremely uncompetitive versus our global counterparts,” he said. “In the U.S., health care costs have been rising at double-digit rates for many years.

“That huge benefit hit is chewing up the salaries and wages we would be receiving,” he said. “That’s the key.”

Wagoner broke his silence on some type of national catastrophic reinsurance program or using a separate government-backed insurance pool to cover the most expensive medical cases.

“If we can create a comprehensive insurance model to better share these catastrophic costs among all consumers, then we can take a big step toward providing affordable health care coverage for all our citizens,” Wagoner said.

“It’s simply not acceptable for over 45 million Americans to be without health care coverage. And it’s unfair for those of us who do provide health care benefits to have to pay higher bills to cover the costs of the uninsured.”

The business leaders cannot understand why the health care industry has been slow to institute the sort of technological changes that helped them improve quality and reduce costs.

“Only in health care does bad service and bad quality get paid for in the same manner as good service and good quality,” said Humana Inc. chief executive Michael B. McCallister, chairman of the Business Roundtable’s health care task force.

The CEOs agree that the double-digit premium increases will continue as long as individuals are sheltered from the true cost of health care.

In November 2006, the CEOs of GM, Ford, and Chrysler met with President George W. Bush to discuss the spiraling healthcare costs manufacturers face. GM is the largest private purchaser of healthcare in the United States. A GM spokesman stated that while the company understands that they have to “win,” there are issues like healthcare that affect competitive balance. In fact all three automakers spend more on healthcare per vehicle than on steel;
healthcare adds $1000 to $1500 per car for each of them. The CEO of GM also urged Congress to provide a “vigorous and robust” prescription drug market.

Consider again that automobile manufacturers now expend only about 25 hours of labor per each vehicle manufactured. That’s rather astounding! These manufacturers can now make an entire automobile with just 25 hours of assembly workers’ labor. That’s because they have been continuously improving their processes, quality, and costs for years. Because of intense foreign competition, they must either improve or disappear. Healthcare can similarly follow their example to improve.

It is becoming increasingly difficult for American manufacturers to compete in world markets because of continually rising healthcare costs. Similarly, school and city budgets have been hard hit by annual health insurance increases. Teacher counts and city services are being reduced to compensate for premium increases. For that matter, every purchaser of healthcare has been adversely affected.

The graph shown in Figure 1.3 illustrates changes in healthcare costs compared to other components of the consumer price index (CPI) between 1990 and 2005. What we see is that the cost of hospital services, nursing home, and adult day care increased 2.7-fold from 1990 to 2005. If hospital services costs were presented alone without nursing homes and adult day care, the increase would probably have been much greater, possibly the highest on the graph. It is little comfort to see that only college tuition and natural gas costs have had a greater increase. Also note that prescription drugs and medical supply costs increased 2.1-fold, while physician service costs increased 1.9-fold from 1990 to 2005. You usually hear people complain about continuing cost increases for cable TV, natural gas, gasoline, and electricity, but the fact is that hospital and other healthcare costs have outpaced them by a wide margin. Something has to be done to slow the steady rise of healthcare costs—that something is improving healthcare processes using the lean production methods described in this book. One consolation from the chart is that televisions and personal computers now cost you about half than they did in 1990. Unfortunately the costs for episodes of individual healthcare are also far greater in magnitude than most items on the chart. A hospital discharge might cost you more than $15,000 (not
counting doctors’ charges) and it’s increasing steadily. That’s a lot more than a tank of gas or a monthly cable TV or home heating bill.²

WHY DOUBLE-DIGIT HEALTH INSURANCE INCREASES?

Why does the cost of health insurance coverage continue to increase at double-digit rates? Could it be that hospitals (and possibly physicians) generally represent near monopolies in their service areas? If you’re having a heart attack, are you going to question the cost of care at the nearest hospital? Insured patients (governmental and commercially insured) make up 84 percent of the U.S. population and usually don’t question healthcare charges even if they are exorbitant, because their insurance will pay most of it. Insurance softens the blow of excessive costs, even if insurance premiums continually go
up. How often do patients with insurance ask for the price of procedures prior to care? Not very often, because someone else is paying the bill. If each person were spending only their own hard-earned dollars, there would be far more scrutiny.

Table 1.1 is from Lucette Lagnado’s article “California Hospitals Open Books, Showing Huge Price Differences.”

A law enacted in California in 2004 requires hospitals to disclose the list prices of each patient chargeable item. Prior to this law, California hospitals, like nearly all other hospitals in the United States, kept their price lists secret. Patients generally had no idea of the gamut of charges they would face until they received their final bill. The new California law, as well as initiatives in a few other states like Arizona, Wisconsin, and Minnesota, is, thankfully, beginning to change this situation. What is surprising is that these disclosures show that prices can vary as much as 17-fold from one hospital to the next for the same item or service. Table 1.1 shows, for example, that a “CT-scan of the head without contrast” varies from a low of $881 to a high of $4,037, a rather remarkable difference. What’s bothersome is that these kinds of price variations are common when comparing random hospitals across the United States. This is a problem for consumers as well as the health care industry to address.

Table 1.1  How much is that chest x-ray?

A new California law allows patients to look up the retail prices of many goods and services at hospitals. A survey of several hospital price lists shows dramatic differences in price.

<table>
<thead>
<tr>
<th>Service</th>
<th>Scripps Memorial</th>
<th>Sutter General</th>
<th>UC Davis</th>
<th>San Francisco General</th>
<th>Doctors, Modesto</th>
<th>Cedars-Sinai Los Angeles</th>
<th>West Hills Hospital, West Hills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-ray (two views, basic)</td>
<td>$120.90</td>
<td>$790</td>
<td>$451.50</td>
<td>$120</td>
<td>$1,519</td>
<td>$412.90</td>
<td>$396.77</td>
</tr>
<tr>
<td>Complete blood count</td>
<td>$47</td>
<td>$234</td>
<td>$166</td>
<td>$50</td>
<td>$547.30</td>
<td>$165.80</td>
<td>$172.42</td>
</tr>
<tr>
<td>Comprehensive metabolic panel</td>
<td>$196.60</td>
<td>$743</td>
<td>$451**</td>
<td>$97</td>
<td>$1,732.95</td>
<td>$576</td>
<td>$387.18</td>
</tr>
<tr>
<td>CT-scan, head/brain (without contrast)</td>
<td>$881.90</td>
<td>$2,807</td>
<td>$2,886</td>
<td>$950</td>
<td>$6,599</td>
<td>$4,037.61</td>
<td>$2,474.95</td>
</tr>
<tr>
<td>Percocet* (or hydrocodone acetaminophen) one tablet, 5-325 mg</td>
<td>$11.44</td>
<td>$26.79</td>
<td>$15</td>
<td>$6.68</td>
<td>$35.50</td>
<td>$6.50</td>
<td>$27.86</td>
</tr>
<tr>
<td>Tylenol* (oracetaminophen) one tablet, 325 mg</td>
<td>$7.06</td>
<td>No change</td>
<td>$1</td>
<td>$5.50</td>
<td>No change</td>
<td>12 cents</td>
<td>$3.28</td>
</tr>
</tbody>
</table>

* Hospitals carry either generic version, name brand, or both
** Represents the added total of 14 tests that make up the comprehensive metabolic panel
Source: Scripps Memorial, La Jolla; Sutter General; UC Davis Health System; San Francisco General; Doctors Medical Center; Cedars-Sinai Health System; West Hills Hospital and Medical Center.
Some semblance of rational pricing needs to prevail here. Admittedly, many patients do not pay list prices because they are part of an HMO or insurance group that has negotiated better pricing, or they are Medicare patients for whom the government pays a fixed amount based on their diagnosis and care episode. Unfortunately, the patients who are billed list prices are generally those without insurance and who are the least able to pay since they have the least market clout. Lucette Lagnado’s Wall Street Journal article states, “The elaborate pricing systems hospitals have developed over the years will be difficult to change, many in the industry say.” Jan Emerson, spokeswoman for the California Healthcare Association, adds, “The entire system will have to be blown up.” Clearly reform is needed here.

Care for Ohio, an organization sponsored by a healthcare union, states, “If you have no health insurance or your health insurance doesn’t cover your bill, chances are you’ll be expected to pay more than twice the price insured patients pay for the same treatment. Care for Ohio is a project launched by the members of SEIU District 1199, Ohio’s healthcare union, to shine a light on the practices of hospitals. The organization makes information available to patients, consumers, hospital employees, taxpayers, elected leaders, and community advocates to help promote the best decisions about health care—and it makes sure hospitals do their share to care for Ohio. In March 2005, Care for Ohio published an outstanding report titled “Twice the Price—What Uninsured and Under Insured Patients Pay for Hospital Care.” It states, “If health insurance doesn’t cover your bill, you’re in for a severe case of sticker shock.” A billing system that charges twice as much to those who can least afford healthcare is clearly broken.6

Care for Ohio recommends:

The ultimate solution, of course, is to create a health care system that guarantees everyone access to affordable health care. In the meantime, there are steps Ohio (and other states) can take to stop the overcharging of the uninsured, including: 1) Set limits on the prices hospitals can charge uninsured and underinsured patients, so that they will not be required to pay more for necessary medical care than it costs hospitals to provide it. 2) Create uniform charity care standards
defining the amount of free and discounted care hospitals are expected to provide patients in need. 3) Require far greater transparency and disclosure so that Ohio (and other) hospitals make their prices more accessible to consumers, publicize the availability of charity care, and report to the state annually the number and income of self-paying patients, the prices charged and free care provided, and the actual cost of providing the care.

