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HEALTH CARE CRITERIA EFFECTIVENESS AND ORGANIZATIONAL PERFORMANCE

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Abstract

This study investigated the impact of the Malcolm Baldrige Health Care Criteria for Performance Excellence (HCPE) on effectiveness in health care organizational performance. The quality of health care has tremendous social and economic consequences for the United States (U.S.), including lost wages, reduced productivity, higher legal expenses, and lower confidence in the health care system. Increasing health care productivity, efficiency, effectiveness, and quality offers critical means to reducing cost and improving U.S. economic performance, which is an objective of the Affordable Care Act enacted by Congress in 2010. This study compared Malcolm Baldrige National Quality Award recipients to competitors in their geographic markets using Centers for Medicare & Medicaid Services (CMS) performance measures to determine if there was a relationship between the use of the HCPE as a business model and the performance of health care organizations. This study included an analysis comparing 34 hospitals using the HCPE as an organizational business model to 153 hospitals in their geographic markets not using the HCPE. There were 42 CMS measures classified into 2 major categories focused on (1) patient experience measures and (2) clinical processes and outcome measures. The results showed that the study-identified hospitals that used the HCPE had values representing higher performance on all 10 patient experience measures than the non-HCPE hospitals, and that 9 of the 10 measures were statistically significant. Although the group mean differences were not statistically significant, the study results showed that HCPE hospitals had performance outcomes with mean values representing higher performance than the non-HCPE hospitals in 38 of the 42 (90%) of the study measures. These results should provide leadership with confidence that the HCPE serve as a valid model to align organizational design, strategy, systems, and human capital to create long-term effectiveness in an institutionalized high performance culture.
Table of Contents

CHAPTER 1. INTRODUCTION ................................................................................... 1
  Introduction to the Problem ............................................................... 2
  Statement of the Problem ............................................................... 3
  Purpose of the Study ................................................................. 3
  Rationale ....................................................................................... 4
  Significance of the Study for Health Care ...................................... 5
  Significance of the Study to Leadership ........................................ 6

CHAPTER 2. LITERATURE REVIEW......................................................................... 9
  Overview of Chapter ........................................................................ 9
  Introduction to the History of Quality and the Development of the Baldrige
  Award Program ........................................................................... 10
    History of Quality ....................................................................... 10
    Development of Baldrige Award Program .................................. 23
  The CPE/HCPE as a High Performance Model .............................. 25
    The CPE/HCPE Model ............................................................... 27
    The Design of the HCPE ........................................................... 32
    The HCPE High-Performance Business Model ......................... 38
    The Process for Achieving the Baldrige Award ......................... 45
  Role of Systems Theory, Systems Thinking —Moving Beyond Linear
    Thinking .................................................................................... 47
Health Care Criteria and Organizational Performance

Evaluation of Quality Improvement Strategies and Programs .................. 55
Lean and Six Sigma Methodologies ..................................................... 58
Constraints Management ..................................................................... 60
The HCPE and the Balanced Scorecard ............................................. 61
The Baldrige Health Care Award Recipients from 2002 through 2011 ....... 62
The Application of Quality in Health Care ........................................... 66
Programs to Improve Health Care Quality ......................................... 71
The Joint Commission ........................................................................ 71
The HCPE and ISO 9001 Standard ..................................................... 72
Other Independent Quality Improvement Programs ............................. 73

Institute for Healthcare Improvement, the Physician Consortium
for Performance Improvement, Leapfrog Group, the National
Quality Forum, and the Health Care Cost and the Patient Protection
and Affordable Care Act (ACA)

The Gaps in Knowledge Including the HCPE in Literature .................... 81
CMS Measures and the Hospital Compare Database in Literature .......... 88
Closing Observations ........................................................................ 90

CHAPTER 3. RESEARCH QUESTION and HYPOTHESIS ......................... 93

CHAPTER 4. METHODOLOGY ................................................................. 94

Review of the Purpose of the Study ................................................... 94
Conceptual Framework ...................................................................... 95
General Research Design ................................................................... 95
HCPE Construct Validity ................................................................. 96
Research Question .......................................................................... 96
Independent and Dependent Variables ............................................ 97
Research Approach .......................................................................... 97
Data Overview .................................................................................. 98
Subjects ............................................................................................... 99
Missing Data ...................................................................................... 103
Data for the Analysis ....................................................................... 106
HCAHPS .......................................................................................... 106
Outpatient Imaging Efficiency ......................................................... 107
Process of Care ................................................................................. 108
Surgical Care Improvement Project ................................................. 109
Outcome of Care .............................................................................. 110
Power and Sample Size Analysis ................................................... 111
Statistical Analysis Plan ................................................................. 112
CHAPTER 5. SPECIFIC FINDINGS AND RESULTS .......................... 114
Evaluation of the Relationship Between HCPE and Organizational
Characteristics .................................................................................. 122
Organizational Characteristics’ Effect on HCAHPS Hospital Experience 124
Patient Survey ................................................................................. 126
Organizational Characteristics’ Effect on Outpatient Imaging Efficiency
Results ..............................................................................................
Health Care Criteria and Organizational Performance

Organizational Characteristics’ Effect on Process of Care: Heart Attack 128

Organizational Characteristics’ Effect on Process of Care: Heart Failure 129

Organizational Characteristics’ Effect on Process of Care: Pneumonia Results 131

Organizational Characteristics’ Effect on Process of Care: Surgical Results ... 133

Organizational Characteristics’ Effect on Outcome of Care Results .......... 135

Summary .................................................................................. 139

CHAPTER 6. DISCUSSION ................................................................................. 141

Summary of the Problem, Purpose, and Research Question.......................... 141

Summary of Main Findings........................................................................ 142

The Bottom Line .................................................................................. 147

Significance of the Study Results to Health Care Organizations............... 152

Significance of the Study Results to Leadership ...................................... 155

Limitations ...................................................................................... 158

Implications for the Literature .................................................................. 160

CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS......................... 161

REFERENCES .......................................................................................... 167

APPENDIX ............................................................................................. 187

vi
List of Tables

Table 1  The Deming Wheel vs. the Japanese PDCA Cycle Depiction ........................................ 18
Table 2.  Brief description of 2011-2012 Health Care Criteria for Performance Excellence ............................................................. 30
Table 3  Baldrige CEO Attitudes and Motivation Depiction ......................................................... 43
Table 4. Health Care Recipients of the Performance Excellence Award ................................. 65
Table 5. National Health Expenditures (NHE) and Selected Economic Indicators, Levels, and Annual Percent Change: Calendar Years 2005-2020 (Projected at 2009) ................................................................. 80
Table 6. Baseline Comparison of Hospital Characteristics ......................................................... 100
Table 7. Characteristics (Control Variables) and Definitions of All HCPE and Non-HCPE Hospitals ................................................................................................................................. 102
Table 8 Health Care Recipients of the Performance Excellence Award with ≥ 100 Beds ................................................................................................................................................................. 104
Table 9 Characteristics of Medium and Large Bed Size HCPE and Non-HCPE Hospitals ................................................................................................................................................................. 105
Table 10. HCAHPS Hospital Experience Patient Survey Measures ......................................... 107
Table 11. Outpatient Imaging Efficiency ..................................................................................... 108
Table 12. Process of Care: Heart Attack .................................................................................... 108
Table 13. Process of Care: Heart Failure .................................................................................. 109
Table 14. Process of Care: Pneumonia ..................................................................................... 109
Table 15. Process of Care: Surgical Care Improvement Project Measures……………… 110
Table 16. Outcome of Care Measures………………………………………………… 110
Table 17. Power- Sensitivity Analysis………………………………………………… 112
Table 18. HCAHPS Hospital Experience Patient Survey Measures Results………… 115
Table 19. Outpatient Imaging Efficiency Results……………………………………… 116
Table 20. Process of Care: Heart Attack Results……………………………………… 117
Table 21. Process of Care: Heart Failure Results …………………………………….. 118
Table 22. Process of Care: Pneumonia Results ………………………………………. 119
Table 23. Process of Care: Surgical Results ………………………………………….. 120
Table 24. Outcome of Care Results…………………………………………………… 122
Table 25. Organizational Characteristics’ Effect on HCAHPS Hospital Experience Patient Survey Measures Results……………………………………………….. 125
Table 26. Organizational Characteristics’ Effect on Outpatient Imaging Efficiency Results…………………………………………………………………………. 127
Table 27. Organizational Characteristics’ Effect on Process of Care: Heart Attack Results…………………………………………………………………………. 128
Table 28. Organizational Characteristics’ Effect on Process of Care: Heart Failure Results…………………………………………………………………………. 130
Table 29. Organizational Characteristics’ Effect on Process of Care: Pneumonia Results ……………………………………………………………………………. 133
Table 30. Organizational Characteristics’ Effect on Process of Care: Surgical Results…………………………………………………………………………….. 135
Table 31. Organizational Characteristics’ Effect on Outcome of Care Results……………………………………………………………………………………… 139
Health Care Criteria and Organizational Performance

Table 32. HCAHPS Hospital Experience Patient Survey Statistically Significant Measures Results…………………………………………………………… 144

Table 33. Summary of the 42 CMS Measures’ Mean Values……………………………… 145

Table 34. Value-Based Purchasing Program Domain Overview………………………… 150
Health Care Criteria and Organizational Performance

List of Figures

Figure 1. Evolution of the Scientific Method and PDSA Cycle Depiction .......... 15
Figure 2. Shewhart Cycle – 1939 Depiction ................................................. 16
Figure 3. Deming Wheel – 1950 Depiction .................................................... 17
Figure 4. Japanese Plan–Do–Check–Act (PDCA) Cycle – 1951 Depiction .......... 18
Figure 5. Shewhart Cycle: Deming – 1986 Depiction ..................................... 19
Figure 6. PDSA Cycle: Deming – 1993 .......................................................... 20
Figure 7. FOCUS-PDCA Methodology .......................................................... 22
Figure 8. HCPE Category Framework Depiction ........................................... 29
Figure 9. Deming’s Chain Reaction Model Depiction .................................... 35
Figure 10. Holistic Health Care Systems Relationship Model Depiction .......... 53
Figure 11. Evolution of Quality and Performance Excellence ........................ 55
Figure 12. Conceptual Framework ............................................................... 95
Figure 13. Operational Framework .............................................................. 98
Figure 14. Mean Score for “Patients Would Definitely Recommend Hospital” .... 126
Figure 15. Conceptual Framework of the Research Results with HCPE and Non-
            HCPE Hospitals .................................................................................. 147
Chapter 1: Introduction

The quality of health care has tremendous social and economic consequences for the United States (U.S.), including lost wages, reduced productivity, higher legal expenses, and lower confidence in the health care system (Shalala, 2007). This study explores the performance of recipients of the Malcolm Baldrige National Quality Award for Performance Excellence (Baldrige Award) and of competing hospitals in Baldrige recipients’ geographic markets, using Centers for Medicare & Medicaid Services (CMS) performance measures. The Baldrige Award is based on the Baldrige Criteria for Performance Excellence (CPE) model for improving organizational performance, with specific criteria for health care, business, education, and non-profit organizations (National Institute of Standards and Technology [NIST], 2011-2012). The use of the Baldrige Health Care Criteria for Performance Excellence (HCPE) was the focus of this study’s analysis. The CPE business model and the HCPE health care model contain similar criteria; the next chapter addresses both models.

The President of the U.S. presents the Baldrige Award to businesses (manufacturing and service, small and large) and educational, health care, and non-profit organizations that demonstrate world-class quality and organizational performance excellence. Award applicants are judged on the basis of their performance in seven areas: (1) leadership; (2) strategic planning; (3) customer and market focus; (4) measurement, analysis, and knowledge management; (5) workforce focus; (6) operations focus; and (7) results (NIST, 2011-2012). Specifically, health care systems using the HCPE have achieved and sustained the highest national levels in patient safety and patient loyalty; health care outcomes; physician, nurse, and staff satisfaction and engagement; revenue and market share; and community services (NIST, 2010a). Well-known health care systems using HCPE to improve organizational performance include Baylor Health Care System,
the Hospital Corporation of America, Kaiser Permanente, Mayo Clinic, M.D. Anderson Cancer Center, St. Jude Medical, Inc., and the Cleveland Clinic (Foundation for the Malcolm Baldrige National Quality Award, 2011).

**Introduction to the Problem**

Increasing health care productivity, efficiency, effectiveness, and quality as a means of reducing cost is critical for U.S. economic performance improvement. By 2020, national health spending is expected to reach “$4.6 trillion and comprise 19.8% of GDP” and government-sponsored share of health spending is expected to increase from “45% in 2010 to about 50% by 2020,” driven by expected robust Medicare enrollment growth, Medicaid coverage expansions, and exchange plan premium and cost-sharing subsidies (Centers for Medicare & Medicaid Services, 2010, p. 1). “American health care is the envy of the world,” but the challenges of addressing rising health care costs while improving quality are present; reforms are needed to ensure health care becomes more widely available and affordable (U.S. Department of Health and Human Services, Office of Assistant Secretary for Planning and Evaluation, 2002, p. 1). The health care systems in this study lead the way in improvement and innovation of efficiencies and performance excellence while addressing the issues of cost, such as quality and accessibility, in the context of the political, policy, economic, and special interest challenges. Evans and Jack (2003) state that applying the HCPE as an integrated performance management model in health care potentially “suggests clear linkages between practice and results” (p. 10). The HCPE serve as a business model for improving organizational performance. Organizational attributes detailed by the HCPE can promote high levels of success in the execution approaches designed to implement change initiatives.
Driven by successful application of the HCPE model in health care organizations such as the Mayo Clinic, a concerted effort is underway through the Monfort Institute at the University of Northern Colorado to organize and assist U.S. universities’ academic researchers to study and publish new interdisciplinary knowledge in the business, education, and health care fields (Monfort Institute, 2012). Due to the promise of economic return on high quality health care services, some of the Baldrige Award recipients eagerly agreed to share detailed corporate information with interested researchers to answer questions about the validity of the criteria and their use as a model for world-class performance (Monfort Institute, 2007). The validation of a business model that has been used to improve health care organizations would be a significant benefit to all stakeholders and the U.S. economy.

**Statement of the Problem**

While anecdotal stories and propositions related to the value of the HCPE in achieving performance excellence in organizations abound, research foci providing empirical evidence of the impact of applying HCPE to improve the efficiency and effectiveness specifically in the health care industry is limited. The field offers rich data for exploration. Increasingly, health care organizations across the U.S. are adopting the HCPE as a business model to improve organizational performance. Each health care application submitted to the Baldrige Award Program documents organizational improvement over time with past and current performance levels, trends in key measures or indicators, as well as comparison with competitors’ levels of performance.

**Purpose of the Study**

The purpose of the study is to determine if there is a relationship between the use of the HCPE as a business model and the performance of health care organizations. To accomplish this,
the study will compare Baldrige Award recipients in health care to their competitors using CMS performance measures. This will help determine if there is sufficient evidence to support the use of the HCPE as a business model for health care systems. The study adds to the health care performance excellence theoretical foundation by identifying process and outcome metrics in which the HCPE have the greatest impact.

No research currently exists that tests the HCPE model by comparing health care recipients of the Baldrige Award to like competitive organizations with the same CMS performance measures (see Chapter 2 for in-depth discussion). Although there are performance criteria for health care, business, education, and non-profit organizations, health care provides the only opportunity to make the comparison through the use of a standardized set of performance indicators such as those found in the CMS measures. As of the end of 2011, 15 health care organizations, representing 51 hospitals, have received the award for performance excellence. The findings from this study could inspire health care leaders to push health care quality to new levels of excellence, with empirical evidence supporting the adoption of the HCPE as a business model to improve organizational performance and value-impact for health care recipients. It is the confluence of evidence and decision making that should provide the structure for leaders to develop evidence-based policy rather than policy based on political conviction, ideology, or organizational position (Pawson, 2006).

**Rationale**

Adopting the HCPE business model requires a transformation of organizational culture, a process requiring years of effort. Organizational transformation on this scale requires a focused, disciplined approach and total commitment from the chief executive officer (CEO), senior leadership, and all levels of management. Human systems in traditional organizations attempt to
maintain equilibrium and thus resist change (Schein, 2004). Considering the current state of health care and projected future challenges, health care leadership would be prudent to utilize a systematic model for improving processes and outcomes to manage organizational change and improve performance. W. E. Deming identified leadership as the key to success in all organizations: “The aim of leadership should be to improve the performance of man and machine, to improve quality, to increase output and simultaneously to bring pride of workmanship to people” (1986, p. 248).

Significance of the Study to Health Care

The proposed research can have a significant impact on health care organizations pursuing performance excellence by providing a clear and objective assessment of the HCPE as an overall business model for leaders to improve the efficiency and effectiveness of health care systems. The efforts of professional organizations such as the Institute for Health Care Improvement (IHI) support the need for this study. The IHI has worked to support and encourage leaders of innovative health systems by identifying important leverage points for leaders striving to achieve dramatic system-level performance improvement for the leadership of organizational transformation. The IHI identified the HCPE as a comprehensive framework for leadership (Reinertsen, Pugh, & Bisognano, 2008) because the HCPE provide a systems approach that has proven successful in assuring the best clinical outcomes. Health care leaders have learned that applying the HCPE helps them focus, prioritize, integrate, and align their improvement initiatives to accomplish the results that matter most (Bodinson, 2005). This proposed research can have a significant impact on understanding the HCPE as a model for improving health care performance.
Significance of the Study to Leadership

The HCPE provide leadership with a model for aligning organizational design, with the resulting efficiencies of policies and processes, in order to better create long-term effectiveness in an institutionalized high-performance culture (Meyer & Rowan, 1977). The result of this study builds an understanding of the leadership characteristics needed to execute change management that leads to performance improvements aimed at excellence. Bossidy and Charan (2002) stated, “The leader must be in charge of getting things done by running the three core processes – picking other leaders, setting the strategic direction, and conducting operations” (p. 24). According to Bass (1990), leaders must be able to formulate and evaluate appropriate organizational responses and arrange for their implementation in operations and policies. Because at least 70% of all initiatives fail despite leaders’ best efforts (Beer & Nohria, 2000), results of this study have provided information leaders can incorporate when planning the implementation of new policy and resulting strategies within a workplace culture of performance.

Furthermore, this study adds value to the validation of the policy decision to use the HCPE as a business model in health care organizations, such that organizations can attempt to develop a high-performance culture that ensures continual learning, transformation, and performance improvement. Hunt (1993, p. 112) believed that the Baldrige Award has become accepted as the “gold standard” of quality practices, and the use of the HCPE model is becoming pivotal to organizational performance. Leadership is responsible for creating a high-performance culture that ensures continual learning, transformation, and performance improvement. The HCPE model provides the framework for leadership that is quantifiable by assessing the performance of health care organizations based on the CMS health care outcomes, processes, patient survey, and imaging results. According to the HCPE model:
Visionary leaders should serve as role models through their ethical behavior and their personal involvement in planning, communicating, coaching the workforce, developing future leaders, and reviewing organizational performance. Leaders should set directions and create a patient focus, clear and visible organizational values, and high expectations for the workforce. Leaders should ensure the creation of strategies, systems, and methods for achieving performance excellence in health care, stimulating innovation, building knowledge and capabilities, and ensuring organizational sustainability. Leaders should inspire and encourage the entire workforce to contribute, to develop and learn, to be innovative, and to embrace meaningful change. (NIST, 2011-2012, p. 49)

Moreover, the HCPE model offers a systematic, holistic approach for hospital governance that can provide answers to questions such as how business systems interrelate, adapt, learn, and improve. Senge (2006a) noted that collective thinking and understanding of the systemic connectivity within organizations must transcend organizational, temporal, and spatial boundaries to redefine the organization and its function at all levels of organizations, communities, and society. For the health care industry specifically, this study provides support to hospital governance boards and trustees in their efforts to guide the complex hospital professional bureaucracies and professional staff to improve overall organizational performance, without the need to become technical experts or overly dependent upon the professional staff (Culbertson & Hughes, 2008). The IHI identified key governance leadership activities to improve quality and reduce harm. One recommendation was that boards spend more than 25% of their meeting time on quality and safety issues, including a full board conversation with at least one patient, or family
member of a patient, who sustained serious harm at their institution within the last year (Institute for Healthcare Improvement [IHI], 2008). According to the Commonwealth Center for Governance Studies (Prybil, Levey, Killian, Fardo, Chait, Bardach, & Roach, 2012), hospitals and health care systems must have the discipline and commitment to organize their governance structures and practices to provide “forward-thinking leadership and evidence-based outcomes” that will assist in advancing their governance practices. It was the governance board of the Mayo Clinic in 2004 that recommended the adoption of the HCPE as a business model, and by 2007, seven of the 12 Mayo Health System organizations were using the HCPE (Fischer, 2007). During that period, the Mayo Clinic Board of Trustees was composed of 23 total members, including three doctors and seven chief executive officers (CEO) of major corporations, such as J. W. Marriott, Jr. of the Marriott Corporation, owner of the Ritz Carlton Hotels and Resorts and 1992 and 1999 recipient of the Baldrige Award, and Frederick W. Smith, founder and CEO of Federal Express and 1990 recipient of the Baldrige Award (Batalden et al., 2010, p. 171; Notable Names Database, 2012). Although this is not a leadership study, leadership is the key to both creating the high-performance culture necessary to the adoption of the HCPE model (Schein, 2004) and to educating future leaders in the health care industry.
Chapter 2: Literature Review

In theory, there is no difference between theory and practice. In practice there is. - Yogi Berra

Overview of Chapter

The chapter begins by setting the stage for understanding the Baldrige Award program and the HCPE, noting that the HCPE function as a continuous organizational performance improvement model that includes all aspects of the organization such as leadership, strategic planning, the customer, workforce, processes, and systems. The HCPE are not the responsibility of a quality or regulatory department or function within the organization but instead the responsibility of senior leadership, specifically the CEO. The HCPE model for continuous organizational performance improvement has been used as a framework to align resources and initiatives (such as the ISO 9001 international quality management standard, lean enterprise, and Six Sigma), to improve communication, productivity, and effectiveness and to achieve organizational strategy.

The U.S. Congress created the Baldrige Award program in 1987 as a national education program developed to enhance the competitiveness of U.S. businesses and improve performance. A brief overview of the history of quality and continuous improvement will provide the background of events that led to the development of the Baldrige Award program. This historiographical approach to understanding quality will address the events, theories, and best practices that influenced the design of various quality programs and attempts to improve organizational performance that are the basis for much of the quality today. These theories and accepted best practices will illuminate the often-confusing array of quality movement initiatives. Moreover, the relationships of these theories and accepted best practices to the hypothesis stated in
The previous chapter will be described in detail in Chapter 3 (Shi, 1997). The outline of this chapter is as follows:

1. An introduction to the history of quality and the development of the Baldrige Award Program;
2. The CPE/HCPE model and the design of the CPE/HCPE framework and the process for achieving the Baldrige Award;
3. The role of systems theory, systems thinking, and moving beyond linear thinking;
4. The evolution of quality strategies and programs, including statistical process control, Lean, Six Sigma, total quality management, constraints management, and the Balanced Scorecard;
5. The Baldrige Health Care award recipients from 2002 through 2011;
6. The conception of applying quality standards and models to health care;
7. Programs to improve health care quality, such as accreditation programs, including the Joint Commission and the ISO 9001 international quality management standard and the Patient Protection and Affordable Care Act;
8. The gaps in knowledge in quality and performance improvement, including the HCPE;
9. CMS measures and Hospital Compare database in literature; and
10. Closing observations.

Based on current literature, this chapter provides the conceptual framework that supports the overall theory for this dissertation and concludes with the values of this study in improving health care outcomes.

**Introduction to History of Quality and the Development of Baldrige Award Program**

**History of Quality.** The body of literature related to the development of quality and performance improvement is immense. This study began with the history, theory, practice, and management of quality and resulting performance improvement. The study of quality and
performance improvement began with the study of philosophy and nature of humanity. Ancient philosophers performed a great deal of analysis to understand the world, studying language, vocabulary, ideas, truth, reality, and methods and tacitly embedding this knowledge into the implementation of working principles to improve understanding. Thus, for thousands of years humans have sought to understand the world in an effort to improve their lives and their conditions. This understanding of the world was critical to the survival of societies that learned how to improve planning, decision making, resource allocation, and leadership.

The accomplishments of ancient society’s architectural marvels, such as the Great Wall of China, Roman aqueducts and roads, and Egyptian pyramids, are well known. Less well-known and often overlooked have been societies’ attempts to manage health, safety, and quality (commerce). Historical records describe the laws ancient societies created to protect people, commerce, and the society or government. For example, the concept of consumer protection dates back to the Code of Hammurabi (c. 2000 B.C.), which “prescribed the death penalty for any builder of a house that later collapsed and killed the owner” and the “Mark of the Seal,” critical to commerce throughout history by ensuring the identity of the producer, traceability, and quality (Juran, 1995, p. 614). Since ancient times, governors and rulers have created laws and regulations to manage the activities of individuals and society.

Ancient philosophers studied the nature of humanity and the natural world, areas of study that today would be considered the fields of physics, biology, and other natural sciences. Ancient philosophers recognized that humans have the capacity to reflect on decisions and behavior, which is a function of our desires, beliefs, and values (Perry, Bratman, & Fischer, 2010). The concepts of values and resulting behaviors are core to the character of humans. The word for “character” in Ancient Greek was ethos, from which we get our word ethics. The Greek philosopher Heraklitos,
held that a person's “ethos is their *daimon*, or fate, thus man's character is his fate, which translates in today’s language as ‘we hold our destiny in our own hands by virtue of our character’” (Geldard, 2000, p. 85).

Before focusing specifically on the literature relative to quality and performance improvement over the past 100 years, acknowledging how the evolution of human development relates to quality bears mentioning because the concept of quality dates back to ancient times and has been part of the fabric of human history. For example, the concept or idea of “progress” dates back to the time of the Greeks and Romans, with the ideals of moral, spiritual, and material improvement as well as the advance of knowledge—more particularly the kind of practical knowledge contained in the arts and sciences. The view of all history may be seen as one of humanity improving itself, step by step, stage by stage, through immanent forces, until at some remote time in the future a condition of near-perfection for all will exist (Nisbet, 1979). This concept of improvement, whether incrementally or through breakthroughs, is the basis of all human learning and improvement of societies.

Joseph M. Juran’s (1995) historiography of quality covers the development and application of quality tenets from ancient societies to current times. In the beginning of recorded history, China’s autocratic form of government, dating back to twenty-first century B.C., controlled political, military, cultural, and economic activities. China’s quality control system dates back to the Western Zhou Dynasty (eleventh century to eighth century B.C.) when five large government departments controlled (a) the production, collection, storage, and distribution of raw materials; (b) the production and manufacturing of goods; (c) the storage and distribution of completed products; (d) formulating and executing standards; and (e) supervision and examination (Juran, 1995, pp. 2-6). The first three departments managed the process of creating goods, and the second two ensured
the quality of the products through standards, inspection, and testing. The ancient kingdoms of Israel and Judea also had laws that regulated work. Additionally, the concepts of product quality, specifications, and laws are present in the Old Testament in the descriptions of Creation, Noah’s ark, the Ark of the Covenant, the Exodus from Egypt by the Israelites, and the ancient cities of Sodom and Gomorrah (Juran, 1995). The Ancient Greek civilization lasted from the Archaic period of the eighth to sixth centuries B.C. to the end of Antiquity around 600 A.D. and is known for the use of standards, specifications, regulations, and planning. The Ancient Greeks developed science, technology, history, medicine, mathematics, economics, architecture, and the major fields of philosophy (Juran, 1995, pp. 63-65). The works of Aristotle, Archimedes, Euclid, Plato, Socrates, and Hippocrates all had a profound influence on Western culture (Perry, Bratman, & Fischer, 2010). The Greek philosopher Hippocrates is credited with being the first person to believe that diseases were caused naturally, not because of superstition and gods, and this prognosis went unchallenged in the Western world until scientific advances in the nineteenth and twentieth centuries supported many of his ideas (Jouanna, 1998). Thus, the concepts of quality and improving performance are part of the effort of humans to learn and improve and part of the story of the evolution of humanity for thousands of years.

The Industrial Revolution and the evolution of the scientific method were also part of this story of human evolution and set the stage for a climate that fostered continuous quality improvement through learning and development. Frederick Winslow Taylor’s “Scientific Management” incorporated strategies of separating planning from execution, of standardization, and of improved working conditions that propelled an increase in productivity (Juran, 1995). Henry Ford adopted Taylor’s methodology in 1913 with the design and operation of the Highland Park car plant in Detroit to produce the Model T (Waddell & Bodek, 2005). In 1918, Walther A.
Shewhart joined the Western Electric Company at the Hawthorne Works outside Chicago in Cicero, Illinois. Hawthorne Works was the center of many well-known industrial studies, as well as the concept of the Hawthorne effect, coined in 1955 by Henry A. Landsberger, who studied and analyzed data from experiments at Hawthorne Works performed between 1924 and 1932 by Elton Mayo (Shuttleworth, 2009).

The scientific method provides the framework for the development of quality and performance improvement during the past century. The modern scientific method was built upon the works of Galileo Galilei (1564-1642) and the philosopher Francis Bacon (1561-1626), the latter who developed the concept of inductive learning as a basis for science rather than the deductive logic common in the 1600s (Moen & Norman, 2010). The work of Galileo and Bacon was the foundation for the development of the concept of pragmatism by three noted philosophers. The first was Charles Peirce who was influenced by Immanuel Kant (1724-1804); second was William James (1842-1910), who studied with French philosopher, Charles Bernard Renouvier (1815-1903); and last was John Dewey (1859-1952), philosopher, psychologist, and educator, who led the integration of pragmatism and empiricism by Clarence Irving Lewis (1883-1964) (Moen & Norman, 2010). During the 1920s and 1930s Shewhart, Harold F. Dodge, and W. Edwards Deming developed the concepts of control charts, sampling plans, and statistical process in attempts to understand and reduce process variation (Watson, 2005). Shewhart developed the Shewhart learning and improvement cycle by combining management thinking with statistical analysis, which led to continuous improvement (Juran, 1995). Figure 1 is a depiction of the evolution of the scientific method and PDSA cycle depiction presented by Moen and Norman (2010, p. 24).
The work of C. I. Lewis influenced the thinking of the pioneers in the modern quality movement, Walther A. Shewhart and W. Edwards Deming. Lewis’ book *Mind and the World-Order* had an enormous influence on Shewhart and Deming in evolving the scientific method. Shewhart’s *Statistical Method from the Viewpoint of Quality Control*, published in 1939, introduced the concept of a straight-line, three-step scientific process of specification, production, and inspection, which Shewhart later revised into a circular model.
According to Moen and Norman (2010), Shewhart identified a relationship between the “three steps in the mass production process of (1) specification, (2) production and (3) inspection, which correspond respectively to (1) hypothesizing, (2) carrying out an experiment and (3) testing the hypothesis. The three steps constitute a dynamic scientific process of acquiring knowledge.” Figure 2 is a depiction that contrasts the two views of Shewhart’s idea of “specification, production, and inspection” and became known as the Shewhart cycle (Moen & Norman, 2010, p. 25).

Figure 2

*Shewhart – 1939 depiction*

**Shewhart straight-line process**

Step one  Step two  Step three

Specification  Production  Inspection

**Shewhart cyclical concept**

Deming built on Shewhart’s cycle and presented the new version of the cycle in 1950 at an eight-day seminar in Japan sponsored by the Japanese Union of Scientists and Engineers. His presentation stressed the importance of constant interaction among the four steps of (1) design, (2) production, (3) sales, and (4) research, with the aim of the quality of product and service. Figure 3 depicts the model for the Deming cycle or the Deming circle.

Figure 3

*Deming Wheel – 1950 Depiction*

1. Design the product (with appropriate tests).
2. Make the product and test in the production line and in the laboratory.
3. Sell the product.
4. Test the product in service and through market research. Find out what users think about it and why non-users have not bought it.


Japanese executives redesigned the wheel Deming presented in the 1950 seminars into the Plan–Do–Check–Act (PDCA) cycle. Table 1 shows Imai’s description of the relationship between the Deming wheel and the PDCA cycle.
Table 1

*The Deming Wheel vs. the Japanese PDCA Cycle Depiction*

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1. Design = Plan</td>
<td>Product design corresponds to the planning phase of management.</td>
<td></td>
</tr>
<tr>
<td>2. Production = Do</td>
<td>Production corresponds to doing, making, or working on the product that was designed.</td>
<td></td>
</tr>
<tr>
<td>3. Sales = Check</td>
<td>Sales figures confirm whether the customer is satisfied.</td>
<td></td>
</tr>
<tr>
<td>4. Research = Act</td>
<td>If a complaint is filed, it must be incorporated into the planning phase and action taken in the next round of efforts.</td>
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The resulting Japanese PDCA cycle, shown in Figure 4, defines the continuous circular nature of the four-step cycle for problem solving.

Figure 4

*Japanese Plan–Do–Check–Act (PDCA) Cycle - 1951 Depiction*


In 1986, Deming redefined the Japanese Plan–Do–Check–Act cycle from 1950 to a Plan–Do–Study–Act (PDSA) cycle to focus on the aspect of studying the variation, system, and
information needed for planning and decision making (Best & Neuhauser, 2006). Figure 5 depicts the PCSA cycle.