Although Care for Ohio’s recommendations are important, they do not reduce the fundamental existing waste and inefficiency in related healthcare processes. It’s important to go beyond the recommendations to improve the care delivery processes by eliminating all forms of waste.

When there is more than one healthcare provider in a service area, how much duplicate technology and facility are there and how much does that add to the overall cost of healthcare? As an example, former U.S. Senator David Durenberger of Minnesota noted in a 2005 presentation that there are 21 CT scanners within 2.1 miles of Fairview Southdale Hospital near Minneapolis. Is that rational from a cost perspective, or does it reflect a healthcare system that is simply out of control?

Healthcare providers operate, by their own nature, in a “survival mode.” Each is trying to overcome the others in a race for market share, growth, and dominance. Competing providers do not generally operate in a synergistic manner to complement one another. Their goal is to simply capture and maintain market share. Shouldn’t their goal instead be to achieve the best health care status at the lowest cost for the entire population of a region? For years (see Figure 1.1) healthcare providers have chosen to increase costs rather than embrace lean delivery methods to lower costs, or even keep costs the same from year to year. At the same time, providers continually try to increase prices and profits to the extent that employers and the public will endure. Some healthcare administrators have told me they are concerned that reducing costs may cause patients to perceive they are receiving lower quality. It makes one wonder what will indeed motivate hospital administrators to lower costs. They don’t seem to wish to do it voluntarily. If a healthcare provider embraced lean methods to lower cost, it would force competing providers to eventually follow suit. According to
the Wisconsin Hospital Association (WHA), the reasons for escalating costs include:

1. Advances in patient care—Advances in medical treatments and technologies mean higher survival rates and safer, more convenient hospital services. Some prescription drugs for example are astronomically expensive. These advances are costly to fund.

2. Input costs—Workforce shortages are driving up healthcare worker salaries at rates much higher than inflation.

3. Government underfunding—The Medicare and Medicaid programs dramatically underpay their fair share of hospital expenses, forcing hospitals to shift costs to private payers.

4. Employer-sponsored health insurance—Lack of economic consequences for employees leads to higher consumption.

5. Less than optimum care—The Midwest Business Group on Health (MBGH) says 30 percent of cost of care is due to poor quality.

46.6 MILLION AMERICANS (ALMOST 1 IN 6) ARE WITHOUT HEALTH INSURANCE

In 2005, the number of Americans without health insurance rose by 1.3 million to 45.6 million, or 15.9 percent of the population. That’s more than the combined population of the nation’s 24 least populous states plus the District of Columbia. It’s also about 1.25 times the entire population of the most populous state, California. Imagine all the people in California representing far less than the total uninsured in the United States.

Figure 1.4 is a remarkable graph of the U.S. trend in uninsured from the Commonwealth Fund. It is not that far off until one in five Americans will lack health insurance. It is a sad commentary that the United States, one of the richest nations in the world, is yet incapable of guaranteeing basic healthcare for its citizens.

In August 2006, the U.S. Census Bureau released figures showing that 15.9 percent of Americans were uninsured during 2005, compared
to 15.6 percent in 2004, 15.5 percent in 2003, 15.2 percent in 2002, and 14.6 percent in 2001. This increasing trend in the number of uninsured is ominous. In 2003, there was an increase of 1.5 million uninsured compared to a 2.4 million increase in 2002. The total increase of 3.9 million uninsured in 2002 and 2003 is larger than the population of either metropolitan Los Angeles or Chicago, which are the second and third largest cities in the United States, exceeded only by the population of metropolitan New York. Understand that the group of uninsured in the United States actually grew during 2002 and 2003 by an amount larger than metropolitan Los Angeles’ population! Nearly one in six U.S. citizens did not have health insurance coverage during 2005. One in four residents of New Mexico and Texas presently lacks health insurance. There are more than 8 million uninsured children in the United States. The rising cost of healthcare coverage is contributing to the growing crisis of the uninsured. In 2005 the percentage of people covered by employer-based health insurance fell to 59.5 percent, compared to 59.8 percent in 2004, 60.4 percent in 2003, and 61.3 percent in 2002, no doubt due to increasing cost.

Figure 1.4 47 million uninsured in 2005; increasing steadily since 2000.

In the United States it is a right of each citizen to receive a public education through high school. Should it not also be a right of each U.S. citizen to receive affordable health insurance and affordable healthcare? The CEO of a large U.S. healthcare system once commented to me that when he looked at the list of personal bankruptcies frequently published in the local newspaper, he observed that the majority was due to healthcare-related bills. In 2005, a Harvard study concluded that half of all U.S. bankruptcies filers stated that medical expenses led to their financial downfall and most of them had health insurance. They also found a 30-fold increase in medically related bankruptcies compared to a similar study conducted in 1981. Medical bankruptcies affect up to 2.2 million Americans. Isn’t it time that we as a nation provide our citizens with a basic level of healthcare so that major illnesses don’t leave them destitute?

**MOTIVATING HEALTHCARE PROVIDERS TO REDUCE COST AND IMPROVE QUALITY**

An important question is what will motivate healthcare providers, particularly hospitals, to truly embrace high-quality, lean production methods? As long as patients and employers continue to accept and endure continually rising healthcare premiums and costs, there is little hope. When the cost of healthcare becomes so outrageous that individuals and employers can no longer afford it, then change may occur as they clamor. After the cost of healthcare doubles again, picket lines may appear in front of healthcare facilities and insurers. This may come to pass within the next seven years, as healthcare costs are projected to double again. A few scenarios are possible: (1) Public and employer outrage will produce meaningful voluntary cost reduction; (2) Partial government intervention (and cost control) will occur; (3) the U.S. healthcare system will be nationalized, as it is in many other countries, such as Canada; or (4) the U.S. may adopt a hybrid system, as in France, that guarantees basic benefits and allows citizens to purchase more comprehensive insurance benefits. While some may argue against nationalized healthcare in the United States, nearly everyone agrees that U.S. healthcare has simply
become too expensive. Healthcare providers and insurers have not held down or reduced costs on their own. Healthcare costs are presently rising at about five times the rate of overall inflation (see Figure 1.1). Few if any would disagree with the objective of simply reducing U.S. healthcare costs.

One may ask why healthcare providers have not yet embraced lean methods as other U.S. manufacturers have. To be frank, many healthcare providers are near monopolies in their service areas. They have had little reason to embrace lean. By comparison, a manufacturer with increasingly low cost foreign competition from China, Asia, or Mexico has been forced to embrace lean or face extinction.

Healthcare worker shortages may encourage providers to embrace lean methods to be more efficient with limited available talent. From 2004 to 2014, employment in healthcare occupations is expected to grow 26 percent, or twice the 13 percent growth rate of nonhealthcare jobs. During that 10-year period, job growth of between 34 percent and 56 percent is expected for personal care aides, medical assistants, and physician assistants, medical record technicians, home health aides, physical and occupational therapy aides and assistants, and audiologists.¹⁰

A 2004 report, “Manufacturing in America—A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers” by the U.S. Department of Commerce—lists reducing healthcare costs as the number one priority.¹¹ Between 2000 and 2003, the U.S. lost 15.1 percent, or 2.6 million, of its manufacturing jobs. The report states, “The challenges confronting American manufacturers and manufacturing workers are urgent, and President Bush has already taken action. He has implemented a jobs and growth agenda and outlined a six-point plan.” Note the number one priority is to reduce healthcare costs.

1. To make healthcare costs more affordable
2. To reduce the lawsuit burden on the U.S. economy
3. To ensure an affordable, reliable energy supply
4. To streamline regulations and reporting requirements
5. To open markets for American products
6. To enable families and businesses to plan for the future with confidence
A typical U.S. small/medium manufacturer would sum up the healthcare cost problem as follows:

Healthcare is a big concern that we have in keeping competitive. We spend about $9000 per employee on healthcare, and when half of our people make under $30,000 a year, it is hard to make ends meet. The rising cost of healthcare is the biggest barrier to health coverage. The annual family health insurance premium grew to $11,480 in spring 2006 while insurance premiums for singles grew to $4242 for employer-based coverage. Note that the family healthcare premium is more than one third of the employee’s salary. In 2007, it cost nearly $7 per hour to pay for a small business employee’s family health insurance premium. Some have projected that by 2010, the cost of healthcare for small business will be more than the employee wages themselves. Insurance premiums for small business have been growing fastest. What these facts suggest is that there is competitive value for reducing healthcare costs that U.S. manufacturing companies face, particularly for small and medium-sized manufacturers that are the foundation of the U.S. manufacturing sector.

What’s in it for hospital administrators to embrace lean? (WIFM = “What’s in It for Me?”) To date they haven’t done so voluntarily. The following points may encourage some administrators to embrace lean. This is a pivotal point. If there isn’t enough incentive to promote positive change, healthcare leaders and their organizations will adhere to the status quo of increasing costs and ok-marginal quality. Healthcare leaders may not be experiencing the kind of “burning platform” that forced most U.S. manufacturers to embrace lean to simply survive against growing Chinese, Mexican, and Asian competition. If hospital administrators would embrace a lean system, they would:

- Produce meaningful cost and quality improvement
- Achieve strategic advantage over competition
- Quell growing business and public clamoring about healthcare costs
- Earn greater prestige—national recognition
- Generate greater profit
• Provide funds for uninsured, uncompensated care, and philanthropy
• Help fend off government intervention, cost control, and nationalized healthcare
• Better use increasingly scarce healthcare workers

TOYOTA LEAN PRODUCTION

To solve the problems of rising healthcare costs and questionable quality, we will turn to the techniques used by one of the most successful automobile companies in the world, the Toyota Motor Company. On May 3, 2003, the Detroit News published an article headlined “Profit-Rich Toyota Threatens Big Three—Can Anything Stop Toyota?” An article on May 11, 2006, exclaimed, “Toyota Profits Jump to $12 Billion” for its fiscal year ending that March. That was nearly double GM’s peak annual earnings of $6.9 billion in 1995. It is also more than any Detroit automaker has made in any one year since at least the 1960s and more than GM, Ford, and Chrysler made combined in any recent year. These companies have faced hardships while Japan-based Toyota is enjoying soaring profits.

In the fiscal year ending January 31, 2006, Toyota continued to grow its net profits by a stunning 17 percent. Toyota moved in front of Ford in 2004 to become the world’s second largest automobile producer, behind only GM. Based on the current trend, Toyota will overtake GM as the world’s largest car company by 2010 with a 15 percent worldwide market share. This is an ominous sign for U.S. automobile manufacturing. By implementing what has become known as the “Toyota Lean Production System (TPS),” Toyota has become the de facto standard of performance for companies. Health care providers can similarly adopt some of Toyota’s successful methods to reduce cost and improve quality.

By contrast, the U.S. automakers are struggling. GM lost $3.4 billion in the quarter ending June 2006. Ford reported its largest-ever annual loss of $12.7 billion in 2006. This amounts to a loss of $4380 on each car or truck they sold in 2006. Ford’s annual sales dropped about 10 percent that year. GM and Ford shares traded at lows not seen in more than a decade. GM has cited rising medical
costs as contributing to its losses. It said that U.S. healthcare costs continue to grow at an excessive rate, which hampers profitability. It will spend $6 billion in 2006 on health insurance to cover over a million salaried and hourly workers, retirees, and family members. Moody’s Investors Service and Fitch Ratings cut GM’s debt rating to one notch above junk status. Ford Motor and DaimlerChrysler are similarly hurt by rising healthcare costs.

GM and Ford are both engaged in large downsizing plans. GM has persuaded about 35,000 hourly workers to leave the company under early retirement or buyout plans, and Ford has offered buyouts and early retirement packages to all 75,000 U.S. production workers. Ford hopes to reduce its hourly workforce by as many as 30,000 and is expected to shutter 16 plants.

On October 4, 2006, a small piece on Bloomberg.com stated: “Toyota takes off. Toyota Motor Corp. hammered its U.S. rivals again last month. Toyota’s U.S. sales soared by 25 percent over a year earlier; General Motors and Chrysler’s domestic sales slipped, and Ford saw a 4.7 percent increase.” David Hilton of Cap Gemini added, “It doesn’t look like anything can stop Toyota, or even slow them down.” Then on October 13 the news was, “Big Japanese automakers made $2,400 more than their U.S. rivals on every car they sold in North America last year. They accomplished the feat by charging more, and spending less on labor and health care.”

Realize that Toyota was nearly bankrupt in 1949 and terminated a large part of its workforce. By implementing what has become known as the Toyota Lean Production System (TPS), Toyota has become the benchmark by which American automobile executives judge their own companies. Compared to traditional mass production techniques, Toyota manufactures with half the human effort in the factory, half the manufacturing space, half the investment tools, half the engineering hours, and half the time to develop new products. Despite being the most efficient carmaker in the world, Toyota produces world-class-quality automobiles.

In the August 2006 J. D. Powers Dependability Study, Toyota models dominated their segment rankings. Toyota captured the best dependability rankings with four models. Toyota also had the highest customer retention rate in the automobile industry. That is, a higher percentage of Toyota owners repurchase another Toyota, as compared to any other automobile brand.
Similarly, the April 2005 Consumer Reports Reliability Study ranked 10 Japanese models “most reliable,” and there were no U.S. domestic models in the top 10. The April 2005 Consumer Reports “Quick Picks” of “82 best cars” based on high ratings, reliability, fuel economy, safety, and overall satisfaction included no domestic models. This issue had a list of 32 cars that more than 80 percent of consumers would “purchase again.” That list contained 25 Japanese models, dominated by Toyota, and only one U.S. model, the Chevrolet Corvette.

In the March 2006 Consumer Reports Reliability Study, Japanese automakers were again the best and most reliable. Asian vehicles took all the spots in the “top picks” list for the first time ever. The results are a setback for Ford and General Motors.

Of the 69 cars and trucks Consumer Reports rated “good bets” for used-car buyers, 59 carried Japanese nameplates, while just 8 were from domestic brands. American brands accounted for 22 of the 34 “bad bets”—a list that included no Japanese models. Consumer Reports, published by the nonprofit Consumers Union, bases its top picks on the findings of a team of engineers and technicians who test vehicles and on its survey results.

The Toyota Lean Production System is what Toyota uses to deliver best quality, lowest cost, and shortest product manufacturing time though the incessant elimination of waste. Toyota focuses on the tasks and responsibilities of those workers, who actually add value to the car, and reduces or eliminates all other non-value-added tasks and labor. TPS is composed of three pillars: just-in-time production with just-in-time inventory; built-in quality at each step without the need for reinspection; and respect for the employee. Quality is defined as “meeting or exceeding customer expectations.” Alternatively it may be defined as “meeting or exceeded predefined standards.” Either definition is workable and interchangeable. Clearly, American industry and by extension the U.S. healthcare system has much to learn from Toyota’s efficient yet high-quality methods.

The Lean Enterprise Institute defines lean production as follows:

A business system for organizing and managing product (or service) development, operations, suppliers, and customer (patient) relations that requires less human effort, less space, less capital, and less time to make products (services) with fewer defects to precise customer desires, compared with the previous system.
Lean production was pioneered by Toyota after World War II and, as of 1990, typically required half the human effort, half the manufacturing space and capital investment for a given amount of capacity, and a fraction of the development and lead time of mass production systems, while making products in wider variety at lower volumes with many fewer defects. The term was coined by John Krafcik, a research assistant at MIT with the International Motor Vehicle Program in the late 1980s.

Lean thinking is a five-step thought process proposed by James Womack and Dan Jones in their 1996 book *Lean Thinking* to guide managers through a lean transformation. The steps are:

1. Specify value from the standpoint of the end customer
2. Identify all the steps in the value stream
3. Make the value creating steps flow toward the customer
4. Let customers pull value (toward them) from the next upstream activity
5. Pursue perfection

WASTE IN HEALTHCARE

Don Berwick, MD president and CEO of the Institute for Healthcare Improvement (IHI), estimates that 30 to 40 percent of the total cost of healthcare production is waste or, as the Japanese call it, *muda*. Cindy Jimmerson, a nurse who has also been pursuing lean healthcare methods states, “The national numbers for waste in healthcare are between 30 percent and 40 percent, but the reality of what we’ve observed doing minute-by-minute observation over the last three years is closer to 60 percent. That’s waste of time, waste of money, waste of material resources. It’s nasty. The waste is not limited to administrative costs, which most research on health-care has documented. It’s everywhere: patient care and non-patient care alike.” Jim Womack, PhD., founder of the Lean Enterprise Institute, similarly estimates that organizations can generally save 50 percent of labor and space by converting to lean production methods similar to Toyota’s. Is it possible that our healthcare delivery system can similarly save 50 percent by converting to lean production? By *lean production*, we
mean the elimination of waste in all its forms whether time, materials, or unneeded process steps. By lean processes, we don’t mean making employees work harder. We do mean eliminating all waste and non-value-added steps in work processes to improve cost and quality. The healthcare industry itself has much to gain by adopting Toyota’s lean methods, as I will further present. What is most critical for U.S. healthcare executives is to embed into their organizations a mind-set of continuous cost and quality improvement. This means setting a goal that there will be no cost (or insurance premium) increase this year for our patients. Even better, there will be an X percent cost reduction, and we will simultaneously achieve quality improvement goals and specific community health objectives.

Cost per case mix indexed (CMI) adjusted patient discharge is defined as the cost per discharged patient adjusted for patient severity. It is a comparable cost indicator across all hospitals. Why is there such huge variability in cost per CMI adjusted discharge across the country from around $5000 at the lowest-cost hospitals to more than $15,000 per discharge at the highest-cost hospitals? You may pay a different price for the same hospital stay or medical procedure all across the country. There is little consistency in the actual price and quality of medical care across the United States.

**EXCESS HEALTHCARE ADMINISTRATIVE AND OVERHEAD COSTS**

Many health care CEO salaries in 2003 ranged from $600,000 up to $2 million and are likely much higher today. One CEO earned about $2.34 million per year in 2003, or about $1125 per hour. That CEO’s salary appears to have increased about 62 percent from 2002 to 2003. Ask any one of the 46 million uninsured in the United States, or any small employer who has just had a 30 percent health insurance premium increase, whether such hospital administrator salaries seem reasonable. A $2.34 million salary equates to the combined salary of about 45 RNs capable of simultaneously caring for about 270 med/surg patients. Can these kinds of administrative dollars be better spent? What’s of more value—one administrator or 45 nurses delivering patient care?
With 1 in 6 people in the U.S being uninsured, is it rational for any nonprofit health system board to approve a CEO’s salary of $2.34 million per year knowing that many uninsured patients will be helping pay it?