Figure 5

*Shewhart Cycle: Deming - 1986 Depiction*

What could be the team’s most important accomplishments?
What changes might be desirable?
What data are available?
Are new observations needed?
If yes, plan a change or test.
Decide how to use the observations.

Step 1

Study the results.
What did you learn?
What can we predict?

Step 4

Step 2

Carry out the change or test decided upon, preferably on a small scale.

Step 3

Observe the effects of the change or test.

Step 5

Repeat step one, with knowledge accumulated.

Step 6

Repeat step two, and onward


Deming again redefined the cycle as Plan–Do–Study–Act (PDSA) cycle to focus on the aspect of studying the variation, system, and information needed for management planning and
Health Care Criteria and Organizational Performance

decision making (Best & Neuhauser, 2006). Deming was clear to distinguish between the Shewhart PDCA cycle and the Deming PDSA circle in 1980 during a roundtable discussion hosted by the U.S. General Accounting Office. In the proceeding, Deming described the PDCA cycle as a method for quality control and the PDSA as a management program with the aim of studying, learning, and prediction (Proceedings of a roundtable discussion on product quality - Japan vs. the United States, 1980). The PDSA cycle, also known as the Deming Wheel, was simple and elegant in understanding and application and is the basis of many organizational improvement systems today including many of the Baldrige Health Care Award recipients.

Figure 6

*PDSA Cycle: Deming – 1993*


In the early 1990s, the Hospital Corporation of America (HCA) customized the Deming PDSA cycle and created the FOCUS-PDCA methodology for application in health care. FOCUS-PDCA is an acronym that adds five basic steps to the PDSA cycle of the performance
improvement process: F – Find an opportunity to improve, O – Organize a team who understands the process, C – Clarify the current knowledge of the process, U – Understand the cause of process variation, and S – Select the process improvement (Merritt, Morrison, Satterwhite, Smith, Thomason, & Thompson, 2001).

Over time, the definition of quality changed in various ways. Juran (1999) provided two definitions: (a) products or services that “meet customer needs resulting in improved customer satisfaction thereby increasing income” and (b) “freedom from deficiencies or errors” that reduce rework and waste, which improves income and reduces customer desertion. W. Edwards Deming, on the other hand, had both a simple definition and a more complex definition of the concept of quality. His simple definition was “quality is doing things right the first time” while his more complex definition suggests a product or service is of high quality if “customers perceive good value for their purchases, remain loyal in their purchases, urge others to buy the product or service, and transfer those sentiments to other products or services from the same company” (Deming, 1986, p. 5). Deming's approach to quality challenged management, for he asserted that management is responsible for 85% of all quality problems: management defines and controls processes, policies, personnel practices, equipment, facilities and supplies; therefore, management must take the lead for quality (Deming, 1994).
During the 1970s and the notable expansion of the global markets, U.S. organizations realized they were in competition with others across the world, in particular the auto industry in Japan. When compared to American companies, organizations in Japan were different in every way. The Japanese leadership, strategy development and execution, customer focus, measurement and analysis, as well as the development and management of human capital, were completely
different. By 1980, the U.S. consumer valued products made in Japan as superior in value and quality. In June 1980, the U.S. television network NBC aired a special documentary featuring Japan’s postwar recovery, entitled “If Japan Can, Why Can’t We?”, based on a NBC white paper. The documentary showed American autoworkers destroying cars made in Japan and members of Congress smashing Japanese-made stereos and cars. The claim in the documentary was that the Japanese business techniques were better than those used by U.S. businesses. The documentary described how American management largely ignored the knowledge taught by American quality gurus such as W. Edwards Deming, and how Japanese manufacturers were receptive to learning and improving the quality of their products and processes to be competitive in the global market.

**Development of Baldrige Award Program.** U.S. business leaders and the White House recognized the challenge from Japan during the 1970s. In response, in 1977, C. Jackson "Jack" Grayson, Jr., chair of the U.S. Price Commission from 1971 to 1973 during the administration of President Richard M. Nixon, founded the American Productivity and Quality Center (APQC) when the need became apparent for business to emphasize increased productivity and quality. Grayson envisioned an award that would set national standards and recognize companies that excelled in productivity and quality. Grayson and co-chair Sanford McDonnell, Chief Executive Officer of McDonnell-Douglas, brought together business leaders to determine the criteria and establish an administrative organization for the award. It took four years, 45 meetings (18 of which were in the White House), and a final 75-page proposal to get the 10 categories of criteria passed into law. In setting up the program, Grayson worked extensively with Malcolm Baldrige, the U.S. Secretary of Commerce nominated by President Ronald W. Reagan on December 11, 1980 (American Productivity and Quality Center, 2012). Malcolm Baldrige served as the
Secretary of Commerce from 1981 to 1987 and was closely involved in the creation of the award until the time of his death in a rodeo accident in 1987 in California (Victor & Koch, 2012).

In 1987, Congress passed into law the Baldrige Award program, named in honor of the quality-passionate Secretary of Commerce. The Baldrige Award was largely viewed by Grayson and industry leaders as a counterpart to Japan's Deming Prize created in 1950 in honor of W. Edwards Deming. (Many Japanese government and academic leaders credit Deming with revolutionizing Japanese post-war industry through his advocacy in Japan of quality control and managerial efficiency.) The specific goal of the Baldrige Award is to heighten U.S. awareness of performance excellence and formally recognize successful high-performing organizational management systems (NIST, 2011c). The Baldrige Award depends on the criteria in the Baldrige Health Care Criteria for Performance Excellence (HCPE), a system-based organizational model that will be described in more detail in the next section of this literature review. The Baldrige HCPE are used in 41 states, which function as incubators for the Baldrige Award, and 79 award programs internationally that include elements of the HCPE, such as the European Quality Award (EFQM), a HCPE-based program in Japan in addition to the Deming Prose, and the New Zealand Business Excellence Award (Latham & Vinyard, 2011, p. 1). The Global Excellence Model (GEM) Council consists of the chief executives of national excellence models and award programs from around the world. Their role is to manage and maintain a leading-edge position in models of excellence by reviewing how business trends and external factors could impact the utility and application of excellence models. In addition to the Baldrige Program from the U.S., GEM members consist of performance excellence organizations from Australia, Europe, Ibero-America (Brazil, Mexico, Spain), India, Japan, and Singapore (EFQM, 2012). The Baldrige Program each year hosts the Quest for Excellence Conference in the Washington, DC, area. This international
conference provides an opportunity for those interested in improving their organizations to learn from the Baldrige recipients and attend training seminars. The GEM is represented, for example, in the 25th Annual Quest for Excellence Conference and Award Ceremony during April 7-10, 2013. Scheduled speakers include Yasufumi Hirai, CEO of Cisco Systems, Japan; Cynthia Payne, CEO of SummitCare, Australia; Choe Peng Sum, CEO of Frasers Hospitality Pte., Ltd., Singapore; and Andreas Sambel, Director of Marketing and Business Excellence for Bosch U.S. (NIST, 2013).

The CPE/HCPE as a High Performance Model.

In a biological model, deoxyribonucleic acid (DNA) molecules are the design framework of all modern living organisms. DNA determines the design, structure, and systems of the organism, and with luck, the design will adapt to the environment and the organism will survive. For the human organism, the body is the structure and consists of a head, neck, torso, two arms, and two legs. The design of complex sustainable organisms may consist of a multitude of design specifications, such as size, which can vary from that of a rat to that of a whale. In the same way, the HCPE are the design framework for the organization, providing the questions for the appreciative inquiry process that assists leadership with the design of the organization (Kelm, 2005). Business leaders structure a design to support the strategy developed from an environmental analysis. The business structure may vary in size and complexity depending on the design created by the leadership. While the human organism is structured on its skeletal system and depends on other critical, complex, and adaptable systems of organs to sustain life (such as the circulatory, repertory, nervous, digestive, and endocrine systems), business systems such as financial, health and safety, customer relationship, operational, and leadership systems are required to sustain the life of the business. The human body’s systems must work efficiently and effectively together to
maintain a constant internal balance to sustain life, and in the business system, the Balanced
Scorecard strategic planning methodology allocates resources necessary to achieve balance in
business (Kaplan & Norton, 1996).

The tools and techniques of Lean methodology (just-in-time inventory, cycle time
reduction, etc.) are used in business systems to improve efficiency while the Six Sigma tools and
methodology reduce variation of the system’s processes (Pyzdek, 2003). The human body systems
are necessary to sustain life and are used in balance to manage the body’s functions. In business, it
is the role of the leadership to monitor failing systems and improve the organizational performance
to ensure sustainability. Use of the HCPE provides the organization with a framework to create a
learning organization that is dynamic and that can adapt to meet the needs of the complex business
environment (Senge, 2006b).

In other words, the HCPE are the architect’s blueprint or framework for creating a high–
performing, sustainable organization. The design provides an aligned, adaptive, integrated, and
systematic approach for organizational product and process improvement and sustainability. The
HCPE framework is a set of open-ended questions with no one correct answer. To answer the
questions, the organization must be creative, innovative, and free to incorporate all knowledge
developed over the past 100 years in academics and a multitude of global industries, including
health care. This presents a challenge to some organizations because the HCPE do not offer a
cookbook of recipes or secret answers to the questions leadership has with respect to
organizational improvement. Nonetheless, the HCPE are available to anyone with the desire and
discipline to “study,” learn, and improve. The HCPE provide the blueprint to build the building
(organization) but does not dictate to the leadership and workforce the necessary tools, technology,
or knowledge to build the systems and processes. The HCPE instead offer a set of improvement tools, including Lean Six Sigma tools.

Since the 1980s, leaders of organizations have rolled out various programs and strategies to improve performance. Strategies such as total quality management (TQM) and continuous quality improvement (CQI) provide a source of knowledge necessary for understanding the HCPE and will assist health care organizations in answering the HCPE questions. In addition, learning from and applying the knowledge developed by various organizations committed to improving health care is important to the greater understanding of how to operationalize the HCPE model. Examples of these organizations include (a) the Institute for Healthcare Improvement (IHI), (b) Physician Consortium for Performance Improvement (PCPI), (c) The Leapfrog Group, (d) National Quality Forum (NQF), (e) CMS, (f) The Joint Commission, (g) ISO 9001 Quality Management Standard, and (h) the American Society for Quality (ASQ). The HCPE allow for inclusion of any or all the above-mentioned tools and knowledge from academies and professional organizations. This study will address the details on these tools, knowledge, organizations, and strategies committed to improve health care.

**The CPE/HCPE Model.** The National Institute for Standards and Technology (NIST) is responsible for the management of the Baldrige Program, which is a public-private partnership and promotes U.S. innovation and industrial competitiveness. The Baldrige Program is a “national education program based on the HCPE model to improve organizational performance” (NIST, 2011-2012, p. i). Although not addressing health care specifically, Werner (2007, p. 34) recommended the adoption of the CPE improvement model as a whole system model that provides a systems perspective for managing an organization and its key processes to achieve performance excellence results. The HCPE have seven categories and an organizational profile
with 40 areas to address (NIST, 2011a). The HCPE have a set of questions used to meet and achieve the HCPE. These questions are based on 11 core values and concepts, which define excellence for the organization (NIST, 2011-2012). The HCPE design includes interdependent system of processes, activities, and practices that make up three essential competencies: strategic leadership, execution excellence, and organizational learning. The HCPE focus on 15 systems and 28 specific processes necessary to achieve and sustain performance (Latham & Vinyard, 2011).

As evidence of the effectiveness of the CPE/HCPE, for example, Leonard (2006, p. 15) wrote that Baldrige Program recipients from the 1988 to 2002 award cycles performed significantly better than the industry medians in terms of profitability and asset utilization with more leveraged debt and greater spending on capital expenditure, research and development, and advertising. Figure 8 depicts the seven categories in the HCPE framework and demonstrates the interrelated nature of the criteria in each category.
Health Care Criteria and Organizational Performance

Figure 8

HCPE Category Framework Depiction

Table 2 provides a brief description of 2011-2012 HCPE categories or constructs. The strength in the unique design of the HCPE model is its support of a systems perspective, discussed in detail in the next section.

Table 2

*Brief Description of 2011-2012 Health Care Criteria for Performance Excellence*

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Description</th>
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<tbody>
<tr>
<td>1. Leadership</td>
<td>Examines how senior leaders’ personal actions guide and sustain the organization. Also examines the organization’s governance system and how the organization fulfills its legal, ethical, and societal responsibilities and supports its key communities (NIST, 2011-2012).</td>
</tr>
<tr>
<td>2. Strategic planning</td>
<td>Examines how the organization develops strategic objectives and action plans. Also examines how strategic objectives are chosen and action plans are implemented and changed if circumstances require, and how progress is measured (NIST, 2011-2012).</td>
</tr>
<tr>
<td>3. Customer focus</td>
<td>Examines how the organization engages its patients and stakeholders for long-term marketplace success. This engagement strategy includes how the organization listens to the voice of its customers (patients and stakeholders), builds customer relationships, and uses customer information to improve and identify opportunities for innovation (NIST, 2011-2012).</td>
</tr>
<tr>
<td>4. Measurement, analysis, and knowledge management</td>
<td>Examines how the organization selects, gathers, analyzes, manages, and improves its data, information, and knowledge assets, and how it manages its information technology. The category also examines how the organization uses review findings to improve its performance (NIST, 2011-2012).</td>
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Table 2 (continued)

<table>
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<tr>
<th>Constructs</th>
<th>Description</th>
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<tr>
<td>5. Workforce focus</td>
<td>Examines the ability to assess workforce capability and capacity needs and build a workforce environment conducive to high performance. The category also examines how the organization engages, manages, and develops the workforce to utilize its full potential in alignment with the organization’s overall mission, strategy, and action plans (NIST, 2011-2012).</td>
</tr>
<tr>
<td>6. Operations focus</td>
<td>Examines how the organization designs, manages, and improves its work systems and work processes to deliver patient and stakeholder value and achieve organizational success and sustainability. Also examines readiness for emergencies (NIST, 2011-2012).</td>
</tr>
<tr>
<td>7. Results</td>
<td>Examines the organization’s performance and improvement in all key areas—health care and process outcomes, customer-focused outcomes, workforce-focused outcomes, leadership and governance outcomes, and financial and market outcomes. Performance levels are examined relative to those of competitors and other organizations with similar health care service offerings (NIST, 2011-2012).</td>
</tr>
</tbody>
</table>

The underlying causal relationships implied in the design structure of the framework of the CPE/HCPE model utilized in the Baldrige Award remain unchanged across industries. Therefore, the terms “Malcolm Baldrige National Quality Award framework,” “Baldrige Award framework,” “Baldrige Award model,” “Baldrige framework,” “Criteria for Performance Excellence (CPE),” “Health Care Criteria for Performance Excellence (HCPE),” and “Baldrige model” are used interchangeably but are often industry specific to embody the causal relationships and framework.
Because the relationships and the skeleton of the frameworks are the same regardless of name, the business, non-profit, education, and health care framework is used here on as a representation of the Baldrige model, the Baldrige Award model, or the Baldrige Award framework.

**Design of the HCPE.** Like DNA, the HCPE are unique as applied to each organization; there is no valid comparison among or between organizational models for creating and sustaining high performance, excluding other international global excellence models earlier described that were developed from the HCPE. Certainly, leaders have created high-performing organizations without the use or knowledge of the HCPE, but when analyzed these organizations have embodied the majority of the criteria depicted in the integrated HCPE framework. After all, much of the knowledge is taught in business education comes in the context of individual silo courses, and what is rarely taught is the integration of HCPE or how to manage the “white spaces on the organizational chart,” which requires a “systems or horizontal understanding of the organization” (Rummler & Brache, 1995, pp. 5-9), which will be addressed more extensively in the next section.

The HCPE offer a systematic, valid, and reliable model that has undergone decades of development, implementation, and testing by thousands of organizations in various industries. The HCPE serve as a non-prescriptive, adaptable, and non-limiting blueprint, framework, or model for high performance presented as a list of open-ended questions. Since their creation in 1987, the HCPE have continually evolved over time based on the input from experts and academics as well as organizations applying the criteria. Each year, organizations across the U.S. utilize the HCPE in an effort to learn and improve. Examiners who are experts in their fields donate their time and expertise totaling more than 63,000 hours in support of the process (note that this equals more than 7,800 workdays, or 19 workdays per examiner) (NIST, 2003). Feedback from operating organizations informs and improves the HCPE and thus institutes a continuous improvement
process for the HCPE. For example, Flynn and Saladin (2001) studied the validity of the HCPE framework as it changed over time (specifically 1988, 1992, and 1997) to broaden the constructs from basic quality management to business excellence. They concluded that most of the changes made to the Baldrige framework over the years have been significant and beneficial.

A non-prescriptive design, the HCPE are not based on any one management theory but instead allow for the integration of any management theories, concepts, and best practices organizations may require to ensure superior levels of performance and sustainability. These theories cover numerous fields of study such as leadership, strategy development and execution, marketing, finance, accounting, metrology, decision science, knowledge management, change management, human capital management, and process management.

Each organization develops varying perspectives along with the structural and contextual dimensions necessary to achieve high performance. The HCPE require leadership to see and analyze the organization accurately and deeply to create the optimum organization design and structure (Daft, 2007, pp. 25, 90). Leaders using the HCPE find mindful reflection is necessary to provide a level of deep knowledge and vision often missing in strategy development and design (Boyatzis & McKee, 2005). Leadership may choose to transform the organization by adopting meta-theories such as Deming’s “System of Profound Knowledge” (Deming, 1994, pp. 92-93), which begins with the transformation of individuals to understand a new way of thinking. This transformation includes (a) appreciation for how the interaction of systems affects the organization; (b) understanding of variation, which is always present and should be expected; (c) theory of knowledge, which includes learning and knowledge transfer; and (d) psychology, which includes motivation and engagement of the workforce.
Although there has been limited scholarly research, some researchers have established the validity of the HCPE framework or model. One empirical study that has validated the theoretical model underlying the Baldrige framework was conducted by Meyer and Collier (2001). They studied the Baldrige Pilot Health Care model in efforts to (a) develop a comprehensive measurement model, with associated constructs and scales, (b) address whether the seven HCPE categories represent a good model for health care organizations, and (c) provide insight into the strength and direction of causation among the seven Baldrige categories. Meyer and Collier tested the HCPE for the health care industry using data from 220 U.S. hospitals, and the results of structural equation modeling showed that many of the hypothesized causal relationships in the HCPE model were statistically significant, confirming the strong relationship between the processes (Categories 1-6) and results (Category 7). The relationship between processes and results was addressed by Deming (1986, pp. 2-4) in his chain reaction model, “which was on the blackboard of every meeting with top management in Japan from July 1950 onward” (see Figure 9 below). Additional research by Wayhan et al. (2010) studied Deming’s theoretical construct, which postulates that the impact of improved quality on financial performance is primarily indirect in nature. Wayhan’s group concluded that their results were “entirely consistent with the essence of Deming’s chain reaction theory of quality” (p. 762).
The HCPE focus on creating value and sustainability and have a non-prescriptive design to encourage creative thinking. The HCPE are adaptable to any theory, standard, or best practice and encourage organizations to be open to continuous change and improvement. The HCPE are non-prescriptive for the following three reasons. First, they focus on results, not on procedures, improvement tools (such as Lean Six Sigma), or organizational structure. Second, the selection of tools, techniques, systems, and organizational structure varies with an organization’s type and size, organizational relationships, stage of development, and capabilities and responsibilities of the workforce. Third, a focus on common requirements, rather than on common procedures, fosters understanding, communication, sharing, alignment, and integration. The HCPE’s open design “encourages creativity and innovation” while enabling the HCPE to integrate key health care themes, such as the patient and stakeholder as key customers, complex leadership structures, and the multiple roles of health care providers, including physicians, staff members, suppliers, and customers (NIST, 2011-2012, p. 55).
Another focus of the HCPE is in maintaining organization-wide goal alignment, which is embedded in the integrated structure of the HCPE, including core values, scoring guidelines, and a focus on results and cross-process linkages. HCPE alignment is built around connecting and reinforcing measures derived from an organization’s processes and strategy. The HCPE systems perspective recognizes that strategy and goals change over time, which requires dynamic linkages among HCPE items. The understanding of the HCPE begins with the organizational strategy and the systems with related processes created to execute the strategy. In the HCPE, action-oriented cycles of improvement take place via feedback between systems, processes, and results along four defined stages. The first is the approach (A), which involves planning, including design of systems, processes, measures, and deployment of requirements. Second is the deployment (D), which includes executing plans. Third is learning (L) by assessing progress and capturing new knowledge, including seeking opportunities for innovation. Fourth is integration (I), which includes revising plans based on assessment findings, harmonizing processes and work unit operations, and selecting better metrics. These four stages, known as ADLI, represent levels of organizational maturity during the scoring process (NIST, 2011-2012). Quantifying the levels of organizational maturity on a scale from 0 to 1,000 is the role of the HCPE scoring process.

Scoring of responses to HCPE items and Baldrige Award applicant feedback are based on two evaluation dimensions process and results. The “process” refers to the methods the organization uses and improves to address the item requirements in Categories 1–6. The four factors used to evaluate process are approach, deployment, learning, and integration (ADLI) (NIST, 2011-2012). The results section is Category 7, which refers to the organization’s outputs and outcomes in achieving the requirements in the following items: “7.1 Health Care and Process Outcomes, 7.2 Customer-Focused Outcomes, 7.3 Workforce-Focused Outcomes, 7.4 Leadership
and Governance Outcomes, and 7.5 Financial and Market Outcomes” (NIST, 2011-2012, pp. 23-26). The four factors used to evaluate results are levels, trends, comparisons, and integration (LTCI) (NIST, 2011-2012). As described in Flynn and Saladin’s research and Deming’s chain reaction model, there is a systems relationship between the process and results. The approach, deployment, learning, and integration of processes are linked to the performance results of the processes. The results show performance levels, trends, and relevant comparisons for key measures and indicators of organizational performance and integration with key organizational requirements. The performance results relate directly to deployment and organizational learning; if improvement processes are widely shared and deployed, there should be corresponding results. A score for a results item is thus a composite based on overall performance, taking into account the four results factors (LTCI) (NIST, 2011-2012).

This section has identified how the unique non-prescriptive design of the HCPE is a basis for international performance excellence models, systems, or horizontal understanding of the organization, and allows for the integration of any management theory, concept, and best practice.
Although no published academic or scholarly work identifies weaknesses of the HCPE, challenges with learning and using the HCPE include (a) the level of complexity, (b) the necessity of learning new mental models, (c) the adoption of a philosophy of continual learning and improvement, and (d) the creation of a culture that fosters high performance, reliability, and sustainability. Overcoming these challenges and achieving the levels of performance necessary to receive the Baldrige Award takes the total commitment of all levels of leadership to creating a high-performing learning organization, and years of cycles of reflection, self-assessment, learning, and transformation (Latham & Vinyard, 2008). Ultimately, organizational performance is the responsibility of the leadership to “create consistency of purpose for improvement,” as described by Deming (1982, pp. 24-25).

The HCPE High-Performance Business Model. Several researchers have studied the general impact of the HCPE and quality awards on organizational results, with encouraging results for application and future research. For example, Evans and Jack (2003) studied the HCPE specifically and identified relationships between employee satisfaction, process performance, work system improvement, and organization productivity. This study provided pioneering evidence that validates the HCPE-based Baldrige model and the relationship between high-performance management practices and business results. In other words, the results of this study supported long-standing beliefs and anecdotal evidence that improving internal management practices leads to improvements in external results.

In a different study of organizations that had received quality awards (including the Baldrige award), Hendricks and Singhal (1997) explored the hypothesis that implementing effective total quality management (TQM) programs improves the operating performance of firms, with winning quality awards being used as a proxy for effective TQM implementation.
Specifically, this study reviewed a ten-year period of performance—six years before and three years following the year of receiving the first quality award—and observed the mean and median change in the operating income. The award winner group reported an average operating income and a median income that were 107% and 48% higher, respectively, than that of the control sample. During the same period, the mean and median change in sales for the test sample were respectively 64% and 24% higher than that of the control sample. Additionally, changes in the ratios of operating income to assets, to sales, and to employees were higher relative to the control by about 20% (Hendricks & Singhal, 1997, p. 1271).

In a follow-up study, Hendricks and Singhal (2001) analyzed long-run stock price performance of firms with effective TQM programs, comparing stock price performance of award winners against various matched control groups for a five-year implementation period and a five-year post-implementation period. Results demonstrated that, for the implementation period, no difference in the stock price performance existed, but for the post-implementation period, award winners significantly outperformed firms in the various control groups, with the mean outperformance ranging from 38% to 46%. According to the authors, “the results clearly indicate that effective implementation of TQM principles and philosophies leads to significant wealth creation” (Hendricks & Singhal, 2001, p. 359).

To demonstrate the quantitative correlation between recipient award winners and market performance, the NIST, the program manager organization for the Baldrige Award, created a fictitious stock fund made up of publicly traded U.S. companies that received the Baldrige Award between 1991 and 2000. The “Baldrige Index” was created with a hypothetical investment of $1,000 in each of the whole company winners—Eastman Chemical Company (1993 winner) and Solectron Corp. (a winner in 1991 and 1997)—and the parent companies of 18 subsidiary
recipients, and a second hypothetical sum of $1,000 was invested in the S&P 500 for the same time period. The two Baldrige companies outperformed the S&P 500 by almost 4.5 to 1, a 512% return on investment. The group of whole company winners plus the parent companies of subsidiary winners outperformed the S&P 500 by about 3 to 1, achieving a 323% return on investment, compared to a 110% return for the S&P 500 (NIST, 2002).

The recipients of the Baldrige Award provide compelling evidence that the adoption of the CPE as a business model creates organizational results that support continuous improvement, resiliency, and sustainability. For example, the Ritz Carlton Hotel Company, LLC is one of five organizations that have sustained high performance over time and have twice received the Baldrige award (1992 and 1999). The other four organizations include Solectron Corp. (1991 and 1997), Texas Nameplate Company, Inc. (1998 and 2004), Sunny Fresh Foods, Inc. (1999 and 2005), and MEDRAD, Inc. (2003 and 2010).

A NIST study looked at three areas of potential growth, such as revenue and jobs. The results for job growth for the Baldrige recipients was 63%, compared to the average job growth of 3.2% for matching industries and time period, according to the Bureau of Economic Analysis and the Bureau of Labor Statistics (NIST, 2012a). In 2011, Thomson Reuters released a report finding that Baldrige hospitals (those that either received a site visit or the Baldrige Award at the national level) outperformed non-Baldrige hospitals on nearly all of the measures of performance used in the Thomson Reuters 100 Top Hospitals. Baldrige-recipient hospitals were six times more likely to count among the 100 Top Hospitals, which represent the top 3% of hospitals in the United States. Baldrige-recipient hospitals also outperform other hospitals in the 100 Top Hospitals on the following Thomson Reuters measures: risk-adjusted mortality index, risk-adjusted complications index, patient safety index, CMS core measures score, severity-adjusted average
length of stay, and adjusted operating profit margin (Foster, 2011). Finally, hospitals that have
received the Baldrige Award have lower rates of mortality and complications, higher profit
margins, and higher improvement levels than other hospitals in the 100 Top Hospitals (top 3%
nationwide) designated by Thomson Reuters. For example, the Advocate Good Samaritan
Hospital reported a 24% reduction over three years in its risk-adjusted mortality rate, exceeding the
top level for its six-county region, while Mercy Health System reduced its mortality resulting from
congestive heart failure by 38% over four years. Moreover, Robert Wood Johnson University
Hospital at Hamilton reported a 95% reduction in mortality resulting from acute myocardial
infarction and a nearly 61% reduction in mortality resulting from congestive heart failure over four
years (NIST, 2012a).

The effects of the Baldrige Program are contagious, especially in health care. The Baldrige
Award and the Baldrige Award recipients constitute the visible centerpiece of the Baldrige
Program. In 2011, there were 69 applicants for the Baldrige Award, which included 40
applications from health care organizations. Between 2005 and 2011, 522 U.S. organizations
applied for the Baldrige Award. In 2010, 83 applications were submitted, which accounted for
277,700 jobs, 1,500 work locations, over $38.5 billion in revenues/budgets, and an estimated 80
million customers served. The value of the services volunteered by the 578 Baldrige examiners in
2010 was estimated at $8.8 million. In addition, 2,270 state Baldrige-based examiners volunteered
about $29.5 million in services to evaluate 1,350 organizations at the state level in 2010 (NIST,
2011b). Since the initial award in 1988, there have been 1,530 applications for the award with
only 95 organizations receiving the Baldrige Award. In health care, since 1999 there have been
382 applications and 15 recipient organizations (NIST, 2011e).
Given the results of the organizational performance research, the more than 20 years of history, and the 79 international award programs based on the CPE, why are the CPE not widely known, accepted, or taught in business schools? This question has not been addressed in research. The CPE’s cross-functional systems design and limited visibility among industry leaders and academics presents a challenge to traditional research approaches along functional areas. Likewise, business leaders have difficulty with the model because they were not educated or trained to understand the CPE, and the weaknesses presented earlier—complexity, new mental models, continual learning and improvement, culture that fosters high performance—seem insurmountable hurdles to overcome.

Another reason for the surprising absence of CPE in business education is because organizations frequently undertake the CPE as a self-assessment exercise rather than a management strategy. Even well-managed organizations quickly realize that there are tremendous gaps in their organization during self-assessment processes that require intense engagement by senior leadership, specifically the CEO. The average company scores 150–200 out of a 1,000 points on their self-assessment, and government agency scores 80–150; in comparison, state award recipients have scored over 450 points and national Baldrige Award recipients score over 600 points out a possible 1,000 points (Latham & Vinyard, 2011, p. 578). Once leaders are exposed to a quantifiable reality of the current state of their organization, they either discredit the HCPE model for a lack of understanding or question if the organization has the resolve to commit to a long-term, continual, focused, and dedicated effort. The journey to performance excellence requires a senior leadership team and CEO to possess specific competencies, motivations, and attitudes, and requires discipline over time to adopt the HCPE as a proven business model for
creating superior value for the customers and stakeholders, including the workforce, community, and stockholders if the organization is a public company.

Researchers from the Monfort Institute Sustainable Transformation Program have studied whether transformational leaders from Baldrige recipient organizations somehow differ in their motivations and attitudes from other leaders who are at the top of their organizations, and they found Baldrige CEOs differed in seven motivational and attitudinal patterns from the CEOs in a control group (Larson, Latham, Appleby, & Harshman, 2012). The six motivational and attitudinal patterns are listed in Table 3 with the “direction” indicating how the mean of the Baldrige CEO Group (n=12) compares to the Leader Comparison Group (n = 1921). These six motivational and attitudinal patterns provide an understanding of the areas where the Baldrige CEOs differ from the comparison group. Thus, when organizations are designing leadership development strategies, incorporation of these seven motivational and attitudinal patterns may be valuable.

Table 3
Baldrige CEO Attitudes and Motivation Depiction

<table>
<thead>
<tr>
<th>Patterns</th>
<th>Direction</th>
<th>Implication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole Responsibility</td>
<td>Lower</td>
<td>Baldrige CEOs are less likely to think that having sole responsibility is important.</td>
</tr>
<tr>
<td>Evolution</td>
<td>Higher</td>
<td>Baldrige CEOs are more likely to want to evolve and to drive continuous improvement.</td>
</tr>
<tr>
<td>Focus on the Past</td>
<td>Higher</td>
<td>Baldrige CEOs concentrate on the past and use experience to make decisions.</td>
</tr>
<tr>
<td>Tolerance</td>
<td>Lower</td>
<td>Baldrige CEOs have a strong tendency to want to impose their “rules” on others (this is “Assertive”). A low score means that the individual is likely to be intolerant of the</td>
</tr>
</tbody>
</table>
actions of others when they differ from their own or are not consistent across the workforce; that is, they are not very motivated to deal with people who have rules different from their own. [Note: Individuals can have very different tolerance patterns in different contexts and low tolerance should not be confused with the extent to which an individual cares about people.]

<table>
<thead>
<tr>
<th>Focus on Systems</th>
<th>Higher</th>
<th>Baldrige CEOs are strongly motivated to work with systems and processes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on</td>
<td>Higher</td>
<td>Baldrige CEOs are strongly motivated to work with facts and knowledge (information).</td>
</tr>
</tbody>
</table>


Unfortunately, there is little understanding of “why” CEOs choose not to transform their organizations to achieve sustained high performance levels. Carl Icahn, a noted investment manager and broker since the 1970s, who over the years has owned controlling positions in major companies such as RJR Nabisco, Texaco, Phillips Petroleum, and Western Union, offered a plausible explanation in *The Icahn Report* in 2008. Called an anti-Darwinian metaphor, Icahn explains that the way CEOs become CEOs in America is one of the U.S.’s major problems: namely, it is the “survival of the unfittest.” Icahn describes the CEO selection process as a flawed fraternity or political approach rather than a competency approach (Icahn, 2008). Numerous books profile the leaders of great organizations. Jim Collins, best-selling author of *Good to Great: Why Some Companies Make the Leap ... and Others Don’t*, stated, “I see the Baldrige process as a powerful set of mechanisms for disciplined people engaged in disciplined thought and taking disciplined action to create great organizations that produce exceptional results” (NIST, 2010b).
Despite the uncertainty of leadership in implementing the model, the HCPE model has proven to be effective in improving business performance for those who have decided to internalize the systems approach the model embodies.