Executives at the six largest nonprofit, tax-exempt hospital systems all make more than $1.2 million a year. One large system has given $5.1 million in forgivable loans to eight top executives since 1998. Another paid $185,427 in 2005 so two executives could live in other states and commute to work. In a Catholic not-for-profit healthcare system, a CEO’s salary was about $1 million in 2001 and was increased by $640,000 or 64 percent within the following 3 years. Do RNs or other frontline healthcare workers ever receive such a percentage salary increase?

Some individual annual salaries for CEOs at 300- to 500-bed community hospitals commonly reach $500,000 and beyond. Look within your own community. If your local hospital has more than 300 beds, you’ll probably find that its hospital administrator is making more than your mayor, your superintendent of schools, your governor, most local corporate executives, and even the president of the United States. By the way, the salary of the president of the United States is $400,000 per year.

By contrast, there are some good examples of rational CEO salaries in U.S. companies. For example, the CEO of the discount retailer Costco had a salary of $350,000 in 2006. Costco had 2006 annual revenue of about $62 billion. It is a large and profitable company. Yet its CEO receives a more reasonable annual salary than many healthcare CEOs. It is true that Costco’s CEO receives stock options, which are a type of bonus that appreciates based on the performance of the company’s stock. Still, Costco represents a good example of rational CEO compensation in business that healthcare organizations may emulate.

Table 1.2 shows that in 2003 hospital presidents and CEOs in Ontario, Canada, earned an average of $239,000—that’s in Canadian dollars (CAD), which equals approximately $210,000 in U.S. dollars (USD). So, it appears that in 2003 the Canadian Universal Healthcare System rewarded the average hospital CEO a salary of $210,000 USD, which is about 47 percent less than his average U.S. counterpart earning approximately $390,000 USD per year. So to some extent, the Canadian Healthcare System contains healthcare costs by containing administrative salaries.
In 2003, it was also true that a hospital CEO in Ontario with an average annual salary of about $239,000 CAD earned approximately 4.6 times a Canadian RN’s salary of about $52,000 CAD. Maybe the U.S. healthcare system can learn from the Canadian system by adopting a guideline that a U.S. hospital CEO or administrator’s salary should not exceed 5 times the average registered nurse’s salary. Or should Congress consider a law to that effect? In reality some U.S. hospital executives earn more than 50 to 100 times the average registered nurse’s salary. Even limiting U.S. healthcare executive compensation to 10 times the average RN salary would be a vast improvement compared to present excesses.

What is a logical way for a hospital board to reward a CEO consistent with a lean philosophy? First, set the base pay at reasonable level of approximately five times the average RN’s salary. Then provide the CEO with a bonus up to 30 percent of salary based on simultaneously achieving patient satisfaction, employee satisfaction, physician satisfaction, quality, cost, and earnings goals. Annual goals would be continuously improved from year to year. Rewarding CEOs at healthcare providers in such a manner would be a win-win for all.

### Table 1.2 Ontario 2003 healthcare executive salaries. ($1 Canadian = approximately $0.88 USD)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Executives</td>
<td>$208,344</td>
<td>3.8%</td>
<td>8.9%</td>
<td>$63</td>
</tr>
<tr>
<td>President &amp; CEO</td>
<td>$239,327</td>
<td>5.4%</td>
<td>4.7%</td>
<td>$28</td>
</tr>
<tr>
<td>Medical executives</td>
<td>$198,361</td>
<td>2.0%</td>
<td>6.9%</td>
<td>$14</td>
</tr>
<tr>
<td>Other nonmedical executives</td>
<td>$182,674</td>
<td>4.6%</td>
<td>17.6%</td>
<td>$20</td>
</tr>
<tr>
<td>Nonexecutives</td>
<td>$148,620</td>
<td>1.5%</td>
<td>18.0%</td>
<td>$247</td>
</tr>
<tr>
<td>All earners over $100,000</td>
<td>$157,762</td>
<td>1.7%</td>
<td>16.2%</td>
<td>$309</td>
</tr>
</tbody>
</table>

Realize also that each RN simultaneously cares for approximately six patients on a general med/surg hospital unit. This means that 10 RNs may care for as many as 60 patients simultaneously. Should any healthcare executive be paid more than 10 RNs able to care for 60 patients simultaneously? Hospital boards should each ask themselves that precise question. How are salary dollars best spent to provide true value added services to patients? If executive salaries were more reasonable, there would still be no shortage of well-qualified applicants for these high-paying jobs. Linking hospital CEO salaries to a multiple of RN salaries like 5 to 10 would also make it less likely for CEOs to reduce RN direct-care salaries, since that would in effect reduce their own salaries. It would encourage CEOs to instead remove other sources of waste, focus on providing even more direct patient care, and even increase RN salaries.

Note that the average salary of a registered nurse in the U.S. is also about $52,000 USD per year, which is about 12 percent more than the similar $52,000 CAD average Canadian RN salary. So it appears that the Canadian Health System is also containing nursing costs.

Consider Figure 1.5, which shows the growth of hospital administrative personnel compared to the growth in RN caregivers.¹⁶ Wouldn’t it make more sense to instead increase the growth in RNs? Note that physician growth versus administrator growth chart is very similar.

![Figure 1.5 Increases in registered nurses versus administrators.](source: Bureau of Labor Statistics and Center for Policy Studies.)
EXCESS INSURANCE COMPANY
ADMINISTRATIVE AND
OVERHEAD COSTS

In reality, health insurance companies are adding approximately 20 percent to 30 percent overhead to patient care costs, or about 10 times the overhead that Medicare adds.

Figure 1.6 shows some sample overhead percentages.

Excess insurance company overhead is due to inflated executive salaries, profits, buildings, and capital expenditures. Should Congress consider a law that all health management and health insurance companies can add no more than 10 percent overhead to the actual cost of patient care? That compares to only 3 percent overhead that the Medicare system currently adds. That would contain their profits and operating costs, including their CEO salaries and capital costs, such as buildings. In fact, Governor Arnold Schwarzenegger’s 2007 California Plan for Healthcare would limit insurance company overhead to about 15 percent of premiums and cover all California residents.17 Or, somehow, the United States might simply reduce reliance on health insurance companies, as Maine and Massachusetts seem to be doing.

As you can see from Table 1.3, it is not uncommon for health management or health insurance company CEO’s to earn salaries of $10 million or more per year, besides owning company shares if publicly traded. Of particular note on the following list is the past CEO of United Healthcare, who earned about $10 million in 2005.
Table 1.3  2005 CEO compensation at selected health management and insurance companies.

<table>
<thead>
<tr>
<th>Company</th>
<th>Pay (millions of dollars)</th>
<th>Five-year Pay (millions of dollars)</th>
<th>Shares Owned (millions of dollars)</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caremark Rx</td>
<td>69.66</td>
<td>161.85</td>
<td>3.9</td>
<td>57</td>
</tr>
<tr>
<td>Aetna</td>
<td>30.86‡</td>
<td>N/A</td>
<td>32.5</td>
<td>57</td>
</tr>
<tr>
<td>Cigna</td>
<td>28.82</td>
<td>78.31</td>
<td>79.7</td>
<td>54</td>
</tr>
<tr>
<td>United Health Group</td>
<td>10.70</td>
<td>297.21</td>
<td>36.6</td>
<td>58</td>
</tr>
<tr>
<td>WellPoint</td>
<td>10.16†</td>
<td>56.95</td>
<td>34.8</td>
<td>58</td>
</tr>
<tr>
<td>Coventry Health Care</td>
<td>7.46‡‡</td>
<td>N/A</td>
<td>14.0</td>
<td>50</td>
</tr>
<tr>
<td>Omnicare</td>
<td>6.02†</td>
<td>39.78</td>
<td>121.9</td>
<td>66</td>
</tr>
<tr>
<td>HCA</td>
<td>3.74†</td>
<td>14.30</td>
<td>15.2</td>
<td>60</td>
</tr>
<tr>
<td>Tenet Healthcare</td>
<td>3.64</td>
<td>9.70*</td>
<td>2.8</td>
<td>46</td>
</tr>
<tr>
<td>Humana</td>
<td>3.33</td>
<td>15.10</td>
<td>18.6</td>
<td>53</td>
</tr>
<tr>
<td>Health Management</td>
<td>1.71</td>
<td>17.37</td>
<td>13.5</td>
<td>60</td>
</tr>
</tbody>
</table>

Methodology: Total 2005 compensation for each chief executive includes the following: salary and bonuses; other compensation, such as vested restricted stock grants, Long-Term Incentive Plan (LTIP) payouts and perks; and stock gains, the value realized by exercising stock options.

*Three-year total.
†Prior-year data.
‡New chief executive; compensation may be for another executive officer.

and about $297 million over five years (that is, nearly $60 million per year). He accumulated a net worth of nearly a billion dollars as CEO with United Healthcare, a Minnesota health insurance company. That’s billion, with a “b.” Are these excesses healthy for our U.S. healthcare system?

Also consider the CEO of Aetna who retired in 2006 and who does not appear in Table 1.3. He has been chairman of the Board since April 1, 2001, and planned to also retire from that position at the end of 2006. In 2006, his salary was $1.1 million, his bonus was $2 million, and his other annual compensation was slightly more than $202,000. In addition, in 2006, he received 911,904 stock options and long-term compensation of over $4.5 million. Furthermore, according to the proxy statement, he owns or controls the equivalent of 6,338,393 shares of Aetna stock, just under 1 percent of the total shares outstanding. Is this former Aetna CEO another good example of insurance company excesses within the U.S. healthcare system? Would any health insurance policyholder or uninsured person approve of such overhead? Should any health insurance company board member allow such overhead to be heaped on policyholders?

Also consider the CEO of Caremark Rx, who earned $69.66 million in 2005, the ninth highest salary of any CEO in the United States. Caremark Rx, Inc., is a pharmaceutical services company that offers pharmacy benefit management services that involve the design and administration of programs for prescription drug use. The company dispenses pharmaceuticals to eligible participants.

Finally, consider the Humana CEO who also does not appear in Table 1.3. In 2005 he had total compensation of $2.6 million, which includes stock options. As of December 31, 2005, he held 1,088,621 exercisable stock options valued at $48 million and 449,996 unexercisable stock options valued at an additional $12.9 million. Is our U.S. health insurance system structured for profiteering or for delivering low cost quality care to patients?

A solution to eliminating insurance company excesses and overhead is to simply avoid these middlemen or at least rely less upon them. This may be done by expanding Medicare to cover more of the population and to somehow include coverage for children. Remember that Medicare adds a small 3 percent overhead to healthcare costs, compared to the 20 percent to 30 percent overhead added by insurance companies; a greater than 20 percent savings that would be more than
enough to pay for the 15.9 percent of Americans currently uninsured. Just eliminate the excess administrative costs of insurance companies and one can then pay for the uninsured in America. This is a logical and reasonable way to make U.S. healthcare more affordable. It is one of the greatest and most obvious opportunities for shifting non-value-added dollars from insurance companies to providing true value-added healthcare services to patients at lower cost.

Moving toward some kind of single-payer approach will also greatly simplify complex dealings with thousands of different insurance companies, each with its own coverage rules. Even state-sponsored programs like the ones recently enacted in Massachusetts or Maine offer the promise of increasing coverage and reducing costs. State programs, as in Illinois, that provide insurance to all children are also gathering strong support. Other options extend the insurance program available to government workers and legislators to more of the U.S. population. Or, simply self-insuring a company if it is large enough would direct more dollars to valued-added patient care. Adopting a universal healthcare system for most of the U.S. population would eliminate non-value-added insurance underwriting costs and mountains of unnecessary paperwork and administrative tasks. The goal is simply to direct a greater portion of current health expenditures toward true value-added care for patients as opposed to funding unnecessary overhead.

Remember our precept that the treatment of patients is primarily between them and their physician and nurse(s) and supporting ancillary departments, and yet large administrative support structures surround them. Thirty-one cents of every dollar spent for healthcare in the United States goes to administrative costs, according to an August 20, 2003 article in the New England Journal of Medicine. That's nearly double the rate in Canada. According to that article, the United States spent $294 billion on healthcare paperwork and administration in 1999. Having a U.S. delivery system administered as efficiently as the one in Canada would save $209 billion annually, the authors say, enough to insure all Americans who now lack health insurance.

In addition to Canada, other countries that have model single-payer systems include France, Germany, and the Netherlands. These single-payer systems standardize all the paperwork, greatly reduce administrative costs, eliminate the underwriting and health insurance
application process, eliminate the patient payment process as they are funded by increased taxes, and provide a defined level of healthcare to each citizen. In our current insurance-based payment system, it is very common for a provider to have to file a claim for reimbursement multiple times before it is paid. In 2003, Maine became the first state to enact a single-payer health system for every resident. It is projected to save $1 billion by 2008, compared to Maine’s 2004 health expenditures of $8.4 billion. The Maine system will also be able to negotiate statewide for better pharmaceutical prices. Maine plans to penalize pharmaceutical companies that refuse to sell drugs to uninsured people at the same discounted prices that Medicaid pays.

Allowing the Medicare system to more aggressively negotiate drug costs with pharmaceutical companies was one of the goals of the Democrats following their landslide midterm election victory in November 2006. Such pharmaceutical savings will benefit many U.S. healthcare recipients. Shouldn’t U.S. residents enjoy pharmaceutical savings comparable to those in Canada or other countries with universal healthcare, since we manufacture most of the drugs? By contrast, drug makers have begun a campaign to prevent Medicare negotiating low prices. Drug makers have not set a budget for their campaign, but they and their trade groups already spend $100 million a year on lobbying in Washington, a non-value added cost that could be better directed to actual patient care.

Streamlining payer methods will help reduce healthcare costs, but these do nothing to attack the other root cause, which is wasteful healthcare operating practices. Eliminating waste and overhead from healthcare processes is a huge opportunity to redirect savings to value-added patient care. It’s clear there are plenty of opportunities to reduce healthcare costs. In this book, hospital executives can learn how Toyota lean production works and how to apply it to their organizations, and then they can then continuously lower cost and improve quality to reach board-approved goals.19

U.S. HEALTH EXPENDITURES ARE A GROWING PERCENTAGE OF GDP

According to the government-run Center for Medicare and Medicaid Services, total national personal healthcare expenditures were $1.3
trillion in calendar year 2000, or nearly 14 percent of the gross domestic product (GDP). This grew about 50 percent to approximately $2 trillion by 2006.) Of the 2000 total, $412 billion or 32 percent was for hospital services, $286 billion or 22 percent was for physician services, $122 billion or 9 percent was for prescriptions, and $92 billion or 7 percent was for nursing home service. Hospitals by far account for the greatest percent (32 percent) of total national healthcare expenditures, that is, nearly 1.5 times total physician expenses. Hospitals are the top priority, but all healthcare providers including physician practices, pharmaceutical companies, and nursing homes are candidates for lean improvements. Between 2001 and 2011, health spending is projected to grow 2.5 percent per year faster than GDP, so it will constitute 17 percent of GDP by 2012 (see Figure 1.7). It is interesting to note that France and Italy were ranked No. 1 and 2 in health system effectiveness by the World Health Organization, and they each spend only 8 percent to 10 percent of their GDP on healthcare. It is also interesting that Italy, which has the third largest health system in Europe, behind Germany and France, spends 41 percent of its health expenditures on physicians, 18 percent on hospital care, and 11 percent on drugs. While drug expenditures are similar to the 9 percent of GDP spent in the United States, Italy spends far less on hospital care: 18 percent of GDP compared to 32 percent in the United States. This is consistent with a lean goal of saving one half. Conversely, Italy spends almost twice

Figure 1.7 National health expenditures as a share of gross domestic product (GDP).

as much on physicians, 41 percent of GDP compared to 22 percent in the United States. Back to our premise that a patient’s care is primarily between them and their physician and nurse(s): Italy’s greater proportion of funding for physicians makes sense because physicians, like nurses, are usually providing patients with value-added services.

A headline in USA Today reads, “Medicare system projected to go broke in 15 years,” that is, by 2019, which is seven years earlier than previously predicted.22

A current report from the trustees of Medicare and Social Security blames this deterioration on “lower-than-expected revenue from workers’ payroll taxes, higher spending on healthcare and the prescription drug benefit Congress passed in 2003.” The report shows that the expenses for Medicare will exceed the revenue from payroll taxes and beneficiary premiums as soon as 2011. Clearly, some important changes are needed to reduce the cost of healthcare, reduce Medicare expenses, and/or increase Medicare funding.

**U.S. SPENDS TWICE AS MUCH ON HEALTHCARE BUT RANKS 37TH IN HEALTH SYSTEM PERFORMANCE**

The U.S. spends more than any other country per capita on healthcare. The U.S. spends per capita on healthcare nearly twice as much as each of the next highest spending countries of Switzerland, Norway, Germany, and Canada. Please see Figures 1.8, 1.9, and 1.10.23 At the same time that U.S. health expenditures and insurance premiums continue rising at unprecedented rates, the quality of U.S. healthcare remains a serious issue. We’re paying more but not necessarily getting better quality. According to a study by World Health Organization done in 2000, the U.S. ranked 37th in the world out of 191 countries in “health system performance,” with France and Italy ranking first and second, even though they spend half as much per capita on healthcare. Based on key national performance indicators, U.S. healthcare is less cost effective than in 36 other countries. Please also note that U.S. pharmaceutical charges are increasing at the third fastest rate within OECD countries (Organization for Economic Cooperation & Development) even though most pharmaceutical
Chapter One: U.S. Healthcare System Problems

Figure 1.8 Health expenditure per capita, US$ PPP, 2001.

Source: OECD Health Data 2003.

Notes: Australia, Japan, Korea, Luxembourg, and Switzerland: 2000
Purchasing power parities (PPPs) provide a means of comparing spending between countries on a common base. PPPs are the rates of currency conversion that equalise the cost of a given “basket” of goods and services in different countries.

Figure 1.9 Growth in pharmaceutical expenditure per capita, in real terms, 1990–2001 (1990 = 100).

Source: OECD Health Data 2003.