**The Process for Achieving the Baldrige Award.** The process for achieving the Baldrige Award is a long-term commitment to moving from good to great, as described by Jim Collins. It is a commitment to creating a culture that supports continuous improvement and learning (Schein, 1997). Depending on the level of organizational maturity in performance excellence, the process could take 5 to 10 years. The Baldrige application process is extensive and thus intimidating. An organization submits detailed application information, including a 5-page organizational profile and a 50-page application addressing all areas of the HCPE, to NIST in May of each year. Experts from around the U.S. donate their time as members of the Board of Examiners, having undergone a comprehensive training course that has been named one of the “Top 10 Government Leadership Development Programs by Leadership Excellence” for three consecutive years (NIST, 2012e).

Following the training, the examiners form teams to evaluate the applications. The board members evaluate each application against the HCPE model’s seven organizational, high-impact categories that were identified earlier in Table 1: (a) leadership; (b) strategic planning; (c) customer focus; (d) measurement, analysis, and knowledge management; (e) workforce focus; (f) operations focus; and (g) performance results. The performance results section include “health care and process outcomes, customer-focused outcomes, workforce-focused outcomes, leadership and governance outcomes, [and] financial and market outcomes” (NIST, 2011-2012, p. 3). The first step is for each examiner to conduct an independent review of the application materials, which takes about 40 hours, and creates a scorebook, or written evaluation, of an award application. Scorebooks ultimately end up with the award applicants and provide them with a criteria-based
assessment of their organization’s strengths and opportunities for improvement. In the second step, all applications are sent through a consensus review. The team of examiners, led by a senior examiner, conducts a series of reviews, including focused conference calls. The purpose of this series of reviews is for the team to reach a consensus on comments and scores that capture the team’s collective view of the applicant’s strengths and opportunities for improvement based on the input from the independent review. The third step is a consensus review process, which includes the development of a consensus report and scoring. Then in the fourth step, a panel of judges selects applicants to receive site visits based upon the scoring profiles. If an applicant is not selected for site visit review, one of the examiners on the consensus team edits the final consensus report, which becomes the application’s terminating feedback report. Site visits are conducted for the highest-scoring applicants. A team of examiners visits each selected applicant to verify and clarify the processes and results described in the application. After the site visit, the team of examiners prepares a final site visit scorebook. Applications, consensus scorebooks, and site visit scorebooks for all applicants receiving site visits are forwarded to the panel of judges, who make final recommendations on which applicants should receive the award. Following the judges’ review and recommendations of award recipients, the site visit team leader edits the final site visit scorebook, which becomes the feedback report. Finally in November, the judges recommend award recipients to the NIST Director and U.S. Secretary of Commerce (NIST, 2012d).

Baldrige Award applicants cite the feedback report as the most significant benefit of applying (NIST, 2012c). The feedback report is a detailed, individualized written assessment of the organization’s strengths and opportunities based on the Baldrige Award application. The process includes approximately 1,000 hours of document review and category scoring for each application. The components of the report include (a) key themes—the “executive summary”—
which is a synthesis of the most significant cross-cutting strengths and opportunities for improvement in the organization’s processes and results; (b) actionable comments addressing strengths and opportunities for improvement related to each of the 17 Baldrige Criteria Items; (c) item scoring range; and (d) scoring band distribution, which provides the percentage of scoring in each of the eight overall scoring bands and gives a context for the total score based on 1,000 points (NIST, 2012d).

**Role of Systems Theory and Systems Thinking—Moving Beyond Linear Thinking**

As introduced earlier in the previous section, a major strength of a HCPE-based approach, such as Baldrige, is its integrative systems design and the prospect for creating sustainable high-performance health care organizations. The seven HCPE categories and the core values and concepts form the building blocks and the integrating mechanism for the system. The core values and concepts are (a) visionary leadership, (b) patient-focused excellence, (c) organizational and personal learning, (d) valuing of workforce members and partners, (e) agility, (f) focus on the future, (g) managing for innovation, (h) management by fact, (i) societal responsibility and community health, (j) focus on results and creating value, and (k) systems perspective. Successful management of overall performance requires organization-specific synthesis, alignment, and integration. Synthesis refers to looking at health care organizations as a whole and builds on key organizational requirements, including strategic objectives and action plans. Alignment focuses on using the key linkages among requirements given in the HCPE categories to ensure consistency of plans, processes, measures, and actions. Integration builds on alignment, so that the individual components of the performance management system operate in a fully interconnected manner (NIST, 2011-2012).
HCPE systems design enables the identification of key leverage points that have the greatest impact on overall system performance and the ability to identify interrelationships, interactions, and complexity, and provides leadership with a structure and mental model to understand how to move the organization from good to excellent performance. This systems perspective concept is based on General Systems Theory, which has been described by Jay Forrester and Peter Senge from Massachusetts Institute of Technology (MIT) Sloan School of Management, Russell Ackoff from the Wharton School at the University of Pennsylvania, and W. Edwards Deming from Columbia University (Latham & Vinyard, 2011). The focus of systems theory is a holistic understanding of reality, as opposed to a reductionist approach to understanding the environment. The reductionist approach initially serves an organization well in improving performance by applying tools, such as Lean Six Sigma, but at a certain point when complexity and interactions are present, the limitation of linear cause-and-effect thinking creates an unseen barrier to further improvement. In other words, this is an important concept in understanding organizational complexity, resiliency, and sustainability.

Systems thinking requires moving beyond silo or functional linear cause-and-effect thinking that is the basis of U.S. business school education to a mental model that presents reality as dynamic interactions and inter-relationships of multiple variables or factors (Checkland, 1999). Due to the complexity of organizations, particularly health care organizations in the current dynamic and uncertain environment, fundamental views of the patterns of interrelationships need to be uncovered in order to understand phenomena such as the relationship of systems and processes to health care outcomes. Linking systems theory and thinking to leadership forecasting, planning, analysis, and decision-making methods is critical in today’s complex world. Senge (2006b, p. 71) adopted a view of “dynamic complexity to explain situations where cause and
effect are subtle, and where the effects over time of interventions are not obvious” and today’s conventional management practices are not equipped to deal with dynamic complexity.

Senge (2006b) built upon systems thinking by emphasizing personal awareness and the integration of individuals’ thoughts, behaviors, and feelings into all aspects of organizational life, and identified the root cause of problems as thinking and interacting, more than organization structure and policy. Schoderbek et al. (1990, p. 9) wrote, “The systems approach, therefore, implies some form of departure from the traditional analytical method so successfully employed with simpler problems. The increasing complexities of various modern-day projects make it impossible to look for isolated solutions to problems.” As organizational environments continue to change dramatically, and often unpredictably, and organizational leaders continue to seek solutions to problems of strategy execution, the value of systems thinking approaches might be recognized. Solutions to complex issues can be found across industries in a variety of processes, designs, product or service offerings, and organizational entities. Systems theory attempts to understand complexity and build on the most comprehensive view of a situation (Checkland, 1999, pp. 3-6). The key principle of systems theory is that it is possible to uncover the true workings of different phenomena by examining the whole instead of the parts.

According to Checkland (1999, p. 210), there are four fundamental types of systems: (1) natural systems such as a biological organism; (2) designed physical systems which are man-made for human purposes, such as buildings or engineering systems; (3) designed abstract systems, which are conscious products of the human mind, such as mathematics, poetry, or philosophy; and (4) human activity systems, which are less tangible but related to a purpose or mission, such as an international political system, a team engaged on a task, or a health care organization. The human activity system is used to understand and solve complex organizational problems, which may
include other types of systems, such as designed physical systems. For example, the social aspects of people and their inter-relationship to technical organizational structure and processes are considered a sociotechnical system.

In the sociotechnical systems approach, the organization is an open system, which means the system is capable of self-maintenance on the basis of throughput of resources from the environment versus a closed system like an engineering or computer system (Scott & Davis, 2003). Closed systems are considered hard systems and are embodied in professions such as systems engineering. The first attempts to solve complex organizational problems originated with the hard systems approach, which was successful with technology but had limited success with social systems. Some previous researchers have advocated that systems thinking approaches, in particular soft systems methodology, be used as a gauge against which human activity could be explored and better understood in terms of wholeness. Soft systems methodology (SSM) tackles “problems which defy formulation in the hard sense, and also enrich the concept of human activity system in order to understand better the social systems of the real world” (Checkland, 1999, pp. 15-17).

SSM has proven to be flexible enough to be successful in organizing and creating debate regarding real-world problems. It is designed as a seven-step process of inquiry. The preliminary steps of an SSM consist of

- identifying a problem situation and expressing the situation in plain language. The intermediate steps, called collectively systems thinking about the real world consist of developing root definitions of associated purposeful activity systems, which give rise to conceptual models of potential systems. The process concludes with a comparison stage, whereby those models are held up against the real world situation. Out of this comparison may emerge changes systemically desirable and culturally feasible. In the best case, these suggestions result in actions to be taken to improve the problem or situation. (Checkland, 1999, pp. 161-183)
SSM is used to make sense of complexity and provide a method for timely decision-making. For example, in the article “Using Soft Systems Methodology to Examine Communication Difficulties,” Brenton (2007) described a problem concerning a number of communication issues between a working-age mental health inpatient acute admission unit and a tertiary rehabilitation service within a health and social care National Health System (NHS) trust in West Sussex, United Kingdom (U.K.). SSM was used to facilitate informal discussion with the unit manager and staff of both the rehabilitation service and the acute inpatient unit, through structured meetings. After the discussion began, it became very clear that attempts to solve the problem using traditional linear cause-and-effect thinking would not work, because the tendency to sub-optimize along organizational functional lines prevented the identification of a solution. This incapability to define the issues “concretely” lent itself to a soft systems approach.

Changes usually can be classified into three inter-related types, including structure, processes, and attitudes; in the situation described by Brenton (2007), changes would be desirable in all three areas. Most importantly, the power of the SSM lay in identifying the ways that issues from one service impacted the other and the feasible changes that might be initiated to improve the relationship between the two services. Specifically in this situation, the following improvements were made: (a) increase in-bed availability on the acute unit; (b) for nursing staff and sector consultants, a better understanding of the role of the rehabilitation service and procedures for referral; (c) rehabilitation service's improved communication and liaison processes with potential referrers; and (d) improved efficiency of rehabilitation service referral process (Brenton, 2007).

In a different study of the systematic performance improvement of a health care organizations, Chuang and Inder (2009) used a systems theory approach (but not SSM) to study the effectiveness of both an accreditation system and a quality management system used to
improve health care quality and patient safety in Australia and New Zealand. The study identified a lack of research literature providing appropriate analysis for identifying improvement of health care outcomes based on a whole system that contributes to those outcomes. Chuang and Inder (2009, p. 12) used a systems theory approach that included a combination of a “theoretical-based and a literature-based empirical concept of systems theory and a general systems flow with the Supply Input Process Output Key Stakeholder (SIPOKS) process model to form the systems’ theoretic approach.” The approach was used to develop a high-level integrated systems model as a framework to guide the investigation of the effect of the accreditation and measurement and reporting systems on health care quality, and then to examine, from a systems flow perspective in a lower level, the causal links within the system that had an impact on effectiveness (Chuang & Inder, 2009). Combining the concept of health care system hierarchy and an analysis of control and communication relationships, a basic holistic health care systems relationship model was designed as shown in Figure 10.
"P1: focus on control relationship with communication. P2: focus on communication without control. P3: concern with communication (in general, no association found, cannot communicate each other). P4: intend to be as a control relationship (to increase the control efficacy of accreditation system on hospital and communication efficacy of quality measurement and reporting system with hospital)." (Chuang & Inder, 2009, p. 4)


In Figure 10, P1 and P2 are vertical control and communication inputs from the accreditation system and the management and reporting system to the hospital-level health care system that is responsible for improving outcomes. The remaining relations, “P3 and P4, are horizontal control and communication relationships within the health administration system, to improve the focus and impact of accreditation on quality of care while P3 communicates correlations in the outputs of the accreditation and the quality measurement and reporting systems and P4 provides feedback from the output of the quality measurement and reporting system to the accreditation system input.” (Chuang & Inder, 2009, p. 4)

Using the systems theoretic approach, the overall effectiveness of the accreditation, measurement, and reporting systems for providing quality of care was identified and system
weaknesses from a system flow perspective were discovered. Overall, the health administration systems did not have significant positive impact on the quality of care. The study conclusion was the identification of weaknesses implicit in the P4 feedback loop from the measurement and reporting system to the accreditation system, thereby affecting the hospital-level health care system (Chuang & Inder, 2009). This was an important discovery because a major component of systems theory is the feedback loop or formal communication flow (Checkland, 1999).

Thus, a systems approach to solving complex problems is proving to be more effective than the traditional silo effort of identifying previously unknown interactions or communications channels as in the previous study, and “the interactions between our thinking and internal models and our perceptions and actions” (Senge, 2006b, p. 222). The value of the HCPE is that they provide a systematic and integrated methodology for aligning the entire organization and transcend the organizational chart, which increases the likelihood that management will make decisions to benefit the whole organization and not particular silos or parts. This type of thinking creates a certain type of organizational enlightenment. It is the evolutionary process of the organizational change and growth to a state of excellence where management systems, knowledge, and tools are applied at a different points to produce a culture that drives performance, builds resiliency, and ensures sustainability. According to Ford and Evans (2000, p. 9), “Many firms use the criteria as a ‘management guide’ and considerable evidence exists as to the benefits of doing so.” Their research was unique for its time and in its approach because their investigation of strategic planning drew from mainstream strategic management literature as well as more distant areas, such as forecasting and systems theory, providing an integrative model for organizational effectiveness.

The HCPE model challenges leaders to learn how to think at a different level, beyond silo or departmental linear thinking to a systems view, which includes unfamiliar concepts.
Acceptance of this challenge to learn a new model for thinking will provide leaders with a broader set of solution resources with which to design approaches and create a high-performing organization. Schein (2004) established a pragmatic view and stated that “the learning leader must believe that the world is intrinsically complex, nonlinear, interconnected, and over determined in the sense that most things are multiply caused” (p. 402). The HCPE challenge leaders to create a leadership system that provides the structures and mechanisms for decision-making: two-way communication; selection and development of leaders and managers; and reinforcement of values, ethical behavior, directions, and performance expectations. An effective leadership system respects the capabilities and requirements of workforce members and other stakeholders, and it sets high expectations for performance and performance improvement. It builds loyalties and teamwork based on the organization’s vision and values and the pursuit of shared goals. It encourages and supports initiative and appropriate risk-taking, subordinates organizational structure to purpose and function, and avoids chains of command that require long decision paths. An effective leadership system includes mechanisms for the leaders to conduct self-examination, receive feedback, and improve (NIST, 2011-2012).

**Evolution of Quality Improvement Strategies and Programs**

This chapter began with a review of the history, theory, practice, and management of quality and resulting performance improvement and the study of philosophy and nature of humanity. This section builds on the philosophical understanding and approaches by providing a historical reference that introduces a change from a Western philosophy to an Eastern philosophy delineated by the end of World War II in 1945, identified in Figure 11, “Evolution of Quality and Performance Excellence.” This figure was adapted from Folaron’s (2003) “The Evolution of Six Sigma.”
The Western philosophy period began with Eli Whitney’s invention of the cotton gin in 1787, which led to Whitney receiving a government contract to produce 10,000 muskets in 1798 (Folaron, 2003, p. 38). Whitney proved it was possible to produce interchangeable parts that were similar enough in fit and function to allow for a random selection of parts in the assembly of the muskets. This had a great impact on modern manufacturing with the introduction of revolutionary uniformity system, which eventually led to the design and operation of the Henry Ford Highland Park assembly line in 1913.

Later, during Ford’s time, practitioners of quality focused on inspection and statistical sampling theory, or the use of statistics for process control (Folaron, 2003). In the 1920s and 1930s, Shewhart, Harold F. Dodge, and Deming developed the concept of control charts. During that time, the first attempt to link management thinking to statistical thinking and create a philosophy of continuous improvement was developed by Shewhart’s PDCA learning and improvement cycle, which was later referred to as PDSA by Deming.
The Eastern philosophy period began with the rebuilding and transformation of Japan. At the end of World War II, Americans were exposed to the cross-cultural perspective or worldview of the Asian mind and philosophy through the reconstruction of Japan after the war. This era began with General Douglas MacArthur and the occupying forces needed to rebuild the Japanese infrastructure and to inform the people of Japan the war had ended and the U.S. was no longer an enemy. In this spirit, MacArthur requested Homer Sarasohn from MIT to teach the Japanese leaders U.S. manufacturing management principles. The Japanese leaders considered the use of statistics the “secret weapon that helped the Allies win the war” and wanted to learn more about the practical application of this weapon (Folaron, 2003, p. 40). The U.S. experts taught Japanese management how to use statistical methods and quality and the use of Deming’s PDSA cycle of continuous improvement. The Japanese embraced and internalized the PDSA learning cycle because it was part of their cultural philosophy of personal improvement. Although statistical methodology was well received as a field for experts, it was not incorporated into management until 1954 with the arrival of Joseph M. Juran, who taught how quality should be incorporated throughout all levels of organizations (Folaron, 2003). Juran included the need for project-by-project quality improvement and diagnostic/remedial journeys, all of which he documented in his *Quality Control Handbook*, first published in 1951 with the introduction of quality management concept.

Ironically, the work in Japan during the 1950s became a learning laboratory for management experts from the U.S. Thus, the origins of total quality management (TQM) began in the early 1950s, with the work of Deming, Juran, and Armand V. Feigenbaum from General Electric. The last of these three established the intellectual framework for quality as a discipline worthy of top management’s attention. Feigenbaum applied a systems engineering approach to
quality and introduced to management the use of financial performance as an indicator of poor
quality. Feigenbaum demonstrated the lag between the initiations of total quality improvement
programs within a nation’s leading companies and the observed economic effects throughout
general business. Feigenbaum used an economic basis for defining total quality and the integration
of previous concepts and methods of quality control into a systematic theory and discipline, which
he termed “total quality control,” known today as total quality management (TQM) (Folaron,
2003).

TQM is more than a quality method; it combines management methods and economic
tory with organizational principles to institute a sound business improvement doctrine that
results in commercial leadership (Watson, 2005). It is a way of emphasizing that quality, as
defined by the customer, results from the integration of multiple cross-functional workflows
throughout an organization. Generally, TQM defines quality as an organization-wide process that
requires continuous improvement and provides the most cost-effective, least capital-intensive route
to productivity.

Although TQM provides a necessary linkage of quality to all levels of management, it does
not provide a holistic model to accomplish these objectives. The HCPE provided the model to
achieve TQM (Watson, 2005). Thus, the quality strategies and programs of today are the result of
hundreds of years of development and the work of visionary individuals in businesses, universities,
and the U.S. and Japanese governments.

**Lean and Six Sigma methodologies.** The HCPE have a category called “operations
focus” that comprises two sections, the first relating to “work systems” and the second to “work
process” management (NIST, 2011-2012, pp. 21-22). Lean and Six Sigma methodologies are
important strategies for managing work systems and processes and consist of various tools and
techniques used to reduce waste and improve process performance by reducing variation. While important tools and strategies for creating high-performing sustainable organizations, Lean and Six Sigma do not offer a holistic model of managing and transforming an organization. The purpose of “Lean” is to reduce or eliminate waste in any form, including unnecessary processing, movement of items or people, transportation of goods, overproduction, and rework because of defects. As in all organizations, the commitment to being lean begins with strategy developed and deployed by leadership and the alignment to goals to improve organizational performance (Zidel, 2006).

The term “lean” was coined by Cusumano (1988), a Massachusetts Institute of Technology researcher in an article about the Japanese auto industry. Henry Ford pioneered and perfected the theory of lean production. In his design, he identified “flow,” which described the production line with minimum inventory, known today as just-in-time. Ford (1926) stated, “The time element in manufacturing stretches from the moment the raw material is separated from the earth to the moment when the finished product is delivered to the ultimate consumer” (p. 99). In 1929 Charles Sorenson, the Assistant Production Manager at Ford taught the concepts of “flow” and lean manufacturing to Eiji Toyoda from Japan who adopted the Ford system for the family-run Toyoda Automatic Loom Works (Waddell & Bodek, 2005, p. 22). Then in 1950, Toyoda was named Managing Director of the Toyoda Automotive Works. In 1957, Toyoda renamed the Toyoda automotive operation the Toyota Company and changed the name again in 1983 to the Toyota Motor Corporation. Toyoda’s adoption of Ford’s concepts is considered to be one of the major building blocks of the Toyota Production System of continuous improvement know as kaizen (Becker, 2012). Applying the Toyota Production System to health care, Chalice (2007) first identifies U.S. health care system problems, then provides 46 steps for improvement. Thus Lean is
a methodology that is beneficial for reducing waste in any organization, including health care systems.

The incorporation of Lean in conjunction with Six Sigma offers an organizational reductionist methodology that is a rigorous, focused, and highly effective improvement strategy. The purpose of Six Sigma is to reduce process variation. The theory of reducing process variation dates back to the 1920s with the development of “statistical process control” (SPC) by Shewhart at the Western Electric Company (Juran, 1995, p. 252). Typically, companies have accepted three to four sigma performance levels as a norm, which equates to 6,200-67,000 problems or errors per million opportunities. High-performance organizations have adopted the strategy of achieving Six Sigma, which translates to 3.4 problems or defects per million opportunities. Motorola, a 1988 recipient of the first Baldrige Award, popularized the theory and practice of Lean and Six Sigma methodologies in the mid-1980s with the work of Bill Smith, an engineer at Motorola who constructed the original statistics and formulas of the Six Sigma culture. To be competitive Motorola developed the Six Sigma DMAIC methodology of defining a process problem (D), measuring the process (M), analyzing the measurement (A), improving the process (I), and ensuring the change was effective by checking for control (C). Eliminating problems or defects improves the performance of any organization (Pyzdek, 2003). The success of Six Sigma was a result of the direct support of leadership when Motorola CEO Bob Galvin and Senior Vice President Jack Germaine incorporated Six Sigma training of the workforce into the company’s Motorola University training and development program (Breyfogle, 2003).

**Constraints Management.** Constraints Management is based on the theory of constraints (TOC) popularized by Eliyahu Goldratt, which focuses on “system” improvement rather than “process” improvement. A constraint is the weak link in a system, and constraints management
focuses on eliminating constraints through a five-step methodology: “(a) identify the constraint, (b) exploit the constraint, (c) subordinate other processes to the constraint, (d) elevate the constraint, and (e) repeat the cycle. TOC considers three measures of system performance: (a) throughput, (b) inventory, and (c) operating expense” (Breyfogle, 2003, pp. 886-900). Some examples of the use of TOC in health care include “patient flow, lead times, supply-chain issues, accounts receivables, and insurance processing” (Inozu, Chauncey, Kamataris, & Mount, 2012, p. 29). The concept of constraints management is important to improving performance by managing the organizational systems. As described earlier, the HCPE are the framework, and TQM, Lean and Six Sigma methodologies, and constraints management are practices and tools to build the framework.

**The HCPE and the Balanced Scorecard.** The Balanced Scorecard was developed as a new approach for more holistic performance measurement and strategy management system by Robert S. Kaplan from Harvard Business School and David P. Norton, CEO of the Nolan Norton Institute, a research arm of KPMG. In 1990, KPMG sponsored a one-year multi-company study, titled “Measuring Performance in the Organization of the Future,” with results suggesting that organizational reliance only on financial performance measures was limiting the ability to create economic value. Four specific perspectives of performance areas were identified by participants to provide a more holistic indicator of organizational performance: “(a) financial, (b) customer, (c) internal, (d) innovation and learning” (Kaplan & Norton, 1996, pp. vii-viii). It is important to balance between short- and long-term objectives, financial and non-financial measures, and lagging and leading indicators.

Kaplan and Norton continued their research throughout the 1990s and in 2001 published *The Strategy-Focused Organization* in which they enhanced the strategy section of the Balanced
Scorecard theory, which included enhancements to planning and budgeting, feedback and learning, leadership, strategy maps, business unit and shared services synergy. They argued that “explicit through the strategy map’s cause and effect linkages across the four perspectives” there would be a balance between short- and long-term strategy (Kaplan & Norton, 2001, p. 308). The four perspectives were refined with expanded definitions and the perspective titled “innovation and learning” evolved to “learning and growth” to enhance the focus on human resources. *The Strategy-Focused Organization* proposed strategy as a continual process: align strategy to the Balanced Scorecard and the performance metrics to operations (Kaplan & Norton, 2001). Many of the Baldrige recipients use the Balanced Scorecard such as the Advocate Good Samaritan (2010), Heartland Health (2009), Poudre Valley Health System (2008), Sharp Health Care (2007), and North Mississippi Medical Center (2006). The Baldrige Program office also uses this effective performance and strategy management theory (NIST, 2012b). The Balanced Scorecard represents a critical component in the development of a more holistic and balanced approach for performance management and strategy management, but it is only a portion of the model presented by the HCPE. The Balanced Scorecard has evolved from its inception as a strategic planning methodology in the 1990s to a more enterprise-focused approach that extends beyond strategy and metrics to encompass enterprise management aligned with the HCPE.

**The Baldrige Health Care Award Recipients from 2002 through 2011**

The HCPE model has been attracting attention from health care organizations and the Joint Commission because of the interest of health care systems throughout the country. Specifically, the American Health Care Association and National Center for Assisted Living Quality Award recognize member organizations that demonstrate their commitment to continuous quality improvement; the Living Quality Award is modeled after the Baldrige Performance Excellence
Award (The Joint Commission, 2007). Due to quality and cost challenges, health care leadership has become increasingly engaged in the Baldrige Program not only as applicants but also in administration and promotion. Additionally, on April 15, 2011, an American College of Healthcare Executives (ACHE) news release announced that Thomas C. Dolan, president and CEO of ACHE, was appointed by the U.S. Secretary of Commerce to the Board of Overseers that advises the Department of Commerce on the Baldrige Program. Consisting of distinguished leaders from all sectors of the U.S. economy, the Board of Overseers evaluates all aspects of the Baldrige Program, including the adequacy of program criteria and processes for determining award recipients. A key Board responsibility is assessing how well the Baldrige Program is serving national interest and, as needed, recommending changes and improvements to the Secretary of Commerce and to the NIST Director. The “ACHE and the Baldrige Program have many things in common, the most important being a commitment to excellence,” says Dolan. “I am greatly honored to chair a board that is dedicated to upholding quality and superior performance in the healthcare field and other sectors of the U.S. economy” (Freund, 2011).

Table 4 lists all the health care recipients of the Baldrige Award through 2011. The hospital systems receiving the award range in size and complexity. The first recipient, SSM Health Care (SSMHC) is a private, not-for-profit health care system based in St. Louis, Missouri, that provides primary, secondary, and tertiary health care services. The system owns, manages, and is affiliated with 18 acute care hospitals and 3 nursing homes in 4 states: Illinois, Missouri, Oklahoma, and Wisconsin. With operating revenues of approximately $1.7 billion, SSMHC provides a wide range of medical services and employs nearly 5,000 physician partners and 23,000 employees (SSM Health Care, 2002).
In 2006, the largest rural hospital system in the country received the Baldrige Award, North Mississippi Medical Center (NMMC) in Tupelo, Mississippi. Established in 1937, NMMC is an integrated health care delivery system that spans 20 counties in northeastern Mississippi and 4 counties in northwestern Alabama with a population of more than 700,000 segmented into 2 service areas, a 7-county primary area closest to NMMC and a secondary service area of the remaining 17 counties. NMMC is the region’s only Level II trauma center, the largest non-government hospital in Mississippi and the largest rural hospital in the country. NMMC has 3,875 employees, making it the largest employer in its service area and the second largest private employer in the state (North Mississippi Medical Center, 2006).

In 2011, three health care recipients received the Baldrige Award: Schneck Medical Center, Southcentral Foundation, and the Henry Ford Health System (HFHS). The HFHS was founded in 1915 by auto pioneer Henry Ford and is headquartered in Detroit, Michigan. HFHS includes 7 hospitals (a large, Level I trauma center flagship hospital; 4 community hospitals; and 2 psychiatric facilities); 33 multi-specialty ambulatory care centers; affiliated physician practices; a research and education component; the Health Alliance Plan (providing health coverage to more than 467,000 members); and 91 community care operations. The community care includes outpatient behavioral health, nursing homes, hospices, and dialysis centers, and a broad range of retail operations offering services such as optometry and home medical products. The 140 sites with HFHS facilities serve a three-county region in southeast Michigan, encompassing Detroit and its suburbs. The HFHS workforce of 29,856 includes 24,322 employees; 2,200 independent community physicians; and 3,334 volunteers. Revenue in 2010 was $4.08 billion (NIST, 2011d). HFHS’s customer engagement and satisfaction results exceeded the 90th percentile level from 2007 to 2010. HFHS maintained a positive net operating income of greater than $25 million per
year from 2007 to 2010 despite significant increases in uncompensated care, which grew from approximately $130 million in 2007 to approximately $200 million in 2010 (NIST, 2011a).

According to a *New York Times* (2012) editorial, Southcentral Foundation in Anchorage, Alaska, has achieved startling efficiencies including a reduction in emergency room use by 50% and in hospital admissions by 53%, while improving access. Other improved outcomes include an increase in children receiving high-quality care for asthma from 35% to 85%, a high percentage (more than 90%) of infants receiving needed immunizations by the age of two, a ranking in the top 10th percentile of a standard national benchmark for percentage of diabetics with blood sugar levels under control, and customer and employee satisfaction rates greater than 90%.

Table 4

*Health Care Recipients of the Performance Excellence Award*

<table>
<thead>
<tr>
<th>Year</th>
<th>Recipients</th>
<th>City</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>SSM Health Care (SSM)</td>
<td>St. Louis</td>
<td>Missouri</td>
</tr>
<tr>
<td>2003</td>
<td>Baptist Hospital</td>
<td>Pensacola</td>
<td>Florida</td>
</tr>
<tr>
<td>2003</td>
<td>Saint Luke’s Hospital (SLH)</td>
<td>Kansas City</td>
<td>Missouri</td>
</tr>
<tr>
<td>2004</td>
<td>Robert Wood Johnson University Hospital at Hamilton</td>
<td>Hamilton</td>
<td>New Jersey</td>
</tr>
<tr>
<td>2005</td>
<td>Bronson Methodist Hospital</td>
<td>Kalamazoo</td>
<td>Michigan</td>
</tr>
<tr>
<td>2006</td>
<td>North Mississippi Medical Center</td>
<td>Tupelo</td>
<td>Mississippi</td>
</tr>
<tr>
<td>2007</td>
<td>Mercy Health System</td>
<td>Janesville</td>
<td>Wisconsin</td>
</tr>
<tr>
<td>2007</td>
<td>Sharp Health Care</td>
<td>San Diego</td>
<td>California</td>
</tr>
<tr>
<td>2008</td>
<td>Poudre Valley Health System</td>
<td>Fort Collins</td>
<td>Colorado</td>
</tr>
<tr>
<td>2009</td>
<td>AtlantiCare Regional Medical Center</td>
<td>Egg Harbor Township</td>
<td>New Jersey</td>
</tr>
<tr>
<td>2009</td>
<td>Heartland Health</td>
<td>St. Joseph</td>
<td>Missouri</td>
</tr>
<tr>
<td>2010</td>
<td>Advocate Good Samaritan Hospital</td>
<td>Downers Grove</td>
<td>Illinois</td>
</tr>
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</table>
The Application of Quality in Health Care

The application of quality to health care has been well documented. The process involved a host of government agencies and commissions, professional organizations, insurance underwriters, corporations, and market forces. In general, quality and performance improvement principals focus on organizational leadership and management, which include process design, measurement, assessment, and improvement of systems and processes. From the health care perspective, quality and performance improvement is not limited to direct patient care functions but clearly recognizes that leadership, management, and support functions significantly influence care outcomes (Community Health Care, 2012). As discussed in preceding sections, various organizations, such as the Institute for Healthcare Improvement (IHI), professional organizations like the Physician Consortium for Performance Improvement (PCPI), and the federal government through CMS have focused on improving the levels of health care quality to improve patient safety and outcomes. This section of the literature review will focus on the work of key individuals who contributed to the evolution in thinking about quality in health care. These individuals made significant contributions in improving health care by influencing others and changing mental models and existing paradigms, which is pivotal to ensuring change (Senge, 2006b). The creative spirit of individuals over time is at the heart of transforming organizations and leads to culture change (Hacker, 2012). A creative spirit in health care quality began with nurse, statistician, and author Florence Nightingale (1820–1910) who made an enormous global contribution with the
foundation of the public health care system in England and created what is known today as “evidence-based nursing” (McDonald, 2001). Nightingale and 38 nurses arrived at a British hospital in Uskiider, outside Istanbul, Turkey in November of 1854. She documented the first seven months of their efforts, recording that 60% of the soldiers died from infection (Inozu et al., 2012). Nightingale’s nursing experience and statistical analysis during the Crimean War (1853–1856) led her to propose changes to health care administration and processes, which included the creation of a royal commission to investigate the causes of the high mortality, the creation of a statistical department to track rates of disease and mortality, and the uniform collection of hospital statistics so that outcomes could be compared by hospital, region, and country (McDonald, 2001).