Notes:
Australia and Switzerland: 1990–2000
Growth in pharmaceutical spending is calculated based on 1995 GDP constant prices.
companies are located in the United States (Figure 1.9). Surprisingly, the U.S. ranked 27th among industrialized countries for infant mortality rate, with 6.9 deaths per 1000 live births or .69 percent. This is nearly double the rate in Sweden, Finland, Norway, and Japan. One wonders if this might also be related to the epidemic of obesity in the United States.24

QUALITY PROBLEMS IN U.S. HEALTHCARE

30 Percent of Total U.S. Healthcare Costs Result from Poor Quality

The Midwest Business Group on Health estimates that 30 percent of total U.S. healthcare costs result from poor quality, defined as shown in Figure 1.11. This estimate is consistent with lean producers’ claims to improve efficiency by 50 percent by removing waste and streamlining processes. The Chicago-based Midwest Business Group on Health (MBGH) was founded in January 1980 by a group of Midwestern employers to address escalating healthcare costs, which threatened
the competitiveness of U.S. employers and the welfare of their employees, families, and the population at large.25

Patients Typically Receive 55 Percent of Recommended Care

According to a study published in the New England Journal of Medicine, participating patients received 54.9 percent of the recommended care.26 Based on this study, it is little different than a coin toss as to whether a patient will receive the recommended care for a given condition. The study involved telephoning a random sample of 13,275 adults in 12 metropolitan areas and asking them about their selected healthcare experiences. Investigators also received written consent to copy medical records for the most recent two-year period to evaluate performance based on 439 indicators of quality of care for 30 acute and chronic conditions as well as preventive care. Quality varied markedly by medical condition, ranging from a high of 78.7 percent of recommended care, delivered for senile cataract, to a low of 10.5 percent, delivered for alcohol dependence. This study concludes: “The deficits we have identified in adherence to recommended processes for basic care pose serious threats to the health of

Figure 1.11  The Midwest Business Group on Health estimates 30 percent of total costs results from poor-quality healthcare.

Source: Midwest Business Group on Health 2002

MBGH definition of poor quality includes:

- **Overuse.** A variety of surgical procedures, tests, medications, and treatments are overused, driving up costs unnecessarily while simultaneously exposing patients to risks of complication and sometimes even death.

- **Underuse.** Providers routinely fail to administer a variety of known-to-be-effective tests and treatments to heart attack victims and individuals with diabetes and congestive heart failure.

- **Misuse.** Medical errors represent the most common form of misuse within the healthcare system, with drug misuse representing the most frequent form of error.

- **Waste.** Waste, primarily in the form of unnecessary administrative activities, is prevalent throughout healthcare, as it is in many other industries.
the American public. Strategies to reduce these deficits in care are warranted.” This study provides strong support for better standardizing care processes, just as Toyota standardized its manufacturing process steps. (See step 27 on page 109.)

Building a Safer Health System

In its report, To Err Is Human: Building a Safer Health System, the Institute of Medicine states:

Healthcare in the United States is not as safe as it should be and can be. At least 44,000 people, and perhaps as many as 98,000 people, die in hospitals each year as a result of medical errors that could have been prevented, according to estimates from two major studies. The knowledgeable health reporter for the Boston Globe, Betsy Lehman, died from an overdose during chemotherapy. Willie King had the wrong leg amputated. Ben Kolb was eight years old when he died during “minor” surgery due to a drug mix-up.27

These horrific cases that make the headlines are just the tip of the iceberg. Two large studies, one conducted in Colorado and Utah and the other in New York, found that adverse events occurred in 2.9 and 3.7 percent of hospitalizations, respectively. That is, approximately 1 in 21 patients experiences an adverse event during hospitalization.

The study in Colorado and Utah implies that at least 44,000 Americans die each year as a result of medical errors. The New York study suggests the number of deaths may be as high as 98,000.

Even when using the lower estimate, deaths due to medical errors represent the seventh leading cause of death in the United States. More people die in a given year as a result of medical errors than from motor vehicle accidents (43,458), breast cancer (42,297), or AIDS (16,516). Only a few hundred people die each year from airplane crashes. Think about that. The seventh leading cause of death in the U.S. is medical errors. Much more effort needs to be focused on reducing this horrendous statistic.

Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong
plan to achieve an aim. Among the problems that commonly occur during the course of providing healthcare are adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries or death, falls, burns, pressure ulcers, and mistaken patient identities. High error rates with serious consequences are most likely to occur in intensive care units, operating rooms, and emergency departments. Beyond their cost in human lives, preventable medical errors exact other significant tolls. They have been estimated to result in total costs (including the expense of additional care necessitated by the errors, lost income and household productivity, and disability) of between $17 billion and $29 billion per year in hospitals nationwide.  

It is not sufficient to address excessive medical errors by just adding more staff and more costs. Rather it is important to get at the root causes of errors, and to design systems that make the errors impossible to occur. (See poka-yoke techniques on page 90.)

Healthcare providers need to adopt an important technique from the aerospace industry called failure mode and effects analysis (FMEA) to reduce errors in healthcare. FMEA originated in the 1960s to improve safety in the aerospace and chemical industries. The goal of FMEA is to prevent safety accidents from ever occurring. This is precisely what we wish to accomplish within healthcare. Automotive and other industries have similarly adopted FMEA analyses, and it's time for the healthcare industry to do likewise. This simple FMEA technique can help reduce the 98,000 medically related deaths and billions in unnecessary costs annually.

The steps within a FMEA analysis can be a simple process as follows:

1. Perform a detailed review of the product or process. A team may be used.
2. Brainstorm all ways the process can fail, that is, all failure modes.
3. List the potential effects of each failure mode.
4. Assign a 1–10 Severity rating for each effect. 
   10 = highest
5. Assign a 1–10 probability of Occurrence rating for each failure mode. 10 = highest probability.

6. Assign a 1–10 Detection rating for each failure mode and/or effect. 10 = not detectable.

7. Calculate the risk priority number (RPN) for each effect. For example, Severity # × Occurrence # × Detection #. Add them all together to get the total RPN for all effects related to a given failure mode.

8. Prioritize the failure modes for action via the RPN score. (That is, list the failure modes in decreasing order by RPN score.)

9. Take action to eliminate or reduce the high RPN failure modes.

10. Calculate the resulting RPN as the failure modes are reduced or eliminated. These new RPN scores should be zero or at least now highly reduced.

**PAST FAILURE OF CONTINUOUS QUALITY IMPROVEMENT AND TOTAL QUALITY MANAGEMENT**

In the past, both continuous quality improvement (CQI) and total quality management (TQM) have been used for improvement in healthcare and elsewhere.

CQI is a process of continuously making everything better each day. It is customer focused and requires that processes be analyzed, measured, and improved on an ongoing basis. It has essentially failed in healthcare in the past because it was not implemented widely or continuously throughout organizations. Rather, it occurs sporadically every four years just before inspections by the Joint Commission for Accreditation of Healthcare Organizations (JCAHO). CQI has basically failed to markedly improve overall cost and quality in healthcare. It has not involved most healthcare employees, and rarely has it been focused on cost.

TQM is a management system in which everyone within an organization constantly monitors what they do to find ways of
improving quality of operations, products, services, marketing, customer and employee satisfaction, and everything else. It is a broader concept that includes CQI. Every individual is responsible for improving the quality of goods and services supplied. Ford with its “Quality is Job One” slogan illustrates this organizationwide philosophy. Again, TQM has basically failed in healthcare organizations in the past since employees simply didn’t understand it. Like CQI, it has not been pervasive throughout organizations, and it has been intermittently applied. It too has been rarely focused on cost in healthcare.

Basically CQI and TQM approaches were done to satisfy JCAHO requirements and have not moved healthcare organizations toward world-class levels of low cost and high quality. CQI and TQM have not generally been the primary focus of hospital boards. A new approach in which hospital boards, administrators, and all staff continuously focus on improving healthcare cost and quality is needed. For this to occur, they must receive adequate rewards and/or negative consequences, or the status quo will continue or degenerate.

REDESIGNING THE U.S. HEALTHCARE SYSTEM

If a reasonable person were to redesign a new U.S. healthcare system from scratch, they would not likely come up with anything like the present system (or should we say nonsystem). The system we have has evolved over the last 200 years, from its beginnings as a cottage industry. Early healthcare providers grew independently within a generally noncoordinated system of similar healthcare providers that have become more like a patchwork quilt than a designed system. If designed in a logical manner, each healthcare provider would serve a limited population in a defined geographic area without duplication. Smaller, satellite centers would refer patients to larger centers to address more difficult cases. The most difficult cases at large centers would be addressed by regional and national centers with extensive capabilities and specialty expertise. A logically designed national healthcare system would look more like a tree with satellite centers as its small branches, regional centers as its large branches, and national centers as its trunk. All costs and charges would be uniform across the United States except for
small cost of living adjustments. Possibly there should be a law that all hospital charges be equal to the appropriate Medicare charge + X percent. In fact, the Medical Savings Insurance Company of Oklahoma and Indiana in 2004 sued certain Florida hospitals that were refusing to accept its routine payments of Medicare charges plus 20 percent for treatment of any non-Medicare patients.30

In a well-designed system, all patients would also have uniform access to services, and duplication would be minimized within each service area. To move in that direction, some states require a hospital to complete a “certificate of need” before new construction is approved. However, that is not required in many states. At a minimum, our government should institute a national certificate of need process for all healthcare providers, to make services uniformly available across the nation and evenly distribute costs. Our current system, which has run amok, is more like a garden overgrown with varieties of plants and weeds. Each plant and weed tries to overtake the other in an uncontrolled erratic manner. What determines which one survives is more a matter of warring factions, that is, the strongest survives, than any logical design to achieve specific community goals of cost and quality.31

The United States will sooner or later need to coordinate its non-system of healthcare. A national imperative is for our country to create a target design for an ideal healthcare delivery system and to create incentives for all stakeholders to begin to gradually move from the nonsystem toward that ideal design. Maybe it’s time to create a new Spartan but highly functional hospital design that provides good nurse staffing; good access to competent physician(s) who attend patients; and good ancillary lab, x-ray, and pharmacy services. All of this would be contained in a compact, low-cost facility that eliminates all other services that a patient does not wish to personally pay for. Maybe it’s time to construct a hospital model that is simply centered on the patient, his or her physicians, nurses, and critical ancillary functions and that contains little or no excess overhead. This ideally designed healthcare system would also minimize handoffs of the patient among too many physicians and hospital staff. How can a patient receive high-quality care if it involves too many participants who aren’t comparing notes? A similar streamlined design may be considered for any other type of healthcare provider, for example, clinic, nursing home, or rehab center.
Index

A3 form, 48–49
administrative costs, 22–30, 130, 138
administrators, 52–54, 103–04
advanced diagnostics and treatment, 68
Aetna, 28
Agency for Health Care Research and Quality, 166
Allegheny General Hospital, 245
Alukal, G., 213
ambiguity in hospital setting, 235–42
American Hospital Association (AHA), 140
anatomic pathology case study, 157–90
  continuous flow, 181–89
  cycle time data, 174–75
  demand data, 171–72
  evolution of lean, 158–59
  5S process, 175–80
  healthcare application, 165–66
  learning line, 167–75
  Toyota’s lean enterprise, 159–65
andon board/cord, 84, 89–91, 163, 205
annual financial report, 66–67
annual quality report, 66–67
Appleby, J., 264
automaker benchmarks, 144
automation of processes, 122
autonomation, 221
Baldridge National Quality Award, 72, 127–29
Baptist Health Care (BHC), 127–28
batch size reduction, 220
Bates, D. W., 236
benchmarking, 122–26
  benchmark values, 68
  healthcare organizations, 127–29
  McDonald’s lessons, 125–26
  nonhealthcare organizations, 124–26
  Wal-Mart’s lessons, 123–25
Berwick, D., 21, 46, 103, 105, 132
Black, I., 259
board-approved strategic goal teams, 65
Board of Directors, 65–66
bottlenecks, 110–12, 223
Bouché, B., 145
Bowen, K., 162, 171
brainstorming, 223, 225
Buckner, C., 268–69, 270
Bush, George W., 7, 16
business value added (BVA), 48, 59, 116–17
buy-in, 55–56
Byrne, A. P., 191
Caldwell, P., 161
California Healthcare Association, 11
“California Hospitals Open Books, Showing Hugh Price Differences” (Lagnado), 10
California Plan for Healthcare (2007), 26
Canadian Universal Healthcare System, 23–27
Care for Ohio, 11–12
Caremark Rx, Inc., 28
cellular flow, 221
Census Bureau, 13
Centers for Disease Control and Prevention (CDC), 230–31
Centers for Medicare and Medicaid Services, 30, 237
Chalice, R., 213
changeover improvement process, 222–23
charity care standards, 11
chief executive officers (CEOs), 22–27
Children's Hospital and Regional Medical Center Emergency Department Patient Flow—Rapid Process Improvement (RPI), 145–50
chosen solution (nemawashi), 80
committees/task forces, 101
Commonwealth Fund, 13–14
communication, 79, 148, 225
Condell, D. J., 110
Conemaugh Health System, 252
consumer price index (CPI), 8
continuous flow, 50, 137, 160–62, 222, 263
anatomic pathology, 181–89
bottlenecks and, 110–12
implementation/maintaining, 113–14
continuous improvement teams, 218
continuous quality improvement (CQI), past failures of, 38–39
control board (andon), 84, 89–91, 163, 205
core processes, 38–50, 59–60, 116–17
Corrigan, J. M., 232
cost control, 15
cost improvements, 277
structure for, 77
cost per case mix indexed (CMI) adjusted patient discharge, 22, 57, 68
Crosby, P., 46, 72
cross-training, 75
culture, 91, 195–96, 198
cycle time, 84, 117–18, 174–75
“Decoding the DNA of the Toyota Production System” (Spear and Bowen), 162
defects and reworks, 88–93, 181, 205, 215, 221
delays, 50, 93–94, 215
Deming, W. Edwards, 5, 41, 46, 72, 160–61, 192
demonstration site, 139–40
departmental scorecard (example), 64
direct patient value-added employees, 104
discharge planners, 104
DMAIC steps (define, measure, analyze, improve, and control), 92, 216
do-it groups (DIGS), 66
documentation of standardized processes, 112–13
Donaldson, M. S., 232
downsizing, 41
Drucker, P., 41, 46
Dunphy, M., 145
Durenberger, D., 12
email, 108
Emerson, J., 11
employees
communication with, 79, 148, 225
easing change transition, 55–56, 184–85
education of, 57–58
incorrect utilization of, 86–88, 215
individual and organization’s objectives, 57–58
making improvement happen, 54
no-layoff policy, 205
rapid improvement circles, 74–77
respect for, 41–42, 135, 209, 218
employer-sponsored health insurance, 4, 13
equipment purchases, 109
“Error-Free Pathology: Applying Lean Production Methods to
Anatomic Pathology” (Condel, Sharbaugh, and Raab), 110, 157–90
error proofing (poka-yoke), 37, 92, 220
excess inventory, 96–99
excess processing, 100–102, 181
executive compensation, 22–27

Failure Mode and Effects Analysis (FMEA), 37–38, 71
Feeley, S., 145
Feinstein, K. W., 110
Fillingham, D., 260
financial analysts/auditors, 106
financial measures/reports, 66–67, 111
Fisher, K., 145
Fishman, C., 267
Fiume, O. J., 191
5 why’s, 221
5S program (sort, set in order, shine, standardize and sustain), 80–82, 217, 219
anatomic pathology case, 175–80
VA Pittsburgh case study, 151–55
flowcharts, 116–17
FMEA analysis. See Failure Mode and Effects Analysis (FMEA)
focus groups, 46
Ford, H., 158–60, 226
Ford Motors, 7, 18–20, 39
Four Days with Dr. Deming (Deming), 5
frontline employees, 52
full-time equivalents (FTEs), 194
gain-sharing program, 78, 136
General Electric (GE), 76, 104
General Motors (GM), 5–7, 18–20
Georgetown, KY Toyota Factory case study, 267–77
Girard, M., 145
Goal, The (Goldratt), 110
Godt, L., 145
Goldratt, E. M., 63, 110–12
government intervention/relations, 15, 108–09
gross domestic product (GDP), 31
group leader, 73
group objectives, 77–78
Grunden, N., 82, 151
guided design, 71

Hammer, M., 42
health insurance
administrative/overhead costs, 26–30, 131–32
cost to businesses, 7–8
GM’s costs of, 5–6
rising premiums of, 3–13
uninsured, 13–15
healthcare
building a safer system, 36–38
changeover improvement process (example), 222–23
eliminating barriers to improvement, 224–25
fixing from inside, 229–35
lean thinking in, 202–11, 219
misuse of, 35
poor quality of, 35
quality problems in, 34–38, 231
redesigning of, 39–41
steps to improve, 45–46
to-do list for national improvement, 139–41
Toyota-like production system for, 135–38, 165–66, 191–212
U.S. performance ranking, 32–34
healthcare alignment, 47
healthcare costs, 3, 9. See also lean business practice; waste
challenges to manufacturers, 16–17
consumer price index (CPI), 8
excess administrative/overhead costs, 22–25
overhead costs, 26
as percentage of GDP, 30–32
performance vs., 32–34
pricelists for, 10
reasons for escalation of, 13
reduction of, 15–18
typical salaries, 22–27
U.S. per capita spending, 32–34
waste in, 21–22
healthcare scorecard, 140
healthcare worker shortages, 16
heijunka (production leveling), 258
Hewitt Associates, 68
Hilton, D., 19
Hoglund, W., 5
hospital daily staffing report (scorecard example), 62
“How Hospital Heal Themselves,” 82
human resources department, 103
Humana Inc., 7, 28
hybrid health care system, 15
implementation management, 224–27
improvement goals/milestone dates, 59–61
improvement philosophies, 72
improvement projects (hanseki), 80
improvement team, 67
infant mortality rate, 34
infection control nurses/staff, 105
information technology, 107–08
inspectors, 103–04
Institute for Healthcare Improvement (IHI), 21, 129, 191, 193, 212
Institute of Medicine (IOM), 36, 165, 230
internal processes, 197
International Organization for Standardization (ISO), 128
inventory, 83, 96–99, 111, 215, 226
ISO 9000, 72, 128–29
ISO 9001 process documentation, 112–13
Jewish Healthcare Foundation, 166
jidoka (quality in station), 89, 91–92, 259
Jimmerson, C., 21
job classifications, 88
job rotation, 88
Joint Commission for Accreditation of Healthcare Organizations (JCAHO), 38
Jones, D., 21, 258, 260, 265
Juran, J., 46, 71
just-in-time (JIT), 53, 221, 258
kaikaku (radical improvement), 114–15, 175, 258, 261, 263
Kaiser Family Foundation, 3
kaizen, 113–14, 161, 198, 199, 207, 218, 254, 258
kaizen blitz, 218, 226, 258, 261
kaizen improvement team, 76
kanban system, 51, 97–99, 177, 180, 221, 258
Kaplan, G. S., 191, 259–60
Kluger, D. M., 232
Kobayashi, I., 46, 77, 85
Kohn, L. T., 232
Krafcik, J., 21
Lagnado, L., 10–11
leadership/lean leaders, 52–54, 195, 218
lean baseline assessment, 217
lean business practice. See also waste
building blocks of, 218–22
core concepts/key precepts of, 195–97, 225–27, 258–60, 263
critics of, 263–65
description of, 214–15
evolution of, 158–59, 227–28
getting started with, 197–202
in healthcare, 213–27
starting point for, 216–22
as winning strategy, 214
lean enterprise, 198, 223–24
Lean Enterprise Institute, 20–21
lean production, 8, 15–16, 20–22, 42, 45, 161. See also Toyota Lean Production System (TPS), anatomic pathology case, 157–90
building blocks of, 217
defined, 20, 22
implementation of, 50–51
lean leaders, 52–54
reasons for, 17–18
Toyota Lean Production, 18–21
lean thinking, 192
Lean Thinking (Womack and Jones), 21, 258
Leape, L., 230
learning line, 167–75, 234
legal counsel, 106
LifeCare Hospitals, 244
Liker, J. K., 163, 164, 276