Building on Nightingale’s work at the national level of health care systems, Ernest Amory Codman (1869–1940) brought individual accountability and quality to health care. Coleman developed the “end results idea” around 1905, which entailed a small pocket-sized card with the patient’s case number, preoperative diagnosis, operating team members’ names, procedure(s), and results (both short- and long-term), and he was instrumental in forming the American College of Surgeons (ACS) in 1913 (Mallon, 2007).

The ACS was created to address great variations in the quality of medical education and the competence of physicians, and in 1917, the ACS developed the Hospital Standardization Program using a learning-based model of quality assurance that successfully improved hospital standards up to the 1950s and 1960s. At that time, the ACS transferred ownership of the original Hospital Standardization Program to the Joint Commission on Accreditation of Hospitals (now Healthcare Organizations, JCAHO) (Mallon, 2007). Institutionalization of quality assurance created a regulatory mindset based on the establishment and maintenance of “minimum standards” that
developed and created a major impediment to improving health care quality systems (Merry & Grago, 2001).

Eliot Freidson (1923–2005) in the 1960s was the leading researcher in the sociology of the profession of medicine. Freidson introduced the concept of the “market shelter” to designate the unique institutional position that the medical profession holds in society, and he described how a market shelter shields professional workers from competition, from third party and government interference, and from other market forces (Freidson, 1975b, pp. 88-91). He was interested in the medical profession's makeup of largely self-regulating bodies with unique expertise. He also looked at how policy supported quality and efficient care but the conflict between the bureaucratic model of service and physicians’ own autonomous professional model, coupled with the complexity of accountability, presented a challenge to physicians and their patients (Freidson, 1975a).

In the 1970s Avedis Donabedian (1919–2000) introduced a method of assessing and measuring the quality of care at the level of the physician-patient interaction, which included outcome of care, process of care (input-activity-output), and structure—attributes of care providers, settings, and arrangements (Donabedian, 2003). In his book, Donabedian (2003) summarized over 30 years of his work in developing the concept of quality assurance in health care with his structure, process, and outcome model and its application to diagnosis and treatment of the patient and the management of the hospital. Donabedian’s work provided the foundational thinking that led to changes in health care during the past three decades.

Although Donabedian does not reference Deming, there is a relationship between Deming’s Theory of Profound Knowledge and chain reaction model (Figure 2) and Donabedian’s structure, process, and outcome model in that both models are based on process, yielding outcomes
as well as provider (physician) and customer (patient) relationships. Donabedian and Deming agree that the assessment and measurement of the quality of care at the level of the physician-patient interaction is the role of management and critical to continuous improvement. In the preface to *Out of the Crisis*, Deming argued that only the transformation of management would lead to the required improvement in organizational quality and performance, a transformation involving learning how to change, understanding the “diseases” or barriers endemic in the system, and knowing how to achieve a cure (Deming, 1986). Deming's philosophy requires “massive changes in how managers think about their jobs” by providing focus on patients and delivering quality services (Darr, 1990). Thus, from the time of Florence Nightingale until today, research and the development of professionalism, standards, accreditations, and structures have influenced the improvement of health care outcomes. The understanding of process design, measurement, assessment, and improvement of systems is also important. Ultimately, creating a culture that supports continuous learning and improvement is important to improving health care outcomes and that is the responsibility of leadership (Schein, 2004).

**The History of CMS/The Joint Commission Measure Alignment.** In 1999, the Joint Commission began a several-year process to solicit input from a wide variety of stakeholders—clinical professionals, healthcare provider organizations, performance measurement experts, and others—about potential focus areas for core measures for hospitals. In 2001, the Joint Commission announced the four initial core measurement areas for hospitals: acute myocardial infarction (AMI), heart failure (HF), pneumonia (PN), and pregnancy and related conditions (PR) (CMS, 2011e). Concurrently, the Joint Commission worked with the CMS on the AMI, HF, and PN sets that were common to both organizations. In 2002, the CMS and the Joint Commission worked to align the measure specifications for the Quality Improvement Organizations (QIO)
contracts and for the Joint Commission-accredited hospitals that began collecting these measures for patient discharges; in 2006 the Surgical Infection Prevention (SIP), which transitioned to the Surgical Care Improvement Project (SCIP), was included (CMS, 2011e).

The CMS partnered with the Agency for Healthcare Research and Quality (AHRQ), another agency in the U.S. Department of Health and Human Services, to develop and test the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) hospital experience survey in 2002 (CMS, 2012b). The AHRQ carried out a rigorous scientific process, including a public call for measures, literature review, consumer focus groups, stakeholder input, a three-state pilot program, and numerous small-scale field tests to develop the HCAHPS hospital experience survey. In May 2005, the HCAHPS hospital experience survey was endorsed by the National Quality Forum, a national organization that represents the consensus of numerous healthcare providers, consumer groups, professional associations federal agencies, and research and quality organizations, and in December 2005, the federal Office of Management and Budget gave its final approval for the national implementation of HCAHPS for public reporting purposes (CMS, 2012b). The CMS implemented the HCAHPS hospital experience survey in October 2006, and the first public reporting of HCAHPS results occurred in March 2008 (CMS, 2012b). Since 2003, the CMS and the Joint Commission have worked to align common measures, which has resulted in the creation of a common set of measure specifications known as the Specifications Manual for National Hospital Inpatient Quality Measures with a standard data dictionary, measure information, and algorithms to focus efforts on the use of data to improve the healthcare delivery process (CMS, 2012b).
Programs to Improve Health Care Quality

Accreditation programs, including the Joint Commission and the ISO 9001 Standard, other programs to improve health care performance, and the Health Care Cost and the Patient Protection and Affordable Care Act include quality improvement as a specific objective.

The Joint Commission. Founded in 1951, the Joint Commission is the nation’s oldest and largest standards-setting, compliance-driven accrediting body, certifying more than 19,000 health care organizations and programs in the U.S. The Joint Commission requires hospitals to meet certain performance standards in an attempt to improve health care. The first major recognition of the Baldrige HCPE was at a the Joint Commission and Joint Commission Resources (JCR) Annual Conference on Quality and Patient Safety, held in June 2011 in Chicago, Illinois. At the pre-conference, a workshop was titled “JCR Creating a Better Patient Experience: Joint Commission, CMS, Magnet and Baldrige Alignment” (The Joint Commission, 2011).

On September 26, 2008, the CMS approved Det Norske Veritas (DNV) Healthcare, Inc.’s accreditation program for hospitals seeking to participate in Medicare or Medicaid. DNV’s program, National Integrated Accreditation for Healthcare Organizations (NIAHO), integrates the quality management system of the International Organization for Standardization (ISO) 9001 with the Medicare conditions of participation. The approval of DNV’s program gave hospitals another accreditation option in addition to existing accreditation programs by the Joint Commission and the American Osteopathic Association (AOA) or certification by a state survey agency.

Accreditation is critical for the existence of a health care system as it is necessary to have before receiving CMS payments, and enormous pressure exists beyond the scope of the Joint Commission survey or inspection once every three years. With such criticality, an industry
evolved to help health care organization prepare for Joint Commission inspections. For example, one company promotes on their website:

CMS Survey Preparation and Rescue Services. We are the only healthcare survey preparation firm in the U.S. that has published 1000+ survey-proven compliance documents – and brings them onsite to assure that you have best possible survey outcome. (Hospital Policy Net, 2012)

The Joint Commission publishes an 85-page guide for the organization to use in preparing for the survey titled *The Joint Commission’s Survey Activity Guide*. In contrast to the approach taken by the Joint Commission, the HCPE do not set standards, provide regulations, or accreditation, and as described earlier, the HCPE serve as a model for creating a high-performing organization and not as a checklist for accreditation.

**The HCPE and ISO 9001 Quality Management System Standard.** The HCPE are a holistic organizational model that differs from ISO 9001 Quality Management System standard in purpose, content, and focus. As a quick review, Congress created the HCPE to enhance U.S. competitiveness. Based on the non-prescriptive paradigm, the HCPE award program promotes quality awareness, recognizes quality achievements of U.S. organizations, and provides a vehicle for sharing successful strategies. The HCPE focus on results and continuous improvement and provides a framework for designing, implementing, and assessing a process for managing an organization. The ISO 9001 standard is a series of five international criteria published in 1987 by the ISO, Geneva, Switzerland. The ISO 9001 standard is a prescriptive Quality Management System that incorporates the W. Edwards Deming PDSA cycle of improvement (Reid, 2001). Organizations use the prescriptive standards to define what is needed to maintain an efficient quality conformance system. For example, the standards describe the need for an effective quality system, ensuring that measuring and testing equipment are calibrated regularly, and for
maintaining an adequate record-keeping system. ISO 9001 registration determines whether an organization complies with its own quality system. Overall, ISO 9001 registration covers less than 10% of the HCPE (NIST, 2010b). Thus the adoption of the prescriptive ISO 9001 standard is the first step in creating and managing an efficient quality conformance system, but lacks a holistic model for organizational performance and sustainability.

**Other Independent Quality Improvement Programs.** This section describes independent programs created by different interests to improve health care performance. All of the programs bring value to the efforts of improving health care, but it is the responsibility of the leadership of health care systems to understand “how” to integrate and align these disparate programs into the organizational culture and strategy to ensure the workforce is not distracted and confused by another “flavor of the month” program.

**Institute for Healthcare Improvement (IHI).** IHI was founded the in the late 1980s by Dr. Don Berwick and other visionary leaders, including Sr. Mary Jean Ryan of SSM Health Care, the 2002 recipient of the Baldrige Award. Dr. Berwick served as a member of the panel of judges for the Malcolm Baldrige National Quality Award program from 1989 to 1991, and Sr. Mary Jean also served as a Baldrige judge. Both Berwick and Ryan served together on the IHI Board at its inception (Rhoades, 2003), with Dr. Berwick being the first Chief Executive Officer of the IHI. While CEO of IHI, Dr. Berwick was appointed by President Barack Obama on July 7, 2010, to serve as the Administrator of CMS through a recess appointment, but on December 2, 2011, he left the position because it was clear that Republicans in the Congress would not allow a vote to confirm him. Even though the American Hospital Association (AHA) issued a letter commending Berwick for “his commitment and passion to improving health care” and his “openness to always being willing to listen to the hospital field's perspective on how to deliver better care to patients,”
political ideology outweighed what was best for the health care system, the economy, and the citizens of the U.S. (Sullivan, 2011).

The IHI has a long history of formulating creative solutions to some of the most difficult problems facing the health care system. Based on years of experience, IHI has created a method for rapidly identifying innovative ideas, assessing their potential, and turning them into processes and systems that work in the real world. The IHI has worked with dedicated partners to devise now-familiar tools and concepts that have been critical to improved health care quality, and through this process, the IHI Triple Aim was developed. The Triple Aim focuses on better care, better health, at lower cost, and with this focus, the IHI has been committed to transforming health care into a system that is no longer plagued by errors, waste, delay, and unsustainable social and economic costs. Although IHI has been pivotal in improving health care, IHI does not offer a comprehensive non-prescriptive organizational systematic model but instead offers the transformational knowledge necessary in applying the HCPE (IHI, 2003).

The Physician Consortium for Performance Improvement (PCPI). PCPI was created in November 2000 by the American Medical Association (AMA) as a national, physician-led program dedicated to enhancing quality and patient safety. The PCPI leads efforts in developing, testing, and implementing evidence-based performance measures for use at the point of care. The purpose of the PCPI is to (a) identify and develop evidence-based clinical performance measures and measurement resources that enhance quality of patient care and foster accountability, (b) promote the implementation of effective and relevant clinical performance improvement activities, and (c) advance the science of clinical performance measurement and improvement (American Medical Association [AMA], 2012). The PCPI develops, tests, implements, and disseminates evidence-based measures that reflect the best practices and best interest of medicine. The PCPI is
nationally recognized for measure development, specification and testing, and enabling the use of measures in electronic health records (EHRs). The PCPI’s measure development resources include a measure testing protocol, a position statement on the evidence base required for measure development, a composite framework, specification and categorization of measure exceptions, and an outcomes measure framework. Performance measures developed at the PCPI are evidence-based, valid, and reliable. More than half of the PCPI performance measures are included in the Physician Quality Reporting Initiative (PQRI) Program. The PCPI has developed more than 250 individual measures covering 42 clinical topics (AMA, 2012). The HCPE provide the model to actualize the knowledge developed by the PCPI to ensure organizational alignment and integration.

**Leapfrog Group.** Supported by the Business Roundtable, the Leapfrog Group began in 1998 with a group of large employers who came together to discuss a way to influence the quality and affordability of purchased health care. In a 1999 report by the Institute of Medicine gave the Leapfrog founders an initial focus—reducing preventable medical mistakes. The report stated that up to 98,000 Americans die every year from preventable medical errors made in hospitals alone. The report actually recommended that large employers provide more market reinforcement for the quality and safety of health care. The founders realized that they could take “leaps” forward with their employees, retirees, and families by rewarding hospitals that implement significant improvements in quality and safety.

The Leapfrog Group’s mission is “to trigger giant leaps forward in the safety, quality, and affordability of health care by supporting informed healthcare decisions by those who use and pay for health care; and, promoting high-value health care through incentives and rewards” (Leapfrog Group, 2012a). The Leapfrog Group offers a voluntary program aimed at mobilizing employer purchasing power to alert America’s health industry that big advances in health care safety,
quality, and customer value will be recognized and rewarded. A range of hospital quality and safety practices are the focus of Leapfrog’s hospital ratings, based on the “Leapfrog Hospital Quality and Safety Survey,” as well as hospital recognition and reward programs. Endorsed by the National Quality Forum (NQF), the practices are computer physician-order entry, evidence-based hospital referral, intensive care unit (ICU) staffing by physicians experienced in critical care medicine, and the Leapfrog Safe Practices Score (Leapfrog Group, 2012a).

Among other initiatives, Leapfrog works with its employer members to encourage transparency and easy access to health care information as well as rewards for hospitals that have a proven record of high quality care (Leapfrog Group, 2012a). The Leapfrog Group created a hospital survey in 2001 based on existing metrics that identified three quality and safety practices (leaps) as the focus for hospital recognition and reward. The survey also encourages hospitals to publicly report their progress in meeting three key safety practices identified as having the potential to save a substantial number of patients’ lives. Since that time, the Leapfrog Hospital Survey has evolved into a survey of hospital quality and safety, focusing on hospital structures, processes of care, and outcomes data, most of which is collected for various regulatory and accreditation organizations. The Leapfrog Hospital Survey results are accessible online at www.LeapfrogHospitalSurvey.org (Leapfrog Group, 2012b). The survey site allows anyone to obtain the results for individual hospitals or to compare hospitals in a region.

Leapfrog works closely with numerous organization to improve health care, such as the National Quality Forum, Centers for Medicaid & Medicare Services (CMS), Agency for Healthcare Research and Quality (AHRQ), and the Joint Commission. By 2012, the Leapfrog Group had evolved into a consortium of Fortune 500 companies and other large private and public health care purchasers providing health benefits to more than 37 million Americans in all 50 states.
and spending tens of billions of dollars on health care annually (Leapfrog Group, 2012b). All the efforts of the Leapfrog Group are important to improving health care, but efforts do not provide a systematic model to create a high performing health care organization.

The National Quality Forum (NQF). The NQF was created in 1999 to develop and implement a national strategy for health care quality measurement and reporting. The NQF has focused on several areas, including error rates, unnecessary procedures, and under-treatment, especially in preventive care. Policies are formed through one of four Member Councils: (1) Consumer Council, (2) Purchaser Council, (3) Provider and Health Plan Council, and (4) Research and Quality Improvement Council. The NQF operates under a three-part mission to improve the quality of American health care by (a) building consensus on national priorities and goals for performance improvement and working in partnership to achieve them, (b) endorsing national consensus standards for measuring and publicly reporting on performance, and (c) promoting the attainment of national goals through education and outreach programs (National Quality Forum, 2012). Although these are important initiatives, the NQF also does not provide a systematic model for creating a high performing health care organization.

Health Care Cost and the Patient Protection and Affordable Care Act (ACA). There is a limited supply of resources available for health care in the U.S. despite the fact that the U.S. spends more of its wealth on health care than any other developed country. In 2005, the U.S. spent $1.9 trillion, 16% of Gross Domestic Product (GDP), on health care, up from $1.7 trillion or 15% of GDP in 2003. In 1960, the share of GDP was only 5.2%, but now the U.S. now spends more on health care than it does on food. Many studies have attempted to explain why the U.S. spends disproportionately more on health care, and some theories include the high price of drugs, the abundance of new medical technology, the private nature and administrative complexity of health
care (Angrisano, Farrell, Kocher, & Laboissiere, 2007), an aging population, reimbursement incentives under fee for service, poor quality, and limited access.

Several recent initiatives attempted address increasing health care expenditures. For example, the U.S. Department of Health and Human Services (HHS) announced on September 27, 2011, grants to states and communities to fight chronic diseases—the leading cause of death in Americans. Created by the ACA, Community Transformation Grants were designed to help states and communities tackle the root causes of chronic disease, which account for 75% of health care costs in the U.S. The root causes of chronic disease often relate to economic, social, and physical factors, such as tobacco use or a lack of places to exercise. Thomas Frieden, Director of the Centers for Disease Control and Prevention, which will administer the grants, said, “This initiative will build on successful programs that have helped people lead healthier lives and will enable communities and states to improve the healthy choices for their residents” (U.S. Department of Health and Human Services, 2011).

Another consideration is the cost of poor health on the productivity of the economy because healthy working people are essential to a productive society. Often researchers reference the cost of poor health to business performance. For example, the National Center for Health Statistics in 2008 reported that employed adults 18 years of age and over experienced an average of 4.4 work-loss days per person due to illness or injury, for a total of approximately 698 million work-loss days (Schuchat, 2009). To improve quality, CMS proposed a rule that would give the agency the power to drop Medicare Advantage plans and Medicare prescription drug coverage plans that get low marks for quality (Reichard, 2011). In addition to business, other segments of the society would benefit from improved health of its participants.
According to Ezekiel J. Emanuel, Special Advisor for Health Policy in the Office of Management and Budget and Chair of the Department of Bioethics at the National Institutes of Health, the ACA is a historical event—the passage of health-care reform having been attempted by five previous presidents over the course of almost 100 years (Helwick, 2010). Dr. Emanuel identified several provisions that will reduce the amount of spending on health care. Projections indicated the greatest reductions will come from the following: (a) cutting overpayment to Medicare Advantage, saving $136 billion, (b) reduction of payment update factor, saving $196 billion, (c) administrative simplification, saving $20 billion, (d) use of generic biologics, saving $7 billion, (e) enforcement of fraud and abuse laws, saving $3 billion, and (f) payment changes for complex imaging procedures, saving $1.2 billion (Helwick, 2010). Although it is too early to understand the actual outcome in the passage of the ACA in controlling spending and improving health care outcomes, a concerted effort to prevent disease is a critical component.

The CMS National Health Expenditure (NHE) Projections 2010-2020 Report projected 2010 NHE to have reached $2.6 trillion and grown 3.9%, down from 4.0% in 2009. Estimated spending growth in 2010 was slow due to the recession. Between 2011 and 2013, national health spending, which is made up almost entirely of medical care, is projected to grow faster, reaching a rate of 5.5% by 2013. In 2014, health spending is projected to grow 8.3%. This projected acceleration in the growth rate, up from 5.5% in 2013, is primarily the result of the ACA’s being signed into law by President Barack Obama on March 23, 2010. The new Health Insurance Exchanges are expected to cover 13.9 million people in 2014 and contribute to 9.4% growth in private health insurance spending. By 2014, Medicaid enrollment is expected to increase by 19.5 million people, and spending is projected to grow 20.3%. Over the projection period (2010-2020), average annual health spending growth (5.8%) is anticipated to outpace average annual growth in
the overall economy by 1.1 percentage points. By 2020, national health spending is expected to reach $4.6 trillion and comprise 19.8% of GDP. The government-sponsored share of health spending is projected to increase from 45% in 2010 to about 50% by 2020, driven by expected robust Medicare enrollment growth, Medicaid coverage expansions, and exchange plan premiums and cost-sharing subsidies. Table 5 identifies the billions of dollars of projected health care expenditures and spending as a percentage of GDP through 2010.

Table 5

National Health Expenditures (NHE) and Selected Economic Indicators, Levels, and Annual Percent Change: Calendar Years 2005-2020 (Projected at 2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>NHE in Billions of Dollars</th>
<th>NHE as a Percentage of Gross Domestic Product (t% GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$2,021.0</td>
<td>16.0%</td>
</tr>
<tr>
<td>2006</td>
<td>$2,152.1</td>
<td>16.1%</td>
</tr>
<tr>
<td>2007</td>
<td>$2,283.5</td>
<td>16.2%</td>
</tr>
<tr>
<td>2008</td>
<td>$2,391.4</td>
<td>16.6%</td>
</tr>
<tr>
<td>2009</td>
<td>$2,486.3</td>
<td>17.6%</td>
</tr>
<tr>
<td>2010</td>
<td>$2,584.2</td>
<td>17.6%</td>
</tr>
<tr>
<td>2011</td>
<td>$2,708.4</td>
<td>17.7%</td>
</tr>
<tr>
<td>2012</td>
<td>$2,823.9</td>
<td>17.6%</td>
</tr>
<tr>
<td>2013</td>
<td>$2,980.4</td>
<td>17.6%</td>
</tr>
<tr>
<td>2014</td>
<td>$3,227.4</td>
<td>18.1%</td>
</tr>
<tr>
<td>2015</td>
<td>$3,417.9</td>
<td>18.3%</td>
</tr>
<tr>
<td>2016</td>
<td>$3,632.0</td>
<td>18.6%</td>
</tr>
<tr>
<td>2017</td>
<td>$3,849.5</td>
<td>18.8%</td>
</tr>
<tr>
<td>2018</td>
<td>$4,080.0</td>
<td>19.1%</td>
</tr>
<tr>
<td>2019</td>
<td>$4,346.5</td>
<td>19.4%</td>
</tr>
<tr>
<td>2020</td>
<td>$4,638.4</td>
<td>19.8%</td>
</tr>
</tbody>
</table>

Note. The health spending projections were based on the National Health Expenditures released in January 2011. The projections include impacts of the Affordable Care Act.

Data from *National health expenditure projections 2010-2020*, by the Centers for Medicare & Medicaid Services, 2010, Washington, DC.
The Gaps in Knowledge Including the HCPE in Literature

The health care quality improvement literature contains large gaps relative to the analysis of HCPE. First, there is a general lack of peer-reviewed scholarly research articles on HCPE over the past 20 years. Second, specific to health care, there are fewer than 50 actual peer-reviewed articles and only about 25 published since 2000. The journal articles that actually study the HCPE do not compare actual performance measures using CMS data in multiple constructs. For example, one study analyzed the HCPE framework through a survey of quality personnel at 220 U.S. hospitals to investigate whether quality management systems relate to organizational results and customer satisfaction in hospitals (Goldstein & Schweikhart, 2002). Third, no studies provide leadership with the compelling evidence to support using the HCPE as a business model. This dissertation begins to fill these knowledge gaps with an empirical study of health care organizations using the HCPE model and comparing their performance with those not using a HCPE model, whether using a different model or no model at all.

Hospitals using the HCPE as an organizational model take a multi-dimensional approach to health care management with a focus on organizational performance. Health care quality management is only one dimension of performance. Most studies only approach health care from the single dimension of quality management, not a holistic approach of organizational performance. Even so, the literature available in health care quality management studies is limited generally to non-randomized experiments. According to Pernege (2006), the International Journal for Quality in Health Care has published 192 papers (excluding editorials and letters) from 2004 through 2006, of which 8 papers, or 4.2%, were randomized experiments because of the nature of organizational studies. Pernege (2006) suggests health care research methods should include more scientific rigor to improve understanding health care quality management. A study of three
organizational models concluded the Baldrige model, the European Foundation Quality Management (EFQM) Excellence model, and the Chronic Care model have high face validity. However, only a few studies exist in the academic literature and the effects of the model as a whole on improved performance remains limited and comes mainly from self-reported, uncontrolled studies (Minkman, Ahaus, & Huijsman, 2007).

A literature search of studies specific to the Baldrige Award and CPE and HCPE yielded limited results. A literature review of available material between 1989 and 2012 included the following keywords: “Baldrige,” “Baldrige Award,” “Baldrige Program,” “Baldrige Award recipient,” “Baldrige recipient,” “Criteria for Performance Excellence,” “Health Care Criteria for Performance Excellence,” and “Malcolm Baldrige National Quality Award.” The search of Tulane University’s main library catalog, the Howard-Tilton Memorial Library, on “Baldrige Award” yielded 897 results with all publication types (periodicals, newspapers, books, primary source documents, education reports, academic journals, etc.) with 298 peer-reviewed journal articles. A search of the Business Source Complete database, an index of 3,800 business journals, magazines, and other publications, identified 260 peer-reviewed journals articles. A search of the PubMed database yielded 31 results, and Ovid MEDLINE 18 results. Removing the editorials, reviews, announcements, news, etc. from the list provided 52 abstracts of articles to be reviewed.

Next, a specific search of professional journals that have traditionally published Baldrige articles and research was conducted with a focus on health care. The results for ASQ Quality Management Journal were 25 articles with one article specific to health care. The Quality Management Journal, a peer-reviewed publication that links the efforts of academic researchers and quality management practitioners by publishing significant research relevant to quality management practice, yielded 25 articles, with 11 in the title and only 1 health care article. In
addition, health care professional organizations and journals were searched and produced the following results: British Medical Journal, 3; Hospitals & Health Networks, 101; IHI, 14; Journal of American Medical Association, 4; the Commonwealth Fund website, 10; the American Medical Association website, 58; the American Hospital Association website, 56; and the ASQ Health Care Division website, 51 results. Finally, 38 books were used for this study with 12 specific to health care improvement, most of which reference the HCPE model.

Most of the books that reference the HCPE do so in terms of identifying the performance of health care recipients of the Baldrige Award and make a general reference to an aspect of the HCPE model. In Strategic Management for Health Care Organizations, Swayne et al. (2008) describe the role of a systems perspective to strategic management and profile the performance of Baldrige Award health care recipients, including SSM Health Care System (2002 Baldrige recipient), Baptist Hospital (2003 Baldrige recipient), and Sharp Health Care (2007 Baldrige recipient). Another approach to describing the HCPE was addressed in The Health Care Quality Book: Vision, Strategy and Tools where the authors describe the HCPE as a system for improving health care performance (Ransom, Josji, Nash, & Ransom, 2008, pp. 70-71). The book Medical Quality Management Theory and Practice addressed the HCPE as a model for “continuous performance improvement” and referenced several recipients of the health care Baldrige Award (American College of Medical Quality, 2010, pp. 178-184). Some books identify high-performing hospitals and profile Baldrige Award recipients but do not address the HCPE model. For example one 2012 book, Pursuing the Triple Aim: Seven Innovators Show the Way to Better Care, Better Health, and Lower Costs, profiles high-performing health care systems such as Southcentral Foundation (2011 Baldrige recipient) and SSM Health Care System (2002 Baldrige recipient) but
makes no mention of the Baldrige Program or the HCPE in the book (Bisognabo & Kenney, 2012).

The literature available in the quality management, organizational systems, and general management theories fields support the prominent view that a value-added experience can be derived from implementing the HCPE for organizational self-assessment and Baldrige award processes. In other words, the use of the HCPE model is pivotal to organizational performance (Latham & Vinyard, 2011). Results of studies presented earlier in this paper suggested that the use of the HCPE improves financial performance, with studies that explored hypotheses that implementation of effective TQM programs improves the operating performance of firms (Hendricks & Singhal, 1997) and that Baldrige award winners significantly outperform firms in the various control groups (Hendricks & Singhal, 2001). Flynn and Saladin (2001) studied the validity of the framework by examining its theoretical constructs relative to changes over time (1988, 1992, and 1997) and found all include robust relationships. Researchers from the Monfort Institute Sustainable Transformation Program have studied how leaders of Baldrige recipient organizations differ in their motivations and attitudes from leaders in other organizations not using Baldrige HCPE models and processes (Appleby, Harshman, & Latham, 2009).

Positive results of a link between HCPE and organizational performance resonate in health care research. In the Institute for Healthcare Improvement (IHI) report titled Seven Leadership Leverage Points for Organization-Level Improvement in Health Care, the IHI identified seven leverage points for organization-level improvement in health care. The IHI recommends the use of the HCPE model as a “comprehensive framework for the leadership” to execute organizational transformation and to operationalize the seven leverage points (Reinertsen, Pugh, & Bisognano, 2004, p. 7). The report provides leaders with a starting point to “leverage” specific activities and
specific changes in leadership systems, in which a small change might bring about large, positive, system-level results. These leverage point were developed from (1) complex systems theory; (2) observed performance of leaders; (3) hunches, intuition, and collective experience; and (4) ongoing research and development of management theories and methods (Reinertsen et al., 2004). The seven leverage points are to (1) establish and oversee specific system-level aims at the highest governance level; (2) develop an executable strategy to achieve the system-level aims and oversee their execution at the highest governance level; (3) channel leadership attention to system-level improvement, personal leadership, leadership systems, and transparency; (4) put patients and families on the improvement team; (5) make the chief financial officer a quality champion; (6) engage physicians; and (7) build improvement capability (Reinertsen et al., 2004).

According to Bodinson (2005), the HCPE provide a systems approach that has proven successful in assuring the best clinical outcomes, and leaders have learned that applying the HCPE helps them focus, prioritize, integrate, and align their improvement initiatives to accomplish the results that matter most. Thus, it is evident a pattern exists in research studies and reports that support the use of the HCPE as a model to improve performance.

In the Thomson Reuters 100 Top Hospitals (2012), Baldrige Award-winning hospitals were six times more likely to be among The 100 Top Hospitals, which represent the top 3% of hospitals in the United States. A NIST commission study in 2003 about leadership’s knowledge and attitude found 70% of leaders surveyed among Fortune 1000 companies said they are likely to use the HCPE while 50% to 80% of the education, health care, and small business organizations surveyed had little or no familiarity with the HCPE (Booz Allen Hamilton, 2003). Leonard and Relle’s (2004) article identified the HCPE as crucial to health care organization results and highlighted critical issues for consideration in improving performance, such as (a) the importance of
leadership, (b) the need to consider all elements of an organization, (c) the strategic importance of scanning and analyzing the business environment, and (d) the value of creating focus on patients and employees.

At the Fourth Annual Nursing Leadership Congress, under a theme of “Driving Patient Safety Through Transformation,” a presentation titled “Using the Baldrige Business Model as the Infrastructure for Creating a Culture of Patient Safety” (Gash & Trimble, 2008) described how the 2003 Baldrige recipient, Saint Luke’s Health System, adapted the Baldrige model into its own model. St. Luke’s “Leadership for Performance Excellence” emphasizes the power of a systems perspective in both vertical and horizontal integration, with everything flowing from the mission, vision, and values of the organization. Together with input from consumers and other key stakeholders, the model drives the organization’s strategic priorities and balanced scorecard (Gash & Trimble, 2009). The HCPE provide a framework that focuses on obtaining the highest levels of health care performance by providing a model to create well-defined systems to share best practices and lessons learned to improve decision making, which offers a differentiating approach to health care performance excellence (DeJong, 2009).

Wilson and Collier’s (2000) research tested the theory and causal performance linkages of the HCPE and found the underlying theory of the HCPE supports leadership as the driver of systems and processes that lead to positive results. Ford and Evans (2001) researched the links between HCPE-inspired learning and effective change management, and their results suggest that an effective process change management model can be derived from the framework of the HCPE for any organization, including health care. Moreover, Denney, Johnson, and Pitcher (2010) studied the relationship between the American Nurses Credentialing Center (ANCC), Magnet Recognition Program, and the Baldrige Program, and their results revealed that the Magnet Criteria
provided a framework for delivering sustained improvement in outcomes of the workforce, patients, and the consumers, while HCPE filled the gaps in improving the leadership and sustainability of an organization (Denney et al., 2010). In other words, “Magnet and the HCPE complement and reinforce each other, the HCPE requires empowerment and staff engagement in improvement, which are the core foundation of Magnet” (Denney et al., 2010, p. 4). The Magnet Criteria provided the foundation to drive improvements in clinical and operational quality, and the HCPE enabled a sustainability system that held the gains that Magnet delivered. The value of the HCPE as documented in research is summed up by Robert Chalice (2007), who describes how leadership must learn to improve decision making to improve the organization as in Step 41, “Learning from Other Benchmark Healthcare Organizations.” Chalice states that hospitals should “learn from Baldrige Award finalists” (p. 127). Finally, according to Kelly (2011, p. 51), the HCPE offer the “most contemporary framework for organizational effectiveness in health care,” and the HCPE provides managers with an understanding of alignment within the organization to improve quality.

The literature has documented the effectiveness of the HCPE and the Baldrige Award program in improving organizational results outside the U.S. boundaries. As described earlier, the HCPE are the genesis for 79 international award programs that include elements of the HCPE, such as the European Quality Award (EFQM), a HCPE-based program in Japan in addition to the Deming Prose, and the New Zealand Business Excellence Award (Latham & Vinyard, 2011, p. 1). The Global Excellence Model (GEM) Council is made up of the Chief Executives of national excellence models and award programs from around the world. Members include Australia, Europe, Ibero-America (Brazil, Mexico, Spain), India, Japan, and Singapore (EFQM, 2012).
Schniederjans, Parast, Nabavi, Rao, and Raghu-Nathan (2006) developed an analysis of the HCPE in terms of their importance and the differences in quality control management in the United States, Mexico, and India. They reported significant differences in opinions regarding the value of the HCPE, and there was less apparent difference between the U.S. and Mexico as compared to India in a study of 500 firms. Some reasons for the differences include the geographic distance between India and the U.S. and shared hemispherical managerial knowledge transfer rates between the U.S. and Mexico. Relying on convergence theory, Schniederjans et al. concluded that the U.S. and Mexico would continue to converge in quality management theory and practice while India would not because of India’s geographical position and the rate of exchange between the U.S. and Mexico.

The literature includes other studies on the international significance of the quality management assessment frameworks. A study of 34 Spanish firms evaluated on the 1997-2000 European Foundation for Quality Foundation Excellence (EFQM) model was conducted by Garcia-Bernal, Gargallo-Castel, Pastor-Agustin, and Ramirez-Aleson (2004). They found that (a) firms with higher levels of quality across the full spectrum of the criteria performed at levels above firms with the lowest scores across the EFQM variables and (b) that firms with partial implementation across some parts of the EFQM criteria lacked positive business results. This international interest in the HCPE and their cross-cultural adaptations shows the level of acceptance in the global marketplace and reinforces the aim of this dissertation to validate a model of performance excellence in health care with worldwide implications.

**CMS Measures and the Hospital Compare Database in Literature**

Due to its richness and availability, CMS data has been widely used by researchers. There are various types of CMS data sets, including the “Long Term Care Minimum Dataset (MDS),
Outcome and Assessment Information Set (OASIS), Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI), Medicare Current Beneficiary Survey (MCBS), Cost Reports, Consumer Assessment Health Plans Survey (CAHPS), Health Outcomes Survey (HOS), [and] Health and Retirement Survey (HRS)” (CMS, 2012e). Since the focus of this study is to compare hospital performance, the CMS data set that will be used is Hospital Compare (CMS, 2012c), which will be explained in detail in Chapter 3.

In order to validate the relevance of CMS data in current literature, a literature search of different keywords related to CMS data in the Ovid MEDLINE and PubMed databases was conducted for the period between 1996 and 2012. For example, the keywords “CMS data research” resulted in 5,603,727 hits in Ovid and 771 in PubMed. For the keywords “hospital compare,” results were 197,490 hits in Ovid and 69,950 in PubMed. Narrowing the search to a focus on CMS data and hospital performance, results include 1,103 hits for keywords “hospital performance comparisons” and 304 hits for “hospital performance quality comparisons.” Narrowing the search further using search terms such as “CMS data for hospital performance,” hits in the literature database were 56 in Ovid and 20 in PubMed. Approximately 150 abstracts were reviewed for relevance to this study, which identified various types of articles on topics, such as “pay-for-performance” (Collier, 2007; Vina, Rhew, Weingarten, Weingarten, & Chang, 2009) and “quality improvement” (Izakovic, 2007; Wong, Levinson, & Shojania, 2012). The review revealed that researchers consistently and confidently use CMS Hospital Compare data to study health care outcomes, processes, and the satisfaction of patients.

Efforts to improve quality and cut costs have led the federal government to initiate public reporting with Hospital Compare data. To reinforce the importance of standardized metrics in the health care industry, the CMS, along with key stakeholders such as the Joint Commission, the
AMA, the PCPI, and many medical societies, is developing performance measures for hospitals and physicians (Laurent, Neuman, Martinez, Pauker, & Dutton, 2011). Although studies have been conducted using CMS data and Hospital Compare, none segmented the study groups based on achieving the performance excellence status of the Baldrige Award. Statistically comparing Baldrige-winning hospitals with non-Baldrige hospitals using CMS data allowed for comparison of the performance of health care systems using the HCPE as a business model to their competitors in their market.

Closing Observations

The purpose of this chapter was to offer a review of the literature that provides a clear and systematic understanding of the Baldrige Award program and the HCPE. The chapter gave a brief historical account of the development of quality, the concept of continuous organizational performance improvement, and various important theories and practices to provide a context for the development of the HCPE. Henry Ford’s approach to manufacturing in 1913 using a production line with minimum inventory, known today as just-in-time, and his philosophy of measuring and eliminating waste, known as Lean, describes an early foundation of management philosophies that the health care industry is implementing. The history of Six Sigma tools and techniques, developed over a 50-year period, starting with Shewhart, Dodge, and Deming in the 1920s and continuing to Motorola in the 1980s, revealed the strength of proven methods that are just now being accepted into health care performance improvement efforts and supported by professional and learning organizations for health care, such as the Institute for Healthcare Improvement, the American College of Healthcare Executives, and the Joint Commission. Finally, the historical review emphasized a long-standing focus on leadership’s role in strategy
development and executions through the Balanced Scorecard process, which is also being currently accepted and applied in health care.

A common challenge in understanding the uniqueness of the HCPE was addressed in the form of an architect’s blueprint or a biological model metaphor. The HCPE model is like DNA; just as DNA is a basic design framework for all living organisms, the HCPE is a basic design framework for organizations. Deming’s chain reaction model (see Figure 2) was presented as a theoretical construct that supports the design of the HCPE. The strengths of the HCPE non-prescriptive design allows for the integration of any management theory, concepts, and best practices to ensure superior levels of performance and sustainability. The process for achieving the Baldrige award explains a unique, complex, intensive organizational assessment system that leads to improvement, with the HCPE systems-perspective design enabling the identification of the key leverage points that have the greatest impact on overall system performance. Providing leadership with a structure and mental model for understanding how to move an organization from good to excellent performance, the HCPE challenge leaders to learn to think at a different level and to move beyond silo or departmental linear thinking. Lines of authority and control are expanded in the context of a systems view and new concepts for integrated performance improvement. Acceptance of this challenge to learn a new model for thinking will provide leaders with a broader set of solution resources with which to design approaches and create a high-performing organization. Future leaders desiring to develop high-performing organizations will have to create leadership systems that provide the structures, mechanisms, and discipline for decision-making, selection, and development of the next generation of leaders, and the reinforcement of values, ethical behavior, directions, and performance expectations.
In this chapter, several studies were reviewed that demonstrated the effect of the HCPE and quality awards on organizational results, including customer satisfaction, employee satisfaction, process performance, financial performance, and stock price. In one study, award recipients outperformed the S&P 500 by about 3 to 1 (NIST, 2002). Specific to health care, Baldrige hospitals outperform *The 100 Top Hospitals* on the following measures: risk-adjusted mortality index, risk-adjusted complications index, patient safety index, CMS core measures score, severity-adjusted average length of stay, and adjusted operating profit margin (Foster, 2011).

Although there are no published academic or scholarly works identifying weaknesses of the HCPE, experts have acknowledged there are challenges with (a) the level of complexity, (b) the necessity to learn new mental models, (c) the adoption of a philosophy of continual learning and improvement, and (d) the creation of a culture that fosters high performance, reliability, and sustainability. This may help explain the low use of the HCPE-based model in academia and industry, but results of its effectiveness cannot be ignored. Overcoming these challenges and achieving the levels of performance necessary to receive the Baldrige Award takes the total commitment of all levels of leadership to create a high-performing learning organization, and years of cycles of reflection, self-assessment, learning, and transformation. Ultimately, organizational performance is the responsibility of leadership—to “create consistency of purpose for improvement” as described by Deming (1982, pp. 24-25).
Chapter 3: Research Question and Hypothesis

The research question for this study is “Do hospitals that have received the national Baldrige Award for Performance Excellence (HCPE) perform better than hospitals in their geographic markets (non-HCPE) based on comparisons of the same CMS performance measures?”

This study explores the relationships between the use of the HCPE as a business model and performance of health care organizations.

The null hypothesis is $H_0$: $\mu_{HCPE} = \mu_{non-HCPE}$. Likewise, the alternative hypothesis is $H_a$: $\mu_{HCPE} > \mu_{non-HCPE}$ or $H_a$: $\mu_{HCPE} < \mu_{non-HCPE}$, depending on whether the higher value of the outcome is favorable or unfavorable.
Chapter 4: Methodology

Review of the Purpose of the Study

Health care organizations across the U.S. are adopting a policy of using the HCPE as a business model to improve organizational performance. Some well-known heath care systems specifically using the Baldrige Health Care Criteria to improve organizational performance include Baylor Health Care System, Health Care Corporation of America, Kaiser Permanente, the Mayo Clinic, M.D. Anderson Cancer Center, St. Jude Medical, Inc., and the Cleveland Clinic (Baldrige Foundation, 2011). The purpose of the study is to determine if there is a relationship between the use of the HCPE as a business model and the performance of health care organizations. To accomplish this, the study will compare Baldrige Health Care Criteria award recipients to their competitors using CMS performance measures. This will help determine if there is sufficient evidence to support the use of the HCPE as a business model for health care systems. The study adds to the health care performance excellence theoretical foundation by identifying process and outcome metrics in which the HCPE have the greatest impact.

In other words, the purpose of this study will help to determine if there is sufficient evidence to support the use of the Baldrige HCPE as a business model for health care systems. The confluence of evidence and decision making should provide the structure for leaders to develop policies based more on evidence than political conviction, ideology, hierarchical privilege, or economic power (Pawson, 2006). No existing research has tested the HCPE model by comparing health care recipients of the Baldrige Award to like competitive health care organizations that have not used the HCPE, using the same CMS performance measures as the dependent variable. Although there are HCPE applications for health care, business, education and non-profit sectors, health care is the only industry with standardized, industry-wide, government-
mandated, uniform reporting performance metrics—the CMS measures—making health care ideal for such a research study.

Conceptual Framework

According to Burns and Burns (2008, pp. 73-74), the conceptual framework is the starting point for quantitative research that graphically specifies proposed relationships between theoretical constructs. The role of theory in practical problem-solving is presented in the form of either an “analytical or a conceptual framework as a means of organizing or interpreting the evidence, and the framework may be one that has been derived deductively (i.e., using logical thought) or inductively (i.e., from empirical work)” (Brewerton & Millward, 2001, p. 14). Figure 12 depicts the conceptual framework for this research study.

Figure 12

Conceptual Framework

<table>
<thead>
<tr>
<th>Structure</th>
<th>Processes</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The way the health care system is set up.</td>
<td>Appropriate processes of care expertly executed</td>
<td>Improvement in health and satisfied patients</td>
</tr>
<tr>
<td>Needed equipment and qualified health care personnel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Figure 12 is a depiction of Donabedian’s Structure, Process, Outcomes Model (Donabedian, 2003, p. 50).

General Research Design

This study tests the hypothesis of a positive relationship between health care organizations using the HCPE as a business model and high levels of performance as measured by CMS performance data. This study utilized a cross-sectional, observational, and retrospective
“quantitative correlational design” to explore these relationships (Brewerton & Millward, 2001, p. 57).

**HCPE Construct Validity**

Goldstein and Schweikhart’s (2002) research examined the relationships between the constructs in the HCPE framework and management systems and organizational results to establish the construct validity of the HCPE. The research hypothesized and tested the relationship between process measures of Baldrige Categories 1 through 6 (independent variables) and hospital Baldrige results scores on Dimensions 7.1 through 7.5 (dependent variables). All relationships between the Baldrige Categories 1–6 and Category 7 were statistically significant. The regression analysis results were as follows: Patient/Customer Satisfaction Results (7.1) $R^2 = 0.316$, $p < .001$; Health Care Results (7.2) $R^2 = 0.165$, $p < .001$; Financial and Market Results (7.3) $R^2 = 0.166$, $p < .001$; Staff and Work Systems Results (7.4) $R^2 = 0.566$, $p < .001$; and Organization-Specific Results (7.5) $R^2 = 0.165$, $p < .001$. The significant associations among Baldrige Categories 1–6 and each of the Category 7 dimensions provide confirmatory evidence of a relationship between using the Baldrige framework as a research construct in studying organizational performance excellence.

**Research Question**

Utilizing a “quantitative correlational design” (Brewerton & Millward, 2001, p. 57), this study explored the relationships between the use of the HCPE as a business model and performance of health care organizations. The research question was “Do hospitals that have received the national Baldrige Award for Performance Excellence (HCPE) perform better than hospitals in their geographic markets (non-HCPE) based on comparisons of the same CMS performance measures?” Currently, no research exists that tests the HCPE model by comparing
health care recipients of the Baldrige Award to like competitive organizations using the CMS performance measures, although some prior research set the foundation for the proposed study. For example, the research of Goldstein and Schweikhart (2002) examined the relationships between constructs in the HCPE framework and organizational results and demonstrated that measures of Baldrige Categories 1–6 predicted hospital scores in Category 7. Details of this study are provided in Chapter 2.

**Independent and Dependent Variables.** In this study, the independent variable of interest was whether a hospital uses the HCPE, and the dependent variables are CMS performance measures. In order to assess performance of health care organizations, four different groups of CMS measures were utilized to analyze whether or not hospitals using the HCPE business model outperform competing hospitals across the following groups of measures:

1. HCAHPS hospital experience patient survey measures performance;
2. Outpatient imaging efficiency;
3. Process of care measures performance for heart attack, heart failure, and pneumonia, and surgical care improvement project (SCIP) process measures performance; and

This data was available at no cost from the Hospital Compare website, which provides consumers with the capability to compare the quality of hospital services and is hosted by the U.S. Department of Health & Human Services (HHS).

**Research Approach**

The study discussed in this dissertation employed a research approach (Shi, 1997, p. 115) designed to test whether the performance of HCPE hospitals will be significantly better on these measures than that of non-HCPE hospitals. The current research was used to test the hypotheses
and examine relationships among variables of interest (Shi, 1997, p. 219). Figure 13 is a depiction of the research approach.

Figure 13
Operational Framework

Data Overview

CMS performance data for Baldrige Award hospitals were compared to competitors in their geographic markets. The hospital performance data was downloaded from the CMS Hospital Compare website (CMS, 2012c); the data are available as a Microsoft Access 2000 database or in CSV file formats. The CMS Hospital Compare database includes all of the hospitals’ addresses with phone numbers, zip codes, number of beds, type of ownership (public, private not-for-profit, for-profit, etc.), and other pertinent information for analysis. Since this analysis would employ the
Statistical Package for the Social Sciences (SPSS), the Microsoft Excel files were converted to SPSS files.

**Subjects**

A purposeful sampling strategy was used to “select information-rich cases” to focus on the specific hospitals in a geographic region rather than a general random sample (Taylor-Powell, 1998, p. 6). Study subjects were chosen according to the following selection criteria. The hospitals must be (1) Baldrige Health Care Award recipients from 2002 through 2011, (2) or competing hospitals within a 25- to 50-mile radius of the Baldrige Award hospital, and (3) must have reported CMS data. The exclusion criteria were (1) hospitals beyond the 25- or 50-mile radius and (2) hospitals with no reported CMS data for the study period, such as Veterans Administration hospitals and children’s hospitals. The Baldrige Health Care Award recipients were identified from the NIST Baldrige Performance Excellence Program (NIST, 2011a) and geographic competitors identified from the CMS Hospital Compare data (CMS, 2012c). To obtain the geographic competitors to the Baldrige recipient hospitals, each Baldrige recipient hospital’s ZIP code was entered into the CMS Hospital Compare website, and a general search was executed on a 25- or 50-mile radius. The distance was based on patients’ access to a nearby hospital; 9 hospital systems had competitors identified within a 25-mile radial search, and 5 hospital systems, in less populated areas, had competitors identified within a 50-mile radial search, and included facilities in multiple states. The five Baldrige Award hospital systems in less populated areas were SSM Health Care, North Mississippi Medical Center, Poudre Valley Health System, Heartland Health, and Schneck Medical Center. In contrast, the Advocate Good Samaritan Hospital, located in the Chicago metropolitan area, had 36 acute care hospitals available within 25 miles. Patients who access hospitals outside metropolitan areas travel greater distances to obtain quality care.
Residents in the Seymour, Indiana, area must travel 50 miles to access one of eight acute care hospitals, including the 2011 recipient, Schneck Medical Center.

Many of the rural area hospitals were critical access hospitals, which play a crucial role in the U.S. rural safety net but which lack in quality of care. A study by Joynt, Harris, Ovar, and Jha (2011) compared critical access hospitals to acute care hospitals and found critical access hospitals had fewer clinical capabilities, worse measured processes of care, and higher mortality rates for patients with acute myocardial infarction, heart failure, and pneumonia. The Balanced Budget Act of 1997 created critical access hospitals as a federal effort to increase resources for small, geographically isolated hospitals, many of which were struggling financially. The Budget Act required hospitals that converted to critical access status to become eligible for cost-based reimbursement rather than diagnoses-related group–based reimbursement.

A total of 315 hospitals were initially considered for the study, with 51 HCPE and 264 non-HCPE or competitors. The data used for this study are from (a) the American Hospital Association, (b) the CMS Hospital Compare database, and (c) hospital websites. After a baseline comparison of characteristics of the 315 hospitals, the study selected 187 hospitals to study and excluded 128 hospitals; the baseline comparison is defined in Table 6.
Table 6

**Baseline Comparison of Hospital Characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Included (N=187)</th>
<th>Excluded (N=128)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bed Size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small (&lt; 99)</td>
<td>0</td>
<td>128 (100.0)</td>
<td>*</td>
</tr>
<tr>
<td>Medium</td>
<td>131 (70.1)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>56 (29.9)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Hospital Type</strong></td>
<td></td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>Acute Care</td>
<td>183 (97.9)</td>
<td>64 (50.0)</td>
<td></td>
</tr>
<tr>
<td>Critical</td>
<td>4 (5.9)</td>
<td>64 (50.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Ownership</strong></td>
<td></td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>For Profit</td>
<td>8 (4.3)</td>
<td>24 (18.8)</td>
<td></td>
</tr>
<tr>
<td>Non-Profit</td>
<td>179 (95.7)</td>
<td>104 (81.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Religious</strong></td>
<td></td>
<td></td>
<td>.001</td>
</tr>
<tr>
<td>Yes</td>
<td>63 (33.7)</td>
<td>22 (17.2)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>124 (66.3)</td>
<td>106 (82.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Emergency</strong></td>
<td></td>
<td></td>
<td>.037</td>
</tr>
<tr>
<td>Yes</td>
<td>174 (93.0)</td>
<td>110 (85.9)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>13 (7.0)</td>
<td>18 (14.1)</td>
<td></td>
</tr>
<tr>
<td><strong>System</strong></td>
<td></td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>Yes</td>
<td>117 (62.6)</td>
<td>48 (37.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>70 (37.4)</td>
<td>80 (62.5)</td>
<td></td>
</tr>
</tbody>
</table>

Note. Data are given as frequency (percentage); Pearson’s Chi-square test for categorical variables was used to determine significance.
*Data not available for analysis.

The statistically significant characteristics were hospital type, ownership, religious affiliation, emergency services, and system, which is a characteristic for multiple hospitals. The characteristic of bed size was important in this study for managing missing data because a majority of the missing data was attributed to hospitals with fewer than 100 beds. Thus, three size categories were created to perform the analysis and clean the data: “small” was fewer than 99 beds,
“medium” was 100-400 beds, and “large” was more than 400 beds. This methodology was adopted from Jha, Orav, Zheng, and Epstein (2008). Table 7 identifies the hospital characteristics (control variables) that were included in the study. The definitions of the hospital characteristics in Table 7 were obtained from the American Hospital Association website, except for religious affiliation, which was determined by reviewing the website of each hospital. This review included references to religious principles in the mission, vision, and values of the organization or the confirmation of a specific religious affiliation.

Table 7

<table>
<thead>
<tr>
<th>Characteristic or Control Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bed Size</strong></td>
<td></td>
</tr>
<tr>
<td>Small (&lt; 99)</td>
<td>The number of beds licensed to operate by the state. The American Hospital Association and health care research use these three hospital categories.</td>
</tr>
<tr>
<td>Medium (100-400)</td>
<td></td>
</tr>
<tr>
<td>Large (401+)</td>
<td></td>
</tr>
<tr>
<td><strong>Hospital Type</strong></td>
<td></td>
</tr>
<tr>
<td>Acute Care or Critical Access</td>
<td>Acute care hospitals have highly specialized personnel and sophisticated, multifaceted equipment materials, and may have intensive or emergency care. Critical access hospitals meet certain federal guidelines, are designed to improve rural health care access while reducing hospital closures, and have a maximum of 25 acute care inpatient beds.</td>
</tr>
</tbody>
</table>
Table 7 (continued)

Characteristics (Control Variables) and Definitions of all HCPE and non-HCPE Hospitals

<table>
<thead>
<tr>
<th>Characteristic or Control Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
<td>For-profit is defined as investor-owned community hospitals. Non-profit is defined as non-government community hospitals.</td>
</tr>
<tr>
<td>For Profit or Non-Profit</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Religious Affiliation</td>
<td>Religious affiliation was determined by hospital self-reporting documentation on their website. This is the only control variable not obtained from the American Hospital Association website.</td>
</tr>
<tr>
<td>Yes or No</td>
<td>Yes or No</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>Hospital provides 24-hour emergency services.</td>
</tr>
<tr>
<td>Yes or No</td>
<td>Yes or No</td>
</tr>
<tr>
<td>System Effect</td>
<td>Hospital that have identified themselves as part of a group of hospitals.</td>
</tr>
<tr>
<td>Yes or No</td>
<td>Yes or No</td>
</tr>
</tbody>
</table>

*Note.* Definitions are based on definitions provided by the American Hospital Association website or information from hospitals’ websites.

**Missing Data.** Hospitals with fewer than 100 beds were excluded from the study due to large amounts of missing data. The exclusion of these cases reduced the number of subject hospitals from 315 to 187, with 34 HCPE and 159 non-HCPE hospitals. Of the 128 hospitals with fewer than 100 beds excluded from the study, 64 (50%) were critical access hospitals.

Table 8 lists the 34 HCPE hospitals by system and indicates how many hospitals remain in each system for study after removing hospitals with fewer than 100 beds. Two of the HCPE hospital systems had no hospitals included in the study after omitting hospitals with fewer than 100 beds from analysis: Heartland Health with 97 beds and Schneck Medical Center with 93 beds.
Table 8

*Health Care Recipients of the Performance Excellence Award with ≥ 100 Beds*

<table>
<thead>
<tr>
<th>Year</th>
<th>Recipients</th>
<th>Number of HCPE hospitals in study after removing hospitals with &lt; 100 beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>SSM Health Care (SSM)</td>
<td>11</td>
</tr>
<tr>
<td>2003</td>
<td>Baptist Hospital</td>
<td>1</td>
</tr>
<tr>
<td>2003</td>
<td>Saint Luke’s Hospital (SLH)</td>
<td>5</td>
</tr>
<tr>
<td>2004</td>
<td>Robert Wood Johnson University Hospital at Hamilton</td>
<td>1</td>
</tr>
<tr>
<td>2005</td>
<td>Bronson Methodist Hospital</td>
<td>2</td>
</tr>
<tr>
<td>2006</td>
<td>North Mississippi Medical Center</td>
<td>1</td>
</tr>
<tr>
<td>2007</td>
<td>Mercy Health System</td>
<td>1</td>
</tr>
<tr>
<td>2007</td>
<td>Sharp Health Care</td>
<td>1</td>
</tr>
<tr>
<td>2008</td>
<td>Poudre Valley Health System</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>AtlantiCare Regional Medical Center</td>
<td>1</td>
</tr>
<tr>
<td>2009</td>
<td>Heartland Health</td>
<td>0 (97 beds)</td>
</tr>
<tr>
<td>2010</td>
<td>Advocate Good Samaritan Hospital</td>
<td>1</td>
</tr>
<tr>
<td>2011</td>
<td>Henry Ford Health System</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>Schneck Medical Center</td>
<td>0 (93 beds)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
</tr>
</tbody>
</table>
Table 9 defines the hospital characteristics based on hospitals with over 100 beds that were retained in the study.

### Table 9

**Characteristics of Medium and Large Bed Size HCPE and Non-HCPE Hospitals**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>HCPE (N=34)</th>
<th>non-HCPE Competitors (N=153)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed Size</td>
<td></td>
<td></td>
<td>.452</td>
</tr>
<tr>
<td>Medium (100-400)</td>
<td>22 (64.7)</td>
<td>109 (71.2)</td>
<td></td>
</tr>
<tr>
<td>Large (401+)</td>
<td>12 (35.3)</td>
<td>44 (28.8)</td>
<td></td>
</tr>
<tr>
<td>Hospital Type</td>
<td></td>
<td></td>
<td>.721</td>
</tr>
<tr>
<td>Acute Care</td>
<td>33 (97.1)</td>
<td>150 (98.0)</td>
<td></td>
</tr>
<tr>
<td>Critical Access</td>
<td>1 (2.9)</td>
<td>3 (2.0)</td>
<td></td>
</tr>
<tr>
<td>Ownership</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>For Profit</td>
<td>0</td>
<td>8 (5.2)</td>
<td></td>
</tr>
<tr>
<td>Non-Profit</td>
<td>34 (100.0)</td>
<td>145 (94.8)</td>
<td></td>
</tr>
<tr>
<td>Religious Affiliation</td>
<td></td>
<td></td>
<td>.026</td>
</tr>
<tr>
<td>Yes</td>
<td>17 (50.0)</td>
<td>46 (30.1)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>17 (50.0)</td>
<td>107 (69.9)</td>
<td></td>
</tr>
<tr>
<td>Emergency Services</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Yes</td>
<td>34 (100.0)</td>
<td>140 (91.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>13 (8.5)</td>
<td></td>
</tr>
<tr>
<td>System</td>
<td></td>
<td></td>
<td>.002</td>
</tr>
<tr>
<td>Yes</td>
<td>29 (93.2)</td>
<td>88 (57.5)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5 (6.8)</td>
<td>65 (42.5)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data are given as frequency (percentage) and Pearson’s Chi-square test for categorical variables used to determine significance.

*Data not available for analysis.
Data for the Analysis

The data used for this study were from (a) the American Hospital Association, (b) the CMS Hospital Compare database, and (c) hospital websites. This study assessed hospital performance in five areas for HCPE and non-HCPE hospitals: (1) HCAHPS hospital experience patient survey measures performance; (2) outpatient imaging efficiency; (3) process of care measures performance for heart attack, heart failure, and pneumonia measures; (4) surgical care improvement project (SCIP) process measures performance; and (5) outcome of care measures performance. See the appendix for a detailed description and definition of variables.

HCAHPS. The HCAHPS hospital experience patient survey measures were refreshed in June 2011 and covered a collection period from October 2009 through September 2010. The HCAHPS hospital experience patient survey measures had three response formats: (a) the patient gives a rating of “sometimes or never,” “usually,” and “always”; (b) the patient indicates that a certain action or process occurred with a response of “yes” or “no”; and (c) the patient gives a rating of 6 or lower, 7 to 8, and 9 and 10 on a scale of 0-10, with 0 being the lowest rating and 10 being the highest.

This study included the positive or highest category score for the analysis, known as “top box.” HCAHPS results are “top-box,” “bottom-box,” and “middle-box” scores. The “top-box” was the most positive response to HCAHPS survey questions. The “top-box” response for the different categories was "Always" for five HCAHPS composites (Communication with Nurses, Communication with Doctors, Responsiveness of Hospital Staff, Pain Management, and Communication about Medicines) and two individual items (Cleanliness of Hospital Environment and Quietness of Hospital Environment); “Yes” for the sixth composite, Discharge Information; 9 or 10 (high) for the Overall Hospital Rating item; and “Would definitely recommend” for the
Recommend the Hospital item (CMS, 2012d). In this study, only the HCAHPS “top-box” methodology was used because it is commonly used in health care research (Gupts, Daigle, Mojica, & Hurley, 2009; Heidenreich et al., 2012; Jha et al., 2008). Table 10 lists the 10 HCAHPS hospital experience patient survey measures.

Table 10

**HCAHPS Hospital Experience Patient Survey Measures**

<table>
<thead>
<tr>
<th>HCAHPS Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses always communicated well.</td>
</tr>
<tr>
<td>Doctor always communicated well.</td>
</tr>
<tr>
<td>Patients always received help as soon as they wanted.</td>
</tr>
<tr>
<td>Patient’s pain was always well controlled.</td>
</tr>
<tr>
<td>Patient’s staff always explained about medicines.</td>
</tr>
<tr>
<td>Room and bathroom were always clean.</td>
</tr>
<tr>
<td>Room was always quiet at night.</td>
</tr>
<tr>
<td>Patients were given information about recovery at home.</td>
</tr>
<tr>
<td>Hospital received rating of 9 or 10.</td>
</tr>
<tr>
<td>Patients would definitely recommend the hospital.</td>
</tr>
</tbody>
</table>

**Outpatient Imaging Efficiency.** The outpatient imaging efficiency measures were refreshed in June 2011 and covered a collection period from January 2009 through December 2010. Outpatient imaging efficiency measures were reported as percentages and composed of the following measures in Table 11.
Table 11

*Outpatient Imaging Efficiency*

<table>
<thead>
<tr>
<th>Imaging Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient CT scans of the abdomen that were combination (double) scans</td>
</tr>
<tr>
<td>Outpatient CT scans of the chest that were combination (double) scans</td>
</tr>
<tr>
<td>Outpatients who had a follow-up mammogram or ultrasound within 45 days after a screening mammogram</td>
</tr>
</tbody>
</table>

**Process of Care.** The process of care measures were composed of four categories: heart attack, heart failure, pneumonia, and surgical measures. All process of care measures were refreshed in June 2011 and covered a collection period from October 2009 through September 2010. The first of the four processes of care measures, the heart attack category, was composed of the four measures listed in Table 12.

Table 12

*Process of Care: Heart Attack*

<table>
<thead>
<tr>
<th>Heart Attack Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin at arrival</td>
</tr>
<tr>
<td>Aspirin prescribed at discharge</td>
</tr>
<tr>
<td>ACE inhibitor (ACE-I) or Angiotensin Receptor Blocker (ARBs) for left ventricular systolic dysfunction</td>
</tr>
<tr>
<td>Adult smoking cessation advice/counseling</td>
</tr>
</tbody>
</table>
The second category, heart failure, was composed of the following four measures in Table 13.

Table 13  
*Process of Care: Heart Failure*

<table>
<thead>
<tr>
<th>Heart Failure Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of left ventricular systolic function</td>
</tr>
<tr>
<td>Given ACE inhibitor (ACE-I) or Angiotensin Receptor Blocker (ARB) for left ventricular systolic dysfunction</td>
</tr>
<tr>
<td>Given discharge instructions</td>
</tr>
<tr>
<td>Adult smoking cessation advice/counseling</td>
</tr>
</tbody>
</table>

The pneumonia category was composed of the following six measures in Table 14.

Table 14  
*Process of Care: Pneumonia*

<table>
<thead>
<tr>
<th>Pneumonia Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients initial antibiotics within 6 hours of arrival</td>
</tr>
<tr>
<td>Patients initial ER blood culture prior to first antibiotics</td>
</tr>
<tr>
<td>Patients given smoking cessation counseling</td>
</tr>
<tr>
<td>Patients given most appropriate initial antibiotic</td>
</tr>
<tr>
<td>Patients given influenza vaccination</td>
</tr>
<tr>
<td>Percent patients given pneumococcal vaccination</td>
</tr>
</tbody>
</table>

**Surgical Care Improvement Project.** The last of the four processes of care measures is the surgical care improvement project (SCIP) measures category, which was composed of the following nine measures in Table 15. All process of care measures were ratio data and reported on patient rates.
Table 15.

*Process of Care: Surgical Care Improvement Project Measures*

<table>
<thead>
<tr>
<th>Surgical Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic given at right time, 1 hour before surgery</td>
</tr>
<tr>
<td>Preventive antibiotics stopped at right time within 24 hours after surgery</td>
</tr>
<tr>
<td>Surgery patients given right kind of antibiotic</td>
</tr>
<tr>
<td>Treatment within 24 hours to help to prevent blood clots</td>
</tr>
<tr>
<td>Surgery patients receive treatment to prevent blood clots</td>
</tr>
<tr>
<td>Patients needing hair removed from surgical area</td>
</tr>
<tr>
<td>Patients’ urinary catheters removed on first or second day</td>
</tr>
<tr>
<td>Patients taking beta blockers were kept on them</td>
</tr>
<tr>
<td>Outpatients received antibiotic at right time, 1 hour before surgery</td>
</tr>
</tbody>
</table>

**Outcome of Care.** The outcome of care measures were refreshed in June 2011 and covered collection period from July 2007 through June 2010. The outcome of care measures were composed of the following five measures listed in Table 16.