McCalister, M. B., 7
McCray, E., 82, 151
Machine That Changed the World, The (Womack), 97, 161
magnet hospital environment/shared governance, 119
Makl, D. G., 232
management by sight, 83–85
managers, 52–54, 103–05, 136, 224, 227
“Manufacturing in America—A Comprehensive Strategy to Address the Challenges to U.S. Manufacturers” (U.S. Dept. of Commerce), 16
manufacturing companies, 159–61
marketing, 106
mass training, 217
medical bankruptcies, 15
medical errors, 36–37, 165, 230, 232–33, 236–37
Medical Savings Insurance Company of Oklahoma and Indiana, 40
Medicare compliance officers/staff, 106
Medicare/Medicaid, 13, 26, 32, 40, 133
medication administration, 247–48
meetings, 101
Midwest Business Group on Health (MBGH), 13, 34–35
Miller, D., 191
model line approach, 249–53
Monongahela Valley Hospital, 244
monopoly power, 9, 16
Moreland, M., 82, 151
motion, 94–96, 215
muda (waste), 21, 193, 198, 258

National Committee for Quality Assurance (NCQA), 140–41
National Health Service (NHS) (case study), 257–65
Bolton Hospitals Trust, 260–61
kaizen blitz, 261
lean thinking and, 260–61
lessons of, 261–63
national healthcare expenditure, 30–31
national healthcare policy, 15, 140
National Institute of Standards and Technology Manufacturing Extension Partnership (NIST/MEP), 213
NUMMI (New United Motor Manufacturing, Inc.) plant, 73–74, 78, 88, 91, 161
“Nun and the Bureaucrat, The,” 82
nursing care delivery models, 119–20
nursing homes, 133

obesity epidemic, 34
Ohno, T., 41, 46, 85, 91, 97, 109, 159–60, 181, 227, 258
O’Neill, P., 132, 165
operating expense, 111
organizational capabilities, 234
organizational structure for quality/cost improvement, 58, 66, 77, 205
overhead costs, 22–30
overproduction/wrong product, 85–86, 100–102, 181, 215
overstaffing/wrong product, 85–86, 100–102, 181, 215

Pareto fashion, 61
partners, 120–21, 138
pathology errors, 166
patient advocate, 104–05
patient care paths, 51
patient care received, 35–36
patient experience, 60
patient-focused care, 119–20
patient lawsuits, 106
patient value added (PVA), 46–48, 59, 116–17
Perfecting Patient Care (PPC) System, 166
performance measures continuous flow and, 110–11, 202
financial indicators, 111
Perreiah, P., 153
personal bankruptcies, 15
Index

personal healthcare expenditures, 30
Physician’s Clinic of Iowa (PCI), 113
Pittsburgh Regional Healthcare Initiative (PRHI) case study, 82, 165–66, 242–45, 246
plan, do, check, act methodology, 71, 199, 202, 226
point of use storage (POUS), 220
poka-yoke techniques, 37, 92, 220
prescription drugs, 30, 68–69, 133
price lists, 10–11
PricewaterhouseCoopers, 3
primary processes, 197
primary/total nursing care, 119
problem-solving methodology, 71, 79
process cycle times, 117–18
process flowchart, 112
process improvement methods, 45, 177, 196–97, 240
“Psychology of Change Management” (McKinsey Quarterly), 55–56
pull system, 51, 148, 213, 217, 222, 263

quality, defined, 20
quality circles, 75
Quality and Cost Improvement Council, 57, 59, 68, 80
Quality and Cost Improvement Department, 56–57
Quality and Cost Improvement Manual, 57, 79, 113
quality improvement, 15–18
at the source, 221
organizational structure for, 58, 77
past failures of, 38–39
quality reports, 66–67
quality in station, 137
queuing situations, 61
quick changeover, 118, 137, 220

Raab, S. S., 110, 157
radical improvement, 114–15
Rapid Improvement Circles (RICs), 57, 66, 74–77, 115, 136
Rapid Improvement Events (RIEs), 54, 76
Rapid Improvement Team (RIT), 57, 66–70, 74–77, 136
Toyta-style work teams, 70–74
Rapid Process Improvement Weeks (RPIW), 195
Rapid Process Improvements (RPIs), 76
Children’s Hospital case study, 145–50
recognition program, 55, 79, 136
red-tag holding area, 83
reengineering, 41–42
regional centers, 39
“respect for humanity” principle, 41, 209
rewards, 55, 78–79, 136
reworks, 88–83
risk priority number (RPN), 38
root-cause analyses, 92

safety/risk managers/staff, 106
satellite centers, 39
scheduling system, 51
Schwarzenegger, A., 26
scorecard, 61–63
for department monitoring, 63–65
for entire organization, 61–63
Scotchmer, A., 257
secretarial staff, 107
SEIU District 1199 union, 11
sequencing work, 109, 137
Sharbaugh, D. T., 110, 157
Shingo, S., 46, 227
Shinjijutsu International Centre, 259
Shook, J., 277
simulation and experimentation, 245–49
Sisters of Mary Health Care (SSMHC), 127
Six Layers of Resistance to buy-in, 55–56
Six Sigma, 71, 92, 93, 157, 216
“Small Improvements Yield Big Results in Shadyside Pathology Lab,” 110
Social Security, 32
spaghetti diagram, 117
Spear, S., 162, 171, 229, 270
staff. See Employees
stakeholders, 67
standardization, 81, 109–10, 114, 137, 152, 217, 220
strategic plan
  improvement plan and, 59–61
  quality/cost improvement goals, 65–66
strategic quality/cost improvement goals, 65–66
sunset date, 66
supervisors, 52–54, 103–05
suppliers, 120–21, 138, 220
surveys, 46
system errors, 162

total productive maintenance (TPM), 222
total quality management (TQM), 214
  past failures of, 38–39
  total systems view, 132–33
Toussaint, J., 191
Toyota family, 158–59, 227
Toyota Motor Company, 18–20, 45, 158–65
Toyota-style work teams, 70–74
Toyota Way: 14 Management Principles from the World’s Greatest Manufacturer (Liker), 163–64, 276
throughput, 111

uninsured population, 13–15
United Auto Workers Union, 6
United Healthcare, 28
  “U.S. Firms Losing Health Care Battle, GM Chairman Says,” 6
U.S. per capita spending on healthcare, 32–34
United Way Organization, 141
unnecessary motion, 94–96, 215
utilization review staff, 104

VA Pittsburgh Health System, 151–55
  value, 263
  definition of, 46
  value-added tasks, 46, 197, 213
  value alignment, 42
  value stream, 47, 193, 197, 220, 263
  value-stream map, 47–48, 200–201, 217
  videotaping work processes, 115–16

Virginia Mason Medical Center case example, 194–95, 202–07, 253, 259–60
visual control, 63, 83–85, 176, 179, 217, 243
visual workplace, 138, 219
Voluntary Hospital Association (VHA), 140
Wagoner, G. R., Jr., 6–7
waits and delays, 50, 93–94, 215
waste, 35, 41, 85, 215–16
  bureaucratic layers, 103–08
  causes and variation of, 216
  correction of, 93
  defects and rework, 88–93
  elimination of, 85–102, 137, 181
  excess inventory, 96–99
  excess processing, 100–101
  government relations area, 108–09
  incorrect utilization of staff, 86–88
  information technology area, 107–08
  overproduction/wrong product, 85–86
  potential waste areas, 103–09
  transportation, 94
  unnecessary motion, 94–96
  waits and delays, 93–94
  work-arounds, 168, 235–37, 238, 241

Web sites, 108
Welch, J., 104
Western Pennsylvania Hospital case study, 237–42
Wisconsin Hospital Association (WHA), 13
Wolk, K., 165
Womack, J. P., 21, 46, 97, 103, 191, 258
Woodward, G. A., 145
work-arounds as waste, 168, 235–37, 238, 241
work-out groups, 76
work pace (takt time), 84, 222
work sequence, 84, 109–10
work teams, 73, 75
work zones, 147
workplace layout, 219
World Health Organization (WHO), 31–32

zero-tolerance, 105