Table 16

*Outcome of Care Measures*

<table>
<thead>
<tr>
<th>Outcome Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack death rates (30-day mortality)</td>
</tr>
<tr>
<td>Heart attack readmission rates</td>
</tr>
<tr>
<td>Heart failure death rates (30-day mortality)</td>
</tr>
<tr>
<td>Heart failure readmission rates</td>
</tr>
<tr>
<td>Pneumonia death rates (30-day mortality)</td>
</tr>
</tbody>
</table>
Outcome of care measures were ratio data and reported as patient rates. For mortality and readmission rates, CMS provides estimates of confidence intervals of 30-day risk-adjusted outcomes. The estimates were weighted to account for variance differences between hospitals, as follows: 30-day mortality rate weight = 1/(standard error 30-day mortality rate)^2, where the standard error of 30-day mortality rate = (upper C.I. – lower C.I.)/(1.96*2). This methodology was used by Heidenreich et al. (2012) in their study of heart failure process of care and outcome of care for hospitalized Medicare patients.

**Power and Sample Size Analysis.**

In this section, a strategy to understand Type I and Type II error was addressed. Effect size in a population is linked to three other statistical properties: (1) sample size, (2) probability level at which statistical significance is accepted (alpha level = 0.05), and (3) the ability of a test to detect an effect (power). A statistical power of 80% and a Type I error of .05 was desired for this study. This study had a predetermined sample size based on availability (n=187). The following equation was used to calculate power for comparing the means of two normally distributed samples using a one-sided test:

\[
\text{Power} = \Phi \left[ -Z_{1-\alpha} + \frac{\Delta}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} \right]
\]  

(Rosner, 2006, p. 333)

Given a predetermined sample size of \( n_1 = 34 \) for the HCPE hospitals and \( n_2 = 153 \) for non-HCPE hospitals and an alpha level of .05, a power analysis varying the \( \Delta \) and \( \sigma^2 \) produced Table 17.
Table 17

**Power- Sensitivity Analysis**

<table>
<thead>
<tr>
<th>$\sigma^2_1$</th>
<th>$\Sigma^2_2$</th>
<th>$\Delta$</th>
<th>Power (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.7</td>
<td>0.8</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>0.7</td>
<td>0.8</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>0.7</td>
<td>0.8</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>0.7</td>
<td>0.8</td>
<td>0.5</td>
<td>97</td>
</tr>
<tr>
<td>0.7</td>
<td>0.8</td>
<td>0.3</td>
<td>71</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>5</td>
<td>99</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>4</td>
<td>94.</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>3</td>
<td>78</td>
</tr>
<tr>
<td>5</td>
<td>11</td>
<td>2</td>
<td>48</td>
</tr>
</tbody>
</table>

Various scenarios were used during the power analysis. The variation ($\sigma$) and the mean differences percentage ($\Delta$) were changed from low to high values. Table 17 provides an example. Sufficient power at low to medium levels of variations with the associated mean value difference was identified. The power analysis determined there is adequate power to detect difference between the means of comparison groups under a variety of conditions except the extremes.

**Statistical Analysis Plan**

This research is a quantitative analysis. The following is a list of proposed steps:

**First**, a power and sample size analysis was performed to understand Type I and Type II error. Effect size in a population is linked to three other statistical properties: (1) sample size, (2) probability level with accepted statistical significance $\alpha$ (alpha), and (3) the ability to detect an effect (power).
Second, frequencies and percentages were reported for categorical variables, while means, medians, and standard deviations were reported for continuous variables.

Third, tests of underlying assumptions were performed, as indicated by statistical analyses used in the study. These included tests for normality and homogeneity of variance.

Fourth a series of univariate hypothesis tests was performed, which compared HCPE and non-HCPE hospitals, using Pearson’s Chi-square or Fisher’s Exact test for categorical variables. The null hypothesis for the Pearson’s Chi-square or Fisher’s Exact test was $H_0: \ p_{HCPE} = p_{non-HCPE}$ and the alternative hypothesis was $H_a: \ p_{HCPE} \neq p_{non-HCPE}$. To assess group differences of continuous variables, the $t$-test was used and the null hypothesis was $H_0: \ \mu_{HCPE} = \mu_{non-HCPE}$. Likewise, the alternative hypothesis was $H_1: \ \mu_{HCPE} > \mu_{non-HCPE}$ or $H_a: \ \mu_{HCPE} < \mu_{non-HCPE}$, depending on whether the higher value of the outcome was favorable or unfavorable. For example, a higher HCAHPS hospital experience patient survey measures performance was favorable, while a lower outcome mortality rate was favorable. To reduce the probability of Type I error, the Bonferroni correction was used with an alpha value equal to .05 to evaluate all hypotheses, except in cases when several dependent or independent statistical tests were performed simultaneously on a single data set (Rosner, 2006).

Fifth, non-parametric generalized linear models (GENLIN) were used to compare HCPE and non-HCPE hospitals and the effect of organizational characteristics such as religious affiliation and hospital systems. In particular, the effect of HCPE on the likelihood of a patient recommending the hospital, while accounting for organizational characteristics was evaluated.
Chapter 5: Specific Findings and Results

This chapter presents the analysis and results of the study’s independent variable of the 34 HCPE and 153 non-HCPE hospitals and the four groups of 42 dependent variables: (1) HCAHPS hospital experience patient survey measures performance; (2) outpatient imaging efficiency; (3) process of care measures performance for heart attack, heart failure, pneumonia, and performance surgical care improvement project (SCIP) process measures; and (4) outcome of care measures performance. All the following tables present mean value comparisons where higher mean values are preferred, except for Table 24, the outcome of care measures, where lower means values are better. Of the 42 CMS measures in the 4 different CMS measure groups analyzed in the study, there was a statically significant difference in 9 of the 10 HCAHPS patient survey measures (Table 18) and in 1 of the 9 surgical care improvement project process measures (Table 23). Although not statistically significantly, HCPE hospitals had higher mean values representing higher performance than the non-HCPE hospitals in 38 of the 42 (90%) of the study measures. For most of the measures there was little difference between the means values and little variation, and most of the values were at the extremes, which were in the 98% to 99% range.

Performance results comparing HCPE hospitals to non-HCPE hospitals using the 10 CMS measures of patients’ satisfaction are listed in Table 18. Hospitals using the HCPE had higher means and 8 of the 10 measures had lower standard deviations than the non-HCPE hospitals, although these numbers are not statistically significant. All differences were statistically significantly at $\alpha < .05$, but after applying the Bonferroni correction of $\alpha^* < .001$, the HCAHPS hospital experience measures were significant except for “Doctor always communicated well.” As a group, these were the most significant findings in the study.
The Bonferroni correction is an adjustment made to $p$ values when several dependent or independent statistical tests are performed simultaneously on a single data set.

Table 18

**HCAHPS Hospital Experience Patient Survey Measures Results**

<table>
<thead>
<tr>
<th>HCAHPS Measures</th>
<th>HCPE</th>
<th>non-HCPE</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=34</td>
<td>N=153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$n=32$</td>
<td>$n=150$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurses always communicated well</td>
<td>79.03 (3.21)</td>
<td>74.64 (5.10)</td>
<td>.000</td>
</tr>
<tr>
<td>Doctor always communicated well</td>
<td>80.00 (3.41)</td>
<td>78.36 (3.58)</td>
<td>.025</td>
</tr>
<tr>
<td>Patients always received help soon as desired</td>
<td>66.50 (5.45)</td>
<td>60.22 (6.21)</td>
<td>.000</td>
</tr>
<tr>
<td>Patients’ pain was always well controlled</td>
<td>71.97 (2.91)</td>
<td>68.03 (4.31)</td>
<td>.000</td>
</tr>
<tr>
<td>Patients’ staff always explained medicines</td>
<td>62.56 (3.92)</td>
<td>58.71 (5.13)</td>
<td>.000</td>
</tr>
<tr>
<td>Room and bathroom were always clean</td>
<td>73.34 (5.93)</td>
<td>67.87 (5.81)</td>
<td>.000</td>
</tr>
<tr>
<td>Room was always quiet at night</td>
<td>58.78 (7.47)</td>
<td>54.25 (6.82)</td>
<td>.000</td>
</tr>
<tr>
<td>Patients were given information about recovery at home</td>
<td>84.56 (2.75)</td>
<td>81.79 (4.14)</td>
<td>.000</td>
</tr>
<tr>
<td>Hospital rating of 9 or 10</td>
<td>73.22 (6.44)</td>
<td>65.67 (7.80)</td>
<td>.000</td>
</tr>
<tr>
<td>Patients would definitely recommend hospital</td>
<td>75.75 (7.28)</td>
<td>68.37 (8.78)</td>
<td>.000</td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean +/- SD. Wilcoxon rank-sum test is use for continuous variables. Bonferroni correction $\alpha^* < .001$.

Table 19 lists outpatient imaging efficiency results. There were no statistically significant differences between the hospitals using the HCPE and the non-HCPE hospitals. There were little face-level differences between the values of the means among the three measures: the CT scans of the abdomen (absolute difference of 0.013%), CT scans of the chest (absolute difference of 0.003%), and follow-up mammogram or ultrasound measure (absolute difference of 0.15%).
Table 19

*Outpatient Imaging Efficiency Results*

<table>
<thead>
<tr>
<th>Imaging Measures</th>
<th>HCPE</th>
<th>non-HCPE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=34</td>
<td>N=153</td>
<td></td>
</tr>
<tr>
<td>Outpatient CT scans of the abdomen that were combination (double) scans</td>
<td>n = 31</td>
<td>n = 147</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.195 (0.235)</td>
<td>0.182 (0.180)</td>
<td>.065</td>
</tr>
<tr>
<td>Outpatient CT scans of the chest that were combination (double) scans</td>
<td>n = 30</td>
<td>n = 145</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.051 (0.080)</td>
<td>0.054 (0.849)</td>
<td>.205</td>
</tr>
<tr>
<td>Outpatients who had a follow-up mammogram or ultrasound within 45 days after a screening mammogram</td>
<td>n = 27</td>
<td>n = 137</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.311 (2.73)</td>
<td>8.461 (3.76)</td>
<td>.246</td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean +/- SD. Wilcoxon rank-sum test is used for continuous variables. Bonferroni correction $\alpha^* < .017$

Process of care heart attack measures performance results for the four measures of inpatient heart attack care are listed in Table 20. Hospitals using the HCPE all had greater means values than the non-HCPE hospitals, but only one of the four measures was statistically significant at $\alpha < 0.05$; no measures were significant using the Bonferroni correction of $\alpha^* < 0.013$. There was no statistically significant difference in (a) aspirin at arrival measure (absolute difference, 0.28%), (b) aspirin prescribed at discharge (absolute difference, 0.059%), and (c) patients given ACE inhibitor or angiotensin receptor blockers (ARBs) for left ventricular systolic dysfunction (absolute difference, 0.09%). There was a statistically significant difference at $\alpha < .05$ in the measure of patients given smoking cessation counseling (absolute difference, 0.32%) between HCPE and non-HCPE hospitals.
### Table 20
**Process of Care: Heart Attack Results**

<table>
<thead>
<tr>
<th>Heart Attack Measures</th>
<th>HCPE N=34</th>
<th>non-HCPE N=153</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin at arrival</td>
<td>99.06 (1.63)</td>
<td>98.78 (2.30)</td>
<td>.286</td>
</tr>
<tr>
<td>Aspirin prescribed at discharge</td>
<td>97.87 (7.17)</td>
<td>98.46 (2.99)</td>
<td>.394</td>
</tr>
<tr>
<td>Given ACE inhibitor (ACE-I) or angiotensin receptor blockers (ARBs) for left ventricular systolic dysfunction</td>
<td>97.13 (4.40)</td>
<td>97.04 (6.14)</td>
<td>.341</td>
</tr>
<tr>
<td>Adult smoking cessation advice/counseling</td>
<td>99.77 (1.28)</td>
<td>99.45 (1.69)</td>
<td>.047</td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean±SD. Wilcoxon rank-sum test is used for continuous variables. Bonferroni correction $\alpha^* < .013$.

Process of care heart failure measures performance results for the four measures of inpatient heart failure care are listed in Table 21. Hospitals using the HCPE had higher mean values than the non-HCPE hospitals in all measures, and two of the four measures were statistically significant at $\alpha < 0.05$ but not statistically significant using the Bonferroni correction of $\alpha^* < 0.013$. There was no statistically significant difference in the four areas: (a) left ventricular ejection fraction (LVEF) (absolute difference, 0.46%), (b) patients given ACE inhibitor or angiotensin receptor blockers (ARBs) for left ventricular systolic dysfunction (absolute difference, 1.02%), (c) patients given discharge instructions (absolute difference, 4.72%), and (d) patients receiving smoking cessation counseling (absolute difference, 1.32%).
Table 21  

*Process of Care: Heart Failure Results*

<table>
<thead>
<tr>
<th>Heart Failure Measures</th>
<th>HCPE N=34</th>
<th>non-HCPE N=153</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of left ventricular systolic function</td>
<td>n = 32</td>
<td>n = 151</td>
<td>0.410</td>
</tr>
<tr>
<td></td>
<td>99.22 (1.29)</td>
<td>98.76 (3.24)</td>
<td></td>
</tr>
<tr>
<td>Given ACE inhibitor (ACE-I) or angiotensin receptor blockers (ARBs) for left ventricular systolic dysfunction</td>
<td>n = 32</td>
<td>n = 151</td>
<td>0.191</td>
</tr>
<tr>
<td></td>
<td>96.81 (3.29)</td>
<td>95.32 (6.23)</td>
<td></td>
</tr>
<tr>
<td>Given discharge instructions</td>
<td>n = 32</td>
<td>n = 151</td>
<td>0.047</td>
</tr>
<tr>
<td></td>
<td>92.06 (7.56)</td>
<td>87.34 (13.6)</td>
<td></td>
</tr>
<tr>
<td>Adult smoking cessation advice/counseling</td>
<td>n = 32</td>
<td>n = 151</td>
<td>0.020</td>
</tr>
<tr>
<td></td>
<td>99.94 (0.35)</td>
<td>98.62 (5.62)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean ± SD. Wilcoxon rank-sum test is used for continuous variables. Bonferroni correction $\alpha^* < .0013$.

Process of care pneumonia measures performance results for the six measures of inpatient pneumonia care are listed in Table 22. Although not statistically significantly, hospitals using the HCPE have higher mean values than the non-HCPE hospitals in all measures except one, but none of the six measures were statistically significant at $\alpha < .05$ or with a Bonferroni correction of $\alpha^* < .008$. There was no statistically significant difference in (a) patients given initial antibiotics within 6 hours after arrival (absolute difference, 0.77%), (b) patients receive initial ER blood culture prior to first antibiotics (absolute difference, 0.16%), (c) patients given smoking cessation counseling (absolute difference, 1.26%), (d) patients given the most appropriate initial antibiotic (absolute difference, 0.98%), (e) patients given an influenza vaccination (absolute difference, 1.58%), and (f) percentage of patients given a pneumococcal vaccination (absolute difference, 0.82%).
Table 22

*Process of Care: Pneumonia Results*

<table>
<thead>
<tr>
<th>Pneumonia Measures</th>
<th>HCPE N=34</th>
<th>non-HCPE N=153</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients given initial antibiotics within 6 hours after arrival</td>
<td>n = 32</td>
<td>n = 152</td>
<td>.356</td>
</tr>
<tr>
<td></td>
<td>96.41 (2.94)</td>
<td>95.64 (4.91)</td>
<td></td>
</tr>
<tr>
<td>Patients receive initial ER blood culture prior to first antibiotics</td>
<td>n = 32</td>
<td>n = 151</td>
<td>.301</td>
</tr>
<tr>
<td></td>
<td>96.63 (2.83)</td>
<td>96.79 (4.53)</td>
<td></td>
</tr>
<tr>
<td>Patients given smoking cessation counseling</td>
<td>n = 32</td>
<td>n = 152</td>
<td>.073</td>
</tr>
<tr>
<td></td>
<td>99.19 (1.97)</td>
<td>97.93 (5.21)</td>
<td></td>
</tr>
<tr>
<td>Patients given most appropriate initial antibiotic</td>
<td>n = 32</td>
<td>n = 150</td>
<td>.260</td>
</tr>
<tr>
<td></td>
<td>94.56 (3.98)</td>
<td>93.58 (5.53)</td>
<td></td>
</tr>
<tr>
<td>Patients given influenza vaccination</td>
<td>n = 32</td>
<td>n = 152</td>
<td>.361</td>
</tr>
<tr>
<td></td>
<td>93.41 (6.64)</td>
<td>91.83 (9.77)</td>
<td></td>
</tr>
<tr>
<td>Percentage of patients given pneumococcal vaccination</td>
<td>n = 32</td>
<td>n = 151</td>
<td>.248</td>
</tr>
<tr>
<td></td>
<td>95.16 (6.34)</td>
<td>94.34 (7.12)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean +/- SD. Wilcoxon rank-sum test is use for continuous variables. Bonferroni correction α* < .006.

Process of care surgical measures performance results for the nine measures of inpatient surgical care are listed in Table 23. Although not statistically significant, hospitals using the HCPE had higher mean values than the non-HCPE hospitals in all nine measures; four of the nine measures were statistically significant at α < .05 but only one was statistically significant with a Bonferroni correction at α* < .006. The one statistically significant measure was “surgery patients
given right kind of antibiotic” (absolute difference, 1.57%). With the Bonferroni correction, the following eight measures had no statistically significant difference: (a) antibiotic given at right time, one hour before surgery (absolute difference, 1.64%), (b) preventive antibiotics stopped at right time, within 24 hours (absolute difference, 1.61%), (c) treatment within 24 hours to help prevent blood clots (absolute difference, 2.02%), (d) surgery patients provided treatment to prevent blood clots (absolute difference, 1.65%), (e) patients needing hair removed from surgical area (absolute difference, 0.14%), (f) patients’ urinary catheters removed on the first or second day (absolute difference, 3.09%), (g) patients taking beta blockers were kept on them (absolute difference, 2.96%), and (h) outpatients given antibiotic at right time, one hour before surgery (absolute difference, 2.35%).
### Table 23

**Process of Care: Surgical Results**

<table>
<thead>
<tr>
<th>Surgical Measures</th>
<th>HCPE N=34</th>
<th>non-HCPE N=153</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic given at right time, one hour before surgery</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>98.19 (1.33)</td>
<td>96.55 (6.73)</td>
<td></td>
</tr>
<tr>
<td>Preventive antibiotics stopped at right time, within 24 hours after surgery</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.156</td>
</tr>
<tr>
<td></td>
<td>96.48 (2.11)</td>
<td>94.87 (6.76)</td>
<td></td>
</tr>
<tr>
<td>Surgery patients given right kind of antibiotic</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>98.52 (1.02)</td>
<td>96.95 (4.57)</td>
<td></td>
</tr>
<tr>
<td>Treatment within 24 hours to help prevent blood clots</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.105</td>
</tr>
<tr>
<td></td>
<td>95.19 (3.89)</td>
<td>93.17 (7.59)</td>
<td></td>
</tr>
<tr>
<td>Surgery patients received treatment to prevent blood clots</td>
<td>n = 31</td>
<td>n = 149</td>
<td>.253</td>
</tr>
<tr>
<td></td>
<td>96.54 (2.94)</td>
<td>94.89 (7.08)</td>
<td></td>
</tr>
<tr>
<td>Patients needing hair removed from surgical area</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.044</td>
</tr>
<tr>
<td></td>
<td>99.81 (0.40)</td>
<td>99.67 (1.40)</td>
<td></td>
</tr>
<tr>
<td>Patients’ urinary catheters removed within the first or second day</td>
<td>n = 31</td>
<td>n = 149</td>
<td>.023</td>
</tr>
<tr>
<td></td>
<td>91.68 (6.82)</td>
<td>88.59 (9.40)</td>
<td></td>
</tr>
<tr>
<td>Patients taking beta blockers were kept on them</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.016</td>
</tr>
<tr>
<td></td>
<td>96.06 (3.43)</td>
<td>93.10 (7.49)</td>
<td></td>
</tr>
<tr>
<td>Outpatients given antibiotic one hour before surgery</td>
<td>n = 31</td>
<td>n = 150</td>
<td>.138</td>
</tr>
<tr>
<td></td>
<td>94.26 (4.93)</td>
<td>91.91 (11.05)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean +/- SD. Wilcoxon rank-sum test is used for continuous variables. Bonferroni correction $\alpha^* < .006.$
The results for the six measures of outcome of care performance are shown in Table 24. Unlike all previous measures, for outcome measures, lower means are better. Although not statistically significant, hospitals using the HCPE all have lower mean values than the non-HCPE hospitals in six measures, but none of the measures were statistically significant ($\alpha^* < .05$).

**Table 24**  
*Outcome of Care Results*

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>HCPE</th>
<th>non-HCPE</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=34</td>
<td>N=153</td>
<td></td>
</tr>
<tr>
<td>Heart attack death rates (30-day mortality)</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.255</td>
</tr>
<tr>
<td></td>
<td>14.86 (1.52)</td>
<td>15.15 (1.47)</td>
<td></td>
</tr>
<tr>
<td>Heart attack readmission rates</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.290</td>
</tr>
<tr>
<td></td>
<td>19.99 (1.75)</td>
<td>20.32 (1.30)</td>
<td></td>
</tr>
<tr>
<td>Heart failure death rates (30-day mortality)</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.237</td>
</tr>
<tr>
<td></td>
<td>10.62 (1.78)</td>
<td>10.74 (1.60)</td>
<td></td>
</tr>
<tr>
<td>Heart failure readmission rates</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.367</td>
</tr>
<tr>
<td></td>
<td>25.20 (2.56)</td>
<td>25.44 (1.89)</td>
<td></td>
</tr>
<tr>
<td>Pneumonia death rates (30-day Mortality)</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.231</td>
</tr>
<tr>
<td></td>
<td>10.96 (1.41)</td>
<td>11.30 (1.61)</td>
<td></td>
</tr>
<tr>
<td>Pneumonia readmission rates</td>
<td>$n = 29$</td>
<td>$n = 135$</td>
<td>.180</td>
</tr>
<tr>
<td></td>
<td>18.85 (1.81)</td>
<td>19.25 (1.61)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Data are given as number (percentage) or mean +/- SD. Wilcoxon rank-sum test is use for continuous variables. Bonferroni correction $\alpha^* < .0083$.

**Evaluation of the Relationship Between HCPE and Organizational Characteristics**

The following analyses were performed using non-parametric generalized linear models (GENLIN) in SPSS. There were two sets of models used for the following analyses, (a) an
“unadjusted” model, which included only included a single HCPE vs. non-HCPE factor, and (b) an “adjusted” model which included the characteristics of HCPE vs. non-HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions. The mean values for the HCPE vs. non-HCPE and \( p \) values were reported for both models. The last column on all the tables identifies interaction by the “In” label. In this interaction column, the presence of a significant HCPE interaction with religious affiliation is signified by “REL” and the effect of hospitals systems by the “SYS” label.

The analyses in this section used a generalized linear model approach in SPSS. General (not generalized) linear models are based on the simple linear equation of

\[
\eta_i = \alpha + \beta_i X_{i1} + \beta_i X_{i1} + \ldots\beta_k X_{ik}
\]

where \( \eta_i \) = outcome variable, \( \alpha = \) intercept, \( \beta = \) coefficients, and \( X = \) predictor variables. The generalized linear model takes this same equation and adds a link function (e.g., log).

Consequently, \( g \) (the link function) is included to the equation

\[
\mu_i = \eta_i \quad \text{which} \quad g(\mu_i) = \eta_i = \alpha + \beta_i X_{i1} + \beta_i X_{i1} + \ldots\beta_k X_{ik}
\]

A Poisson probability distribution was used to analyze the HCAHPS hospital experience patient survey measures performance. The Poisson Model is \( \log Y_i = \log(L_i) + \Sigma \alpha_k x_{ik} \) where \( X \) is the outcome variable and \( \log(L_{ii}) = s \) the logarithmic link function. \( \Sigma \alpha_k x_{ik} \) are the covariates.

A gamma distribution was used for heart attack, heart failure, pneumonia, and surgical care improvement project (SCIP) process measures performance. Normal probability distributions were used for outcome of care measures performance and outpatient imaging efficiency. All probability distributions used a logarithmic-linked function. Maximum likelihood estimation for parameters with a robust covariance matrix estimation approach was used, and the Wald Likelihood was used for tests of model effects. Estimated marginal means are reported.
throughout, and sequential Bonferroni corrections at $\alpha^*<.05$ were used in reporting pairwise significance levels with an alpha value equal to .05 and to evaluate all hypotheses. Other organizational characteristics were analyzed and found to have no significance or interaction and are not reported in this analysis. The following organizational characteristics were considered: (a) hospital type, whether acute care or critical access, (b) for-profit or non-profit, (c) emergency services, and (d) number of beds. However, these organizational characteristics were excluded because there were no for-profit HCPE hospitals and no HCPE hospitals without emergency services. The Wald $\chi^2$ values in this section will only be given for significant effects or interactions.

**Organizational Characteristics’ Effect on HCAHPS Hospital Experience Patient Survey.** Performance results comparing HCPE hospitals to non-HCPE hospitals using the 10 CMS measures of HCAHPS patient experience are listed in Table 25. In the unadjusted model, for each of the 10 measures there was a significant effect of HCPE. The effect of HCPE was robust throughout. HCPE hospitals scored significantly higher on all 10 HCAHPS measures. This was also the case with the adjusted model, with the exception of the question about “doctors always communicating well.” For that particular question, there was not a significant effect of HCPE (Wald $\chi^2 = 3.39, p > .05$) when other variables of interest were included in the model.

In addition to the robust HCPE effects throughout the adjusted model, 3 of the 10 patient experience measures indicated a main effect of system. These three were “room was always quiet at night” (Wald $\chi^2 = 5.41, p < .05$); “patients were given information about recovery at home” (Wald $\chi^2 = 6.52, p < .05$); and “patients would definitely recommend the hospital” (Wald $\chi^2 = 4.44, p < .05$). The importance of the variable “patients would definitely recommend the hospital” will
be discussed in the next chapter because of its potential to affect hospital profitability and sustainability.

Table 25

Organizational Characteristics’ Effect on HCAHPS Hospital Experience Patient Survey Measures

<table>
<thead>
<tr>
<th>HCAHPS Measures</th>
<th>Unadjusted means a</th>
<th>Sig</th>
<th>Adjusted means b</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Nurses always communicated well</td>
<td>79.031</td>
<td>74.640</td>
<td>.001</td>
<td>78.089</td>
<td>74.789</td>
</tr>
<tr>
<td>Doctor always communicated well</td>
<td>80.000</td>
<td>78.366</td>
<td>.013</td>
<td>80.666</td>
<td>78.662</td>
</tr>
<tr>
<td>Patients always received help soon as they wanted</td>
<td>66.500</td>
<td>60.220</td>
<td>.000</td>
<td>66.562</td>
<td>59.931</td>
</tr>
<tr>
<td>Patients’ pain was always well controlled</td>
<td>71.968</td>
<td>68.026</td>
<td>.000</td>
<td>71.955</td>
<td>68.106</td>
</tr>
<tr>
<td>Patients’ staff always explained about medicines</td>
<td>62.562</td>
<td>58.713</td>
<td>.000</td>
<td>62.918</td>
<td>58.744</td>
</tr>
<tr>
<td>Room and bathroom were always clean</td>
<td>73.343</td>
<td>67.866</td>
<td>.000</td>
<td>74.711</td>
<td>67.870</td>
</tr>
<tr>
<td>Room was always quiet at night</td>
<td>58.781</td>
<td>54.253</td>
<td>.001</td>
<td>60.171</td>
<td>54.927</td>
</tr>
<tr>
<td>Patients were given information about recovery at home</td>
<td>84.562</td>
<td>81.793</td>
<td>.000</td>
<td>83.588</td>
<td>81.791</td>
</tr>
<tr>
<td>Hospital rating of 9 or 10</td>
<td>73.218</td>
<td>65.673</td>
<td>.000</td>
<td>75.259</td>
<td>65.981</td>
</tr>
<tr>
<td>Patients would definitely recommend the hospital</td>
<td>75.750</td>
<td>68.373</td>
<td>.000</td>
<td>78.373</td>
<td>68.4315</td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at α* < 0.05. Unadjusted model * includes HCPE variables. Adjusted model † includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions.
Organizational Characteristics’ Effect on Outpatient Imaging Efficiency Results.

There were no statistically significant effects of HCPE in the unadjusted or adjusted models for all three measures. For “Outpatient CT scans of the abdomen that were combination (double) scans,” there was a significant interaction of religious affiliation and HCPE. Religiously affiliated hospitals that used the HCPE had a higher marginal mean when compared to non-religiously affiliated HCPE hospitals. Interestingly, there was a drop in performance for non-religiously affiliated HCPE hospitals, where they performed lower than non-HCPE hospitals.

For “Outpatient CT scans of the abdomen that were combination (double) scans,” there was a main effect by religion (mean difference of .014, Wald $\chi^2 = 6.49, p < .05$), with religiously affiliated hospitals having a higher mean percentage. There was also a religion by HCPE interaction (Wald $\chi^2 = 12.15, p < .05$). Although the result for this measure for hospitals using HCPE was not significant, religiously affiliated hospitals that used the HCPE had a much higher
marginal mean (.303) when compared to non-religiously affiliated HCPE hospitals (.0805). Likewise, religiously affiliated hospitals that were non-HCPE had a lower marginal mean (.170) when compared to non-religiously affiliated non-HCPE hospitals (.188). There was no significant effect of HCPE in the unadjusted model with “Outpatient CT scans of the chest that was combination (double) scans” (absolute difference, 0.002%) or in the adjusted model. There was an interaction between system and religiously affiliated hospitals (Wald $\chi^2 = 7.51, p < .05$).

Religiously affiliated hospitals that were part of a system had a higher marginal mean (.081) when compared to religiously affiliated hospitals that were not part of a system (.024). In contrast, non-religiously affiliated hospitals that were part of a system had a lower marginal mean (.0317) than the non-system hospitals (.170). The organizational characteristics’ effects on outpatient imaging efficiency results are listed on Table 26.

Table 26

<table>
<thead>
<tr>
<th>Imaging Measures</th>
<th>Unadjusted means</th>
<th>Sig</th>
<th>Adjusted means</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Outpatient CT scans of the abdomen that were combination (double) scans</td>
<td>.1953</td>
<td>.1824</td>
<td>.770</td>
<td>.1563</td>
<td>.1793</td>
</tr>
<tr>
<td>Outpatient CT scans of the chest that were combination (double) scans</td>
<td>.0513</td>
<td>.0536</td>
<td>.885</td>
<td>.0292</td>
<td>.0494</td>
</tr>
<tr>
<td>Outpatients who had a follow-up mammogram or ultrasound within 45 days after a screening mammogram</td>
<td>8.3111</td>
<td>8.4613</td>
<td>.804</td>
<td>8.2302</td>
<td>8.4297</td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at $\alpha* < .05$. Unadjusted model $^a$ includes HCPE variables. Adjusted model $^b$ includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions. SYS indicates the presence of a significant system by HCPE interaction.
Organizational Characteristics’ Effect on Process of Care: Heart Attack Results.

There were no significant effects of HCPE in the unadjusted model or adjusted model in the performance results of the four process of care heart attack measures. Religious affiliation did interact with HCPE on two of the four measures. Religiously affiliated hospitals that used the HCPE had a higher marginal mean when compared to non-religiously affiliated HCPE hospitals, and religiously affiliated hospitals that were non-HCPE had lower marginal means when compared to non-religiously affiliated non-HCPE hospitals.

There was no significant effect of HCPE in the unadjusted model with “Aspirin at arrival” (absolute difference, 0.287%) or in the adjusted model (absolute difference, 0.375%). There was an interaction between HCPE and religious affiliation interaction ($p = .028$, Wald $\chi^2 = 4.80$, $p < .05$). Religiously affiliated hospitals that used the HCPE had a higher marginal mean (99.691) when compared to non-religiously affiliated HCPE hospitals (98.427). In contrast, religiously affiliated hospitals that were non-HCPE had a slightly lower marginal mean (98.406) when compared to non-religiously affiliated non-HCPE hospitals (98.958).

There was no effect of HCPE in the unadjusted model with “Given ACE inhibitor (ACE-I) or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction” (absolute difference, 0.090%) or in the adjusted model (absolute difference, 0.327%). There was a religious affiliation and HCPE interaction ($p = .028$, Wald $\chi^2 = 4.81$, $p < .05$). Religiously affiliated hospitals that used the HCPE had higher marginal means (98.917) when compared to non-religiously affiliated HCPE hospitals (95.15). In contrast, religiously affiliated hospitals that were non-HCPE had a lower marginal mean (95.785) when compared to non-religiously affiliated non-HCPE hospitals (97.606). The organizational characteristics’ effect on the process of care heart attack results are listed in Table 27.
Table 27

*Organizational Characteristics’ Effect on Process of Care: Heart Attack Results*

<table>
<thead>
<tr>
<th>Heart Attack Measures</th>
<th>Unadjusted means</th>
<th>Sig</th>
<th>Adjusted means</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Aspirin at arrival</td>
<td>99.064</td>
<td>98.777</td>
<td>.404</td>
<td>99.057</td>
<td>98.682</td>
</tr>
<tr>
<td>Aspirin prescribed at discharge</td>
<td>97.871</td>
<td>98.462</td>
<td>.647</td>
<td>97.705</td>
<td>98.362</td>
</tr>
<tr>
<td>Given ACE inhibitor (ACE-I) or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction</td>
<td>97.133</td>
<td>97.042</td>
<td>.924</td>
<td>97.019</td>
<td>96.691</td>
</tr>
</tbody>
</table>

*Note.* Bonferroni corrections at α* < .05. Unadjusted model *a* includes HCPE variables. Adjusted model *b* includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions. REL indicates presence of a significant religious affiliation by HCPE interaction.

**Organizational Characteristics’ Effect on Process of Care: Heart Failure Results.** For the four processes of care heart failure measures performance, two measures demonstrated a significant effect of HCPE in the unadjusted model and only one in the adjusted model. The “Adult smoking cessation advice/counseling” measure was the one measure that showed an effect of HCPE in the adjusted model, with HCPE hospitals performing better than non-HCPE hospitals on this measure.

Note that these findings should be interpreted cautiously given the overall lack of variation, range, and potential ceiling effects on the dependent variable. In addition, Wald $\chi^2$ values in this section will only be given for significant effects or interactions.
There was not a significant effect of HCPE in the unadjusted model with “Evaluation of left ventricular systolic function” (absolute difference, 0.4638%) or in the adjusted model (absolute difference, 0.210%). There was a significant effect of religious affiliation (mean difference .658, Wald $\chi^2 = 4.24, p < .05$). Religiously affiliated hospitals that used the HCPE had a higher marginal mean (99.123) when compared to non-religiously affiliated HCPE hospitals (98.465).

There was a borderline effect of HCPE in the unadjusted model with “Given ACE inhibitor (ACE-I) or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction” (absolute difference, 1.494%, Wald $\chi^2 = 3.84, p = .05$), but there was no significant effect in the adjusted model (absolute difference, 1.051%). There was a significant effect of HCPE in the unadjusted model with “Given discharge instructions” (absolute difference, 4.724%, Wald $\chi^2 = 7.64, p < .05$), but not in the adjusted model (absolute difference, 0.269%). There was a significant effect of HCPE in the unadjusted model with “Adult smoking cessation advice/counseling” (absolute difference, 1.315%, Wald $\chi^2 = 8.10, p < .05$), and in the adjusted model (absolute difference, 1.432%, Wald $\chi^2 = 4.25, p < .05$). The organizational characteristics’ effect on the process of care heart failure results are listed in Table 28.
Table 28

Organizational Characteristics’ Effect on Process of Care: Heart Failure Results

<table>
<thead>
<tr>
<th>Heart Failure Measures</th>
<th>Unadjusted means (^a)</th>
<th>Sig</th>
<th>Adjusted means (^b)</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Evaluation of left ventricular systolic function</td>
<td>99.218</td>
<td>98.755</td>
<td>.179</td>
<td>98.688</td>
<td>98.899</td>
</tr>
<tr>
<td>Given ACE inhibitor (ACE-I) or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction</td>
<td>96.812</td>
<td>95.317</td>
<td>.050</td>
<td>96.311</td>
<td>95.259</td>
</tr>
<tr>
<td>Given discharge instructions</td>
<td>92.062</td>
<td>87.337</td>
<td>.006</td>
<td>87.154</td>
<td>87.424</td>
</tr>
<tr>
<td>Adult smoking cessation advice/counseling</td>
<td>99.937</td>
<td>98.622</td>
<td>.004</td>
<td>99.899</td>
<td>98.641</td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at \(\alpha^* < .05\). Unadjusted model \(^a\) includes HCPE variables. Adjusted model \(^b\) includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions.

Organizational Characteristics’ Effect on Process of Care: Pneumonia Results. There was one significant effect of HCPE in the unadjusted model, “Patients given smoking cessation counseling,” with HCPE hospitals performing better than non-HCPE hospitals, and no significant effect in the adjusted model in the six process of care pneumonia measures performance results. There was a significant system by HCPE interaction. Hospitals that were part of a system and used the HCPE had a higher marginal mean when compared to hospitals using HCPE that were not part of a system. Likewise, non-HCPE hospitals that were part of a system had a lower marginal mean than the non-system hospitals.

There was a significant effect of HCPE in the unadjusted model with “Patients given smoking cessation counseling” (absolute difference, 1.253%, Wald \(\chi^2 = 5.30, p < .05\), but not in
the adjusted model (absolute difference, 0.666%). In addition, there was a significant system by HCPE interaction (Wald $\chi^2 = 4.22, p < .05$). Hospitals that were part of a system and used the HCPE had a higher marginal mean (99.592) when compared to hospitals using HCPE that were not part of a system (95.070). In contrast, non-HCPE hospitals that were part of a system had only a slightly lower marginal mean (97.642) than the non-HCPE non-system hospitals (98.303).

There was no significant effect of HCPE in the unadjusted model with “Patients given most appropriate initial antibiotic” (absolute difference, 0.975%) or in the adjusted model (absolute difference, .450%). There was an interaction between system and religiously affiliated hospitals (Wald $\chi^2 = 5.61, p < .05$). Religiously affiliated hospitals that were part of a system had a lower marginal mean (93.905) when compared to religiously affiliated hospitals that were not part of a system (95.710). In contrast, non-religiously affiliated hospitals that were part of a system had a higher marginal mean (94.347) than the non-system hospital mean (91.956).

Process of care pneumonia measures performance results for the six measures of inpatient pneumonia are listed in Table 29.
### Organizational Characteristics’ Effect on Process of Care: Pneumonia Results

<table>
<thead>
<tr>
<th>Pneumonia Measures</th>
<th>Unadjusted means a</th>
<th>Sig</th>
<th>Adjusted means b</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients receive initial antibiotics within 6 hours of arrival</td>
<td>96.406</td>
<td>.239</td>
<td>97.100</td>
<td>.067</td>
<td></td>
</tr>
<tr>
<td>Patients’ initial ER blood culture prior to first antibiotics</td>
<td>96.625</td>
<td>.728</td>
<td>96.705</td>
<td>.447</td>
<td></td>
</tr>
<tr>
<td>Patients given smoking cessation counseling</td>
<td>99.187</td>
<td>.021</td>
<td>97.305</td>
<td>.588</td>
<td>SYS</td>
</tr>
<tr>
<td>Patients given most appropriate initial antibiotic</td>
<td>94.562</td>
<td>.238</td>
<td>94.195</td>
<td>.617</td>
<td></td>
</tr>
<tr>
<td>Patients given influenza vaccination</td>
<td>93.406</td>
<td>.293</td>
<td>93.654</td>
<td>.533</td>
<td></td>
</tr>
<tr>
<td>Percent patients given pneumococcal vaccination</td>
<td>95.156</td>
<td>.514</td>
<td>95.004</td>
<td>.822</td>
<td></td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at α* < .05. Unadjusted model a includes HCPE variables. Adjusted model b includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions. SYS indicates the presence of a significant system by HCPE interaction.

**Organizational Characteristics’ Effect on Process of Care: Surgical Results.** There was a strong HCPE effect in many cases. A significant HCPE effect was present in the unadjusted model with “Antibiotic given at right time, one hour before surgery” (absolute difference, 1.6469%, Wald χ² = 7.55, p < .05), and in the adjusted model (absolute difference, 1.1668%, Wald χ² = 6.91, p < .05). There was a significant effect of HCPE in the unadjusted model with “Preventive antibiotics stopped at right time within 24 hours” (absolute difference, 1.6105%, Wald χ² = 5.83, p < .05), but not in the adjusted model.
There was a significant effect of HCPE in the unadjusted model with “Surgery patients given right kind of antibiotic” (absolute difference, 1.5695%, Wald $\chi^2 = 14.26, p < .05$), and in the adjusted model (absolute difference, 1.4846%, Wald $\chi^2 = 10.92, p < .05$). There was the presence of a significant religious affiliation by HCPE interaction (Wald $\chi^2 = 7.54, p < .05$). This interaction was driven by an increase in performance of religiously affiliated HCPE hospitals over non-religiously affiliated HCPE hospitals (marginal means = 99.21 and 97.47, respectively).

There was a significant effect of HCPE in the unadjusted model with “Treatment within 24 hours to help prevent blood clots” (absolute difference, 2.026%, Wald $\chi^2 = 4.82, p < .05$), but not in the adjusted model. There was a significant HCPE effect in the unadjusted model with “Surgery patients receive treatment to prevent blood clots” (absolute difference, 1.6558%, Wald $\chi^2 = 4.53, p < .05$), but not in the adjusted model. There was a significant effect of HCPE in the unadjusted model with “Patients’ urinary catheters removed on the first or second day” (absolute difference, 3.0841%, Wald $\chi^2 = 4.73, p < .05$), but not in the adjusted model.

There was a statistically significant difference in the unadjusted model with “Patients taking beta blockers were kept on them” (absolute difference, 2.9571%, Wald $\chi^2 = 11.84, p < .05$), but not in the adjusted model. In addition, there was a significant religion by HCPE interaction (Wald $\chi^2 = 5.53, p < .05$). Religiously affiliated hospitals that used the HCPE had a higher marginal mean (97.551) when compared to non-religiously affiliated HCPE hospitals (93.395). In contrast, religiously affiliated hospitals that were non-HCPE had a similar marginal mean (93.076) when compared to non-religiously affiliated non-HCPE hospitals (93.059). Process of care surgical measures performance results for the nine measures of inpatient surgical care are listed in Table 30.
Table 30

**Organizational Characteristics’ Effect on Process of Care: Surgical Results**

<table>
<thead>
<tr>
<th>Surgical Measures</th>
<th>Unadjusted means a</th>
<th>Sig</th>
<th>Adjusted means b</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Antibiotic given at right time, one hour before surgery</td>
<td>98.193</td>
<td>96.546 .006</td>
<td>97.866</td>
<td>96.699 .009</td>
<td></td>
</tr>
<tr>
<td>Preventive antibiotics stopped at right time, within 24 hours after surgery</td>
<td>96.483</td>
<td>94.8733 .015</td>
<td>96.524</td>
<td>94.541 .140</td>
<td></td>
</tr>
<tr>
<td>Surgery patients given right kind of antibiotic</td>
<td>98.516</td>
<td>96.946 .000</td>
<td>98.335</td>
<td>96.8507 .001 REL</td>
<td></td>
</tr>
<tr>
<td>Treatment within 24 hours to help prevent blood clots</td>
<td>95.193</td>
<td>93.166 .028</td>
<td>92.554</td>
<td>93.250 .719</td>
<td></td>
</tr>
<tr>
<td>Surgery patients receive treatment to prevent blood clots</td>
<td>96.548</td>
<td>94.892 .038</td>
<td>94.730</td>
<td>95.240 .734</td>
<td></td>
</tr>
<tr>
<td>Patients needing hair removed from surgical area</td>
<td>99.806</td>
<td>99.673 .322</td>
<td>99.949</td>
<td>99.6962 .140</td>
<td></td>
</tr>
<tr>
<td>Patients’ urinary catheters removed on first or second day</td>
<td>91.677</td>
<td>88.593 .031</td>
<td>88.902</td>
<td>88.1444 .817</td>
<td></td>
</tr>
<tr>
<td>Patients taking beta blockers were kept on them</td>
<td>96.064</td>
<td>93.107 .001</td>
<td>95.450</td>
<td>93.067 .106 REL</td>
<td></td>
</tr>
<tr>
<td>Outpatients received antibiotic at right time, 1 hour before surgery</td>
<td>94.258</td>
<td>91.906 .061</td>
<td>92.491</td>
<td>92.403 .952</td>
<td></td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at α*. Unadjusted model a includes HCPE variables. Adjusted model b includes HCPE, religious affiliation, single or multiple hospitals to control for hospitals systems, and all 2-way interactions. REL indicates presence of a significant religion by HCPE interaction.

**Organizational Characteristics’ Effect on Outcome of Care Results.** Unlike all the previous performance measures, lower mean values are better for the six outcome of care measures. There were no statistically significant differences in the means of six outcomes of care measures unadjusted models. However, five of the six adjusted models were statistically
significant, and each measure exhibited a strong system effect. **This system effect was consistent in all five measures, which concluded HCPE hospitals that were not part of a system performed better.**

There was not a significant HCPE effect in the unadjusted model with “Heart attack death rates (30-day mortality)” (absolute difference, 0.0126%), but there was a statistically significant difference in the adjusted model (absolute difference, 0.0902%, Wald $\chi^2 = 5.79, p < .05$). In addition, there was a significant system main effect (mean difference .1456, Wald $\chi^2 = 27.59, p < .05$), with hospitals that are part of the system having higher means. There was also presence of a significant system by HCPE interaction (Wald $\chi^2 = 6.50, p < .05$). Hospitals that used the HCPE and were part of a system had a higher marginal mean (.4584) when compared to non-system-affiliated HCPE hospitals (.2425). In contrast, system hospitals that were non-HCPE had a higher marginal mean (.4529) when compared to non-system non-HCPE hospitals (.3963), but less of a difference. Based on these results, HCPE hospitals that were not part of a system performed better.

There was no significant HCPE effect in the unadjusted model with “Heart failure death rates (30-day mortality)” (absolute difference, 0.0899%), but there was a significant HCPE effect in the adjusted model (absolute difference, 0.2582%, Wald $\chi^2 = 9.72, p < .05$). In addition, there was a significant system main effect (absolute difference 0.3166%, Wald $\chi^2 = 11.71, p < .05$), with hospitals that are part of a system having a higher marginal mean than those who are not. There was presence of a significant system by HCPE interaction (Wald $\chi^2 = 5.59, p < .05$). Hospitals that used the HCPE and were part of a system had a higher marginal mean (.8025) when compared to non-system affiliated HCPE hospitals (.4527). In contrast, system hospitals that were non-HCPE
had a slightly higher marginal mean (.8825) when compared to non-system non-HCPE hospitals (.8400). Based on these results, HCPE hospitals that were not part of a system performed better.

There was no significant HCPE effect in the unadjusted model with “Heart failure readmission rates” (absolute difference, 0.0202%) but a significant HCPE effect in the adjusted model (absolute difference, 0.0913%, Wald $\chi^2 = 5.55, p < .05$). There was a significant system main effect (absolute difference 0.1168%, Wald $\chi^2 = 13.01, p < .05$), with hospitals that are part of a system having higher marginal means than those who are not. There was presence of a trending system by HCPE interaction (Wald $\chi^2 = 3.61, p = .05$). Hospitals that used the HCPE and were part of a system had a much higher marginal mean (.4448) when compared to non-system-affiliated HCPE hospitals (.2765). Similarly, system hospitals that were non-HCPE had a higher marginal mean (.4684) when compared to non-system-affiliated non-HCPE hospitals (.4171). Based on these results, HCPE hospitals that were not part of a system performed better.

There was no significant HCPE effect in the unadjusted model with “Pneumonia death rates (30-day mortality)” (absolute difference, 0.0724%) but a significant effect in the adjusted model (absolute difference, 0.1849%, Wald $\chi^2 = 9.09, p < .05$). There was a significant system effect (absolute difference 0.1933%, Wald $\chi^2 = 11.13, p < .05$), with hospitals that are part of a system having higher marginal means than those not part of a system. There was a presence of a significant system by HCPE interaction. Hospitals that used the HCPE and were part of a system had a higher marginal mean (.6902) when compared to non-system-affiliated HCPE hospitals (.4139). In contrast, system hospitals that were non-HCPE had a higher marginal mean (.7600) when compared to non-system non-HCPE hospitals (.6810). Based on these results, HCPE hospitals that were not part of a system performed better.
There was no significant effect of HCPE in the unadjusted model with “Pneumonia readmission rates” (absolute difference, 0.0290%) but a significant effect in the adjusted model (absolute difference, 0.0691%, Wald $\chi^2 = 5.13, p < .05$). There was a significant system effect (mean difference 0.0852%, Wald $\chi^2 = 7.56, p < .05$), with hospitals that are part of a system having higher marginal means than those not part of a system. There was not a significant system by HCPE interaction (Wald $\chi^2 = 2.01, p > .05$), but the means have a similar trend as other measures in this set. Hospitals that used the HCPE and were part of a system had a higher marginal mean (.4512) when compared to non-system-affiliated HCPE hospitals (.3290). Likewise, system hospitals that were non-HCPE had a higher marginal mean (.4754) when compared to non-system non-HCPE hospitals (.4341). Based on these results, HCPE hospitals that were not part of a system performed better. The organizational characteristics’ effect on outcome of care results are listed in Table 31.
Table 31

Organizational Characteristics’ Effect on Outcome of Care Results

<table>
<thead>
<tr>
<th>Outcome of Care Measures</th>
<th>Unadjusted means a</th>
<th>Sig</th>
<th>Adjusted means b</th>
<th>Sig</th>
<th>In</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCPE</td>
<td>non-HCPE</td>
<td>HCPE</td>
<td>non-HCPE</td>
<td></td>
</tr>
<tr>
<td>Heart attack death rates (30-day mortality)</td>
<td>.4396</td>
<td>.4269</td>
<td>.727</td>
<td>.3334</td>
<td>.4237</td>
</tr>
<tr>
<td>Heart attack readmission rates</td>
<td>.3654</td>
<td>.3539</td>
<td>.653</td>
<td>.3490</td>
<td>.256</td>
</tr>
<tr>
<td>Heart failure death rates (30-day mortality)</td>
<td>.7782</td>
<td>.8680</td>
<td>.296</td>
<td>.6027</td>
<td>.8610</td>
</tr>
<tr>
<td>Heart failure readmission rates</td>
<td>.4329</td>
<td>.4531</td>
<td>.630</td>
<td>.3507</td>
<td>.4420</td>
</tr>
<tr>
<td>Pneumonia death rates (30-day mortality)</td>
<td>.6649</td>
<td>.7373</td>
<td>.269</td>
<td>.5345</td>
<td>.7194</td>
</tr>
<tr>
<td>Pneumonia readmission rates</td>
<td>.4395</td>
<td>.4684</td>
<td>.335</td>
<td>.3852</td>
<td>.4543</td>
</tr>
</tbody>
</table>

Note. Bonferroni corrections at α*< .05. Unadjusted model a includes HCPE variables. Adjusted model b includes HCPE, religious affiliation, single or multiple hospitals to control for hospital systems, and all 2-way interactions. SYS indicates the presence of a significant system by HCPE interaction.

Summary. The evaluation of the relationship between HCPE and organizational characteristics of religious affiliation and “single or multiple hospitals to control for hospital systems” using the unadjusted and adjusted models produced interesting results. There was a religious affiliation effect with several measures: the process of care heart attack performance (Table 27) and the process of care surgical measures performance (Table 30). For these measures, religiously affiliated hospitals that used the HCPE had the highest mean values when compared to non-religiously affiliated HCPE hospitals, non-HCPE hospitals, and non-religiously affiliated non-HCPE hospitals. Process of care pneumonia measures performance (Table 29) had one out of six measures that exhibited an interaction between religious affiliation and system affiliation. For that
measure, religiously affiliated hospitals that were not part of a system had the highest mean values compared to religiously affiliated hospitals that were part of the system, non-religiously affiliated hospitals that were part of a system, and non-system hospitals. Finally, for the process of care surgical measures (Table 30), five of the six adjusted models were statistically significant, and each measure exhibited a strong system effect. Based on these results, HCPE hospitals that were not part of a system performed better.
Chapter 6: Discussion

This chapter consists of six sections. The first is a summary of the problem, purpose, and research question. Second is a summary of the main findings. Third is a discussion of the impact on a hospital’s financial bottom line with consideration to changes in CMS payment structure and a review of the net promoter theory. Fourth is a discussion of the significance of the study to health care. Fifth is a discussion of the importance of this study to health care leaders. Sixth is a discussion of the limitations and implications of this study in the wider context of the published literature at large.

Summary of the Problem, Purpose, and Research Question

Despite anecdotal stories and propositions related to the value of the HCPE in achieving performance excellence in organizations, there has been limited research providing empirical evidence of the impact of applying HCPE to improve efficiency and effectiveness specifically in the health care industry. The field offers rich data for exploration as health care organizations across the U.S. increasingly have been adopting a policy of using the HCPE as a business model to improve organizational performance. Each health care application submitted to the Baldrige Program documents organizational improvement over time with past and current performance levels, trends in key measures or indicators, as well as competitor’s levels of performance.

The purpose of the study was to determine if there was a relationship between the use of the HCPE as a business model and the performance of health care organizations. To accomplish this, the study sought to answer the following research question: “Do hospitals that have received the national Baldrige Award for Performance Excellence (HCPE) perform better than hospitals in their geographic markets (non-HCPE) based on comparisons of the same CMS performance measures?” This study explored the relationships between the use of the HCPE as a business
model and the performance of the health care organization. In other words, the purpose of this study was to determine if there was sufficient evidence to support the use of the Baldrige HCPE as a business model for health care systems.

In this study, the independent variable of interest was a hospital’s use of the HCPE, and the dependent variables were CMS performance measures. This study tested the HCPE model by comparing health care recipients of the Baldrige Award to like competitive health care organizations that have not used the HCPE, using the same CMS performance measures. Some well-known health care systems using the Baldrige Health Care Criteria to improve organizational performance include Baylor Health Care System, Health Care Corporation of America, Kaiser Permanente, the Mayo Clinic, M.D. Anderson Cancer Center, St. Jude Medical, Inc., and the Cleveland Clinic (Foundation for the Malcolm Baldrige National Quality Award, 2011).

Summary of Main Findings

This summary includes the analysis and results from the Wilcoxon Rank Sum test described in Table 18 through Table 24. The study compared 34 HCPE hospitals to 153 non-HCPE hospitals in the same geographic markets. There were 4 groups of 42 dependent variables: (1) HCAHPS hospital experience patient survey measures performance; (2) outpatient imaging efficiency; (3) process of care measures performance for heart attack, heart failure, pneumonia, and surgical care improvement project process; and (4) outcome of care measures performance. Of the 42 CMS measures in the 4 different CMS measures groups, there was a statistically significant difference in 9 of the 10 HCAHPS patient survey measures and 1 of the 9 surgical care improvement project process measures. To simplify the discussion, the 42 CMS measures were classified into two major categories focused on (1) patient experience and (2) clinical
processes and outcomes. The patient experience measures were comprised of the 10 HCAHPS patient survey performance measures, and the clinical processes and outcomes were comprised of the 32 measures in the other groups: outpatient imaging efficiency, heart attack, heart failure, pneumonia, surgical care, and outcomes measures performance. Categorizing the data into two categories assisted with rethinking and understanding of the results by the presentation of a different mental model (Senge, 2006b).

**Patient Experience Category.** The first of the two categories studied was the patient experience survey performance measures. **The HCAHPS hospital experience patient survey measures performance results were the most significant findings in this study.** Hospitals that used the HCPE had higher means and lower standard deviations than the non-HCPE hospitals in all 10 measures, and all differences were statistically significant except the HCAHPS hospital experience measure “Doctor always communicated well.”

A recent study on patient experience indicated that “the heart of the patient experience lies in the organization's ability to energize the unique employees, relationships, and services it offers and to purposefully shape a positive experience that delivers on the brand's promise” (Needham, 2012, p. 262). There has been ample research identifying the positive relationship between patient experience and employee satisfaction, engagement, and quality of care (Atkins, Marshall, & Javalgi, 1996; Davis et al., 2000; DerGurahian, 2009; Forrester & Maute, 2001). The patient experience is important for the future of health care and will be discussed in more detail later in this chapter. According to Dr. Donald Berwick, former President and Chief Executive Officer of IHI and former Administrator of CMS, the concept of “patient-centeredness is a dimension of health care quality in its own right, not just because of its connection with other desired aims, like safety and effectiveness” (Berwick, 2009, p. 555). The concept of “patient-centeredness” was
pivotal concept defined by the Institute of Medicine’s study as one of the “six aims and ten rules for health care redesign” (Institute of Medicine, Committee on Quality of Health Care in America, 2001).

The final survey prompt, “Patients would definitely recommend the hospital,” was perhaps the most critical performance measure in the study. This is a likelihood-to-recommend question that has proven to be important to the profitability and sustainability of organizations, including hospitals, and will be discussed further in the next section titled “The Bottom Line.” A list of the statistically significant measures results is presented in Table 32.

Table 32

<table>
<thead>
<tr>
<th>HCAHPS Hospital Experience Patient Survey Statistically Significant Measures Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCAHPS Measures Statistically Significant</td>
</tr>
<tr>
<td>1. Nurses always communicated well.</td>
</tr>
<tr>
<td>2. Patients always received help soon as they wanted.</td>
</tr>
<tr>
<td>3. Patients’ pain was always well controlled.</td>
</tr>
<tr>
<td>4. Patients’ staff always explained about medicines.</td>
</tr>
<tr>
<td>5. Room and bathroom were always clean.</td>
</tr>
<tr>
<td>6. Room was always quiet at night.</td>
</tr>
<tr>
<td>7. Patients were given information about recovery at home.</td>
</tr>
<tr>
<td>8. Hospital rating of 9 or 10.</td>
</tr>
<tr>
<td>9. Patients would definitely recommend the hospital.</td>
</tr>
</tbody>
</table>

**Clinical Processes and Outcomes Category.** The clinical processes and outcomes category was composed of 32 measures. Unlike the patient experience performance measures, these clinical and outcome process measures have been ingrained in health care education and
experience for years. Health care professionals have been taught and have become proficient at administering numerous examinations and tests including taking blood cultures and determining the right kind of antibiotics and beta-blockers. Over the years, accreditation of hospitals through the Joint Commission has depended on achieving performance targets for clinical processes. This historically clinical approach has proven to be effective for all hospitals and may be a reason why there is a lack of a statistically significant difference in process performance between clinical performance between hospitals using the HCPE and the non-HCPE hospitals. **There was only one statistically significant measure among the 32 measures in the clinical processes and outcomes category, which was “Surgery patients given right kind of antibiotic.”** Although there was no statically significant difference in the other 31 process of care measures there is more to discuss.

**Mean Values.** Although the group mean differences were not statistically significant, the study results showed that HCPE hospitals had performance outcomes with mean values representing higher performance than the non-HCPE hospitals in 38 of the 42 (90%) of the study measures. All 10 measures in the patient experience category and 28 of the 32 (88%) of the clinical processes and outcomes category had mean values representing higher performance. Even though there was a lack of a statistically significant difference in process performance between HCPE hospitals and non-HCPE hospitals, there was a difference in performance between HCPE and non-HCPE hospitals based on the mean values. As discussed above, decades of standardized health care education, training, and hospital accreditation programs may explain the lack of statistical differences in the clinical processes and outcomes category but not the overall difference in mean values. Table 33 provides a summary of the 42 CMS measures’ mean values.
Table 33

**Summary of the 42 CMS Measures’ Mean Values**

<table>
<thead>
<tr>
<th>Table of Performance Measures</th>
<th>Number of measures with higher mean values for HCPE organizations than non-HCPE organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 18. HCAHPS Patient Experience Results</td>
<td>10 of the 10 with higher mean values</td>
</tr>
<tr>
<td>Table 19. Outpatient Imaging Efficiency Results</td>
<td>1 of the 3 with higher mean values</td>
</tr>
<tr>
<td>Table 20. Process of Care: Heart Attack Results</td>
<td>3 of the 4 with higher mean values</td>
</tr>
<tr>
<td>Table 21. Process of Care: Heart Failure Results</td>
<td>4 of the 4 with higher mean values</td>
</tr>
<tr>
<td>Table 22. Process of Care: Pneumonia Results</td>
<td>5 of the 6 with higher mean values</td>
</tr>
<tr>
<td>Table 23. Process of Care: Surgical Results</td>
<td>9 of the 9 with higher mean values</td>
</tr>
<tr>
<td>Table 24. Outcome of Care Results</td>
<td>6 of the 6 with lower mean values</td>
</tr>
<tr>
<td>Total</td>
<td>38 of the 42 performance measures</td>
</tr>
</tbody>
</table>

**Research Model.** The model in Figure 15 describes the results of this study, depicting the relationship of the HCPE to non-HCPE organizations. The model is based on an adaptation of the Donabedian’s Structure, Process, and Outcomes Model earlier presented in Figure 11. The Donabedian model was used because it has been so ingrained in the understanding of the process for evaluating the quality of medical care that the Agency for Healthcare Research and Quality (AHRQ) acknowledges its use for creating quality measures (Agency for Healthcare Research and Quality [AHRQ], 2013e). The three structures of this model are first the “organizational model,” which identifies two basic conceptual designs developed from the application of the HCPE. The center structure is the “process,” and the final structure is the “quality outcomes.”

In Figure 15, the organizational model defines the difference between the traditional non-HCPE and HCPE health care organizations in philosophical approaches. The traditional non-HCPE health care organization model is focused on physical characteristics, equipment, qualified
health care personnel, technology, and management, while the HCPE model is based on a comprehensive, integrated, aligned, patient-centered system of care that is based on inter-related organizational systems. Although both the non-HCPE and HCPE models contain much of the same organizational “components” for providing patient care, a difference in approaches affects the processes of care, especially those processes that influence the patient experience. As a result, there is a statistical difference in patient experience and quality outcomes. This difference affects loyalty, sustainability, and the bottom line and will be discussed next.

Figure 15
Conceptual Framework of the Research Results for HCPE and Non-HCPE Hospitals
The Bottom Line

This section reviews the role of the federal government in health care funding and how the performance measures in this study, including the HCAHPS patient experience survey questions, have an effect on a hospital’s bottom line.

In 2012, U.S. health care spending hit a record $2.67 trillion; however, its share of the overall economy shrank from 17.12% of gross domestic product in 2011 to 17.04% because non-health care segments of the economy grew faster and because cost-saving measures put in place by the initiation of the Affordable Care Act (ACA) had an impact (Cauchon, 2013). The ACA of 2010 has changed health care. One major practical implication of this study was revealing how hospitals in this study using the HCPE have performed significantly better at managing the patient experience than their competitors. This is important in a practical sense because the difference has an effect on the hospital’s financial performance. The ACA has changed the Medicare program's history as a payer for health care services, evolving from the reimbursement of providers based on reasonable costs to a prospective payment system, to a payment system that will vary based on the quality of the care provided (Shoemaker, 2011).

The ACA created the CMS value-based purchase (VBP) program to transition Medicare toward integration and alignment between payment and quality. The VBP was designed to reward hospitals for improving the quality of care by redistributing Medicare payments so that hospitals with higher performance in terms of quality receive a greater proportion of the payment than do the lower performing hospitals (CMS, 2012a). The VBP goal was to transform Medicare from a passive payer of claims based on volume of care to an active purchaser of care based on the quality of services its beneficiaries receive (CMS, 2012a). The program was designed to provide acute-care hospitals that meet established performance or improvement standards with value-based
incentive payments beginning in the federal fiscal year (FFY) 2013, which started on October 1, 2012 (Fahlman, 2012). The incentive payment was based on a hospital’s performance during the period from July 1, 2011, to March 31, 2012. Over 3,000 hospitals across the country are eligible to participate in Hospital VBP, which has a bonus pool to incentivize improved performance and outcomes (CMS, 2012a). In the future, under the VBP, a hospital’s performance in clinical quality process of care and patient experience (HCAHPS) measures will determine 1% of the traditional base payment for FFY 2013, and payments for FFY 2014 will incorporate performance on outcomes measures (CMS, 2012a).

The hospital's value-based incentive payment will be based on the hospital's performance or improvement during the performance period. The VBP program was designed to be revenue neutral for the federal government and is funded through a 1% reduction overall on Medicare payments from participating hospitals’ base operating diagnosis-related group (DRG) payments for FFY 2013, increasing to 2% by FFY 2017 under the Inpatient Prospective Payment System (CMS, 2012a). In 2015, hospitals that continue to show poor performance ratings will be excluded from the bonus pool and will face additional cuts in reimbursement. Table 33 provides an overview of the VBP program schedule changes in payments and identifies the transformation from the passive payer of claims based on volume of care to an active purchaser of care based on the quality of services that beneficiaries receive (CMS, 2012a). Note the shift from a focus on process of care to outcomes and efficiency from 2013 to 2017. CMS will assess each hospital’s total performance by comparing its achievement and improvement scores for each applicable VBP measure and award the higher score for each measure. CMS will then aggregate each hospital’s scores into the appropriate domain. The FFY 2013 Hospital VBP Program consists of only two domains: (1) clinical process of care and (2) patient experience of care; many of these measures were part of this
study (CMS, 2012a). The clinical process of care score is the sum of measure scores in that
domain, and the patient experience of care score is the sum of a hospital’s HCAHPS base score
and that hospital’s HCAHPS consistency score (CMS, 2012a). Table 34 identifies how hospitals’
domain scores will be weighted and the corresponding percentage of CMS program contribution.
For example for FFY 2013, the weight is 70% for clinical process of care and 30% for patient
experience of care, totaling 100% of the CMS contribution. Several of the clinical process of care
measures and all 10 HCAHPS included in this study are part of the 2013 value-based purchasing.
Physician payments will become more closely linked to value with the launch of a physician value-
based payment system and the implementation of a “value-modifier” that rewards physicians who
deliver better care.

Table 34

<table>
<thead>
<tr>
<th>Value-Based Purchasing Program Domain Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Program Contribution</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>1 Process of Care</td>
</tr>
<tr>
<td>2 Patient Experience</td>
</tr>
<tr>
<td>(HCAHPS Survey)</td>
</tr>
<tr>
<td>3 Outcome</td>
</tr>
<tr>
<td>4 Efficiency:</td>
</tr>
<tr>
<td>Medicare Spending per Beneficiary</td>
</tr>
</tbody>
</table>

*Six Domains: (1) Clinical Care, (2) Person- and Caregiver-Centered Experience and Outcomes, (3) Safety, (4)
Efficiency and Cost Reduction, (5) Care Coordination, and (6) Community/Population Health

Currently the VBP measures are defined for 2013 and 2014, while those for 2015 have not
been released. CMS has not finalized its proposal to reclassify the VBP measures into the

The value-based purchasing strategies were designed to reward hospitals financially for providing higher quality care, to bring about transformational changes in total care delivery, and to increase the level of shared accountability among providers (Miltenberger, Downs, & Greene, 2012). The overall goal was to improve care outcomes and reduce Medicare spending per beneficiary. The VBP Program was only one of the challenges leaders of health care systems across must address in the future.

Net Promoter Score. The final measure in the HCAHPS patient experience survey, “Patients would definitely recommend the hospital,” is a likelihood-to-recommend question that has proven to be the "Ultimate Question" and the basis for calculating a “net promoter score” (Reichheld & Rob, 2011). Of patients treated at a HCPE hospital in the study, 75.75% would recommend the hospital, versus 68.37% for the non-HCPE hospitals ($p < .000$). Since 2001, Reichheld has researched this likelihood-to-recommend question to identify those who would not recommend (“detractors”) and those who would strengthen the organization image and reputation through positive word of mouth (“promoters”), thus generating profitability and sustainable growth (Reichheld & Rob, 2011, pp. 6-7). Initially the outcome of the research yielded the concept of a “net promoter score” and later developed into a “management system,” which provided the organization with an understanding of “how well the organization treats the people whose lives it affects [and] how well it generates relationships worthy of loyalty” (Reichheld & Rob, 2011, p. 1).

This theory of customer focus and loyalty to the organization dates back to ancient times, as described in the literature review. More recent theories of customer loyalty date from the
1920s, and customer loyalty has been researched in other fields such as quality and operations management. For example, Henry Ford said, “It is not the employer who pays the wages. Employers only handle the money. It is the customer who pays the wages” (2006, p. 14). Likewise, W. Edwards Deming stated that “loyal customers (and loyal employees and investors) are also your most important business asset and loyal customers keep coming back; they refer their friends and they measurably grow in value over time” (1994, p. 8). In health care, research continues to confirm that patients choose hospitals on the basis of past experience, and “80% of consumers now go online for health information, and 58% of those say their search affected their health care decision-making” (Forrester & Maute, 2001, p. 259). There has been an effort over the past decade to learn from the hospitality industry what factors improve the patient and family hospital experience to foster healing and drive customer decisions and perceptions of service quality (Wu, Robson, & Hollis, 2013). Health care research has identified “patient-centered communication, reassurance, high-quality emotional and psychosocial care” as important attributes for medical practices' developing sensitivity to patients' needs, which was “a leading predictor of overall patient satisfaction and holds powerful influence over likelihood to recommend the practice” (Clark, 2003, p. 119). The results of this study support the concept that patient experience is important to HCPE hospitals. Ultimately, customer loyalty is an important aspect of the profitability and sustainability of any organization. The hospitals using the HCPE have transformed their organizations from a narrow focus on clinical outcomes to a more holistic approach to quality in all respects, including the customer experience

**Significance of the Study to Health Care Organizations**

This research adds to the body of knowledge and understanding of the HCPE in health care. The HCPE offer a systematic valid, reliable model that has undergone decades of
development, implementation, and testing by thousands of organizations in various industries. The
HCPE model is a non-prescriptive, adaptable, and non-limiting blueprint, framework, or model for
high performance, presented as a list of open-ended questions. Since its creation in 1987, the
HCPE has continued to evolve based on input from experts, academics, and organizations applying
the criteria. Each year, health care organizations across the U.S. apply the HCPE in an effort to
learn and improve. The HCPE form a non-prescriptive model and are not based on any one
management theory but instead allow for the integration of any management theories, concepts,
and best practices that an organization requires to ensure superior levels of performance and
sustainability. These theories cover numerous fields of study such as leadership, strategy
development and execution, marketing, finance, accounting, metrology, decision science,
knowledge management, change management, human capital management, and process
management.

This study has an impact on organizations pursuing performance excellence, but especially
for health care organizations, by providing a clear and objective assessment of the HCPE as an
overall business model for leaders to improve the health care systems’ focus on the patient. As
discussed earlier, this focus on the patient has an effect on the bottom line. This study supports the
efforts of professional organizations, such as the IHI, that have worked to support and encourage
leaders of innovative health systems by identifying important leverage points for leaders striving
for dramatic system-level performance improvement for the leadership of organizational
transformation (Latham & Vinyard, 2011). The IHI identified the HCPE as a comprehensive
framework for improving health care performance (Reinertsen et al., 2008). The HCPE provide a
systems approach that has proven successful in assuring the best clinical outcomes, and leaders
have learned that applying the HCPE helps them focus, prioritize, integrate, and align their improvement initiatives to accomplish the results that matter most (Bodinson, 2005).

The HCPE are more than a proven framework for improving health care performance. Some leaders apply the HCPE as a transformation strategy. The IHI has interviewed CEOs regarding their first-hand experience in transforming health care in their organization. In a 2011 interview with Dennis Keefe, CEO of Cambridge Health Alliance (CHA) in Cambridge, Massachusetts, Keefe explained how his organization is trying to get away from the concept of pursuing perfection as a “project” to getting people to understand the transformation of the organization using system-wide indicators and the HCPE as an overall framework for transformation (IHI, 2011). In 2012, IHI profiled three recipients of the Baldrige Award—Baptist Hospital, SSM Health Care and Saint Luke’s Hospital—in a story that described “how three health care organizations won the top U.S. quality award” and “if you’re obsessed with organizational quality, the Malcolm Baldrige National Quality Award is as good as it gets” (IHI, 2012).

The HCPE has provided a proven methodology for adapting and aligning health care organizations to meet the new health care value-based paradigm created by the ACA. This new paradigm requires health care organizations to develop strategies for achieving high value for patients. The overarching goal of health care delivery is defined as the health outcomes achieved per dollar spent (Porter & Teisberg, 2006). An organizational strategy aligned with patient-specific goals is the requirement for any health care system. When value improves, patients, payers, providers, and suppliers all benefit while the economic sustainability of the health care system increases (Porter, 2010). Value is defined around the patient, and in a well-functioning health care system, the creation of value depends on patient experience, input, process of care, and results. Value in health care is measured by the outcomes achieved, not the volume of services
delivered, and shifting focus from volume to value is a central challenge because value for patients should determine the rewards for all other actors in the system (Porter, 2010).

Each health care organization develops varying perspectives along with the structural and contextual dimensions necessary to achieve high performance. The HCPE requires leadership to see and analyze the health care organization accurately and deeply to create the optimum organization design and structure (Daft, 2007). The HCPE focus on creating value and sustainability and has a non-prescriptive design to encourage creative thinking. The HCPE are adaptable to any theory, standard, or best practice and encourage organizations to be open to continuous change and improvement. Creating value is paramount to the sustainability of health care. The concept of customer or patient loyalty is a critical component to sustainability. The greater the loyalty an organization engenders among its customers, employees, suppliers, and shareholders, the greater the profits it reaps (Reichheld, 2001). As hospitals look to the future, it will require a greater level of teamwork to create relationships with various providers that deliver high quality care.

The HCPE model is an open design that “encourages creativity and innovation” while enabling the HCPE to integrate key health care themes, such as the patient and stakeholder as key customers, complex leadership structures, and the multiple roles of health care providers, including physicians, staff members, suppliers, and customers (NIST, 2011-2012, p. 55). The HCPE can have a significant impact on organizations pursuing performance excellence, particularly health care organizations.

**Significance of the Study to Leadership**

The ACA is redesigning health care, and leadership must be engaged in the transformation of their health care organizations. The CMS is leading the effort in the redesign of health care
systems with a new philosophical approach to managing health care organization, ranging from the implementation of electronic health records to new designs of clinical quality measures. The CMS will establish new programs and expectations in an attempt to facilitate the transformation. In 2014, a new standard for clinical quality measures (CQMs) will be required for hospitals to measure and track the quality of health care services. These measures use a wide variety of data that are associated with a provider’s ability to deliver high-quality care or relate to long-term goals for health care quality. These measures include many aspects of patient care including “health outcomes, clinical processes, patient safety, efficient use of healthcare resources, care coordination, patient engagements, population and public health, and clinical guidelines” (CMS, 2013). The question is, will health care organizations have the ability to transform and meet the challenges over the next 10 years? The answer is up to their leadership.

According to Meyer and Rowan (1977), leadership needs structured models to align organizational design with the resulting efficiencies of policies and processes in order to better create long-term effectiveness in an institutionalized high-performance culture. The result of this study helps provide leadership with a model to execute change management, leading to performance improvements aimed at excellence. Bossidy and Charan (2002) stated, “The leader must be in charge of getting things done by running the three core processes – picking other leaders, setting the strategic direction, and conducting operations” (p. 24). According to Bass (1990), leaders must be able to formulate and evaluate appropriate organizational responses and arrange for their implementation in operations and policies. Because at least 70% of all initiatives fail despite leaders’ best efforts (Beer & Nohria, 2000), this study provides information that leaders can incorporate when planning the implementation of new policy and resulting strategies within a workplace culture of performance.
Furthermore, this study adds value to the validation of the policy decision to use the HCPE as a business model in health care organizations, such that organizations can attempt to develop a high-performance culture that ensures continual learning, transformation, and performance improvement. Hunt (1993, p. 112) believed that the Baldrige Award has become accepted as the “gold standard” of quality practices, and the use of the HCPE model is becoming pivotal to organizational performance. Leadership is responsible for creating a high-performance culture that ensures continual learning, transformation, and performance improvement. The HCPE model offers leaders a systematic holistic approach for hospital governance that presents questions as to how business systems interrelate, adapt, learn, and improve. Senge (2006a) noted that collective thinking and understanding of the systemic connectivity within organizations must transcend organizational, temporal, and spatial boundaries to redefine the organization and its function at all levels of the organization, community, and society.

Specifically for the health care industry, this study provides support for hospital governance boards and trustees in their efforts to guide the complex hospital professional bureaucracies and professional staff to improve overall organizational performance, without the need to become technical experts or overly dependent upon the professional staff (Culbertson & Hughes, 2008). According to the Commonwealth Center for Governance Studies (Prybil et al., 2012), hospitals and health care systems must have the discipline and commitment to organize their governance structures and practices to provide “forward-thinking leadership and evidence-based outcomes” that will assist in advancing their governance practices. It was the governance board of the Mayo Clinic in 2004 that recommended the adoption of the HCPE as a business model, and by 2007 a total of seven of the 12 Mayo Health System organizations were using the HCPE (Fischer, 2007). During that period, the Mayo Clinic Board of Trustees was composed of
23 total members, including 3 doctors and 7 chief executive officers (CEO) of major corporations, such as J. W. Marriott, Jr. of the Marriott Corporation, owner of the Ritz Carlton Hotels and Resorts and 1992 and 1999 recipient of the Baldrige Award, and Frederick W. Smith, founder and CEO of Federal Express and 1990 recipient of the Baldrige Award (Batalden et al., 2010, p. 171; Notable Names Database, 2012). Although this was not a leadership study, leadership is the key to both creating the high-performance culture necessary to the adoption of the HCPE model and educating future leaders in the health care industry (Schein, 2004).

Certainly, leaders have created high-performing organizations without the use or knowledge of the HCPE, but when analyzed these organizations have embodied the majority of the criteria depicted in the integrated HCPE framework. After all, much of the knowledge taught in business education comes in the context of individual silo courses, and what is rarely taught is how to integrate HCPE or how to manage the “white spaces on the organizational chart,” which requires a “systems or horizontal understanding of the organization” (Rummler & Brache, 1995, pp. 5-9). Leaders using the HCPE find mindful reflection is necessary to provide a level of deep knowledge and vision often missing in strategy development and design (Boyatzis & McKee, 2005).

**Limitations**

This study used CMS patient experience and process of care measures to compare hospitals. These measures are useful but only present a limited understanding of the total hospital performance. W. Edwards Deming credits Lloyd S. Nelson, the Director of Statistical Methods for the Nashua Corporation, with the concept that “the most important figures needed for management of any organization are unknown and unknowable” (Deming, 1986, p. 121). The implication of this concept is that not everything can be measured but management must take all aspects into
account. The main areas of limitation are in (a) the statistical analysis because of the small sample size, (b) the lack of randomization in sampling, (c) the inability to generalize the results to small hospitals, and (d) the use of CMS measures with lack of mean difference between the measures.

Of the number of limitations in this study, the most important is the sample size. There were a fixed number of Baldrige Award recipients, and selection was based on geography. A purposeful geographic sampling strategy was used to “select information-rich cases” to focus on the specific hospitals in a geographic region rather than a general random sample (Taylor-Powell, 1998, p. 6). This was required to design a competitive analysis of CMS data to provide leaders with an understanding of the competitive viability of using the HCPE as a business model. The ability to generalize the study to small hospitals may be a limitation. Hospitals under 100 beds were excluded from the study to reduce the amount of missing data. The exclusion of these cases reduced the number of subject hospitals from 315 to 187, with 34 HCPE and 153 non-HCPE hospitals.

Finally, the CMS patient experience and process of care measures used here are useful but only present a limited understanding of the total hospital performance. Although numerous organizations have made a concerted effort to understand hospital and clinical processes, the challenge is to develop measurements of process that are focused on the improvement of patient outcomes and hospital performance. Health care organizations have been measuring clinical performance for decades and the accreditation process has helped to drive improvements. Now with the development and adoption of CMS measures and performance targets, and the future evolution of the ACA, the CMS has recognized these limitations and has focused on redesigning its core measures beginning in 2014 to clinical quality measures (CQMs) to measure and track the quality of healthcare services within the health care system. The CQMs will include 16 core
clinical-focused objectives that are associated with a provider’s ability to deliver high-quality care or that relate to long-term goals for health care quality. The CQMs measure many aspects of patient care, including “health outcomes, clinical processes, patient safety, efficient use of healthcare resources, care coordination, patient engagements, population and public health, and clinical guidelines” (AHRQ, 2013c). Finally, the lack of a sizable mean difference between the measures and the fact that the performance results had extreme values in the 98-100% range posed limitations.

**Implications for the Literature**

This study begins to fill the gap in the wider context of the published literature by addressing the use of the HCPE in health care quality improvement literature. First, there is a general lack of peer-reviewed scholarly research articles (fewer than 300) on HCPE over the past 20 years. Second, specific to health care, there are fewer than 50 actual peer-reviewed articles and only about 25 published since 2000. The journal articles that actually study the HCPE do not compare actual performance measures using CMS data in multiple constructs. Third, there is a general lack of health care studies with the compelling evidence to support using the HCPE as a business model.

The review revealed that researchers consistently and confidently use CMS Hospital Compare data to study health care outcomes, processes, and satisfaction of patients. Efforts to improve quality and cut costs have led the federal government to initiate public reporting with Hospital Compare data. Although studies have been conducted using CMS data and Hospital Compare, none segmented the study groups based on achieving the performance excellence status of the Baldrige Award. By statistically comparing Baldrige-winning hospitals with non-Baldrige hospitals using CMS data, this study begins to fill the gap in the published literature.
Chapter 7: Conclusions and Recommendations

The quality of health care has tremendous social and economic consequences for the U.S., including lost wages, reduced productivity, higher legal expenses, and lower confidence in the health care system (Shalala, 2007). This study explored the performance of recipients of the Malcolm Baldrige National Quality Award for Performance Excellence (Baldrige Award) and competing hospitals in their geographic markets using CMS performance measures. The Baldrige Award is based on the Baldrige Criteria for Performance Excellence (CPE) model for improving organizational performance, with specific criteria for health care, business, education, and non-profit organizations (NIST, 2011-2012). The use of the Baldrige Health Care Criteria for Performance Excellence (HCPE) was the focus of this study. Health care systems using the HCPE have achieved and sustained the highest national levels of patient safety and patient loyalty, health care outcomes, physician, nurse, and staff satisfaction and engagement, revenue and market share, and community services (NIST, 2010a).

This study included an analysis comparing 34 hospitals that use the Baldrige Health Care Criteria for Performance Excellence (HCPE) as an organizational business model (independent variables) to 153 hospitals in their geographic markets that do not use the HCPE. There were 4 groups of 42 dependent variables: (1) HCAHPS hospital experience patient survey measures performance; (2) outpatient imaging efficiency; (3) process of care measures performance for heart attack, heart failure, pneumonia, and surgical care improvement project processes; and (4) outcome of care measures performance. The 42 CMS measures in these 4 groups were classified into 2 major categories focused on (1) patient experience and (2) clinical processes and outcomes. The 10 patient experience measures were the HCAHPS patient survey performance measures and the
32 clinical processes, and the outcomes measures were comprised of the three other groups of variables.

The first of the two categories studied was the patient experience survey performance measures. The results of the HCAHPS hospital experience patient survey measures were the most significant statistical findings in this study. The second category was the clinical processes and outcomes. There was only one statistically significant measure in the 32 clinical processes and outcomes category, which was the measure “Surgery patients given right kind of antibiotic.” The overall performance of all 42 CMS measures analyzed in the study was noteworthy. Although the group mean differences were not statistically significant, the study results showed that HCPE hospitals had performance outcomes with mean values representing higher performance than the non-HCPE hospitals in 38 of the 42 (90%) of the study measures. All 10 measures in the patient experience category and 28 of the 32 (88%) of the clinical processes and outcomes category had mean values representing higher performance.

A research model (Figure 15) was developed to describe the results of the study, which was based on an adaptation of Donabedian’s Structure, Process, and Outcomes Model (Donabedian, 2003). The model identified differences in approaches that affect the processes of care, especially those processes that influence the patient experience. As a result, there is a statistical difference in patient experience and quality outcomes. These differences affect loyalty, sustainability, and the bottom line.

The Affordable Care Act (ACA) of 2010 has changed health care. One major practical implication of this study is revealing how hospitals using the HCPE have performed significantly better at managing the patient experience than their competitors. This is important in a practical sense because the difference has an effect on the financial performance of acute care hospitals.
The ACA created the CMS value-based purchase program to shift Medicare toward integration and alignment between payment and quality. The value-based purchasing strategies were designed to reward hospitals financially for providing higher quality care, transform total care delivery, and increase the level of shared accountability among providers (Miltenberger et al., 2012).

Another significant result was the identification of Reichheld’s (2001) measure of the loyalty a company engenders among its customers, employees, suppliers, and shareholders, based on the final question of the HCAHPS hospital experience patient survey about the “patient definitely recommending the hospital.” A mean value of 75.75% of patients treated at HCPE hospitals would recommend the hospital versus 68.37% of the non-HCPE hospitals $p < .000$. This question is a likelihood-to-recommend question that has proven to be the “Ultimate Question” relating to patient loyalty, which is important for the profitability and sustainability of the hospital (Reichheld & Rob, 2011). Health care research has identified “patient-centered communication, reassurance, [and] high-quality emotional and psychosocial care” as important attributes for medical practices’ developing sensitivity to patients’ needs, which is “a leading predictor of overall patient satisfaction and holds powerful influence over likelihood to recommend the practice” (Clark, 2003). The results of this study support the concept that patient experience is important to HCPE hospitals. Ultimately, customer loyalty is important for the profitability and sustainability of any organization. The hospitals using the HCPE have transformed their organizations from a narrow focus on clinical outcomes to a more holistic approach to quality in all respects, including the customer experience.

This research adds to the body of knowledge and understanding for health care leaders. What the HCPE offer is a systematic, valid, and reliable model that has undergone decades of development, implementation, and testing by thousands of organizations in various industries.
This study identifies that organizations pursuing performance excellence, especially in health care, have an overall business model for leaders to use in their efforts to improve the health care system. The HCPE have provided a proven methodology for adapting and aligning health care organizations to meet the new health care value-based paradigm created by the ACA. This new paradigm requires health care organizations develop strategies for achieving high value for patients.

Finally, the ACA is redesigning health care, and leadership must be engaged in the transformation of their health care organizations to ensure success. The CMS is leading the effort in the redesign of how health care systems operate. Health care organizations will experience a complete transformation over the next 10 years. The HCPE provides leadership with a model for aligning organizational design, strategy, systems, and human capital to create long-term effectiveness in an institutionalized high-performance culture.

**Future Research.** This study revealed the opportunity for future research. An approach for planning future research could be structured around the Institute of Medicine's Committee on Quality of Health Care in America report, *Crossing the Quality Chasm: A New Health System for the 21st Century*. The committee identified and analyzed deficiencies in the quality of the medical care delivery system and presented a framework for quality of care, described as “six aims” which include (1) safety, (2) effectiveness, (3) patient-centeredness, (4) timeliness, (5) efficiency, and (6) equitability (Institute of Medicine, Committee on Quality of Health Care in America, 2001). Since 2000, the CMS and the Agency for Healthcare Research and Quality (AHRQ) have worked with interested parties to develop performance measures to address each of the six aims. This
framework has been the foundation for the development of health care performance measures such as the CMS patient experience, process of care, and outcomes used in this study.

The AHRQ has developed a portfolio of measures that address the six aims and other issues such as access, care coordination, and health systems’ infrastructure capabilities. Using this framework will provide a strategy for future research. For example, the AHRQ Hospital Survey on Patient Safety Culture would provide performance measures for comparison. This hospital survey addresses areas such as (a) hospital work area/unit performance, (b) supervisor/manager expectations and actions promoting patient safety, (c) communications effectiveness, (d) frequency of adverse events or mistakes, and (e) general hospital work climate (AHRQ, 2013b). Another source of data is the AHRQ Inpatient Quality Indicators (IQIs). The IQIs include 28 hospital-level indicators that can be used with inpatient discharge data to provide a perspective on quality (AHRQ, 2013a).

The Healthcare Cost and Utilization Project (HCUP) sponsored by AHRQ is another source of data for future comparison. The HCUP data provides a broad range of data on health policy issues, including cost and quality of health services, medical practice patterns, access to health care programs, and outcomes of treatments at the national, state, and local market levels. For example, one of the HCUP databases includes more than 100 clinical and non-clinical data elements for each hospital stay, and research studies could determine costs of hospital services, medical practice variation, hospitals’ financial status, access to care, and utilization of health services by special populations (AHRQ, 2013d).

Future research in employer and employee relationships is important to improving health care. Consideration should be given to studies of the hospital workforce and their impact on the process, outcomes, and parent experience. Employers find that dedicated employees stay with
their organization, resulting in a reduction of turnover costs, and dedicated employees fare better in comparison for clinical outcomes, increasing patient safety, improving the patient experience, and reducing potential risk and loss (Press Ganey, 2012). Finally, there is a need for studies of hospital organizational cultures and design relative to organizational performance.
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APPENDIX

REPRODUCED FROM THE CMS HOSPITAL COMPARE MEASURE WEBSITE
Survey of Patients' Hospital Experiences (HCAHPS):

The CAHPS® Hospital Survey (Consumer Assessment of Healthcare Providers and Systems), also known as Hospital CAHPS® or HCAHPS, is a standardized survey instrument and data collection methodology for measuring patients' perspectives of hospital care. While many hospitals collect information on patient satisfaction, there is no national standard for collecting or public reporting information that would enable valid comparisons to be made across all hospitals. In order to make apples-to-apples comparisons to support consumer choice, it is necessary to introduce a standard measurement approach. HCAHPS is a core set of questions that can be combined with customized, hospital-specific items to produce information that complements the data hospitals currently collect to support internal customer service and quality-related activities.

Three broad goals have shaped the HCAHPS survey. First, the survey is designed to produce comparable data on patients' perspectives of care that allows objective and meaningful comparisons among hospitals on topics that are important to consumers. Second, public reporting of the survey results is designed to create incentives for hospitals to improve quality of care. Third, public reporting will serve to enhance public accountability in health care by increasing transparency. With these goals in mind, the HCAHPS project has taken substantial steps to assure that the survey is credible, useful, and practical. This methodology and the information it generates will be made available to the public.
HCAHPS Survey Implementation

Voluntary collection of HCAHPS data for public reporting began in October 2006. March 2008 is the first public reporting of HCAHPS results, which encompasses eligible discharges from October 2006 through June 2007.

HCAHPS Survey Structure

The HCAHPS survey is composed of 27 items: 18 substantive items that encompass critical aspects of the hospital experience (communication with doctors, communication with nurses, responsiveness of hospital staff, cleanliness and quietness of hospital environment, pain management, communication about medicines, discharge information, overall rating of hospital, and recommendation of hospital); four items to skip patients to appropriate questions; three items to adjust for the mix of patients across hospitals; and two items to support congressionally-mandated reports. On average, it takes respondents about seven minutes to complete the HCAHPS survey items (CMS2011c).

Process of Care Measures:

The clinical measures reported here focus on heart attack, heart failure, pneumonia, asthma (children only) and the surgical care improvement project. Each rate calculation is based on the hospital's relevant discharges.

Process of Care Measures Implementation

Beginning with discharges in 2004, eligible acute care hospitals could elect to report quality data in order to receive the incentive payment established by Section 501(b) of the
Medicare Prescription Drug, Improvement and Modernization Act of 2003 (MMA). To obtain increased payment, the provision required eligible hospitals to report on an initial set of 10 quality performance measures (the "starter set") and to agree to have their data publicly displayed. Under Section 5001(a) of the Deficit Reduction Act of 2005, the set of measures included in the incentive was expanded.

Process of Care Measures Structure

Heart Attack and Chest Pain

Every year, about one million people suffer a heart attack (acute myocardial infarction or AMI). AMI is among the leading causes of hospital admission for Medicare beneficiaries, age 65 and older.

Scientific evidence indicates that the following process of care measures represent the best practices for the treatment of AMI. Higher scores are better.

Asprin at Arrival - Acute myocardial infarction (AMI) patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival. (Is both an inpatient and outpatient measure.)

Aspirin at Discharge - AMI patients without aspirin contraindications who were prescribed aspirin at hospital discharge.
Angiotensin Converting Enzyme (ACE) Inhibitor or Angiotensin Receptor Blocker (ARB) for Left Ventricular Systolic Dysfunction - AMI patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACE inhibitor) contraindications or angiotensin receptor blocker (ARB) contraindications who are prescribed an ACE inhibitor or an ARB at hospital discharge.

Beta Blocker at Discharge - AMI patients without beta-blocker contraindications who were prescribed a beta-blocker at hospital discharge.

Fibrinolytic Medication Within 30 Minutes Of Arrival - AMI patients receiving fibrinolytic therapy during the hospital stay and having a time from hospital arrival to fibrinolysis of 30 minutes or less (Is both an inpatient and outpatient measure.)

Percutaneous Coronary Intervention (PCI) Received Within 90 Minutes of Hospital Arrival - AMI patients receiving Percutaneous Coronary Intervention (PCI) during the hospital stay with a time from hospital arrival to PCI of 90 minutes or less.

Smoking Cessation Advice/Counseling - AMI patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during a hospital stay.

Median Time to Fibrinolysis (This is only an outpatient measure.) - Median time from arrival to fibrinolysis for patients that received fibrinolysis.

Median Time to Transfer to Another Facility for Acute Coronary Intervention (This is only an outpatient measure.) - Median number of minutes before outpatients with heart attack
who needed specialized care were transferred to another hospital (a lower number of minutes is better).

Median Time to ECG (This is only an outpatient measure.) - Median number of minutes before outpatients with heart attack (or with chest pain that suggest a possible heart attack) got an ECG (a lower number of minutes is better).

Heart Failure

Heart failure is the most common hospital admission diagnosis in patients age 65 or older, accounting for more than 700,000 hospitalizations among Medicare beneficiaries every year. It is associated with severe functional impairments and high rates of mortality and morbidity.

Substantial scientific evidence indicates that the following Process of Care measures represent the best practices for the treatment of heart failure. Higher scores are better.

Evaluation of left ventricular systolic (LVS) function - Heart failure patients with documentation in the hospital record that an evaluation of the left ventricular systolic (LVS) function was performed before arrival, during hospitalization, or is planned for after discharge.

ACE inhibitor or ARB for left ventricular systolic dysfunction - Heart failure patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACE inhibitor) contraindications or angiotensin receptor blocker (ARB) contraindications who are prescribed an ACE inhibitor or an ARB at hospital discharge.
Discharge instructions - Heart failure patients discharged home with written instructions or educational material given to patient or care giver at discharge or during the hospital stay addressing all of the following: activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen.

Smoking cessation advice/counseling - Heart failure patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during a hospital stay.

Pneumonia

Community acquired pneumonia is a major contributor to illness and mortality in the United States, causing 4 million episodes of illness and nearly one million hospital admissions each year. Scientific evidence indicates that the following process of care measures represent the best practices for the treatment of community-acquired pneumonia. Higher scores are better.

Initial Antibiotic Timing - Pneumonia inpatients that receive within 6 hours after arrival at the hospital. Evidence shows better outcomes for administration times less than four hours.

Pneumococcal Vaccination Status - Pneumonia inpatients age 65 and older who were screened for pneumococcal vaccine status and were administered the vaccine prior to discharge, if indicated.

Influenza Vaccination Status - Pneumonia patients age 50 years and older, hospitalized during October, November, December, January, or February who were screened for influenza vaccine status and were vaccinated prior to discharge, if indicated.
Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic
Received in Hospital - Pneumonia patients whose initial emergency room blood culture specimen was collected prior to first hospital dose of antibiotics.

Appropriate Initial Antibiotic Selection - Immunocompetent patients with pneumonia who receive an initial antibiotic regimen that is consistent with current guidelines.

Smoking cessation advice/counseling - Pneumonia patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during a hospital stay (CMS2011d).

Outcome of Care Measures:

The 30-day risk-standardized mortality and 30-day risk-standardized readmission measures for heart attack, heart failure, and pneumonia are produced from Medicare claims and enrollment data using sophisticated statistical modeling techniques that adjust for patient-level risk factors and account for the clustering of patients within hospitals.

The three mortality models estimate hospital-specific, risk-standardized, all-cause 30-day mortality rates for patients hospitalized with a principal diagnosis of heart attack, heart failure, and pneumonia. All-cause mortality is defined as death from any cause within 30 days after the index admission- Opens in a new window date, regardless of whether the patient dies while still in the hospital or after discharge. For each condition, the risk-standardized (“adjusted” or “risk-adjusted”) hospital mortality rate can be used to compare performance across hospitals (CMS2011a).
Outpatient Imaging Efficiency Measures:

Outpatient imaging is a common and frequently performed component of healthcare delivery, with important applications in diagnosing disease, establishing prognosis, and monitoring therapy. Although the quality and safety of outpatient imaging services are critically important, few national standards exist to address the variations in the delivery of services, define the quality of outpatient imaging care, or allow its measurement. In addition, because the cost of outpatient imaging studies is approximately $14 billion annually for Medicare beneficiaries, it is critical to ensure that there is value for this investment. Defining measurable value indicators such as appropriate utilization, excellence in technical performance by certified or credentialed personnel, timeliness in study reporting, and clinical efficacy is essential to this process.

The purpose of these measures is to promote high-quality efficient care. Specifically, each of the following measures was created to reduce unnecessary exposure to contrast materials and/or radiation, ensure adherence to evidence-based medicine and practice guidelines, and promote efficiency defined as “absence of waste.”

The Centers for Medicare & Medicaid Services (CMS) has adopted 11 measures that are currently used in the Hospital Outpatient Quality Data Reporting Program (HOP QDRP). Four of the measures (OP-8 through OP-11) capture the quality of outpatient care in the area of imaging. CMS notes that the purpose of these measures is to promote high-quality efficient care. Specifically, each of the following measures was created to reduce unnecessary exposure to contrast materials and/or radiation, ensure adherence to evidence-
based medicine and practice guidelines, and promote efficiency defined as “absence of waste.”

OP-8: MRI Lumbar Spine for Low Back Pain (NQF endorsed, October 2008)

This measure calculates the percentage of patients who had an MRI of the Lumbar Spine with a diagnosis of low back pain without Medicare claims-based evidence of antecedent conservative therapy.

OP-9: Mammography Follow-up Rates (Not NQF endorsed at this time)

This measure calculates the percentage of patients with mammography screening studies done in the outpatient hospital setting that are followed within 45 days by a diagnostic mammography or ultrasound of the breast study in an outpatient or office setting.

OP-10: Abdomen CT – Use of Contrast Material (Not NQF endorsed at this time)

This measure calculates the ratio of CT abdomen studies that are performed both with and without contrast out of all CT abdomen studies performed (those with contrast, those without contrast, and those with both).

OP-11: Thorax CT – Use of Contrast Material (NQF endorsed, October 2008)

This measure calculates the ratio of CT thorax studies that are performed with and without contrast out of all CT thorax studies performed (those with contrast, those without contrast, and those with both).
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OP-11: Thorax CT –Use of Contrast Material (NQF Endorsed, October 2008) This measure calculates the ratio of CT thorax studies that are performed with and without contrast out of all CT thorax studies performed (those with contrast, those without contrast, and those with both) (CMS2011b).